# GADRI MEMBERS
# PROSPECTUS 2017/2018

GADRI
Global Alliance of
Disaster Research Institutes

Edition 1—2017

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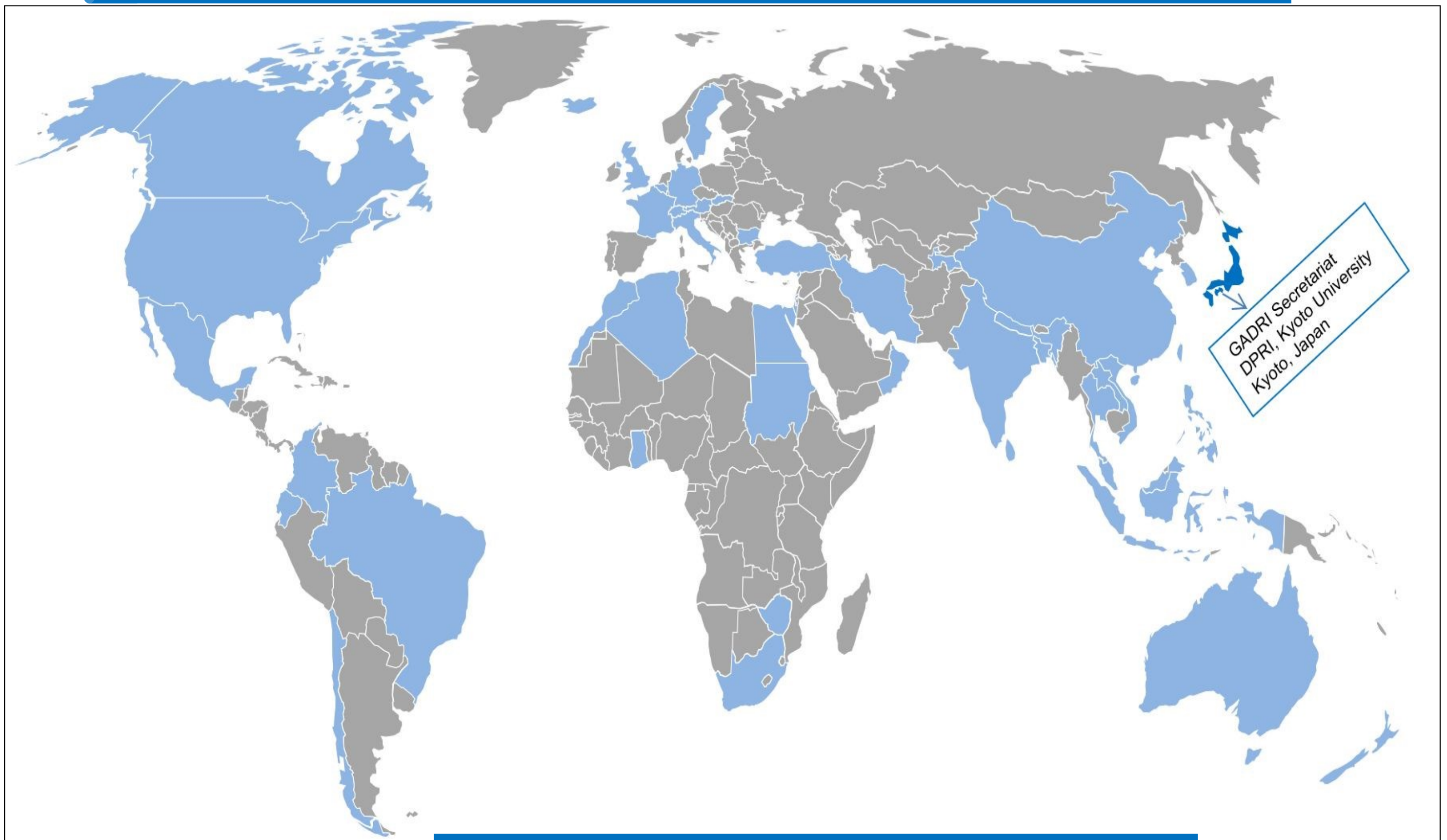
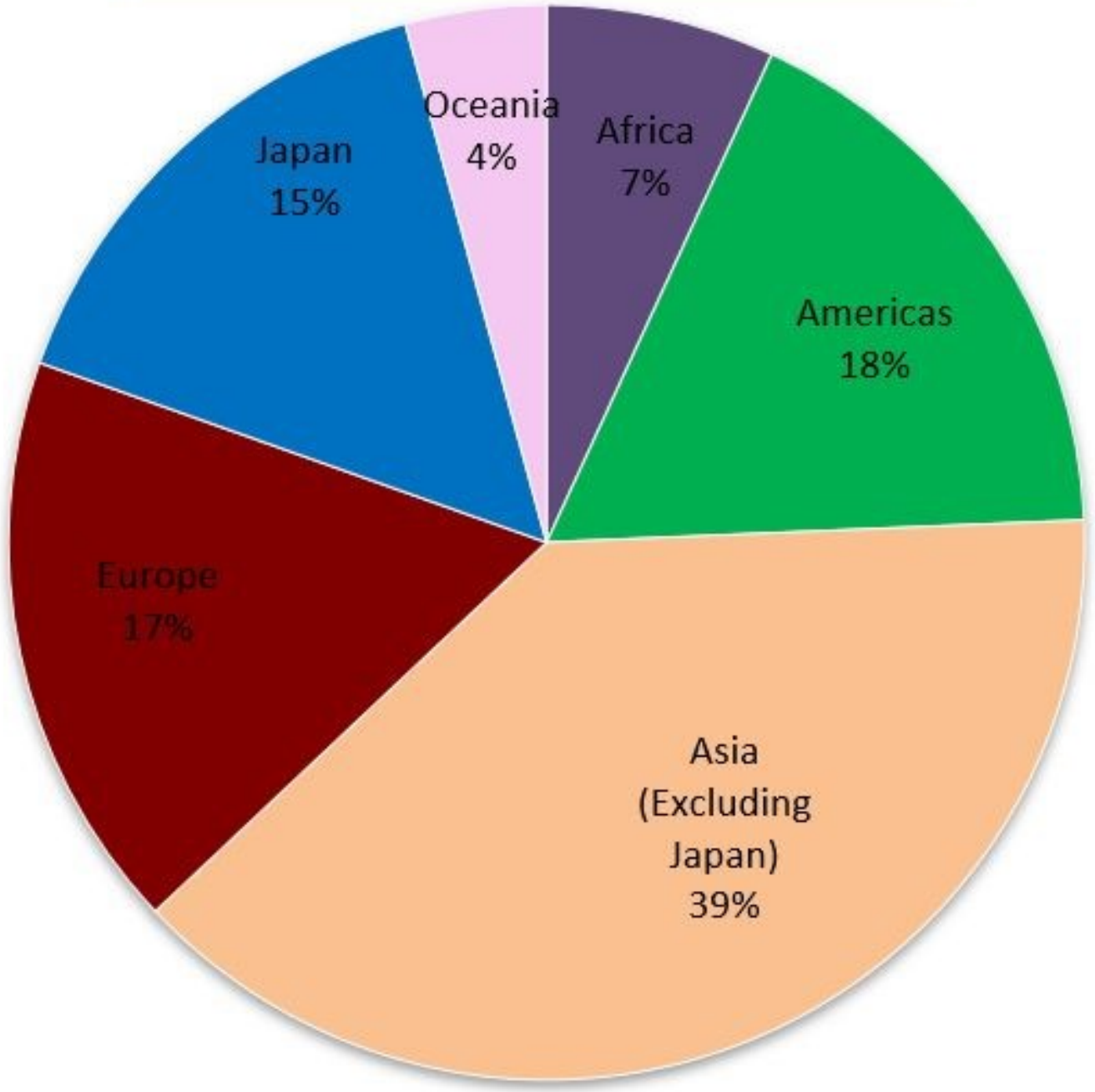



Geographical Distribution of GADRI Members as of May 2019

# GADRI Member Institutes
# As of 31 May 2019




| Area | Members | States |
|---|---|---|
| Africa | 13 | 7 |
| Americas | 33 | 7 |
| Asia (Excluding Japan) | 73 | 19 |
| Europe | 33 | 11 |
| Japan | 29 | 1 |
| Oceania | 8 | 2 |
| **Total Institutes** | **189** | **47** |
| | 47 states | |

# Africa

Figure 1: Tsetsefly research building structures that are threatened by gully erosion in Mbire Zimbabwe.




# Water Resources Research Institute (WRRI), National Water Research Center（NWRC) Ministry of Water Resources and Irrigation, Egypt

Water Resources Research Institute, NWRC, El Kanater El Khairia. Delta Barrage 13621, Qalyoubia, Cairo. Egypt Tel: **+202 4218 8787**

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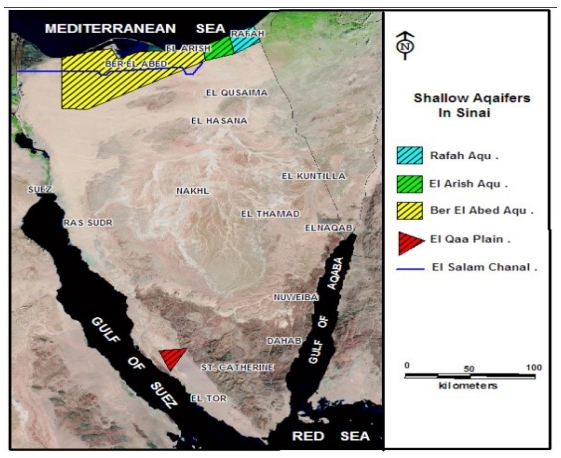
Website: wrri@wrri.org.eg


The Water Resources Research Institute (WRRI) is one of twelve research institutes comprising the National Water Research Center (NWRC) of the Ministry of Water Resources and Irrigation (MWRI). It is located on the campus of the NWRC in El Qanater El khairiya, 25 km North of Cairo a short distance downstream the Delta Barrage overlooking Damietta Branch of the Nile. WRRI is pioneer in the fields of, Wadi hydrology studies, flash floods risks, the Nile River basin studies, groundwater development, and integrated water resources management. In addition, to plan and design appropriate projects for flood protection works, taking into account economic, environmental and social dimensions. WRRI is keen to engage innovative researches that enhance understanding of integrated Water Resources Management, and to implement effective strategies to address the barriers that have prevented full participation of women and stakeholders in projects. WRRI strives to maintain high standards of competence in its work. Vision: Making the WRRI a leader organization conducting cutting-edge research in water resources. Mission: To conduct, coordinate and integrate multi-disciplinary research to address critical national and regional priorities (Arab and Nile Basin Countries) in water resources.

## Research Focus

1-Performing hydrological and geo-hydrological research to evaluate and develop conventional and non- conventional water resources and studying related environmental, social, and economical implications.

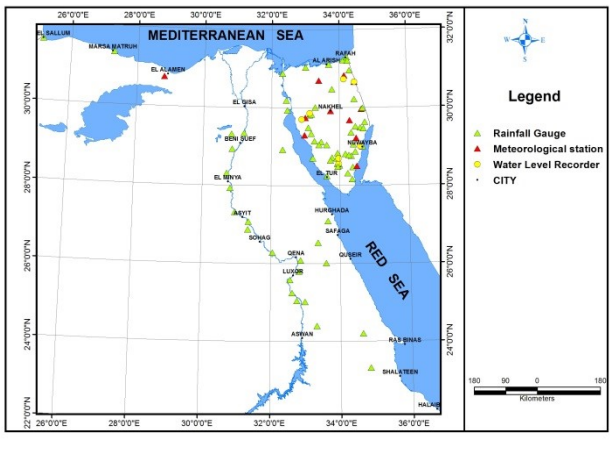
**2-** Conducting necessary water policies targeting more efficient programs for horizontal and vertical expansion for sustainable development.




**3-** Studying the most appropriate procedures for forecasting flash floods, rainfall, and inflow of the Nile River to support planning and management of water resources.

4- Studying side effects of Upper Nile projects and presenting various alternatives to minimize their negative impacts.

5- Establishing monitoring network covering entire Egypt to observe and measure different meteorological parameters.

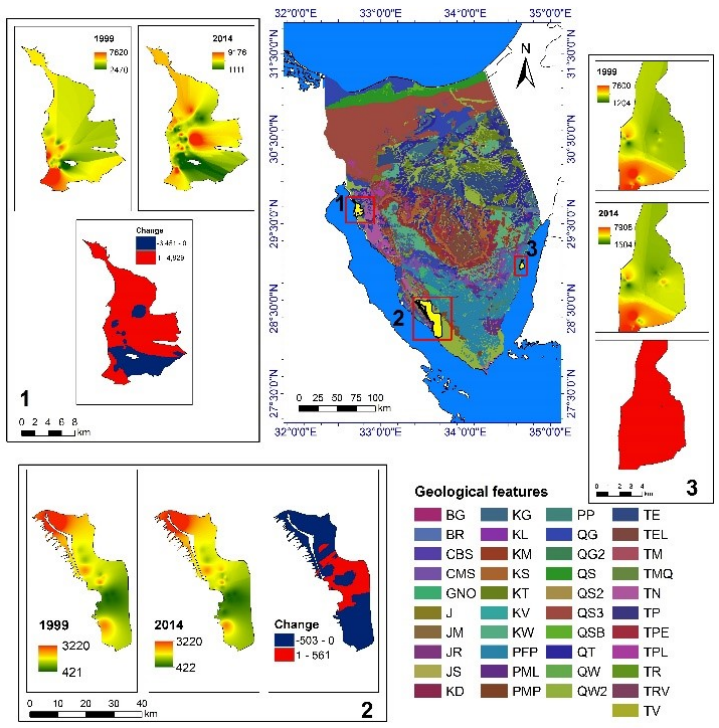


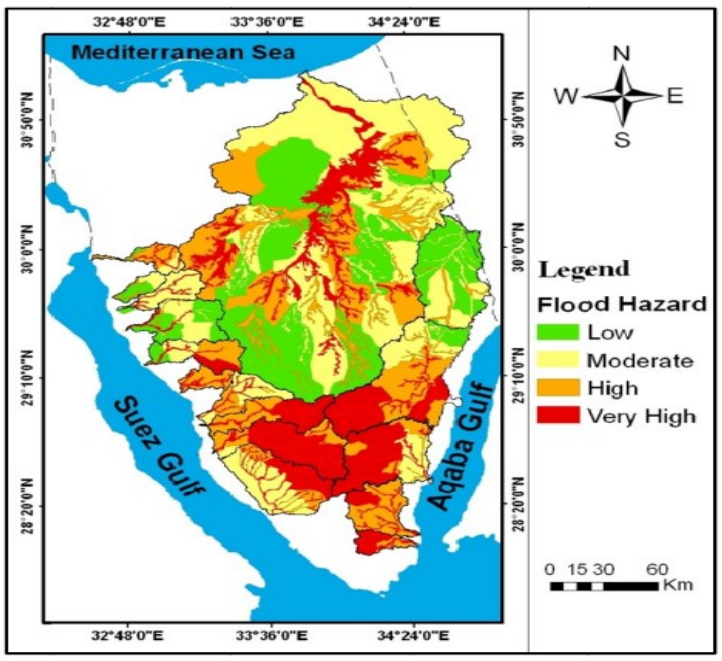

Prof. Dr. Gamal Kotb E-mail: E-mnail: gkotbmohamed@yahoo.com

## Research Focus

- Analyzing satellite images, topographical, and geomorphological maps and developing an integrated hydrological database.
- Estimating flash flood volumes for water harvesting and protection
- Estimating flash flood volumes for water harvesting and protection


- Developing hydrogeological maps, and groundwater Atlas.
- Developing research for shallow and deep regional aquifers.
- Groundwater development and management.
- Performing well design and supervising well drilling.




Developing flood hazard and risk maps.

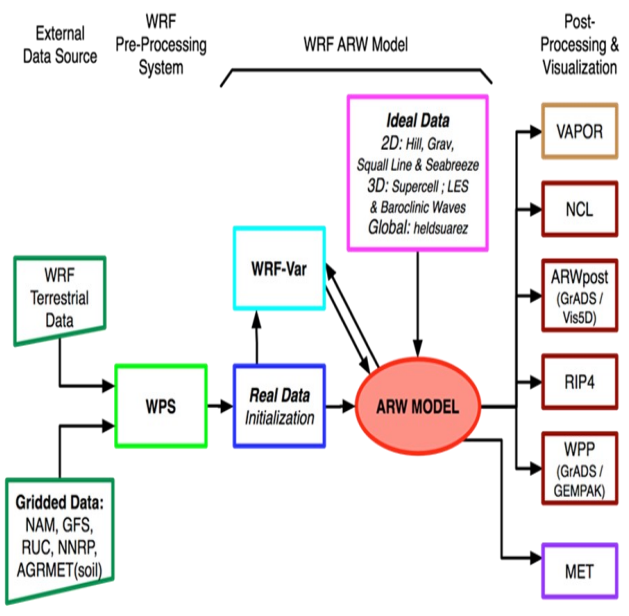
- Integrated water resources management to balance environmental and socioeconomic requirements.
- Best practice in transboundary water resources management.
- Developing studies for conventional and non-conventional water resources.
- Legislation for efficient use and protection of water resources.
- Design of surface and groundwater monitoring network based on influence coverage to incorporate real time information.

- Set procedures and standards for optimum utilization of flood

protection and water harvesting structures.

Developing Innovative early warning system

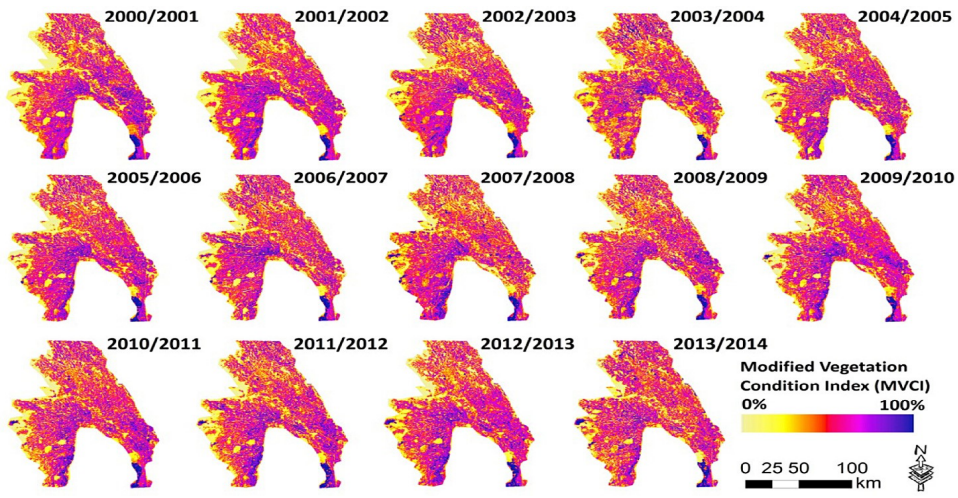
- Early Warning System Network
- Geophysical Unit
- Short-term weather Forecasting (WRF)
- Surveying Unit
- Database Unit
- Remote Sensing and GIS Mapping Unit



## Research Focus

Designing, constructing and supervising different water structures

Institute for Technology and Resources Management in the Tropics and Subtropics (ITT) of the University of Applied Sciences, Germany, since 2010.

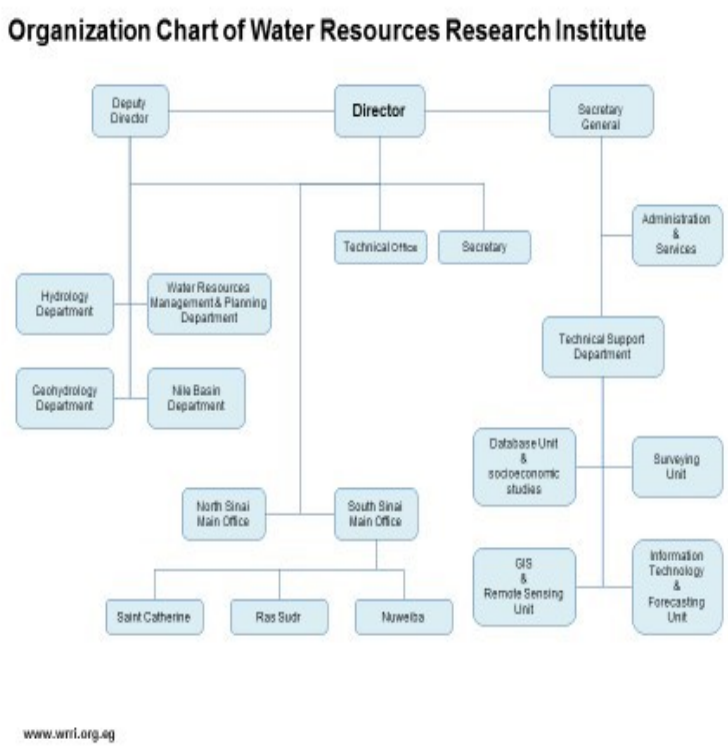



Spatial irrigation supply assessment for the summer crop season Gezira Scheme in Sudan, ITT and WRRI

**Institute's Departments**

The institute has four main departments.

- Hydrology Department
- Hydrogeology Department
- Nile Basin Department
- Water Resources Management and Planning Department



## Research Unit Contacts

WRRI can provide expert consultations for interested agencies and clients all over the world. The consultation includes studies, supervision, experimental, and field investigations as well as training of engineers, technicians working in the field of water-related projects. Consultations cover the following fields:

- Site and field investigations for optimum design and implementation of flash floods mitigation measures
- Statistical analysis of Hydrological data
- Hydrologic studies for water harvesting, and flood protection
- Hydrological and optimization studies to secure Egypt limited water resources due to upper Nile basin development
- Hydraulic studies for management of wadi flood plains
- Surface and groundwater modeling
- Environmental and socioeconomic studies of water resources projects
- Performing studies of water resources policies and strategies for supporting decision makers.
- Supervising implementation process of different type of infrastructures and mitigation measures
- Designing and implementation of database, hydrological, hydrogeological, hydro-chemical and meteorological monitoring network.
- Processing and analyzing different types of Earth observation Images.
- Enhancement of pilot projects for testing different phenomenon
- Establishment of flood and water resources Atlas for enhancing secure development areas
- Preparation of tender documents for proposed projects.
- Construction of hydrologic and hydro-geological maps.
- Consultation of Desalination plants (Construction of withdrawal and injection wells)
- Qualitative Geophysical well logging interpretation and well design
- Supervision of drilling shallow and deep water wells
- Storm water management planning and design in urban areas

WRRI is always open to partnership opportunities and welcome anyone with interest in partnering on a particular project, topic, or initiative.

Contact details:

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## Latest Publications

WRRI published in the last 15 years about 150 research papers in journals, periodicals and conferences. WRRI publishes its own bulletin series on specific topics, technical reports and working papers.

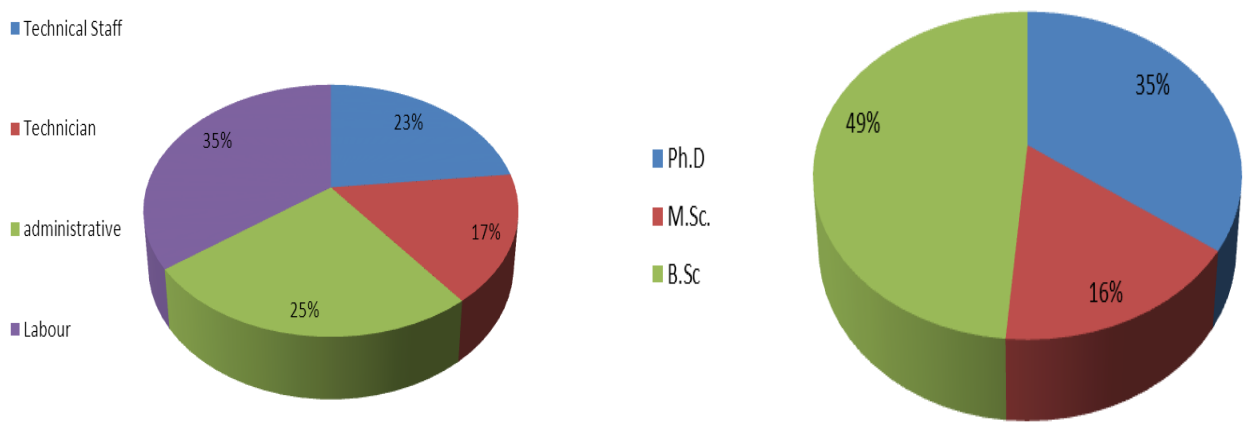
For a complete listing of the available publications, please visit the Institute web site: www.wrri.org.eg (**2017/2018~):**

## Institutional Capacity Development Activities and internship Opportunities

The WRRI has about 159 personnel. The technical staff includes 37 professionals covering the disciplines of hydrology, hydro-geology, civil engineering, geology, geo-physics, agronomy, survey and hydraulics, socio-economy and environment. Most of the staff members has benefitted from international and regional short and long-term training and hold research degrees.

WRRI obtained excellent regional and international recognized reputation through conducting technical consultancy services and cooperation with different agencies that have similar interests all over the world. It is actively cooperating with Saudi Arabia consultancy and governmental agencies, Japan International Cooperation Agency (JICA), European Union (EU) consultants, and China Research Institutes in several joint projects and training courses that address a range of water related issues. In addition, WRRI has recently completed several projects focusing on IWRM and projects related to stakeholder engagement such as:

- Flash Flood Management (FlaFloM) LIFE Project (2007 -2010).
- Rainfall estimation from remote sensing data in Sinai peninsula (2007-2009).
- Flow Regimes from International and Experimental Network Data (FRIEND/Nile) project (2001-2006) and (2006-2011).
- Flash floods consultation and studies, Oghanda, Sudan, Morotanya, and Togo since 2013.




WRRI personnel and qualifications

# Faculty of Sciences and Techniques of Mohammedia, Hassan II University of Casablanca Morocco

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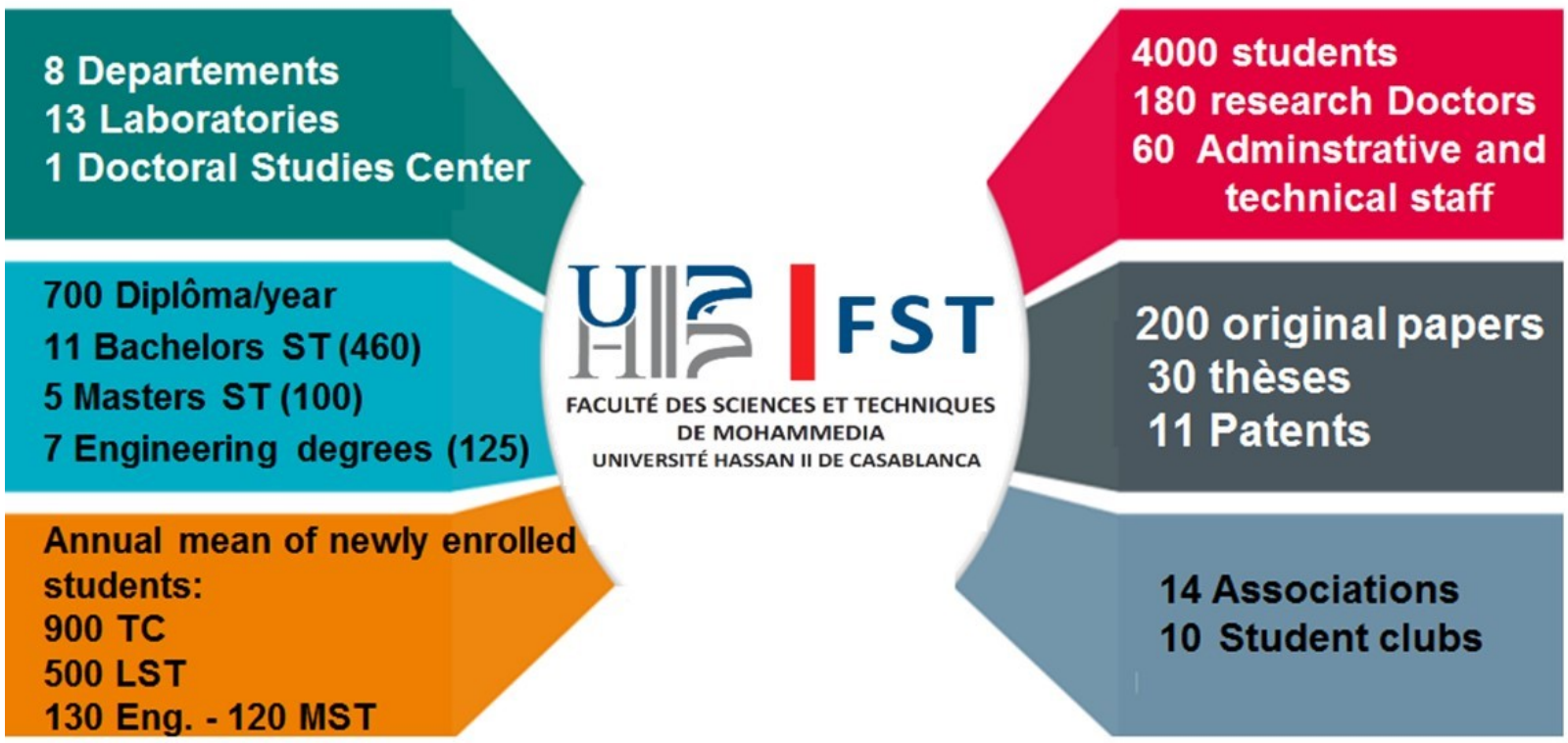
Website: http://www.univh2c.ma/

http://www.fstm.ac.ma

Established in 1975, University of Hassan II of Casablanca is a public university locatin in Casablanca, Morocco. There are over 24,000 total students, including local and foreign. Full-time faculty teachers and professors are over eleven hundred, making it the third largest university in Morocco. Official staff total 850 people.

The Faculty of Sciences and Techniques-Mohammedia (FSTM), part of Hassan II University of Casablanca, belongs also to a network of eight Faculties of Sciences and Techniques (FST) throughout Morocco whose main vocation is academic training in science and technology.

The FSTM, located in an area with strong industrial activity, has a vulnerable coastal area. Indeed the city of Mohammedia, and its wider region, namely Casablanca-Settat are facing important risks of floods and erosion. Probabilistic risk assessments for the entire country reveal that floods, earthquakes and tsunamis are expected to cost on average USD 500 million annually, of which flooding constitutes the biggest part. The main disaster risks in Morocco are floods and droughts, earthquakes, tsunamis, coastal erosion and sea level rise.




Prof. Dalila Loudyi

E-mail: loudyi.d@gmail.com

Prof. Mustapha Lkhider, Dean

Email: mustaphalkhider@gmail.com

## Research Focus

The FSTM is located in a region with strong potential offering various opportunities for collaboration and scientific, technical and cultural development. Indeed the city of Mohammedia offers a more balanced industrial panorama in comparison with the other cities of the kingdom of the same size. Its industry is marked by a clear specialization in chemistry and parachemistry activities as well as mechanical and electrical engineering.

Other sectors of activities are: Energy, textiles, leather, furniture, household goods, metallurgical products, electrical equipment, agribusiness, trade and services ... The strong industrialization of the Casablanca region Mohammedia has encouraged research professors to initiate various research topics, particularly those related to environmental protection. Targeted research directions geared to the needs of the socio-economic sector, to support the development of the region will be a priority for the institution.

FSTM has 21 Laboratories grouped into a research and development center called CRD FSTM.

The main research axes developed at FSTM are:

- Biochemistry, Bioinformatics Environment and Food Industry
- Biosciences, Functional and Molecular Integrated Exploration
- Physical Chemistry and Chemistry Bio-organic
- Mathematics and Applications
- Mathematics, Cryptography, Mechanical and Numerical Analysis
- Physic of Condensed Matter and renewable energies
- Physics of the Atmosphere, Materials and Modeling
- Virology, Microbiology, Quality et Biotechnologies
- Electronic, Energy, Automatic et Data Treatment
- Materials, Membranes et Environment
- Computer Science
- Process and Environmental Engineering
- Materials, Catalysis and Natural Resources recovery.

## Research Unit Contacts

Within the Process and environmental engineering laboratory there are 5 research units:

- Water , Environment and climate change research unit
- Water, soil and environment
- Chemical analysis
- Process engineering and quality
- Material sciences and Experimental research methodology

http://www.fstm.ac.ma/ced/Structure/LGPE.pdf

## Jobs/Internship Opportunities

There are opportunities for professor/student exchange programs throughout international cooperation with USA and EU.

## Latest Publications

- *Pollution parameters and identification of performance indicators for wastewater treatment plant of Medea (Algeria*), A. Karef, A. Kettab, D. Loudyi, M.C. Bruzzoniti, M. Del Bubba, F. Ait Nouh, N. Boujelben, L. Mandi; Desalination and Water Treatment , Vol 65 (2017), p 192-198, doi: 10.5004/dwt.2017.20290
- *Climate change impact on stormwater systems in the coastal city of Casablanca, Morocco*, L. Ennajem, D. Loudyi, Journal of Water Sciences & Environment Technologies, JOWSET, 2017 (02), N°02, 200-206, ISSN: 2508-9250
- *Impact of urban planning on river systems: The case of Bouskoura urban stream flooding over Casablanca city-Morocco*, D. Loudyi; Proceedings of the 3rd International Symposium on Flash Floods in Wadi Systems, 6-8 December 2017, Muscat, Oman.
- Analysis of the water-energy nexus in central OumErRbia sub-basin - Morocco, M. El Azhari, D. Loudyi, International Journal of River Basin Management, In print (Feb, 2018), DOI 10.1080/15715124.2018.1446966.
- *Reservoirs silting in Morocco*, D. Loudyi, M. Chagdali, S. Belmatrik and K. El Kadi Abderrezzak , Hydrolink, number 3/2018
- Chair of the 4th International Symposium on Flash Floods in Wadi Systems ISFF2018, 4-6 December 2018, Palace d'Anfa Hotel, Casablanca Morocco, on "*Urban Flood Risk Management: Mitigation and Adaptation Measures in the MENA Region*", www.isff2018.com

# Disaster Management and Training Education Centre (DiMTEC), University of the Free State, South Africa

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**Fax:** +27 51 401 9336
Website: https://www.ufs.ac.za

University of the Free State is one of the oldest and top universities in South Africa with a total of approximately 35 000 students. Its Disaster Management Training and Education Centre for Africa (UFS-DiMTEC) based in the Faculty of Natural and Agricultural Sciences is the largest post graduate program in disaster management in Africa with that 60 post graduate diploma students, 50 Master students and 20 PhD candidates.

When disaster strikes, all living creatures naturally react with a fight-or-flight response. But what if you're not strong enough, or have nowhere to run? This is when suffering sets in. Hunger, death, degradation, loss, damage, destruction, desperation. Since 2001, we have the vision to reduce disaster risk – because we can!

At the University of the Free State (UFS) Disaster Management Training and Education Centre for Africa (DiMTEC), we strive towards informing the public about disaster risk reduction through education. Our master's, postgraduate degrees in disaster management, short courses, and research are of the highest quality. The recent addition of a PhD ensures that research towards making a difference continue in various fields.

DiMTEC's first course was approved and registered by the South African Qualifications Authority in 2001, after which we joined the Department of Agricultural Economics in the vision of becoming an independent centre, which came about in 2005. The education and research at DiMTEC is multi disciplinary with a focus on disaster risk reduction in Africa. We have a footprint in than 17 African Countries.

DiMTEC is proud to be on the foreground of disaster management training in Africa.

## Research Focus:

Research at UFS:

The next stage in the evolution of universities has been the 'entrepreneurial university', with universities partaking in the creation of a business future, and issues such as venture creation, incubation, and risk management becoming important.

The fourth stage, in which some are already participating, but which for many remains a 'future stage', is the 'knowledge platform university'. This type of university sees its responsibility to build the knowledge markets and platforms of the knowledge society. And so the university and parts of the university form partnerships to establish research consortia and research platforms, industry clusters and platforms, and creative commons and open-source platforms.

This is an environment where the university and business are increasingly overlapping. It is a challenging future, but one which we will have to enter.

To succeed in such a future, we need to be excellent. But what is excellence? It is a continually moving target, but one which speaks of being unusually good or superior, and surpassing ordinary standards. And, when it comes to research, we cannot remove excellence from impact. The full scope of our efforts lies in the notion that excellent research can create an improved quality of life and a better world.

Prof. Andries J Jordaan
E-mail: ajjrdn@gmail.com

## Latest Publications

UFS Publications

Non-accredited Journals

- Acta Varia — http://apps.ufs.ac.za/kovsiejournals/default.aspx?journal=18

- Corporate Law Development—http://apps.ufs.ac.za/kovsiejournals/default.aspx?journal=3

- Dolos—The departmental academic journal of the students of the department of Afrikaans and Dutch, German and French of the University of the Free State. Creative Afrikaans literary work, as well as academic or research articles in Afrikaans and especially Afrikaans and Dutch language and literature by students, lecturers and guest associates is published. Secondly, Dolos reports on activities of the Department of Afrikaans and Dutch, German and French.—http://apps.ufs.ac.za/kovsiejournals/default.aspx?journal=20

- Journal for Estate Planning—The Journal for Estate Planning Law is published by the Faculty of Law, University of the Free State and deals with articles relating to all aspect.—http://apps.ufs.ac.za/kovsiejournals/default.aspx?journal=2

- Textures—*Textures* is published annually by the Department of English and Classical Languages—http://apps.ufs.ac.za/kovsiejournals/default.aspx?journal=15

Publication Series

- Transactions of the Centre for Business Law

  Transactions of the Centre for Business Law is a series of monographs devoted to the advanced study of legal issues in the context of the business world. Scholarly dissertations at Masters and Doctorate level in the fields of mercantile, corporate, commercial and general business law are of particular interest to the editors of this highly respected series. All submissions for consideration by the Editorial Board are reviewed by at least two eminent referees who are not informed as to authorship."- http://apps.ufs.ac.za/kovsiejournals/default.aspx?journal=4


Prof. Desmond Manatsa

E-mail: dmanatsa@buse.ac.zw

# Bindura University of Science Education

## Geography Department , Africa Alliance for Disaster Research Institutions (AADRI), Zimbabwe

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**Tel:** +263 773 275 334
**Website:** https://www.buse.ac.zw/

Faculty of Science at Bindura University of Science Education which houses AADRI

Bindura University of Science Education has several faculties including the Faculty of Science. Faculty of Science is committed to offering high quality programmes and strives to recruit and produce scholars in the field of Sciences including Disaster Research. This Faculty is where the Africa Alliance for Disaster Research Institutions (AADRI) is housed. Basically AADRI was formed under the initiative to function as a collaborative platform for engaging discussion, sharing knowledge and promoting networks on topics related to risk reduction and resilience to disasters related to Africa. The institution strives to bring empirically sound, disaster theory, measures and practices to bear on the real-world problems demanding disaster risk reduction, including the challenges of implementing the Sendai Framework for Disaster Risk Reduction in Africa. This should be achieved through bringing together Africa's disaster research community to provide an accessible forum through which individuals and groups can engage with disaster research and scholarship. Recently AADRI was instrumental is organising the First International Conference on Climate Change and Food Security from the 4th to the 5th of October 2018. The theme was 'Developing Adaptive Capacity and Resilient Food Production Systems in the Face of Climate Change. AADRI currently has four members namely National University of Science and Technology (NUST), Chinhoi University of Technology (CUT), Midlands State University, University of Zimbabwe and Women University in Africa. It is in the process of recruiting regional members from all countries in Africa after which it will hold its first conference in 2019 to elect substantive AADRI committee members.



**Figure 1: Tsetsefly research building structures that are threatened by gully erosion in Mbire Zimbabwe.**

## Research Focus:

AADRI member's research focus is in the following areas:

- Reducing the impact of floods and droughts in flood and drought prone areas
- Enhancing food security in the face of climate change
- Disease prevention through awareness and vaccination
- Building resilience to climate change in local communities
- Enhancing disaster preparedness in rural schools
- Child Sensitive Social Policies Programme
- GIS based stratification of Diseases

Prof. Desmond Manatsa
E-mail: dmanatsa@buse.ac.zw

## Research Units Contacts

- Community Disaster Research

  Contact Person: Dr. Paul Chipangura from National University of Science Technology, Zimbabwe

- Climate Change Research

  Contact Person: Dr. Desmond Manatsa from Bindura University of Science Education—dmanatsa@buse.ac.zw

- Community Resilience

  Contact Person: Paradzayi Bongo from Woman University of Africa—paradzayib@gmail.com

- Agriculture and Food Security

  Contact Person: Dr. Menas Wuta from University of Zimbabwe - wokwawuta@gmail.com)

- GIS based disease research

  Contact Person: Dr. Munyaradzi Shekede from University of Zimbabwe—shekede@gmail.com

- Crop Research

  Contact Person: Dr. Ezekia Svotwa Chinhoi University of Science Technology—esvotwa2@gmail.com

- Agriculture Research

  Contact Person: Dr. Raymond Mugandani from Midlands State University—mugandanir@gmail.com

**Figure 2: A member of the research team showing the level of flood waters at a school in Mbire district, Zimbabwe**

## Latest Publications

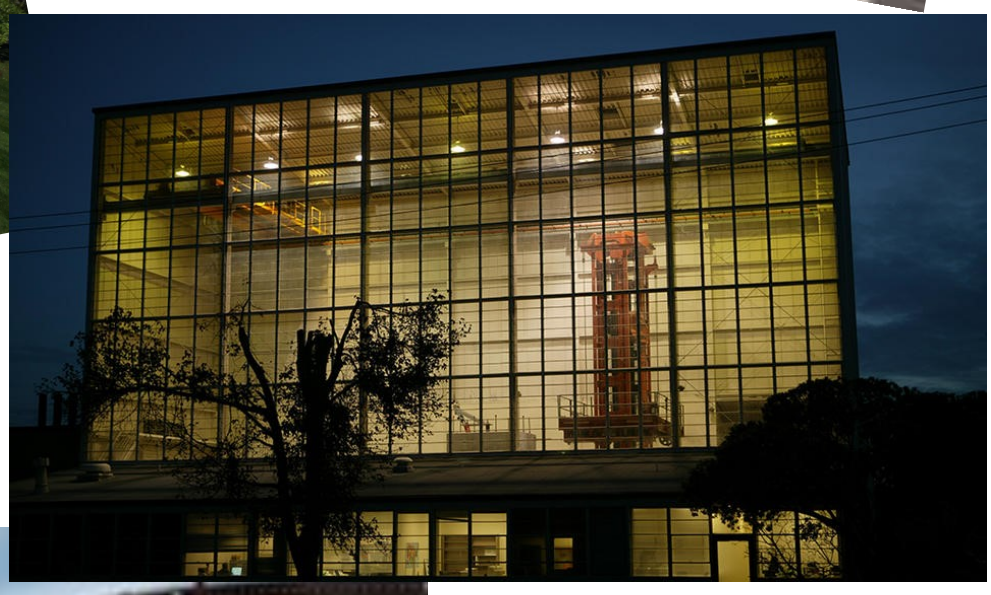
- Building community resilience to disasters in Muzarabani, Zimbabwe (ongoing)
- Geospatial capabilities for revision of agro ecological zones of Zimbabwe (ongoing)
- Enhancing water harvesting in rural communities (ongoing)
- A Resource Book for disasters in schools and tertiary institutions (completed)
- Scaling up Climate Change Adaptation in Zimbabwe through strengthening integrated planning systems
- Enhancing disaster preparedness in most vulnerable flood prone districts of Zimbabwe through multi level capacity build- ing

**Figure: Members of AADRI being involved in community research in**

# Americas


UFCG


Institute of Behavioral Science
University of Colorado at Boulder



# Federal University of Campina Grande (UFCG)
# Brazil

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Website: http://www.ufcg.edu.br/


The Federal University of Campina Grande conducts studies and research on environmental disasters in a broad sense, spanning several areas. This is partly motivated by the institution's location in the a semiarid region of Brazil, high populated and socially and economically vulnerable to environmental hazards, such as droughts, desertification, land degradation, flash floods, health vulnerability, leading to social inequality. Our present interests are on understanding local and regional needs and the social aspects of Disaster Risk Reduction.

UFCG, and its several research centers and academic units, are reference for the development of science and technology, education, arts and culture in the north-eastern region of Brazil. Social inclusion and economic development of the region have always been highlighted in the projects and activities of the university. The local environmental issue in the region demands a lot of studies concerned with the dynamics of disasters, including hydrological extremes (floods and droughts), land degradation, desertification and climate change, among other topics.

## Research Focus

Our research interests based on an interdisciplinary context are:

- Water resources management
- Semi-arid hydrology
- Water security
- Planning and management of water resources
- Geoenvironmental disasters
- Erosive processes
- Environmental perception
- Risk Governance
- Land degradation
- Desertification
- Climate Change

Prof. Carlos de Oliveira Galvao
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## Latest Publications:


- Kolokytha, E.; Galvao, C. O.; Teegavarapu, R. The way ahead: climate change impacts and water resources management and planning. In: Kolokytha, E.; Oishi, S.; Teegavarapu, R. (Org.). Sustainable Water Resources Planning and Management under Climate Change. 1ed.Tokyo: Springer, 2017, v. , p. 350-358.

- Andrade, T. S.; C ; Galvao, c. O. ; Rufino, I. A. A. Milk production as an indicator of drought vulnerability of cities located in the Brazilian semiarid region. Engenharia Agrícola, v. 37, p. 1203-1212, 2017. http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-69162017000601203&lng=en&tlng=en

- Leal Filho, Walter; Modesto, Francine; Nagy, Gustavo J.; Saroar, Mustafa ; Yannicktoamukum, Nsani ; Haapio, Michael . Fostering coastal resilience to climate change vulnerability in Bangladesh, Brazil, Cameroon and Uruguay: a cross-country comparison. Mitigation and Adaptation Strategies for Global Change, v. 22, p. 1-24, 2017. https://link.springer.com/article/10.1007%2Fs11027-017-9750-3

- Santos, F. M. dos; Serrao-Neumann, S. Climate and environmental perception and governance in coastal areas: the case of Ilha Comprida, São Paulo, Brazil. In: Leal Filho, W.; Esteves Freitas, L. (Eds.). Climate Change Adaptation in Latin America: Managing Vulnerability, Fostering Resilience. Rio de Janeiro, Springer, 2017, p. 399-411. http://www.springer.com/gp/book/9783319569451

- Grande, M. H. ; Galvao, C. O.; Miranda, L. I. B.; Guerra Sobrinho, L. D. The perception of users about the impact of water rationing on their household routines. Ambiente & Sociedade (Online), v. 19, p. 163-182, 2016.

- Farias, C. A. S.; Bezerra, U. A. ; Silva filho, J. A. . Runoff-erosion modeling at micro-watershed scale: a comparison of self-organizing maps structures. Geoenvironmental Disasters, v. 2, p. 1-8, 2015. https://geoenvironmental-disasters.springeropen.com/articles/10.1186/s40677-015-0022-9


## Research Units

- Technology and Natural Resources Center**:**
  http://www.ctrn.ufcg.edu.br/
- Semi-arid Sustainable Development Center:
  http://www.cdsa.ufcg.edu.br/
- Food and Agriculture Sciences and Technology Center: http://www.ccta.ufcg.edu.br/
- Electrical and Computer Engineering Center:
  http://www.ceei.ufcg.edu.br/
- Humanities Center: http://www.ch.ufcg.edu.br/
- Science and Technology Center:
  http://www.cct.ufcg.edu.br/
- Biological and Health Sciences Center:
  http://ccbs.ufcg.edu.br/
- Educational Training Center:
  http://cfp.ufcg.edu.br/portal/
- Law and Social Sciences Center:
  http://www.ccjs.ufcg.edu.br/
- Health and Rural Technology Center
  http://www.cstr.ufcg.edu.br/
- Education and Health Center
  http://www.ces.ufcg.edu.br/
- The Semi-Arid Program: http://peasa.paqtc.org.br/

## Other Useful Contacts

**International Affairs Secretariat - http://www.sai.ufcg.edu.br/**

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Head of the International Affairs Secretariat

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Tel +55 83 2101 1048

**Prof. Camilo Farias**

Vice-Rector , UFCG

Email: vice.reitor@ufcg.edu.br

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# Building Aerodynamics Laboratory, Federal University of Rio Grande do Sul (UFRGS), Brazil

Laboratório de Aerodinâmica das Construções,
Universidade Federal do Rio Grande do Sul
Rua Ferreira Viana, 14 / 5 – 90.670-100 Porto Alegre, Brazil

Tel: +55-51-3308-7145

Website: www.ufrgs.br/lac

LAC is composed by a group of professionals always attempting to create solutions in the most different wind engineering problems. Our wind tunnel was the pioneer in Latin America, always working for the development of wind engineering industrial applications, research and education. The Brazilian Wind Code NBR-6123 is largely based on the work developed in the lab. In association with partner institutions in Brazil, Argentina, Cuba and Paraguay, there has been an enormous effort in the last years aiming to natural disaster reduction.

## Research Focus

Static and dynamic wind effects on buildings: pressure prognosis, tension, deformation, translation and vibration characteristics.

- Wind effects on special structures: tall buildings, chimneys, bridges, transmission lines, stadiums and flexible structures.
- Climatic studies and environmental impacts / Atmospheric pollution / Acclimatization and ventilation / Agriculture / Eolic Energy / Transport.
- Wind related disaster reduction & hazards mitigation.

Achievements:

- Development and improvement of the Brazilian Wind Code (currently under revision, with Prof. Acir M. Loredo-Souza as the President of the Code Review Committee).
- LAC/UFRGS has more than 40 years' experience in the development of wind tunnel studies and applications to real buildings and environmental solutions, helping to diminish the number of wind related disasters.

Challenges:

In a country with numerous problems to solve, as Brazil, the challenges are enormous, ranging from the lack of financial resources to limited culture. The understanding that natural disasters may be diminished or even avoided is still not clear. There is a confusion between natural meteorological event and natural disaster. LAC has been disseminating educational activities along the past years with the aim to teach the technical processes regarding wind engineering, helping in the design and construction of more resilient buildings and infrastructure throughout Brazil and neighboring countries. We have joint research activities with groups in Argentina, Cuba and Paraguay.

Prof. Acir Mércio Loredo-Souza

Professor & Director

E-mail: acir@ufrgs.br

# Institute for Catastrophic Loss Reduction (ICLR), Western University, Canada

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Tel: (416) 364-8677

Fax: (416) 364-5889

Website: https://www.iclr.org/


The Institute for Catastrophic Loss Reduction (ICLR) is a world-class centre for multidisciplinary disaster prevention research and communication. ICLR is an independent, not-for-profit research institute founded by the insurance industry and affiliated with Western University, London, Ontario. The Institute's mission is to reduce the loss of life and property caused by severe weather and earthquakes through the identification and support of sustained actions that improve society's capacity to adapt to, anticipate, mitigate, withstand and recover from natural disasters.

## Research Focus

ICLR's mandate is to confront the alarming increase in losses caused by natural disasters and to work to reduce disaster deaths, injuries and property damage. Disaster damage has been doubling every five to seven years since the 1960s, an alarming trend. The greatest tragedy is that many disaster losses are preventable. ICLR is committed to the development and communication of disaster prevention knowledge.

ICLR has established itself as the national leader in the development of research and resources to reduce the risk of natural hazards to people and property in Canada. Materials generated by ICLR researchers and staff have been used widely by insurers, all levels of government and non-government groups engaged in disaster risk reduction and climate change adaptation.

ICLR's Quick Response Program

ICLR's Quick Response Program was designed to allow social, behaviourial and economic scientists to quickly deploy to a disaster-affected area in the aftermath of a flood, extreme weather event or earthquake to collect perishable data. In addition to expanding academic knowledge, funded researchers submit brief reports that make preliminary analyses of recent events available to ICLR's multidisciplinary network of researchers, practitioners, and educators as well as other interested parties. The program promotes innovation in disaster research by favoring students, new researchers, and novel areas of study at the Natural Hazards Center, University of Colorado at Boulder and offered to researchers based in the United States for more than 25 years. The ICLR version of this initiative will be open to all university-based Canadian social scientists.

For more information, visit - https://www.iclr.org/wp-content/uploads/2018/04/ICLR-Quick-Response-Program.pdf

Prof. Paul Kovacs

E-mail: pkovacs@iclr.org

## Research Unit Contacts

Paul Kovacs – Executive Director

Adjunct Research Professor, Economics, Western University

President & CEO, Property and Casualty Insurance Compensation Corporation

Paul Kovacs is founder and Executive Director of the Institute for Catastrophic Loss Reduction at Western University, and CEO of PACICC.

Since 1996 Paul has been a contributing author to the Intergovernmental Panel on Climate Change (IPCC), the world's leading forum for the study of climate issues. The Panel won the 2007 Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change". He is Canada's leading authority on insurance and climate change and has been a contributing author to numerous international and Canadian reports on reducing the risk of loss from earthquakes, flood and severe wind.

For more than thirty-five years Paul has been a popular commentator on insurance, disaster safety and economic policy. He has written more than 200 publications and articles and he is a passionate champion for insurance, disaster resilience and adaptation to climate extremes. Paul has worked in private industry, the public sector and academia. He is Co-Chair of the Infrastructure and Housing Working Group of Canada's Adaptation Platform. He is Co-Chair of the Science and Technology Working Group of Canada's Platform on Disaster Risk Reduction. Paul is also a member of a number of Boards and Advisory Panels. He is a proud husband and father, with a growing collection of bow ties.

Sophie Guilbault – Manager, Partnership Development

Sophie Guilbault currently serves as Manager, Partnership Development. She completed her Masters at Tulane University in Disaster Resilience Leadership Studies and holds a Master of Architecture degree from Laval University. At ICLR, Sophie is leading the Cities Adapt research program, ICLR's Quick Response Grant Program and MEOPAR research on hurricane warnings in Atlantic Canada.

Gordon McBean – Professor Emeritus, Western University

Research Chair, Institute for Catastrophic Loss Reduction

Professor, Departments of Geography & Political Science, Western University

Professor Gordon McBean is President of the International Council for Science (2014-18) and Co-Chair (2016-18) Governing Council for Future Earth. He was Professor at Western University (2000-2015); Assistant Deputy Minister, Environment Canada (1994-2000) responsible for weather, climate and air quality sciences and services; Professor, Atmospheric-Oceanic Sciences, University of British Columbia (1988-94); and Senior Scientist in Environment Canada. Dr. McBean has been very active in international and national programs, projects and assessments. Some examples are:

Global Change START International' President (2009-15); Integrated Research on Disaster Risk, Chair Science Committee, co-sponsored by ICSU, ISSC and UN International Strategy for Disaster Reduction (2009-11); Intergovernmental Panel on Climate Change (IPCC), Convening Lead Author, Special Report on Climate Extremes (2009-2011); Lead Author, 1st and 2nd Science Assessments, Review Editor, 4th Assessment; Canadian Foundation for Climate and Atmospheric Sciences (CFCAS), CEO and Chair, Board of Trustees (2000-11) Canadian Climate Forum, Chair (2011-14); Canadian Urban Environmental Research Consortium (CANUE) Member, Advisory Board, (2016-); UNSDR Science and Technology Committee, Member (2008-12); International Institute for Sustainable Development: Member, Board of Directors, (2004 -10); World Climate Research Programme, WMO-ICSU-IOC Joint Scientific Committee (JSC), Chair (1988-94), (Vice-Chair, 1986-88; Arctic Climate Impact Assessment, Lead Author.

He was a lead investigator in ArcticNet (2004-11) and now in MEOPAR (2011- ). His recent research includes: Integrated Strategies for Risk Reduction (SSHRC); Coastal Cities at Risk (IDRC); and Knowledge Synthesis Grant on climate change as a security issue.

He is a Member of the Orders of Canada and Ontario; Fellow: Royal Society of Canada; American Meteorological Society, American Geophysical Union, CMOS, IUGG, RCGS and awarded, in 2015: UBC Alumni Award of Distinction; AGU Ambassador Award; and AMS Cleveland Abbe Prize; and in 2017, 62nd International Meteorological Organization (IMO) Prize for outstanding contributions to meteorology, hydrology and geophysical sciences.

He received his B.Sc. in Physics and Ph.D. in Oceanography from the University of British Columbia (UBC), and also holds a M.Sc. in Meteorology from McGill University. He was a scientist at Environment Canada from 1970 to 1988 when appointed Professor and Chair of the Atmospheric Science Program at UBC. In 1992, he was appointed Head of the Department of Oceanography. From 1994 to 2000, he was Assistant Deputy Minister responsible for the Meteorological Service of Environment Canada.

He has received the Patterson Medal for distinguish contributions to meteorology by a Canadian and is a Fellow of the Royal Society of Canada, the Canadian Meteorological and Oceanographic Society, and the American Meteorological Society.

R. Glenn McGillivray – Managing Director

Glenn McGillivray is Managing Director of the Institute for Catastrophic Loss Reduction. Prior to joining ICLR, he served as Assistant Vice President of Corporate Communications for Swiss Reinsurance Company Canada and was Corporate Secretary for three Swiss Re operations in the country. He began his insurance career at The Personal Insurance Company of Canada in Toronto and went on to work for a major Canadian corporate law firm before joining Swiss Re in 1994 and the ICLR in November, 2005.

As an insurance writer and commentator, his work has been widely disseminated across Canada. Glenn has written more than 225 magazine and journal articles, publications and blogposts on a range of issues for Canadian Underwriter, Canadian Insurance, Municipal World, Disaster Management Canada, Canadian Consulting Engineer, The Lawyers Weekly and The Globe and Mail, as well as for the International Journal of Insurance Law. Additionally, he speaks and lectures regularly on subjects related to the area of property and casualty insurance and reinsurance and natural hazards. Glenn is author of the Swiss Re publications “Cross-border litigation in the age of free trade”; “Twister: The professional reinsurer’s perspective”; and “Inside an Icestorm”.

He holds a B.A. in political science from Wilfrid Laurier University, a M.A. in political science from McMaster University, and a graduate diploma in corporate communication from Seneca College. He recently earned his Certificate in Risk Management from University of Toronto’s School of Continuing Education.

Dan Sandink – Director of Research

Dan Sandink has led a significant portion of the Institute’s urban flood risk reduction work, and has authored or co-authored dozens of reports and articles on topics related to urban flooding and natural hazards. His work has focused on public risk perceptions, adoption of lot-level practices, insurance, climate change adaptation, lot-level flood protection technologies, inflow/infiltration, construction codes, and mitigation of wildland-urban interface fire and high wind risk for low-rise residential buildings, among other topics.

Dan is involved in a number of local and national technical committees and projects concerning residential building design and construction related to urban flood, wildland-urban interface fire, and high wind. He is a graduate of the geography and planning programs at the universities of Guelph, Western Ontario, and Toronto.

Slobodan Simonovic – Professor, Department of Civil and Environmental Engineering, Western University

Director Engineering Studies, Institute for Catastrophic Loss Reduction

Slobodan P. Simonovic is globally recognized for his unique interdisciplinary research in Systems Analysis and the development of deterministic and stochastic simulation, optimization, multi criteria analysis, and other decision-making methodologies. His work addresses challenging system of systems problems lying at the confluence of society, technology and the environment and has been applied with a sustainable development perspective in water resources management, hydrology, energy, climate change and public infrastructure. His main contributions include modelling risk and resilience of complex systems.

Professor Simonovic has influenced academia, industry and government via university teaching, publication of leading-edge research, mentoring of young people, delivering stimulating research seminars at institutions around the world, carrying out joint research projects, and consulting work. He has received awards for excellence in teaching, research and outreach.

Dr. Simonovic has published over 530 professional publications (over 220 in peer reviewed Journals) and three major textbooks. He has delivered over 260 keynote and invited talks and was inducted into the Canadian Academy of Engineering in June of 2013.

**Latest Research or disaster Reports/Results—Please refer to [www.iclr.org](http://www.iclr.org)**

# Department of Chemical Engineering
# Universidad de los Andes
# Colombia

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Universidad de los Andes is an autonomous, independent, and innovative institution that fosters pluralism, tolerance, and respect for ideas. It aims for academic excellence while providing rigorous critical and ethical character development, in order to enhance in all students the awareness of their social and citizenship responsibilities, as well as a firm commitment to the society. The university's student body, in an environment of interdisciplinary and flexible integral character development, becomes the chief agent of the educational process. A highly skilled, knowledgeable, and prestigious faculty facilitates the development of an outstanding academic and professional life project that supports research, contributes to the development of the country, and transcends its geographical boundaries.

## Research Focus

- Process safety is a relatively new concept and it has found its main driving force in catastrophic industrial events. Its objective is to eliminate security incidents that occur in fixed installations or permanent systems, in which releases of pure hazardous substances or in mixture with air can occur. Generally, these events originate accidental, intentional or NATECH events (Natural Hazard Triggering Technological Disasters), which expose the measured interests to flows of toxic, thermal, overpressure and projectile dangers.
- Characterization of hazardous materials
- Simulation of fires using Fire Dynamics Simulation (FDS)
- Intrinsic safety
- Transport of dangerous material
- Risk analysis and consequences evaluation
- Paula Daniela Pico Viviescas pd.pico10@uniandes.edu.co
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- Felipe Muñoz Giraldo fmunoz@uniandes.edu.co

## Latest Publications

- CFD and experimental study of the pyrolysis and oxidation phenomena of wheat starch dust in the 20L sphere standard test.
- Influence of the Particle Size Distribution on the Dispersion Process of Combustible Dusts in the 20L Sphere.
- Experimental and Computational Study of the Dispersion and Combustion of Wheat Starch and Carbon-Black Particles During the Standard 20L Sphere Test.
- Computational Study of the Dispersion and Combustion Steps of a Gas Mixture in the 20L Sphere.
- CFD study of the effects of turbulence and homogeneity degree of a fuel-gas/air mixture on the estimation of exclusivity severity parameters and flame propagation in standard dust test equipment
- Risk assessment for unconventional oil and gas wells, throughout their life cycles.
- Inherently safer facility layout with multiple floors.
- Methodological proposal for conducting multi-hazard analysis in process units.
- Approach to reduce uncertainty in an integrity program regarding corrosion-defects in inspected pipelines

## Jobs/Internship Opportunities

The Japanese Center at Universidad de los Andes started to become a physical reality with the symbolic laying of the first brick. The Japanese information center for culture, economy, and academia will open its door in the second semester in 2018 as part of the 110th anniversary of diplomatic relations between Japan and Colombia (https://uniandes.edu.co/centrodeljapon/ ).

Prof. Felipe Munoz Giraldo

fmunoz@uniandes.edu.co

# Universidad del Valle, Cali
# Colombia

Seismological and Geophysical Observatory of the Colombian Southwest (Observatorio Sismológico y Geofísico del Suroccidente Colombiano (OSSO )

Ciudad Universitaria Meléndez, Calle 13 No 100-00, Sede San Fernando, Calle 4B No 36-00 , Colombia

Tel: +57 2 3301661

Fax: +57 2 3313418

Website: http://www.univalle.edu.co/english/

The Seismological and Geophysical Observatory of the Colombian Southwest - OSSO is attached to the Geography Department of the Universidad del Valle, it conducts and promotes teaching and academic research in Seismology, Geophysics and Seismic Engineering to provide qualified personnel, information and knowledge to the community of the Colombian Southwest in order to prevent and mitigate possible disaster situations due to phenomena of geophysical origin or the reduction of vulnerability in the region.

As the agency in charge of the operation and maintenance of the Seismological Network of the Colombian Southwest, we are committed to timely inform the competent authorities and the community in general about the parameters of the seismic events that occur in the region. Besides, carries out studies on the seismic sources, the hazard and the seismic risk, as well as the development of investigations in the matter of risk management and continuous update publications of the information on the seismic activity of the region.

REDSW is a regional network founded in 1987 and restructured in 2008 with the digital technology to monitor the seismicity of the Colombian Southwest, which is considered one of the most seismic activity regions of the country. We exchange data with the National Seismological Network of Colombia, supporting the national/regional disaster prevention and response systems, providing information for timely attention in emergency situations in case of strong earthquakes.

Dr. Elkin De J. Salcedo Hurtado

E-mail: elkin.salcedo@correounivalle.edu.co

## Research Focus

Seismology

It is dedicated to the study of seismicity and its relationship with active tectonic structures in order to provide coherent results of the seismic danger of the Valle del Cauca and the region of the Colombian Southwest in general.

Regional Seismicity:

- Instrumental
- Historical
- Large earthquakes (macroseismic study)
- Seismicity and isosist maps

Seismotectonic research:

- Study of active faults and seismogenic zones
- Focal mechanisms

Seismic hazard:

- Analysis of the seismic regime
- Analysis of zoning methods
- Regional seismic network

A project will be presented for the installation and monitoring of a new three-component digital regional seismic network and broadband.

Geodesy

It is dedicated to the study of deformations of the earth's crust to determine the recent vertical and horizontal movements of the cortical blocks and along the active faults using conventional geodetic techniques and high precision with GPS.

- IGAC GPS network
- GPS network of INGEOMINAS for geodynamic studies
- Network of tide gauges

Geophysics

It is in charge of the application of methods and techniques for the study of the mechanical and geometric characteristics (surface extension, thickness and depth of the strata) of the subsoil on which various infrastructure works will be built and for the search of deposits and other types of resources.

- Reflection and seismic refraction
- Gravimetry
- Magnetometry
- Geoelectric
- Geochemical methods (Measuring radon gas)
- Bark modeling
- Spatial analysis and GIS

Natural hazards and risks

It focuses on the development of risk studies, vulnerability and risk in different territorial environments.

- Hazard Studies
- Vulnerability Assessment
- Risk assessment
- Risk management

Georiesgos research group

It consists of a team of researchers from different disciplines, mainly in relation to earth sciences and social sciences interested in the knowledge of the geophysical and social dynamics of the Colombian Southwest. Among its activities are studies of threats, vulnerability and risks, as well as the estimation of potential losses due to the occurrence of natural phenomena.

- Deformation of the Earth's Crust and Geoprocessing
- Assessment of natural hazard
- Assessment of social vulnerability and risk management
- Geophysical Modeling of the Earth's Crust
- Regional Seismicity

## Research Unit Contacts

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| Omar Andres Prieto Arias | omar.prieto@correounivalle.edu.co |

## Latest Publications:

- Evaluación del riesgo de inundación ante tsunami local en la isla de Cascajal, Pacífico Colombiano. Chile, Revista de Geografia Norte Grande ISSN: 0718 -3402, 2017 vol:68 fasc: págs: 185 - 219, **DOI:**10.4067/S0718-34022017000300185 Autores: DANNY ALEXANDER COCUNAME.
- 3.- Publicado en revista especializada: Gravity Survey at the Ceboruco Volcano Area (Nayarit, Mexico): a 3-D Model of the Subsurface Structure Estados Unidos, Pure and Applied Geophysics ISSN: 0033-4553, 2017 vol:174 fasc: págs: 3905 - 3918, DOI:https:// doi.org/10.1007/s00024-017-1600-4 Autores: JHONATTAN FERNANDEZ CORDOBA, ARACELI ZAMORA CAMACHO, JUAN MANUEL ESPINDOLA CASTRO,
- Deformación sismotectónica a partir de mecanismos focales de terremotos en el Valle del Cauca, suroccidente de Colombia Costa Rica, Revista Geologica De America Central ISSN: 0256-7024, 2017 vol:57 fasc: págs: 23 - 43, **DOI:**10.15517 Autores: ELKIN DE JESUS SALCEDO HURTADO, JHON LEANDRO PEREZ
- Publicado en revista especializada: Implementation of an Electronic Ionosonde to Monitor the Earth¿s Ionosphere via a Projected Column through USRP Suiza, Sensors ISSN: 1424-8220, 2017 vol:5 fasc: -- págs: 1 - 23, DOI:10.3390/s17050946 Autores: JHON JAIRO BARONA MENDOZA, CARLOS FERNANDO QUIROGA RUIZ, CARLOS RAFAEL PINEDO JARAMILLO,
- Monitoreo sísmico en tiempo real para la alerta temprana, el caso de SeisComP México, Geos - Caracas ISSN: 0435-5601, 2017 vol:36 fasc: págs: 317 - 327, **DOI:** Authores: JHON LEANDRO PEREZ

## Institutional Capacity Development Activities

Monitoring

The OSSO is a stage where students in undergraduate, master's and doctoral training develop their research work. Students from different disciplines are linked as monitors for the analysis of seismic processes, as well as research assistants for several projects and consultancies.

## Research Projects

Undergraduate and Graduate Students develop their degree work and thesis linked to the research projects of OSSO

## Jobs/Internship Opportunities

OSSO receives semi-annual academic interns from Colombian universities and abroad. PhD students, Graduate students and Undergraduate students that have joined our institution as interns exchange experiences and research methodologies related to the work areas of OSSO.

In OSSO, the following activities can be carried out:

- Participation in workshops and courses
- Assistance in research projects as interns
- Involvement in seminars, congresses and other activities perform in OSSO.

For other additional information, please visit out website— http://osso.univalle.edu.co

# Centro Nacional de Investigacion par la Gestion de Desastres Naturales (CIGIDEN) Chile

CIGIDEN

Research Center for Integrated Disaster Risk Management

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Website: http://cigiden.cl

**NATIONAL RESEARCH CENTER FOR INTEGRATED NATURAL DISASTERS MANAGEMENT - CIGIDEN**

We are an association of four universities:

Pontificia Universidad Católica de Chile

Universidad Nacional Andrés Bello

Universidad Técnica Federico Santa María

Universidad Católica del Norte

Chile is a natural laboratory for studying models and theories of mitigation and disaster management. Through this process, our main goal is to contribute to increasing levels of resilience and help mitigate the consequences caused by natural disasters. Thus disasters of natural origin present, for this scientific center, a series of technological, social and political challenges. From CIGIDEN, we are generating scientific and technical knowledge to help improve the way the risk management cycle is approached in our country.

Our work is carried out under the conceptual framework of resilience, orienting our results towards the reduction of the initial impact of extreme events, and to restore and improve the functionality of the different systems that are affected by them in shorter periods. The center seeks to be recognized internationally as a research center with the necessary capabilities to address all areas related to natural hazards and management of extreme events, producing world-class research for public policy of disaster risk reduction.

We are an association of four universities –Pontificia Universidad Católica de Chile, Universidad Nacional Andrés Bello, Universidad Técnica Federico Santa María y Universidad Católica del Norte– which was born in response to the call made by CONICYT's FONDAP program by Chile, in its fourth national competition of Priority Areas Research Centers to address research on disasters and their consequences.

The multidisciplinary and integrated team of CIGIDEN brings together more than 50 researchers and professionals who travel through six lines of research:

**RL1 Solid Earth Processes and Associated Hazards**/ Principal Investigator: Gabriel González – Earth Science & Natural Hazards.

**RL2 Surface Water Processes and Associated Hazards**/ Principal Investigator: Rodrigo Cienfuegos – Earth Science & Civil Engineering.

**RL3 Risk and Resilience of Complex Systems and Networks/** Principal Investigator: Juan Carlos De la Llera – Civil Engineering/Risk and Resilience of Physical Systems.

**RL4 Disaster Cultures and Risk Governance**/Principal Investigator: Manuel Tironi - Sociology & Anthropology.

**RL5 Socio-Economic Assessment of disasters and Mitigation Strategies for Resilient Critical Infrastructure Systems/**Principal Investigator: Alondra Chamorro – Civil Engineering & Infrastructure Management.

**RL6 Communication and Emerging Technologies for Disaster Risk Reduction**/Principal Investigator: Gonzalo Bacigalupe – Psychology & Public Health.

Prof. Rodrigo Cienfuegos
E-mail: director@cigiden.cl

## Research Focus

Our six research lines (RLs) lead the development of this research agenda where their specific objectives and scopes are framed under three interline research clusters: i) Natural Systems and Processes, ii) Risk and Resilience Analysis, and iii) Social Practices. Our research work plan to center to specific urban settlements where the integration of original results shall contribute to the development of pilot platforms or protocols, institutional transformations and public policy, and the engagement of citizens in disaster risk reduction processes.

Ours clusters work under the premise of the following work package and research questions:

### 1. Spatial-Temporal Processes in Subduction Earthquake Phenomena and linked hazards

- How we can anticipate places where future earthquakes can nucleate along the Chilean subduction zones?
- What are the main aspects of the coseismic slip pattern that determines the localization of energetic pulse for strong ground motion?
- Can we anticipate the distribution of aftershocks by using the coseismic slip distribution?
- Is there a link between the resulting coseismic slip in a given earthquake and the coupling distribution at the interplate contact?
- Are subduction earthquakes in some way connected with volcanic eruptions?
- Can we anticipate the distribution of aftershocks by using the coseismic slip distribution?
- Given the occurrence of a subduction-type and/or crustal-type earthquake, which are the site effects in the sedimentary basins of the fore-arc Andean region?
- Based on the previous questions, what are the expected ground motion intensities, and their variability at different sites in Chile?

### 2. Multi-hazard Approach for Interlinked Natural Threats

- How recent geophysical knowledge and associated uncertainties can be quantified and incorporated into seismic and tsunamigenic hazard assessment at different scales?

### 3. Hydroclimatic Hazards in a Context of Global Change

- How the characterization and monitoring of variables and physical processes involved in triggering hydroclimatic hazards can be used to mitigate risks both in the short-term through early warning systems, and the long-term through public policies and design practices developed to deal with non-stationary climatic variability?

### 4. Risk and Resilience of Complex Systems and Networks

- The fundamental research question posed by this research is how significant is the risk and resilience of critical networks of infrastructure and services, and complex systems deployed in central Chile subject to the disruption caused by extreme natural events, and what variables should be controlled to reduce risk and enhance resilience?
- However, to answer such question each of the areas within WP4, has its own driving research question: (WP4.1) How can we best characterize the natural hazard input (e.g. earthquake,tsunami) for distributed network systems located in central Chile using instrumental localdata, scenario-based simulated data, and the wealth of data available in other similar regions worldwide?; (WP4.2) In a hypothetical condition of independent performance of each network, what would be the risk and resilience of these networks subjected to extreme events in central Chile?; (WP4.3) Would graphical model representations of each of these networks be capable of providing consistent estimates of risk and resilience and its propagation?; (WP4.4) How would the interdependencies and cascading effects in these networks impact their risk and resilience, and what would be an appropriate model representation to capture these interdependencies between the physical network models relative the conventional models developed in platforms such as HAZUS/GEM?

### 5. Risk and resilience of urban settings

- Under the premise of a complex system, how do we generate a more resilient complex urban setting under the actions of multiple natural hazards?

### 6. Socio-Economic Assessment of Mitigation Strategies for Resilient Critical

- Work Package 6 will focus its research on which are the social and economic consequences of natural hazards that may disrupt critical network infrastructure and complex systems in central Chile, and how socio-economic effects of natural hazards can be accounted for in the design of mitigation strategies and resilience increase, and later evaluated in terms of impact within a specific socio-economic context? However, to answer such question five research areas have been defined within WP6, having each a driving research question: (WP6.1) Which are the social and economic consequences of major natural hazards that may disrupt critical infrastructure systems in central Chile?; (WP6.2) Which are the socio-economic impacts of the exposure model developed in WP4.2 for specific critical infrastructure systems considered in central Chile?; (WP6.3) How socio- economic effects of natural hazards can be modeled and accounted for in the design of mitigation strategies and resilience increase of critical infrastructure systems in central Chile?; (WP6.4) Which is the effectiveness of different mitigation strategies measured through the reduction generated in socio-economic impacts and risk, and the corresponding increase in resilience?; (WP6.5) How do the proposed models reliably predict the socio-economic and risk reductions of effective mitigation strategies in a case study located in Central Chile?

### 7. Disaster Cultures and Risk Governance

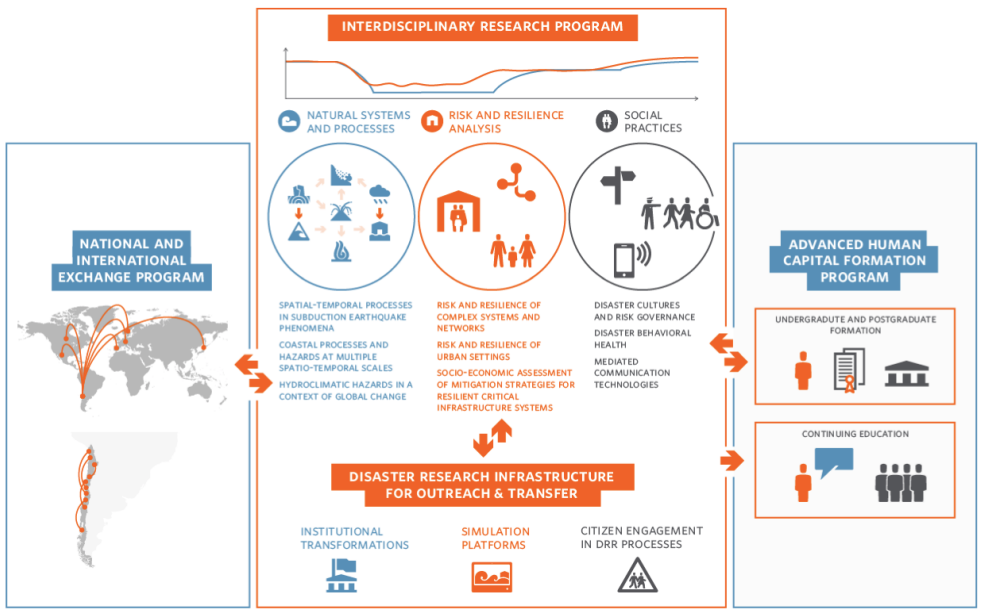
- How cultural differences impact on the modes of understanding disasters and taking decisions about them?

### 8. Disaster Behavioral Health

- How cultural differences impact on the modes of understanding disasters and taking decisions about them?
- What are the psychosocial factors that influence the response (coping behavior) of individuals, families, groups and communities affected by disasters and the different outcomes presented among individuals exposed to disasters? (or what are the psychosocial factors that explain well-being among individuals exposed to disasters)
- What are the active components of PFA interventions, when should be delivered and who benefits from these?

### 9. Mediated Communication Technologies

- How people who live a disaster become informed through a variety of media and information sources? How using multiple media channels exerts direct, indirect, and moderate effects on learning and behavior related to disaster management? How journalists and media professionals inform on multiple platforms and seek to adapt (or not) their messages to a multichannel environment? What theoretical, research, and policy frameworks are required to understand the use of emerging technologies within the context of increased inequality, large social vulnerability, and multi-risk environments? What are the technologies that support the most vulnerable citizens to foster equity rather than increasing inequality (the typical outcome of technology innovation as well as natural hazards)?




## Research Unit Contacts:

- **RL1 Solid Earth Processes and Associated Hazards**/ Principal Investigator: Gabriel González – Earth Science & Natural Hazards. Gabriel González ggonzale@ucn.cl
- **RL2 Surface Water Processes and Associated Hazards**/Principal Investigator: Rodrigo Cienfuegos – Earth Science & Civil Engineering

  Rodrigo Cienfuegos: director@cigiden.cl
- **RL3 Risk and Resilience of Complex Systems and Networks/** Principal Investigator: Juan Carlos De la Llera – Civil Engineering/Risk and Resilience of Physical Systems.

  Juan Carlos De la Llera: jcllera@ing.puc.cl
- **RL4 Disaster Cultures and Risk Governance**/Principal Investigator: Manuel Tironi - Sociology & Anthropology.

  Manuel Tironi: metironi@uc.cl
- **RL5 Socio-Economic Assessment of disasters and Mitigation Strategies for Resilient Critical Infrastructure Systems/**Principal Investigator: Alondra Chamorro – Civil Engineering & Infrastructure Management.

  Alondra Chamorro: achamorro@ing.puc.cl
- **RL6 Communication and Emerging Technologies for Disaster Risk Reduction**/Principal Investigator: Gonzalo Bacigalupe – Psychology & Public Health.

  Gonzalo Bacigalope: gonzalo.bacigalupe@cigiden.cl

## Latest Publications:

Indicators of scientific production 6th year CIGIDEN

- Articles year 6: 60, over the expected 55.
- Top 10% items: 11, over the expected 9.
- Items in Q1 + Q2: so far 87%, over 75% expected.
- Articles among researchers CIGIDEN: 22, out of 16 expected.
- International collaboration articles: 35, out of the expected 31
- Of the 60 articles in year 6, 50% are authors of 2 or more different disciplines.

## Institutional Capacity Building Activities and Jobs/ Internship opportunities:

For information, please visit our website: http://cigiden.cl/es/

## Other Useful Information and contacts

- Website: http://cigiden.cl/es/
- Twitter: @cigiden
- Facebook CIGIDEN
- Instagram: @cigiden

# University of California, Berkeley

## Pacific Earthquake Engineering Research Center (PEER), National Information Service for Earthquake Engineering (NISEE)

## USA

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PEER is a multi-institutional research and education center headquartered at University at California, Berkeley

The Pacific Earthquake Engineering Research Center (PEER) is a multi-institutional research and education center with headquarters at the University of California, Berkeley. Since its inception in 1997, PEER has been the primary earthquake engineering research arm of the State of California. Researchers from 11 core universities, several consulting companies, plus researchers at various State and Federal government agencies contribute to research programs focused on performance-based earthquake engineering in disciplines including structural and geotechnical engineering, geology/seismology, lifelines, transportation, risk management, and public policy. PEER's mission is to (1) develop, validate, and disseminate performance-based engineering technologies for buildings, critical civil structures, and infrastructure networks subjected to earthquakes and other natural hazards, with the goal of achieving community resilience; and (2) equip the earthquake engineering and other extreme event communities with tools, technologies and the future workforce, through collaboration between PEER institutions and industry partners. In addition to conducting research, PEER actively disseminates its findings to earthquake professionals who are involved in the practice of earthquake engineering, through various mechanisms including workshops, conferences and the PEER Report Series. PEER also conducts Education and Outreach programs to reach students, policy makers, and others interested in earthquake issues. In the past 21 years, PEER has had major impacts on research and professional practice nationally and internationally. The Center will continue to provide major contributions to earthquake engineering by supporting: (a) research activities in Transportation and Lifelines, Tall Buildings and Ground Motions, (b) technology development including OpenSEES in analytical simulation, OpenFresco in hybrid simulation and BridgePBEE for performance-based bridge earthquake engineering, and (c) dissemination of research outcomes and developed tools and technologies, such as distribution of PEER products, to a broad audience of students, researchers, industry sectors and the general public; supporting interns; training graduate and undergraduate researchers to conduct research; publishing PEER reports; and operating the NISEE-PEER library which has nearly 10,000 users and provides access to thousands of research reports, photographs, and articles.

Prof. Khalid Mosalam, PEER Director

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## Research Focus

- **Geo-hazards research:** This includes Improved characterization of ground motion models, Non-ergodic GMPEs, Physics-based models, Liquefaction, Constitutive modeling, etc.
- **Bridge and Other Transportation Systems Research:** Including Performance-Based Earthquake Engineering of Bridges and Transportation Systems
- **Building Systems Research:** Structural and Non-structural Performance, Loss Modeling and Decision Making
- **Performance-Based Design of Lifeline Systems**
- **Tsunami Research**
- **Research related to Fire Following Earthquakes**
- **Data Sciences Research:** Simulation, Use of Machine Learning and AI to enhance research and practice in Extreme Events
- **Structural Health Monitoring**

Kobe, 1995, NISEE Collection

## PEER-funded Projects

Pacific Earthquake Engineering Research Center (PEER) has continuing funding from the State of California related to the seismic performance of transportation systems.

**Refer to [https://peer.berkeley.edu/research/transportation-systems/projects] for more information about these projects and additional PEER-funded projects.**

- *Modeling Bay Area Transportation Network Resilience.* PI: Jack Baker.
- *Liquefaction Triggering an dEffects at Silty Soil Sites.* PI: Jonathan Bray.
- *Aftershock Seismci Vulnerability and Time-Dependent Risk Assessment of Bridges.* PI: Henry Burton.
- *A Systematic Computational Framework for Multi-span Bridge PBEE Applications.* PI: Ahmed Elgamal.
- *UNR-Stanford Collaboration: Accounting for Earthquake Duration in Performance-Based Evaluation and Design of Bridges.* Co-PIs: Mohamed A. Moustafa, Gregory Deierlein.
- *Post-Earthquake Fire Performance of Industrial Facilities.* PI: Erica C. Fischer.
- *Dissipative Base Connections for Moment Frame Structures in Airports and other Transportation Systems.* PI: Amit Kanvinde.
- *Towards Next Generation p-y Formations – Part 2: Statistical Assessment of Uncertainties in Key Components of Soil Resistance Functions.* PI: Anne Lemnitzer.
- *Tsunami Debris: Simulating Hazard and Loads.* PI: Patrick Lynett.
- *Development of a Database and a Toolbox for Regional Seismic Risk Assessment of California's Highway Bridges.* PI: Ertugrul Taciroglu.
- *Micro-inspired Continuum Modeling Using Virtual Experiments.* PI: Jose Andrade.
- *Implementation and Validation of PM4Sand in OpenSees.* PI: Pedro Arduino.
- *Towards Multi-Tier Modeling of Liquefaction Impacts on Transportation Infrastructure.* PI: Brett Maurer.
- *Influence of Vertical Ground Shaking on Design of Bridges Isolated with Friction Pendulum Bearings.* PI: Keri Ryan.
- *High-Performance Computing Based Distributed Multi-Layered City Scale Transportation Network Tool.* PI: Kenichi Soga.
- *Fluid-Structure Interaction and Python Scripting Capabilities in OpenSees.* PI: Minjie Zhu.

## Latest Publications

**(2017/2018~):**

- **The recent PEER Annual Report is listed below. Refer to [https://peer.berkeley.edu/peer-annual-reports] for additional PEER Annual Reports.**

  *PEER Annual Report 2017-2018.* Khalid Mosalam, Amarnath Kasalanati, and Selim Günay. PEER Report 2018/01. June 2018.

- **PEER Research Reports (2017) are listed below. Refer to [https://peer.berkeley.edu/peer-reports] for all PEER report listings.**

  - *U.S.–New Zealand–Japan Workshop: Liquefaction-Induced Ground Movements Effects, University of California, Berkeley, California, 2–4 November 2016.* Jonathan D. Bray, Ross W. Boulanger, Misko Cubrinovski, Kohji Tokimatsu, Steven L. Kramer, Thomas O'Rourke, Ellen Rathje, Russell A. Green, Peter K. Robinson, and Christine Z. Beyzaei. PEER Report 2017/02. March 2017.

- *NGA-East Ground-Motion Models for the U.S. Geological Survey National Seismic Hazard Maps*. Christine A. Goulet, Yousef Bozorgnia, Nicolas Kuehn, Linda Al Atik, Robert R. Youngs, Robert W. Graves, and Gail M. Atkinson. PEER Report 2017/03. March 2017.
- *Expert Panel Recommendations for Ergodic Site Amplification in Central and Eastern North America*. Jonathan P. Stewart, Grace A Parker, Joseph P. Harmon, Gail M. Atkinson, David M. Boore, Robert B. Darragh, Walter J. Silva, and Youssef M.A. Hashash. PEER Report 2017/04. March 2017.
- *Recommendations for Ergodic Nonlinear Site Amplification in Central and Eastern North America*. Youssef M.A. Hashash, Joseph A. Harmon, Okan Ilhan, Grace A. Parker, and Jonathan P. Stewart. PEER Report 2017/05. March 2017.
- *Guidelines for Performance-Based Seismic Design of Tall Buildings, Version 2.03*, prepared by a TBI Working Group led by co-chairs Ron Hamburger and Jack Moehle: Jack Baker, Jonathan Bray, C.B. Crouse, Greg Deierlein, John Hooper, Marshall Lew, Joe Maffei, Stephen Mahin, James Malley, Farzad Naeim, Jonathan Stewart, and John Wallace. PEER Report 2017/06. May 2017.
- *A Nonlinear Kinetic Model for Multi-Stage Friction Pendulum Systems.* Paul L. Drazin and Sanjay Govindjee. PEER Report 2017/07. October 2017.
- *Influence of Kinematic SSI on Foundation Input Motions for Bridges on Deep Foundations.* Benjamin J. Turner, Scott J. Brandenberg, and Jonathan P. Stewart. PEER Report 2017/08. November 2017.
- *"R" Package for Computation of Earthquake Ground-Motion Response Spectra* Pengfei Wang, Jonathan P. Stewart, Yousef Bozorgnia, David M. Boore, and Tadahiro Kishida. PEER Report 2017/09. December 2017.
- *Development of Time Histories for IEEE693 Testing and Analysis (Including Seismically Isolated Equipment).* Shakhzod M. Takhirov, Eric Fujisaki, Leon Kempner, Michael Riley, and Brian Low. PEER Report 2017/10. December 2017.
- *Preliminary Studies on the Dynamic Response of a Seismically Isolated Prototype Gen-IV Sodium-Cooled Fast Reactor (PGSFR*). Benshun Shao, Andreas H. Schellenberg, Matthew J. Schoettler, and Stephen A. Mahin, PEER Report 2017/11. December 2017.
- *Experimental Investigation of the Behavior of Vintage and Retrofit Concentrically Braced Steel Frames under Cyclic Loading*. Barbara G. Simpson, Stephen A. Mahin, and Jiun-Wei Lai. PEER Report 2017/12. December 2017.

## Other useful information and contacts:

Contact for Communications & Outreach: Grace Kang, Director of Communications, PEER, g.kang@berkeley.edu

Contact for Operations and PEER Labs: Amarnath Kasalanati, Associate Director, amarnath1@berkeley.edu

Contact for Research, Funding & Sponsorship Activities: Khalid Mosalam, Director, PEER, mosalam@berkeley.edu

# University of Colorado Boulder
# Natural Hazards Center
# USA

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Boulder as a result of the landmark National Science Foundation-funded *Assessment of Natural Hazards Research in the United States*. The NHC is the one academic center in the nation dedicated to linking researchers, practitioners, and policy makers to reduce the harm from disasters. The Center team shares and advances social science and interdisciplinary knowledge, with a special emphasis on the most vulnerable populations and places. Every day, the Center team works with a variety of research and practice communities to empower a culture where all people are educated and inspired to take positive action to mitigate hazards losses and to build stronger communities.

The Center engages in four interconnected work streams to generate a variety of outputs: (1) translating and sharing hazards information; (2) facilitating connections between researchers, policy makers, and practitioners, the private sector, the media, and the broader public; (3) training and mentoring a diverse next generation of hazards researchers and practitioners; and (4) advancing social science and interdisciplinary knowledge through original empirical research. All work is informed by a justice and equity approach, and the core values of the Center are focused around a commitment to human dignity, collective wellbeing, scientific understanding, sustainable hazards mitigation, and environmental stewardship.


The Center is funded by the National Science Foundation, Division of Civil, Mechanical, and Manufacturing Innovation (CMMI), Program on Humans, Disasters, and the Built Environment (Award #1635593) with supplemental support from the U.S. Geological Survey, the Centers for Disease Control and Prevention, and the National Integrated Drought Information System of the National Oceanic and Atmospheric Administration. In addition, Center faculty and researchers have contracts and grants from a variety of other federal agencies and nonprofit organizations.

Prof. Lori Peek, Director

E-mail: Lori.Peek@Colorado.edu

Dr. Jennifer Tobin, Deputy Administrator

E-mail: Jennifer.L.Tobin@Colorado.edu

## Research Focus

The research activities of the Natural Hazards Center focus on the social, behavioral, socioeconomic, mental health, and other societal aspects of hazards and disasters, using quantitative, qualitative, and mixed-methods approaches. Current and recently-completed projects involve research with a range of population groups, including potentially vulnerable groups such as children, elderly persons, and low-income populations. Studies explore topics throughout the hazards cycle, from mitigation and preparedness to response and recovery. Various types of hazards are addressed in the Center's research portfolio, ranging from earthquakes, floods, and hurricanes to toxic hazards and technological disasters. Research activities span urban and rural areas in the U.S. and other countries. Studies frequently involve collaborations with researchers from engineering and natural science disciplines.

## Latest Publications

### Active Projects

(https://hazards.colorado.edu/research-projects/index)

2018-23 "CONVERGE: Coordinated Social Science, Engineering, and Interdisciplinary Extreme Events Reconnaissance Research." Funded by the National Science Foundation, Award #18418338. Principal Investigator, Lori Peek.

2018-21 "Building Voluntary Organizations Active in Disaster (VOAD) Capacities to Protect Children in Disasters." Funded by Save the Children. Principal Investigator, Lori Peek.

2018-19 "Workshop: Hazards and Disaster Researchers Meeting: Improving Post-Disaster Rapid Reconnaissance Research." Funded by the National Science Foundation, Award #1833298. Principal Investigator, Lori Peek.

2018-19 "National Flood Insurance Program (NFIP) at 50." Funded by the Association of State Floodplain Managers and the Federal Emergency Management Agency. Principal Investigator, Lori Peek.

2018-19 "Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety." Funded by the Federal Emergency Management Agency, contract to the Applied Technology Council. Outreach Committee Chair, Lori Peek.

2018 "Translating Research into Health Applications." Funded by the U.S. Department of Health and Human Services, Office for the Assistant Secretary for Preparedness and Response. Principal Investigator, Lori Peek.

2017-19 "EAGER: Interdisciplinary and Social Science Extreme Events Reconnaissance." Funded by the National Science Foundation, Award #1745611. Principal Investigator, Lori Peek.

2017-19 "NSF INCLUDES: Capacity Building in Disaster Research for Scholars from Under-Represented Groups." Funded by the National Science Foundation, Award #1744479. DeeDee Bennett, Principal Investigator. Co-Principal Investigator, Lori Peek.

2016-22 "A Clearinghouse on Natural Hazards Applications." Funded by the National Science Foundation, Award #1635593. Principal Investigator, Lori Peek.

2016-18 "Interdisciplinary Methods for Disaster Research." Funded by the National Science Foundation. Principal Investigator, Lori Peek.

2015-20 "Community Resiliency to Natural Disasters: NIST-Center of Excellence." Funded by the National Institute of Standards and Technology. John van de Lindt and Bruce Ellingwood, Principal Investigators. Co-Investigator, Lori Peek.

2015-20 "Demographic and Health Disparities in Recovery from Hurricane Katrina: KATRINA@10." Funded by the National Institute of Health. Mark VanLandingham, David Abramson, and Mary Waters, Principal Investigators. Co-Investigator, Lori Peek.

2015-19 "A Risk-Informed Decision Framework to Achieve Resilient and Sustainable Buildings that Meet Community Objectives." Funded by the National Science Foundation. John van de Lindt, Principal Investigator. Co-Investigator, Lori Peek.

### Guidebook

2017 Contributing Author—Applied Technology Council Project Management Committee. *Safer, Stronger, Smarter: A Guide to Improve School Natural Hazards Safety.* Washington, D.C.: Federal Emergency Management Agency and Applied Technology Council. https://www.fema.gov/media-library/assets/documents/132592

### Journal Articles

2018 Masoomi, Hassan, John W. van de Lindt, and Lori Peek. "Quantifying Socioeconomic Impact of a Tornado by Estimating Population Outmigration as a Resilience Metric at the Community Level." *Journal of Structural Engineering* 144(5): https://doi.org/10.1061/(ASCE)ST.1943-541X.0002019

2018 Peek, Lori. "Looking Back and Moving Forward: 2018 International Sociological Association Research Committee on Disasters (RC39) Presidential Address." *International Journal of Mass Emergencies and Disasters* 36(2): 87-96.

2017 Cox, Robin, Leila Scannell, Cheryl Heykoop, Jennifer Tobin, and Lori Peek. "Understanding Youth Disaster Recovery: The Vital Role of People, Places, and Activities." *International Journal of Disaster Risk Reduction* 22: 249-256.

2017 Fothergill, Alice and Lori Peek. “Kids, Creativity, and Katrina.” *Contexts* 16(2): 65-67.

2017 Pardee, Jessica, Alice Fothergill, Lynn Weber, and Lori Peek. “The Collective Method: Collaborative Social Science Research and Scholarly Accountability.” *Qualitative Research* DOI: https://doi.org/10.1177/1468794117743461.

2017 Sutley, Elaina, John W. van de Lindt, and Lori Peek. “Community-Level Framework for Seismic Resiliency, Part I: Coupling Socioeconomic Characteristics and Engineering Building Systems.” *Natural Hazards Review* 18(3): 04016014. DOI: http://dx.doi.org/10.1061/(ASCE)NH.1527-6996.0000239.

2017 Sutley, Elaina, John W. van de Lindt, and Lori Peek. “Community-Level Framework for Seismic Resiliency, Part II: Multi-Objective Optimization and Illustrative Examples.” *Natural Hazards Review* 18(3): 04016015. DOI: http://dx.doi.org/10.1061/(ASCE)NH.1527-6996.0000230.

2017 Sutley, Elaina, John W. van de Lindt, and Lori Peek. “Multi-Hazard Analysis: Demonstrating How Socioeconomic and Demographic Factors Act as a Hazard for Natural Disasters.” *Journal of Structural Engineering* DOI: https://doi.org/10.1061/(ASCE)ST.1943-541X.0001846#sthash.C7B5iKir.dpuf.

### Special Journal Issue Editorships

2018 Guikema, Seth and Lori Peek, Guest Editors. Interdisciplinary Methods and Approaches for Hazards and Disaster Research. Forthcoming in *Risk Analysis: An International Journal.*

### Chapters in Books and Monographs

2018 Davis, Elizabeth A., Rebecca Hansen, Lori Peek, Brenda Phillips, and Sarah Tuneberg. “Identifying and Accommodating High-Risk, High-Vulnerability Populations in Disasters.” *Disaster Nursing and Emergency Preparedness for Chemical, Biological, and Radiological Terrorism and Other Hazards, 4th ed.,* edited by T. G. Veenema, 115-138. New York: Springer.

2018 Enarson, Elaine, Alice Fothergill, and Lori Peek. “Gender and Disasters.” *Handbook of Disaster Research, 2nd ed.,* edited by H. Rodriguez, W. Donner, and J. E. Trainor, pp. 205-223. New York: Springer.

2018 Peek, Lori, David Abramson, Robin Cox, Alice Fothergill, and Jennifer Tobin. “Children and Disasters.” *Handbook of Disaster Research, 2nd ed.,* edited by H. Rodriguez, W. Donner, and J. E. Trainor, 243-262. New York: Springer.

### Encyclopedia Entries

2017 Peek, Lori and Kai Erikson. “Hurricane Katrina.” *Blackwell Encyclopedia of Sociology, 2nd ed.,* edited by G. Ritzer. Oxford: Blackwell.

### Research Reports

2018 National Institute of Standards and Technology (NIST). “Community Resilience-Focused Technical Investigation of the 2016 Lumberton, North Carolina Flood Multi-Disciplinary Approach.” Contributing Author to Chapter 3 and Chapter 4. Edited by: John W. van de Lindt, Walter Gillis Peacock, Judith Mitrani-Reiser. NIST Special Publication 1230.

2018 Federal Emergency Management Agency (FEMA). “A Proposed Emergency Management Research Agenda.” Contributing Authors: Lori Peek, Jennifer Tobin, Wendy Walsh, DeeDee Bennett, Kevin Kloesel, Steven Patterson, Brenda Phillips, Gary Webb, and Kristin Wyckoff. Washington, D.C.: FEMA.

2017 Association of State Floodplain Managers (ASFPM). “Floodplain Management 2017: State Programs.” Contributing Authors: Liesel Ritchie, Chad Berginnis, Jolie Breeden, Bill Brown, Nnenia Campbell, Simone Domingue, Allison Madera, Lori Peek, Catherine Brownlee Talbot, Jennifer Tobin, and Jamie Vickery. Madison, WI: ASFPM.

## Institutional Capacity Development Activities

The Natural Hazards Center does not currently offer any training opportunities. However, in the very near future we will be launching our most recent project, Converge, a Natural Hazards Engineering Research Infrastructure (NHERI) facility, where we will be offering online tutorials and trainings for people interested in conducting rapid reconnaissance research.

We also promote trainings and resources offered by a variety of institutions, which are available on our website: https://hazards.colorado.edu/ under the “Resources” tab. Check back regularly for more information about Converge.

# Wind and Hurricane Impact Research Laboratory (WHIRL), Florida Institute of Technology (FIT), USA

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STUDENTS WALK NEAR EVANS LIBRARY ON THE FLORIDA TECH CAMPUS IN MELBOURNE, FLA –Photo Forbes Magazine

The WHIRL is dedicated to the study of the effects and impact of wind storms, including hurricanes, tornadoes, and thunderstorms, and other related meteorological hazards (e.g. flooding, and storm surges) on the natural environment and man-made structures. The laboratory involves a multidisciplinary team of engineers, scientists, and business experts, who take advantage of a geographic location in the heart of Florida Space Coast, to serve the needs of industry, government, and the public in wind hazard mitigation. Objectives The three main objectives of the WHIRL are: research on mitigation of losses to life, property, and the environment; education of the public through dissemination of information, and organization of seminars and workshops; promotion of multidisciplinary studies focused on wind engineering, and wind related socio-economic studies and analyses.

## Research Focus

The three main objectives of the WHIRL are:

- research on mitigation of losses to life, property, and the environment;
- education of the public through dissemination of information, and organization of seminars and workshops;
- promotion of multidisciplinary studies focused on wind engineering, and wind related socio-economic studies and analyses.

## Research Units

- Ondrej Doule, Ph.D.: Human centered design; architecture.
- Ivica Kostanic, Ph.D.: Electrical and Computer Engineering
- Steven M. Lazarus, Ph.D.: Meteorology
- Carlos E. Otero, Ph.D.: Electrical and Computer Engineering
- Jean-Paul Pinelli, Ph.D., P.E.: Structures and wind engineering
- Mani Subramanian, Ph.D., P.E.: Aerospace engineering/meteorology
- Robert J. Weaver, Ph.D.: Coastal engineering

## Internship Opportunities

We welcome interns for work related to:

- hurricane risk modeling;
- field measurements during hurricane events;
- post-disaster surveys

Prof. Jean-Paul Pinelli

E-mail: pinelli@fit.edu

# Coastal Resilience Center (CRC) University of North Carolina at Chapel Hill (UNC), USA

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

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coastalresiliencecenter.unc.edu

The mission of the Coastal Resilience Center of Excellence (CRC) is to conduct research and education to enhance the resilience of the nation's people, infrastructure, economies and the natural environment to the impacts of coastal hazards such as floods and hurricanes, including the effects of future climate trends.

With funding from the U.S. **Department of Homeland Security (DHS)** Science and Technology Directorate, the CRC operates as a nationwide consortium of universities, private companies, and government agencies led by the **University of North Carolina at Chapel Hill** in partnership with Jackson State University in Jackson, Mississippi.

Examples of expected outcomes include:

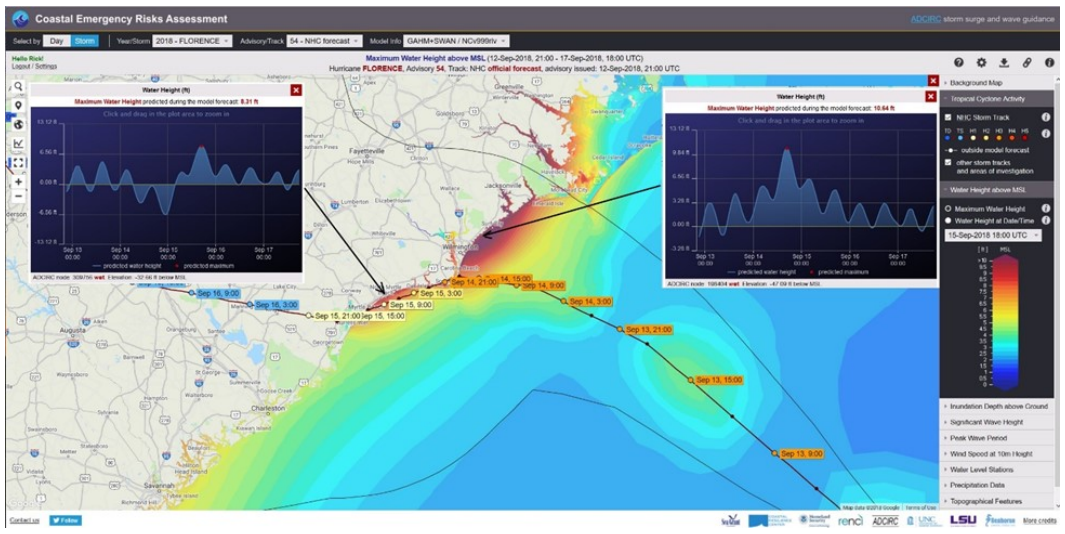
- More accurate storm surge models and timely delivery of high-resolution surge predictions for approaching storms to protect flood-prone communities.
- A planning toolkit to help coastal communities assess their vulnerability to future flooding and storm risks, and integrate coastal hazards into community planning processes.
- Improved approaches to communicate risk through computer tailored interventions and text messaging that incentivize people to take life-saving protective actions.
- Educate the next generation of hazards researchers and practitioners, emphasizing the development of certificate and degree programs in minority-serving educational

## Research Focus

- Disaster Dynamics: Advancing storm surge and flooding predictions with the ADCIRC storm surge model. Enhancing mapping and other visualization capabilities for storm surge and flooding predictions.
- Education and Workforce Development: Graduate-level programs, degrees and certificates focused on diversifying the Homeland Security workforce, particularly in the fields of engineering, disaster studies and planning.
- Building Resilient Communities: Strengthening planning networks and neighborhood vulnerability indicators; communicating risk to motivate individual action.
- Coastal Infrastructure Resilience: Improving damage and loss estimation due to overland waves and surge hazards.


Anna Schwab, Program Manager,
E-mail: akschwab@email.unc.edu

## Research Unit Contacts




- University of North Carolina at Chapel Hill: Rick Luettich, rick_luettich@unc.edu
- Jackson State University: Thomas Richardson, thomas.w.richardson@jsums.edu

## Latest Publications

- ***"Resilient Design Education In The United States: Current and Emerging Curricula in Colleges and Universities"*** (2018)
- ***"Rethinking Flood Analytics: Proceedings from the 2017 Flood Analytics Colloquium."*** DOI: 10.17615/C6S08Z
- ***Integrating Maritime and Coastal Resilience: Report from the 7th Annual Maritime Resilience Symposium*** (2017)
- Rick Luettich (ed.), "**Coastal Hazards Related to Storm Surge**," *Journal of Marine Science and Engineering*, 2018.
- ***Landscape Survey to Support Flood Apex National Flood Decision Support Toolbox: Definitions and Existing Tools*** by Aaron Strong and Debra Knopman (developed under contract with the DHS Coastal Resilience Center of Excellence to support the Flood Apex program)
- "Disaster Recovery in an Era of Climate Change: The Unrealized Promise of Institutional Resilience" by Dr. Gavin Smith, Amanda Martin and Dr. Dennis E. Wenger (from ***Handbook of Disaster Research***, Eds. Havidán Rodríguez, William Donner and Joseph E. Trainor. Springer, 2018)
- "Pre- and Post-Disaster Conditions, their Implications, and the Role of Planning for Housing Recovery" by Dr. Gavin Smith (from ***Coming Home After Disaster: Multiple Dimensions of Housing Recovery***, Eds. Ann-Margaret Esnard and Alka Sapa. CRC Press, 2017)
- "Social Media and Emergency Management" by Josh Kastrinsky (from ***Technology and Emergency Management, 2nd Edition***, Ed. John C. Pine. Wiley, 2017)
- **"Intensification of landfalling typhoons over the northwest Pacific since the late 1970s"** by Wei Mei and Shang-Ping Xie. *Nature Geoscience* (2016).
- "**Reducing Coastal Risk on the East and Gulf Coasts**" Committee on U.S. Army Corps of Engineers Water Resources Science, Engineering, and Planning: Coastal Risk Reduction, National Academy of Engineering and National Research Council, 167p (R. Luettich, Committee Chair).
- More at http://coastalresiliencecenter.unc.edu/resources/publications-and-products/.

## Institutional Capacity Development Activities and other Useful Information

- DHS Summer Research Team Program for Minority Serving Institutions: The goal of this program is to increase and enhance the scientific leadership at Minority Serving Institutions in the U.S. in research areas that support the mission and goals of DHS. Each fall, teams of faculty and students apply for placement at participating DHS Centers of Excellence for an intensive 10-week collaborative research experience. More information can be found at https://www.orau.gov/dhseducation/faculty/.
- ADCIRC Boot Camp: Each spring, attendees learn the basics of the ADCIRC storm surge modeling system through hands-on training sessions. Experienced users can engage in more advanced discussions about ADCIRC's latest features and applications. Registration is open to students, researchers, professionals and government employees. For more information, see https://adcirc.org

Internships/job opportunities posted as available on center website.

Dr. Rick Luettich, Lead Principal Investigator

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# Global Resilience Institute, Northeastern University, USA

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Global Resilience Institute funds inaugural university-wide resilience research projects at Northeastern

In 2016, Northeastern University approved the launch of the Global Resilience Institute (GRI), a first of its kind university-wide institute dedicated to advancing resilience, as a major initiative to support the university's 2025 strategic plan. Underwritten with a significant internal investment, GRI has over 20 full-time staff; over 100 faculty affiliates from all 9 of Northeastern's colleges including the College of Engineering, College of Computer and Information Science, Business School, Law School, and College of Social Sciences and Humanities; 19 eminent practitioners who serve as Distinguished Senior Fellows; and 7 exceptional professionals from private business and industry who serve as Distinguished Corporate Fellows.. In March 2018, the institute launched the Global Resilience Research Network (GRRN) with the participation of 20 universities and research institutes from 14 countries around the world. This collaborative research and educational community shares a common commitment to work in close partnership with industry and public entities in developing and deploying practical tools, applications, and skills that bolster the resilience of individuals, communities, critical systems and networks, and societies.

## Research Focus

The Global Resilience Institute supports research and educational efforts in seven strategic areas that draw on the latest findings from network science, health sciences, coastal and urban sustainability, engineering, cyber-security and privacy, social and behavioral sciences, public policy, urban affairs, business, law, game design, architecture, and geospatial analysis:

- Tools and measurement: Research and development of risk-based models, visualization, and simulation tools and measurement methodologies to support urban planning; public policy; community development, public safety, security, and emergency management; and post-disaster recovery and adaptation.
- Design and engineering: Research on cross-sector design of infrastructure, systems, and networks that prepare for climate change and other disruptive hazards – both man-made and naturally occurring.
- Governance and incentives: Research on the role of regulations, standards, codes, and market-based incentives such as insurance, reinsurance, and financing that can advance early and widespread adoption of resilience best practices by public, private and non-governmental networked organizations.
- Individual and health: Research on the capacity for individuals to cope and respond to trauma and adversity, and to stay healthy while aging, including linkages between physical and emotional health.
- Social and community: Research on social interactions, networks, and communication to include the role of social media within communities; cultural resilience; inclusive well-being and prosperity for all members of a community; barriers that contribute to growing socio-economic inequality, racial and gender exclusion, and other forms of disparity in vulnerabilities and opportunities.
- Security and systems: Research on the role of resilience in response to transnational threats; conventional and cyber-physical attacks on critical infrastructure with the associated risk of cascading failures; and cyber, information, and communications security.
- Socio-ecological: Research on integrated ecological, socioeconomic, and cultural systems in the context of climate change, globalization, and other anthropogenic disruptions.

Angie Valencia

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## Latest Publications


- Flynn, S. (2018, Feb 1). *Higher Ground: The Sophisticated Healthcare Response of the SouthEast Texas Regional Advisory Council to Hurricane Harvey.* Retrieved from: https://globalresilience.northeastern.edu/resources/higher-ground-the-sophisticated-healthcare-response-of-the-southeast-texas-regional-advisory-council-to-hurricane-harvey/
- Flynn, S. (2017, Dec 1). *Wildfire: A Changing Landscape | A Global Resilience Institute and National Fire Protection Association Assessment.* Retrieved from: https://globalresilience.northeastern.edu/app/uploads/2017/12/WildfireReport_13dec17_Full.pdf
- Flynn, S. (2017). *Boston Under Snow: Resilience Lessons for the Nation.* Retrieved from: https://globalresilience.northeastern.edu/resources/boston-under-snow-resilience-lessons-for-the-nation/
- Aldrich, D. (2019). *Black Wave: How Connections and Governance Shaped Recovery from Japan's 3/11 disasters.* University of Chicago Press.
- Aldrich, D., Metaxa-Kakavouli, D. Mass, P. (2018) How Social Ties Influence Hurricane Evacuation Behavior, *Computer Supported Cooperative Work and Social Computing* 1(122): 1-16
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- Aldrich, D., Sadri, A. et all (2018) The Role of Social Capital, Personal Networks, and Emergency Responders in Post-Disaster Recovery and Resilience: A Study of Rural Communities in Indiana. *Natural Hazards 90(3) 1377–1406*
- Aldrich, D. (2018, May). A research agenda for disaster entrepreneurship. *Review of Austrian Economics.*


## Jobs and Internship Opportunities

The Global Resilience Institute's co-op program is an experiential learning opportunity that allows students at the undergraduate and graduate level to work on an interdisciplinary team of researchers seeking to solve complex resilience challenges. GRI co-ops not only provide critical support for the Institute's mission, but also get practical training in the skills needed for a career in resilience, including research and writing, critical thinking, and collaborating with experts from all fields of study. The Global Resilience Institute also offers the same learning opportunities through part-time research positions for students currently enrolled in classes. Through the Global Resilience Institute's seed grant program, students are able to work on research projects with faculty from all nine of Northeastern's colleges.

# Advanced Radar Research Center (ARRC)
# University of Oklahoma, USA

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The Advanced Radar Research Center (ARRC) at the University of Oklahoma (OU) is arguably the largest academic research center in radar in the world. Currently, the ARRC has 18 faculty members, ten radar engineers, and more than 100 undergraduate and graduate students, postdocs, and visiting scholars from meteorology, hydrology, and engineering. A list of ARRC faculty can be found in https://arrc.ou.edu/people.html. Its main mission is to solve challenging radar research problems, and prepare the next generation of students through innovative and integrated end-to-end approaches. The core capabilities of the ARRC in weather radar include rapid radar prototyping, design of polarimetric phased array, development of signal processing algorithms, and radar applications. These capabilities are supported by the state-of-the-art Radar Innovations Laboratory (RIL) and close collaborations with scientists and engineers in the National Weather Center (NWC). Both RIL and NWC are located on OU's Research Campus, which was named the nation's top research park in 2013 by the Association of University Research Parks. The NWC is the focal point of the Research Campus, and houses over 500 professionals from both academic and government organizations such as National Oceanic and Atmospheric Administration's (NOAA) Storm Prediction Center (SPC), National Severe Storms Laboratory (NSSL), and Weather Forecast Office (WFO). Located immediately east of the NWC, RIL houses all of OU's radar faculty, staff, and students. The RIL is a 35,000 square foot state-of-the-art facility, dedicated to advancing the scientific and educational goals of OU's radar program through the design and fast prototyping of innovative hardware and software systems. Specifically, RIL has two precision anechoic chambers, machine shop, microfabrication laboratory, microwave laboratory, high-bay garage, and experimental observation roof deck. A picture of RIL is presented in the following figure. A more detailed description of the RIL is here https://arrc.ou.edu/ril.html.

Specifically, ARRC has strong experience in design, integration, and operation of various systems ranging from conventional dish-antenna weather radar to innovated and complex polarimetric phased array radar. Included in the ARRC facilities is a diverse set of radars of complementary wavelengths, scanning options, and polarimetric capabilities (https://arrc.ou.edu/radars.html), as presented in the following table.

## Research Focus

Areas of emphasis exist in rapid hardware prototyping, advanced signal processing, antennas, hydrometeorology, clear-air sensing, UAS sensors, severe weather, applied electromagnetics, and microwave engineering. ARRC's research portfolio is recognized as cycle of innovation, as demonstrated in the following figure.

When the ARRC faces a challenge or task in radar engineering and science, the first step is to analyze the problem and subsequently come up with a conceptual and system design and strategy to tackle the problem. Various faculty in the ARRC specialized in RF components, traditional and phased array antenna, backend system and embedded software can be assembled to realize the proposed system. Through the state-of-the-art fabrication and test facility, the system will be developed, built, and tested. The ARRC, sometimes in collaboration with scientists in other institutes, will take the system to the field supporting campaigns and experiments. ARRC is also specialized in signal processing for improving weather observations and detection of hazardous weather. The application of radar in both meteorology and hydrology to advance science and help decision making are also a strength in the ARRC. The lessons learned through the above process will feed into the design of next generate radar system. A detailed description of ARRC's cycle of innovation and how faculty expertise fits can be found in https://arrc.ou.edu/research.html. In summary, ARRC's strength in radar includes in the areas of interdisciplinary radar education, phased array radar, dual-polarization radar, mobile/deployable radars, severe weather, clear-air turbulence, microphysics/hydrometeorology, digital signal/ array/image processing, antenna design, radar simulation, microwave engineering, spectrum sharing technologies, etc.

Dr. Tian-You Yu

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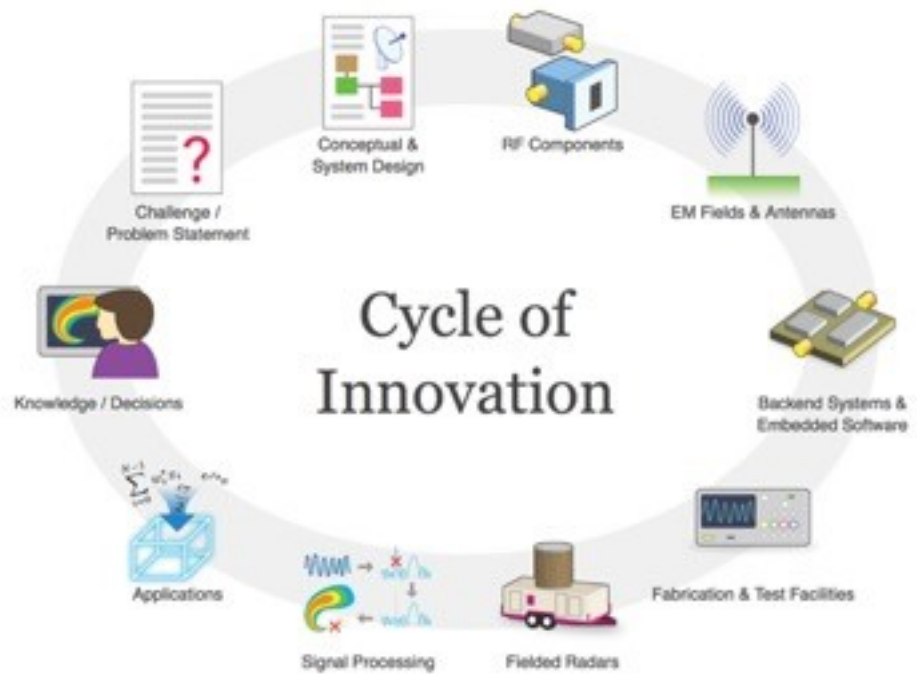



***Table 1**: A list of Weather Radars in the ARRC—[+]Ant: Antenna type: P denotes phased array and D denotes dish antenna*

[*]As of 02/20/2018

| Name | Freq. | Pol. | Transmitter | [+]Ant. | BW | platform | Status* |
|---|---|---|---|---|---|---|---|
| CPPAR[1] | S | dual | SSPA[#] (1.5 KW) | P | 4.5° | portable | operational |
| All-digital radar (HORUS) | S | dual | SSPA (10 W/ ele/pol) | P | 4.5° | mobile | commission in 2019 |
| OU-PRIME[2] | C | dual | Magnetron (1 MW) | D | 0.5° | fixed | Maintenance |
| SMART-R[3] | C | dual | Magnetron (250 KW) | D | 1.5° | mobile | operational |
| PAIR[4] | C | dual | SSPA (41 KW) | P | 1.8° | mobile | Commission in 2020 |
| RaXPol[5] | X | dual | TWTA[$] (20 KW) | D | 1.0° | mobile | operational |
| AIR[6] | X | single | TWTA (3.5 KW) | P | 1.0° | mobile | operational |
| PX-1000 | X | dual | SSPA (400 W) | D | 1.8° | transportable | operational |
| PX-10000 | X | dual | SSPA (1.2 kW) | D | 1.4° | transportable | Commission in 2018 |
| Reflected-Array | X | single | SSPA (150 W) | P | 4.0° | portable | operational |

[#]SSPA: solid state power amplifier

[$]TWTA: traveling wave tube amplifier

[1]CCPAR: Cylindrical Polarimetric Phased Array Radar

[2]OU-PRIME: OU-Polarimetric Radar for Innovations in Meteorology and Engineering

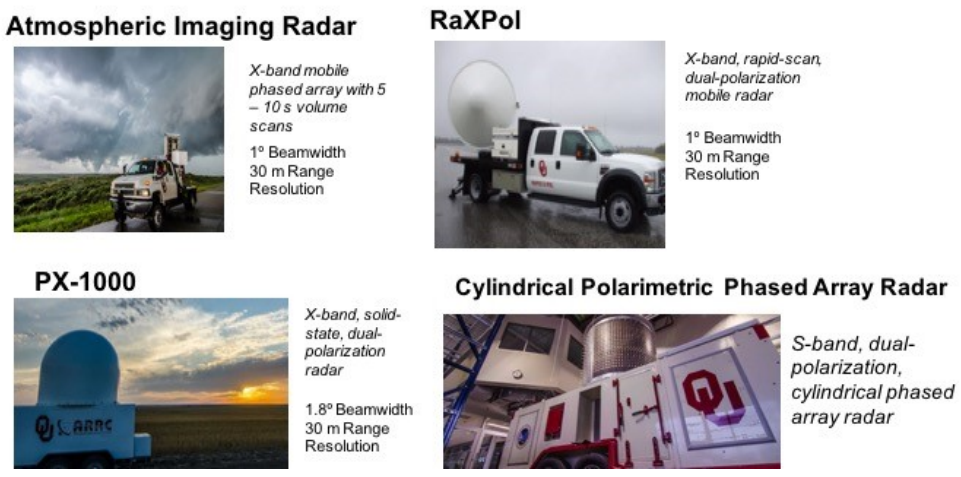
[3]SMART-R: Shared Mobile Atmospheric Research & Teaching Radar

[4]PAIR: Polarimetric Atmospheric Imaging Radar

[5]RaXPol: Rapid scan X-band Polarimetric Radar

[6]AIR: Atmospheric Imaging Radar

Example of four radar systems are presented in the following picture.



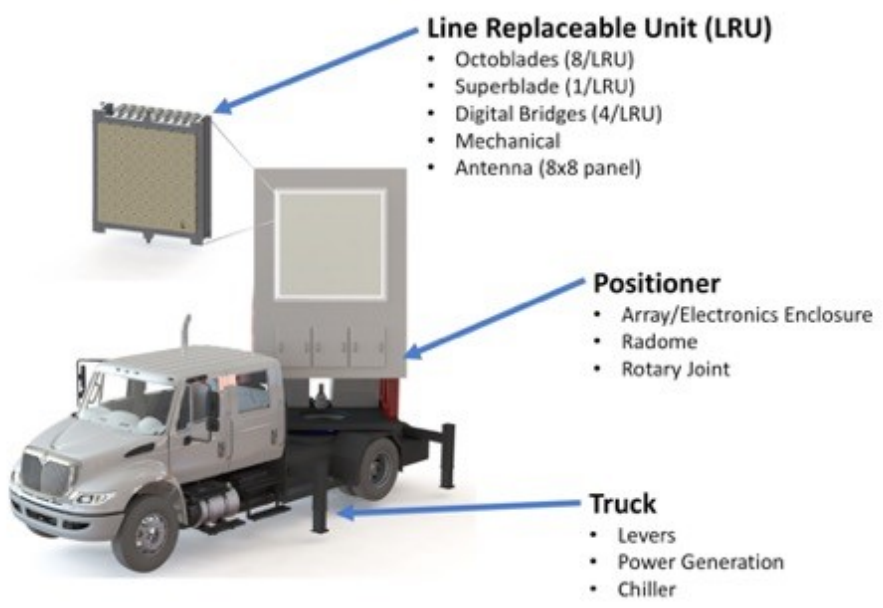
## Institutional Capacity Development Activities

The ARRC faculty has developed an interdisciplinary curriculum, which cuts across several academic units with the goal of producing the leaders of the next generation of weather radar scientists and engineers. Recently, the curriculum has been enhanced and broadened to include a more general coverage of radar and applied electromagnetics. Students involved in OU's radar curriculum are provided a coherent and comprehensive experience not matched at other institutions. Some example courses offered in the curriculum are Electromagnetics I, Propagating Waves, Advanced & Computational EM, Antennas, RF & Microwave Filter Design, Microwave Systems & Components, RF & Microwave Engineering, Radar Signal Processing, Radar Hydrometeorology, Weather Radar Theory, Radar Engineering, Digital Radar Systems, Weather Radar Applications, Weather Radar Polarimetry, Radar Imaging & Array Processing.

A more detailed description of the curriculum can be found in Palmer at al. (2009).

Palmer, R. D., M. Biggerstaff, P. Chilson, J. Crain, K. Droegemeier, Y. Hong, A. Ryzhkov, T. Schuur, S. Torres, M. Yeary, T.-Y. Yu, G. Zhang, Y. Zhang (2009): Weather Radar Education at the University of Oklahoma: An integrated interdisciplinary approach, Bull. Amer. Meteor. Soc., 1277-1282.

## Latest Research Reports




One the ARRC's research is highlighted in the following. In collaboration with the National Severe Storms Laboratory, the ARRC has been developed the most advanced and flexible all-digital polarimetric phased array system. This project is termed HORUS. This project is funded under the Spectrum Efficient National Surveillance Radar (SENSR) program. The goal is to develop a unified, multi-function technology that delivers complete CONUS radar coverage for air traffic control and weather. The HORUS system developed at OU is a polarimetric all-digital phased array system that is capable of emulating any phased array architecture to allow architecture comparisons and exploring advanced calibration techniques and trade spaces. Due to the flexibility gained by the all-digital approach, various advanced scanning techniques can be implemented and compared such as imaging, space-time multiplexing, focusing, etc. The ARRC has been developed an S-band HORUS demonstrator. The all-digital Horus demonstrator can be broken into several major subsystems, which are shown in the figure below.

The Horus antenna is an 8x8 dual-pol stacked patch design, which will be affixed to the front of the LRU and will directly connect to the RF connections on the Octoblades. The initial design proved to have extremely good performance and was verified in anechoic chamber. A picture of the antenna test in ARRC's anechoic chamber is provided in the following.

The ARRC team has made significant progress and it is planned to complete the system development in 2019.

**Useful links to Publications:**

https://arrc.ou.edu/publications.html

https://arrc.ou.edu/books.html

# Rensselaer Polytechnic Institute (RPI)
# USA


i. Center for Infrastructure, Transportation, and the Environment (CITE)
ii. Department of Industrial and Systems Engineering

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**Center for Infrastructure and Transportation Studies (CITS)** in January 1, 2010. The center was established by Rensselaer in 1993 as a collaborative environment in which interdisciplinary transportation and infrastructure-related research could be conducted. CITE based doctoral students have prepared theses related to network design, system design, operational control, sensors, and instrumentation. A member of the 53-university Council for University Transportation Centers (CUTC), CITE/CITS is known more generally for research in transportation systems planning, design and operation; freight network planning; modeling, simulation, and capacity assessment; emergency response; hazardous materials logistics; traffic signal system control; and pavement and bridge management systems.

The mission of CITE/CITS is to investigate complex transportation and infrastructure problems and to assist in developing solutions or approaches for dealing with these problems. The Center either directly provides solutions to the owners, operators, or users of civil infrastructure systems or delivers educational technologies that allow the owners, operators, or users to develop and implement their own solutions.

CITE/CITS focuses on the following roles:

Providing a forum for complex transportation issues, identifying the parameters of the issues and cooperatively develop solutions or approaches for dealing with the issues.

Developing advanced educational technologies.

Conducting studies in systems operation and facilities management, including incident management.

Developing methodologies focused on goods movement and logistics.

Developing analytical techniques that help prioritize investments in infrastructure.

During its early years, the main funding for CITE/CITS was derived from the New York State Thruway Authority, the New York State Energy Research and Development Authority (NYSERDA), New York State Department of Transportation (NYSDOT), and the United States Department of Transportation (USDOT). More recently, continued funding from USDOT and NYSDOT has been supplemented by projects sponsored by the National Science Foundation (NSF), and the New Jersey Department of Transportation (NJDOT). Work on pavement management systems, bridge management systems, hazardous materials logistics, and traffic signal systems has given way to projects focused on truck flows in urban areas, two-tiered network analyses where the IT aspects of transport systems operation are directly taken into account, educational tool development, and advanced materials. Current research funding within CITE/CITS stands at between $1.5-$2 million annually.

## Research Focus

Projects recently completed or presently underway include:

- Disaster response logistics (NSF)
- Dynamic urban goods modeling (NSF)
- Integrated urban freight demand management (USDOT)
- Advanced Wireless Traveler Information Systems (USDOT/NYSDOT)
- Electronic toll collection system design game (FHWA/ NYSDOT)
- Assessment of impacts of Value Pricing Projects (FHWA/ NJDOT)
- Freight-related network enhancements (USDOT/ NYSDOT)
- Transport systems control (NSF)

Dr. Holguín-Veras is a member of the prestigious National Academy of Sciences' Disaster Research Roundtable, a highly selective group of disaster responders and researchers charged with advising the federal government in disaster policy, and providing a bridge between the research and practitioner communities.


Prof. José Holguín-Veras, Director

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Assoc. Prof.. David Mendonca, Associate Professor

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## Research Focus

Dr. Holguín-Veras and his team has pioneered the holistic study of humanitarian logistics by: (1) analyzing response operations as a socio-technical system; (2) conducting research to characterize actual operations and identify lessons learned; and (3) developing suitable mathematical models as decision-support tools. This work has had a transformative effect on disaster policy. His team's deep knowledge of disaster operations has been accumulated through extensive fieldwork, and interviews with hundreds of individuals directly involved in: World Trade Center, Katrina, Joplin, Hurricanes Irene and Sandy, Port-au-Prince and Chile earthquakes, and the Tohoku disasters in Japan, among others. The lessons learned through this fieldwork are routinely shared with FEMA and many other disaster agencies. The RPI team develops mathematical models that incorporate the realities and behaviors identified in the fieldwork, such as: inventory allocation models that account for deprivation costs, dynamic control models to manage material convergence, and models of immediate resource requirements, among others.

Outside of CITE, other RPI faculty are involved in a number

Outside of CITE, other RPI faculty are involved in a number of hazards-related areas. Within the Department of Industrial and Systems Engineering, three faculty—W.A. (Al) Wallace, T. Sharkey and D. Mendonça—have been working for more than a decade on critical infrastructure-related research.

**Al Wallace** is currently the Head of Industrial and Systems Engineering at Rensselaer and a Professor Wallace is presently engaged in research on the application of agent based technology to problems in incident management and emergency response, issues in trust and ethical decision making, resilience supply networks, and in studying emergentand improvisational behavior in social media immediately before and following a disaster. Professor Wallace's research has been supported by agencies and organizations such as the U.S. National Science Foundation, U.S. Department of Homeland Security (including the U.S, Coast Guard), U.S. Department of Transportation and Army Research Office, and has resulted in over 200 archival publications.

http://ise.rpi.edu/people/william-al-wallace

**David Mendonça** is engaged in research that centers on the study of the cognitive processes that underlie human decision making in the management of critical infrastructure systems with a focus on understanding and supporting decision making in high consequence, non-routine, time-pressured situations. He utilizes laboratory and field-based methods to collect data on the physical state of systems in the built environment, and the psychological state of humans operating in relation to those systems. His work has led to the development of statistical and computational models to explain decision maker behavior in the field and has translated these results into implications for practice and policy. He has pioneered new technologies providing cognitive support in solving sequential multi-criteria decisions for these constituents and developed novel statistical models that have explained variability in cognition, behavior and communication among individuals and collectives in the hours following disruptive events.

http://homepages.rpi.edu/~mendod

**Thomas Sharkey** has research interests focusing on creating novel optimization models and algorithms for problems in network resilience with applications in supply chain management, national defense, and homeland security. The resilience of a network is its ability to withstand and rapidly recovery from a disruptive event. Professor Sharkey has created new optimization algorithms to better understand the recovery part of resilience for interdependent infrastructure networks and multi-echelon assembly supply chain networks (the latter in collaboration with a leading defense aircraft manufacturer). He is interested in applying game-theoretic techniques in order to understand how decentralized decision-making in these recovery efforts (for example, decentralized across infrastructures or decentralized across suppliers) impacts the overall recovery efforts and how incentives could improve the cost of decentralization.

http://homepages.rpi.edu/~sharkt/

## Latest Publications

**José Holguín-Veras:**

(1) "Field Investigation on Post-Disaster Humanitarian Logistic Practices under Cascading Disasters and a Persistent Threat: The Tohoku Earthquake Disasters" (NSF, 2012-13); (2) "Cyber Enabled Discovery System for Advanced Multidisciplinary Study of Humanitarian Logistics for Disaster Response" (NSF-IIS, 2011-14); (3) "Contending with Materiel Convergence: Optimal Control, Coordination, and Delivery of Critical Supplies to the Site of Extreme Events" (NSF-CMMI, 2008-11); (4) "Field Investigation on the Comparative Performance of Alternative Humanitarian Logistic Structures" (NSF-RAPID, 2010-2011); (5) "Characterization of the Supply Chains in the Aftermath of an Extreme Event: The Gulf Coast Experience" (NSF-CMMI, 2005-2006); (6) "Impacts of Extreme Events: A Systematic Analysis of Individual Travel Choice Decisions After 9/11" (NSF-CMS, 2002-2004); (7) "Impacts of Extreme Events on Passenger Travel Behavior After 9/11" (NSF-CMMI, 2001-2002).


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- Holguín-Veras, J., J Amaya-Leal, V Cantillo, LN Van Wassenhove, F Aros-Vera, M. Jaller Econometric estimation of deprivation cost functions: A contingent valuation experiment, Journal of Operations Management 2016, 45, 44-56
- Holguín-Veras, J., E. Taniguchi, M. Jaller, F. Aros-Vera, F. Ferreira, and R.G. Thompson, The Tohoku disasters: Chief lessons concerning the post disaster humanitarian logistics response and policy implications, Transportation Research Part A: Policy and Practice, 2014 69, 86-104
- Holguín-Veras, J., N. Pérez, M. Jaller, L. N. Van Wassenhove and F. Aros-Vera (2013). "On the appropriate objective function for post-disaster humanitarian logistics models." Journal of Operations Management 31(5): 262-280

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***ISE Projects***

***Wallace***


- RA Garrett, TC Sharkey, M Grabowski, WA Wallace, "Dynamic resource allocation to support oil spill response planning for energy exploration in the Arctic," European Journal of Operational Research 257 (1), 272-286, 2017.
- R Korolov, J Peabody, A Lavoie, S Das, M Magdon-Ismail, W Wallace, "Predicting charitable donations using social media," Social Network Analysis and Mining 6 (1), 1- 10, 2016.
- Jeffrey Wojtowicz, William A Wallace, "Use of Social Media by Transportation Agencies for Traffic Management," Transportation Research Record: Journal of the Transportation Research Board, 2551, 82-89, 2016.
- D. Mendonça, W.A. Wallace, "Factors underlying organizational resilience: The case of electric power restoration in New York City after 11 September 2001," Reliability Engineering & System Safety 141, 83-91, 2015
- T.C. Sharkey, S.G. Nurre, H. Nguyen, J.H. Chow, J.E. Mitchell, W.A. Wallace, "Identification and classification of restoration interdependencies in the wake of Hurricane Sandy," Journal of Infrastructure Systems 22 (1), 2015.


***Sharkey***


- H. Sun and T.C. Sharkey. Approximation algorithms for fractional optimization problems arising in dispatching rules for integrated network design and scheduling problems. Forthcoming in Journal of Global Optimization.
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- E. Heath, J.E. Mitchell, and T.C. Sharkey. Applying ranking and selection procedures to mitigation for improved network restoration. EURO Journal on Computational Optimization, 4(3): 447-481, 2016.


***Mendonça***


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- Mendonça, D., G. Webb, C. Butts and J.D. Brooks* (2014). "Cognitive Correlates of Improvised Behavior in Disaster Response: The Cases of the Murrah Building and the World Trade Center," Journal of Crisis and Contingency Management 22(4) 185-195.
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## Institutional Capacity Development Activities and Job/ Internship Opportunities

We do training sporadically, though it is not our primary activity.

Our group typically receives 15-25 visiting scholars, both faculty and advanced PhD students that come to Rensselaer to conduct their research with our team. We provide space, access to computers and libraries, and typically involve the visiting scholars in our projects.

**Other Useful Information**


Prof. José Holguín-Veras, Ph.D., P.E., F.ASCE

Prof. William H. Hart

Director of the VREF Center of Excellence for Sustainable Urban Freight Systems (COE-SUFS)

Director of the Center for Infrastructure, Transportation, and the Environment (CITE)

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URL: https://www.coe-sufs.org/

# Southern California Earthquake Center (SCEC)
# University of Southern California, USA

SCEC Annual meeting

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The Southern California Earthquake Center (SCEC) was founded in 1991, with joint funding by the National Science Foundation (NSF) and the U. S. Geological Survey (USGS) and headquarters at the University of Southern California. SCEC coordinates fundamental research on earthquake processes using Southern California as its main natural laboratory. Currently, over 1000 earthquake professionals are participating in SCEC projects, representing more than 70 research institutions. This research program is investigator-driven and supports core research and education in seismology, tectonic geodesy, earthquake geology, and computational science. The SCEC community advances earthquake system science by gathering information from seismic and geodetic sensors, geologic field observations, and laboratory experiments; synthesizing knowledge of earthquake phenomena through system-level, physics-based modeling; and communicating understanding of seismic hazards to reduce earthquake risk and promote community resilience.

Earthquakes are emergent phenomena of active fault systems, confoundingly simple in their gross statistical features but amazingly complex as individual events. SCEC's long-range science vision is to develop dynamical models of earthquake processes that are comprehensive, integrative, verified, predictive, and validated against observations. The science goal of the SCEC5 core program is to *provide new concepts that can improve the predictability of the earthquake system models, new data for testing the models, and a better understanding of model uncertainties*.

SCEC's core research program is investigator-driven and open to anyone who is willing to submit a qualified project plan for peer review. The core resources are allocated through an annual planning process that involves input from the entire SCEC community, as well as counsel from an external Advisory Council and the sponsoring agencies. About two-thirds of the SCEC science budget goes to students and early-career scientists engaged in investigator-initiated research. The Center's working groups, workshops, field activities, and annual meeting enable scientists to work together over sustained periods, building "deep collaborations" and strong interpersonal networks that promote intellectual exchange and amplify the support for students and early-career scientists. SCEC encourages colleagues with creative ideas about earthquakes to formulate them as hypotheses that can be tested collectively. Researchers with new hypotheses are quickly brought together with experts who have observational insights, modeling skills, and knowledge of statistical testing methods.

The validation of model-based predictions against data is a key SCEC activity; efforts tightly couple basic earthquake research to the practical needs of probabilistic seismic hazard analysis, operational earthquake forecasting, earthquake early warning, and rapid earthquake response. Moreover, the risk-reduction problem—which requires actions motivated by *useful* information—strongly couples SCEC science to earthquake engineering. SCEC collaborations with engineering organizations are directed towards end-to-end, physics-based modeling capabilities that span system processes from "ruptures-to-rafters."

SCEC connects to the social sciences through its mission to convey authoritative information to stakeholders in ways that result in lowered risk and enhanced resilience. SCEC's vision is to engage end users and the public at large in ongoing, community-centric conversations about how to manage particular risks by taking specific actions. The SCEC Communication, Education, and Outreach (CEO) program seeks to promote this dialog on many levels, through many different channels, and inform the conversations with authoritative earthquake information. Towards this goal, SCEC CEO program builds and participates in networks of organizational partners that can act in concert to prepare millions of people of all ages and socioeconomic levels for inevitable earthquake disasters.

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Basic graphic showing self-protective “Drop, Cover, and Hold On” procedure of the global *Great ShakeOut Earthquake Drills*, coordinated by SCEC

Southern California is SCEC’s principal natural laboratory for the study of earthquake physics and geology. Earthquake processes in this tectonically diverse stretch of the Pacific-North America plate boundary are closely monitored by instrumental systems of increasing density and resolution. Recent research has posed crucial questions about the current earthquake hazard of the San Andreas fault system. In particular, the observed open intervals (times since the last large ruptures) on major faults are skewed to higher values than expected from the latest Uniform California Earthquake Rupture Forecast (UCERF3). Random chance or subtle data or model bias are potential explanations, but another hypothesis of basic-research interest is the synchronization of fault ruptures into “seismic super-cycles” modulated by the largest ruptures. Understanding the earthquake behavior of the San Andreas system is a fundamental problem for SCEC that has considerable practical implications.

The current “SCEC5” (2017-2022) Science Plan was developed to address five basic questions of earthquake science: (1) How are faults loaded on different temporal and spatial scales? (2) What is the role of off-fault inelastic deformation on strain accumulation, dynamic rupture, and radiated seismic energy? (3) How do the evolving structure, composition and physical properties of fault zones and surrounding rock affect shear resistance to seismic and aseismic slip? (4) How do strong ground motions depend on the complexities and nonlinearities of dynamic earth-quake systems? (5) In what ways can system-specific studies enhance the general understanding of earthquake predictability? These questions cover the key issues driving earthquake research in California, and they provide a basis for gauging the intellectual merit of SCEC5 research activities. To address these questions, fourteen research areas were identified across four main themes:

Modeling the fault system: We seek to know more about the geometry of the San Andreas system as a complex network of faults, how stresses acting within this network drive the deformation that leads to fault rupture, and how this system evolves on time scales ranging from milliseconds to millions of years.

•***Stress and Deformation Over Time*.** We will build alternative models of the stress state and its evolution during seismic cycles, compare the models with observations, and assess their epistemic uncertainties, particularly in the representation of fault-system rheology and tectonic forcing.

•***Special Fault Study Areas*.** Focus on Earthquake Gates. Earthquake gates are regions of fault complexity conjectured to inhibit propagating ruptures, owing to dynamic conditions set up by proximal fault geometry, distributed deformation, and earthquake history. We will test the hypothesis that earthquake gates control the probability of large, multi-segment and multi-fault ruptures.

•***Community Models*.** We will enhance the accessibility of the SCEC Community Models, including the model uncertainties. Community thermal and rheological models will be developed.

***Data Intensive Computing*.** We will develop methods for signal detection and identification that scale efficiently with data size, which we will apply to key problems of Earth structure and nanoseismic activity.

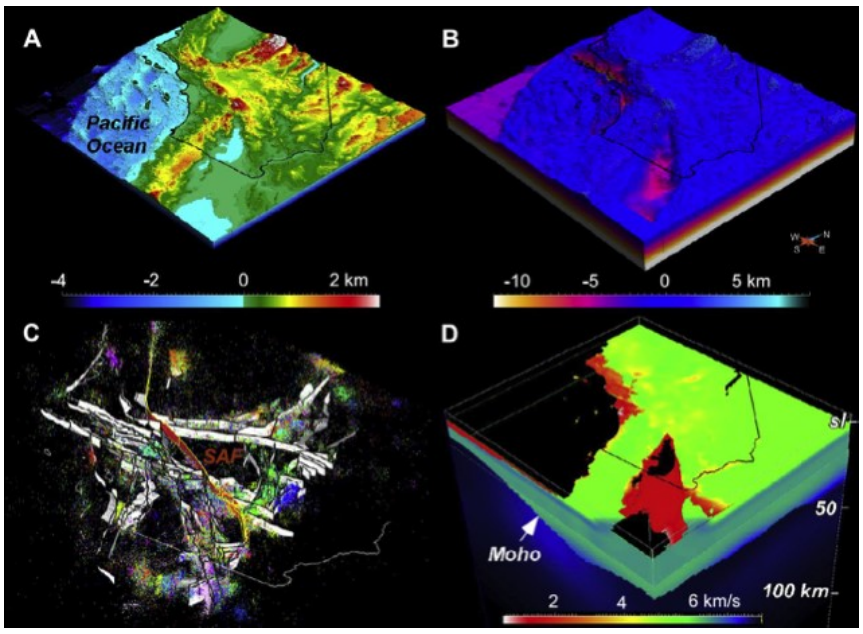
Understanding earthquake processes: Many important achievements in understanding fault-system stresses, fault ruptures, and seismic waves have been based on the elastic approximation, but new problems motivate us to move beyond elasticity in the investigation of earthquake processes.

•***Beyond Elasticity*.** We will test hypotheses about inelastic fault-system behavior against geologic, geodetic, and seismic data, refine them through dynamic modeling across a wide range of spatio-temporal scales, and assess their implications for seismic hazard analysis.

•***Modeling Earthquake Source Processes*.** We will combine co-seismic dynamic rupture models with inter-seismic earthquake simulators to achieve a multi-cycle simulation capability that can account for slip history, inertial effects, fault -zone complexity, realistic fault geometry, and realistic loading.

•***Ground Motion Simulation*.** We will validate ground-motion simulations, improve their accuracy by incorporating nonlinear rock and soil response, and integrate dynamic rupture models with wave-scattering and attenuation models. We seek simulation capabilities that span the main engineering band, 0.1-10 Hz.

***Induced Seismicity*.** We will develop detection methods for low magnitude earthquakes, participate in the building of hydrological models for special study sites, and develop and test mechanistic and empirical models of anthropogenic earthquakes within Southern California.




Perspective view of components of the **Unified Structural Representation (USR)**. A. Topography and bathymetry; B. top basement surface; C. Community Fault Model (CFM); and D. USR showing compressional wave velocity. SAF is the San Andreas fault.

Characterizing seismic hazards: We seek to characterize seismic hazards across a wide spectrum of anticipation and response times, with emphasis on the proper assessment of model uncertainties and the use of physics-based methods to lower those uncertainties.

•***Probabilistic Seismic Hazard Analysis*.** We will attempt to reduce the uncertainty in PSHA through physics-based earthquake rupture forecasts and ground-motion models. A special focus will be on reducing the epistemic uncertainty in shaking intensities due to 3D along-path structure.

•***Operational Earthquake Forecasting*.** We will conduct fundamental research on earthquake predictability, develop physics-based forecasting models in the new Collaboratory for Interseismic Simulation and Modeling, and coordinate the Working Group on California Earthquake Probabilities.

•***Earthquake Early Warning*.** We will develop methods to infer rupture parameters from time-limited data, ground-motion predictions that account for directivity, basin, and other 3D effects, and better long-term and short-term earthquake rupture forecasts for conditioning of early-warning algorithms.

***Post-Earthquake Rapid Response*.** We will improve the rapid scientific response to strong earthquakes in Southern California through the development of new methods for mobilizing and coordinating the core geoscience disciplines in the gathering and preservation of perishable earthquake data.

Reducing seismic risk: Through partnerships coordinated by SCEC's Earthquake Engineering Implementation Interface, we will conduct research useful in motivating societal actions to reduce earthquake risk. Two topics investigated by these engineering partnerships will be:

•***Risk to Distributed Infrastructure*.** We will work with engineers and stakeholders to apply measures of distributed infrastructure impacts in assessing correlated damage from physics-based ground-motion simulations. An initial project will develop earthquake scenarios for the Los Angeles water supply.

## Research Unit

SCEC supports *disciplinary science* through standing **disciplinary committees** in Seismology, Tectonic Geodesy, Earthquake Geology, and Computational Science. These groups are responsible for disciplinary activities relevant to the SCEC Science Plan developed by the SCEC Planning Committee each year.

SCEC also coordinates earthquake *system science* through **interdisciplinary focus groups** in Fault and Rock Mechanics, Earthquake Forecasting and Predictability, Stress and Deformation Over Time, Earthquake Engineering Implementation Interface, Ground Motion Prediction, San Andreas Fault System, and Community Models.

SCEC **special projects** are research partnerships in targeted earthquake research that heavily leverage the core program but also have additional resources. Current SCEC special projects include Uniform California Earthquake Rupture Forecast (UCERF), Collaboratory for the Study of Earthquake Predictability (CSEP), Software Environment for Integrated Seismic Modeling (SEISM2), Collaboratory for Interseismic Simulation and Modeling (CISM), and Central California Seismic Project (CCSP).

SCEC's **Community Modeling Environment** (CME) is a high-performance collaboratory for implementing large-scale earthquake simulations that span many SCEC research groups via five major SCEC computational platforms: High Frequency (High-F), CyberShake, Broadband, Full 3D Tomography (F3DT), and Uniform Community Velocity Model UCVM). SCEC has become a world-leading virtual organization through the innovative use of high-performance computing to solve system-level problems; the current rate of computer usage by the SCEC co-laboratories is almost 1 million CPU-hours per day.

## Education/Outreach:

The SCEC Communication, Education, and Outreach program (www.scec.org/learn) manages and expands a suite of successful activities within four focus areas. *Knowledge Implementation* connects SCEC scientists and research results with practicing engineers, government officials, business risk managers, and other professionals in order to improve application of earthquake science. The *Public Education and Preparedness* focus area educates people of all ages about earthquakes, tsunamis, and other hazards, and motivate them to become prepared. This includes SCEC's coordination of the global *Great ShakeOut Earthquake Drills* (www.ShakeOut.org) which in 2017 were held in more than 70 countries. The *K-14 Earthquake Education Initiative* improves earth science education in multiple learning environments, overall science literacy, and earthquake safety in schools and museums. The *Experiential Learning and Career Advancement* program provides research opportunities, networking, and other resources to encourage students and sustain careers in STEM fields. Four long-term intended outcomes of the CEO program are: improved application of earthquake science in policy and practice; reduced loss of life, property, and recovery time; increased science literacy; and increased diversity, retention, and career success in the scientific workforce. SCEC's vigorous promotion of workforce diversity will be augmented by a new Transitions Program that will provide students and early-career scientists with resources and mentoring at major steps in their careers.

## Institutional Capacity Development Activities

SCEC coordinates a series of research and educational workshops each year, with several held in conjunction with the SCEC Annual Meeting in September which typically is attended by more than 600 SCEC scientists and students. A list of recent workshops and meetings is at www.scec.org/meetings.

## Latest Publications

SCEC supports research by hundreds of scientists and students, resulting in many papers published each year, listed at www.scec.org/publications.

Annual SCEC summary reports, meeting proceedings, and collaboration plans (RFPs) are available at www.scec.org/reports/annual.

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# Asia


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The Center for Energy & Environmental Policy Research, Beijing Institute of Technology (CEEP-BIT), was founded in 2009. The current director of CEEP-BIT, Prof. Yi-Ming Wei, established a CAS-CNPC Joint Center for Energy and Environmental Policy in 2006, and held the founding director. The core research team then joined BIT and kept on contributing to research, education and international communication in the fields of energy and environmental policy. According to the statistical analysis from RePEc in November, 2018,CEEP-BIT ranks 33, top 10% institutions in the field of Environmental Economics at IDEAS (http://ideas.repec.org/top/top.env.html), and ranks 29, top 10% institutions in the field of Energy Economics at IDEAS (http://ideas.repec.org/top/top.ene.html).

CEEP-BIT conducts researches on energy economics, climate policy and environmental management armed with qualitative and quantitative tools, aiming to provide scientific basis for public and private decisions in strategy planning and management that needed to cope with China's increasing demand for energy as well as the challenges of adapting to and mitigating climate change. CEEP also serves as a professional education center and a platform for international exchange in the area of energy and environmental policy research.

CEEP-BIT also has the Beijing Key Laboratory of Energy Economics and Environmental Management, which was approved by the Beijing municipal Science & Technology Commission in 2016. It is one of the first five institutes that are enrolled into the Beijing Think Tank Initiative. Based on CEEP-BIT, the Key Laboratory is currently directed by Professor Yi-Ming Wei, the Distinguished Professor of Cheung Kong Scholar Program and the National Natural Science Funds for Distinguished Young Scholar. The Key Laboratory is also entitled by The Funds for Creative Research Groups of China, the first five think tanks accredited by the National Natural Science Foundation of China, and awarded by the Beijing Natural Science Foundation as one of the ten excellent research teams during the Twelfth Five-Year Plan.

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# Research Focus/Organizational Structure

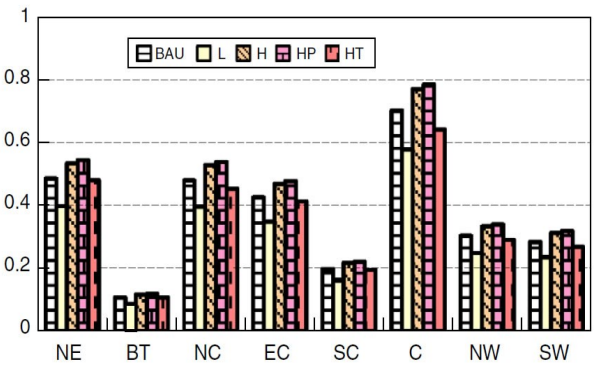
Research teams of the CEEP-BIT bring expertise from many different disciplines in a problem-solving environment. Applying multidisciplinary approaches and methodologies of complex systems, the faculties of CEEP-BIT emphatically have been dedicated to addressing the challenges confronting China's energy and environmental strategies and policies through cooperation with worldwide partners.

CEEP-BIT mainly focus on seven research areas: Energy Supply and Demand, Energy Efficiency and Conservation, Energy Market and Carbon Markets, Climate Change and Environmental Issues, Energy Security and Warning, Green Supply Chain, as well as Energy Modeling and System Development.

## Energy Supply and Demand

Energy supply/demand balance and its sustainable development are affected by economic development, energy investment and financing, new technologies, consumption patterns and energy policies, etc. Based on China's energy supply and demand characteristics, the following issues are being studied:

- Energy and economic development
- Energy supply/demand forecast
- Energy consumption patterns
- Regional energy consumption
- Energy investment and financing
- Energy sustainable development
- Energy technology policies

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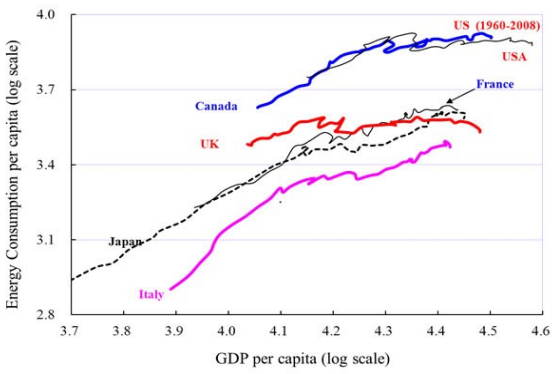
## Energy Efficiency and Conservation

Improving energy efficiency is an important and effective way to address energy challenges. Based on China's population, resources and development stage, CEEP emphatically studies the public policies and management issues on energy efficiency and conservation as follows:

- Energy efficiency measurement methods and applications
- Energy efficiency and economic-social development
- Energy conservation policy design and simulation
- Residential consumption behavior and energy conservation
- Energy efficiency in major industries and sector
- Regional energy efficiency

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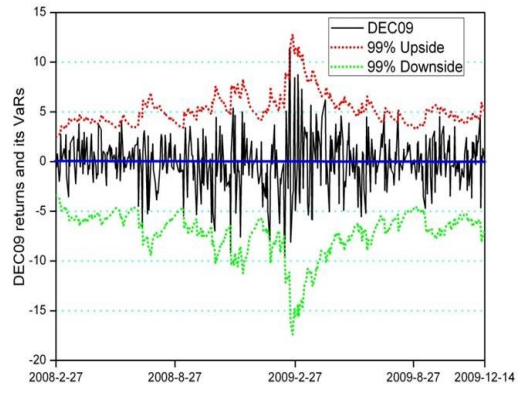
## Energy Markets and Carbon Markets

Financial properties in energy and carbon markets have been increasingly prominent. Also interrelations between these two markets appear closer. Pricing mechanism and risk management in energy markets and carbon markets have been brought into focus. Therefore, some important research issues have attracted our attention:

- Energy pricing mechanism and forecast
- Risk management in international energy market
- Energy finance and carbon finance
- Carbon emission allowance allocation mechanism
- Carbon market and low-carbon development

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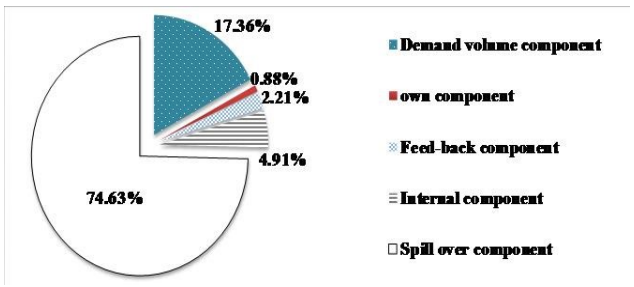
## Climate Change and Environmental Issues

Climate Change and Environmental Issues：Studies on various temporal and spatial scales are involved in this research area. Main topics concerned in CEEP include：

Global climate change is a typical complex problem. Studies of various temporal and spatial scales are involved in this research field:

- CO2 emissions
- Climate change scenarios analysis
- Climate policy design and simulation
- Carbon capture and storage
- Energy-Environment-Health
- Vulnerability to climate and environment change

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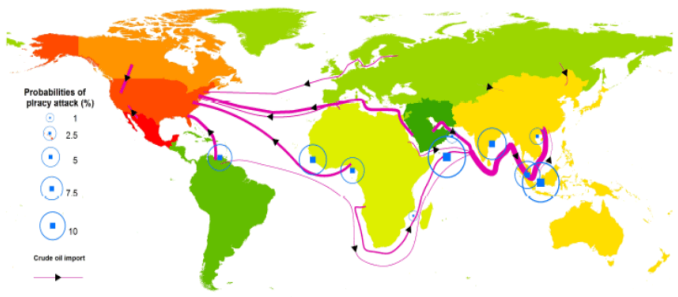
## Energy Security and Warming

Due to complicated international geopolitics and violent oil price fluctuation, the international oil trade is subjected to many risks. This directly impacts the energy security in China for its large dependece on international markets. Therefore, the following issues about China's energy security are being studied:

- Strategic Petroleum Reserve
- Risk assessment of energy import
- Risk management for overseas oil and gas
- Transportation risk assessment for overseas oil and gas
- Energy supply security warning
- International energy security policies

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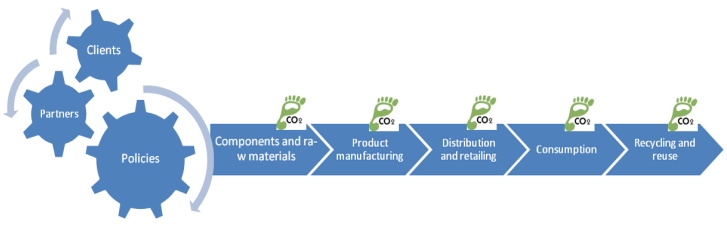
## Green Supply Chain

- Economic and social development requires higher efficiency with less impact on environment. We focus on the following key issues in operations & supply chain management area:
- Supply chain optimization of new energy vehicles
- Decision bias in supply chain and sustainable development
- Supply chain carbon footprint analysis
- Decision analysis of low-carbon supply chain
- Energy supply chain analysis

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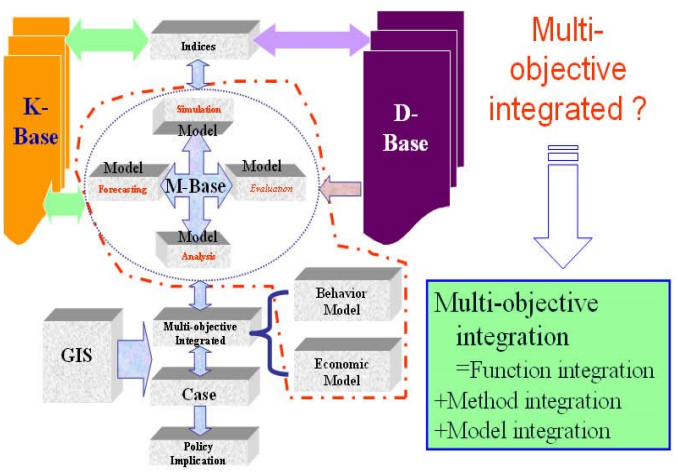
## Energy Modelling and System Development

The facuties of CEEP is committed to energy and environment policy research, and makes great efforts to develop models,approaches and software as follows:

- Society-Economy-Energy-Environment-technology complex system (SE3T)
- Multi-objective integration Methodology (MoiM)
- China Energy Demand Analysis System (CEDAS)
- China Energy and Environment Policy Analysis System (CEEPA)
- Oil Price Forecast system (OPFor)
- Metal intelligent Decision Support System (MiDSS)
- Investment for Coal（IFCoal）

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## Selected Research Projects

| Project Name | Fund/Funding Organization | Period | Amount | Team Leader |
|---|---|---|---|---|
| *Energy Strategy and Climate Policy* | *Think-Tank Research Program supported by NSFC* | *2017-2018* | *RMB$ 1.9M* | *Prof. Yi-Ming Wei* |
| *Integrated Assessment of Economic Impacts of Climate Change* | *National Key R&D Program* | *2016-2021* | *RMB$ 24M* | *Prof. Yi-Ming Wei* |
| *Energy Economics and Climate Policy* | *National Innovation Research Team Program supported by NSFC* | *2015-2020* | *RMB$ 9M* | *Prof. Yi-Ming Wei* |
| *The effect of energy structure on carbon emission intensity and its parameterization* | *National Key R&D Program* | *2016-2021* | *RMB$ 3M* | *Prof. Hua Liao* |
| *Integrated analysis method and application of energy and climate policy* | *Excellent Young Scholar Program supported by NSFC* | *2019-2021* | *RMB$ 1.3M* | *Assoc. Prof. Biying Yu* |
| *Integrated Modeling Method and Application on Simulation and Evaluation of Carbon Market Emission Reduction Effect* | *General Program supported by NSFC* | *2019-2022* | *RMB$ 0.48M* | *Prof. Ke Wang* |

## Latest Publications:

### Books

- Y.-M. Wei, L.-C. Liu, H. Liao, CO2 Emissions and Low Carbon Development in China, Science Press, Beijing, 266 pages (2017) [ISBN 978-7-03-051428-8] (in Chinese).
- K. Wang, Comprehensive Evaluation System and Method of DEA, Science Press, Beijing, 310 pages (2018) [ISBN: 978-7-03-056599-0] (in Chinese).

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- Y.-M. Wei, R. Han, Q.-M. Liang, B-Y. Yu, Y.-F. Yao, M.-M. Xue, K. Zhang, L.-J. Liu, J. Peng, P. Yang, Z-F. Mi, Y.-F. Du, C. Wang, J.-J. Chang, Q.-R. Yang, Z. Yang, 2018, An integrated assessment of INDCs under Shared Socioeconomic Pathways: an implementation of C3IAM. Natural Hazards, 92(2), pp 585-618.
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- B.-Y. Yu, Y.-M. Wei, G.-Kei, Y. Matsuoka, 2018, Future scenarios for energy consumption and carbon emissions due to demographic transitions in Chinese households. Nature Energy, 3, pp.109–118.
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- D. Wiedenhofer, D. Guan, Z Liu, J. Meng, N. Zhang, Y.-M. Wei, 2017, Unequal household carbon footprints in China. Nature Climate Change, 7, pp 75–80.
- Y.-M. Wei, J.-N. Kang, B.-Y. Yu, H. Liao, Y.-F. Du, 2017. A dynamic forward-citation full path model for technology monitoring: An empirical study from shale gas industry, Applied Energy, pp 769-780.
- Z.-F. Mi, Y.-M. Wei, C.-Q. He, H.-N. Li, X.-C.Yuan, H. Liao, 2017, Regional efforts to mitigate climate change in China: a multi-criteria assessment approach. Mitigation and Adaptation Strategies for Global Change, 22, pp 45-66.
- H. Chen, J.-N. Kang, H. Liao, B.-J. Tang, Y.-M. Wei, 2017. Costs and potentials of energy conservation in China's coal -fired power industry: A bottom-up approach considering price uncertainties, Energy Policy, 104, pp 23-32.
- B.-Y. Yu, Y. Ma, M.-M Xue, B.-J Tang, B. Wang, J.-Y Yan, Y.-M. Wei, 2017. Environmental benefits from ridesharing: A case of Beijing, Applied Energy, pp 141-152.
- R. Han, B.-Y. Yu, B.-J. Tang, H. Liao, Y.-M. Wei, 2017. Carbon emissions quotas in the Chinese road transport sector: A carbon trading perspective, Energy Policy, 106, pp298-309.
- Q. Cui, Y. Li, Y.-M.Wei, 2017, Exploring the impacts of EU ETS on the pollution abatement costs of European airlines: An application of Network Environmental Production Function, Transport Policy, 60, pp 131-142.
- Z.-F. Mi, Y.-M.Wei, B,-J. Tang, R.-G. Cong, H. Yu, H. Cao, D.-B. Guan, 2017. Risk assessment of oil price from static and dynamic modelling approaches, Applied Economics, 49, pp 929-939.
- J.-L. Fan, Q. Wang, S.-W. Yu, Y.-B. Hou, Y.-M.Wei, 2017. The evolution of CO2 emissions in international trade for major economies: a perspective from the global supply chain, Mitigation and Adaptation Strategies for Global Change, 22, pp 1229-1248.
- K. Wang, J. Zhang, Wei YM, 2017, Operational and environmental performance in China's thermal power industry: Taking an effectiveness measure as complement to an efficiency measure. Journal of Environmental Management, 192, pp.254-270.

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- K. Wang, J. Zhang, Wei YM, 2017, Operational and environmental performance in China's thermal power industry: Taking an effectiveness measure as complement to an efficiency measure. Journal of Environmental Management, 192, pp.254-270.
- Q.-D. Qin, X. Li, W. Zhen, Y.-M. Wei, 2017, Air emissions perspective on energy efficiency: An empirical analysis of China's coastal areas. Applied Energy, 185, pp 604-614.
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- Li, G., Li, L., Liu, M. and Sethi, S.P., 2018. Impact of power structures in a subcontracting assembly system. Annals of Operations Research, pp.1-24.
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- He, L.Y., Hou, B. and Liao, H., 2018. Rural energy policy in China: Achievements, challenges and ways forward during the 40-year rural reform. China Agricultural Economic Review, 10(2), pp.224-240.


## Institutional Capacity Development Activities or training opportunities:

- National Outstanding College Students Summer Camp for Junior Undergraduates: http://ceep.bit.edu.cn/english/admissions/sc/index.htm
- International Exchange: http://sme.bit.edu.cn/2018gb/enie/shortp/index.htm

## Jobs/ internship/ exchange opportunities:

- Admissions for prospective students: http://ceep.bit.edu.cn/english/admissions/postgraduates/index.htm
- Postdoctoral programme: http://ceep.bit.edu.cn/english/admissions/postdoctoral/index.htm
- Job vacancies: http://ceep.bit.edu.cn/english/admissions/fr/index.htm

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# State Key Lab of Earth Surface Processes and Resource Ecology (ESPRE) Beijing Normal University, China

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The State Key Laboratory of Earth Surface Processes and Resource Ecology (Beijing Normal University) is an applied geology and ecology research laboratory.The State Key Laboratory of Earth Surface Processes and Resource Ecology of BNU focuses on studying the semi-arid grassland and the transitional zone between the pastoral and agricultural areas in northern China and the coastal areas. It deems sustainable ecosystem management and restoration of degraded ecosystems as the overall target while it strives to advance resource ecology research and dynamic modeling of ecosystems at multiple scales. The Laboratory conducts experiments and studies by integrating multiple disciplines to explore the geographical processes and the rational use of renewable natural resources. To date, it has established four major research themes including earth surface processes, resource ecology, earth surface system modeling and simulation, and sustainable regional development modeling. The goal is to provide technical support for the prevention and control of land degradation and restoration of degraded ecosystems in ecologically fragile regions. The objective also is to build the Laboratory into a research center and education base that specializes in earth surface processes and resource ecology, with important international influence and status. The Laboratory is headed by Professor Cunde Xiao. The Director of the Academic Committee is Academician Zhisheng An.

## Research Focus / Interests:

### Earth Surface Processes

**Aeolian Process:** sand movement mechanism, soil wind erosion, complex erosion by wind and water, aeolian geomorphology, and environmental change in desert regions; **Soil Erosion Process:** responses of soil erosion to global change and biological, soil-loss-drived soil carbon migration and transformation, multi-scale soil erosion modeling, regional soil loss evaluation and mapping, identifying and simulating sediment sources, and potential effects of soil loss on land productivity; **Eco-hydrological Processes:** interactions and feedbacks between ecological and hydrological processes of terrestrial ecosystems, the underlying mechanism of the terrestrial adaptation and vulnerability to climate changes, the scale effects within the terrestrial eco-hydrological processes, integrated coupling model of ecology, hydrology, and economy system for a sustainable management of watershed water resources.

### Resource Ecology

**Biodiversity:** mechanism of the origin, maintenance, and loss of biodiversity, and biodiversity-ecosystem functioning relationship, with crucial implications for sustainable management of natural biological resources and creation of ecological civilization**;** **Eco-remote Sensing and Ecosystem Dynamics:** **i**nteraction mechanism of ecological system and environmental system; **Landscape Ecology and Ecological Service:** spatial pattern, system function, and dynamics of landscapes in multi-scale and their mutual influences for clarifying the main ecological factors and processes that constrain regional ecosystem sustainability.

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## Research Focus / Interests:

**Earth Surface Processes**

**Aeolian Process:** sand movement mechanism, soil wind erosion, complex erosion by wind and water, aeolian geomorphology, and environmental change in desert regions; **Soil Erosion Process:** responses of soil erosion to global change and biological, soil-loss-drived soil carbon migration and transformation, multi-scale soil erosion modeling, regional soil loss evaluation and mapping, identifying and simulating sediment sources, and potential effects of soil loss on land productivity; **Eco-hydrological Processes:** interactions and feedbacks between ecological and hydrological processes of terrestrial ecosystems, the underlying mechanism of the terrestrial adaptation and vulnerability to climate changes, the scale effects within the terrestrial eco-hydrological processes, integrated coupling model of ecology, hydrology, and economy system for a sustainable management of watershed water resources.

**Resource Ecology**

**Biodiversity:** mechanism of the origin, maintenance, and loss of biodiversity, and biodiversity-ecosystem functioning relationship, with crucial implications for sustainable management of natural biological resources and creation of ecological civilization**; Eco-remote Sensing and Ecosystem Dynamics: i**nteraction mechanism of ecological system and environmental system; **Landscape Ecology and Ecological Service:** spatial pattern, system function, and dynamics of landscapes in multi-scale and their mutual influences for clarifying the main ecological factors and processes that constrain regional ecosystem sustainability.

Key Projects:

- National Natural Science Foundation of Innovative Research Group Project: Maintenance Mechanisms of Biodiversity
- National Natural Science Foundation of Innovative Research Group Project: Earth Surface Processes Model and Simulation
- National Key R&D Plan: Global Change Risk of Population and Economic Systems: Mechanisms and Assessments
- National Key R&D Plan: Integrative Modeling and Strategic Planning for Regional Sustainability under Climate Change
- National Key R&D Projects: Interaction between Natural and Anthropogenic Factors with Their Regional Performance Driven by Global Change
- National Key R&D Projects: Comprehensive Control Technology of Water and soil loss of Slopes in Terra Preta Area of Northeast China
- National Key R&D Projects: Monitoring, Modeling the Changes of Greenland Ice Sheet and Assessment of its Impacts

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## Latest Publications

Books:

Guangrong Hu, Xiaoyan Li, Subsurface Flow, Springer-Verlag Berlin Heidelberg 8.2018

Shaomin Liu, Ziwei Xu, Micrometeorological Methods to determine evapotranspiration, Springer-Verlag Berlin Heidelberg 10.2018

SCI(E) Papers:

1. Aizhong Ye, Zheng Zhou, Jinjun You, Feng Ma, Qingyun Duan. Dynamic Manning's roughness coefficients for hydrological modelling in basins. HYDROLOGY RESEARCH. 2018, 49 (5): 1379-1395;

2. Bin He, Haiyan Wang, Lanlan Guo, Junjie Liu. Global Analysis of Ecosystem Evapotranspiration Response to Precipitation Deficits. JOURNAL OF GEOHPYSICAL RESEARCH-ATMOSPHERES. 2017, 122 (24): 13308-13318;

3. Bin He, Ling Huang, Ziyue Chen, Haiyan Wang. Weakening sensitivity of global vegetation to long-term droughts. SCIENCE CHINA-EARTH SCIENCES. 2018, 61 (1):60-70.

4 Bojie Fu, Yongping Wei. Editorial overview: Keeping ft in the dynamics of coupled natural and human systems, CURRENT OPINION IN ENVIRONMENTAL SUSTAINABILTY. 2018, 33: A1-A4.

5. Caiwang Zheng, Chuanfeng Zhao, Yanping Li, Xiaolin Wu, Kaiyang Zhang, Jing Gao, Qi Qiao, Yuanzhe Ren, Xin Zhang, Fahe Chai. Spatial and temporal distribution of NO2 and SO2 in Inner Mongolia urban agglomeration obtained from satellite remote sensing and ground observations. ATMOSPHERIC ENVIRONMENT. 2018, 188:50-59

6. Chao Guo, Yuzhen Ma, Hongwei Meng, Caili Hu, Dandan Li, Jierui Liu, Congwen Luo, Kai Wang. Changes in vegetation and environment in Yamzhog Yumco Lake on the southern Tibetan Plateau over past 2000 years. PALAEOGEOGRAPHY PALAEOCLIMATOLOGY PALAEOECOLOGY. 2018, 501:30-44.

7. Chenchen Liu, Zhongquan Zheng, Hong Cheng, Xueyong Zou. Airflow around Single and Multiple Plants. AGRICULTURAL AND FOREST METEOROLOGY. 2018, 25 (1):27-38.

8. Chenzhi Wang, Zhao Zhang, Maigeng Zhou, Pin Wang, PengYin, Wan Ye, Lingyan Zhang. Different response of human mortality to extreme temperatures (MoET) between rural and urban areas: A multi-scale study across China. HEALTH& PLACE. 2018, 50:119-129.

9. Chenzhi Wang, Zhao Zhang. Yi Chen, Fulu Tao, Jing Zhang, Wen Zhang. Comparing different smoothing methods to detect double-cropping rice phenology based on LAI product a case study on double-cropping rice in Hunan Province of China. INTERNATIONAL JOURNAL OF REMOTE SENSING. 2018, 39(19):143-1161.

10. Chiyuan Miao, Qingyun Duan, Qiaohong Sun, Xiaohui Lei, Hu Li. Non-uniform changes in different categories of precipitation intensity across China and the associated large-scale circulations. ENVIRONMENTALRESEARCHLETTERS. 2018 10. 1088/1748-9326/aaf306.

11. Chuanfeng Zhao, Yanan Li, Fang Zhang, Yele Sun, Pucai Wang. Growth rates of fine aerosol particles at a site near Beijing in June 2013. ADVANCES IN ATMOSPHERIC SCIENCES. 2018, 35(2):209-217

12. Chuanfeng Zhao, Yanluan Lin, Fang Wu, Yang Wang, Zhanqing Li, Daniel Rosenfeld, Yuan Wang, Enlarging Rainfall Area of Tropical Cyclones by Atmospheric Aerosols. GEOPHYSICAL RESEARCH LETTERS. 2018,45(16)8604-8611

13. Chunlai Zhang. Qing Li, Yaping Shen, Na Zhou, Xuesong Wang, Jiao Li, Wenru Jia. Monitoring of aeolian desertification on the Qinghai-tibet plateau from the 1970s to 2015 using landsat images. SCIENCE OF THETOTAL ENVIRONMENT. 2018, 619-620:1648-1659

14. Chunlai Zhang. Xuesong Wang, Xueyong Zou, Jinlu Tian, Bo Liu, Jifeng Li, Liqiang Kang, Hong Chen, Yongqiu Wu. Estimation of surface shear strength of undisturbed soils in the eastern part of northern China's wind erosion area. SOIL & TILLAGE RESEARCH.2018, 178:1-10.

15. Chunlai Zhang, Yaping Shen, Qing Li, Wenru Jia, Jiao Li, Xuesong Wang. Sediment grain-size characteristicoand relevant correlations to the aeolian environment in China's eastern desert region. SCIENCE OF THE TOTALENVIRONMENT 2018. 627:586-599.

16. Chunming Shi, Valerie Daux, Zongshan Li, Xiuchen Wu, Tianyi Fan, Qian Ma, Xiaowu Wu, Huaiyu Tian, Matthieu Carre, Duoying Ji, Wenli Wang, Annette Rinke, Wei Gong, Yan Liu, Yating Chen, Valerie Masson-Delmotte The response of relative humidity to centennial-scale warming over the southeastern Tibetan Plateau inferred from tree ring width chronologies. CLIMATE DYNAMICS. 2018, 51(9-10):3735-3746.

17. Cong Wang, Jin Chen, Yanhong Tang, T.andrew Black, Kai Zhu. A Novel Method for Removing Snow Melting-Induced Fluctuation in GIMMS NDVI3g Data for Vegetation Phenology Monitoring: A Case Study in Deciduous Forests of North America. IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING. 2018, 11(3):800-807.

18. Congrong Li, Ming Wang, Kai Liu, Jun Xie. Topographic changes and their driving factors after 2008 Wenchuan earthquake. GEOMORPHOLOGY. 2018, 311:27-36.

19. Dandan Wang, Yunhao Chen, Yanhui Cui, Hao Sun. A Geometric Model to Simulate Urban Thermal Anisotropy for Simplified Neighborhoods. IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING. 2018, 56(8):4930-4944

20. Deyong Yu, Jianmin Qiao, Peijun Shi. Spatiotemporal patterns, relationships, and drivers of China's agricultural ecosystem services from 1980 to 2010: a multiscale analysis, LANDSCAPE ECOLOGY. 2018.334:575-595.

# Key Laboratory of Coastal Disaster and Defense (KLCDD)
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The Key Laboratory of Coastal Disaster and Defense (KLCDD) at Hohai University was founded by Ministry of Education, China in 2005, and consequently passed the government assessment in 2008. The laboratory operates on the policy that the director takes the full responsibility of administration under the supervision of academic committee, and it heavily relies on broader national and international collaborations for cross-disciplinary integrations. The main objective of the KLCDD is to explore and develop new ideas, new approaches and new technologies for making the coastal environments more resilient to the impacts of natural hazards and human induced threats.

The research activities in the KLCDD are mainly related to coastal disaster and defense, including the mechanisms of generation and development, prediction methods and warning systems, reduction and protection technologies, and evaluation and management of coastal disaster. The laboratory has particular interests in the areas of sea level rise and its impact, formation and propagation of storm surge and tsunami, saltwater intrusion in estuary, warning technology of storm surge, coastal dynamics of disaster process and its induced sediment transport, prediction of change of environmental factors in coast and estuary, design criteria of protection engineering, innovative technologies for protection engineering, damage assessment and recovery measures of protection engineering, the impact evaluation of coastal disaster on ecological environment and social economy and countermeasures.

The KLCDD has more than 40 members of which 8 are Professors and 12 are Associate Professors. Three laboratory halls with a total area more than 12000 $m^2$ are equipped with high-tech devices and facilities, including wind-wave-current flume, 3D wave basins, sedimentation circle flume, open multi-pump tidal control system, PIV system, ADV system, OBS system and so on. Five field observatories are located along Jiangsu Coast for monitoring the coastal dynamics and disasters, in which surface water elevation, current speed and direction, wave height and period, wind motion, water quality and the others are recorded. A set of high-performance computing cluster system of Hohai University, known as HHU-GRID, is a data-intensive computing platform especially designed for modeling real-time disaster risk in coastal regions (Figure 1).

There are many researches carried or supported by the KLCDD, by the end of 2017, the researches include: "Study on the characteristics and mechanism of the Indian-Pacific Ocean the sea-level variation"; "Coastal disaster evaluation and regionalization of Shanghai"; "The propagation and wave run-up of isolated waves across coral reefs"; "High-resolution prediction system of tide-wave climatology and the stability of seawalls in the bay area of Guadong, Hong Kong and Macao"; "Study on the origin and early-warning system of water pollution accidents in Pearl River estuary".

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## Research Focus/Interests

**Research Focus 1: exploration of genetic and evolutional mechanisms of coastal disasters.** The main research contents include: (1) sea level rise and its impact; (2) transformation of storm surge and tsunami in shallow water; (3) formation and propagation of typhoon induced waves; (4) study of saltwater intrusion on estuarine coast.

**Research Focus 2: coastal disaster prediction and forecast.** The main research contents include: (1) storm-surge disaster prediction technology (tropical storm, short-term forecast of typhoon tracks, establishment of typhoon warning system); (2) study on the destructive coastal dynamic process and its impact on sediment transport; (3) prediction of environmental factors for estuarine and coastal regions.

**Research Focus 3: coastal disaster protection.** The main research contents include: (1) design standards of coastal protection buildings; (2) new type and new technology of coastal protection engineering; (3) evaluation and extension of coastal protection works;

**Research Focus 4: coastal disaster assessment and management.** The main research contents include: (1) assessment on ecological environment, social and economic impact; (2) establishment of countermeasures and management of coastal disasters.

An integrated test basin


Environment sediment laboratory


Field station


Wind-wave flume

### Major Research Challenges

Most of the world's coastal cities were established during the last few millennia, a period when global sea level has nearly remained unchanged. Since the middle of 19th century, sea level has been rising, caused primarily by two factors related to global warming (the added water coming from the melting of land ice and the expansion of sea water as it warms). It is suggested that the rate of sea level rise is likely to increase during the 21st century, although there is considerable controversy about the likely size of the increase. As a result of sea level rise, the coastal erosion and sea flooding in coastal cities are becoming more and more severe. Meanwhile, coastal and estuarine ecosystems have been, and still are, heavily influenced by the human activities, such as the pollution discharge and habitat loss. This coastal pollution and its impacts have resulted in a number of environmental issues including the enrichment of enclosed or partially-enclosed waters with organic matter leading to eutrophication, pollution by chemicals such as oil, and sedimentation due to land-based activities or sea level rise.

Many coastal cities are currently or will be exposed to the coastal disasters and ecosystem degradation, and there are still some essential knowledge gaps and efficient actions needed on the way to coastal defense and disaster risk reduction. Further efforts need to be made in the near future for the following research challenges.

- Generation theory of coastal disasters under the impact of sea level rise
- Mechanism of multi-resource flooding event in coastal cities
- Dynamic response and failure mechanism of newly-designed marine structures
- Evolution of aquatic ecosystem in coastal wetland
- Influences of multiple human activities on coastal system
- Disaster risk management and reduction strategies.

**Suggestions for the Disaster Research Roadmap**

The KLCDD looks forward to a significant contribution to the disaster risk reduction, and would like to be heavily involved in the worldwide research activities. The following issues mainly concerned by the KLCDD may possibly become parts of the disaster research roadmap for the next decade.

(1) Platform for research exchange and collaboration

It is very exciting to know that the establishment of the International Forum on Natural Disaster Research (IFNDR) will be formalized in the 2nd Global Summit. What specific actions and practical plans will be taken by the IFNDR to help share knowledge, experiences and ideas on disaster research? Is there any possibility to attract multi-country joint funds to support the research on disaster as many countries are facing the same disaster problem?

(2) Identification of knowledge gaps involving cross-disciplines

Disaster is an extremely complex system consisting of many disciplines, such as, physics, mechanics, chemistry, engineering, economy and society. The experts from different disciplines need to team up and work together in order to achieve a goal of disaster risk reduction. Research should focus on the identification of strength and weakness in each discipline, and an efficient cross-disciplines framework for disaster research is desired.

(3) Adoption of emerging technologies

Research should focus on the application of emerging technologies to disaster risk reduction. For example, the innovative technologies dealing with mega data and cloud computing may provide valuable tools in the real-time disaster warning system. The quick/immediate adoption of emerging technologies will create long-term benefits.

(4) Energy harvesting from disaster

Governments are succeeding in reducing energy consumption through policy and industry, while developing new energy generation technologies. Disaster is normally with a huge amount of energy, resulting in a destructive force. The traditional defence works need to bear such kind of destructive force and become vulnerable in order to protect the people or assets behind. If energy absorber (for the generation of electricity power) can be installed into the defence works, the destructive energy leading to disaster becomes renewable energy.

## Latest Publications

**Major research achievements are as following:**

One of the most important research achievements of the KLCDD is the innovative development and successful applications of key technologies and warning system of water disaster in coast and estuary, which won the second prize of National Science and Technology Progress Award.

According to the disaster statistics by the State Oceanic Administration of China, nearly 7% of disaster loss and damage is caused by coastal disasters (Figure 3). For example, the coastal disasters including storm surge and large ocean waves result in missing and deaths of 121 people and an economic loss of exceeding CN¥16 billion in 2013. Storm surge is the heaviest cause of coastal disaster, contributing to almost 94% of the economic loss. The recent researches indicate that the tropical cyclone and storm surge may become more and more severe due to the global climate change and the resulting damages are likely increasing in the near future.

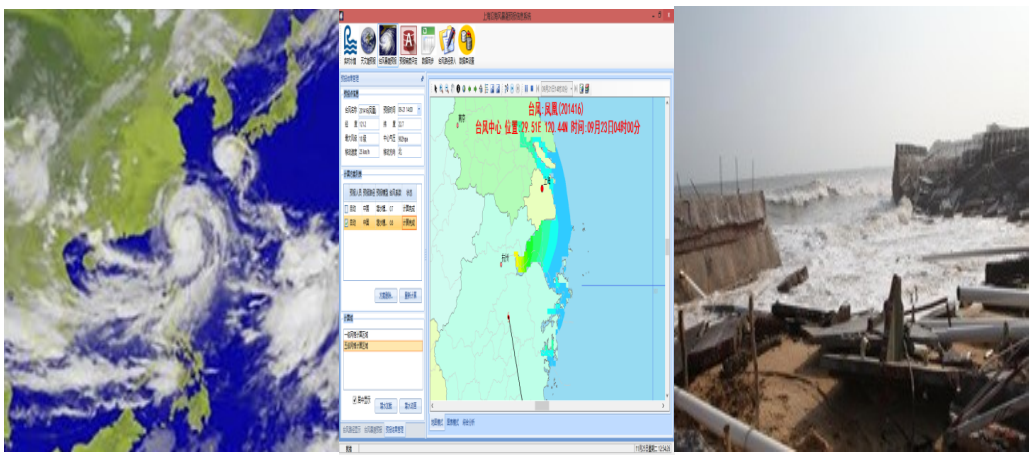

Figure 3. Tropical cyclone and storm surge disasters

The research members at the KLCDD devote themselves to this research challenge and have made some significant progresses. (1) A multi-factor coupling warning technology is proposed for the complex interactions between storm surge and astronomical tides, providing an accurate modeling method for the coastal flooding water. This largely contributes to the key technology of warning system for flooding control and defence in coastal cities. (2) A series of pioneer laboratory experiments are carried out for the comprehensive investigation of generation mechanisms of coastal disaster, clearly revealing the detailed dynamics of baroclinic flow, bifurcated flow, stratified shear flow in curve channel, buoyant jet in waves and induced mass transport. These results fill in the gaps in the mechanisms of coastal disaster with extremely complex conditions. (3) An early warning system for water disaster is developed, and it is widely used to predict a real-time progress of multi-work in coast and estuary. This warning system has been integrated into the control system of the State Flood Control and Drought Relief Headquarter, and the Hydrology Bureau of the Ministry of Water Resources of China, providing fundamental data base and technical supports for the decision maker.

The research outcomes have been extensively acknowledged by the Chinese government and administration society. The “Tide Table for Flooding Defence” originally produced by the research team is currently used by 48 units for flooding defence along the coast, playing an essentially important role in predicting extreme water level and determining the defence strategies for coastal cities. One of the key contributions is to protect the human being and the whole society from the coastal disasters. For example, a total reduction from the economic loss due to coastal disasters between 2002 and 2009 is roughly CN¥0.6 billion.

## Institutional Capacity Development Activities or training opportunities:

The laboratory holds “Public Open Day” activities every year, and carries out education and publicity in various forms, including public class and lectures; opening visits to large-scale equipment; and organizing scientific and technological summer camps. In the year of 2017, the KLCDD has been open to the public for a total of 10 days, participated in public science popularization 3 times, and published 4 scientific papers. The major activities and training organizations are as following:

**“Sea-Young” Association**

A graduate student organization, established and managed by the KLCDD, intending to establish a marine cultural community. During every summer vacation, multiple social and practical activities will be carried out, through lectures, field trips and lab researches to understand the coastal and marine disasters, its situations on present-day and the principle of early warning systems.

**“Xue-Hai” Competition**

The "Xue-Hai" Competition, which is founded by the KLCDD for graduate students. The competition invites experts on-site to comment and grade on the students’ research presentations. “Xue-Hai” aims to build a widely-open interaction platform for academic exchange, and helps to strengthen the students’ realization on the coastal disasters and protection.

**Summer School**

The KLCDD holds “Excellent Undergraduates and Graduates Summer Camp” every year. The summer school is sponsored by the Education Department Of Jiangsu Province, Innovation Project Of Hohai University, and aims is to improve research level and educational quality for graduate students, to mobilize and use of the advantage of the graduate student education resources, to promote the mutual recognition of credits between different institutes, and to promote graduate student exchanges and cooperation. The summer school usually carries out during summer vocation, between July and August, for the specific time and admission rules, please refer to news posts on the official website of the College of Harbour, Coastal and Offshore Engineering, Hohai University (http://ghxy.hhu.edu.cn/ ).

**Academic Exchange Opportunities**

The KLCDD holds academic meetings annually. In 2017, there are 3 internaitonal conferrences held, including The 8th China-Germany Conference On Water And Marine Engineering, Water Disaster Simulation And Prediction Method Of International Academic Seminar and 1st Conference On The Marine Environment And Climate Change. We invited 22 famous scholars from abroad for academic exchange.

**Job Opportunities**

The laboratory job opportunities and hiring plans will be announced in Hohai University personnel online, please pay attention to Hohai University personnel web site, http://rsc.hhu.edu.cn/ (Chinese Only).

**Funding Opportunities**

The KLCDD also sets up an open research fund to finance scholars and scientists domestic and abroad to promote the research work on coastal disasters and protection.


“Sea-Young” Association

## Other Useful Information:

Up to the Year of 2017, the KLCDD has undertaken a total of 66 national and international scientific research projects, published 65 SCI/EI papers, and achieved 72 invention patents and 3 national scientific awards.

Latest KCLDD Annual Report: http://klcdd.hhu.edu.cn/2017/0331/c2577a38621/page.htm

KCLDD Preventative Results: http://klcdd.hhu.edu.cn/2577/list.htm

Research Projects: http://klcdd.hhu.edu.cn/2578/list.htm

Books: http://klcdd.hhu.edu.cn/2579/list.htm

Awards: http://klcdd.hhu.edu.cn/2580/list.htm

Research Resources: http://klcdd.hhu.edu.cn/2586/list.htm

**Useful Links**

KLCDD open platform:

http://klcdd.hhu.edu.cn/2581/list.htm

Internship and job opportunity with National Marine Hazard Mitigation ServiceLink:

http://www.nmhms.gov.cn/html/list_1454.html

KLCDD Open Research Fund Link:

http://klcdd.hhu.edu.cn/2017/0920/c2593a157169/page.htm

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Natural Disaster Research Institute (NDRI) has formed distinctive research directions such as the environmental disaster risk assessment and prevention, the early warning, evaluation and regulation of ecological security, the theories and methods of strategic environmental assessment and planning, and early warning technologies of disaster risk assessment. The researches provide a scientific theoretical basis and technological support for solving major issues of the ecological environment and the disaster prevention and mitigation in China. In recent years, the institute has obtained more than 100 projects, such as the National Science-Technology Support Plan Project, the National Key Basic Research and Development Plan Project, the Special Scientific Research Fund of Public Welfare Profession of China, the National Natural Science Foundation, and the Key Scientific and Technological Research Project in Jilin Province, etc. And published more than 80 papers in journals of Science of the Total Environment, Agriculture Ecosystems & Environment, Journal of Hydrology, etc., and 7 monographs. Also has obtained 5 technical patents and 12 software copyrights, established 5 industry standards, and received 2 awards of the scientific and technological progress in Jilin Province.

Research Focus

The main research fields are integrated natural disaster risk assessment and management, including disaster monitoring and early warning, risk assessment, risk prevention and emergency management, disaster insurance, urban safety assessment and integrated disaster prevention and mitigation planning.

Mainly focus on the research of integrated disaster risk assessment and management, research fields include disaster risk assessment, disaster losses assessment, forecasting and early warning technologies and models also risk control countermeasures, disaster prevention and mitigation planning, emergency management, emergency rescue and assistance decision support technologies. Over the years, applied field positioning observation, satellite telemetry, laboratory simulation, computer technology, network technology, "3S" technology, disaster simulation and evaluation technology, disaster risk assessment and early warning/ forecasting technology, decision support system and emergency management technology, multi-source information Fusion technology, virtual reality technology, etc. other modern science and technology, combined with multidisciplinary intersection, integrated theory and method also with the advanced foreign research results, using main environment and disasters in northeast China as the object, carried out a systematic study of sandstorms, grassland disasters (fires, snowstorms ), geological disasters, environmental pollution, waterlogging and drought, formation mechanism of climate change and extreme climate events, evolution mechanism, monitoring and early warning, risk assessment, impact and disaster assessment, risk aversion, risk prediction and early warning theory and technology and their society prevention, coping strategies, disaster risk comprehensive measures and their optimization decision-making model and intelligent decision support system construction, urban safety assessment and disaster reduction planning and other research. Established a relatively complete and practical disaster risk assessment and emergency tube technology method system, the number of models and the corresponding software system, and achieved good economic and social benefits.

Prof. Jiquan Zhang

E-mail: zhangjq022@nenu.edu.cn

NDRI Group

## Latest Publications


[1] Sijia Li ,Yanan Chen, Jiquan Zhang *, Kaishan Song, Guangyi Mu, Caiyun Sun, Hanyu Ju, Meichen Ji. The Relationship of Chromophoric Dissolved Organic Matter Parallel Factor Analysis Fluorescence and Polycyclic Aromatic Hydrocarbons in Natural Surface Waters[J]. Environmental Science and Pollution Research, 2018, 25: 1428-1438.（SCI）

[2] Siqin Tong, Quan Lai, Jiquan Zhang *, Yuhai Bao *, Lusi A, Qiyun Ma, Xiangqian Li, Feng Zhang. Spatiotemporal Drought Variability on the Mongolian Plateau from 1980-2014 Based on the SPEI-PM, Intensity Analysis and Hurst Exponent[J]. Science of the Total Environment, 2018,615: 1557-1565. (SCI)

[3] Yanan Chen, Jiquan Zhang *, Feng Zhang, Fengxu Li, Mo Zhou. Polycyclic Aromatic Hydrocarbons in Farmland Soils Around Main Reservoirs of Jilin Province, China: Occurrence, Sources and Potential Human Health Risk[J]. Environmental Geochemistry and Health, 2018,40(2): 791-802. (SCIE)

[4] Na Li, Jiquan Zhang *, Yulong Bao, Yongbin Bao, Risu Na, Siqin Tong, Lusi A. Himawari-8 Satellite Based Dynamic Monitoring of Grassland Fire in China-Mongolia Border Regions [J]. Sensors, 2018, 18(1):276-290. (SCIE)

[5] Yanan Chen, Caiyun Sun, Jiquan Zhang *, Feng Zhang. Assessing 16 Polycyclic Aromatic Hydrocarbons (PAHs) in River Basin Water and Sediment Regarding Spatial-Temporal Distribution, Partitioning, and Ecological Risks [J]. Polish Journal of Environmental Studies, 2018, 27(2):579-589. (SCI)

[6] Yanan Chen, Jiquan Zhang *, Feng Zhang, Xingpeng Liu, Mo Zhou. Contamination and Health Risk Assessment of PAHs in Farmland Soils of the Yinma River Basin, China [J]. Ecotoxicology and Environmental Safety, 2018, 156: 383-390. (SCI)

[7] Yanan Chen, Feng Zhang, Jiquan Zhang *, Mo Zhou, Fengxu Li, Xingpeng Liu. Accumulation characteristics and potential risk of PAHs in vegetable system grow in home garden under straw burning condition in Jilin, Northeast China . [J]. Ecotoxicology and Environmental Safety, 2018, 162: 647-654. (SCI)

[8] Hanyu Ju, Jiquan Zhang *, Caiyun Sun. Occurrence, spatial Distribution and Risk and Hazard Assessments of Antibiotics in Drinking Water Sources of a Polluted Large River Basin in China [J]. Aquatic Ecosystem Health & Management, 2018, 21(1):107–117. (SCI)

[9] Qiyun Ma, Jiquan Zhang *, Caiyun Sun, Feng Zhang, Rina Wu, Lan Wu. Drought Characteristics and Prediction During Pasture Growing Season in Xilingol, Grassland, Northern China [J]. Theoretical and Applied Climatology, 2018, 133(1-2): 165-178. (SCI)

[10] Rui Wang, Jiquan Zhang *, Enliang Guo, Si Alu, Danjun Li ,Si Ha, Zhenhua Dong. Integrated Drought Risk Assessment of Multi-Hazard-Affected Bodies Based on Copulas in the Taoerhe Basin, China [J]. Theoretical and Applied Climatology, 2018. (SCIE)

[11] Liang Xu, Mo Zhou, Hanyu Ju, Zhenxing Zhang, Jiquan Zhang *, Caiyun Sun *. Enterobacter Aerogenes Metabolites Enhance Microcystis Aeruginosa Biomass Recovery for Sustainable Bioflocculant and Biohydrogen Production [J]. Science of the Total Environment, 2018, 634: 488-496. (SCI)

[12] Mo Zhou ,Jiquan Zhang *, Caiyun Sun. Easier Removal of Nonylphenol and Naphthalene Pollutants in Wet Weather Revealed by Markov Chains Modeling [J]. Environmental Chemistry Letters, 2018. (SCIE)

[13] Siqin Tong, Jiquan Zhang, Yuhai Bao, Quan Lai, Xiao Lian, Na Li, YongbinBao. Analyzing vegetation dynamic trend on the Mongolian Plateau based on the Hurst exponent and influencing factors from 1982–2013 [J]. J. Geogr. Sci. 2018, 28(5): 595-610.(SCI)

2017

[1] Sijia Li, Jiquan Zhang *, Enliang Guo, Feng Zhang, Qiyun Ma. Dynamics and Ecological Risk Assessment af Chromophoric Dissolved Organic Matter in The Yinma River Watershed: Rivers, Reservoirs, and Urban Waters [J]. Environmental Research, 2017, 158: 245-254. (SCIE)

[2] Mo Zhou, Jiquan Zhang *, Caiyun Sun. Occurrence, ecological and Human Health Risks, and Seasonal Variations of Phenolic Compounds in Surface Water and Sediment of a Potential Polluted River Basin in China [J]. International Journal of Environmental Research and Public Health, 2017, 14(10). (SCIE)

[3] Enliang Guo, Xingpeng Liu *, Jiquan Zhang *, Yongfang Wang, Cailin Wang, Rui Wang, Danjun Li. Assessing Spatiotemporal Variation of Drought and its Impact on Maize Yield in Northeast China[J]. Journal of Hydrology, 2017, 553: 231-247. (SCI)

[4] Enliang Guo, Jiquan Zhang *, Si Ha, Zhenhua Dong, Tiehua Cao, Lan Wu. Temporal and Spatial Characteristics of Extreme Precipitation Events in The Midwest of Jilin Province Based on Multifractal Detrended Fluctuation Analysis Method and Copula Functions[J]. Theoretical and Applied Climatology, 2017, 130(1-2): 597-607.(SCIE)

[5] Yichen Zhang, Feng Zhang *, Jiquan Zhang *, Enliang Guo, Xingpeng Liu, Zhijun Tong. Research on the Geological Disaster Forecast and Early Warning Model Based on the Optimal Combination Weighing Law and Extension Method: a Case Study in China [J]. Polish Journal of Environmental Studies, 2017, 26(5): 2385-2395.(SCIE)

[6] Jie Yu, Jiquan Zhang *, Ming Zhang. Theoretical Model of Spiral Rain Clusters and Analysis of Their Horizontal Structure Equation [J]. Atmosphere, 2017, 8 (6). (SCIE)

[7] Qiyun Ma, Jiquan Zhang *, Caiyun Sun, Enliang Guo, Feng Zhang, Mengmeng Wang. Changes of Reference Evapotranspiration and Its Relationship to Dry/Wet Conditions Based on the Aridity Index in the Songnen Grassland, Northeast China [J]. Water, 2017, 9(5): 316. (SCIE)

[8] Siqin Tong, Jiquan Zhang *, Yuhai Bao, Rina Wu, Rigele Te, Lisi Wei, Xiao Lian. Spatial and Temporal Variations of Vegetation Cover and the Relationships with Climate Factors in Inner Mongolia Based on GIMMS NDVI3g Data [J]. Journal of Arid Land, 2017, 9(3): 394-407.(SCIE)

[9] Siqin Tong, Jiquan Zhang *, Yuhai Bao. Inter-decadal Spatiotemporal Variations of Aridity Based on Temperature and Precipitation in Inner Mongolia, China [J]. Polish Journal of Environmental Studies, 2017, 26 (2): 819-826.(SCIE)

[10] Feng Zhang, Xingpeng Liu *, Jiquan Zhang *, Rina Wu, Qiyun Ma, Yanan Chen. Ecological Vulnerability Assessment Based on Multi-Sources Data and SD Model in Yinma River Basin, China [J]. Ecological Modelling, 2017, 349: 41-50.(SCI)

[11] Caiyun Sun, Jiquan Zhang *, Qiyun Ma, Yanan Chen, Hanyu Ju. Polycyclic Aromatic Hydrocarbons (PAHs) in Water and Sediment from a River Basin: Sediment-Water Partitioning, Source Identification and Environmental Health Risk Assessment [J]. Environmental Geochemistry & Health, 2017, 39(1):63-74.(SCIE)

[12] Xiangqian Li, Zhijun Tong *, EnlianGuo g, Xiaolong Luo. Quantifying Spatiotemporal Dynamics of Solar Radiation over the Northeast China Based on ACO-BPNN Model and Intensity Analysis[J]. Advances in Meteorology, 2017:1-15. (SCIE)

[13] Chunlei Meng *. Quantifying the Impacts of Snow on Surface Energy Balance Through Assimilating Snow Cover Fraction and Snow Depth[J]. Meteorol Atmos Phys , 2017,

New Library

# Ocean University of China
# College of Engineering, China

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**Fax:** +86 0532-66781550

**Website:** http://eweb.ouc.edu.cn/engineering/

College of Engineering

College of Engineering was founded in 1993, whose predecessor is Department of Ocean Engineering established in1983. It is a domestic well-known engineering faculty with distinctive feature of Ocean Engineering.

In recent years, aiming at academic excellence and benefiting society, our college has made remarkable achievements in disciplinary development, education, research and social service. As one of the most dynamic colleges, we are striving for prosperous future in conformity with national mid-long development planning.

## Research Focus / Interests:

College of Engineering has 4 departments: Department of Ocean Engineering, Department of Automation and Measurement, Department of Mechanical Engineering and Department of Civil Engineering. The research focuses of the 4 departments are as below:

### 1. Department of Ocean Engineering

- Dynamic Analysis, Design and Disaster Prevention for Offshore Structures
- Interaction between Port, Coastal Engineering and Marine Environment
- Dynamic Theory and Its Application of Estuarine and Coastal Engineering
- Development of Ocean Renewable Energy

**Contact person:** Prof. Fushun Liu—percyliu@ouc.edu.cn

**Website:** http://eweb.ouc.edu.cn/engineering/departmentofoceanengineering_4538/list.htm

### 2. Department of Civil Engineering

- Dynamic Analysis of Engineering Structure and Hazard Prediction
- Mechanism and Recognition of Structural Damage
- Appraising and Strengthening of Structures
- Infrastructure Project Management and Decision Support Information System
- Construction Engineering Management
- Marine Civil Engineering and Management Based on Low Carbon

**Contact person:** Prof. Shutong Yang—shutongyang2013@163.com

**Website:** http://eweb.ouc.edu.cn/engineering/departmentofcivilengineering_4539/list.htm

### 3. Department of Automation and Measurement

- Measurement and Automatic Device
- Pattern Recognition and Intelligent System
- Control Theory and Control Engineering

**Contact person:** Associate Prof. Shengbo Qi—qsb@ouc.edu.cn

**Website:** http://eweb.ouc.edu.cn/engineering/departmentofautomationandmeasurement_4541/list.htm

### 4. Department of Mechanical Engineering

- Technology on Low Carbon Energy and Renewable Energy
- Design and Control Marine Mechanical Equipment
- Mechanical Design and Manufacture
- Industry Design

**Contact person:** Prof. Baocheng Zhang—zbc2014088@ouc.edu.cn

**Website:** http://eweb.ouc.edu.cn/engineering/departmentofmechanicalengineering_4540/list.htm

### 5. Key Laboratory of Ocean Engineering of Shangdong Province

Contact person: Yu Xu—

kloe@ouc.edu.cn; xianzhixu2006@yahoo.com.cn

Prof. Hongda Shi

E-mail: hd_shi@ouc.edu.cn

## Latest Publications:


- Zhifeng W , Shuiqing L , Sheng D , et al. Extreme wave climate variability in South China Sea[J]. International Journal of Applied Earth Observation and Geoinformation, 2018, 73:586-594.
- Wang Z , Zhou L , Li Q , et al. Storm Surge along the Yellow River Delta under Directional Extreme Wind Conditions[J]. Journal of Coastal Research, 2017, 80:86-91.
- Wang Z , Wu K , Gao S , et al. Nearshore Wave Forecast for Xiamen, China[J]. Journal of Coastal Research, 2017, 80:48-54.
- Cao, H., Zhou, L., Li, S., & Wang, Z. Observation and numerical experiments for drag coefficient under typhoon wind forcing. Journal of Ocean University of China, 2017, 16(1), 35-41.
- Osinowo, A., Lin, X., Zhao, D., & Wang, Z. Statistical analyses of sea state conditions in south china sea. Journal of Ocean University of China, 2017, 16(3), 357-369.
- Jing Jia, Jitong Jiang, Qiuhong Zheng, Huiying Gao. Research on the spatial analysis method of seismic hazard for island. Journal of Physics, 2017,842.


## Jobs/ internship/ exchange opportunities:

### Job opportunities

- (Links: http://eweb.ouc.edu.cn/963/list.htm)

### Scholar Programs at the State/Provincial Level

- **National 1000 Talents Plan: Recruitment Program for Global Experts (full-time and short-term)**

  Applicants should be under the age of 55 and hold position of full professorship (or equivalent), senior engineer/technology expert roles in high-level overseas universities/institutions.

- **National 1000 Talents Plan: Recruitment Program for Young Experts (full-time)**

  Applicants should be under the age of 40 and have a PhD degree with overseas research experience of over 3 years and demonstrate a strong potential to make future achievements.

- **National 1000 Talents Plan: Recruitment Program for Overseas Experts (full-time & short-term)**

  Applicants should be under the age of 65 and be foreign citizens of no Chinese origin internationally recognized as experts who hold professorships (or equivalent) senior engineer/technology positions in overseas universities/institutions.

- **Chang Jiang Scholars Program of the State Ministry of Education**
  - **Distinguished Professor (full-time):** Candidates of natural sciences & engineering should be under the age of 45, and those of social sciences should be under the age of 55.
  - **Young Expert (full-time):** Candidates of natural sciences and engineering should be under the age of 38, and under 45 for those of social sciences.

- **Taishan Scholars Program for Outstanding Experts, Shandong Province**
  - **Distinguished Professor (full-time):** Applicants should hold positions of associate professor or above in universities/institutions and meanwhile be under the age of 55.
  - **Young Expert (full-time):** Applicants should be under 40 years old, with a doctoral degree.

  See more details of the recruitment programs above in the relevant regulations of the state and Shandong province.

### OUC Recruitment Programs

Qualified applicants for state/provincial programs may first apply for Zhufeng Scholars Program (full-time), Fanrong Scholars Program (full-time), Young Talented Professionals (full-time) or Green Card Scholars Program (part-time), and work at OUC after peer review. Successful applicants will be given priority for recommendations for state/provincial programs mentioned above.

Website: http://www.ouc.edu.cn/06/46/c332a67142/page.htm

- **Zhufeng/Fanrong Scholars Program (full-time)**
- **Master Scholars Program**
- **Recruitment Program for Young Talented Professionals**
- **Green Card Scholars Program**

Visiting professors/ chair professors The program aims to bring in well-known scholars from overseas who hold positions of associate professor or above in universities/ institutions in a flexible way Successful applicants should work at OUC for a minimum of 2 months per year.

- **Young Teachers Program**

Applicants should have a PhD degree from a prestigious overseas or home university/institution, and demonstrate expertise in research and potentials for future achievements. In principle, applicants should graduate from high-level universities or academic institutions during their undergraduate and postgraduate period. Their management is based on post-doctoral teaching or appointment system.

- **Post-Doctors (Research)**

Applicants should be PhD recipients and selected by professors or major project investigators. Ocean University of China has 12 post-doctoral programs. College of Engineering has one of them, named Hydraulic Engineering. (Links: http://eweb.ouc.edu.cn/953/list.htm)

### Exchange opportunities

College of Engineering signed agreements or MOU in exchanges of students and teachers, collaboration on research and teaching with University of Liverpool, University of Rode Island, TUAM, West Australia, University of Strathclyde, University of Cheung Kong and so on. Hundreds of undergraduates, graduates and teachers are benefit from these international collaborative programs.

Website: http://eweb.ouc.edu.cn/engineering/internationalcooperation/list.htm)

# Department of Geography, Delhi School of Economics, University of Delhi, India

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The department traces its origin to October 1959, when under the initiative of Professor V.K.R.V. Rao, the then Vice-Chancellor of the University and an eminent Economist, a Department of Human Geography was established as a constituent of the Delhi School of Economics. Professor George Kuriyan, a renowned Geographer of India at that time, was the first Professor and founder of the department. In 1966, Professor V.L.S. Prakasa Rao took over from him and guided the department until 1973. Since then, the department acquired a name and a distinctive identity in India and abroad. It draws students from all over India as well as abroad. The department has expanded many times over since 1973. The name of the department was changed to the Department of Geography in 1976 to indicate the widening scope of teaching and research activity in physical and human aspects of Geography. The Department has evolved many new courses, which have been widely acclaimed as the frontiers in Geography. The Faculty members undertake research projects from various agencies including University Grants Commission, Indian Council of Social Science Research, Council for Scientific and Industrial Research, Indo-Canadian Shastri Institute and Ministries of Government of India, which include Indian Space Research Organization, Department of Science and Technology and the Planning Commission. The department is located within the teaching block of the campus of the Delhi School of Economics, Delhi University North Campus. Diversity of Teaching programme with 6 specialized groups. Faculty received several prestigious Awards and Grants Established International Collaboration with Canada, Netherlands, UK, Japan and USA. Engage with national and international Geography Associations occupying post of Vice-President, IGU and Secretary General, NAGI.

## Research Focus

Future plans for the Department are presented in line with the identified thrust areas and available expertise within the department proposed under UGC DRS III. The thrust areas identified are the following:

Environment and Resources.

The thrust area will focus on the following specialized themes:

Climate Change Analysis in selected Indian Geosystems i.e., Mountain, Arid Regions and Megacities (using UHI)

Hazard, Risk and Vulnerability mapping and modeling

Ecological Footprint Analysis in Critical Regions

Urban and Regional Planning.

The thrust area will focus on the following specialized themes:

Urban Health and Well-being

Gender, Space and Development

Regional Development , Policy Analysis and Assessment of Development Programs

## Research Unit Contacts

**Professor's Profile of our Department**

**http://geography.du.ac.in/professor.html**

**Associate Professor's Profile of our Department**

**http://geography.du.ac.in/associate_professor.html**

**Assistant Professor's Profile of our Department**

**http://geography.du.ac.in/assistant_professor.html**

Dr Netrananda Sahu

E-mail: babunsahu@gmail.com

nsahu@geography.du.ac.in

## Latest Publications

**Research Publications, Research Thrust areas all are within this link:**

http://geography.du.ac.in/naac2012_17/SSR_Quantitative_Metrics.pdf

http://geography.du.ac.in/naac2012_17/SSR_Qualitative_Metrics.pdf

http://geography.du.ac.in/naac2012_17/iqac_aqar.pdf

### Institutional Capacity Development Activities

**Skill Enhancement and Capacity Building to college teachers apart from teaching:**

- Participatory field observations involving research scholars.
- Intensive fieldwork undertaken involving research students for mountain, climatic, gender studies, megacities and rural studies.
- Capacity Building for Researchers and teachers in colleges.
- Time to time organization training programme for researchers and college teachers on recent techniques and software related to RS/GIS.
- Dissemination of Research Findings through workshops:
- Organization of seminars/workshop for disseminating the findings to larger academic community, policy makers and community groups.

### Other useful information and contacts:

In QS World Ranking Department of Geography is No. 1 in India

https://www.topuniversities.com/university-rankings/university-subject-rankings/2017/geography

http://geography.du.ac.in/home.html

# Centre of Excellence in Disaster Mitigation & Management, Indian Institute of Technology Roorkee (IIT-R), India

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Website: https://www.iitr.ac.in/centers/COEDMM/pages/Home.html

**Center of Excellence in Disaster Mitigation and Management *(CoEDMM)*** has been established with the goal of conducting educational programmes, cutting edge research and training on disasters, vulnerability and their mitigation. The main aim of center is to develop human resource for all phases of disaster to help Mother Nature become a sustainable habitat and protecting the lives and economy of the nation. Creation of a National Database for rapid dissemination of information and knowledge is also an objective.

The center is a multidisciplinary research and education center. Main aim of the educational program is to impart advance knowledge on technical and managerial skills to the professionals to make them equipped with innovative technologies for effective mitigation and management of disasters for overall benefit of the society.

The Center aims to achieve excellence in key areas of education and research at par with international standards. Regional issues especially related with *Earthquakes, Tsunamis, Floods, Cyclones and their early warnings are other focus areas.*

The center has faculty from diverse backgrounds covering technical, biological, social, economic and managerial aspects covering both natural as well as man- made disasters. In natural disasters mainly Earthquake, Landslide, Cyclones, Floods, Tsunami are covered. In man-made disasters, chemical, fire, biological disasters are covered. The Center has high-end technical expertise in geospatial and remote sensing technology.

Research and consultancy projects are carried out through sponsored funding from Ministry of Earth Science, Govt. of India and other National and International funding agencies like Uttarakhand State Science & Technology Council- Dehradun, ISRO, NDMA-New Delhi, SAARC Disaster Mitigation Centre, Nanyang Technological University Singapore, to name a few.

## Research Focus

The Centre was incorporated in 2006 with an objective of becoming a multi-disciplinary research hub that specifically caters to the development of disaster resilience in India and mitigating disaster risks. Since its


inception, the Centre has remained truthful to its objective. Our research themes can be classified into four major areas, irrespective of the different laboratories we have; geo-technical, bio-chemical, hydraulics / wind and built environment. Apart from these strict categories, we do have interests in generic issues too which grandly subsumes all of the above. Our Centre has faculty researches as well as scholarly researches; the former being the individual and group endeavours of our faculties ranging from academic researches to industrial consultancies and the later being the dissertation and thesis of our students in novel and non-overlapping fields. On the faculty side of the spectrum, we have research interests in development and installation of earthquake early warning systems, vulnerability and risk analysis of geo-hazards in Himalayan regions to name some in the geotechnical category, rehabilitation and retrofitting of buildings, seismic strengthening technologies, documentation of traditional EQ resistant building technologies etc. in the built environment category, wind tunnel studies for various real-life projects across India in the hydraulics category and bioremediation of accumulated pesticides, mitigation techniques of contaminated environments etc. in the bio-chemical category. On the academic side, our research interests vary to such extents that it covers almost all avenues of disaster management and mitigation. Starting from micro-insurances for risk reduction to involvement of corporates in sustainable and holistic development, from humanitarian logistics during disaster relief and rescue to escape route and evacuation planning, from simulating tropical cyclones to studies on urban heat island, from cyber breach to seismic retrofitting from architectural perspective, our Centre patronises research in all possible diversities with the sole aim of resilient nation building.

Prof. Mahua Mukherjee, Head

E-mail: coe_dmm@iitr.ac.in

## Latest Publications

- Study on Seismic Strengthening Technologies and Comparative Assessment of Various Retrofit Techniques for Unreinforced Masonry (URM) School Buildings in India
- Documentation on Traditional Earthquake Resistant Building Technology Available with SAARC Countries
- Hazard Characterization and Isolation of Pesticide degrading Bacteria for Mitigating the Contaminated Environment
- Seismic Vulnerability Assessment of Building Types in India
- Development of Bacterial Pesticide Degrading System for Bioremediation of Pesticides Accumulated in the Local Environment
- Vulnerability and Risk Analysis of Geohazards in Himalayan Region
- Rehabilitation & Retrofitting of Pre-Independence Building of FRI, Dehradoon
- Repair and Retrofitting of Foundation at LBSNAA Mussoorie
- To Check Feasibility for Installation of Lift At LBSNAA, Mussorrie

## Research Unit Contacts

**There are some multidisciplinary laboratories in the Centre –**

- Bio-Chemical Risk Assessment Laboratory
- Climate Change & Wind Engineering Laboratory
- Earthquake & Landslide Risk Assessment Laboratory
- High Performance Computer Laboratory
- Industrial /Man-made Disaster Risk Assessment Laboratory
- Wind Simulation Laboratory
- **Link https://www.iitr.ac.in/centers/COEDMM/pages/Home.html**

## Institutional Capacity Development Activities

The Centre has imparted various training programs as per requirement of the sponsoring agency. The duration and timeframe depends on the mutual understanding with the sponsoring agency and our Centre. We welcome if any organization wish to sponsor any training program with the Centre.

The Centre has already completed a Training and Capacity Building Programme on Seismic Strengthening sponsored by Nanyang Technological University, Singapore.

## Internships and Job Opportunities

The Indian Institute of Technology Roorkee has various Fellowships for Visitors Like Distinguished Visiting Professor programme.

The Institute instituted internship program for internal and external students through SPARK and SURA programme (www.iitr.ac.in).

Also the Institute encourages various student exchange programs.

One of our M.Tech. Student is doing Sandwich Masters' Dissertation in Germany under DAAD fellowship.

## Other Useful Contact Information:

**Dr. Mahua Mukherjee**

Head

Centre of Excellence in Disaster Mitigation & Management

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# International Institute of Earthquake Engineering and Seismology (IIEES) , Iran

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Website: http://www.iiees.ac.ir/en/

Iran being located in high seismic hazard regions of the world, with frequent occurrence of devastating earthquakes, has experienced extreme human, social and property losses in past decades due to vulnerability of the built environment, rapid growth of population, and seismically-incompatible urban development. To ensure the sustainable development, Iran required a multidisciplinary risk reduction strategy with the objective of saving human lives and resources along with an effective implementation program. The establishment of International Institute of Earthquake Engineering and Seismology (IIEES) in 1989, by the Iranian in cooperation of UNESCO on a right time provided an excellent platform for answering the increasing demand for safety, development of the required disaster reduction program and providing the required know-how and expertise for hazard and risk mapping, vulnerability reduction and public awareness and preparedness.

IIEES is composed of different research Centers, including Seismology, Geotechnical Engineering, Structural Engineering, Risk Management, Graduate Studies, Information Technology, and International Relations.

## Research Focus

- Seismotectonic and seismological research on the earth crust, active faults, seismicity and earthquake hazard; mapping active faults, hazard zonation; and earthquake catalogues;
- Development and operation of Iranian National Broadband Seismic Network; and mobile network for understanding of the seismic activity, and providing online post event information to the disaster management authorities;
- Seismic hazard modeling, analysis and zonation of Iran;
- Conducting comprehensive theoretical and experimental researches in the fields of liquefaction, landslides, site effects, soil structure interaction, soil modelling, dynamic behavior of porous media, earth-structures behavior, zonation and geotechnical microzonation;
- Conducting comprehensive analytical, experimental, field and instrumental studies and research for seismic safety of structures (buildings, lifelines, industrial structures, power plants, oil and petrochemical industries, and important facilities like dams, bridges, etc.);
- Developing aseismic design methods, guidelines and codes for new buildings, strengthening of the existing structures; as well as adopting new technology for semi-industrial construction of buildings against earthquakes;
- Vulnerability and risk assessment of cities, developing integrated, doable and effective risk management and reduction program, proposing effective risk reduction measures to the authorities, and cooperate toward its approval and implementation with the consideration of socio-economic and cultural aspects;
- Promoting the earthquake safety, prevention and preparedness culture in all levels of society (general public, specialist and decision makers) through comprehensive earthquake awareness program;
- Offering M.S. and Ph.D. graduate programs and extension courses i n are of IIEES activity;
- Providing technical and research consultancy to the government and industries for their seismically safe development and construction;
- Expanding scientific and technical cooperation and exchange of knowledge with the international and regional organizations and institutions in all fields related to earthquake risk reduction and mitigation.

Prof. Mohammad Kazem Jafari , President

E-mail: jafari@iiees.ac.ir

Prof. Mohsen Ghafory-Ashtiany

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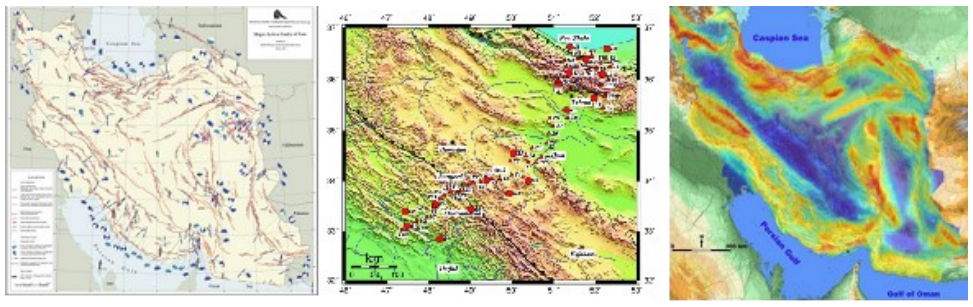
## Seismological Research Center




**Missions:**

- Understanding seismic sources, earth's crust and mantle structure of Iran;
- Seismic monitoring and modeling;
- Development of earthquake catalog and data-base;
- Strong Ground Motion studies;
- Hazard modeling and mapping.

Currently, the seismological research center is composed as follows:

- Seismology Department
- Seismotectonics Department
- Engineering Seismology and Hazards Department; and
- Earthquake Prediction and Forecasting

## Geotechnical Engineering Research Center


**Missions:**

- Comprehensive studies on site effects, liquefaction, soil-structure interaction, landslide, surface fault rupturing, etc.;
- Evaluation of dynamic behavior and seismic bearing capacities of shallow and deep foundations, dams, underground cavities and retaining walls;
- Geotechnical hazard zonation and microzonation.

Geotechnical Engineering Research Center has organized its activities in four departments:

- Geotechnical Earthquake Engineering Department
- Foundation Engineering & Geotechnical Structures Department
- Soil and Rock Dynamics Department
- Geohazard Department

## Structural Engineering Research Center

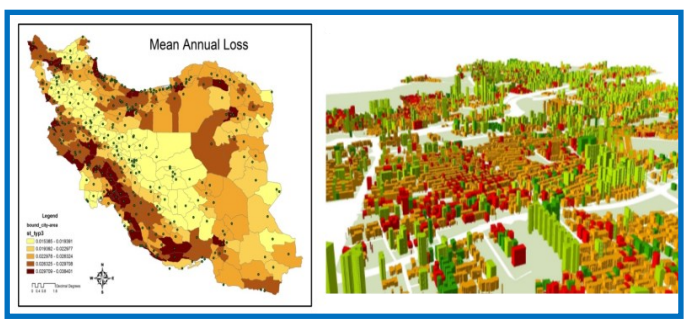

**Missions:**

- Structural safety and quality improvement;
- Seismic design guidelines;
- Retrofitting guidelines of structures, lifelines and infrastructure
- Vulnerability and risk modeling and assessment.

This center offers the students very new experiences in its highly equipped laboratory, and is composed of:

- Building Department;
- Special Structures Department;
- Lifeline Earthquake Engineering Department;
- Applied Structural Dynamics Department

## Earthquake Risk Management Research Center




**Missions:**

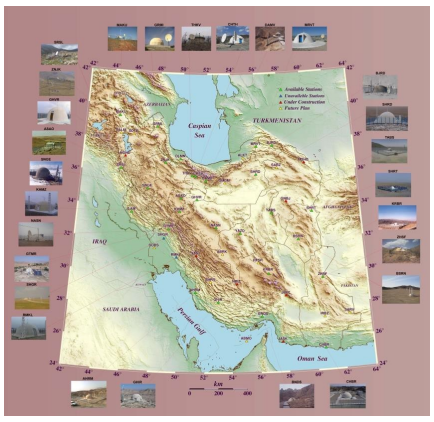
- Studying seismic risk reduction methods in urban and rural areas;
- Integrating relevant components for risk management planning;
- Research on socio-economic and cultural approaches to improve public safety;
- Developing damage and loss estimation systems.

Departments are: Urban and regional studies, Emergency management, Socio-economic and cultural studies, Geomatics, and Public Education

## IIEES Broadband Seismic Network

IIEES Broadband Seismic Network has been designed and operated for better understanding of the seismicity and seismic sources in Iran, and works as national network. The main goals for establishing and developing this network are:

- Full coverage of Iran by seismic stations and high-quality seismic data acquisition;
- Recording all seismic waves from local, regional and teleseismic sources in a large frequency and amplitude dynamic range;
- Establishing a reliable database for advance studies in seismology by scientists all over the world;
- Complementary seismic analysis and development of the rapid analysis systems for rapid earthquake notification and Quick Damage and Loss Estimation system.




http://www.iiees.ac.ir/en/iranian-national-broadband-seismic-network/

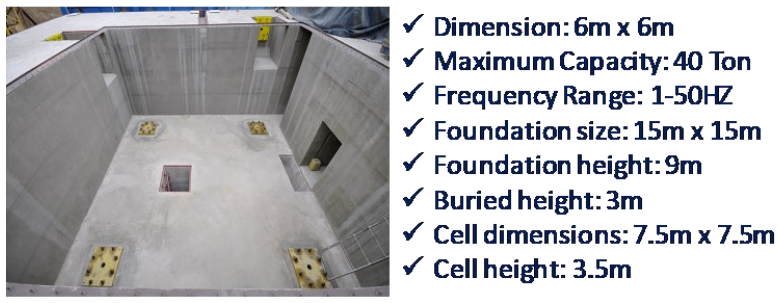
## Advanced Earthquake Engineering Laboratory (AEEL)

As the only multi-disciplinary research center within earthquake related fields in Iran, IIEES has developed a regional hub with world-class experimental facilities, which is the first of its type in the country and the surrounding region. The Advanced Earthquake Engineering Laboratory (AEEL) consists of several types of structural and geotechnical testing facilities to enable major progresses in experimental investigations in the field of earthquake engineering. AEEL have increased the ability to predict and improve the performance of typical structural and soil-structure systems.

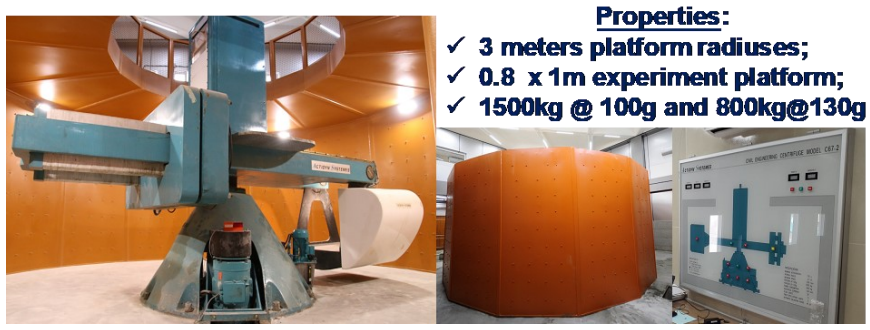
Construction of AEEL began in 2012 in North East of Tehran and will be completed by 2020. The long delay is due to unjust and unfair sanction on Iran. The AEEL consists of Strong floor and reaction wall, Shaking table, Geotechnical centrifuge facility, Soil Dynamics Laboratory and Structural Engineering Laboratory.

### Strong Floor and Reaction Wall


### Shaking Table Laboratory




### Geotechnical Centrifuge Laboratory




## Research Unit Contacts

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- Structural Earthquake Engineering Research Center: Dr. Omid Bahar omidbahar@iiees.ac.ir
- Risk Management Research Center: Dr. Kambod Amini kamini@iiees.ac.ir
- IIEES Broadband Seismic Network: Dr. Gholam Javan javandoloei@iiees.ac.ir
- IIEES Graduate School: Dr. Yaser Jafarian yjafarianm@iiees.ac.ir
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**Visit - http://www.iiees.ac.ir/en/faculty-member/**

## Latest Publications

- Development of IIEES fragility functions for building and bridges
- Risk Modelling and analysis of urban area; such as Sari, Karaj, Tehran, etc.
- Reconnaissance of earthquake damaged area, mapping the damages, lessons learned. And provide recommendations to the authorities on reconstructions.
- Development of urban resilience analysis.
- Seismic monitoring of Iran and improving the understanding the Iran earth crust.
- Tsunami potential assessment of Makran region.
- Structural health monitoring of bridges.
- Risk analysis of thermal power plants.
- SGM record selection for nonlinear response-history analysis of structural systems based on incorporation of time and frequency domain characteristics
- Proposing of Design Response Spectrum for Staged Construction Structures
- Provide Method to Satisfy Drift Controlling Criteria for Steel Special Moment Resisting Structures to have a better seismic behavior
- Investigation of strong-motion characteristics of Alborz - Northwest Iran using Hybrid Generalized inversion method (accelero- and seismometers)
- Needs assessment of hearing-impaired high school students and their schools for preparedness in earthquakes
- Investigation of stress and strain rate variations in the Central Alborz by using earthquake focal mechanisms and GPS data
- Evaluating Media Managers Awareness and Preparedness on Earthquakes to Improve Media Organizations Performance during a Disaster
- Complex Pattern Recognition Earthquakes in Zagross Using Copulas Theory
- Temporal Variation of Q Factor and Vp/Vs Ratio Before and after Earthquakes
- Morphotectonic and geological evidence of active faulting in the North Tabriz Fault
- Experimental Investigation of Liquid Impact Forces on the Roof of Storage Tanks
- Capacity Building at Neighbourhood Level for Improving Emergency Response Considering Public Buildings with Effective Performance
- Presentation of new Combined Damper for Steel Structures with Dual Performance.
- Numerical and Experimental Study of Performance of Isolated Floors with Rotating Mass Damper for Equipment and Secondary Systems
- Experimental investigation of lead extrusion dampers and numerical application to steel building bases during rocking motion
- Application of Perfectly Matched Layer (PML) in Dynamic Analysis of Embankment Dam-Foundation Interaction
- Seismic vulnerability functions for gas transmission pipelines in Iran
- Improving the existing methods for inclusion of kinematic interaction in seismic evaluation of soil-structure systems
- Development of Spatial Statistics Methods to Evaluate Seismic Vulnerability of Lifeline Networks
- Evaluating the Interaction of Surface Fault Rupture – foundation – Steel Structure
- Direct time integration from earthquake-induced equations of motion with steps larger than conventional without direct dependence to the response
- The Increasing of Energy–Absorption of CBFs by using of the new Steel or aluminum Cases based on experimental investigations
- Development of an Image Based on Response Recording Software

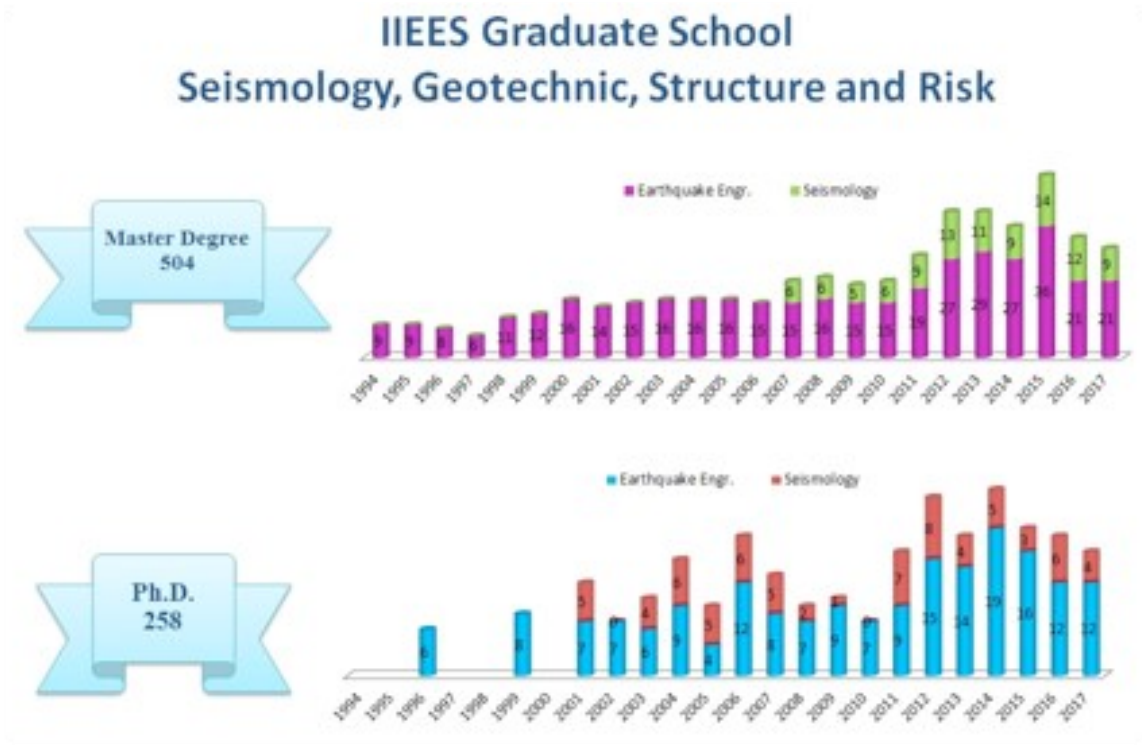
- Journal of Seismology and Earthquake Engineering: http://www.jsee.ir/index.php/jsee;
- Bulletin of Earthquake Science & Engineering http://www.bese.ir
- Research Bulletin of Seismology and Earthquake; www.rbsee.ir

Visit the Library link - http://www.iiees.ac.ir/en/library-and-document-center/

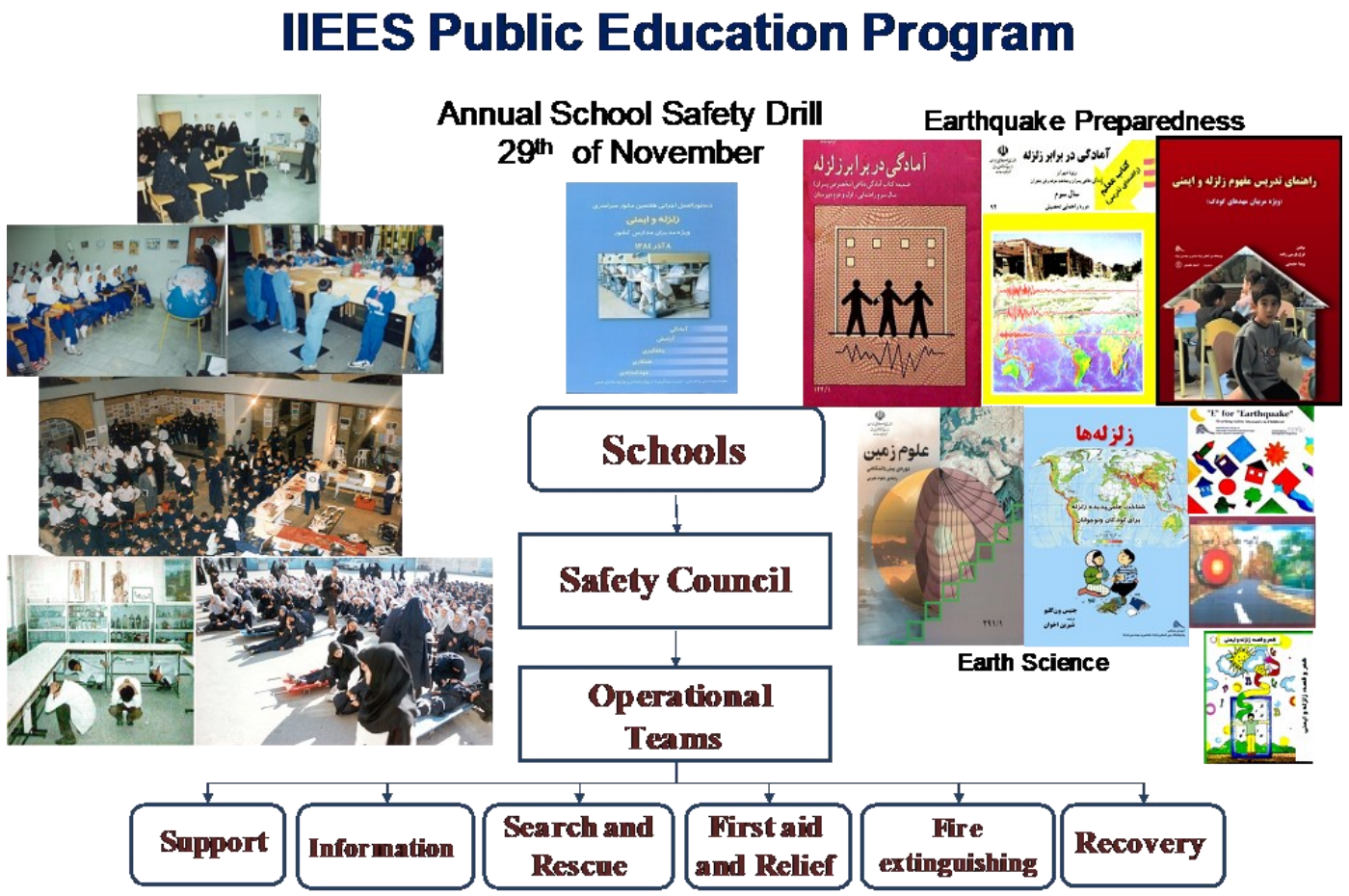
**Institutional Capacity Development Activities or training opportunities**

**1. IIEES Graduate School**

IIEES is accredited by Ministry of Science and Technology to offer Master and Ph.D. Program in Seismology, Geotechnical Earthquake Engineering, Structural Earthquake Engineering and Risk Management since 1984.




**2. IIEES Public Education Department**



# National Knowledge and Research Center for Emergency Readiness, University of Haifa, Israel

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The National Knowledge and Research Center for Emergency Readiness with eighty-five researchers, was established in January 2018 by the Israel Ministry of Science and Technology and the National Emergency Management Authority (NEMA) of the Ministry of Defense. Core institutions involved are University of Haifa, the Technion and the Hebrew University, together with researchers from Rafael Advanced Defense Systems, Rambam Hospital, Tel Hai College, and the Israel School for Humanitarian Aid; the municipality of Haifa and NATAN International Humanitarian Aid. The Center's mission is to provide a state-of-the-art scientific research institute to serve as a think-tank for policy framers, decision-makers, the academic community and practitioners from all sectors. The two intertwined functions of the Center are 1) independently generated, cutting-edge and multi-disciplinary research, and 2) solicited real-time response to requests by NEMA, government ministries, elected officials, NGOs and other stakeholders. The first activity (9 months) was a research gap assessment originating with the eight disciplinary groups (Social Science; Public Health and Emergency Medicine; Welfare and Social Work; Engineering, Technology, and Planning; Risk Assessment and Management; Environment; Law; and Public Policy). This culminated in September with a prioritized research agenda whose emphasis is multi(trans)-disciplinary in nature. According to the prioritization, calls for proposals have been and will be issued. Some of the projects will be of a comparative nature and be conducted together with international partners.

**Research Focus**

The National Knowledge and Research Center for Emergency Readiness (NKRC-EM) is comprised of 8 disciplinary research groups: Social Science; Public Health and Emergency Medicine; Welfare and Social Work; Engineering, Technology, and Planning; Risk Assessment and Management; Environment; Law; and Public Policy.

Conceptually the research at the Center is structured along two axes: the nature of the extreme condition and the time period. The relevant clusters of extreme conditions are:

- Man and Nature - natural (including fires, earthquakes, epidemics, hurricanes, and floods) and man-made disasters (including ecological, chemical, environmental, cyber, and nuclear); and
- Belligerencies - terrorism, rocket attacks, and cyber attacks. These extreme events are situated temporally: Before (deterrence, mitigation, and preparation for response); During (crises management), and After the crisis (short and long term recovery).

Coping with a disaster in each timeframe is approached through the multiple disciplines and their research frames, and a multidisciplinary lens. The research goals include not only understanding and documenting the current situation (the 'what is') but also normative analysis – including critical and constructive evaluations and suggestions for improvement (the 'what ought to be').

The Law and Public Policy groups have a dual role: they receive the research outputs of the other six groups, assess their implications for law and policy and make recommendations, providing a built-in operational pipeline aspect to the research. This ensures the integrative dimension critical for the success of the Center.

This first year of the Center's activity was devoted to a mapping of research and knowledge gaps (needs assessment) in the various relevant areas related to Emergency Preparedness. The data sources for the mapping were interviews with the 85 Center researchers; the scientific literature; interviews with experts and practitioners, and examination of internet sites of professional organizations and of disaster recovery websites and media reports. Each research group undertook a disciplinary mapping – using the sources above, for all disaster types and time phases. Each group held meetings scoping the needs and identified what is important to do and what the group researchers want to do – culminating in in-group prioritizing. We then pulled out the trans-disciplinary topics and analogies across groups.

Prof. Deborah Shmueli, Head

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Dr. Michal Ben Gal, Research coordinator

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These trans, or multi-disciplinary research topics include:

- Creating a common language to overcome discourse gaps among disciplines, and between the academy and practitioners
- National, local (urban) and community resilience
- Communication and participation of the public and different population groups
- Technological solutions
- Evaluation research
- Tools and models for simulations and practice
- Management and governance of the civil arena in an emergency
- Resources prioritization – economic aspects
- Long-term planning and preparedness

The results of the mapping were presented in a center-wide meeting which included researchers, affiliates and outside stakeholders, followed brainstorming on projects which could address these trans-disciplinary issues.

This led to the Center's first (internal) call for proposals (October 2018), and the prioritization of the first round of research. The call favored research that includes solicitation of the perspectives of relevant stakeholders: practitioners of state agencies in charge of responding to emergencies (governmental ministries, independent agencies established for addressing a particular type of crisis, local government, first responders, general security and enforcement agencies, relief-providing agencies and NGOs, relevant medical institutions and the insurance industry).

**<u>Four research proposals were selected for funding in 2018-2019</u>**:

*1. Insurance, Thresholds and Mechanisms for Post Disaster Resilience*

Researchers: Eran Feitelson, Daniel Felsenstein and Itay Fishhendler (Hebrew University of Jerusalem).

This research proceeds beyond the classic conception of insurance-as-risk-mitigation and suggests that it is also an under-recognized indicator of post-disaster resilience. Hitherto this topic has not been addressed in the literature and this has serious consequences for practice and policy. If imperfectly-competitive markets do not allocate insurance resources efficiently this can mean serious drawbacks in the post-disaster recovery process and resilience of places and sectors. If institutional constraints do not allow for flexible insurance contracts this can lead to an unfair insurance burden on government (and the non-affected taxpayer). If institutions such as insurance companies, government disaster funds etc. are over-exposed while adopting inappropriate insurance thresholds, this can have serious implications for public faith in post disaster recovery. If regulatory land use and planning practices are used as insurance mechanisms this can lead to market distortions and hamper post--disaster resilience. This research aims to fill this knowledge gap in Israel.

The key research questions relate to the demand, supply and institutional dimensions of insurance for natural hazards.

What is the spatial distribution of insurance (mis)coverage? (demand side)

Do insurance contracts and premia reflect natural hazards and risks? (supply side)

What are the local and global regulatory constraints operating in the natural hazards risk insurance market? What are the risks of harnessing the regulatory land use planning system to hazard insurance and what is the optimal public/ private insurance coverage mix? (institutional side).

The research will use both quantitative and qualitative methods. Demand and supply side questions will be addressed using by estimation spatial demand and supply functions for insurance (household, industrial, agricultural) using appropriate spatial econometric methods and GIS techniques to identify spatial mismatch. To ascertain how threshold conditions are fixed and made operative, a series of interviews with stakeholders will be conducted.

Research outputs include, comprehensive national mapping of areas and populations over exposed to hazards given their level of insurance, identification of pockets of 'insurance deprivation' and archetypes of thresholds pertaining to natural disaster compensation. These results are expected to have significance for government (thresholds), insurance providers (mapping mis-match) and exposed populations (generating local awareness and contributing to resilience).

*2. Using Twitter for near real-time alerts and damage analysis of natural hazards in Israel and its close surrounding*

Researchers: Motti Zohar, Lea Wittenberg, (Department of Geography and Environmental Studies, University of Haifa); Avigdor Gal (Faculty of Industrial Engineering & Management, Technion), Efrat Morin (Institute of Earth Sciences, Hebrew University of Jerusalem) and Ran Nof, (the Geological Survey of Israel).

During the last decade, the social network of Twitter has become a robust platform for distributing messages (tweets) among numerous subscribers worldwide. To date, Twitter is used by more than 300 million users worldwide. In Israel the growth of twitter subscribers is by ~100,000 since 2014 and to date consists of over 1,000,000 subscribers. The tweets, up to 280 characters only, can be sent via web pages, mobile devices or third-party Twitter applications. During and around the occurrence of natural hazards, people tend to over-tweet and consequently, the number of tweets raise significantly. While Twitter is already in use for near real-time alerts, processes for extracting reported damage from tweets and examining the resulted spatial distribution are still under development. In the proposed study it is suggested to acquire tweets made prior to and after natural hazards such as floods, fire and earthquakes that occurred in Israel and its close surroundings.

3. *Robust Preparedness Against Surprises in Extreme Events: Multi-Site Fires and Earthquakes*

Researchers: Yakov Ben-Haim (Technion – Israel Institute of Technology), Ronen Avni, (Israel Fire and Rescue Authority), Rivka Yahav, Anat Gesser-Edelsburg, Adar Ben-Eliyahu, (University of Haifa), Erez Sverdlov (Consultant).

This project is a combination of policy orientation and scientific emphasis on basic questions.

**Policy-orientation.** Info-gap decision theory will be used for prioritizing action alternatives according to their robustness to surprise. The product is a decision support tool for planning and preparedness of emergency responders in two areas: multi-site fires and earthquakes. We use models from different fields of science, and identify defects in them and show how to robustify against these deficiencies.

**Basic-science orientation**. The research team is multi-disciplinary, combining field and academic personnel, employing the method of Mental Models in Risk Assessment. The product of the project is understanding in support of preparations to build personal and community resilience, and to prepare therapeutic teams for emergency response.

*4. Managing a nation and its citizens during a crisis:*

*Interrelation test between government and public during emergency times*

Researchers: Eran Vigoda-Gadot, Shlomo Mizrahi, Rotem Miller-mor Attias, Nissim (Nessi) Cohen, Uri Hertz, Adar Ben-Eliyahu (University of Haifa)

The study examines government system management and preparation for emergencies, management of State functions in times of crisis, and the learning process following it. The public is at the forefront of dealing with emergency situations, is the first to be affected, and thus in need of developing ways of coping. The tool to be developed will examine the public views on a wide range of parameters which may affect the public and government ways of coping in emergency situations both on the theoretical and the practical level. To date, literature has examined only limited aspects of public-government relations in emergency situations. These studies demonstrate the significant role of citizens' trust in the existence of communication which is crucial in emergency situations (Wray et al., 2006). The important role of public trust is compounded in a security threat situation, where a low level of trust increases the public's willingness to waive civil rights, thus causing a threat to democracy (Silver, 2004). However, there is a significant lack of knowledge regarding explanations and models that shed light on changes in public trust, positions and behavior in times of emergency (Blendon et al, 2003; Davis and Silver, 2004; Hance et al, 1988; Peters et al, 1997; Wray et al, 2006). This research addresses this deficiency through examining questions which deal with the mutual relations between government and citizens related to issues of emergency and their implications for public attitudes and behavior. The study will examine what affects public trust in government systems during emergency times? Which areas have a greater impact and under what conditions? Are there changes in the public trust / positions / behavior considering the improvement in public systems management? The surveys will be conducted on the basis of the tools and insights accumulated by the researchers in previous projects dealing with the interrelations between public and government with regard to trust, satisfaction and effectiveness of the public sector. The survey data will present attitudes and behavioral tendencies of citizens at various points in time, regarding the performance of government emergency bodies, and behavioral tendencies in relation to emergency situations and preparedness for emergencies. In light of this data, computerized laboratory experiments and various simulation tools will be employed, aimed at an in depth examination of the specific issues related to public behavior in emergency situations.

## Latest Publications

- Elkin-Koren and Gal (2018). The Chilling Effect of Governance-by-Data on Data Markets
- Felsenstein & Mas (2018). Introduction to SI - Modeling urban resilience to disasters
- Felsenstein, Vernik & Israeli (2018). Household insurance expenditure as an indicator of urban resilience
- Fischhendler (2017). The Use of Intangible Benefits for Promoting Contested Policies: The Case of Geopolitical Benefits and the Israeli Gas Policy
- Fischhendler, I. (2017). The Use of Intangible Benefits for Promoting Contested Policies: The Case of Geopolitical Benefits and the Israeli Gas Policy.
- Grinberger & Felsenstein (2017). A Tale of Two Earthquakes: Dynamic Agent-Based Simulation of Urban Resilience
- Grinberger & Felsenstein (2018). Using big (synthetic) data to identify local housing market attributes
- Grinberger, Felsenstein & Samuels (2018). Emerging Urban Dynamics in the Aftermath of a Disaster: Simulating the Role of the Labor Market
- Grinberger, Lichter & Felsenstein (2017). Dynamic agent based simulation of an urban disaster using synthetic big data
- Salzberger (2017). The Rule of Law Under Extreme Conditions and International Law: A Law and Economics Perspective
- Segal, Negev, Feitelson & Zaychik (2017). Devising ‘policy packages’ for seismic retrofitting of residences
- Shmueli et al. (2018). How can regulatory systems be assessed? The case of earthquake preparedness in Israel
- Van Wijk & Fischhendler (2017). The construction of urgency discourse around mega-projects: the Israeli case

**Institutional Capacity Development Activities**

The Center conducts events and bi-weekly seminars that are open to the public. Most of them are streamlined on YouTube (some in Hebrew). The list of seminar talks with links to videos are available in the Center’s website (http://muchanut.haifa.ac.il) under “Events”.

Latest international conference and workshop titled: “Cascading Disasters: Theory, Methods and Empirics” took place on November 28-29, 2018. For more details and videos see on the website under “Events”, or press here for a direct link.

In addition, the Center offers a yearly condensed course, open to the public. This year’s course is on Risk Assessment and it will take place in January 2019.

# Research Center for Potential Development of Disaster Prevention (PDDP), Akita University Japan

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The center was established in January 2006 as one of research centers attached to the Graduate School of Engineering and Resource Science to make our community safe and peace from natural disasters, and is composed of the following six research fields :

1) Earthquake disaster
2) Tsunami disaster
3) River disaster
4) Slope disaster
5) Volcanic disaster and
6) Information and plan for disaster prevention and mitigation.

The center aims to promote fundamental and applied studies that contribute to prevention and mitigation of natural disasters, to study and support regional disaster prevention and mitigation, and to educate and spread the knowledge of natural disasters on the general public, the local government staff concerned, the company personnel concerned and so on through lecture meetings, forums, seminars, symposiums, etc. In order to perform these aims, the center actively promotes cooperative researches and projects with national and local governments, companies, local communities and so on. Postgraduate students may study in any of above fields towards the master's and doctor's degrees under the supervision of the center staff.

## Research Focus

1) Earthquake disaster field

Historical earthquake disaster

2) Tsunami disaster field

Behavior of tsunami in nearshore and on shore

Tsunami wave force on structures

Collision force of floating object

Density of tsunami inundation water

Historical tsunami deposit

3) River disaster field

River flooding

Dam break flooding

Density of river flooding water

Estuary environment

4) Slope disaster field

Mechanics for geological disaster

5) Volcanic disaster field

Petrogenesis and isotropic age determination on plutonic

6) Information and plan field for disaster prevention and mitigation

7( High performance broadband communications systems

Prof. Hideo Matsutomi

E-mail: matsu@gipc.akita-u.ac.jp

## Research Unit Contacts

1) Earthquake disaster fieldo

Prof. Toshihiko Mizuta

2) Tsunami disaster field

Prof. Hideo Matsutomi

3) River disaster field

Prof. Hideo Matsutomi

4) Slope disaster field

Prof. Tadao Imai

5) Volcanic disaster field

Prof. Tsukasa Oba

6) Information and plan field for disaster prevention and mitigation

Prof. Hitoshi Obara

## Latest Publications

- **2017**
- ・Toshihiko MIZUTA, Hiroshi KAGAMI: Literature Survey on the 1914 Akita Senboku (Kowakubi) Earthquake Based on the Archived Documents of Former Ohsawago Village, Senboku County, Akita Prefecture, AIJ Journal of Technology and Design, 23 (54), pp.735-738, 2017.(in Japanese)
- ・Hideo MATSUTOMI, Tomoe KONNO and Shunsuke TAKAO: A Method for Estimating the Tsunami Inundation Depth at the Front of RC Building with Connection Space and Aperture, Journal of JSCE, Ser. B1 (Hydraulic Engineering), Vol.73, No.4, pp.1015-1020, 2017. (in Japanese)
- ・Hideo MATSUTOMI, Fumiko KONNO, Satoru SAIKAWA, Takanobu KAMATAKI and Kazuya WATANABE: Influence of the Density of Tsunami Flooding Water on Tsunami Deposit and Run-up Height, Journal of JSCE, Ser. B2 (Coastal Engineering), Vol.73, No.2, pp.373-378, 2017. (in Japanese)
- ・Takanobu KAMATAKI, Norifumi ABE, Shin KANAZAWA and Hideo MATSUTOMI: A Study on Paleo-tsunami Inundation Area and Depositions in Coastal Lowland on the Southern Part of Akita Prefecture, the Eastern Margin of Japan Sea, Journal of JSCE, Ser. B2 (Coastal Engineering), Vol.73, No.2, pp.445-450, 2017. (in Japanese)
- **2018**
- ・Toshihiko MIZUTA, Hiroshi KAGAMI: Literature Survey on Reconnaissance and Related Reports for the July 28,1889 Kumamoto Earthquake, AIJ Journal of Technology and Design, 24(56), pp.457-460, 2018.(in Japanese)
- ・Toshihiko MIZUTA, Hiroshi KAGAMI: Damage due to the 1894 Shonai Earthquake Denoted in Archived Documents in the Former Nishigho Village, Historical Earthquakes, 32, pp.31-38, 2018.(in Japanese)
- ・Hiroshi KAGAMI, Toshihiko MIZUTA: Damage due to the 1896 Rikuu Earthquake Denoted in “ Disastrous Records in Hataya Village”, a Private Note Archived at the Village, Historical Earthquakes, 32, pp.93-101, 2018.(in Japanese)
- ・Hideo MATSUTOMI and Fumiko KONNO: Features and Problems of Flood Inundation Occurred at the Omono River Caused by the Akita Torrential Rainfall in July, 2017, Journal of JSCE, Ser. B1 (Hydraulic Engineering), Vol.74, No.4, pp.1165-1170, 2018. (in Japanese)
- ・Hideo MATSUTOMI, Hayato OKADA, Tomohiro KUBOTA and Fumiko KONNO: Experiments on the Dependency of Tsunami Load on RC Building on the Density of Tsunami Inundation Water, Journal of JSCE, Ser. B2 (Coastal Engineering), Vol.74, No.2, pp.265-270, 2018. (in Japanese)
- ・Takanobu KAMATAKI, Miki UCHIDATE, Shin KANAZAWA, Masataka ISHIDA and Hideo MATSUTOMI: A Study of Paleo-tsunami History around the Area Affected by the 1983 Japan Sea Earthquake, Coastal Lowland on the Northern Part of Akita Prefecture, the Eastern Margin of Japan Sea, Journal of JSCE, Ser. B2 (Coastal Engineering), Vol.74, No.4, pp.529-534, 2018. (in Japanese)
- ・Hideo MATSUTOMI, Takuya KOIZUMI, Yusuke TERUI, Hiroyuki KATO and Hiroyuki IWASE: Influence of the Differences in the Methods of the Steady and Unsteady Experiments on the Inundation Flow and Load on RC Building of Tsunami after Overflowing a Chest Wall, Journal of JSCE, Ser. B1 (Hydraulic Engineering), Vol.74, No.5, pp.1225-1230, 2018. (in Japanese)

# Asian Disaster Reduction Center (ADRC)
# Japan

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Fax: +81 78 262 5546

Website: http://www.adrc.asia/

The Asian Disaster Reduction Center was established in Kobe, Hyogo prefecture, in 1998, with mission to enhance disaster resilience of the member countries, to build safe communities, and to create a society where sustainable development is possible. The Center works to build disaster resilient communities and to establish networks among countries through many programs including personnel exchanges in this field. The Center addresses this issue from a global perspective in cooperation with a variety of UN agencies and international organisations/ initiatives, such as the International Strategy for Disaster Reduction (ISDR), the Office for the Coodination of Humanitarian Affairs (OCHA), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Economic and Social Commission for Asia and the Pasific (ESCAP), the World Meteorological Organization (WMO), and the World Health Organization Regional Office for the Western Pacific (WHO/WPRO).

## Research Focus

Disaster information development and dissemination system to facilitate DRR/DRM activities such as GLIDE and Sentinel Asia


GLIDE: disaster event identification scheme

http://gs.adrc.asia/glide/public/search/search.jsp


Sentinel Asia: disaster management support system using earth satellites

https://sentinel.tksc.jaxa.jp/sentinel2/topControl.jsp

## Publication:

Natural Disasters Databook 2016, 2017 (in press)

Annual Report 2017

The Report of 20-Year History of ADRC

Planned Projects:

Study on Disaster Resilience Policies and Measures for Sustainable Economic Growth in ASEAN Region

GNSS (Global Navigation Satellite System) application to EWM (early warning message) platform

Multi-hazard risk assessment methodology for regional disaster management planning

## Institutional Capacity Development Activities

Visiting Researcher Program

http://www.adrc.asia/project/development.php

## Latest Publications

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Dr Yumi Shiomi E-mail: ys-shiomi@adrc.asia

# Public Works Research Institute (PWRI)

# International Centre for Water Hazard and Risk Management (ICHARM) under the auspices of UNESCO , Japan

United Nations Educational, Scientific and Cultural Organization

International Centre for Water Hazard and Risk Management under the auspices of UNESCO

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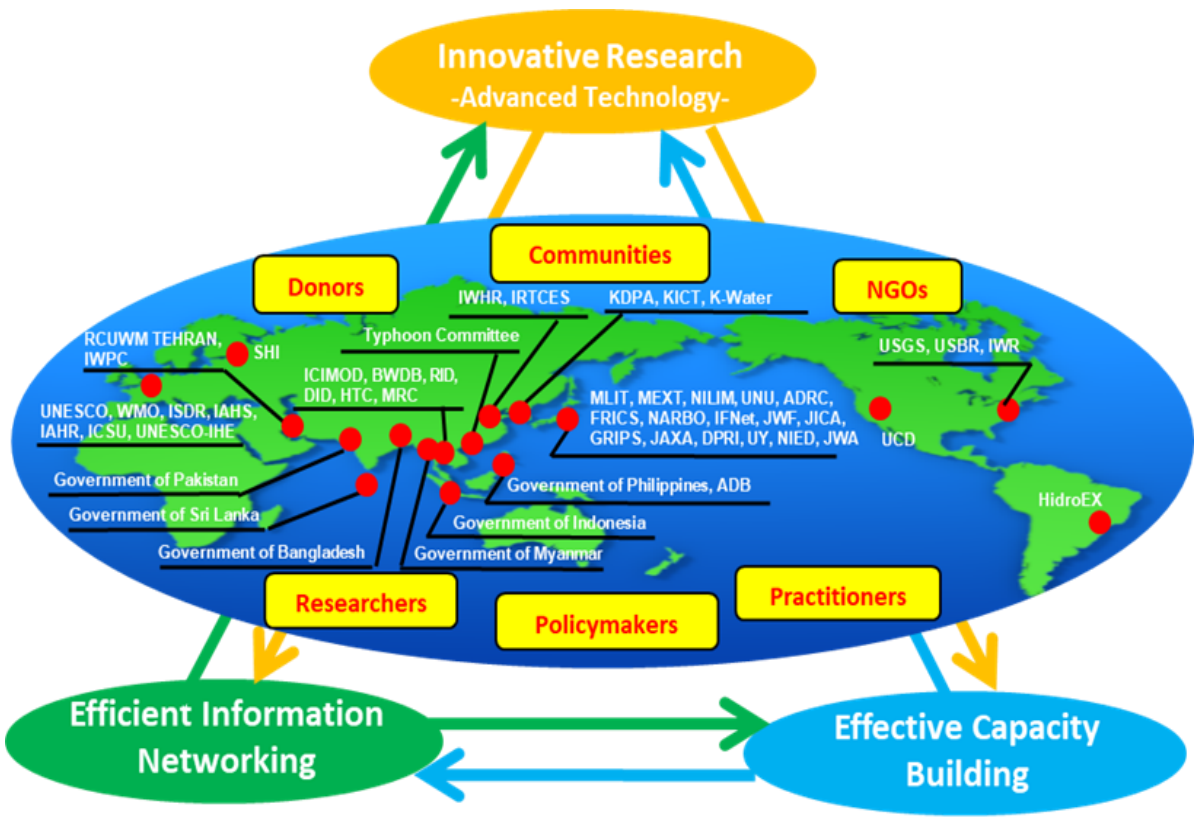
Website: http://www.icharm.pwri.go.jp/


The International Centre for Water Hazard and Risk Management (ICHARM) was officially established as a UNESCO category II center and a part of the Public Works Research Institute of Japan on 6th March, 2006.

ICHARM envisions a Center of Excellence housing a group of leading people, superior facilities, and a knowledge base which enables conducting **i) innovative research, ii) effective capacity building,** and **iii) efficient information networking**.

Based on these three pillars, ICHARM will globally serve as a knowledge hub for best national/local practices and an advisor in policy making.

ICHARM emphasizes localism, i.e., project implementations tailored to local needs and conditions, by creating an efficient worldwide information network based on innovative research and effective capacity building.




**Three Pillars of ICHARM Activities**


Dr. Tetsuya Ikeda,

Mr. Daisuke Kuribayashi

E-mail: icharm@pwri.go.jp

## Research Focus

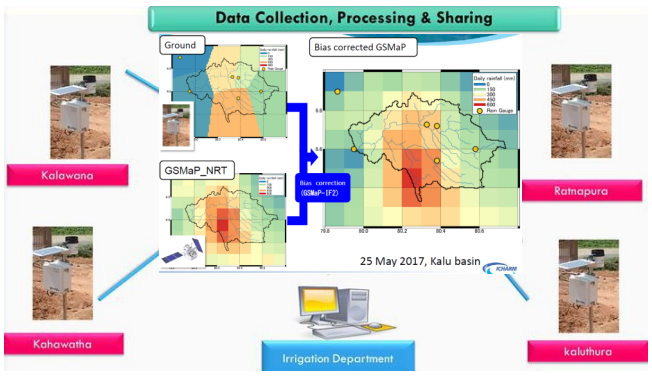
**<5 Core Research Activities>**

ICHARM has accumulated a broad range of knowledge and produced high-quality research outcomes to make practical policy recommendations and solve problems in the field of water disaster reduction, including methods for observing, forecasting and analyzing water related disaster hazards and methods for assessing, analyzing and monitoring exposure and vulnerability.

ICHARM implements many researches in cooperation with other organizations as shown in below:

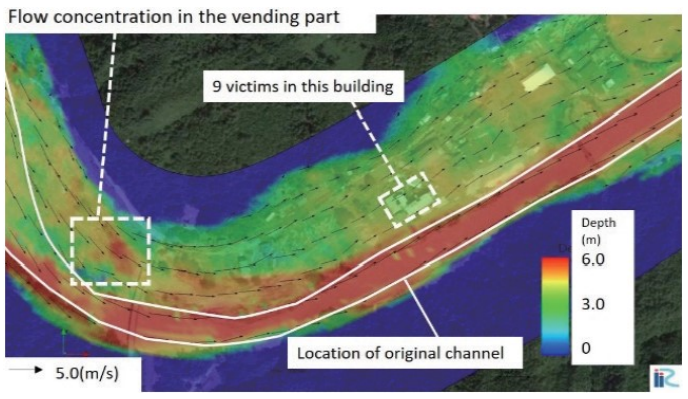
(1) **Data collection, storage, sharing, and statistics on water related disasters**

Sri Lanka—The real-time system to collect ground rainfall data and send the bias corrected GSMaP using the collected ground data.



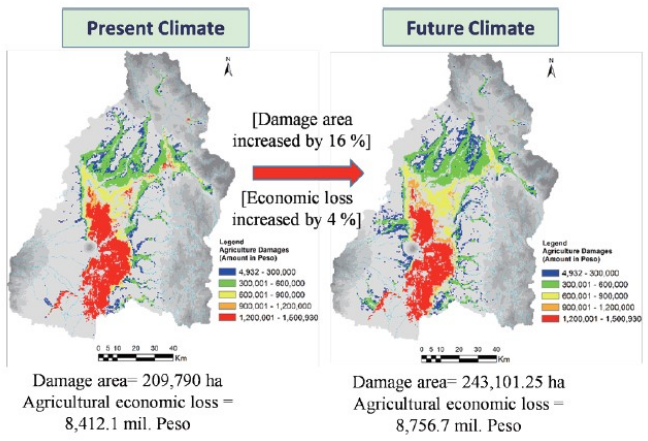

(2) **Risk assessment on water related disasters**

Characteristics of flood flow with riverbed deformation in mountainous valley-bottom streams the flood flow is concentrated on the bending parts of the valley, and is diverged toward the downstream of the sand bars.



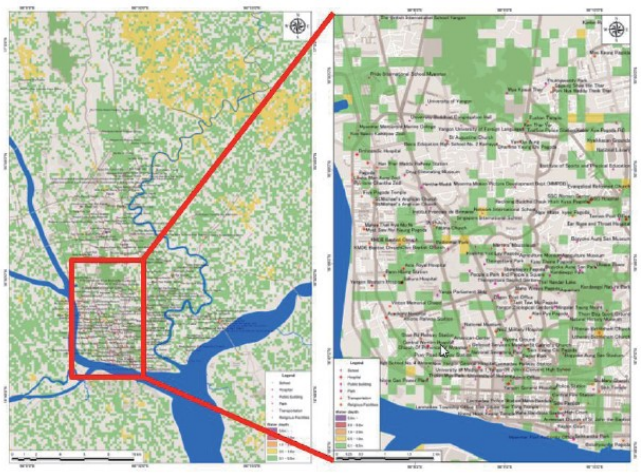

(3) **Monitoring and prediction of changes in water related disaster risk**

The comparison of flood damage assessment for a 100-year flood in the case of the worst scenario, which causes the largest flood area for the river basins of Pampanga.



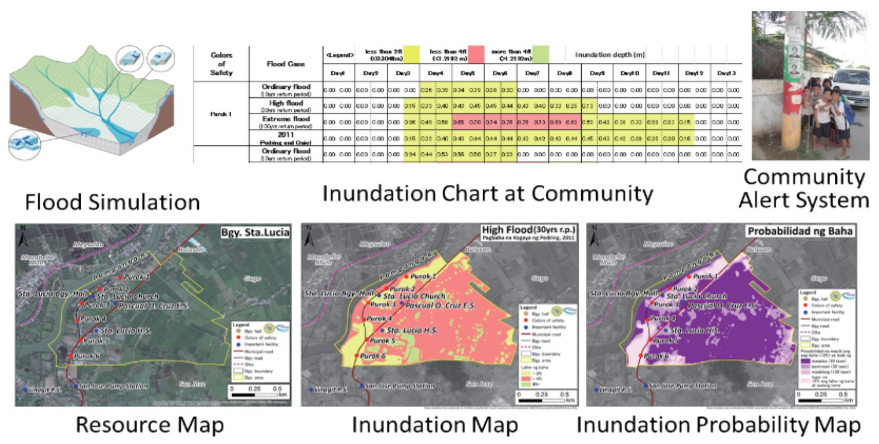

(4) **Proposal, evaluation and application of policy ideas for water related disaster risk reduction**

Flood Hazard Map of Yangon 100-year flood (green (0.1-0.5 m), yellow (0.5-1.0m)) created in the ADB project.

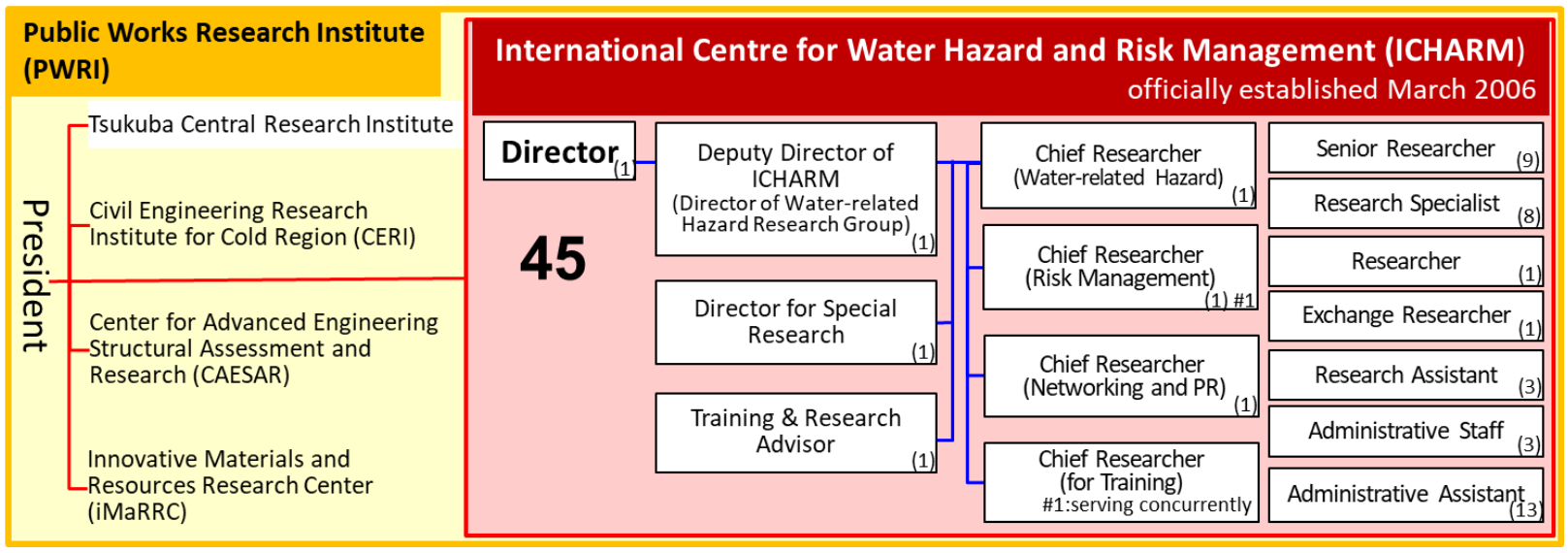


(5) **Support in constructing the applicability of water-related disaster management**

The Results of the research activity on community-level flood contingency planning in the Philippines



## Research Unit Contacts




### Latest Publications

**International Flood Initiative (IFI)**

The International Flood Initiative (IFI) is a worldwide framework to promote collaboration in flood management among international organizations such as UNESCO, WMO, UNU and UNISDR. ICHARM has been serving as its secretariat.

ICHARM is now conducting activities to support countries in the establishment of the “platform” to discuss and formulate strategies for the reduction of disasters in collaboration with other IFI partners. This effort has already started in Asia-Pacific countries such as the Philippines, Sri Lanka, Myanmar and Pakistan, and is expected to expand to other countries.

Other latest activities of ICHARM are introduced in the web page and the Newsletters.

**ICHARM web page:** http://www.icharm.pwri.go.jp/activities/special-activities/index.html

**ICHARM Newsletter:** http://www.icharm.pwri.go.jp/publication/index.html

### Publications

**Books:** http://www.icharm.pwri.go.jp/publication/book.html

**ICHARM Newsletter:** http://www.icharm.pwri.go.jp/publication/index.html

**ICHARM Brochure:** http://www.icharm.pwri.go.jp/publication/brochure.html

**PWRI Technical Note:** http://www.icharm.pwri.go.jp/publication/technical_note.html

### Major publications

No. 4353 ICHARM 10th Anniversary;

No. 4322 Lessons Learned from the Flood Disaster in Industrial Estates/Parks/Zones in Thailand

### Institutional Capacity Development Activities

ICHARM provides educational and training programs that empower both individuals and organizations in disaster management. The programs are designed to effectively collaborate with research and networking activities at ICHARM to increase the synergy effect between students and ICHARM researchers, as well as their affiliations and ICHARM, in research and projects. The main programs include:

- **One-year master's degree program**, "Water-related Risk Management Course of Disaster Management Policy Program," conducted in collaboration with National Graduate Institute for Policy Studies (GRIPS) and JICA; http://www.icharm.pwri.go.jp/training/master/master_index.html
- **Three-year doctoral degree program**, “Disaster Management,” jointly conducted with GRIPS; http://www.icharm.pwri.go.jp/training/phd/phd_index.html
- **Short-term training programs** held in Japan and overseas; and
- **Follow-up Seminar** held annually overseas for graduates and trainees;

Occasionally, PWRI/ICHARM receives visiting foreign researchers, short- and long-term internship students, which is decided depending on the research theme and availability of supervisor.

### Jobs/Internship Opportunities

Research Specialist

PWRI/ICHARM employs researchers with particular skills and knowledge as Research Specialists. Researchers in this position can access to PWRI's special research facilities and locally-collected data and engage in investigation and research with fellow researchers.
For more detail information, please access to the PWRI web site;

https://www.pwri.go.jp/eng/employ/employ/index.html#03

Visiting foreign researchers and internship students

PWRI/ICHARM receives visiting foreign researchers, short- and long-term internship students, which is decided depending on the research theme and availability of supervisor.

### Other Useful Information

**PWRI Web Magazine:**

The purpose of this Magazine is to make widely known to the general public what kinds of research are carried out by PWRI and how these are used to benefit society.

https://www.pwri.go.jp/eng/about/pr/webmag/index.html**Public Works Research Institute (PWRI):**

General inquiries (including Interview inquiries, Facility tour inquiries, etc.);

General Affairs Division: +81-29-879-6700

# International Consortium on Landslides (ICL)
# Japan

IPL World Centre, 138-1
Tanakaasukaicho, Sakyo-ku

Kyoto 606-8226, Japan

Tel: +81-757230640

Fax: +81-759500910

Website: http://icl.iplhq.org/


The International Consortium on Landslides (ICL) is an international non-governmental and non-profit scientific organization promoting landslide research and capacity building for the benefit of society and the environment. The ICL was founded in January 2002 in Kyoto, Japan. It was registered as a legal body (No. 1300-05-005237) under Japanese law in Kyoto Prefectural government in August 2002. In March 2007 the ICL was approved as a scientific research organization (No. 94307) which can receive the scientific grants of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan.

ICL, Kyoto University and UNESCO established the UNITWIN (University Twining and Networking) Cooperation Programme on Landslide risk mitigation for society and the environment in March 2003 and expanded its activity area to Landslide and water-related disaster risk management for society and the environment in November 2010. The ICL has been approved as an NGO having operational relations with UNESCO in April 2007, and reclassified as an NGO with a consultative partnership with UNESCO in March 2012.

ICL exchanged Memorandums of Understanding (MOU) with each of five UN organizations (UNESCO, WMO, FAO, UNISDR, UNU, ICSU,) and two global stakeholders in Science and Technology (ICSU and WFEO) to promote the 2006 Tokyo Action Plan “Strengthening Research and Learning on Landslides and Related Earth System Disasters for Global Risk Preparedness”. It is the follow-up to the "2005 Letter of Intent", an outcome of the session titled "New international Initiatives for Research and Risk Mitigation of Foods (IFI) and Landslides" (IPL: International Programme on Landslides) organized in the 2005 United Nations World Conference on Disaster Reduction in Kobe, Japan, 2005

Landslides are studied in many fields of science, technology and disaster reduction, and understandings of landslides differ in various fields. To create a common understanding of landslides as a distinct science, an international journal is absolutely necessary. The first project of ICL was to found an international journal “Landslides”: IPL C100. There are many different terminologies used in landslides in different fields. However, one information source these fields have in common are full color photos of landslides. The most important condition was that the new journal should be printed in full color. The first full color scientific journal “Landslides: Journal of International Consortium on Landslides” was inaugurated in 2004. It is not easy to launch a new journal and it was developed based on the past 15 years of publication of the three-color printed International Newsletter “Landslide News” from 1987-2003 by the Japan Landslide Society. This The journal “Landslides” has a latest impact factor 3.811 and is published monthly and, with 300 pages/ per issue from 2018.

ICL has organized World Landslide Forums (WLF) together with IPL Partners in 2008, 2011, 2014, 2017 and will organize the 5$^{th}$ WLF in 2020 in Kyoto, Japan. The ISDR-ICL Sendai Partnerships 2015-2025 for Global Promotion of Understanding and Reducing Landslide Disaster Risk was adopted on 16 March 2015 as a voluntary commitment to the United Nations World Conference on Disaster Risk Reduction, held in Sendai, Japan, 14-18 March 2015. It is a supporting tool for the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 which was adopted at the afore-mentioned Conference. Seventeen global stakeholders have adhered to, and signed the Partnerships, and additional five organizations joined it by signing the partnerships in Ljubljana, Slovenia in 2017. The Fifth World Landslide Forum will be organized in Japan to achieve a mid-term review, and assess the progress made in the implementation of the Partnerships. In order to implement further the ISDR-ICL Sendai Partnerships 2015-2025 and pursue and enhance thereafter efforts towards landslide risk reduction, the establishment of the Kyoto 2020 Commitment for global Promotion of understanding and reducing landslide disaster risk will be examined by the participating partners as a long-term, wider and stronger framework for the global landslide risk reduction network. The outline on the concept of the Kyoto 2020 Commitment was endorsed by the high-level panel discussion and the following round table discussion on 30-31 May 2017 during the Fourth World Landslide Forum in Ljubljana, Slovenia.

Prof. Kyoji Sassa

E-mail: kyoji.sassa@gmail.com

## Research Focus

The principal objectives of ICL are to:

a) promote landslide research for the benefit of society and the environment, and capacity building, including education, notably in developing countries;

b) integrate geosciences and technology within the appropriate cultural and social contexts in order to evaluate landslide risk in urban, rural and developing areas including cultural and natural heritage sites, as well as to contribute to the protection of the natural environment and sites of high societal value;

c) combine and coordinate international expertise in landslide risk assessment and mitigation studies, thereby resulting in an effective international organization which will act as a partner in various international and national projects; and

d) promote a global, multidisciplinary Programme on landslides, the International Programme on Landslides.

ICL consists of ICL headquarters and 65 full member organizations, 15 associate member organizations and 14 supporters, total 94 organizations.

Disaster Prevention Research Institute (DPRI), Kyoto University and ICL headquarters are regarded as the host institution. 65 full member organizations except the Disaster Prevention Research Institute, Kyoto University and 15 ICL Associates are regarded as partner institutions.

## Latest Publications

1. ***Landslide**s-Journal of International Consortium on Landslides,* 17 issues (4,450 pages) Vol.13 (No. 6), Vol.14 (No.1, 2, 3, 4, 5, and 6), Vol. 15 (No.1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
2. Organization of the Forth World Landslide Forum (WLF4) from 29 May to 2 June 2017 in Ljubljana, Slovenia. 588 persons from 52 countries and 7 United Nations and International Organizations. Five volumes of full color books were published containing papers presented in WLF4.
3. Two volumes of Landslide Dynamics: the ISDR-ICL Landslide Interactive Teaching Tools were published in 2018. Supplementary materials such as PPT tools for lessons and PDF tools for references were also published in the digital forms together with these two books.
4. Book publication for understanding and reducing landslide disaster risk assessment:
   a. Volume 1 : ISDR-ICL Sendai Partnerships 2015-2025 (Kyoji Sassa, Matjaž Mikoš, Yueping Yin, eds.) of « Advancing Culture of Living with Landslides » (2017). Springer, 586p.The book is an open access book as well as a full color printed book (586 pages).
   This book includes activity reports of IPL projects and WCoEs and ICL networks in 2014-2017. Everybody can download the whole book free of charge through the link—https://link.springer.com/book/10.1007%2F978-3-319-59469-9
   b. Volume 2 : Advances in Landslide Science (Matjaz Mikos, Binod Tiwari, Yueping Yin, Kyoji Sassa, eds.) of « Advancing Culture of Living with Landslides ». (2017). Springer, 1197p.
   c. Volume 3 : Advances in Landslide Technology (Matjaž Mikoš, Željko Arbanas, Yueping Yin, Kyoji Sassa, eds.) of « Advancing Culture of Living with Landslides ». (2017). Springer, 621p.
   d. Volume 4: Diversity of Landslide Forms (Matjaž Mikoš, Nicola Casagli, Yueping Yin, Kyoji Sassa, eds.) of « Advancing Culture of Living with Landslides ». (2017). Springer, 707p.
   e. Volume 5 : Landslides in Different Environments (Matjaž Mikoš, Vít Vilímek, Yueping Yin, Kyoji Sassa, eds.) of « Advancing Culture of Living with Landslides ». (2017). Springer, 557p.
5. Landslide Dynamics: ISDR-ICL Landslide interactive Teaching Tools. Volume 1. Fundamental, Mapping and Monitoring (Kyoji Sassa, Fausto Guzzetti, Hiromitsu Yamagishi, Zeljko Arbanas, Nicola Casagli, Mauri McSaveney, Khang Dang, eds) (2018). Springer, 604p.
6. Landslide Dynamics: ISDR-ICL Landslide interactive Teaching Tools. Volume 2: Testing, Risk Management and Country Practices (Kyoji Sassa, Binod Tiwari, Ko-Fei Liu, Mauri McSaveney, Alexander Strom, Hendy Setiawan, eds.) (2018). Springer, 836p.

### ICL Headquarters (host institution)


- Prof. Kyoji Sassa: Professor Emeritus, Secretary General: sassa@iclhq.org
- Prof. Kaoru Takara: Professor, Executive Director: takara.kaoru.7v@kyoto-u.ac.jp
- Dr. Khang Dang: Research Promotion Officer: khang@iclhq.org
- Ms. Mie Ueda: Secretary for ICL-IPL management: secretariat@iclhq.org
- Ms. Ngoc Pham : Secretary for membership service: secretariat@iclhq.org
- URL: http://www.iplhq.org/

# Disaster Prevention Research Institute (DPRI)
# Kyoto University, Japan

Gokasho,Uji,Kyoto 611-0011 Japan

Tel: +81-774-38-3348

Website: http://www.dpri.kyoto-u.ac.jp/en/

## Promoting Cutting-Edge Research Activities

DPRI is located in a tranquil suburban setting within the Uji Campus of Kyoto University. There are five research divisions, and six research centers with 15 state-of-the-art laboratories in Japan engaged in the development of cutting-edge science and technology. To facilitate integrated research, each division and center is nestled among one of the following four research groups:

The Disaster Prevention Research Institute (DPRI) of Kyoto University was established in 1951 in response to devastating typhoon that struck Japan.

DPRI pursues the principles of natural hazard reduction, establish integrated methodologies for disaster loss reduction on the basis of natural and social sciences, and educate students in related fields. DPRI has been performing basic research on various disaster-related themes at local to global scales from the viewpoints of natural science, engineering, and human and social sciences, as well as conducting practical projects that meet the needs of society by organizing interdisciplinary groups. The scope of research, education, and social contributions of DPRI are as follows:

**Research:** DPRI conduct comprehensive academic and applied research on hazard reduction, as well as investigate mechanisms of natural hazards on local to global scales.

**Education:** DPRI foster students as future leaders, who have the ability to harmonize within global societies, while maintaining education standards and high human qualities. Education is carried out in the undergraduate and graduate schools of Kyoto University and uses the accumulated knowledge of DPRI's research.

**Social contributions:** DPRI provide the public with scientific results and knowledge on natural hazards, as well as advise national and local governments on hazard reduction strategies.

**Administration:** DPRI is recognized as a Center of Excellence of the world, as well as of Japan, for its consideration to the respect of human rights and the environment, while trying to establish balance with a sustainable society.

**Faculty and Students**: As of 1 April 2018, there are 125 full time faculty members, and over 500 graduate students. In addition, there are young post-docs, visiting scholars and invited researchers engaged in scholarly research, exploring innovative ideas and continue to deliver excellent research outcomes for a disaster resilience and prevention.

Tel: +81-774-38-4640 (Public Relation)

E-mail: toiawase@dpri.kyoto-u.ac.jp

## Research Focus

DPRI is located in a tranquil suburban setting within the Uji Campus of Kyoto University. There are five research divisions, and six research centers with 15 state-of-the-art laboratories in Japan engaged in the development of cutting-edge science and technology. To facilitate integrated research, each division and center is nestled among one of the following four research groups:

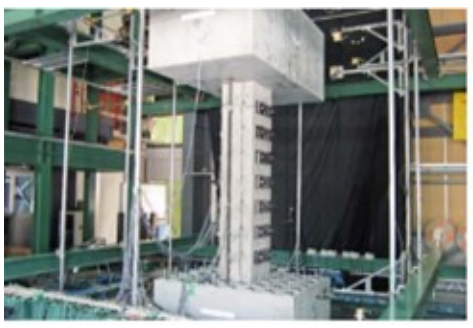
### I Integrated Arts and Sciences for Disaster Reduction Research Group

This research group takes a holistic approach for effective use of state-of-the-art science and technology for disaster reduction, considering the significance of human activities during hazardous events and impacts on the socio-economic environment. Major themes include increases of societal vulnerability to hazards, preventive measures for improvement of social robustness, and policies of recovery after disasters. This group also, focuses on long-term scientific perspectives about characteristics of multiple disasters due to social development and complexity, comprehensive diagnosis on vulnerability to hazards of the modern society, and development of technologies and methodologies of planning and management for disaster reduction.

Experimenting seismic reinforcements of column-walls in a real size wooden house

### II Seismic and Volcanic Hazards Mitigation Research Group

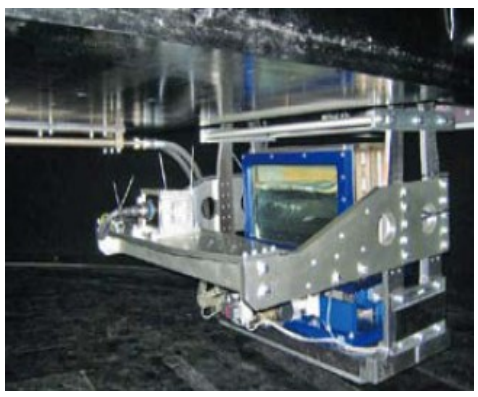
Large earthquakes and eruptions of volcanoes cause more damage than other natural hazards in Japan. Short-term predictions of these events, especially for earthquakes, are still difficult. However, when these events occur, they can cause huge damage. Also continuing events can cause fear and alarm among the population, due to extended shaking from aftershocks or multiple volcanic eruptions. The research of this group contributes to the understanding of the physical processes of earthquakes and volcanic eruptions. Also there are engineering studies that improve technical applications to better withstand the effects of the natural disasters on society. With the interaction of science and engineering researchers, the group pursues basic research investigations as well as seeking applied technologies that can protect human lives and property from the severe effects of earthquakes and volcanoes.



Shaking table test for a RC column installing an advanced system

### III Geohazards Research Group

Soil liquefaction, ground settlements, landslides, erosion, and related phenomena are studied to identify the distribution, processes, mechanisms, and historical anthropogenic conditions contribution to hazards, for establishing assessment and mitigation methodologies. These investigations incorporate combined process-based and modeling approaches to hillside and lowland hazards in both urban and mountain regions. Integrated studies on landslides are performed with respect to the mechanisms of initiation and motion, risk evaluation and disaster reduction, and development of regional and global monitoring systems. A geotechnical centrifuge and numerical modeling are intensively employed to study risk mitigation measures and performance of geotechnical structures.



Geotechnical Centrifuge at DPRI

### IV Atmosphere-Hydrosphere Research Group

Water studies in this group include, impact assessment of global environmental changes on general circulation and water circulation, development of innovative methodologies for water resources management and water environment conservation in harmony with water utilization and social activities. Also studies of atmospheric environments causing disasters, elucidation of hazardous climate, quantitative prediction of disastrous meteorological phenomena, and prevention of wind damage are carried out. Mitigation efforts are investigated with countermeasures for abnormal phenomena such as floods, storms, tidal waves and tsunamis, and planning of river basin environment management strategies considering sediment transportation processes ranging from soil erosion to estuary deposition.

Trial release of meteorological observation sonde balloon

# Members of the GADRI Secretariat Committee

## I. Integrated Arts and Sciences for Disaster Reduction Research Group

Focal Point: Prof. Hirokazu Tatano

- Research Division of Disaster Management for Safe and Secure Society
  Focal Point: Prof. Hirokazu Tatano
- Safety Control of Urban Space
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- Innovative Disaster Prevention Technology and Policy Research
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## II Seismic and Volcanic Hazards Mitigation Research Group

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- Research Division of Earthquake Disasters
  Focal Point: Prof. Shinichi Matsushima
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- Research Division of Earthquake Hazards
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- Earthquake Resistant Structures
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- Seismotectonics
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  Dr. Ryokei Yoshimura—
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- Earthquake Source Mechanisms
  Prof. James Mori - mori@eqh.dpri.kyoto-u.ac.jp

## III Geohazards Research Group

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- Research Division of Geohazards
  Focal Point: Prof. Masahiro Chigira
- Mountain Hazards
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  Dr. Yuki Matsushi—
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## IV Atmosphere-Hydrosphere Research Group

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  Focal Point Hitoshi Mukougawa
- Severe Storm and Atmospheric Environment
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- Wind Engineering and Wind Resistant
  Prof. Takeshi Maruyama
  Dr. Kazuyoshi Nishijima—
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- Research Center for Fluvial and Coastal Disasters
  Focal Point Prof. Akira Igarashi
- River Disaster Prevention Systems
  Prof. Hajime Nakagawa
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- Water Resources Research Center
  Focal Point: Prof. Shigenobu Tanaka
- Socio and Eco Environment Risk Management
  Prof. Tetsuya Sumi - sumi.tetsuya.2s@kyoto-u.ac.jp
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  Ms. Wilma James—
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  Ms. Ayuna Matthews—
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- **DPRI Administration Office**
  Mr. Yasuhiko Hironaka
  Ms. Atsuko Nakamura

- **Public Relations Office**
  Ms. Kaoru Saeki
  Ms. Wilma James
  Mr. Hideaki Matsuura
  E-mail: toiawase@dpri.kyoto-u.ac.jp

## Institutional Capacity Development Activities or training opportunities

- Short-term fellowships under the Agreement of Cooperation between the World Meteorological Organization and the DPRI .

## Useful Publications

- New Research and Development Project on “Coastal Disaster Simulation System”
- Disaster Survey Report on July 2017 Heavy Rainfall in Northern Kyushu
- Earthquake South Island, New Zealand on 13 November 2016—http://wwwcatfish.dpri.kyoto-u.ac.jp/~goto/eq/20161113/report.html
- The 2016 Kumamoto Earthquake — http://www.dpri.kyoto-u.ac.jp/disaster_report_en/
- Brochure of DPRI — http://www.dpri.kyoto-u.ac.jp/bro_en/

年報、ニュースレター、パンフレット、DVD
DPRI Annuals, Newsletter, Brochure, DVD

- Pamphlet of DPRI — http://www.dpri.kyoto-u.ac.jp/web_j/publication/catalogue/dpri_pamphlet_2017.pdf

- DPRI Newsletter – Japanese only —http://www.dpri.kyoto-u.ac.jp/publications_en/newsletter_en/
- DPRI Annual Report — http://www.dpri.kyoto-u.ac.jp/publications_en/nenpo_en/

- Other publications — http://www.dpri.kyoto-u.ac.jp/publications_en/

## Jobs/internship/exchange opportunities

For job opportunities, visit the link - http://www.dpri.kyoto-u.ac.jp/job_en/

## Other useful information

- DPRI Database — http://www.dpri.kyoto-u.ac.jp/database_en/

- Admissions – How to Apply — http://www.dpri.kyoto-u.ac.jp/education_en/

- Academic Exchange Agreements — http://www.dpri.kyoto-u.ac.jp/scademic_en/

- **Global Alliance of Disaster Research Institutes (GADRI)**
  Focal point: Prof. Hirokazu Tatano, Secretary-General
  GADRI Secretariat
  Disaster Prevention Research Institute (DPRI)
  Kyoto University, Uji Campus
  Gokasho, Uji-shi, Kyoto 611-0011, Japan
  Tel: +81-774-38-4651
  E-mail: secretariat-gadri@dpri.kyoto-u.ac.jp

- **Collaborative Research**
  Disaster Prevention Research Institute (DPRI)
  Kyoto University, Uji Campus
  Gokasho, Uji-shi, Kyoto 611-0011, Japan
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- **General Inquiries, Disaster Prevention Research Institute (DPRI), Kyoto University**
  Focal point: Public Relations Office
  Disaster Prevention Research Institute (DPRI)
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  Gokasho, Uji-shi, Kyoto 611-0011, Japan
  Tel: +81-774-38-4640
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- **Kyoto University**
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# Research Center for Societal Safety Sciences, Faculty of Societal Safety Sciences
# Kansai University, Japan

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〒569-1098

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Website: http://www.kansai-u.ac.jp/Fc_ss/english/index.html


Natural and man-made disasters reveal problems that we typically fail to notice in our daily lives. The Faculty of Safety Science aims to minimize natural and man-made disasters through finding and solving existing problems by carefully observing society, people and nature through the lens of safety and security. The faculty intends to foster human resources equipped with problem-solving capabilities by developing studies into specialized fields including law, politics, economics, business administration, psychology, sociology, science, informatics, engineering and social medicine as well as comprehensive study of all fields. The curriculum is centered on the two categories of accidents and natural disasters. Students participate in small-group seminars, and learn current cases of man-made disasters including accidents and natural disasters, while conducting exercises, research and simulations. In the autumn term of their second year, students take either the Man-made Disaster Management Course, or the Natural Disaster Management Course. Depending on their interests and future courses, students are expected to acquire the ability to formulate and implement policies related to safety and security, and thus contributing to society in several fields after graduation.

Kansai University opened the Graduate School of Societal Safety Sciences (GSS) Master Course at its MUSE Campus in Takatsuki city, Osaka pref., in April, 2010. The aim of the establishment is to accumulate “safety knowledge and wisdom” and systematize them into a new realm of studies. We are committed to fostering researchers and experts who are equipped with advanced knowledge and skills that enable them to make and implement proposals and measures for disaster risk reduction, to develop technologies to facilitate a consensus-building process during emergencies, and to simulate emergency and design resilient systems and such. In the past several decades, some methods have been developed through research done in the field of prevention and mitigation of natural disasters, and these methods serve as the main pillar of the education at the GSS. However, to deal with other safety-related issues like man-made disasters, food safety, health risks, environmental hazards, and the like, we need to go further and put these issues into perspective from the viewpoints of corporate ethics, CSR, management, law, labor policies, and maybe even the meaning of life and the joys of working. In other words, nowadays, things cannot be solved with the limited scope of one specific discipline. This is why we set up the GSS to tackle such problems head-on through an interdisciplinary and multi-faceted approach; going beyond the borders of any established discipline – law, political science, economics and management, social studies, psychology, science, information technology, engineering, social medicine, etc. By doing so, priority is given to the realization of a “safe and secure society” and the commitment to elevate our research to an even higher level.

Prof. Kenji Koshiyama

E-mail: k-koshi@kansai-u.ac.jp

## Research Focus

We aim to advance the studies on Societal Safety Sciences and to foster the researchers who contribute to develop the said studies and make proposals through interdisciplinary studies on disaster prevention and reduction, in order to build a safer, more secure and disaster -resistant society. Therefore, we deal with various academic fields of cultural, social, and natural sciences.

Societal Safety Sciences Research Theme

- Economics of Disasters and Policy Analysis for disaster Reduction
- Urban Disaster Reduction Planning
- Earthquake Engineering
- Geo-Disaster
- Hydrospheric Disasters
- Disaster Prevention/Disaster Mitigation
- Public Policy against Crisis
- Sociology for Support and Revitalization
- Safety Education
- Disaster Information
- Risk Management
- Psychology of Societal Safety
- Accident Simulation
- Health Risk Management
- Legal Systems for Social Safety
- Public Utility and Safety System
- Engineering Safety Systems

## Latest Publications

**Publications**

- **Science of Societal Safety -Living at Times of Risks and Disasters-, Springer, 2018**
  https://link.springer.com/book/10.1007/978-981-13-2775-9
- **The Fukushima and Tohoku Disaster -A Review of the Five-Year Reconstruction Efforts-, ELSEVIER, 2017**
  **https://www.elsevier.com/books/the-fukushima-and-tohoku-disaster/unknown/978-0-12-812964-7**

- Pamphlet
  **http://www.kansai-u.ac.jp/Fc_ss/english/img/school/PDM.pdf**

**Institutional Capacity Development Activities**

We have PH.D of Disaster Management Program of English Based Program.

Please contact us.

Graduate School of Societal Safety Sciences, Kansai University

**http://www.kansai-u.ac.jp/Gr_sch/english/eng/index.html**

Application Guidelines:

**http://www.kansai-u.ac.jp/Gr_sch/english/eng/asset/index/spring2019/saf_eb_info.pdf**

Contact us (http://www.kansai-u.ac.jp/Fc_ss/english/staff.html).

# Institute of Disaster Area Revitalization, Regrowth and Governance (IDiARRG), Research Institute for Disaster Area Reconstruction , Kwansei Gakuin University , Japan

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Fax: +81-798-54-6997

Website: http://www.kwansei.ac.jp

関西学院大学災害復興制度研究所
Institute of Disaster Area Revitalization, Regrowth and Governance
KWANSEI GAKUIN UNIVERSITY

Our institute is the first research facility in Japan devoted to research on revitalizing and regrowing disaster-struck areas. It was created on January 17, 2005, the tenth anniversary of the earthquake that devastated Kobe and neigboring areas in 1995. Since then, our institue has been made open to the public, joined by nationwide researchers, media representatives, volunteers and lawmakers.

In 2008, the institute took the initiative to create **the Japan Society for Disaster Recovery and Revitalization**.

Our missions are:

"Systematized recovery and revitalization philosophy"

"Institutionalized recovery and revitalization philosophy"

"Practice in line with recovery and revitalization philosophy"

We promote our researches from these three pillars, especially focusing the theme of "recovery and revitalization" which has been the weakest and thus unexplored research area in Japan, in terms of the disaster management cycle (prevention, emergency response, recovery and revitalization)

We aim to offer a foothold for the safety and secure world in this super-aged society as well as this unequal society.

Our institute tries to integrate actuals and research, and aims to find a way to pursue happiness of the affected people. We keep our researches to create institutionalized system for supporting **"human-centered recovery"**.

Research Focus

Research activities:

The institute has the following on-going projects;

Study on establishment of mid-and long term evacuation plans in nuclear power plant regions.

Study on upland relocation in the planning of pre-disaster recovery and revitalization for the Nankai trough Mega Earthquake

International comparative study on disaster recovery and revitalization policies

A Network meeting of disaster-affected areas in Japan

There are various types of "recovery and revitalization knowledge" which emerge after a disaster. They will serve as a useful policy and help us to design a new social system for supporting the affected people who are tackling with this disaster prone country. These valuable pieces of knowledge, however, tends to remain only within the affected area, and often fails to transfer to other areas.

We organize a network meeting once a year to share these lessons from various disaster affected areas in Japan. (See the below photos)

Policy advocacy:

In 2009, the institute released a draft for a Basic Law on Disaster Reconstruction, and now working on creating a draft proposal for a comprehensive act for affected people.

The institute has released various policy recommendations after a disaster as follows:

"The way for overcoming the GEJE with supports from all the people (March, 17, 2011)

Policy recommendation for not creating "neglected citizens" caused by nuclear accidents

(September, 30, 2012)

Policy recommendation on the Kumamoto Earthquake (May 16, 2016)

Latest Research Reports

Studies in Disaster Recovery and Revitalization, Vol.9 (2017) (in Japanese)

http://www.fukkou.net/research/bulletin/bulletin.html

The reality of long-term evacuation from nuclear accidents: lessons from Chernobyl and Marshall Islands (in Japanese)

http://www.fukkou.net/publications/other/2016_06.html

**Institutional Capacity Development**

The institute organize an academic conference on disaster recovery and revitalization on November 9, 10, 2019 in Tottori.

The detailed information will be made available from April.

Dr. Masayuki NORO, Senior researcher/
Professor, Institute of Disaster Area Revitalization, Regrowth and Governance

E-mail: masa1117yuki@kwansei.ac.jp

# National Research Institute for Earth Science and Disaster Resilience (NIED) , Japan

3-1, Tennodai, Tsukuba, Ibaraki, 305-0006, JAPAN
Tel. +81-29-851-1611
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Website: http://www.bosai.go.jp/e/

It is a common hope of all human beings to create a safe and peaceful society. Our mission is to protect people's lives from threatening disasters and to develop science and technology in order to realize the society resilient to natural disasters. NIED (National Research Institute for Earth Science and Disaster Resilience) aims to protect people's lives and properties from natural disasters and to prepare society to be resilient to natural disasters, through research on disasters caused by earthquakes, volcanoes, floods, landslides, meteorological changes, snow and ice damages.

The goal of the National Research Institute for Earth Science and Disaster Resilience (NIED) is the "maximization of research and development results" for improving disaster resilience. As of April 2016, NIED commenced the 4th mid-to-long term plan period that will last 7 years, with a new English name for the institute.

The mission of NIED is "to conduct comprehensive fundamental basic study and fundamental research and development in order to increase the level of science and technology for disaster risk reduction" as stipulated in the "National Research Institute for Earth Science and Disaster Resilience Law."

Thus, the greatest characteristic of the current period is that NIED is required to become a "core institute for innovating science and technology for disaster risk reduction." The roles that this research institute should fulfil are explicitly stated in the objectives of the current period: to become a comprehensive research institute regarding science and technology for all disciplines and domains of disaster risk reduction, and to maximize research and development results for the whole country encompassing the research and development results of universities, other national research and development agencies, and private sector research institutions.

NIED committed to fulfil the following 6 roles: i) Promote industry-academic-government cooperation as a core institution, ii) Provide and promote communal use of a foundational observation network and advanced research facilities, iii) Diffuse R&D accomplishments/promote the practical use of intellectual property, iv) Expand R&D internationally, v) Develop human resources, and vi) Contribute to administration of disaster risk reduction.


Mr. Soichi Nakajima,
Deputy Director-General, Strategic Planning Department
E-mail: soichi-nakajima@bosai.go.jp

Basic Research Division

### Earthquake and Tsunami Research Division

We carry out research to strategically enhance the functionality of prediction technology for earthquakes and tsunami. http://www.bosai.go.jp/e/research/dep_jishin_tsunami.html

### Volcano Disaster Resilience Research Division

We carry out research regarding multifaceted assessment of volcanic phenomena. http://www.bosai.go.jp/e/research/dep_kazan.html

### Earthquake Disaster Mitigation Research Division

We carry out research to mitigate earthquake disasters utilizing research infrastructure such as the 3-D Full-Scale Earthquake Testing Facility (E-Defense). http://www.bosai.go.jp/e/research/dep_jishin_jikken.html

### Storm, Flood and Landslide Research Division

We carry out research into storm, flood and landslide prediction technologies using multisensing. http://www.bosai.go.jp/e/research/dep_mizu.html

### Snow and Ice Research Division

We carry out integrated research regarding snow and ice disasters - which are increasingly diverse - from identifying degree of risk to whole area prediction. http://www.bosai.go.jp/e/research/dep_seppyo.html

### Integrated Research on Disaster Risk Reduction Division

We carry out research regarding hazard risk assessment for natural disasters, as well as research regarding disaster countermeasures based on the use and application of information on natural disasters. http://www.bosai.go.jp/e/research/dep_shakai.html

### Disaster Resilience Research Division

We investigate the mechanism of disasters as social phenomena, carrying out R&D conducive to realizing effective disaster response. http://www.bosai.go.jp/e/research/dep_saigai.html

Center for Fundamental Research and Development

### Network Center for Earthquake, Tsunami and Volcano

We maintain and operate the high-sensitivity seismic observation network, broadband seismic observation network, volcano observation network, and seafloor tsunami and earthquake observation network, while also carrying out research and development. http://www.bosai.go.jp/e/research/center_network.html

### Center for Comprehensive Management of Disaster

We gather, organize and archive information and resources regarding science and technology for disaster risk reduction, while developing technologies for their usage and application. http://www.bosai.go.jp/e/research/center_jouhou.html

### Center for Advanced Research Facility

To innovate science and technology in the field of disaster risk reduction, we oversee the utilization of the large-scale experimental facilities which can reproduce various natural conditions. We also promote open science conducive to disseminating experimental results. http://www.bosai.go.jp/e/research/center_shisetsu.html

### Research Center for Reinforcement of Resilient Function

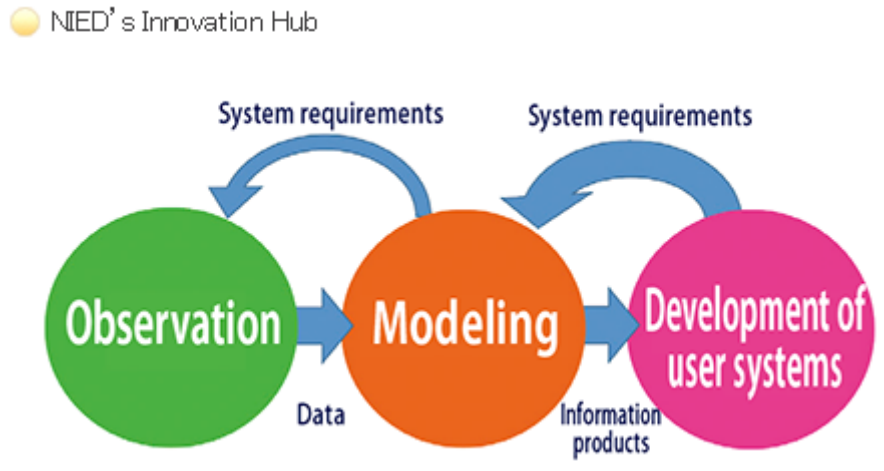
Under the Strategic Innovation Promotion Program (SIP), we work with related organizations and government departments for the reinforcement of resilient function for preventing and mitigating disasters, while promoting R&D for social implementation. http://www.bosai.go.jp/e/research/center_sip.html

### Innovation Center for Meteorological Disaster Mitigation

Bringing together personnel, information and technology from industry, academia and government, we promote R&D oriented toward social impementation of research results through the systemization of prediction technologies for meterological disasters, and performance evaluation/ standardization of mesurement technologies related to disaster risk reduction. http://www.bosai.go.jp/e/research/center_ihub.html

### Center for Integrated Volcano Research

We observe volcanos to detect transition in activity and to predict disasters, and implement intergrated R&D with the aim of providing society with technology that contributes to volcano disaster countermeasures. http://www.bosai.go.jp/e/research/center_kazan.html



# Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University (R-DMUCH), Japan

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Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University based in Kyoto and Shiga, the rich repository of cultural heritage, has been aiming at establishing a base hub for education and research in “Disaster Mitigation of Cultural Heritage and Historic Cities.” This considers preservation of arts and culture and disaster mitigation measures to protect the community that supports culture and arts as a whole. In 2003, the University established the Research Center for Disaster Mitigation of Urban Cultural Heritage to lead research activities where arts and sciences work in cooperation, with substantial external funds such as the 21st Century COE Program and the Global COE Program adopted by Ministry of Education, Culture, Sports, Science and Technology (MEXT).

Since the UNESCO headquarter authorized the Ritsumeikan University as a UNESCO Chair in 2006, we have implemented an international training program on disaster mitigation for cultural heritage for nine consecutive years up to 2017. This has been taking on the role as an international network hub for the study.

With the completion of the Global COE Program in March 2013, the Center was reorganized into the Institute of Disaster Mitigation for Urban Cu ltural Heritage which aims at further unfolding education and research activities.

Protection of cultural heritage and the surrounding historic cities, this only can be achieved through comprehensive research by researchers who are specialized in various disciplines. This makes it possible to reflect development of technology and research outcomes into actual social policies. In addition, the multidisciplinary collaboration at both domestic and international level needs a proper place where it is supposed to be done.

Therefore the Institute aims to be a global leading education and research center that provides policies for the development of cultural and safe society both in Japan and the rest of the world.


**The four main activities**

**Research**

- Developing various research projects based on the achievement of the two former COE programs.

♦Annually publishing *Journal of Disaster Mitigation for Historical Cities* by assembling research articles submitted to the *Symposium on Disaster Mitigation of Cultural Heritage and Historical Cities*.

**Education**

- Providing training courses for young researchers, such as the Academic Program on Cultural Heritage and Disaster Mitigation for graduate students.

- Training researchers with practical situations through specialized courses, such as UNESCO Chair International Training Program.

**Collaboration with society**

- Promoting projects in collaboration with society, such as the Children’s Map Contest for Community Safety.

- Supporting national and local agencies for disaster mitigation projects on cultural heritage in Japan and foreign countries.

**Collecting and disseminating information**

- Collecting and archiving historical materials and geographical information relevant to research projects.

- Exhibiting the collected materials related to historical disasters and outcome s o f re se arch projects to the general public using the exhibition space.

Prof. Takeyuki Okubo, Director

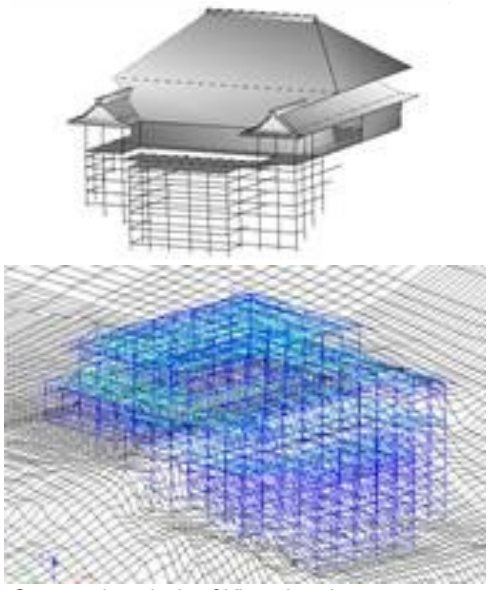
E-mail: rekibou@st.ritsumei.ac.jp

## Research Focus

### Learning from the history of disasters and communities

By collecting historical materials related to past disasters and social responses to them, creating a “Memory map” of local community based on qualitative surveys, and developing a space-time GIS to understand the various aspects of historical disasters, we explore the history of disasters in historical and cultural cities to learn more about the regional knowledge readily available for disaster reduction initiatives in the future.

Kawaraban (Newspaper of the Edo period)



Structural analysis of Kiyomizu-dera

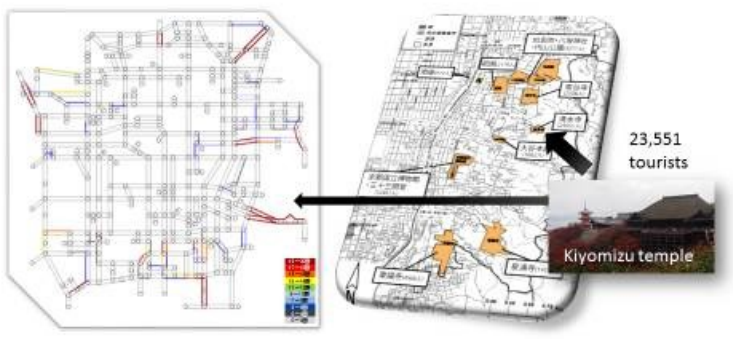
### Developing disaster mitigation technologies of historic and cultural cities

By developing seismic design and seismic retrofitting technologies, and fire protection systems with advantages of traditional wisdom, regional history and culture, and also proposing disaster mitigation countermeasures of historic and cultural regions by assessing geo-environments, we aim to establish new disaster mitigation technologies of historic and cultural cities uniting both “historic, cultural and design values” and “disaster mitigating performance”.

### Preventing damage of cultural heritage sites from human and animal made disasters

We systematically investigate damages to cultural heritage caused by human and animal activities including criminal acts, such as theft of traditional artifacts and arson of historical buildings, and invasion of raccoons into the temples and shrines. Further, we develop effective counter measures including action planning guidelines and hi-functioning protection systems to safeguard the cultural heritage site from the human and animal made disasters.

A raccoon invading a heritage building




Planning Tourist Evacuation and Traffic Management in Disaster Situations

### Designing disaster mitigation for historic cultural cities

We aim to make local disaster mitigation plans in historical zones and policies to effectively implement them. We contribute to designing the future of historical environments and communities through practical applications of analyzing the local characteristics and making the best use of the cutting-edge technology of disaster mitigation in the fields.

### Contributing to the international community

Through the UNESCO Chair Programme on Cultural Heritage and Risk Management, International Training Course (ITC) and research network, we are carrying out research and development of educational programs to enhance the capacity of disaster risk management for cultural heritage in developing countries, and promoting studies and field researches on disasters affecting cultural heritage in the international field.

Site visit to Kiyomizu-dera Temple during ITC

## Institutional Capacity Development Activities

UNESCO Chair Programme on Cultural Heritage and Risk Management,

International Training Course (ITC) on Disaster Risk Management of Cultural Heritage, Ritsumeikan University

We have been authorized as the world's first UNESCO Chair in the field of cultural heritage and risk management in the year 2006. This UNESCO initiative aimed at promoting international networking cooperation based on exchange of knowledge across the borders and research outcomes.

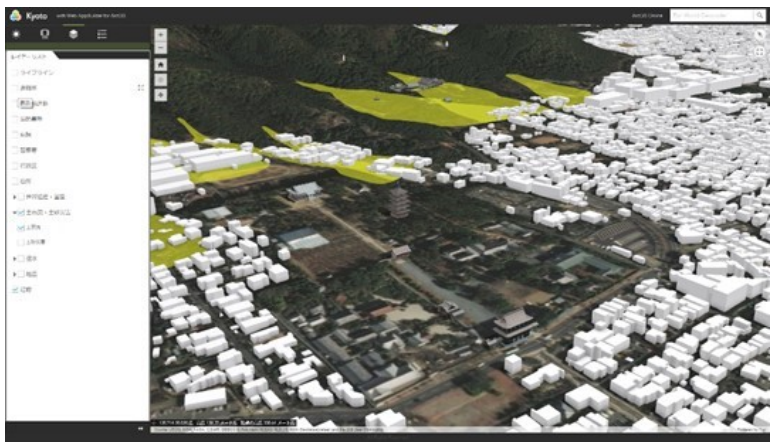
We have more than 100 certified participants over the course of 10 years. We are continuing this training activity, and our goal is to produce around 10 graduates every year through this training.

**■ For more details**

http://www.r-dmuch.jp/en/project/itc.html

**■ Movie of International Training Course**

https://youtu.be/nFvM0XhEBkY



**Safety and Security 3D Maps of the Historical City Kyoto** http://www.dmuchgis.com/hazard_kyoto/main_en.html

**Latest Research Reports/Results:**

**Gorkha Earthquake**

http://www.r-dmuch.jp/en/project/n_heritage_E.html

**Useful links to Publications:**

- **English Brochure** http://www.r-dmuch.jp/en/pamphlet/index.html
- **English Publications** http://www.r-dmuch.jp/en/project/index.html
- **Annual Report (Japanese Only)** http://r-dmuch.jp/jp/results/nenpou.html



**Interactive Training Guide on Disaster Risk Management of Cultural Heritage in Urban Areas** http://www.r-dmuch.jp/en/project/itc/training_guide/index.html

### Other useful information

**Symposium on Disaster Mitigation of Cultural Heritage and Historical Cities**

R-DMUCH holds "Symposium on Disaster Mitigation of Cultural Heritage and Historical Cities" annually to provide the participants with opportunities of knowledge sharing and academic discussions. For the symposium, we call for both refereed papers and non-refereed reports. Welcome your submissions.

http://www.r-dmuch.jp/en/project/symposium/index.html

**Children's Map Contest for Community Safety**

Since 2007, we have been holding an annual Map Contest for Community Safety for children in primary schools. We ask the children, together with guardians or members of their family, local residents, and teaching staff, to investigate the safety and security of their local areas and describe the results into maps. Through this, we hope to encourage the children to have greater interests in local safety and security as well as sharing of information. Maps in English are welcome.

http://www.r-dmuch.jp/en/project/mapcontest.html

**Exhibitions**

On the ground floor of Institute of Disaster Mitigation for Urban Cultural Heritage, Ritsumeikan University is an Exhibition Hall where we show exhibitions of historical documents and other materials related t0 disaster prevention, as well as displays of the findings of more recent research.

http://www.r-dmuch.jp/en/exhibit/index.html

# Disaster Prevention Research Center for Island Regions, University of Ryukyus, Japan

〒903-0213

沖縄県中頭郡西原町字千原1

Tel: +81-098-895-8829

Website: http://www.u-ryukyu.ac.jp/en/index.html

http://www.bosai.u-ryukyu.ac.jp/

Recent increase global warming has elevated the need for preparedness against destructive typhoons and strategic adaptation methods to the rapid rise in sea level, especially in tropical and subtropical regions. Preparedness against huge earthquakes and tsunamis is a matter of great urgency after the Great East Japan Tohoku Earthquake and Tsunami in 2011. The Disaster Prevention Research Center for Island Regions was established as the principal center considering the above factors, and it provides a platform for research on natural disasters in Okinawa Prefecture.

The natural disasters of Ryukyu Archipelago are earthquakes. tsunamis, geotechnical disasters (e.g. slope failure, debris flow, landslides dams, sinkholes), typhoons and tornadoes (Photo-1). This center mainly deals with natural disasters associated with earthquakes, tsunamis, geotechnical disasters and typhoons and tornadoes. The engineering Faculty of the University of the Ryukyus has recently re-organized itself and it has 7 different departments. The Civil Engineering and Architectural Departments have some new classes on earthquake engineering and disaster prevention engineering. The awareness of the people of Okinawa Prefecture on the natural disasters except typhoon is quite low and it needs to be re-brushed.

The center promotes the multidisciplinary studies on disaster prevention methods for earthquakes, tsunamis, typhoons, landslides and floods. The development of numerical simulations to predict these disasters, wireless communications and satellite distant education for island regions in emergency is promoted.


Photo 1: Views of recent modern-time past traces of natural disasters in Ryukyu Archipelago

Prof. Dr. Ömer Aydan, Director E-mail: aydan@tec.u-ryukyu.ac.jp

Prof. Dr. Juan Jose Castro, Vice-director E-mail: castro@tec.u-ryukyu.ac.jp

Ms. Youko Higa, Secretary E-mail: h160191@jim.u-ryukyu.ac.jp

## Research Focus

The center consists of the members from the related departments of 6 faculties of the University of the Ryukyus. The main areas of research are:

1) Earthquake mechanism, earthquake prediction

2) Earthquake engineering

3) Geotechnical engineering

4) Tsunamis around Ryukyu Archipelago and counter-measures

5) Climatic disasters (typhoons, tornadoes)

The center has three rental research rooms to collaborate with private and NPO organizations to study on the disaster preparedness and possible counter measures. There is a close collaborations among the members of the center and the organizations renting the rooms (Figure 1)

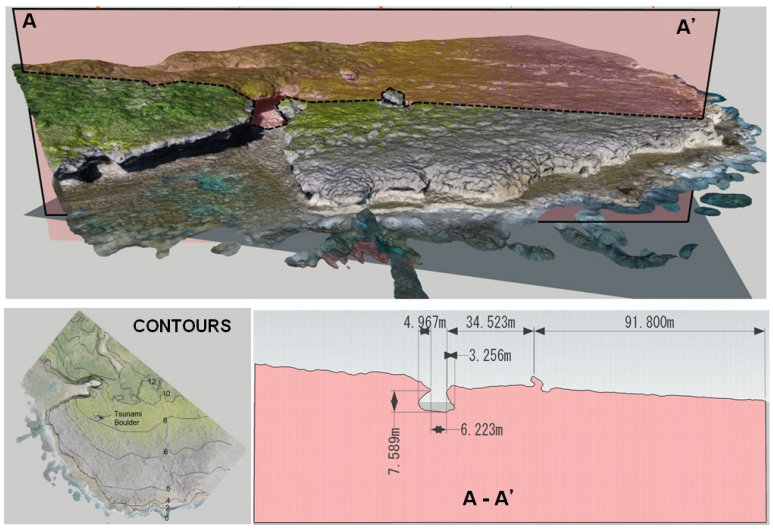



Figure 1. Topographic imaging of Kasakanja tsunami boulder (Aydan, Green-earth-Okabe)

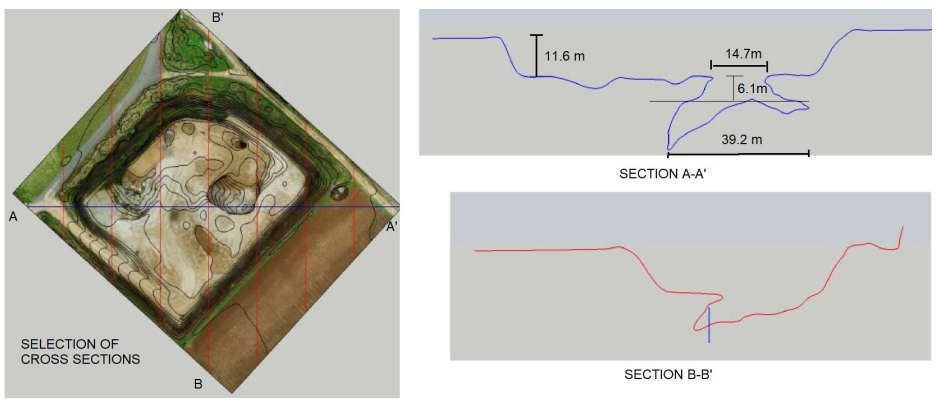



Figure 2. Imaging a sinkhole formation in Kumejima (Aydan, Green-earth-Okabe)

## Research Unit Contacts

- Prof. Ömer Aydan, Director (earthquake engineering, geotechnical disasters, tsunami) -aydan@tec.u-ryukyu.ac.jp
- Prof. Juan Jose Castro, Vice-director (seismic resistance of buildings) - castro@tec.u-ryukyu.ac.jp
- Prof. Eizo Nakaza: Tsunami, floods (former director), Civil Eng. Dept.—enakaza@tec.u-ryukyu.ac.jp
- Prof. Dr. Minoru Yaga (Typhoon related research) (Member of the center), Mech. Eng.—yaga@tec.u-ryukyu.ac.jp
- Assoc. Prof. Dr. D. Kamiya (Tsunami counter-measures) Member of the center) - d-kamiya@tec.u-ryukyu.ac.jp
- Assoc. Prof. Dr. Hiroyuki Yamada (Climatic disasters) (Member of the center) - yamada@sci.u-ryukyu.ac.jp

## Latest Publications

1) The establishment of Natural Disaster Demonstration Facility

2) The reconnaissance of the seismic damage induced by the 2018 Hokkaido Iburi earthquake and a conference on the reconnaissance results to public.

3) Joint Symposium on the earthquake resistant and resilience of infra-structures with JSCE earthquake Engineering Committee

4) The organization of the 12th Disaster Prevention and Environment Symposium on "Energy and Natural Disasters"

**Publications**

1) Aydan, Ö., Tomiyama, J., Matsubara, H., Tokashiki, N., Iwata, N. (2018). Damage to rock engineering structures induced by the 2016 Kumamoto earthquakes. The 3rd Int. Symp on Rock Dynamics, RocDyn3, Trondheim, 6p, on CD.

2) Aydan, Ö. (2018) Some Thoughts on Risk of Natural Disasters in Ryukyu Archipelago. International Journal of Environmental Science and Development, Vol. 9, No. 10, 282-289.

3) Aydan, Ö., Tokashiki, N. (2018). Tsunami Boulders and Their Implications on the Mega Earthquake Potential along Ryukyu Archipelago, Japan. Bulletin of Engineering Geology and Environment, Springer.

## Institutional Capacity Development Activities

The Natural Disaster Demonstration Facility is now available for visitors from public, schools. It has been used as research and educational purposes.

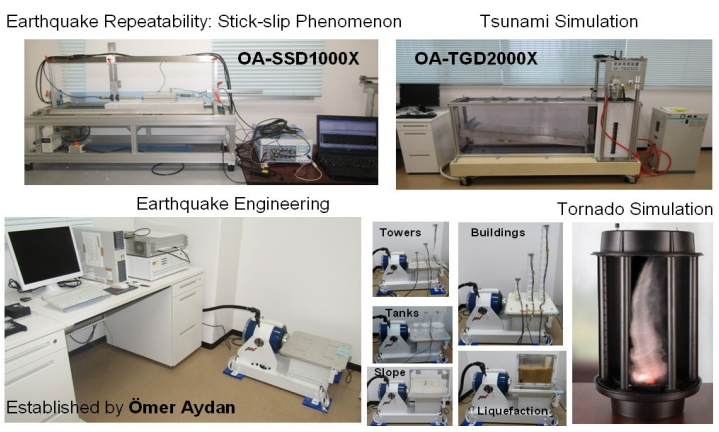



Photo 2: Views of natural disasters demonstration devices

# International Research Institute of Disaster Science (IRIDeS), Tohoku University

# Japan

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Having experienced the catastrophic disaster in 2011, Tohoku University has founded the International Research Institute of Disaster Science (IRIDeS). Together with collaborating organizations from many countries and with broad areas of specializations, the IRIDeS conducts world-leading research on natural disaster science and disaster mitigation. Based on the lessons from the 2011 Great East Japan (Tohoku) earthquake and tsunami disaster, IRIDeS aims to become a world centre for the study of the disasters and disaster mitigation, learning from and building upon past lessons in disaster management from Japan and around the world. Throughout, the IRIDeS will contribute to on-going recovery/reconstruction efforts in the affected areas, conducting action-oriented research, and pursuing effective disaster management to build sustainable and resilient societies, the IRIDeS innovates the past paradigm of Japan's and world's disaster management to catastrophic natural disasters, hence to become a foundation stone of disaster mitigation management and sciences. Mission of IRIDeS Disaster mitigation management aims to reduce or avoid the potential losses from natural hazards, to assure prompt assistance to victims, to achieve rapid and effective recovery, and to build disaster-resilient and sustainable societies, by five stages of the disaster management cycle; Mitigation, Preparedness, Response, Recovery and Reconstruction. The action-oriented research of the IRIDeS is a pursue of each point in the cycle and integrating and universalizing the scientific discoveries to be dedicated to the world. The IRIDeS creates a new academia of disaster mitigation that subsumes the lessons from the 2011 Tohoku earthquake and tsunami disaster and the findings of the world-leading research into our societies with the aim of establishing the social systems responding promptly, sensibly and effectively to natural disasters, withstanding the adversities with resiliency, passing and exploiting the lessons to the forthcoming disaster management cycles.

## Research Focus

Enhancing the cooperation with the local municipalities and governments in the affected areas, and contributing to their recovery and reconstruction efforts, the IRIDeS conducts the action-oriented research. They aim to create the disaster-resilient societies that enable to overcome the complex and diverse processes of forthcoming natural disasters, not only by preventing but also preparing and responding to them, and achieving recovery and renovation, hence to engender the culture of disaster-resiliency incorporating into our social systems.

The action-oriented research of the IRIDeS focus on;

- Investigating the physics of global scale natural disasters such as mega-earthquakes, tsunamis and extreme weather
- Reconstructing disaster response and mitigation technologies based on the lessons of the 2011 Tohoku earthquake and tsunami disaster
- Inventing "Affected Area Supportology" in the aftermath of natural disasters
- Enhancing disaster-resiliency and performance of multiple -fail-safe systems in regional and urban areas
- Establishing disaster medicine and medical service systems towards catastrophic natural disasters
- Designing disaster-resilient societies and developing the digital archive system to pass the lessons from the disasters

Prof. Yuichi Ono

E-mail: yono@irides.tohoku.ac.jp

## Research Unit Contact

- Hazard and Risk Evaluation Research Division
- Human and Social Response Research Division
- Regional and Urban Reconstruction Research Division
- Disaster Science Division
- Disaster Medical Science Division
- Disaster Information Management and Public Collaboration Division
- Endowed Research Division
- Inter-Graduate School Doctoral Degree Program on Science for Global Safety
- Public Relations Office

## Latest Publications

- IRIDeS NEWs 2018
- WORLD BOSAI FORUM
- 活動報告書 2017年度版
- (in Japanese)
- 勉強会「南海トラフ沿い大規模地震に関する予測的情報に基づく社会対応のあり方」成果・報告レポート集

(in Japanese)

**Academic and International Activity / Data Center**

Data center of IRIDeS provides the 2011 Great East Japan Earthquake disaster related digital archieve (Michinoku-Shinrokuden) and large amount of data and reaserch papaers in Tohou region from the Tohoku Regional Data Center for Natural Disasters. Due to the damage caused by the Great East Japan Earthquake, the Tohoku Regional Data Center for Natural Disasters could not operate their service for a while. If you have any questions and inquiries, please contact us via email below.

- Michinoku-Shinrokuden
- the Tohoku Regional Data Center for Natural Disasters
- Introduction of books and publications

Visit: http://irides.tohoku.ac.jp/eng/archive/index.html

**Institutional Capacity Development Activities**

**Master's Program**

Enroll in Tohoku University, School of Engineering after passing an entrance examination for Master's Program. The examinations for foreign students are usually held twice a year. Foreign students are required to submit the original of TOEFL/TOEIC score sheets.

**Doctoral Program**

Enroll in Tohoku University, School of Engineering after passing an entrance examination for Doctoral Program. The examinations for foreign students are usually held twice a year. Foreign students are required to submit the original of TOEFL/TOEIC score sheets.

**Research students and others**

A student may be enrolled in the university as a research student who studies specific subjects in an undergraduate faculty, a division in a Graduate School, or a research institute. A research student cannot in principle acquire an academic degree.

**Jobs/ internship/ exchange opportunities**

**Transfer students**

Foreign students are required to have a good command of the Japanese language and to submit the certificate of Japanese Language Proficiency. Enroll in the third year of Tohoku University, School of Engineering, Civil Engineering and Architecture Program after passing the entrance examination for transfer students. In the spring semester of the third year you will be assigned to a course. You will enroll in a laboratory in the spring of the fourth year.

# International Water Resources Research Institute, Chungnam National University

# Republic of Korea


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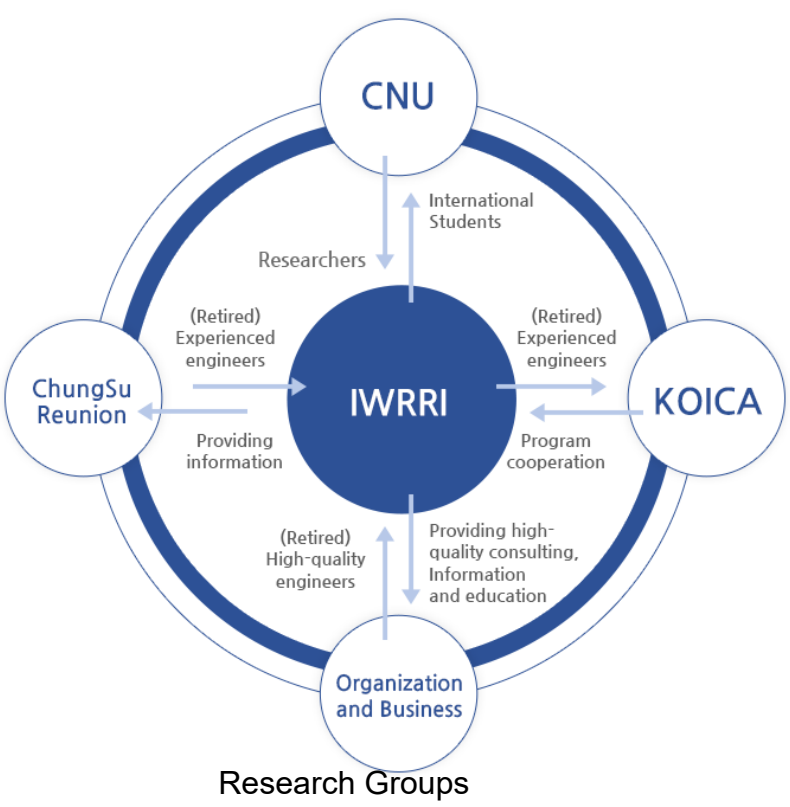
These days we have faced several disasters related to water resources e.g. drought, flood, polluted water, etc. Even though it is impossible to control or prevent these disasters totally, however, adopting or applying suitable 'Technology' for water management is one of the most effective approaches to minimize the damage. International Water Resources Research Institute (IWRRI) aims to to promote education, innovation, leading research, high technology, and public services provided by experts and researchers together with international partners from around the world. IWRRI signed MOU with 38 institutes and 15 countries since the institute was established in April 2011. The IWRRI are playing an important role in not only interdisciplinary researches but also personal exchange with other countries by producing international students. The IWRRI has research, management, international relationship and public relationship divisions. The mission of our institute is to create an innovative solution satisfying the needs of social and to support the provision of technological challenges of the future




Research Groups

**Excellent Water Resources Services Provider**

- Serving as a center of experts in the water resources field,
- Solving water resource problems, and providing better education, research, planning and community services,
- Assisting public and private interests in the context of conservation, development, and use of water resources.

**History**

- 2011. 04 Establishment of International Water Resources Research Institute
- 2012. 1st ~ 6th International Symposium
- 2013. 7th and 8th International Symposium
- MOU with institutes and research centers of 8 Asian Countries
- 2014. 9th International Symposium
- Korean Representative of Global Water Partnership
- MOU with National Polytechnic Institute of Cambodia
- 2015. MOU with institutes of 4 countries
- Establishment of Center for Water Problem of Korean Peninsula affiliated with IWRRI
- 2016. MOU with institutes of 1 country
- 2017. 10th and 11th International Symposium
- 2018. 12th International Symposium
- MOU with institutes of 2 countries

Prof. Kwansue Jung E-mail: ksjung@cnu.ac.kr

## Research Focus


Latest Research Activities

IWRRI is actively participating in researches related to rainfall -sediment-runoff numerical and physical modeling in large scale watersheds, riverbed stabilization techniques in river system.

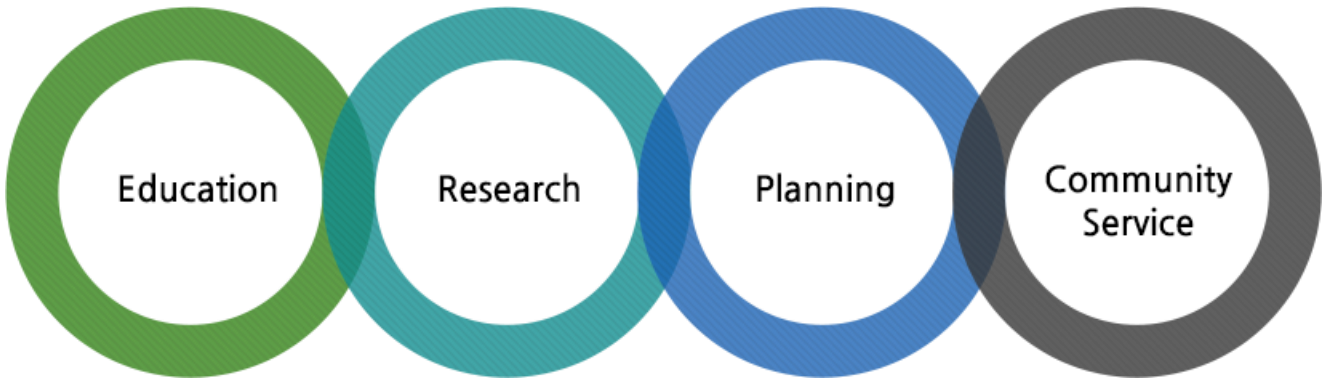
Director has been appointed as the project team leader for green technology for maintenance and management of hydraulic structures and river channels and the project of technical development against flood according to a change of future environment under the Ministry of Land, Infrastructure and Transport. IWRRI is also participating in researches regarding numerical and physical modeling of landslides due to rainfall variations as the project team leader of development of landslide risk analysis system by a coupling of short-term rainfall forecasting method and distributed hydrological-geotechnical model under the National Research Foundation of Korea.

## Research Unit Contact

**IWRRI**

- Director : Kwansue Jung (ksjung@cnu.ac.kr)
- Vice Director: Minwoo Son (mson@cnu.ac.kr)
- Secretary Ganeral : Kyeongmin Jung (rosegirl0@naver.com)

**Professional Training and collaboration**




## Latest Publications (2017-2018


- Xuan Khanh Do, Ram Krishna Regmi, Ho Phuong Thao Nguyen, Kwansue Jung, “Study on the Formation and Geometries of Rainfall-Induced Landslide Dams”, KSCE Journal of Civil Engineering, Vol. 21, No. 5 (Sep. 2017), pp. 1657-1667
- Ram Krishna Regmi, Kwansue Jung, Hajime Nakagawa, Xuan Khanh Do, Binaya Kumar Mishra, “Numerical analysis of multiple slope failure due to rainfall: Based on laboratory experiments”, Catena, Vo.150 (2017. 07), pp.173-191
- JooCheol Kim, Kwansue Jung, “Geomorphologic Skewness of Hydrologic Response”, Water Resources Management, Vol. 31, No. 6 (2017), pp. 1759-1776
- Wansik Yu, Seongsim Yoon, Mikyoung Choi, Kwansue Jung, “Performance comparison of rainfall and flood forecasts using short-term numerical weather prediction data from Korea and Japan”, J. Korea Water Resour. Assoc., Vol. 50, No. 8 (Jun. 2017), pp. 537-549
- KyungHyuk Lee, DongGyu Kim, BoungSu Kwon, KwanSue Jung, “A Study of the Optimization Process Combination on the Ultrapure Water Treatment System”, J. Korean Soc. Environ. Eng., Vol. 38, No. 7 (Jun. 2016), pp. 364~370
- Wansik Yu, Mikyoung Choi, Anchul Jeong, Hyejin Moon, Kwansue Jung, “Ensemble Rainfall Estimation and Flood Forecast by Considering Spatial Prediction Uncertainty of Numerical Weather Prediction”, J. Korean Soc. Hazard Mitig., Vol. 17, No. 5 (Oct. 2017), pp.43~55
- JooCheol Kim, Cui, Feng Xue, KwanSue Jung, “Analysis of runoff aggregation structure and energy expenditure pattern for Choyang creek basin on the basis of power law distribution”, J. Korea Water Resour. Assoc., Vol. 50, No. 11 (Sep. 2017), pp. 725-734
- Kok, Kahhoong, Wansik Yu, JooCheol Kim, Lariyah MOHD SIDEK, Kwansue Jung, “Feasibility Study of Deriving Areal Reduction Factor for Storm Design Application in Malaysia Using Satellite Rainfall Products”, J. Korean Soc. Hazard Mitig., Vol. 17, No. 6 (Dec. 2017), pp.399~409
- GeunSang Lee, HyunSeok Lee, KwanSue Jung, “The Analysis of Flood Damage Assessment using MD-FDA based on Inundation Trace Map”, Journal of Korean Association of Cadastre Information, Vol. 19, No. 3 (Dec. 2017), pp.29-40
- Wansik Yu, Giha Lee, Youngkyu Kim, Kwansue Jung, “Watershed-based PMF and Sediment-runoff Estimation Using Distributed Hydrological Model”, Journal of the Korean Society of Agricultural Engineers (Mar. 2018), Vol. 60, No. 2, pp. 1-11
- Kahhoong Kok, Lariyah Mohd Sidek, Kwansue Jung, JooCheol Kim, “Application of Geomorphologic Factors for Identifying Soil Loss in Vulnerable Regions of the Cameron Highlands”, water, Vol. 10, No. 4 (2018)
- JooCheol Kim, Feng Xue Cui, KwanSue Jung, “Identification of vulnerable region susceptible to soil losses by using the relationship between local slope and drainage area in Choyang creek basin, Yanbian China”, J. Korea Water Resour. Assoc., Vol. 51, No. 3 (Dec. 2018), pp. 235-246

- Anchul Jeong, Seongwon Kim, Wansik Yu, Youngkyu Kim, Kwansue Jung, “Estimation of River Dredging Location and Volume Considering Flood Risk Variation Due to Riverbed Change”, J. Korean Soc. Hazard Mitig., Vol. 18, No. 3 (Apr. 2018), pp.279~291
- ByoungHo Shin, DooYong Choi, Kwansue Jeong, “A Numerical Method to Calculate Drainage Time in Large Transmission Pipelines Filter”, Journal of Korean Society of Water and Wastewa, Vol.31, No. 6 (Dec. 2017), pp. 511-519
- SeungSoo Lee, Pakdimanivong, Mary, KwanSue Jung, Yeonsu Kim, “Study on the influence of sewer network simplification on urban inundation modelling results”, J. Korea Water Resour. Assoc. Vol. 51, No. 4 (2018), pp. 347-354
- Ruetaitip Mama, Kwansue Jung, Butsawan Bidorn, Matharit Namsai, Meiyan Feng, “The Local Observed Trends and Variability in Rainfall Indices Over the Past Century of the Yom River Basin, Thailand”, J. Korean Soc. Hazard Mitig., Vol. 18, No. 4 (Jun. 2018), pp.41~55
- Kahhoong Kok, Wansik Yu, Lariyah Mohd Sidek, and Kwansue Jung, “Review and Derivation of Areal Reduction Factor in Malaysia with Response to Changing Climate”, KSCE Journal of Civil Engineering, (Jun. 2018)
- Kahhoong Kok, Lariyah Mohd Sidek, Kwansue Jung, JooCheol Kim, “Analysis of Runoff Aggregation Structures with Different Flow Direction Methods under the Framework of Power Law Distribution”, Journal of Water Resources Management, (Aug. 2018)
- Mikyoung Choi, Yasuhiro Takemon, Wansik Yu and Kwansue Jung, “Ecological evaluation of reach scale channel configuration based on habitat structures for river management”, Journal of Hydroinformatics, (Feb. 2018)
- Kania Dewi Nastiti, Hyunuk An, Yeonsu Kim, Kwansue Jung, “Large-scale rainfall-runoff-inundation modeling for upper Citarum River watershed, Indonesia”, Environmental Earth Sciences, Springer, (Sep. 2018)
- Hongyan Li, Jiaqi Sun, Hongbo Zhang, Jianfeng Zhang, Kwnasue Jung, Joocheol Kim, Yunqing Xuan, Xiaojun Wang and Fengping Li, “What Large Sample Size Is Sufficient for Hydrologic Frequency Analysis?.A Rational Argument for a 30-Year Hydrologic Sample Size in Water Resources Management”, Water, Vol 10, No. 4 (Apr. 2018)

## Institutional Capacity Development Activities

**The latest international activities**

1 2018 International Symposium

The 12th International Symposium on “Climate Change and UAV Application on Floods and Droughts in Asia Region” and The 2nd China-Japan-South Korea Water Science Research Forum

Date : July 8~12, 2018

Organizer : CNU IWRRI, UNESCO i-WSSM, Jilin University


12th International Symposium

2. Capacity building workshop for ITC of Cambodia

Date : July 30~August 12, 2018

Organizer : CNU IWRRI, ADB(Asian Development Bank)

3. 2017 International Symposium

The 11th International Symposium on Climate Change and Sustainable Development in Asia -Water Resources Management and Disaster Monitoring-

Date : December 21 ~25, 2017

Organizer : CNU, IWRRI


11th International Symposium

## Jobs/ internship/ exchange opportunities:

We welcome visiting professors, exchange students and foreign students throughout the year.

# Structural System Reliability Group, Seoul National University , Korea

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Website: http://


The origin of Seoul National University (SNU) dates back to the late nineteenth century when Korean Emperor Gojong established modern higher education institutions which later became part of SNU. In 1895 Emperor Gojong issued Imperial Order 49 and established the Legal Training School as the first modern higher education institution in Korea. It turned out 209 graduates including the Martyr Yi Jun. The Seoul (Hanseong) Normal School, the first modern teacher training school was established in the same year and later became the SNU College of Education.

The Structural & System Reliability Group (SSRG) aims to provide cutting-edge solutions for each stage of natural/man-made disasters and hazards in order to maximize the society's disaster-hazard resilience, and produce high-quality human resources for the next-generation convergence research.

## Latest Publications


- Koh, H.-M., J.-H. Lim, H.-J. Kim, J.-W. Yi, W. Park, and J. Song* (2017). Reliability based structural design frame-work against accidental loads – ship collision. *Structure and Infrastructure Engineering: Maintenance, Manage-ment, Life-cycle Design and Performance.* Vol. 13(1), 171-180.
- **(Open Access)** Wang, Z., and J. Song* (2017). Equivalent linearization method using Gaussian mixture (GM-ELM) for nonlinear random vibration analysis. *Structural Safety.* Vol. 64, 9-19.
- Stern, R.E., J. Song*, and D.B. Work (2017). Accelerated Monte Carlo system reliability analysis through machine-learning-based surrogate models of network connectivi-ty. *Reliability Engineering & System Safety*. Vol. 164, 1-9.
- Deniz, D.*, J. Song, and J.F. Hajjar (2017). Energy-based seismic collapse criterion for ductile structural frames. *Engineering Structures.* Vol. 141, 1-13.
- **(Open Access)** Byun J., H.-M. Noh, J. Song* (2017). Reliability growth analysis of k-out-of-N sys-tems using matrix-based system reliability meth-od. *Reliability Engineering & System Safety.* Vol. 165, 410-421.
- Saykin, V.V.*, T.H. Nguyen, J.F. Hajjar, D. Deniz, and J. Song (2017). Material characterization using finite element deletion strategies for collapse modeling of steel struc-tures. *Engineering Structures*. Vol. 147, 125-133.


Dr. Junho Song
E-mail: junhosong@snu.ac.kr

- Lee, S.-H., and J. Song* (2017). System identification of spatial distribution of structural parameters using modified Transitional Markov Chain Monte Carlo (m-TMCMC) method. *ASCE Journal of Engineering Mechanics*. Vol. 143(9), 04017099-1~18.
- Coccon, M.N., J. Song*, S.-Y. Ok, and U. Galvanetto (2017). A new approach to system reliability analysis of offshore structures using dominant failure modes identified by selective searching technique. *KSCE Journal of Civil Engineering*. Vol. 21(6), 2360-2372.
- Wang, Z., and J. Song* (2018). Hyper-spherical extrapolation method (HEM) for general high dimensional reliability problems. *Structural Safety*. Vol. 72, 65-73.
- Byun, J., J. Song*, K. Zwirglmeier, and D. Straub (2018). An improved Non-parametric Bayesian Independence Test for Probabilistic Learning of the Dependence Structure among Continuous Random Variables. *KSCE Journal of Civil Engineering*. Vol. 22 (3), 974-986.
- Yi, S., Z. Wang, and J. Song* (2018). Bivariate Gaussian mixture based equivalent linearization method (GM-ELM) for stochastic seismic analysis of nonlinear structures. *Earthquake Engineering and Structural Dynamics*. Vol. 47(3), 678-696.
- Kim, T., and J. Song* (2018). Generalized reliability importance measure by Gaussian mixture.*Reliability Engineering and System Safety*. Vol. 173, 105-115.
- Contreras-Jiménez, J.S.*, F. Rivas-Dávalos, J. Song, and J.L. Guardado (2018). Multi-state system reliability analysis based on the matrix-based system reliability method for HVDC transmission systems. *International Journal of Electrical Power and Energy Systems.* Vol. 100, 265-278.
- Deniz, D.*, J. Song, and J.F. Hajjar (2018). Energy-based sidesway collapse fragilities for ductile structural frames under earthquake loadings. *Engineering Structures*. Vol. 174, 282-294.
- **(Open Access)** Ok, S.-Y.*, S. Jung, and J. Song (2018). Multi-objective optimization approach for robust bridge damage identification against sensor noise. *Shock and Vibration*, Vol. 2018, Article ID 3024209.
- **(Open Access)** Yi, S., and J. Song* (2018) Particle filter based monitoring and prediction of spatiotemporal corrosion using successive measurements of structural responses. *Sensors,* Vol. 18(11), 3909.
- **(Open Access)** Wang, Z., M. Broccardo, and J. Song* (2019). Hamiltonian Monte Carlo methods for subset simulation in reliability analysis. *Structural Safety*. Vol. 76, 51-67 [AAM]
- Chun, J., J. Song*, and G.H. Paulino (2019). System-reliability-based design and topology optimization of structures under constraints on first-passage probability. *Structural Safety*. Vol. 76, 81-94.
- Kim, T., O.-S. Kwon*, and J. Song (2019). Response prediction of nonlinear hysteretic systems by deep neural networks. *Neural Networks*. Vol. 111, 1-10.
- **>> Accepted/To Appear/In Press**
- Jeon, J.-S.*, S. Mangalathu, J. Song, and R. DesRoches. Parameterized seismic fragility curves for curved multiframe concrete box-girder bridges using Bayesian parameter estimation. *Journal of Earthquake Engineering*.
- Kim, S.-M., S.-Y. Ok*, and J. Song. Multi-scale dynamic system reliability analysis of actively-controlled structures subject to earthquake excitations. *KSCE Journal of Civil Engineering*.
- Byun, J.E., K. Zwirglmaier, D. Straub, and J. Song*. Matrix-based Bayesian Network for efficient memory storage and flexible inference. *Reliability Engineering and System Safety*.

# Institute for Environment and Development (LESTARI)
# Universiti Kebangsaan Malaysia (UKM), Malaysia

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Universiti Kebangsaan Malaysia (UKM) or The National University of Malaysia was established in 1971 is located adjacent to Malaysia's administration city of Putrajaya at the outskirt of Malaysia's administration city. The university's mission is to be ahead of society and time in leading the development of a learned, dynamic and moral society. UKM, as a public university of choice and the only National University in Malaysia, attracts local and international students by offering a vast number of programs at undergraduate and postgraduate levels. Continuous assessments of programmes offered are always performed to ensure that the courses meet the latest technology and development as well as introduction of new courses to meet the demand of the industry. The academic staffs of UKM are always kept abreast of the evolution of teaching methods including implementation of Massive Open Online Courses (MOOCs). To cater for its main objective of educating the nation, the university has a total of 13 well-established faculties, 13 institutes, 10 residential colleges and 10 service centres. UKM Medical Centre (UKMMC) is a teaching hospital which has achieved several outstanding milestones in the field of medicine involving state-of-the-art treatments and breakthrough surgeries. UKM also has five "living labs" which Universiti Kebangsaan Malaysia are dedicated to scientific and sociological research on the sustainability of different ecological systems in the country. These labs are open not only to UKM students and researchers but also to all to appreciate and learn. In 2006, UKM was certified as one of the five research universities in Malaysia, based on its achievement in producing many researches of high quality. These researches are all linked to the seven National Grand Challenges which comprises of issues to be addressed by Malaysian in order to be a developed nation. The Institute of Ethnic Studies (KITA), UKM is the only full-fledged research institute in Malaysia focusing specifically on 'ethnic studies'. UKM is home to 3 scientists included on Thomson Reuters' list of "The World's Most Influential Scientific Minds", whose published research ranked among the top 1% most cited in their respective fields in the given year of publication. UKM has bagged several awards and recognitions at national and international level. It is the first university in Malaysia to receive the ISO 9000 accreditation in 1998. In 2008, UKM has also obtained the self-accreditation status by the Minister of Higher Education. The conferment of these awards reflects the excellent ability of UKM in managing, administering and assuring a good quality of its academic programmes. Through the brainchild involving nationalistic flavor and global aspiration, UKM is a university which is international in its outlook that maintains and cherishes the national cultures and values successfully.

Professor Dato' Dr. Mazlin Bin Mokhtar

E-mail: mazlin@ukm.my/ mazlinmokhtar@yahoo.com

LESTARI was formed on 1st October 1994 about two years after the famous 1992 Rio Conference on Sustainable Development.

The establishment of this multidisciplinary research institute was one of Malaysia's response to the calling of the world's conference on balancing protection of the environment with socio economic development via integrated and holistic approaches.

Research fellows of LESTARI come with different expertise of knowledge disciplines and experiences; including in the areas of natural sciences; social & humanities; economics; anthropology; education; physical sciences; town and country planning; law; etc.

LESTARI is celebrating its Silver Jubilee this coming 2019; and it's researchers and researches have had given good impacts to various important policies, mechanisms, and processes at national and regional levels over the years; especially via initiatives of Science and Governance for Sustainability; and Policy Advocacy; also Education for Sustainable Development.

Some of LESTARI's main contributions include ideas, dossiers, implementation, and continuous improvements upon the establishment of Langkawi Global Geopark with partners such as LADA & UNESCO; Langat Basin HELP UNESCO network; DRR approach with partners like KU DPRI and GADRI; and Climate Change policy advocacy with partners like Cambridge, IPCC, etc; and as such.

## Research focus

- Development and Social Well-being
- Urbanization and the Region
- Ecosystem and Landscape
- Education for Sustainable Development
- Environmental Governance
- Governance of Natural Resources
- Governance of Hazardous Substances and Wastes
- Cultural Heritage
- Biological Heritage
- Geological Heritage
- Environmental Health
- Disaster Management
- Climatic Disaster
- Geological Disaster
- Technological Disaster

## Research Unit Contacts:


- gohchoota@yahoo.com
- tieka@ukm.edu.my


## Disaster Project Titles

- Geohazard Mapping in the Klang Valley, Prime Ministry Department, 1999-2000
- Kundasang Landslide Complex: Hazard Assessment and Control, Malaysian Government, 2003-2005
- Environmental Hazards and Human Security: Natural and Geoenvironmental Disaster prevention and Management ,Research University Grant, 2007-200
- Disaster Risk Reduction and Climate Change Adaptation- Enhancing Capacity for Sustainable Livelihood and Lifestyles, Research University Grant, 2010
- Economic Approaches for Linking Disaster Risk Management and Climate Change Adaption, Ministry of Education Grant, 2011-2014
- Vulnerability and Adaptation towards *Cascading Hazard, Ministry of Education, 2012-2013*
- A DNA Biosensor with Dry-Reagent for Rapid Detection of Biohazards Vibrio Chorela in Flood Disaster Zones, Ministry of Science and Technology, 2012-2014
- Disaster Prevention through Adaptation to Changes: Science and Management Relation, Research University Grant, 2013-2014
- Development of Integrated Approach for Reduction of Based Risk Disaster, Research University Grant, 2013-2014
- Promoting Community Involvement in Disaster Management System, Research University Grant, 2013-2015
- Disaster and Climate Extreme, Research University Grant, 2014-2015


Langkawi Research Centre

- Assessing Community Risk Insurance Initiatives and Identifying Enabling Policy and Institutional Factors for Maximizing Climate Change Adaptation and Disaster Risk Reduction Benefits of Risk Insurance, Institute for Global Environmental Strategies (IGES), Japan, 2014-2017
- Developing a Multi-criteria Decision Support System for Urban Disaster Management, Research University Grant, 2014-2017
- Estimation for Flood Disaster Damage and Losses in area of Kajang, Selangor Malaysia, Global Change System for Analysis, Research and Training (START), 2015-2016
- Integrated Approach for Aiding Decision Making Process for Better Flood Disaster Risk Management: A Case Study of Pahang River Basin, Ministry of Education, 2015-2016
- Socioeconomic, Wellbeing, and Health Impacts Of Flood Disaster In The Pahang River Basin: Implications for Livability, Sustainability and Quality of life, Ministry of Education, 2015-2016
- Disaster Resilient Structural Design for Urban and Rural Cultural Landscape of Pahang River Basin, Ministry of Education, 2015-2016
- Climate Related Disasters, Research University Grant, 2015-2016
- Disaster Resilience Cities: Forecasting Local Level Climate Extremes and Physical Hazards for Kuala Lumpur, The Newton-Ungku Omar Fund (NUOF), 2017-2019
- Developing An Online Tool for Health Risk/Benefit Information for Consumers of Fish and Shellfish, Research University Grant,2017-2019
- GIS Application in Index Mapping of Vulnerability Livability towards Flood Disaster in Pahang, Research University Grant, 2018-2020
- Multihazard Prediction Disaster Risk for Urban Area: Pilot Study Langat River Basin, Selangor, Research University Grant, 2018-2020

## Capacity Development Activities and Internship Opportunities

- LESTARI do offer training and exchange opportunities.
- Some examples from our past trainings and as such:
- UNCECAR with UNU; and partner universities in South Asia, Australasia; and ASEAN;
- Asia Pacific Geopark Workshops and Seminars;
- Green Hotels of Asia Pacific with Frangipani Resorts & Spa; PATA and Partners;
- Asean Youth Volunteers Programme i.e. AYVP;
- Broadening Sustainability Science Applications with UNESCO and other partners;
- Chemicals and Hazardous Substances Management with MITI; MONRE; and with USA Homeland Security Dept on Chemical Safety;
- Citizens' Sustainability programme with Bank Rakyat Foundation;
- Climate Change Adaptation with Malaysia Cambridge Association, and other partners;
- FLEGHT on forestry and forest products;
- IWRM and IRBM with GWP, ASM and UNESCO ;
- Mangrove protection and rehabilitation via Mangrove Alliance, etc;
- Sustainable Schools programme with NRE & MOE; etc;
- Sustainable Cities Programme with KPKT, Plan Malaysia; etc;
- Provincial Governance for Sustainability with various local governments;
- International Development programme for Senior Ministries' officers from South Asian country in collaboration with GSB UKM; etc;
- Personality Development programme for tertiary students from a South Asian university;
- Sustainable Development training for officers of an Asean country;

..and many more.

LESTARI accept internship for local and foreign students. The internship application can be sent directly to Senior Executive LESTARI via tnkirana@ukm.edu.my

## Latest Publications


- Rospidah Ghazali & Hafizi Mat Salleh. 2017. Strategi daya tahan dalam menghadapi bencana banjir di Kelantan (Reseliency strategies in facing flood disasters in Kelantan) in Bencana Alam: Ke Arah Pengurusan Bencana yang Mampan (Natural disasters: Towards a Sustainable Disaster Management). Page 139 -159.
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# Centre for Southeast Asia Disaster Prevention Research Institute (SEADPRI_UKM), Universiti Kebangsaan Malaysia (UKM), Malaysia

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The Centre for Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM), was established on 1 June 2008, under the administrative structure of Universiti Kebangsaan Malaysia. The establishment of SEADPRI was aimed at bringing together experts from multiple disciplinary backgrounds and training, to help build the corpus of knowledge and measures to effectively address disaster risks and explore opportunities to build resilience in Malaysia and South East Asia. SEADPRI UKM is supported by three key research programmes focusing on geological hazards, climatic hazards and technological hazards, which are looked at independently and collectively, continuously feeding back into a loop that serves to strengthen contribution to the DRR corpus of knowledge and practice, towards better-informed DRR governance. In 2016, SEADPRI UKM was named as one of the IRDR International Centres of Excellence for Disaster Risks and Climate Extreme, which will help provide the regional research foci for IRDR programmes. SEADPRI UKM has in its first decade established several strong links with academic and research institutions, as it believes in partnerships and collaboration, and it now helps coordinate the Asian Network on Climate Science, which was formally recognised by the ASEAN Working Group on Climate Change (AWGCC) at its 7th Meeting on 21 July 2016 in Kuala Lumpur. SEADPRI-UKM is also active in several research networks and platforms such as the UNISDR Asia Science Technology Academia Advisory Group (ASTAAG), Intergovernmental Panel on Climate Change (IPCC) and the Global Alliance of Disaster Research Institutes (GADRI). In Malaysia, SEADPRI-UKM continues to support the National Platform and Action Plan on Disaster Risk Reduction (myDRR).

SEADPRI UKM is presently one of the four centres that are administered by the Institute for Environment and Development (LESTARI), a multidisciplinary research institute etablished in 1994, also within the structure of Universiti Kebangsaan Malaysia. LESTARI focuses on issues relating to environment and development, with a goal towards contributing to the knowledge and practice related to sustaibable development and sustainability. Full details about LESTARI and the work it does can be accessed at http://www.ukm.my/lestari/en/.

Research Focus

Three research programmes focusing on geological hazards, climatic hazards and technological hazards, serve as SEADPRI UKM's main backbone. These three research programmes run independently, but converge towards framing integrated and holistic contributions that translates science to practice. The Geological Hazards Programme looks at all forms of geological hazards, including earthquakes, tsunamis, landslides, slope failures, debris flows, subsidence and sinkholes. The programme seeks to shift the focus from mere response and mitigation to one that addresses risks, so as to ensure that the level of vulnerability is reduced and resilience is strengthened. The Climatic Hazard Programme focuses on research and strengthening capacity to support the national and regional agenda on adaptation to extreme weather and climate change. The focus of research includes disaster prevention, risk reduction and management, post-disaster recovery and reconstruction. Aspects considered are science and technology for disaster risk reduction, socio-economic impacts and vulnerability assessments, education and awareness as well as governance for human security and sustainability. The Technological Hazards Programme currently focuses on hazardous materials, with research and capacity building activities geared towards the reduction of disaster risk to the environment and humans. It promotes disaster risk reduction of technological hazards, translating scientific knowledge and practices to benefit key stakeholders, that include both government and related industries. Key research work and activities undertaken by the programmes is reported in SEADPRI-UKM's bulletin which can be accessed at http://www.ukm.my/seadpri/?page_id=171.

## Latest Research or disaster Reports/Results

The last year saw SEADPRI filing two patents on DNA Biosensor and Method of Fabrication Thereof; and Re-agentless Microbial Biosensor for Nitrite Ion Detection based on Nitrite-degrading Microorganism-immobilized Acrylic Microspheres, as well as publishing a book entitled *SEADPRI Series No.1: Laying the Foundation for Enhancing Climate Change Adaptation in Southeast Asia* (ISBN 978-967-5227-74-5). Outcomes of research projects, as well as progress are reported in the bi-annual SEDAPRI UKM Bulletins that can be accessed at http://www.ukm.my/seadpri/?page_id=171

**Institutional Capacity Development Activities and Internship Opportunities—refer to our website.**

Prof. Dr. Mohd Raihan Taha, Director of LESTARI UKM / Assoc Prof. Dr. Sarah Aziz, SEADPRI-UKM Chair
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# Centre for Coastal and Ocean Engineering (COEI)
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COEI was formally known as the Coastal and Offshore Engineering Institute. The rebranding of COEI was formalized by Universiti Teknologi Malaysia (UTM) in 2015 under a university wide restructuring of research centers and faculties. COEI was first established in 1990 as a pioneer R&D research centre in Malaysia that specialize in coastal and offshore engineering. It is one of the five research centres (RC) that forms the Research Institute for Sustainable Environment (RISE) in UTM. As a member of RISE, COEI works very closely with other member RCs whose niche areas are all related to sustainable environment and sustainable processes. COEI has developed a few innovative products related to coastal erosion protection and engineered reef system such as the Sine Slab, Hydrocheese, Stepfloat and Artgrass. Many of these products has been in employed throughout the country either as prototype application or field test systems. COEI has wide experience in hydraulic studies and hydrodynamic simulation of coastal processes with over 60 consultancy works on record and over 20 research projects. Clients include port authorities and port operators, the Marine Department, PETRONAS Carigali, Drainage and Irrigation Dept, private developers and other engineering consultants needing specialized services in coastal engineering. Our present interest now are on climate change effects, primarily sea level rise, extreme coastal storms, coastal floods and tsunamis. We were responsible for completing the first tsunami modelling study for Malaysia, after the catastrophic 2004 Indian Ocean tsunami event and pioneer application of the coastal vulnerability index (CVI) in Malaysia as a means to classify and assess coastlines risks to sea level rise that would help future planning and strategy. Another research area that COEI embark on are mangrove adaptation to sea level rise and marine eco-system regeneration.

## Research Focus

The research and consultancy services provided by COEI including the development of coastal protection and computer modelling systems, and the applications of computer simulation and physical modelling for feasibility studies, hydraulic and coastal designs and impact assessment studies. Our clients include various government agencies and local authorities, private developers and consulting firms, port and highway authorities, local universities and multi-national companies. We also provide technical advisory services to the government pertaining to the evaluation of Environmental Impacts Assessment reports. We are also involved in training technical staff from other agencies and play a major role in drafting various national guidelines and policies pertaining to the practice of coastal and hydraulic engineering in Malaysia., COEI has extensive experience in hydraulic and coastal site investigation and data collection, development and applications of physical and mathematical models and conducting comprehensive hydraulic and coastal studies.

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## Latest Publications

- An Updated Categorisation Of Coastal Erosion And Vulnerability Index Along Melaka State (2017)
- Runoff Simulation Of Mixed Landused Of Skudai Watershed : Sensitive Parameters (2017)
- Sandy Beach Profile Erosion And Accretion (2017)
- Riverbank Erosion Mapping Using High Resolution Sattelite Image And Unmmanded Aerial Vehicle Approach (2017)
- Assessment Of Mangrove Habitat Abd River Shoreline Erosion Based On Sea Level Rise And Unmanded Aerial Vehicle System (2017)
- Return Period Analysis Of Major Flood Events In Peninsular Malaysia (2017)
- Return Period Analysis Of Major Flood Events In East Malaysia (2017)
- Identifying The Meteorologically Homogeneous Zones Within Asean (Malaysia-Indonesia) And Its Application For Extreme Rainfall Analysis And Climate Change (2017)
- The Return Period Of Major Flood Events In Peninsular Malaysia Considering Homogeneous Zones
- Community-Based Disaster Informatics For Building Resilient Cities (2017)
- Climate And Disaster Resilient Cities: Challenges For Malaysia (2017)
- Kajian Garis Panduan Perancangan Tahap (2017)
- Landslide Causal Factor Maps Report (Kota Kinabalu And Kundasang) (2017)
- Landslide Risk Mapping And Analysis (2017)
- Landslide Susceptibility Mapping And Analysis (2017)
- Pengurangan Risiko Bencana Berbasis Komuniti: Penelitian Terhadap Komuniti Di Serendah, Selangor (2017)
- Tidal Contribution To The Flood Event (2017)
- Assessment of drought risk index using drought hazard and vulnerability indices (2018)
- Development of climate-based index for hydrologic hazard susceptibility (2018)
- Spatial distribution of unidirectional trends in temperature and temperature extremes in Pakistan (2018)
- Unidirectional trends in annual and seasonal climate and extremes in Egypt (2018)
- Potential Impact of Climate Change on Residential Energy Consumption in Dhaka City (2018)
- The new concept of water resources management in China: ensuring water security in changing environment (2018)
- Changing Pattern of Droughts during Cropping Seasons of Bangladesh (2018)
- Trends in heat wave related indices in Pakistan (2018)
- Long-term trends in daily temperature extremes in Iraq (2018)

## Other useful information and contacts:

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# German University of Technology Sultanate of Oman

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The German University of Technology in Oman (GUtech) strives to become a leading university of technology in Oman and the wider region, thus defining the highest standards in education, research and innovation. GUtech provides students with the education required to become highly qualified and socially responsible graduates, guided by German excellence in science and technology with a firm grounding in Oman`s culture and heritage. The University fosters creative and critical thinking to advance research and development and, through this, aims at serving society as a whole. GUtech is committed to ethical principles in all of its undertakings. In particular, the University welcomes students and employees from both genders, all ethnic, geographical, cultural and religious backgrounds. The University encourages association in peace and with tolerance, and welcomes further intercultural exchange between Oman and Germany.

## Research Focus

- Applied Geology
- Geo-Engineering, including Hydro-Engineering
- Flash Floods
- Modeling and Simulation

Watershed boundaries, which are important to delineate flood prone regions, are not clearly defined in lowland regions, where most of damages occur from flash flood events. Figure 1 shows the results of different delineation methods, based on digital elevation maps and satellite data, in South Batina plain in Oman. Aim of the research is to evaluate different methodologies for modeling and forecasting and to come up with better flood maps.

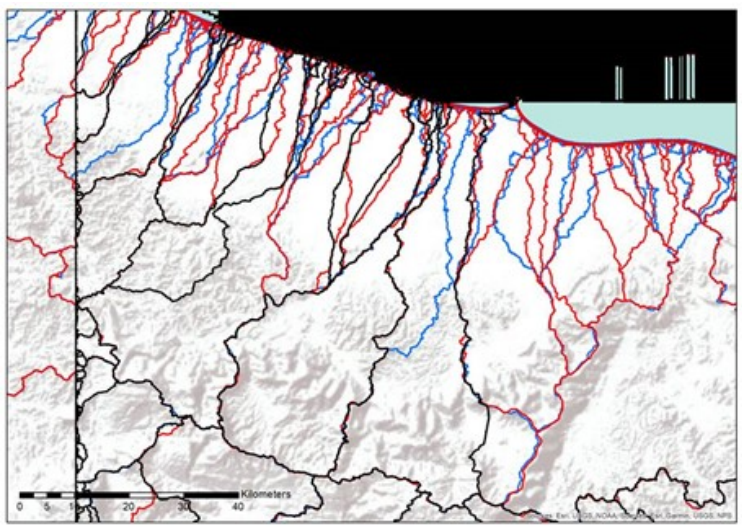


Figure 1: Delineation of watersheds by different methods

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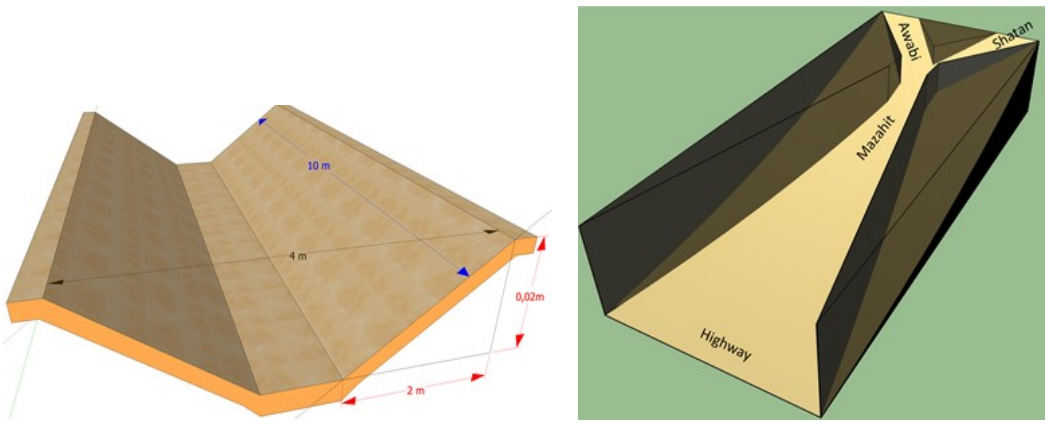
Flood modeling is performed based on the shallow water equations, using various software tools (ANUGA, COMSOL). Modeling approaches are tested for experimental set-ups and field situations (Figure 2). An advanced simulation approach is developed for sediment transport during floods, taking suspended load and bedload into account. Among others one aim is its application for watershed delineation.




Figures 2: Model geometries from experimental set-up (left) and field (right)

## Latest Publications:

- Project: Towards a flood-resilient Omani society: improved tools for flood management, funded by The Research Council (TRC) Since 2014

**Ongoing Publications (2017/2018):**

- Holzbecher E. & Hadidi A., Some Benchmark Simulations for Flash Flood Modelling, COMSOL Conference, Rotterdam, October 18-20th, 2017
- Hadidi A. & Holzbecher E., Utilizing Space-Borne Precipitation Radar Data For Flash Flood Studies In Wadi Systems, 3rd International Symposium on Flash Floods in Wadi Systems, Muscat, December 5-7th, 2017
- Tügel F., Marafini E, Özgen I., La Rocca M., Hadidi A.,Tröger U. & Hinkelmann R., Flash flood simulations considering infiltration processes and structural protection measures for El Gouna, Egypt, 3rd International Symposium on Flash Floods in Wadi Systems, Muscat, December 5-7th, 2017
- Bauer F. & Hadidi A., Flash floods along the Red Sea Coast in Egypt - characterization of landscape and climate for risk assessment, 3rd International Symposium on Flash Floods in Wadi Systems, Muscat, December 5-7th, 2017
- Holzbecher E. & Hadidi A., Some Benchmark Simulations for Flash Flood Modelling, 3rd International Symposium on Flash Floods in Wadi Systems, Muscat, December 5-7th, 2017a
- Holzbecher E. & Hadidi A., Sediment Transport in Shallow Water as Multiphysics Approach, 3rd International Symposium on Flash Floods in Wadi Systems, Muscat, December 5-7th, 2017b
- Holzbecher E. & Hadidi A., A multiphysics approach to sediment transport in shallow water, COMSOL2018, Lausanne, October 22-24th, 2018a
- Holzbecher E. & Hadidi A., Coupled flow and sediment transport in shallow water, 4th Symp. on Flash Floods in Wadi Systems, Casablanca, December 4-6th, 2018b
- Hadidi A. & Holzbecher E., Delineation of catchment boundaries in wadis' downstream in South Batinah, 4th Symp. on Flash Floods in Wadi Systems, Casablanca, December 4-6th, 2018

## Institutional Capacity Development Activities or training opportunities:

- Internships for graduate students, before or after graduation

## Jobs/ internship/ exchange opportunities:

- Fly-in professors teach block-courses in undergraduate and graduate levels

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Philippine School of Business Administration (PSBA) was incorporated as a full-fledged school in 1966. It is duly recognized by the Philippine Commission on Higher Education (CHED) and included in World Higher Education Database (WHED). It is also part of United Nations Educational, Scientific and Cultural Organization's (UNESCO) and the International Association of Universities (IAU) so called IAU/UNESCO List. The main rationale of the School is to help meet the country's management requirements for advanced and sophisticated industrial and commercial life and government responsibilities as well. PSBA started its Research Arm for Disaster Risk Management (DRM) researches and projects in 2001. Currently, to fulfill the country's demand for DRM formal education, PSBA-Manila has launched the Master of Business Administration (MBA) specialization in Disaster Risk Management (DRM) program in first semester of Academic Year 2017-2018 being the first Higher Education Institution (HEI) to offer a formal DRM education in the Philippines. Researches on Disaster Risk in The Philippine School of Business Administration (PSBA) started in 2001, when Dr. Teodoro Santos and Prof. Harry Lorenzo along with Dr. Teodorico Molina approved the proposal of Dr. Tabassam Raza, while taking up his Doctorate in Business Administration, for his dissertation that was focused towards Disaster Risk Management (DRM). The pilot research entitled "Strategic Model: Conceptualization and Implementation of a Total Disaster Risk Management: Cherry Hills Tragedy, Antipolo City", was published on 2002 as a first of its kind of researches on disasters in the Philippines. In 2003, the DRM Unit was founded under the Graduate School Research Center of PSBA where Dr. Raza was appointed Special Associate for the DRM and Information Technology (IT) Researches and Projects for PSBA. From here on, researches on DRM with focus on Business Continuity were done under the name of the School.

## Research Focus

**Institutional Disaster Risk Management Education through Master in Business Administration specialization in Disaster Risk Management (MBA-DRM) Program:**

The MBA-DRM program is a formal education program accredited by CHED offered in PSBA-Manila as a first of its kind in the Philippines. This participatory and practice-oriented program trains students to become future disaster managers who will create DRM plans and programs for their communities and workplaces with their capacity to work and link with public and private sectors in sharing, disseminating, and mainstreaming DRM in every functions of the community. Subjects are modern and innovative, including Damage, Loss, and Need Assessment (DLNA), Crisis Management, Geographic Information Systems (GIS), Environmental Impact Assessment, among others, ensuring a well-rounded experience that is relevant to the developing and ever-changing world. In addition, students are required to observe similar programs in PSBA-Manila networked universities via foreign travel in order to learn about trends relevant to DRM. Further, they also conduct at least one international conference per year on relevant DRM topics with focus on Business Continuity.

**Risk Sensitive Comprehensive Land Use and Development Planning (RSCLUDP) towards Resilient Cities**: The RSCLUDP Model has been used to create Local Climate Change Action Plans (LCCAP) and its corresponding workshops and training manuals, such as the Quezon City Local Government Climate Change Action Plan (LCCAP) 2017-2027. The DRM Unit aims to apply this model in other LGUs to create their LCCAP and Local Disaster Risk Reduction and Management Plan (LDRRMP) and combine them into an Integrated Action Plan. This will allow the LGU to create their Risk-Sensitive Comprehensive Land Use Plan (RSCLUP) and Risk-Sensitive Comprehensive Development Plan (RSCDP) for implementation towards resilient cities. This is in line towards the Sustainable Development Goals (SDG), especially SDG 11.

Dr. Tabassam Raza

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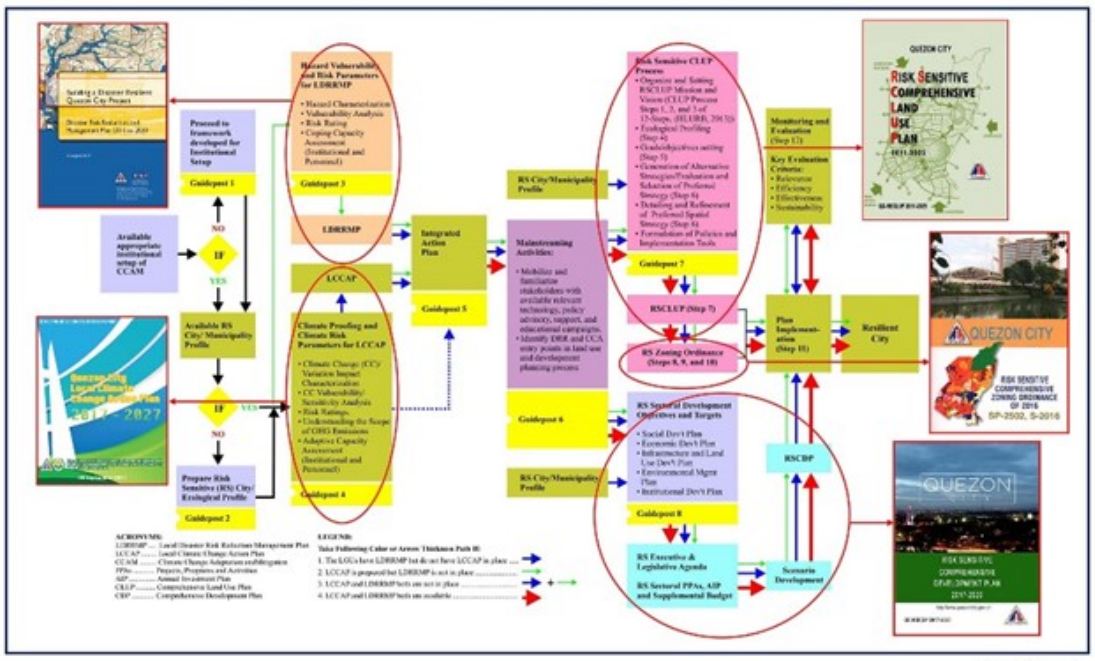
## Latest Publications

- **Localizing Climate Risk Management in Planners' and Decision Makers' Agenda: A Scientific Comprehensive Model (SCM), Quezon City, Philippines** (International Scientific Conference on Climate Risk Management, 2017 Apr. 5-7, Red Cross Red Crescent Climate Centre co-sponsored by International Panel for Climate Change, Nairobi, Kenya)
- **Developing Low Carbon Cities into Planners' and Decision Makers' Agenda: An Urban Climate Change Adaptation Solutions, Quezon City, Philippines** (ECCA 2017, 2017 Jun. 9, Glasglow, Scotland)
- **Localizing Climate Change Adaptation and Mitigation into Urban Sustainable Development: Low Carbon and Climate Resilient Quezon City, Philippines** (International Conference on Sustainable Development, 2017 Sept. 18-19, Columbia University, New York)
- **2nd International Disaster Risk Management Research Colloquium** (2017 Oct. 14, Manila, Philippines)**:** http://psba.edu/wp-content/uploads/2018/09/Second-International-DRM-RC.pdf
- **Localizing Disaster Risk Reduction and Climate Change Adaptation in Planners' and Decision Makers' Agenda: Technical Comprehensive Model, Quezon City, Philippines,** 7th International Conference on Building Resilience; Using scientific knowledge to inform policy and practice in disaster risk reduction, ICRB 2917, 27-29 November 2017, Bangkok, Thailand, ELSEVIER, Science Direct, Procedia Engineering, V.212(2018)1311–1318, https://www.sciencedirect.com/search?qs=&authors=tabassam+raza&pub=&volume=&issue=&page=&origin=home&zone=qSearch
- **International Symposium** (2018 Jan. 27-28, Manila, Philippines)**:** http://psba.edu/wp-content/uploads/2018/09/Second-International-DRM-RC.pdf
- **International Seminar** (2018 Feb 19-20, Manila, Philippines): http://psba.edu/wp-content/uploads/2018/08/International-Seminar-Feb19-20.pdf
- **AIT-PSBA International Workshop** (2018 Jun. 11-13, Asian Institute of Technology, Bangkok, Thailand): http://psba.edu/wp-content/uploads/2018/08/AIT-PSBA-Manila-International-Workshop-Proceedings.pdf
- **Understanding and Managing Risks of Climate Extremes: A Local Sustainable Development Action Plan, Quezon City, Philippines** (Sixth Annual International Conference on Sustainable Development, Columbia University, New York, United States of America, 2018 Sept. 26-28): http://unsdsn.org/icsd/wp-content/uploads/sites/4/2018/09/180917-Abstract-Book_WEB.pdf
- **3rd International Research Colloquium** (2018 Oct 14, Manila, Philippines) Publication in progress
- **Science and Policy Framework for Urban Water Sufficiency during Extreme Weather Disastrous Impact: Adaptation Action Plan of Quezon City, Philippines** (Water Science for Impact International Conference, Wageningen University & Research, Wageningen, the Netherlands, 2018 Oct. 16-18): https://dev.iwcconferences.com/program-tool/assets/uploads/Netherlands-Poster-Final.pdf
- **Development and Implementation of a Disaster Risk Management Specialization: Philippine School of Business Administration, Manila** (14th APRU Multi-Hazards Symposium, 2018 Oct. 21-24, Australian National University, Canberra, Australia)
- **Assessing Personnel Digital Capacity of Graduate School of Business towards Technology-Enhanced Learning Environment: Advancing for Self-regulated Learning** (ICODeL 2018, Kaohsiung Taiwan, 2018 Nov. 26-28)
- **Climate-Related Disasters Challenges for Sustainable Development: Innovating a Science and Policy Framework towards Sustainable and Climate-Resilient Quezon City, Philippines** (8th International Conference on Building Resilience, University of Lisbon, Lisbon, Portugal, 2018 Nov. 14-16)

## Institutional Capacity Development Activities and job/internship opportunities:

- Think Tank for Media Management with the Collaboration with Iqra University, Karachi, Pakistan to be held in the Philippines (2019 January 14-18, Manila, Philippines)
- Strategic Planning Workshop for Science Management in collaboration with Lahore College for Women University (Tentative date: 2019 February 1st Week, Manila, Philippines)
- "Disaster Resilience and Sustainable Development" Collaboration with Asian Institute of Technology (Scheduled 2019 March 7-8, AIT, Bangkok, Thailand)
- 2019 International Symposium in Collaboration with Asian Institute of Technology (Tentative date: third week 2019 March, Quezon City, Philippines)
- Multi-Hazards Summer School in Tohoku University Sendai (Tentative date: Last week of July)
- 2019 4th International Research Colloquium (Tentative Date Second Week of October 2019, Quezon City, Philippines)
- Exact dates, venues, and themes will be posted in our website's news and announcements page at http://psba.edu and http://drm.psba.edu
- Jobs, internship, and exchange notices will be posted at our website's announcement and news sections at http://psba.edu and http://drm.psba.edu

## Risk Sensitive Comprehensive Land Use and Development Planning (RSCLUDP) Model




(Raza, 2017)

**Geographic Information Systems (GIS):** The Center encourages research related to spatial technologies by conducting studies using GIS and related applications. The Center seeks to organize research events such as international conferences, workshops, seminars, and symposiums, among others. The Geographic Information Systems Research and Development Hub (GIS-RDH) of the DRM Unit seeks to acquire a respectful status within the Philippines as a credible research center specialized in DRM. The center aims to establish a geospatially-centered research environment and providing world-class knowledge and expertise for disaster research. The center serves as a synergetic avenue for the pursuit of excellence in research, education, and services in geographic information technologies. The Center encourages and promotes research papers and research projects and development in the GIS fields. The Center focuses and conducts various interdisciplinary research projects and applications. The Center also provides trainings and workshops to employees of local government and private entities that pioneer the use of GIS software such as, but not limited to, ArcGIS in their respective departments. The GIS-RDH seeks to have comprehensive and up to date instruments to ensure the reliability and sustainability of the center.

**PSBA-Manila E-Learning System :** PSBA-Manila has an E-learning System at psbaelearning.psba.edu which acts as a portal for information sharing from the School. The medium of instruction in the GSB, PSBA-Manila is English. Following the blended mode, the MBA in DRM modules are delivered using at least 80% through face to face. To support such mode PSBA-Manila has developed in-house Moodle platform in the form of PSBA- Manila E-learning portal. Further, an e-library is also developed to support the online information dissemination to match the advancement in technology. In addition to offering the School's main educational programs, the e-Learning Portal also offers certificate courses for Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA)-related programs, such as Geographic Information Systems.

The E-learning System uses third-party off-site hosting, ensuring 24/7 availability from all around the globe even on the onset of a disaster.

**Research Fellowship Program:** The PSBA-GSB Research Fellowship Program was officially established in 2017, by the Philippine School of Business Administration- Graduate School of Business to support the successful completion of the study program of graduate students who are pursuing the thesis/dissertation stream.

The Research Fellowship Program provides partial financial support to deserving graduate students of thesis program at Philippine School of Business Administration- Graduate School of Business to help them to complete their thesis or dissertation work. An amount of Php 60,000.00 is available for DBA students and Php 30,000.00 for MBA thesis program including MBA-DRA students.

Applicants must have the following qualification to merit award of this research grant:

1. Applicants must be in active status as a graduate student of the Philippine School of Business Administration - Graduate School of Business (PSBA-GSB) MBA thesis program or DBA program at the time of application

2. Applicant must have successfully defended his thesis/ dissertation proposal, or else, such proposal must have been approved by the panel committee. A certification from the thesis/dissertation adviser to this effect shall be required.

3. At the time of application, applicants are expected to be either preparing for fieldwork, collecting or analyzing their data, or writing their thesis/dissertation. No application for a grant shall be entertained when the thesis/dissertation draft has already been completed.

### Research Unit Contacts

**Disaster Risk Management Unit -** http://drm.psba.edu

Contact: Dr. Tabassam Raza, Director, tabassamr@psba.edu

**PSBA-Manila E-Learning System -** http://psbaelearning.psba.edu/

Contact: Mr. Ramon Iñigo M. Espinosa, DRM E-Learning Coordinator, inggo@psba.edu

**Geographic Information Systems Research and Development Hub -** http://drm.psba.edu/gis

Contact: Mr. Ernie M. Lopez, Senior System Analyst & GIS Coordinator, xtremu@psba.edu

**Research Fellowship Program -** http://drm.psba.edu/research

Dr. Tabassam Raza, Director, Research and Development tabassamr@psba.edu

# Center for Urban Water (CUrW)
# Ministry of Megapolis and Western Development
# Sri Lanka


10th Floor, Wing C, Sethsiripaya Stage II,
Battaramulla 10120

Tel: +94 11 2 186 003/4

Fax; +94 11 2 186 003/4

Website: http://www.curwsl.org/


Currently housed in Sethsiripaya, 10F Wing C

The Center for Urban Water is being set up for flood control and water management in Metro Colombo to became operational in 2018. Its primary function is the control of pumps and gates that are being installed under the Metro Colombo Urban Development Project.

CUrW develops an integrated flood control and water management information system for flood risk reduction through optimal operational use of flood control facilities such as pumps, storages facilities, surface storages and flood early warning system for Metro Colombo. Center also assess current and evolving future water related risks to Megapolis from urban development as well as climate change.

CUrW building is under construction—Six-story new building will house a state-of-the-art center for data integration, modelling, control and dissemination. The first two floors are planned for public outreach, the 3rd floor for data integration and flood control, 4th floor for environmental services, 5th floor for R&D and the 6th floor for administration.

## Research Focus

CUrW focusses on Modeling – Weather forecast, Hydrological forecasts, Hydrodynamic modeling and inundation forecast, Risk assessment, Operation of control facilities (pumps, gates, etc.), IOT devices for real time monitoring, climate change impacts, Urban Water Management, storm water retention and infiltration.

Modelling

A combination of hydrological and hydro-dynamic models are used to forecast the state of water in the Colombo System with rainfall inputs from Numerical Weather forecasts, Satellite Data and Rain Gauge Observations.



Prof. Srikantha Herath

E-mail: srikantha.herath@gmail.com

## STATE OF WATER

A combination of hydrological and hydro-dynamic models are used to forecast the state of water in the Colombo System with rainfall inputs from numerical weather forecasts, satellite data and rain gauge observations. Current and future canal water levels, interaction with river and the lake water levels are forecast in 15 min time intervals at present.

Rainfall and water levels are observed using IoT devices and transmitted to CUrW IOT server. The data are used to simulate water levels in canals and lakes and to validate model forecasts.

## RAIN GAUGE DATA

CUrW has deployed a number of IoT based rain gauges and their observations are directly coupled to simulation models through CUrW IoT platform. These data are also available to public.

Currently the deployment is in the study phase where different types of rain gaugesand communication protocols are being tested.

## WATER LEVEL DATA

CUrW has deployed a number of IoT based water level gauges and their observations are used for simulation models validation and operating SCADA systems controling pumping stations and gates. These data are also available to public.

Currently the deployment is in the study phase where both ultra-sonic and radar type of water level gauges and different communication protocols are being tested.

## NUMERICAL WEATHER FORECASTS

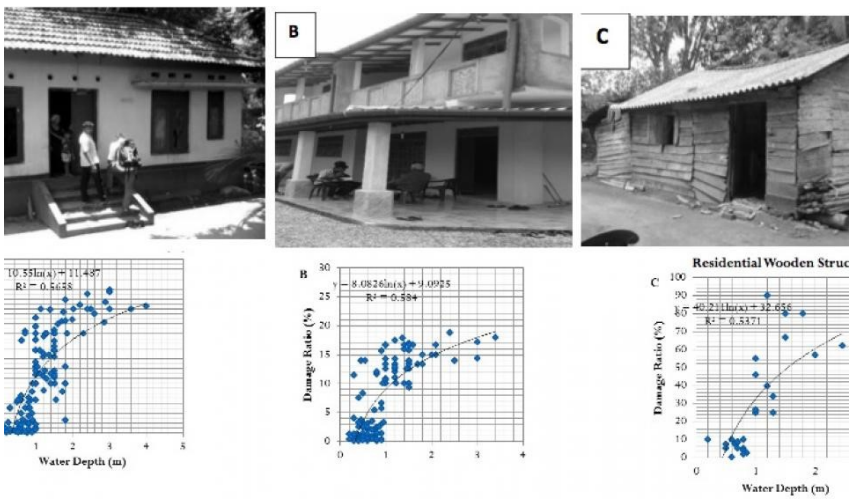
The center carries out numerical weather forecasts for Sri Lanka focussing on the Western Reigion using the WRF model. The final domain resolution is 3km and the forecasts are carried out automatically. This is a work in progress and at present we are comparing the forecasts with real time satellite rain observations to select the best fit parameterisation for the current weather sytem. The bias correction of this forecasts will be carried out with the gauge observations once become available.

## WATER LEVEL FORECASTS

Hydrological and hydrodynamic modelling of whole Kelani Basin and the Metro Colombo canal system is carried out using the numerical models using rainfall forecasts for next two days. Water levels in the canal system at any point can be extracted from this simulation and the key location water level plots are made automatically for dissemination.

## RISK MANAGEMENT

The impact of urbanization on urban water as well as impacts of floods on population and properties are modeled. Pre-disaster loss estimations based on vulnerability functions for different building categories are carried out to clarify flood control investment needed. Various urban water management strategies including improving conveyance as well as retention, including green infrastructure are studied.




Risk assessment interface

Risk reduction efforts are discussed in three focused areas.

Developing hazard and economic risk profiles that will be useful in estimating annual expected losses and justifying investments for mitigation efforts.

Developing risk based response and relief measures with early warning that will minimize losses.

Developing and assessment of a portfolio of distributed and centralised measures that will support integrated water management promoting risk reduction and enhancing amenity.

## MONITORING AND CONTROL

A dense network of rain gauges and water level sensors are planned to be installed in the basin. A scads control system will be employed to control 3 pumping stations and 3 gate structures. In addition future developments in retention storage units will also be monitored and control through the center.

## Institutional Capacity Development Activities and Job/ Internship Opportunities:

We have internship opportunities for 15 students for 3 months twice a year.

We can provide office space, computing facilities, and access to data real world data and project problems as well as research problems to Visiting professors. Their travel and living expenses need to be arranged by themselves.

For opportunities please check

http://www.curwsl.org/careers

Most of the information is available in the website

http://www.curwsl.org

However, there are many access levels according to the user permissions granted by the center.

# National Building Research Organisation (NBRO) Sri Lanka

99/1, Jawatta Road, Colombo 05

Tel: +94 112 588 946

Fax: +94 112 502 611

Website: http://www.nbro.gov.lk/index.php?lang=en

National Building Research Organisation (NBRO) the premier research & development institute established in 1984 has now grown into a successful research & development institution and a technical service provider where experts from multiple disciplines have teamed up and dedicated their services to create a disaster-free built environment for the nation. With the expansion of housing construction activities, particularly in the rural sector, the need for research and development into materials and technology locally available was felt. In order to provide this service centrally, the National Building Research Organisation (NBRO) was established under the Ministry of Local Government, Housing and Construction in March 1984 by the merger of former Building Research Institute (BRI) of the State Engineering Corporation and the Soil testing Laboratory of the Department of Buildings. The activities of the NBRO expanded considerably and covered further the areas of Human Settlements Planning, Environmental Management, Structural Engineering and Project Management. Research and Development work on disaster mitigation related to landslides was also planned and carried out from 1988 onwards. Thus research and development activities of the total shelter sector were undertaken by the NBRO. In 2007, the NBRO was brought under the Ministry of Disaster Management and Human Rights by a Cabinet decision, after considering the importance of insitutional involvement in disaster management in the country. NBRO is under the purview of Ministry of Public Administration and Disaster Management at present, and as the national focal point for landslide risk reduction in Sri Lanka, NBRO carries out the important duties of landslide identification, mapping, monitoring, early warning and mitigation.

Technical divisions of NBRO namely, Building Materials Research and Testing Division, Environmental Studies and Services Division, Geotechnical Engineering Division, Human Settlement Planning and Training Division, Landslide Research and Risk Management Division and the Project Management Division carries out research and development in their fields of expertise and provide technical consultancy and testing services to clients coming from the state sector, local & foreign private companies and institutions and the general public. NBRO services are highly recognized for their high quality and timely delivery. The three laboratories of NBRO testing building materials, environmental quality and geotechnical properties of soil are accredited with ISO 17025.

NBRO often collaborates with local and foreign universities and institutions to carry out information exchange programmes and joint research, as a consequence of which, NBRO has a strong network of academic collaborators. Presently, NBRO is a member of Global Alliance of Disaster Research Institutions. NBRO is “Member of the International Landslide Forum Board of Representatives” and a recipient of their coveted award “World Center of Excellence on Landslide Disaster Reduction 2017-2020” at the Forth World Landslide Forum in Ljubljana, Slovenia in 2017.

## Research Focus

1. **Determination of regional and local rainfall thresholds for landslides in Sri Lanka** - This study was carried out to investigate the relationship between occurred date/time of landslides and antecedent rainfall characteristics. Landslides in some districts logically are connected with a shorter time period of rainfall, whereas some others are not. To determine the effective antecedent rainfall threshold values, 1-day, 2-day, 3-day, 5-day, 10-day,15-day and 20-day cumulative rainfall were considered. In certain circumstances, the crucial soil moisture to trigger a landslide in central highland districts is related to more than 15-20 days antecedent rainfall (lower intensities over long time period) and in South-Western districts the crucial soil moisture to trigger a landslide is related to less than 3-5 days antecedent rainfall (high intensities over long time period). Studies proved that not only the daily rainfall affects for the initiation of a landslide but also, the antecedent rainfalls are a necessity. As a result of these different features in different scale, more research is needed to investigate the relation between rainfall and other physical characteristics to trigger a landslide event.

Dr. Asiri Karunawardena

E-mail: asiri13@hotmail.com

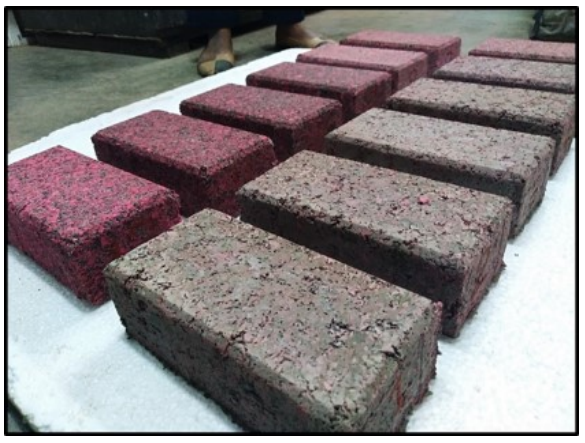
2. **Development of geotechnical guidelines for high-rise buildings** – Recent increase in the construction of high-rise buildings and large building complexes in urban areas are often found to be affecting stability of adjacent buildings and sometimes, damaging them. As poor designs and construction practices during excavation and subsurface construction contribute vastly, it is necessary to develop mechanisms guide design and construction personnel to follow proper and systematic work procedures. This research will probe into pros and cons in present design and construction work and prescribe correct procedures to follow and it has been proposed that using such developed procedures and guidelines be made mandatory in future.

3. **Design a Transitional shelter for disaster affected communities** – The frequency of landslide and flood occurrence has increased significantly in the recent past as a result of which the need for transitional shelters to shelter disaster affected persons has also risen. Tents are used for this purpose at present but contemporarily, improved transitional shelters are a necessity. This research will lead to the development of transitional shelters that can be transported to selected sites quickly and erected and at the same time, stored in compact stores when not in use. Benefit of such development is that prefabricated shelters can be made and kept in store beforehand and deployed quickly after emergencies and further, this can prevent using schools as transitional shelters.

4. **Analyze the effect of meteorological, environmental and anthropogenic factors attributed to drought severity and sector-based water stress in Anuradhapura District** –Drought and water stress occur as a consequence of rainfall deficiency and projections for Si Lanka are severe. The study focuses onto the effect of rainfall variability on drought related water stress in a particular area in the dry zone for a period of 9 years from 2008 onwards. The results show a strong rainfall variability seasonally. There is no variability in the annual rainfall, but a large fraction of rainfall has been delivered by extreme rainfalls. An increasing trend of extreme rainfall events was apparent during this period.

5. **Preparation of Technical Guidelines for Building Demolition work in Sri Lanka** –Increasing number of buildings are being demolished especially in urban areas for various reasons like creating land space for gardens or constructing newer and larger buildings, or because of being unfit for occupancy or lack of structural integrity. In the absence of controlling mechanisms or procedures such demolitions take place in an ad hoc and unsafe manner. With the need for preparing and introducing a suitable guideline being felt, this project was launched as a research first to study the current demolition procedures and identify strengths and weaknesses, and then to compile and introduce a suitable guideline for demolition work.

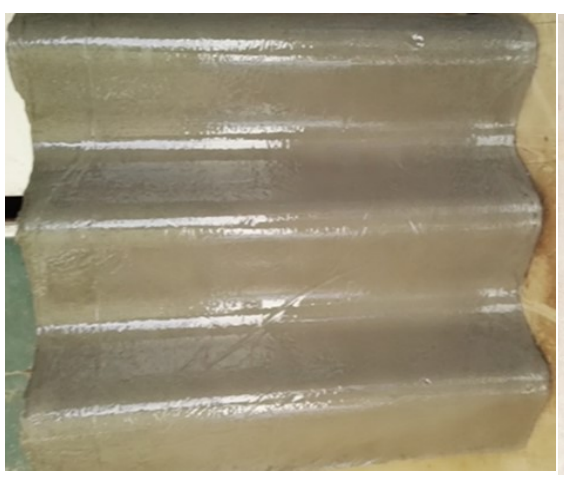
6. **Development of cost-effective green masonry products using textile waste** – The apparel industry generates vast quantities of fabric offcuts as waste resulting in a waste disposal problem and of these, disposal of offcuts of rubber-mixed fabrics like polyester spandex is found to be a difficult issue. This research is expected to develop polyester spandex embedded masonry products that can be produced with desired



strength and other properties and used in construction work. Accordingly, paving blocks were developed incorporating shredded form of polyester spandex, which shows superior energy absorption capability.

7. **Development of guideline for selection of materials and products for construction industry** – Presently a large number of different construction materials and products are available in the market and construction persons are often unaware of their properties, how to design with such materials and how to correctly use them in construction work. This research will develop a guideline giving such information, as a valuable future reference.

8. **Development of alternative fibers to asbestos fibers for roofing materials** – This research project is expected to develop roofing materials using natural fibers as viable alternative to asbestos fibers. Many different natural fibers have been tested and roofing sheets samples have been fabricated and tested.



## Latest Publications

- Symposium Proceedings of 9th Annual NBRO Symposium – Innovations for Build Back Better 18th & 19th December 2018, Colombo
- Drone Survey and Damage Assessment Report on Norwood Landslide in Hatton, Nuwara Eliya, Sri Lanka
- Symposium Proceedings of 8th Annual NBRO Symposium 2017 – Investing in Disaster Risk Reduction for Resilience 24th 25th January 2018, Colombo
- Proceedings - Recognizing Climate Change Risk of Dry Zone Farmers Symposium 2017, 10th August 2017, Colombo
- Implementation Framework for the Resettlement of Landslide and Flood Victims
- Hazard Resilient Housing Construction Manual

## Institutional Capacity Development Activities

- Mason Training Programme – 15 (Resilient Construction)
- Technical Officer Training programmes – 10 (Resilient Construction)
- University vocational training programmes – 05 (Laboratory testing, Resilient Construction)
- Grama Niladhari (Village Officer) Training programmes – 25 (Disaster Risk Identification)

## Other useful information and contacts:

- Mr. Kenichi HANDA, Senior Officer for Engineering Management, Development Construction Department, Okinawa General Bureau, Cabinet Office Government of Japan – formerly Team Leader of Technical Cooperation Landslide Mitigation Programme (TCLMP) Joint cooperation programme between Japan and Sri Lanka
- Mr. Ryuichi HARA, Executive Engineer, Administration Division, Earth System Science (ESS, TEL +81-3-3357-1761

  FAX +81-3-3357-1762, E-mail:hara-ryuichi@ess-jpn.co.jp）
- Dr. Yasuo ISHII: Landslide Research Team Leader, Erosion and Sediment Control Research Group, Tsukuba Central Research Institute, Public Works Research Institute
- Mr. Masaru KUNITOMO: Director, Sabo Risk-Management Division, Sabo Department, National Institute for Land and Infrastructure Management
- Mr. Koichi ISHIO: Deputy Director, Sabo Planning Division, Sabo Department, Ministry of Land, Infrastructure, Transport and Tourism
- Dr. Taro UCHIDA: Senior Researcher, SABO Department, National Institute for Land and Infrastructure Management
- Mr. Yoichi WASHIO: Chief, Sabo Division, Civil Engineering Department, Niigata Prefectural government office
- Mr. Naoki MATSUMOTO: Researcher, SABO Department, National Institute for Land and Infrastructure Management
- Mr. Kiyotaka SUZUKI: Researcher, SABO Department, National Institute for Land and Infrastructure Management
- Mr. Atsushi OKAMOTO: Director of Sabo Department, National Institute for Land and Infrastructure Management,
- Mr. Masaki TAGO: Chief Official of Sabo Information Policy Planning, Earthquake and Volcanic Disaster Management Office, Sabo Planning Division, Sabo Department, Ministry of Land, Infrastructure, Transport and Tourism
- Prof. Kyoji SASSA, Executive Director of International Consortium of Landslides
- Mr. Takayuki NAGAI, JICA Expert/Disaster Risk Reduction Advisor for Sri Lanka,
- Mr. Toru KOBAYAKAWA, Senior Representative, Japan International Cooperation Agency, Sri Lanka Office, Kobayakawa.Toru@jica.go.jp
- Hiroki HASHIMOTO, Representative, Japan International Cooperation Agency, Sri Lanka Office, Hashimoto.Horoki@jica.go.jp
- Mr. Hiroyuki SAKAMOTO, Deputy Director, Earth System Science Consultants and Engineers, sakamoto-hiroyuki@ess-jpn.co.jp
- Mr. Mitsuya OKAMURA, Geotechnical Engineer, Nittoc Corporation

# National Center for Research on Earthquake Engineering (NCREE)

# Chinese Taipei

200 Section 3 Xinhai Rd., Daan District,
Taipei City 10668, Chinese Taipei

Tel: +886-2-6630-0888

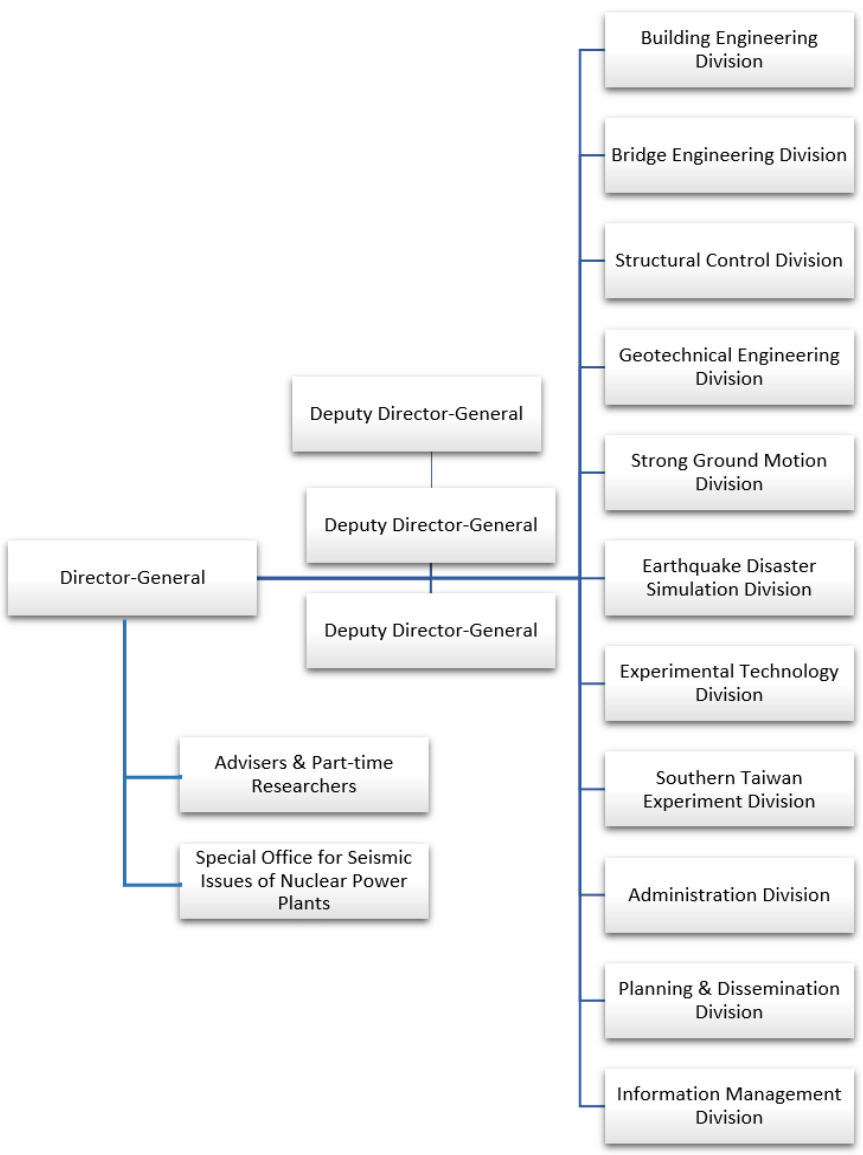
Fax: +886-2-6630-0858

Website: https://www.ncree.org/

Taipei Lab

The National Center for Research on Earthquake Engineering (NCREE) was officially established in 1990 through a joint effort of the National Science Council (NSC; now the Ministry of Science and Technology, MOST) and the National Taiwan University (NTU). In order to enhance the efficiency and performance of the national research laboratories, which belong to NSC, the National Applied Research Laboratories (NARLabs) was established in June, 2003. Since then, NCREE has become a non-profit organization and is one of the ten laboratory members of NARLabs.

In accordance with the national requirements for pre-earthquake preparedness, emergency response, and post-earthquake recovery, NCREE has put together academic resources and researchers to carry out joint projects to upgrade seismic technologies and to reduce life and property losses resulting from earthquakes. On top of that, NCREE also encourages international collaborations in selected fields to initiate consolidation and innovation in academic research and engineering practice. In doing so, NCREE could promote Taiwan's academic reputation in the related filed around the globe. It is hoped that NCREE will become a prestigious and respected international earthquake engineering research center through its modern large-scale experimental facilities, newly developed experimental technologies and up-to-date earthquake database.




The management group of NCREE consists of one Director-General, three Deputy Directors-General and eleven division Directors. The administrative missions and research projects are supervised by the management group. The eleven divisions are:

- Building Engineering Division
- Bridge Engineering Division
- Structural Control Division
- Geotechnical Engineering Division
- Strong Ground Motion Division
- Earthquake Disaster Simulation Division
- Experimental Technology Division
- Southern Taiwan Experiment Division
- Administration Division
- Planning & Dissemination Division
- Information Management Division

As of 31 February 2018, NCREE has 209 full time faculty members. The details are shown in the following table.

| Ph.D. | Master | Others | Total |
|---|---|---|---|
| 71 | 99 | 39 | 209 |

| Researcher | Technologist | Manager | Total |
|---|---|---|---|
| 132 | 56 | 17 | 209 |

## Research Focus

The scope of research, collaboration, and outreach are as follows:

- Providing the seismic engineering laboratory and related database to support earthquake engineering researches.
- Constructing the platform for research on seismic risks to provide information for planning and response of seismic disaster prevention.
- Promoting the technology of seismic design, evaluation and retrofit as a pioneer of earthquake engineering research to boost the technology.
- Innovating and distributing the seismic technology as a bridge between industry and academy of earthquake engineering.

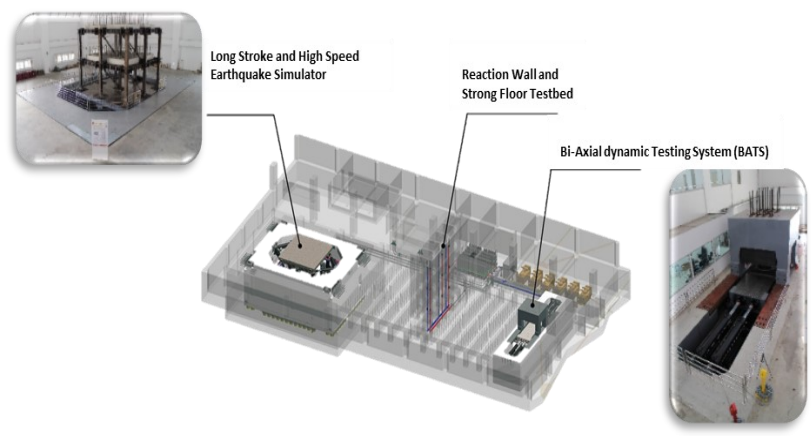
The major experimental facilities at NCREE Taipei Laboratory are shown below:

3D earthquake simulator (5mx5m)

L-shape reaction wall and strong floor


Multi-Axial Testing System (MATS )

NCREE started to construct a high-speed long-stroke shaking table system in the new laboratory, which is located at the Gueiren campus of National Chen-Kung University, Tainan, in 2014. The specifications of the shaking table system are summarized in the table below. The horizontal one-side maximum displacement of the shaking table is almost 2 meters if the shaking table moves to the other side at the beginning of a test, with a maximum velocity 2 meters per second and a maximum payload of 100 metric tons. The new shaking table system and the new laboratory started to operate in August 2017. Special conferences to demonstrate the capability of the new shaking table system and to cooperate with international specialists about the research on novel near-fault seismic technologies will be hosted by NCREE.




NCREE Tainan Lab Interior Layout

### Building Research Group

The building research group is a nonprofit technical society consisting of engineers, architects, planners, geoscientists, and public officials. The members of this group include researchers, practicing professionals, educators, government officials, and building code regulators. The objectives of the building research group are to reduce earthquake damage and enhance earthquake-resilience of the cities by (1) advancing science and practice of earthquake engineering, (2) improving seismic assessment and design methodology, and structural and nonstructural performance of buildings, (3) enhancing the level of innovative earthquake-resistant technology and the competitiveness of building industry (4) developing and revising the seismic codes and provisions for buildings.

Focal Point: Division Director / Professor Chung-Che Chou (cechou@ntu.edu.tw)

Seismic provisions development and revisions

- Dr. Tsung-Jen Teng (tjteng@ncree.narl.org.tw)
- Dr. Yuan-Tao Weng (ytweng@ncreel.narl.org.tw)
- Mr. Shyh-bin Chiou (sbchiou@ncree.narl.org.tw)

Seismic assessment and retrofit methodology

- Dr. Yeong-Kae Yeh (ykyeh@ncree.narl.org.tw)
- Dr. Fu-Pei Hsiao (fphsiao@ncree.narl.org.tw)
- Dr. Tsung-Chih Chiou (tcchiou@ncree.narl.org.tw)

Seismic technology advances

- Prof. Chung-Che Chou (cechou@ntu.edu.tw)
- Dr. Ker-Chun Lin (kclin@ncree.narl.org.tw)
- Dr. Min-Lang Lin (mllin@ncree.narl.org.tw)

## Bridge Engineering Research Group

The major mission of bridge engineering division is to extend the lifespan of bridges, so the research subjects can be classified into two categories. The first is the development of bridge design, evaluation and retrofit technologies to enhance the seismic capacity of newly designed bridges with new technologies and design methods, and to improve the seismic performance of existing bridges. The second is the development of bridge health monitoring systems and technologies for disasters warning and reduction. The research topics for the first category includes the revisions of bridge design codes and structural analysis techniques, the development of innovative construction methods and structural systems, and the development of bridge evaluation and retrofit technologies. The second category consists of the development of integrated life-cycle based bridge management system and the smart sensor technologies for bridge monitoring and early warning.

Focal Point:

Division Director / Prof. Yu-Chi Sung (sungyc@ntut.edu.tw)

Precast Segmental Bridge Pier system constructed with Modular Methodology

Dr. Hung Hsiao-Hui (hhung@ncree.narl.org.tw)

Seismic technology for Near fault bridges

Dr. Hung Hsiao-Hui (hhung@ncree.narl.org.tw)

Dr. Chia-Chuan Hsu (chiachuan@ncree.narl.org.tw)

Composite Emergency Bridge for Disaster Rescue

Dr. Fang-Yao Yeh (fyyeh@ncree.narl.org.tw)

Revision of bridge related design codes, include seismic evaluation and retrofit code, and seismic design code

Dr. Hung Hsiao-Hui (hhung@ncree.narl.org.tw)

Development of Smart Nano Damper

Dr. Fang-Yao Yeh (fyyeh@ncree.narl.org.tw)

## Structural Control Research Group

The research field of the structural control research group is broad. Several areas of interest are: (a) The Earthquake Early Warning System (EEWS), which is realized by integration of technologies in measurement, identification, data transmission, storage and user-friendly interface. This warning system has been widely implemented especially in schools and government buildings. Over 2000 buildings have been equipped with the EEWS system in Taiwan; (b) Researches on seismic isolation and energy dissipation, the effectiveness of isolation and energy dissipation devices have been proven that the verification of commercial products or new devices are fully tested through the well-developed testing facilities, including the high performance damper testing system and Bi-Axial dynamic Testing System (BATS); (c) In view of the needs of immediate operation of essential buildings after strong earthquakes, the OFCs (operational and functional components in buildings) research team aims to organize research programs on seismic assessment and improvement strategies for vulnerable and influential OFCs; (d) Smart structures and materials not only involve the distributed actuators and sensors but also include response analysis and the integrated systems used to communicate; (e) Researches on development and applications of advanced experimental technology, which is aimed to provide a cost-effective approach to evaluating seismic response of large-scale structures with isolation and energy dissipating devices.

Focal Point:

Division Director / Professor Jenn-Shin Hwang (JSH@mail.ntust.edu.tw)

Earthquake Early Warning System (EEWS)

Dr. Pei-Yang Lin (pylin@ncree.narl.org.tw)

Seismic Isolation and Energy Dissipation Technologies

Prof. Shiang-Jung Wang (sjwang@ncree.narl.org.tw)

Operational and functional components in buildings (OFCs)

Dr. Juin-Fu Chai (frlin@ncree.narl.org.tw)

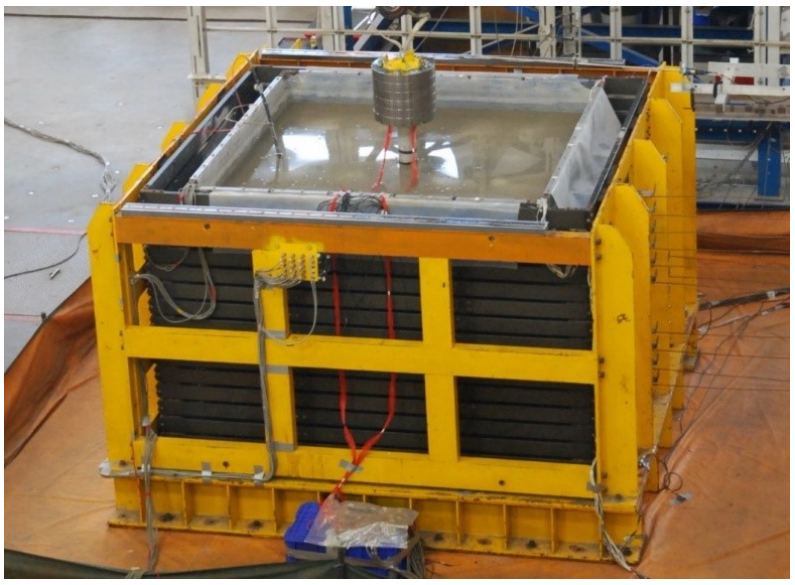
Smart Structures, Smart Materials, and Integrated Systems

Dr. Shieh-Kung Huang (sghuang@ncree.narl.org.tw )

Development and Applications of Advanced Experimental Technology

Dr. Pei-Ching Chen (peichingchen@mail.ntust.edu.tw )

## Geotechnical Research Group



In order to understand mechanical behaviors of soil at the actual field condition under seismic ground shaking, a large laminated shear box with flexible boundary was developed to be installed on the large shake table at NCREE. This large laminated shear box with inner dimensions of 1.88 m x 1.88 m x 1.5 m to contain the soil specimens. The flexible shear box is composed of 15 layers of square frames made of aluminum alloy. Each individual frame is allowed to move freely in 2 axes on the horizontal plane while the shear box is subjected to a 2-dimensional horizontal shaking induced by the large shake table at NCREE. With this experiment apparatus, studies on behavior of saturated sand, especially liquefaction, interaction between soil and pile foundation, seismic performance of shallow foundation, and the seismic behavior of waterfront structures and embankment are made possible. The geotechnical physical model tests and numerical simulations are intensively employed to study liquefaction and performance of geotechnical structures.

Focal Point: Division Director / Professor Jin-Hung Hwang (hwangjin@ncu.edu.tw)

Soil liquefaction and geotechnical model tests

- Dr. Chih-Chieh Lu (chchlu@ncree.narl.org.tw)
- Dr. Hsuan-Chih Yang (hcyang@ncree.narl.org.tw)

Pile foundation and numerical simulation

- Dr. Wei-Kuang Chang (wkchang@ncree.narl.org.tw)

Site response and Soil-Structure Interaction

- Dr. Shang-Yi Hsu (syhsu@ncree.nal.org.tw)

## Ground Motion Research Group

The island of Taiwan is the result of the ongoing orogeny induced by the complex arc-continent collision between the Philippine Sea plate and the Eurasian plate. This research group takes advantage of the high seismicity and dense deployment of strong-motion stations to research on the strong motion seismology to support the development of earthquake engineering in Taiwan.

The key issues are focused on seismic site effect, near-surface velocity structure, seismic classification, seismic waveform simulation, ground motion prediction, and probabilistic seismic hazard analysis. This group also conducts long-term and real-time earthquake and geochemical monitoring to collect valuable data. All researches contribute to the seismic design, design code, seismic scenario simulation, and risk assessment.

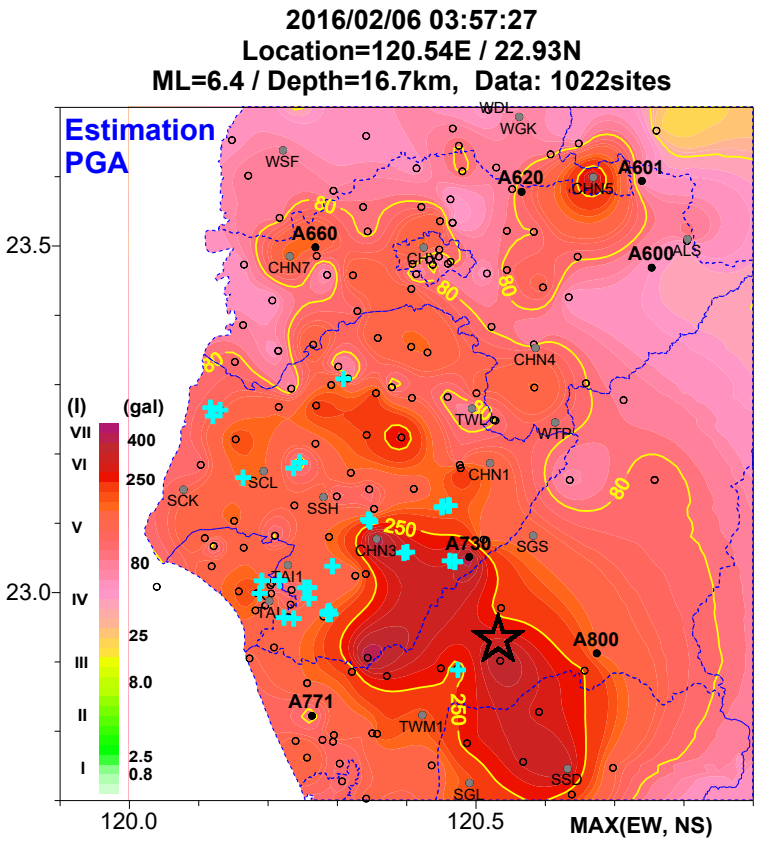
Focal Point: Division Director / Professor Kuo-Liang Wen (wenkl@cc.ncu.edu.tw)

Strong Motion Seismology

- Prof. Kuo-Lian Wen (wenkl@ncree.narl.org.tw)
- Dr. Che-Min Lin (cmlin@ ncree.narl.org.tw)

Seismic Hazard Analysis

- Dr. Wen-Yu Chien (wychien@ncree.narl.org.tw)
- Dr. Yu-Wen Chang (ywchang@ncree.narl.org.tw)
- Geochemistry
- Dr. Vivek Walia (walia@ncree.narl.org.tw)



**Earthquake Disaster Simulation Research Group**

The goal of this division is to serve the public and private sectors in Taiwan with the state-of-the-art simulation methodologies, nation-wide database, and comprehensive seismic scenario simulation tools for disaster preparedness and emergency response. The division provides customized services to government agencies, public utilities and private enterprises with optimized risk management strategies to reduce losses, casualties and social impacts caused by earthquakes. Accordingly, it works on developing capabilities to understand and quantify the risks and consequences caused by earthquakes. Currently, it focuses on the study of best strategies for retrofitting various existing infrastructures, and the seismic risk assessment of critical facilities, transportation and utility systems.

In order to mitigate seismic risk and catastrophic consequences, it is necessary to build adequate damage assessment and risk management strategies. NCREE has developed GIS-based software “Taiwan Earthquake Loss Estimation System (TELES)” for the estimation of ground shaking and failure, damages of buildings and civil infrastructures, casualties and injuries, direct and indirect socio-economic losses given any hypothetical earthquake scenario.

Focal Point: Division Director / Dr. Chin-Hsun Yeh (chyeh@ncree.narl.org.tw)

Seismic Loss estimation

- Dr. Chin-Hsun Yeh (chyeh@ncree.narl.org.tw)

Seismic performance analysis of water supply systems

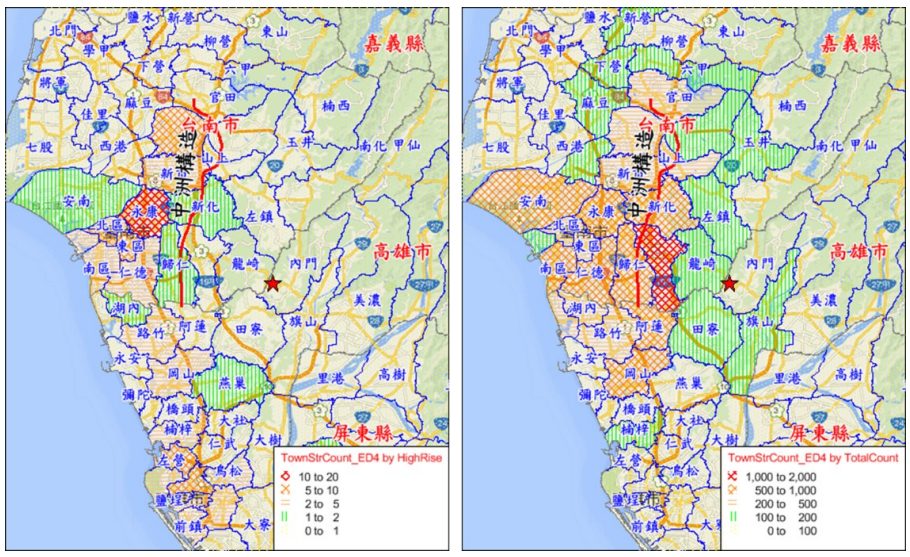
- Dr. Gee-Yu Liu (karl@ncree.narl.org.tw)

Seismic risk assessment of road networks

- Dr. Cheng-Tao Yang (ctyang@ncree.narl.org.tw)

Seismic risk assessment of hospitals

- Dr. Chi-Hao Lin (chihao@ncree.narl.org.tw)




Institutional Capacity Development Activities

**International Training Program for Seismic Design of Structures (ITP) -** https://conf.ncree.org.tw/indexEng.aspx?n=I10510170


In order to promote the seismic design technology to mitigate seismic risk of high-seismicity regions, such as in South-East Asia and Latin America, the Ministry of Science and Technology (MOST) of Taiwan has continuously sponsored the NCREE to host the International Training Program for Seismic Design of Structures (ITP). This training program is designed as a short-term workshop aimed at training government officials, researchers, and engineers from different countries. All the participants will learn about earthquake engineering research and practice in Taiwan.

The ITP has been held annually since 2002. Every year, a number of about 30 participants are supported to attend the ITP. In the program, a total of about 18 technical lectures are scheduled during one week. The topics of the lectures include:

- Earthquake Engineering and Seismic Hazard Analysis
- Seismic Design Force
- Seismic Design of Structures, Bridges, and Foundations
- Seismic Evaluation and Retrofitting
- Energy Dissipation and Isolation Systems
- Seismic Loss Estimation
- New Researches and Technologies of NCREE

**Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS) - https://www.ncree.org/ideers/2017/**

In order to promote earthquake engineering and seismic protection education and encourage students to participate in a creative scientific competition, a program entitled "Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS)" is held at the NCREE annually.

The goal of the contest is to design and construct, using specific materials and tools, the building models to be subjected to earthquake excitations. The earthquake excitations are produced by the triaxial shaking table at the NCREE laboratory.

The objective of this seismic-resisting contest is to grade the earthquake-resistant capacities of the tested models, encourage innovations in architectural design and structural design at the same time, highlight the effectiveness of materials used for build, and promote the development of seismic-resistant and earthquake-isolated schemes that can control the response of building structures subjected to strong dynamic loading such as earthquakes.

## Latest Publications

- **2018-02-06 Hualian Earthquake Information - https://www.ncree.org/EarthquakeInfo/20180206/HualianEqTW_V7.2.pdf**

- **Experimental Data Center**

  **https://www.ncree.org/expdb/**

- **Reports -**

  **https://www.ncree.org/Publications.aspx**

- **Newsletters -**

  **https://www.ncree.org/Newsletter/EN/index.html**


## Other Useful Information

**Job Opportunities - https://www.ncree.org/Ncree.aspx?id=14**

**National Center for Research on Earthquake Engineering, National Applied Research Laboratories**

**Address: 200 Section 3 Xinhai Rd., Taipei City 10668, Taiwan**

**Tel: 886-2-6630-0888**

**Fax: 886-2-6630-0858**

**Website: https://www.ncree.org/**

**National Applied Research Laboratories**

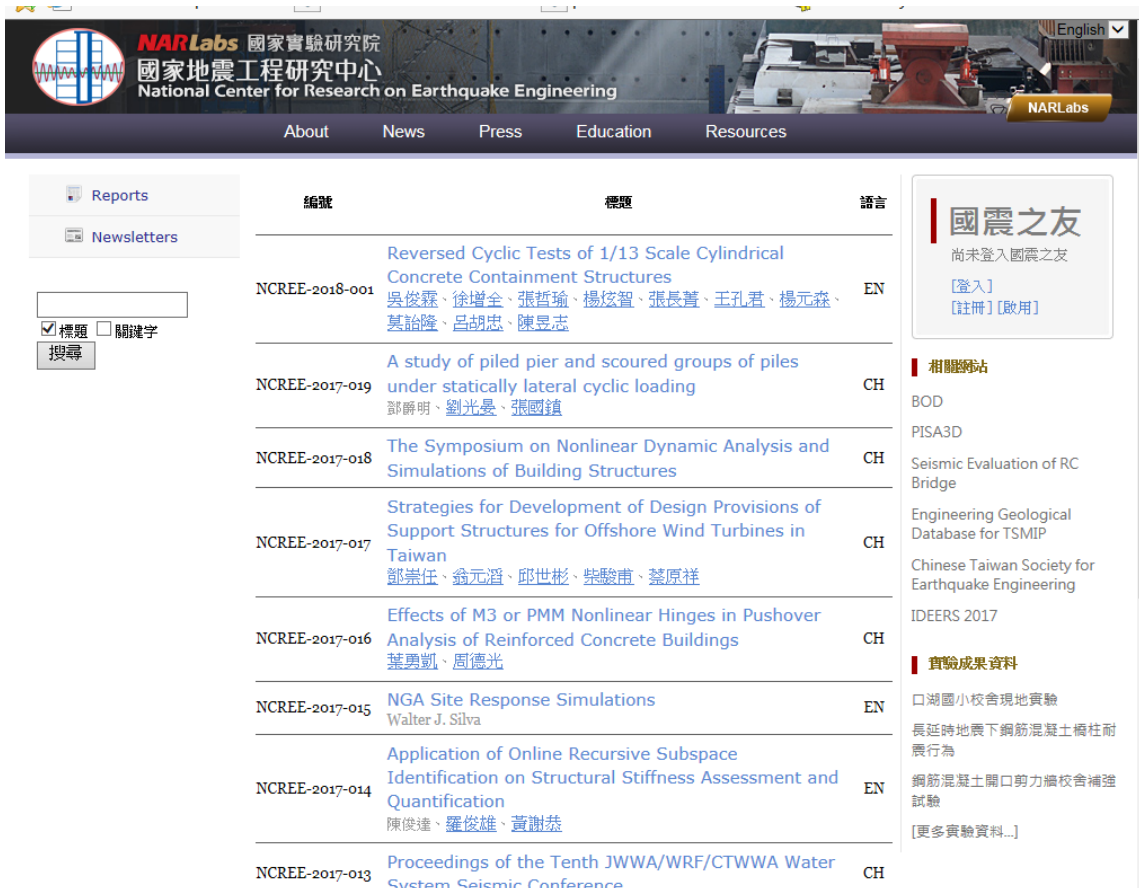
**Address: 3F. 106 Section 2 Heping E. Rd., Taipei City 10622, Taiwan**

**Tel: 886-2-2737-8000**

**Fax: 886-2-2737-8044**

**E-mail: service@narlabs.org.tw**

**Website: http://www.narlabs.org.tw/en**



# National Science and Technology Center for Disaster Reduction (NCDR), Chinese Taipei

9F., No.200, Sec. 3, Beisin Rd.,
Xindian District, New Taipei City
23143

Tel: +886-2-8195-8600

Fax: +866-2-8912-7766

Website: https://www.ncdr.nat.gov.tw/home.aspx?WebSiteID=873f5b27-b86d-4d5c-a356-c369768bffe9


Taiwan is located in a region with a high risk of natural disasters, which frequently cause considerable loss of life and damages to property. Therefore, the government has highly prioritized the development of applicable outputs of science and technology on disaster reduction and emergency preparedness to mitigate the adverse impacts caused by disasters.

Therefore, the frequent occurrences of natural disasters could often result in serious damages and loss of lives and properties. The whole society deeply concerns much toward disaster related impacts. The government and the private sector also actively engage in disaster reduction and emergency response. However, due to rapid economic developments and social changes, disaster risk management could fall behind the demanding situations. The government also realize urgency to formulate an effective framework of disaster risk management, increase investment in science and technology and carry out implementations though cross-cutting collaboration. Under supervision of the Ministry of Science and Technology, the National Science and Technology for Disaster Reduction (NCDR) has become an independent administrative institution in 2014.

The major missions of NCDR include:

- Promote and conduct activities related to applied research and developments on disaster risk management
- Apply outcomes of science and technology for disaster risk reduction and emergency preparedness
- Facilitate scientific knowledge and technological achievements for practical implementation to benefit the whole society.
- Build up international partnerships, exchanges experiences and conduct joint projects.
- Collaborate with domestic research institutes to engage stakeholders' contributions to reducing disaster risk and enhancing emergency preparedness.
- Provide other services related to matters of disaster management.

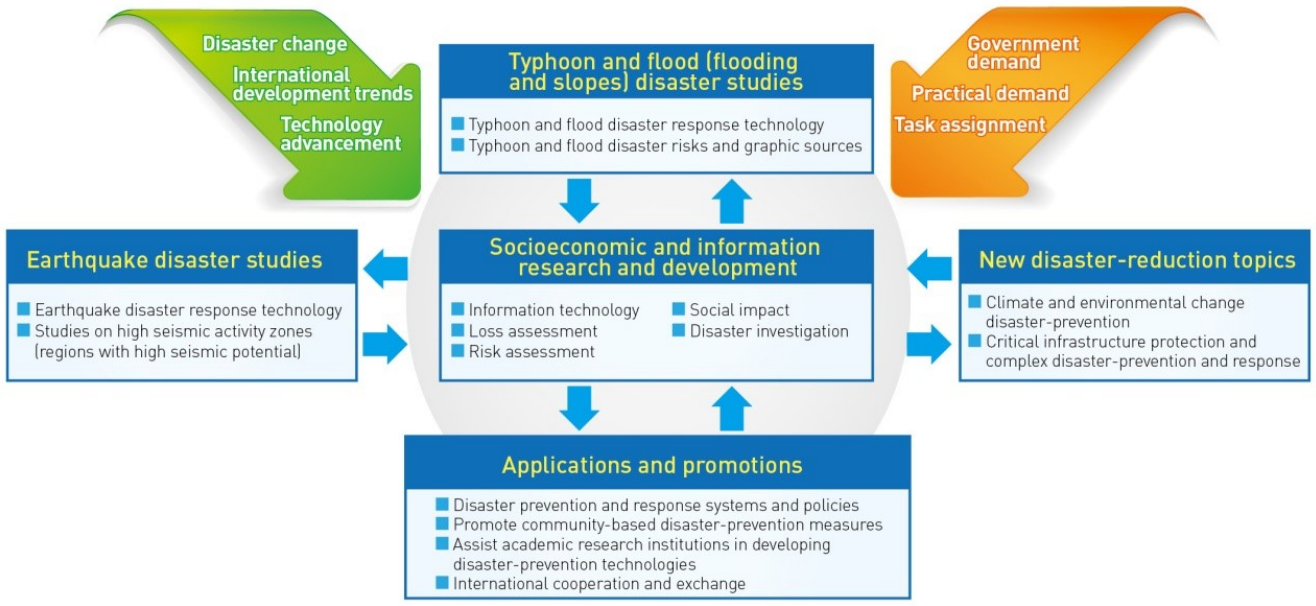
## Research Focus

The NCDR integrates interdisciplinary capacity, observes dynamic evolutions of natural disasters and pays attention to global trend of disaster risk reduction. NCDR seeks close collaborations with partners to synergize joint efforts on reducing adverse brought by natural disasters including typhoons, floods and earthquakes. Furthermore, to accommodate the changing world, climate change adaptation, compound-type disasters, social-economic issues, information-based decision support, administrative policy suggestions and international collaboration are the major task under daily operation.

These results can be implemented in formulating policies that enhance society's capacity to mitigate disasters. Additionally, through collaboration with domestic and international partners, NCDR has been endeavoring to identify potential demands of disaster reduction; enhance capacity building at different levels of governments; provide assistance during emergency; raise public awareness by promoting community-based disaster risk management; and provide help for education program on disaster risk reduction. The progressive outcomes gradually improve the social disaster resilience with participation by all actors and stakeholders.

Dr. Wei-Sen Li

E-mail: li.weisen@ncdr.nat.gov.tw




## Research Units

METEOROLOGY DIVISION

Meteorology Division collects and analyzes meteorological data of disaster events, extreme weather and climate. The division also focuses on root-cause studies causes of meteorology-related disasters and develops models and methods supporting early warning system.

SLOPELAND AND HYDROLOGY DIVISION

Slopeland and Hydrology Division concentrates efforts on geo-hazards and floods, major tasks include post-disaster investigations, disaster database, environmental vulnerability analysis, numerical models and disaster impact assessment. The division routinely maintains all-hazard potential maps based inputs from other agencies.

POLICY AND SOCIO-ECONOMICS DIVISION

Policy and Socio-Economics Division studies system and policy of disaster management, and socio-economic vulnerability by setting up database. To offer suggestions to management system, the division actively joins the annul surveys on all local governments. To conduct social, economic and psychological surveys is also focal topics.

EARTHQUAKE AND MAN-MADE DISASTERS DIVISION

Earthquakes and Man-Made Division has focuses on seismic impacts by developing a information system to support scenario-based drill and emergency operation. About research related to man-made disaster, the division works on business continuity planning and disaster impact assessment for critical infrastructures.

INFORMATION DIVISION

Information Division's primary researches topics include disaster reduction information decision support system, maintenance and applications of big data, and approaches to push disaster alerts to end users. The division also integrates research outputs from other divisions of NCDR and delivers outcomes on information platform.

CLIMATE CHANGE DIVISION (TASKFORCE)

Climate Change Division gathers researchers with diverse backgrounds of meteorology, hydrology, geology, socio-economics and environmental policies. The key missions are to assess climate change risk and impact through conducting climate change adaptation researches. This division develops key tools to project future climate change scenarios,

Latest Publications

- Disaster Environment Investigation and Disaster Experience Learning Network
- The Assessment and Adaptation Strategies for Extreme Climate-Related Disaster Risks
- Large-Scale Earthquake (Fault) Impact Analysis, Scenario Elaboration, and Protection Mechanism
- Developing a Method of Local Capability Assessment

Institutional Capacity Development Activities

2019-04-30 2019 International Training Workshop (1) Decision support system and Big data (3 days)

2019-06-25 International Training Workshop (2) Applications of social media and instant messenger for risk communication (3 days)


## Jobs and Internship Opportunities

Currently, NCDR accepts self-funded internship application. During period of internship, NCDR will provide space, office utilities and necessary assistance. Applicant could sent a letter of intention to NCDR contact window.

| | |
|---|---|
| **National Science and Technology Center for Disaster Reduction** | **http://ncdr.nat.gov.tw/** |
| **Disaster Information System** | **http: //eocdss.ncdr.nat.gov.tw/** |
| **NCDR Alerts Platform** | **https://alerts.ncdr.nat.gov.tw/** |
| **Weather and Climate Monitoring, “Watch”** | **http: //watch.ncdr.nat.gov.tw/** |
| **Disaster Potential Map** | **http://satis.ncdr.nat.gov.tw/ Dmap/** |
| **Taiwan Climate Change Projection and Information Platform Project** | **http://tccip.ncdr.nat.gov.tw/** |

# Disaster Preparedness, Mitigation and Management (DPMM), Asian Institute of Technology (AIT), Thailand

P.O. Box 4
58 Moo 9, Km. 42, Paholyothin Highway,
Klong Luang, Pathum Thani 12120
Tel: +66 (2) 524-6430
Website: http://dpmm.ait.ac.th/wp/


The Asian Institute of Technology promotes technological change and sustainable development in the Asian-Pacific region through higher education, research and outreach. Established in Bangkok in 1959, AIT has become a leading regional postgraduate institution and is actively working with public and private sector partners throughout the region and with some of the top universities in the world. AIT's Mission is: To develop highly qualified and committed professionals who play leading roles in the region's sustainable development and its integration into the global economy.

Disaster Preparedness, Mitigation and Management (DPMM) at Asian Institute of Technology (AIT) uses interdisciplinary capacities (engineering, medicine, natural and social science, as well as management) to manage and minimize the effects of disasters in people on the front lines of disaster response and preparedness. It provides professional education and short term training for the capacity building of the Asia-Pacific as well as neighboring regions. AIT's contribution towards disaster research is multi-faceted, starting from Disaster Education, Capacity development, Training, engineering and social solution for disaster risk reduction.

## Research Focus

DPMM research is focused on the broad aspects of disaster risk reduction mechanism as soft solution. The interdisciplinary academic program, Disaster Preparedness, Mitigation and Management (DPMM) at Asian Institute of Technology (AIT) working on the regional capacity development on Higher education in DRR, Social vulnerability assessment, Risk characterization, Evidenced based approach for social risk indexing, Risk Perception at Multi-stakeholder level, Risk governance, Resilience indexing, Flood risk and impacts assessment, public health risk assessment considering occupational hazards, impacts of extreme weather events in livelihoods, Conflicts IDPs and its impact on public health etc.

Presently working on GCRF project “Living Deltas” with UK Research Innovation fund support for risk characterization in deltas for three countries (Bangladesh, Indian, Vietnam).

Core Research Area

- Emergency Response and Preparedness
- Vulnerability and Risk Assessment
- Coping and Adaptation
- Disaster Risk Reduction and Management
- Institutional and Community Capacity Building
- Mitigation of Flood, Drought, Cyclone, Earthquake Disasters
- Tsunami and Coastal Engineering
- Remote Sensing and GIS Technology for Disaster Mitigation
- Human Conflicts and Humanitarian Emergency Management
- Governance and Participatory DRM
- Social Capital and DRM

Dr. Indrajit Pal
E-mail: indrajit-pal@ait.asia

## Latest Publications

- "Natural Hazards Management in Asia" (2017), SAGE Publications, Authored by: **Dr. Indrajit Pal** and Dr. Tuhin Ghosh (ISBN: 978-938-66-0218-3).
- "Disaster Risk Governance in India and Cross Cutting Issues" (2017), Edited by **Dr. Indrajit Pal** and Prof. Rajib Shaw, Springer, Singapore. ISBN 978-981-10-3309-4 ISBN 978-981-10-3310-0 (eBook) DOI 10.1007/978-981-10-3310-0.
- Book Chapter "Risk Assessment and Reduction Measures in Landslide and Flash Flood Prone Areas: A Case of Southern Thailand (Nakhon Si Thammarat Province)", **Pal, I.**, Tularug, P., Jana, S. K., and Paul, D. K., in "Integrating Disaster Science and Management" to be edited by Pijush Samui, Dookie Kim, and Chandan Ghosh, **Elsevier 2018 (**ISBN: 978 -0-128-12056-9).
- Book Chapter "Disaster Governance and Its Relevance", **Pal, I** and Shaw, R, in "Disaster Risk Governance in India and Cross Cutting Issues" (2017), Edited by Dr. Indrajit Pal and Prof. Rajib Shaw, **Springer**, 2017. ISBN 978-981-10-3309-4 ISBN 978-981-10-3310-0 (eBook) DOI 10.1007/978 -981-10-3310-0.
- Book Chapter: "Disaster Risk Governance and Response Management for Flood: A Case Study of Assam, India", **Pal, I** and Singh, S., in "Disaster Risk Governance in India and Cross Cutting Issues" (2017), Edited by Dr. Indrajit Pal and Prof. Rajib Shaw, **Springer, 2017**. ISBN 978-981-10-3309-4 ISBN 978-981-10-3310-0 (eBook) DOI 10.1007/978 -981-10-3310-0.
- Book Chapter: "Risk Governance Measures and Actions in Sundarbans Delta (India): A Holistic Analysis of Post-disaster Situations of Cyclone Aila", **Pal, I** and Ghosh, T., in "Disaster Risk Governance in India and Cross Cutting Issues" (2017), Edited by Dr. Indrajit Pal and Prof. Rajib Shaw, **Springer, 2017.** ISBN 978-981-10-3309-4 ISBN 978-981-10-3310-0 (eBook) DOI 10.1007/978-981-10-3310-0.
- Book Chapter: "National-Level Disaster Risk Governance for Rapid Response", **Pal, I** and Tarun, N. K., in "Disaster Risk Governance in India and Cross Cutting Issues" (2017), Edited by Dr. Indrajit Pal and Prof. Rajib Shaw, **Springer, 2017.** ISBN 978-981-10-3309-4 ISBN 978-981-10-3310-0 (eBook) DOI 10.1007/978-981-10-3310-0.
- Book Chapter "Disaster Risk Governance and City resilience in Asia-Pacific region", **Pal, I** and Bhatia, S., in "Science and Technology in Disaster Risk Reduction: Potentials and Challenges", edited by Rajib Shaw, Takako Izumi, and Koichi Shiwaku, (2016), **Elsevier 2017** (ISBN: 978-0-12-812711-7).
- Book Chapter "Land use and land cover change analysis in Uttarakhand Himalaya and its impact on environmental risks" in the Book "Mountain Hazards and Disaster Risk Reduction" **Indrajit Pa**l, edited by Rajib Shaw and Hari Krishna Nibanupudi, **Springer Japan,** pp 125-137, 2015 (ISBN: 978-4-431-55241-3).
- Thanvisitthpon, N., Shrestha, S., and **Pal, I,** (2018), "Urban flooding and Climate Change: A case study of Bangkok, Thailand", Environment and Urbanization ASIA, SAGE Publications, 9(1) 1-15. DOI: 10.1177/0975425317748532 [ISSN: 0975-4253]
- Ghosh, C and **Pal, I.,** (2017), "Enviro-geotechnical concern for Dam Safety posed by Uttarakhand Flash Flood-2013", Geotechnical Engineering, Journal of the SEAGS (Southeast Asian Geotechnical Society) & AGSSEA (Association of Geotechnical Societies in South East Asia, (ISSN: 0046-5828), Vol. 48 No. 1 March 2017. [Impact Factor: 0.92]
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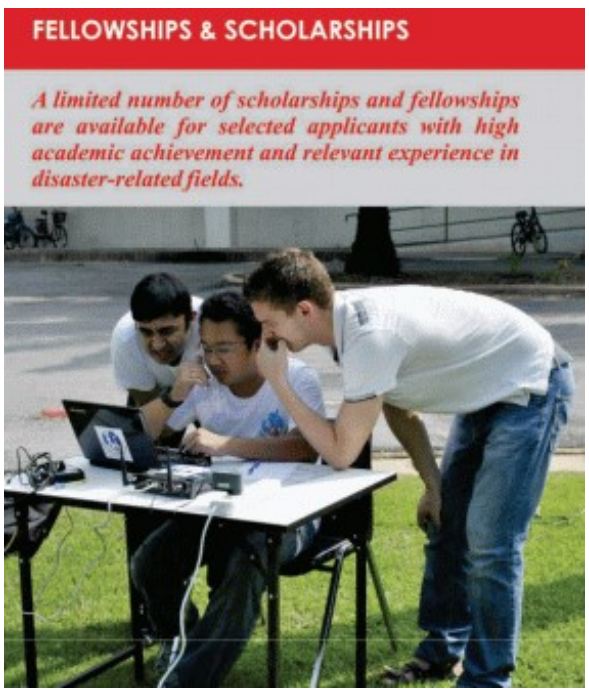



DPMM Brochure—http://dpmm.ait.ac.th/wp/wp-content/uploads/2015/01/DPMM-Brochure-2015.pdf

- **Pal, I.,** Ghosh, T., and Ghosh, C, (2017), "Institutional Framework and Administrative Systems for effective Disaster Risk Governance - perspectives of 2013 Cyclone Phailin in INDIA", International Journal of Disaster Risk Reduction, Vol. 21, (2017) 350–359. [Impact Factor: 1.603]
- Sekac, T., Jana, S. K., **Pal, I.**, and Pal, D.K., (2017), "Earthquake Risk Assessment in Momase Region of Papua New Guinea using GIS", in "International Expert Forum on Mainstreaming Resilience and Disaster Risk Reduction in Education", December 1 - 2, 2017, Asian Institute of Technology, THAILAND.
- Nghia, B. P.Q., and **Pal, I.,** (2017), "Applying Integrated Coastal Management Process To Enhance Resilience and Disaster Risk Governance In Hoi An City, Vietnam", "International Expert Forum on Mainstreaming Resilience and Disaster Risk Reduction in Education", December 1 - 2, 2017, Asian Institute of Technology, THAILAND.
- Sarkar, R., and **Pal, I.,** (2017), "Risk identification, Assessment and Management of a Building Information Modelling (BIM) implemented project", "International Expert Forum on Mainstreaming Resilience and Disaster Risk Reduction in Education", December 1 - 2, 2017, Asian Institute of Technology, THAILAND.
- **Pal, I.,** (2017), Policies and Institutional Framework for Disaster Risk Governance – a case of 2015 Myanmar Floods in "13th Association of Pacific Rim Universities (APRU) Multi-Hazard Symposium 2017", 28 - 29 August 2017, Peking University, Beijing China.
- Nawhath, T and **Pal, I.**, (2017), "Land Use and Social Impact Assessment from Flooding in Heritage City, Ayutthaya", International Academic Conference on Social Sciences and Management, May 24-26, 2017 Bangkok, Thailand (Best Paper Award)
- Sharma, A and **Pal, I.**, (2017), "Challenges of reconstruction of Nepal's cultural heritages after 2015 Earthquake", 7th International Conference on Building Resilience, Using scientific knowledge to inform policy and practice in disaster risk reduction, 7-9 Nov, 2017, Bangkok Thailand.
- Sekac, T., Jana,S. K., **Pal. I.**, and Pal, D. K, (2017), "GIS and Remote Sensing Approach in Earthquake Hazard Assessment and Monitoring: A Case Study in the Momase Region of Papua New Guinea", 18th International Conference on Earthquake and Structural Engineering, London, United Kingdom, February 16-17, 2017.
- Saqib, S. E., Ahmad, M. M., **Pal, I.,** and Panezai, S, (2016), "Forward contract as means for managing agriculture risk: the case of Pakistan", Linkages and Cooperation in Agricultural Production and Marketing in the Context of International Economic Integration, 10 Sept, 2016, Vietnam.
- **Project Report:** "Critical Factors for Post-Disaster Educational Continuity in Urban Flood Impacts in South and Southeast Asia, 2018, Save the Children.

## Institutional Capacity Development Activities

There are various training course that we are offering at AIT, Thailand. (Min. no. of participants 12 to run the course) (Short term)

- Fundamentals of Disaster Risk Management
- Climate Risk Management & Community Livelihood
- Hydro-Meteorological Hazard, Risk Management
- Multi-Hazard Early Warning Systems & Disaster Communication
- GIS for Disaster Risk Management

## Jobs/ internship/ exchange opportunities

- DPMM, AIT is open for short and long term student exchange program
- Internship at AIT for students from other institutes are welcome.
- DPMM, AIT is also regularly engaging students for internship with UN organization, INGO and inter-governmental organizations.

# Vietnam National University (VNU)
# Vietnam

144- Xuân Thủy Street - Cầu Giấy - Hà Nội

Vietnam

Tel: + 84-(04) 37547670

Website: http://vnu.edu.vn/eng/

Throughout its over 100 years of development, being aware of responsibilities toward global issues, VNU has affirmed its position as Vietnam's top comprehensive multi-disciplinary academic and research center of excellence based on international standards. With modern comprehensive higher education management, VNU has been striving to establish itself as a leading institution in Vietnam and in the region based on the philosophy "Excellent through Knowledge" and by promoting six core values: high quality, creativity, innovation, integration, responsibility to society, and sustainable development. An important task of VNU is to provide the country with high quality human resources to meet the developmental needs of the society, thus making important contributions to the progress of Vietnam and within this region and the world. VNU has created an impressive cultural community, a harmonious academic environment in which lecturers, scientists and students are working together in an open and friendly manner.

## VNU STATISTICS

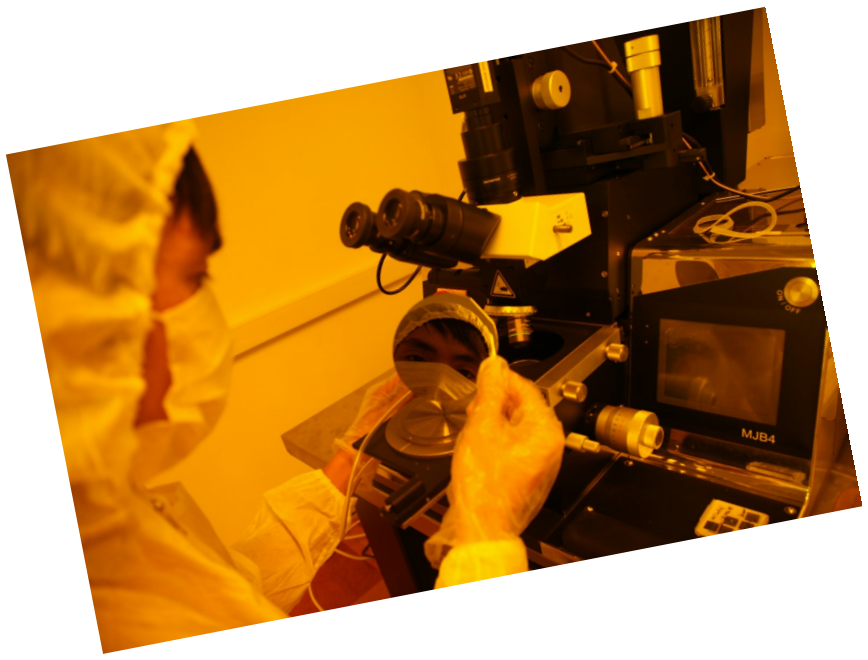
| Faculty | Students |
|---|---|
| Faculty: 2,253<br>Staff: 1,819<br>Professors: 72<br>Associate Professors: 326<br>Doctors of Science and PhDs: 1,178 | Undergraduate Students: 25,820<br>Master & PhD Students: 8,080<br>Gifted High School Students: 3,226<br>High School of Education Science<br>Students: 300<br>International Students: 1,163 |

Prof. Mai Trong Nhuan

E-mail: mnhuan@yahoo.com

## Research Focus

Vietnam National University, Hanoi is a center for high quality, multi-field, multi-disciplinary research which closely combines training with research and application, natural sciences and social sciences-humanities so as to create highly qualified human resources, nurture talents, implement focal research projects in basic science, high technology and key socio-economic fields, and provide scientific and technological advances for the development of the country.



VNU is the leader in science and technology in Vietnam. Believing that the lecturer is also the scientist, training is associated with research and vice versa, scientific and technological research activities in VNU not only involve researchers but also lecturers, undergraduate and graduate students in the six constituent universities, 5 institutes and several other centers. All these activities in VNU are related to the aim of producing high quality human resources, generating top scientific and technological products with high applicability to meet high social demands.

VNU research results are constantly highly appreciated by the society. Many products meet all the regional and international standards, and prove to be of great applicability not only in the nation but also of great importance for the world sciences. Especially, a number of research projects in Social Sciences and Humanities have followed the Resolution of the Fourth Conference of Party Central Committee of Session VIII "to ensure the scientific foundation for the development of strategic directions, policies, guidelines, plans and development planning of the Party and the Government". The University also serves as the focal informant to the Central Council for Political Theories, carries out many scientific and technological projects and contributed greatly to the cause of developing and protecting the nation such as "Scientific Justifications in History, Geography and Legislation of the Socialist Republic of Vietnam on two archipelagoes Hoang Sa and Truong Sa (the Paracels and the Spratlys)", "Formation and development process of the South region and southwestern border areas", etc.

VNU research covers vast and diverse areas, including natural sciences, social sciences and humanities, laws, economics as well as application of high technology, with the following strengths:

Fundamental sciences: mathematics, physics, chemistry, biology, earth – environment sciences;

Advanced technology: bio-technology, material science and technology, nano technology, life science, information technology, telecommunication and electronic technology, etc;

Social Sciences and Humanities: History, Linguistics, Area Studies, Foreign Languages, Psychology, Literature, Law, Economics, etc.

Environment protection and sustainable development.The multi-disciplinary knowledge and strengths of VNU have been used effectively in inter-disciplinary research such as medicine and pharmacy for health improvement; conservation of historical places and world heritages such as Phong Nha caves, Thăng Long Ancient Citadel, Hội An Town and Huế Ancient Capital, etc., which played an important role in securing UNESCO decisions on the recognition of these as World Natural and Cultural Heritages. VNU also makes important contributions to sustainable development, environment protection, disaster relief, and is a champion in research and development of climate change studies in Vietnam.

Many projects have won high awards, including 13 Hồ Chí Minh prizes and 21 National prizes. Several VNU scientists, individually or collectively, have been awarded with international prizes such as Kovalevskaya, Nobel Prize 2007, Cosmos 2008, Blue Planet prize 2003 – an annual environmental award by Asahi Glass (Japan) for two individuals or organizations with outstanding contributions in environment and natural resources.

Further details at: http://vnu.edu.vn/eng/?C2288

**Lê Thánh Tông Campus**

# Europe


# University of National and World Economy
# Science Research Centre for
# Disaster Risk Reduction (SRCDRR)
# Bulgaria

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Fax: +359 2 962 39 03
Website: http://srcdrr.unwe.bg/ http://www.unwe.bg/en/

The main objectives of the SRCDRR are to:

- Support scientific research and the development in the field of Information Technology application for disaster risk reduction;
- Develop new knowledge and skills to increase the potential in the field of Information Technology application for disaster risk reduction;
- Support the integration of science, training and corporate practice in the country together with the European and world achievements in the field of Information Technology application for disaster risk reduction;
- Create dynamic, project-based virtual research laboratories for conducting research related to the work of student colleges, PhD students and teams of young researchers, in the field of Information Technology application for disaster risk reduction;
- Help solve practical problems and to improve the qualification of practitioners in this field.
- Facilitate the transfer of knowledge and experience in the field of Information Technology application for disaster risk reduction to higher education institutions at national and international level.

## Research Focus:

The research focus of the SRCDRR are:

- Conducting scientific research with theoretical and applied character in the field of Information Technology application for disaster risk reduction;
- Development and participation in national and international projects in the field;
- Conducting scientific conferences and seminars;
- Organizing and conducting courses for experts and other persons in this field;
- Providing consultancy assistance;
- Exchange of related information with other higher schools and scientific organizations;

Prof. Dr. Dimiter Velev
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## Research Projects:

Currently SRCDRR manages three R&D projects:

**Information System for Integrated Risk Assessment from Natural Disasters**, Grant № DFNI-I02/15, 2014 - 2018, funded by the Bulgarian National Science Fund. In accordance with the national and European priorities for the security, the purpose of the project is to develop a general framework of information system for integrated risk assessment from natural disasters with the help of modern information and communication technologies with the following objectives:

- A systematic study of the problem area: determination of potential sources of risk (natural disasters, possible for Bulgarian territory) and analysis of the mutual influence between them.
- Examination and analysis of existing approaches, methods and models to assess the risk of a variety of natural disasters;
- Analysis and selection of appropriate modern information technologies (Cloud Computing, Big data, online social networks and others, which together with heterogeneous databases and GIS to be included in a single information system;
- Proposing approaches and mathematical models for integrated risk assessment from natural disasters based on developed under the project new and/or adapted existing methods;
- The development of a general framework of information system, unifying the proposed models and selected information technologies for an integrated risk assessment from natural disasters;
- Approbation of the general framework of the information system with examples of specific disasters and locations, verification of the results obtained and the formulation of requirements for the implementation of the system;
- Dissemination of the results among all interested in the topic and developing specialized modules for training in risk assessment from natural disasters.
- New information retrieval for the levels of extremity of the monitored objects and presentation of the corresponding recommendations for efficient distribution of the financial funds, defined for preventing and reducing risk from possible disasters;
- Integration of heterogeneous databases with chronological and expert information for the possible disasters for both countries – Bulgaria and China;
- Development of new and adaptation of appropriate existing methods for risk analysis and evaluation;
- Organization and conducting of thematic conferences and training seminars in both countries – Bulgaria and China.
- Development of educational modules for the M.Sc. courses and special training.

**A Conceptual Model of Cloud Based Information System for Risk Assessment from Natural Disasters**, Grant № DNTS/ China 01/6, 2014–2018, a Bulgarian – Chinese R&D Project (University of National and World Economy, Sofia, Bulgaria – Shenyang University of Chemical Technology, Shenyang, China) with the following objectives:

- Definition and analysis of risk sources (possible disasters) and risk components (monitored objects), as well as their interrelationship for both countries – Bulgaria and China;
- Economic and financial assessment of the consequences (losses) for the monitored objects;
- Complex risk assessment by the use of classical and intelligent mathematical methods;

**Research on the Applicability of Virtual Reality in Education and Business**, Grant № 22/2017, 2017 – 2019, funded by the University of National and World Economy, Bulgaria, which has a specific emphasis on the application of Virtual Reality (VR) in disaster training. Disaster risk reduction and emergency specialists can obtain an invaluable experience from VR environments in which different disaster scenarios could be simulated and the personnel could be trained to respond to critical situations with confidence. A virtual reality simulation of emergency preparedness could provide more varied scenarios and help avoid the hasty, panic driven thinking which can lead to unnecessary accidents and deaths. Interactive VR based disaster training can be tailored to specific users as well as organizations, based on their resources and hazard vulnerability analysis. VR based scenarios can be developed for instructional task focused training in which the program responds to user inputs and provides instant feedback. VR based exercises can also allow an organization to test its emergency response plans in order to assess its effectiveness, and in turn identify gaps and areas for improvement. VR based applications can also facilitate consistent and repeated training over geographical and organizational divides.

The SRCDRR has co-organized the ***2nd IFIP Conference on Information Technology in Disaster Risk Reduction (ITDRR 2017)***, October 25 - 27th, 2017, UNWE, http://itdrr.unwe.bg/.

SRCDRR members took part in the ***2017 International Training Workshop on Natural Disaster Reduction on Regional and Local Best Practices of Post-Disaster Recovery: Building Sustainability and Resilience through Scientific Approaches***, 17- 21, July, 2017, Taipei, Taiwan, organized by the National Science and Technology for Disaster Reduction (NCDR). NCDR is also a GADRI member.

# Risk and Prevention Department, Bureau de Recherches Geologiques et Minieres (BRGM), France

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Fax:

Website: http://www.brgm.fr/


BRGM is France's reference public institution for Earth Science applications in the management of surface and subsurface resources and risks. BRGM ("Bureau de Recherches Geologiques et Minieres") is the French Geological Survey. The key objectives for BRGM are: i) Understanding geological processes and associated risks; ii) Developing new methodologies and techniques helpful in geosciences; iii) Producing and disseminating data to support the management of soils, subsoils and resources; iv) Delivering the necessary tools for the management of soils, subsoils and their resources, for risk prevention and for policy responses to climate change. BRGM's activities are organized around its 5 key roles: scientific research; support to public policy development; international cooperation; mine Safety and training through "ENAG" school. Scientific research at the BRGM is focused on furthering geological knowledge and understanding surface and subsurface phenomena. The key issue at stake is to meet the challenges of global change. Over 700 BRGM engineers and researchers - two thirds of its staff - are involved in scientific research. Support to public policy development covers all expert appraisals, monitoring and studies such as: surface/subsurface monitoring and disseminating knowledge; methodological studies and synopses to transfer research results to "civil society"; independent expert appraisals; and training or knowledge transfer. International cooperation is also one of the major roles: with over 200 projects each year in than 40 countries, BRGM works across the globe towards enduring protection for people and resources. BRGM provides know-how and expertise in two main areas: i) protecting people and their environment against natural risks; ii) ensuring the permanence and quality of natural water, mineral and (geothermal) energy resources. Mine Safety, since 2006, has been entrusted to BRGM by the French State. Monitoring and action to prevent risks and pollution arising from mine closures are part of BRGM's missions. BRGM has state delegated responsibility for all mine safety engineering work. Through ENAG, the BRGM disseminates its scientific competences and techniques through a range of courses: higher education diploma courses in the geosciences, through training support and partnerships with higher education establishments; continuing professional training, through some sixty introductory and advanced courses in all geosciences fields.

## Research Focus

**Scope :**

- Earthquakes and volcanoes
- Ground instabillities and slope and soil erosion
- Coastal and climate change
- Geological storage and deep subsurface operations
- Cavities, subsurface planning and imaging
- Post-mining

Dr. Taillefer Nicolas

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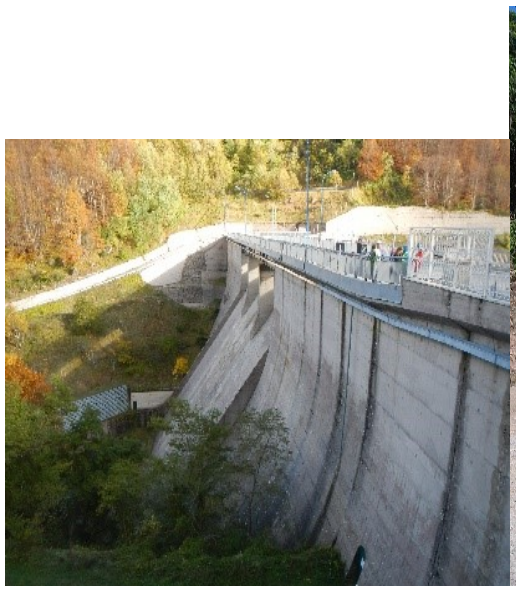

**Risks and Prevention at BRGM, an overview :**

Approximately 100 scientists

Multi-disciplinary R&D teams : Combine experiments and modelling in : geology, soil mechanics, geotechnics, geophysics, remote detection, oceanography, hydrodynamics, seismology, structural mechanics, volcanology and geomatics.

A wide range of skills :

- Understanding phenomena and mapping geological and coastal risks
- Developing observatories
- Metrology and acquiring data as part of a network
- Imaging complex and near subsurface environments using non-destructive and indirect techniques and combined methods
- Digital simulation of phenomena with predictive modelling and quantification of the risks and associated uncerntainty
- Research and development focusing on processes, methods and specific software
- Evaluating and reducing risks : diagnosing and analysing the different risks, estimating damages, avaluating systemic vulnerability
- Site studies and urban planning for use in decision-making
- Designing monitoring systems, developing decision-making tools and supporting crisis management : studying early signs of hazards and how to evaluate hazards, crisis exercices, prevention initiatives to the benefit of the general population
- Post-mining expertise : ensuring the safety of former mining facilities, assessing the environmental impact on the local populations

- Investing and sharing knowwledge : distributing data to the public, the scientific community and public authorithies.


- **Risk and Prevention department :** Gilles Grandjean Ø g.grandjean@brgm.fr
- **Seismic and Volcanic Risks :** Nicolas Taillefer Ø n.taillefer@brgm.fr
- **Landslides and cavities :** Olivier Cerdan Ø o.cerdan@brgm.fr
- **Geophysics and teledetection :** Jean-Christophe Gourry Ø jc.gourry@brgm.fr
- **Coastal risks and Climate Change :** Carlos Oliveros Ø c.oliveros@brgm.fr
- **Security, use and performance :** André Burnol Ø a.burnol@brgm.fr


## Latest Publications

- Earthquake swarm in Mayotte : a clearer understanding is emerging

  http://www.brgm.eu/news-media/earthquake-swarm-mayotte-clearer-understanding-is-emerging

- Climate Change: BRGM research cited by the IPCC at the French Senate

  http://www.brgm.eu/news-media/climate-change-brgm-research-cited-ipcc-at-french-senate

## Institutional Capacity Development Activities—http://www.brgm.eu/key-roles/training/continuing-professional-training

## Internships and Job Opportunities—.http://www.brgm.fr/emploi/metiers-carrieres-brgm

# Center for Disaster Management and Risk Reduction Technology (CEDIM) at the Karlsruhe Institute of Technology (KIT), Germany

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76344 Eggenstein-Leopoldshafen
Germany

Tel: +49 721 608 – 23522 (Head Office)

Website: http://www.cedim.de/english


The Center for Disaster Management and Risk Reduction Technology (CEDIM) is an interdisciplinary research center of the Karlsruhe Institute of Technology (KIT) in the field of disaster management. The main goal of CEDIM is to advance the scientific understanding of natural and man-made hazards, and to develop disaster management solutions for the early detection and reduction of the related risks. CEDIM is dedicated to developing technologies and tools in the areas of risk assessment, risk communication and management in a world with increasing population, rapid urbanization and a growing threat associated with climate change. To achieve this, CEDIM employs interdisciplinary competence and synergies between its affiliated institutions and cooperates with emergency management at international, national, state and community levels.

## Research Focus

For several years now, CEDIM's research has focused on Forensic Disaster Analysis (FDA) in near-realtime (http://www.cedim.de/english/2863.php). In this superordinate research program, CEDIM researchers from various disciplines contribute by their specific disaster analyses and impact assessments in near real-time. The core of CEDIM's D is to examine disasters in an interdisciplinary manner with a focus on the complex interactions between

(1) the natural hazard,

(2) the technical installations, facilities, and infrastructures, and

(3) the societal structures, institutions and capacities.

The aim of FDA activities is to evaluate immediately after the occurrence of a disaster this event, assess the impacts, retrace the temporal development, and identify the most important factors that determine the impacts. Forensic means here the combination of methods and findings from different disciplines with the aim of describing and reconstructing disasters and their relevant drivers as comprehensively as possible. The approach in interdisciplinary teams takes into account the complexity of the loss events and the risk of natural disasters with manifold interactions and cascade effects in both natural and anthropogenic systems.

The objectives of the current CEDIM projects, which began at the end of 2016, are to scrutinize changes in risk and resilience attributable to social change, especially concerning energy, mobility, and supply systems, and critical infrastructures in urban areas. These projects are supplemented by existing projects in the areas of rapid damage assessments after natural catastrophes, web-based prediction and analysis of extreme weather situations, automatic space-time detections of disasters from social networks and the modeling of the threat and risk of tsunamis. Thus, the current projects address important questions of risk and catastrophe research from the hazard to systemic resilience to the social impact and the handling of risks.

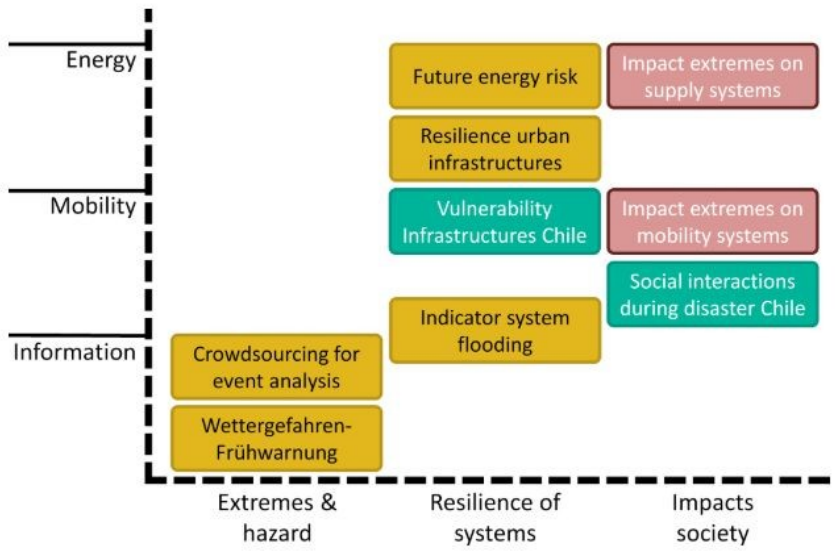


*Abbildung:* CEDIM projects of the funding phase 2016 - 2018 with their focus on the thematic orientation and the profile sharpening fields of the Dachstrategie KIT 2025. The red/green marked projects are joint projects between two institutes.

Prof. Dr. Michael Kunz (CEDIM Spokesman)

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## Research Unit Contacts

All participating institutes are at the Karlsruhe Institute of Technology (KIT) (http://www.kit.edu/english):

- Geodetic Institute (GIK) https://www.gik.kit.edu/english
- Geophysical Institute (GPI) http://www.gpi.kit.edu/english
- Institute for Applied Geoscience (AGK) http://www.agw.kit.edu/english
- Chair of Financial Economics and Risk Management (FBV) http://risk.fbv.kit.edu/policy
- Institute for Hydromechanics (IFH) http://www.ifh.kit.edu/english
- Institute for Industrial Production (IIP) http://www.iip.kit.edu/english
- Institute for Nuclear and Energy Technologies (IKET) http://www.iket.kit.edu/english
- Institute of Concrete Structures and Building Materials (IMB) http://www.imb.kit.edu/english
- Institute for Meterology and Climate Research (IMK) http://www.imk.kit.edu/english
- Institute for Photogrammetry and Remote Sensing (IPF) http://www.ipf.kit.edu/english
- Institut Regionalwissenschaft (IfR) https://www.ifr.kit.edu/english
- Institute for Technology Assessment and System Analysis (ITAS) http://www.itas.kit.edu/english
- Institute for Technology and Management in Construction (TMB) http://www.tmb.kit.edu
- Institute of Economics (ECON) http://www.econ.kit.edu/english
- Institute for Water and River Basin Management (IWG) http://www.iwg.kit.edu

See also: http://www.cedim.de/english/156.php

## Institutional Capacity Development Activities—Graduate School for Climate and Environment (GRACE) at KIT

https://www.grace.kit.edu/english

## Latest Publications

- CEDIM Research Report 2015 – 2016 (http://www.cedim.de/download/CEDIM_Research_Report_15_16_WEB.pdf)

FDA reports in 2017/2018:

### Short Reports:

- Winter storm Friederike, January 2018 (in German only; pdf)
- CEDIM FDA Report No. 2: Hurricane Irma, October 2017 (pdf)
- CEDIM FDA Report No. 1: Hurricane Irma, Focus on the Caribbean, September 2017 (pdf)
- Short Report: Excessive Indian Monsoon, September 2017 (pdf)
- CEDIM FDA Report No. 1**:** Hurricane Harvey (Texas, USA) August/September 2017 (pdf)

### Useful links to Publications:

- **General:** http://www.cedim.de/english/904.php
- **CEDIM Annual Reports:** http://www.cedim.de/english/1709.php
- **FDA reports:** http://www.cedim.de/english/2850.php

# Department of systemic risk research, Institute for Advanced Sustainability Studies (IASS), Germany

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The Institute for Advanced Sustainability Studies (IASS) conducts research with the goal of identifying, advancing, and guiding transformation processes towards sustainable societies. Its research practice is transdisciplinary, transformative, and co-creative. The institute cooperates with partners in academia, political institutions, administrations, civil society, and the business community to understand sustainability challenges and generate potential solutions. The IASS was officially founded in 2009 as a joint initiative of the German Federal Government, the Federal State of Brandenburg and the research organizations of the German Science Alliance.

**Our Approach**

We live in an age of constant, rapid change. A person born in the early twentieth century would be overwhelmed by the complexities of modern-day life. Electric motors, the Internet, computers, jet aircraft, and robots are among the many side-effects that have accompanied this evolution. While we experience many of these developments as passive observers, others are planned and promoted purposefully by individuals and societies. These developments are referred to as 'transformations'.

The alignment of our various ways of life with the principles of sustainable development will play a vital role in shaping the future of humanity. This transformation encompasses the development of ethically responsible economic and societal systems that are sustainable in their economic and environmental dimensions and will not compromise the ability of future generations to meet their needs. The protection of the environment and the climate, the preservation of the natural and material resources that ensure an efficient supply of goods and services to all, and a peaceful society with an equitable social system informed by the principle of the public good are important objectives within this vision of sustainable development.

**What does the IASS stand for?**

The Institute for Advanced Sustainability Studies (IASS) is committed to advancing these goals. The institute has set itself the task of supporting transformations towards sustainability through its research activities. On the one hand, it generates knowledge on the prerequisites for a sustainable way of life that informs political decision-making (expertise). On the other, it identifies factors that are crucial to the success of political processes aimed at achieving a sustainable society (process knowledge).

For example, the institute's research on air pollution generates expertise that supports the development and implementation of air quality programmes – and the promotion of healthy, sustainable lifestyles – by policymakers and the private sector in cooperation with researchers. At the same time, a research team at the IASS is drawing on and refining process knowledge to develop new political processes that will ensure that the living conditions of future generations are sufficiently taken into account in contemporary decision-making.

Prof. Ortwin Renn
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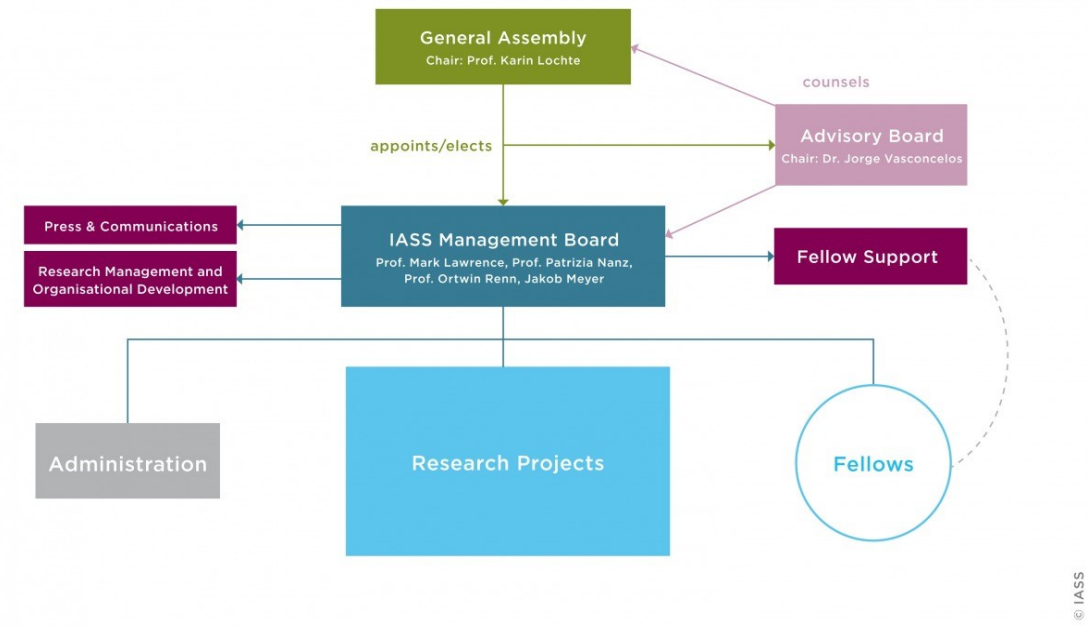


## Research Focus

In its research the IASS aims to merge all relevant types of knowledge – both within and outside science – in order to jointly find solutions that help us initiate, support and scientifically accompany the transformation to sustainable development. In accordance with its mission, the IASS involves a wide range of stakeholders from all parts of society in a transdisciplinary process with the goal of developing solutions, and it does not view these stakeholders as mere addressees of the institute's findings at the end of the research process. Our transdisciplinary research processes are based on excellent disciplinary and interdisciplinary research; at the same time, the questions they raise and the results they produce feed into such research. The IASS does not merely work to create the knowledge needed for action; it also discusses its findings with representatives of politics, industry and civil society and furthers the transformation process through this kind of consultation.

## Research Units

**Department of systemic risk research:** How do technical interventions to cool the Earth's atmosphere (climate engineering) impact on the environment, the economy, and human health? What risks are posed by the pervasive growth of digital technologies throughout society? What chain reactions might future financial crises trigger? These issues form the focus of this research project in which researchers at the IASS seek to identify and characterise common patterns and structures of systemic risk across the domains of technology, economics, environment, and society in an increasingly complex world. The scope of this research extends to include issues of social justice and equity. This global goal of this project is to develop robust, enhanced governance instruments to support the management of systemic risks and to protect critical infrastructure and utilities.

### What topics and questions does the IASS work on?

The research projects conducted at the IASS contribute to key national and international sustainability agreements such as the 2030 Agenda for Sustainable Development, the Paris Agreement, and government policies to advance the energy transition in Germany. The targets contained in these agreements are critically assessed with the aims of identifying trade-offs and inconsistencies and developing potential solutions in cooperation with other actors.

Researchers at the IASS are, for example, working on prospective solutions to advance the energy transition. The focus of this work lies on the development of actionable policy options that give equal consideration to ecological, economic, legal, and social impacts and minimise potential negative side effects. And in the area of marine conservation, IASS researchers are assisting intergovernmental bodies with much-needed scientific expertise to support the development of international agreements to protect the world's oceans from pollution and overfishing.

These examples of our work illustrate the institute's commitment to both analysing and actively contributing to processes of societal transformation in research projects that engage with stakeholders across science, policymaking, administration, civil society and the business sector. IASS activities are guided by two central questions:

- What conditions must be met in order to foster successful transformations towards a sustainable economic system and way of life?

How can we develop and design transformation processes for success?

Research conducted by the IASS addresses diverse sustainability fields. The institute's work is currently focused on energy transitions; climate protection; air quality; governance frameworks for oceans and the Arctic region; global risk governance; new democratic decision-making processes that involve relevant actors, including affected populations; and the role of narratives and lifestyles in the context of the need for individuals to align their behaviour with the principles of sustainability.

### How does the IASS conduct its research?

As well as providing a supportive environment for all those who wish to shape our future, the IASS is itself actively engaged in this process. It brings together different parties and applies its expertise and process knowledge to advance transformations effectively and for the good of all. Far from lecturing from ivory towers, our researchers provide hands-on support to policymakers, representatives of the business world, and civil society actors to ensure that decision-making and implementation processes lead to the successful adoption of sustainable development pathways. Only then do we and future generations have a hope of a good life in a world worth living in.

## Institutional Capacity Development Activities

**Summer School**

The aim of the summer school is to bring together outstanding young researchers and practitioners from science, industry and the public sector from all over the world to discuss current and innovative research questions around sustainable development and to promote international exchange and network building. It takes place annually since 2014 and is a joint initiative of the IASS, the Alfred Wegener Institute for Polar and Marine Research, the GeoForschungsZentrum Potsdam, the Potsdam Institute for Climate Impact Research, the University of Potsdam and the City of Potsdam. With its comprehensive interdisciplinary approach, the project is unique in the Potsdam research landscape.

## Latest Publications

Renn, O. (2017): Risk Governance: Concept and Application to Systemic Risk. - In: Kasperson, R. E. (Ed.), Risk Conundrums: Solving Unsolvable Problems, (Earthscan Risk in Society), London : Routledge, p. 243-259.

## Other Useful Contact Information:

**Contact**

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# Institute for Environment and Human Security (UNU-EHS), United Nations University (UNU), Germany

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Fax: +49-228-815-0299
Website:https://ehs.unu.edu/

The United Nations University (UNU) is the academic arm of the United Nations and acts as a global think tank. The United Nations University (UNU) is an international community of scholars, engaged in research, postgraduate teaching and capacity development and dissemination of knowledge in furthering the purposes and principles of the Charter of the United Nations. The mission of UNU is to contribute, through research and capacity building, to efforts to resolve the pressing global problems that are the concern of the United Nations and its Member States. For more information, please visit: www.unu.edu.

The United Nations University Institute for Environment and Human Security (UNU-EHS), established in December 2003, is part of the UNU system, a worldwide network of Research and Training Institutes. Its mission is to advance human security through knowledge-based approaches to reducing vulnerability and environmental risks, whilst simultaneously carry out cutting edge research on risks and adaptation related to environmental hazards and global change. The institute's research promotes policies and programmes to reduce these risks, while taking into account the interplay between environmental and societal factors.

## Research Focus

The mission of the United Nations University Institute for Environment and Human Security (UNU-EHS) is to carry out cutting edge research on risks and adaptation related to environmental hazards and global change. The institute's research promotes policies and programmes to reduce these risks, while taking into account the interplay between environmental and societal factors.

Research areas include climate change adaptation incorporating insurance-related approaches, environmentally induced migration and social vulnerability, ecosystem services and environmental deterioration processes, models and tools to analyze vulnerability and risks linked to natural hazards, with a focus on urban space and rural-urban interfaces. Research is always conducted with the underlying goal of connecting solutions to development pathways.

UNU-EHS' experts have recently concluded the largest national household survey regarding climate change and migration in the Pacific, with the newly-published results providing a valuable insight into the themes of resilience and adaptation. Groundbreaking research also analyses the interplay between environmental and societal factors in the Mekong Delta, Nepal and Bangladesh. Additionally, through the Munich Climate Insurance Initiative, UNU-EHS experts contribute to the G7 Initiative on Climate Risk Insurance.

A list of research projects at the institute can be found here: https://ehs.unu.edu/research.

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## Research Unit contacts:

The different research units at UNU-EHS include:

- Vulnerability Assessment, Risk Management & Adapative Planning (VARMAP); Head – Prof. Dr. Matthias Garschagen (garschagen@ehs.unu.edu)
- Environmental Vulnerability & Ecosystem Services (EVES); Head – Dr. Zita Sebesvari (sebesvari@ehs.unu.edu)
- The Munich Climate Insurance Initiative (MCII) – Executive Directo – Mr. Sönke Kreft
- Migration & Environment (M&E); Head – *N.N.*
- Pan African Cooperation and Educational Technologies (PACET); Head – Dr. Erick Tambo

Beyond its research mandate, UNU-EHS is actively engaged in education. It offers the joint Master of Science degree programme "The Geography of Environmental Risks and Human Security" with the University of Bonn. UNU-EHS also hosts a number of international PhD projects and courses on global issues of environmental risks and sustainable development.

## Projects:

A comprehensive overview of all UNU-EHS projects can be found via https://ehs.unu.edu/research.

A small selection of some of our institutional projects which a disaster-related research focus include:

Climate Risk Adaptation and Insurance in the Caribbean (CRAIC)

Phase 1: 03/2011-06/2015 to Phase 2: 11/2016-10/2019

Country Implementation: Jamaica, Saint Lucia, Grenada, Belize, Trinidad & Tobago

The Climate Risk Adaptation and Insurance in the Caribbean project seeks to address climate change, adaptation and vulnerability by promoting weather-index based insurance as a risk management instrument in the Caribbean. The project has developed two parametric weather-index based risk insurance products aimed at low-income individuals and lending institutions exposed to climate stressors.

The objective of the project is to help target countries increase social resilience and incentivize sustainable adaptation measures by incorporating climate risk insurance within a broader framework of disaster risk reduction strategies.

The overarching goals of the project are:

- To support the development of weather-related risk management solutions, including insurance;
- To support the development of public-private insurance solutions so that financial support is extended to the most vulnerable groups;
- To demonstrate the value of a regional risk pooling instrument in climate change adaptation and risk management.

The implemented product is called **The Livelihood Protection Policy:** Targeted at individuals, this product helps protect the livelihoods of vulnerable low-income individuals by providing swift unbureaucratic cash payouts following extreme weather events (i.e. high wind speed and heavy rainfall). This crucial support will reduce poverty and vulnerability by enabling these groups to recover quickly following a disaster.

The activities included (amongst others) a feasibility analysis, risk analysis, technical preparation and design of the products, implementation and monitoring, product refinement, market development & expansion, capacity development as well as outreach and awareness raising activities.

Lessons learned of this project are continually shared during conferences and through publications.

Advancing Climate Risk Insurance Plus (ACRI+)

Phase 1: 02/2012-06/2014 Phase 2: 03/2015-12/2018

Country of Implementation: Morocco, Barbados, Ghana

Together with local authorities and private sector partners, the project develops new insurance solutions that are linked to all of phases of the disaster risk management cycle (disaster prevention, preparedness, addressing residual risk, response and recovery). Based on a comprehensive risk analysis of extreme weather events and their direct and indirect effects on people, the environment, and the economy, new measures are also being devised. These are designed to have a positive impact on all of the phases in disaster risk management – an integrated, effective approach which uses the full potential of each phase. This project works towards long-term solutions for urban development, industrial zones, renewable energy, and water infrastructure.

The second key focus of ACRIplus is to gather the experiences of different international organizations and channel them to the international dialogue on climate change. Relevant, comparable information is provided in partnership with the Global Index Insurance Facility (GIIF). ACRIplus actively brings these experiences to the international climate dialogue by participating in conferences, climate negotiations, and talking to experts from the public, private, and political sectors.

MCII's contributions are as follows:

Development of country-specific integrated climate risk management concepts

Development of a diagnostic toolbox for agricultural weather risk insurance

Preparation of knowledge products and establishment of a database for knowledge sharing on climate insurance

Awareness raising activities on risk transfer approaches and feeding the ACRI+ results, opportunities and lessons learnt into the international debate

MCII Contribution to the G7 Initiative on Climate Risk Insurance

Phase 1: 02/2015-06/2015 Phase 2: 08/2015-06/2016

Phase 3: 11/2016-12/2018

Country Implementation: Global (developing countries)

By initiating a Climate Risk Insurance Initiative (InsuResilience) the G7 countries acknowledged the central role insurance plays in a comprehensive climate risk management approach. InsuResilience aims to increase the number of poor and vulnerable people in vulnerable developing countries who have access to direct or indirect insurance coverage against the negative impact of climate change-related hazards by up to 400 million by 2020.

Under the overall guidance of the German Federal Ministry for Development and Economic Cooperation (BMZ) and in cooperation with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), MCII contributes to InsuResilience by providing strategic and technical advice to BMZ & and the InsuResilience Secretariat, facilitating dialogue among G7 stakeholders, including private sector, civil society and target countries, and undertaking research on the nexus between resilience, insurance and risk reduction.

MCII's activities include:

- Analysis potentials for reducing vulnerability/enhancing resilience using insurance and development of criteria to measure the pro-poor and resilience impact of InsuResilience
- Providing strategic or technical input on questions related to climate risk insurance and actively feedback results from stakeholder involvement activities
- Developing the methodology for case studies in InsuResilience target regions (e.g. on how to improve the measurement of household vulnerability and resilience; how social security systems can be used as implementation tools for climate risk insurance)
- Identify options to build an innovative climate risk insurance pool that leverages private finance

Designing a Disaster Risk Insurance Framework for Pakistan

Phase 1: 02-04/2014 Phase 2: 10/2014-06/2016

Country Implementation: Pakistan

The vulnerable people of Pakistan face disruptive shocks of natural hazards such as flood, earthquakes, drought and other impacts, every few years. Insurance reduces the catastrophic impact of disasters, enables a timely recovery, and can be coupled with other disaster risk management to soften the impacts of catastrophic events on vulnerable communities. Insurance can and should also be linked with risk reducing, preventive activities. Prudently employing a combination of insurance measures with risk reduction, including early warning, education, infrastructure strengthening, and land-use regulations, can greatly reduce the immediate losses and long-term development setbacks from disasters. In addition, by creating a secure investment environment, insurance instruments can enable productive risk taking on the part of individuals and governments, and in this way reduce disaster-induced poverty traps. However, insurance for natural hazards is not affordable or even available to many in the most vulnerable communities in Pakistan.

Phase 1 of the project resulted in the design and proposed option for a viable national fund designed to help the most vulnerable communities to better manage natural hazards. By moving forward in this endeavor, in phase 2, five districts Poonch, AJK; Charsadda, KPK; Ziarat, Balochistan; Tharparkar, Sindh; Bahawalnagar, Punjab district and population were chosen for the insurance pilot. The fund design in the second phase focused on encouraging the beneficiaries to become active in reducing their own risk. The project worked with insurance regulators to help create an enabling regulatory environment, legal and financial experts in establishing the fund, as well as technical risk assessment experts to ensure the viability of the fund. The undertaking of the National Disaster Management Authority (NDMA) in Pakistan to explore a possible National Disaster Insurance Fund is groundbreaking. It provides leadership and innovative vision in addressing some of the most acute, and often invisible, challenges of protecting vulnerable people from the risks of natural hazards.

In a press release, NDMA acknowledges the results of the project and mentions the way forward, see http://www.ndma.gov.pk/3/dynamic/?p=5848.

MCII's activities included:

- Preparation of a risk profile for Pakistan
- Development and implementation of a market demand assessment for the creation of weather-risk insurance products for low-income groups in Pakistan
- Development of an insurance fund strategy design including an analysis of the regulatory framework and gender considerations
- Articulating insurance fund options with concrete recommendations for implementation

Strengthening Climate and Disaster Resilience of Myanmar Communities

Phase 09/2018-03/2020

Country Implementation: Myanmar

The overall objective of the project is to support the Government of Myanmar (GoM) to develop a disaster risk financing (DRF) strategy for Myanmar and in the Ayeyarwady region and to increase the country's/region's capacity to deal with all kinds of DRF aspects in an efficient and effective way.

The project includes three major tasks:

- Development of **a risk layered approach; providing a suitable blend of financing instruments and structures** with a particular focus on risk transfer through insurance schemes. Output 1 of the TA will provide the Consultant team with detailed quantification results of disaster risk in Myanmar and especially in Ayeyarwady region before the start of this assignment.
- Review of the **enabling environment** and provision of recommendations to address challenges for DRM on the regulatory and policy level.
- Provision of **capacity building and awareness raising** activities on DRF to public and private actors in the financial and insurance sector.

## Latest Publications

- Walz, Yvonne, Dall, Karen, Graw, Valerie, Villagrán de León, Juan Carlos, Kussul, Nataliia and Jordaan, Andries (2018). Understanding and reducing agricultural drought risk: Examples from South Africa and Ukraine. United Nations University - Institute for Environment and Human Security. Policy report. http://collections.unu.edu/view/UNU:6688#viewAttachments
- Climate Risk Assessment for Ecosystem-based Adaptation (EbA Guidebook) GIZ, EURAC & UNU-EHS (2018): Climate Risk Assessment for Ecosystem-based Adaptation – A guidebook for planners and practitioners. Bonn: GIZ. https://ehs.unu.edu/research/climate-risk-assessment-for-ecosystem-based-adaptation-eba-guidebook.html#outline
- Hagenlocher, Michael, Renaud, Fabrice G., Haas, Susanne and Sebesvari, Zita (2018). Vulnerability and risk of deltaic social-ecological systems exposed to multiple hazards. Science of the Total Environment, 631-632, 71-80.
- Nguyen, Minh Tu, Renaud, Fabrice G. and Sebesvari, Zita (2018). Drivers of change and adaptation pathways of agricultural systems facing increased salinity intrusion in coastal areas of the Mekong and Red River deltas in Vietnam. Environmental Science & Policy, 1-18.
- Whelchel, A. W., Renaud, Fabrice G., Sebesvari, Zita and Sudmeier-Rieux, Karen (2018). Advancing ecosystems and disaster risk reduction in policy, planning, implementation, and management. International Journal of Disaster Risk Reduction, 32, 1-3
- Braun, Gianna, Sebesvari, Zita, Braun, Melanie, Kruse, Jens, Amelung, Wulf, An, Ngo T. and Renaud, Frabice G. (2018). Does sea-dyke construction affect the spatial distribution of pesticides in agricultural soils? – A case study from the Red River Delta, Vietnam. Environmental Pollution, 242, 890-899.
- UNU-EHS and GIZ have launched their InsuRisk Assessment Report 2018. In 2017, commissioned by the InsuResilience Secretariat, UNU-EHS and Social Impact Partners developed a tool that provides information on countries' vulnerability towards climate and disaster risks and their readiness to accommodate insurance solutions. More information can be found here: https://ehs.unu.edu/news/announcement/updated-insurisk-assessment-report-at-cop24.html
- Integrating Insurance into Climate Risk Management: Conceptual Framework, Tools and Guiding Questions: Examples from the Agricultural Sector http://www.climate-insurance.org/fileadmin/mcii/pdf/ACRI_/ACRIplus_2018_Summary_ToolBox.pdf
- Increasing Resilience through Integrated Climate Risk Management (ICRM) http://www.climate-insurance.org/fileadmin/mcii/pdf/ACRI_/ACRI__ICRM_Factsheet_final.pdf
- The Role of Insurance in Integrated Disaster and Climate Risk Management: Evidence and Lessons Learned http://www.climate-insurance.org/fileadmin/user_upload/ACRI__2017_Role_of_Insurance_in_ICRM_online.pdf
- Climate Risk Insurance for Resilience: Assessing Countries' Implementation Plans http://www.climate-insurance.org/fileadmin/mcii/documents/MCII_DIE_171107.pdf
- Climate Insurance and Water-related Disaster Risk Management – Unlikely Partners in Promoting Development? http://www.climate-insurance.org/fileadmin/mcii/documents/11_climate_insurance_perspectives_paper.pdf
- Climate Risk Insurance: Transparency, Participation and Accountability – An Overview Assessment of Regional Risk Pools. http://www.climate-insurance.org/fileadmin/mcii/pdf/DiscussionPaperSeries/MCII_DiscussionPaper_Vol2_2018_CRI_Transparency_Participation_Acountability_FINAL.pdf
- Impact Evaluation of Climate Risk Insurance Approaches – Status Quo and Way Forward http://www.climate-insurance.org/fileadmin/mcii/pdf/DiscussionPaperSeries/Discussion_paper_MCII_Final_June_11_vs.pdf

## Institutional Capacity Development Activities and Internship Opportunities

- Joint Master of Science in "Geography of Environmental Risks and Human Security" (offered together with the University of Bonn)
- Doctoral Programme (offered in collaboration with a wide range of international universities)
- Affiliated Degree Programmes
- Non-Degree Courses
- UNFCCC – UNU Early Career Climate Fellowship Programme

All of the aforementioned activities are ongoing: the exact dates of open calls for applications for any of these programme will be published on our institutional website in due course.

- Visiting Scientist Programme – ongoing, no set deadline, duration decided in discussion with the host research unit and visiting scientist's availability
- International Internship Programme – ongoing, available positions listed under https://ehs.unu.edu/about/internship, duration decided in discussion with the host research unit and intern's availability.
- Vacancies – ongoing, specific deadlines indicated per post advertised.

### Other Useful Information

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UNU-EHS offices are located on the 22nd, 26th, 27th and 28th floor of the Langer Eugen building on the United Nations Campus. Information on the latest UNU-EHS activities can also be found in our quarterly newsletter, press releases, regular news announcements, and general media.

# European Commission
# Joint Research Centre (EC-JRC)
# Italy

Directorate E – Space, security and migration

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Website: https://ec.europa.eu/jrc/en


The Joint Research Centre (JRC) is the European Commission's science and knowledge service which employs scientists to carry out research in order to provide independent scientific advice and support to EU policy.

Our scientific work supports a whole host of EU policies in a variety of areas from agriculture and food security, to environment and climate change, as well as nuclear safety and security and innovation and growth.

The JRC carries out research in crisis management technologies, analysis and application of remotely sensed data, natural hazard modelling, early warning and monitoring systems, information mining/analysis, vulnerability and risk analysis for natural and technological hazards including multi-hazard risks, and in engineering and construction standards to support resilience against disasters.

Research Focus

The Directorate for Space, Security and Migration's mission is to focus on emergency preparedness, response, disaster risk management and resilience in cases of natural and man-made hazards. To cover the fight against crime and terrorism, including combatting the illicit trafficking of people, drugs and weapons. To focus on cyber security, data protection and space infrastructures as well as the use of communications data by security and intelligence agencies. To also include certain technical aspects relating to the implementation of Treaties and Conventions on the non-proliferation of nuclear, chemical and biological weapons. To further study the implications of demographic change and to analyse the root causes, likely scale, timing and impact of migration. The Directorate will serve the Foreign and Security, Humanitarian Aid and Civil Protection, Human Rights, Justice and Home, and Institutional Affairs policy areas including the perspective of the emerging Digital Single Market.

It has seven Units:

E.1 Disaster Risk Management

E.2 Technology Innovation in Security

E.3 Cyber and Digital Citizens' Security

E.4 Safety and Security of Buildings

E.5 Transport and Border Security

E.6 Demography, Migration and Governance

E.7 Knowledge for Security and Migration

https://ec.europa.eu/jrc

Disaster risk is addressed horizontally in the JRC, across several Units in several Directorates. The main entry point is the Disaster Risk Management Knowledge Centre: http://drmkc.jrc.ec.europa.eu/

Dr. Tom De Groeve

E-mail: tom.de-groeve@ec.europa.eu

## Latest Publications

http://drmkc.jrc.ec.europa.eu/

http://publications.jrc.ec.europa.eu/repository/

The Science for Disaster Risk Management report

Contribution to UN efforts to strengthen prevention, preparedness and response to disasters. Science plays a key role in preventing disasters, preparing for the ones that cannot be prevented and recovering from them. Using already existing knowledge more widely would save the lives and livelihoods of millions of people around the world. The report contributes to this objective by presenting the best available knowledge in various fields of Disaster Risk Management, such as risk assessment and risk communication, across the whole spectrum of hazards (earthquakes, tsunami, floods, extreme weather, epidemics, nuclear and chemical accidents, etc.) and throughout the entire disaster risk management cycle.

https://ec.europa.eu/jrc/en/publication/science-disaster-risk-management-2017-knowing-better-and-losing-less

https://ec.europa.eu/jrc/en/publication/future-challenges-disaster-risk-management

The 2017 Human Planet Atlas covered Exposure to natural disasters 1975-2015

One out of three people in the world is exposed to earthquakes, a number which almost doubled in the past 40 years. Around 1 billion in 155 countries are exposed to floods and 414 million live near one of the 220 most dangerous volcanoes. The 2017 edition of the JRC Atlas of the Human Planet looks at the exposure of people and built-up areas – derived from remote sensing – to the six major natural hazards, and its evolution over the last 40 years. The atlas was presented during the 2017 Global Platform for Disaster Risk Reduction meeting in Cancun, Mexico.

https://ec.europa.eu/jrc/en/news/atlas-human-planet-2017-how-exposed-are-we-natural-hazards

Social and economic impacts of climate extremes in a warming world

Research to better understand the potential social and economic impacts of extreme weather events and develop strategies for increasing resilience to changing climatic conditions. Global warming and consequent climate change is one of the biggest global threats to humanity of the 21st century, with impacts on health, the performance of economies, food security, conflict, migration, and demographics. Its peril to society will be increasingly connected to extreme weather events due to their disproportionate rise compared to changes in climate averages.

The research provides direct input to the forthcoming (2018) review of the EU Strategy on Adaptation to Climate Change and further provides knowledge in support of the implementation of the stringent mitigation and adaptation goals stipulated in the Paris Climate Agreement and achieving the goals of the Sendai Framework for Disaster Risk Reduction

https://ec.europa.eu/jrc/en/peseta

https://www.sciencedirect.com/science/article/pii/S2542519617300827

Advanced in Natech research

Space weather driven by solar activity can induce geomagnetic disturbances at the Earth's surface that can affect power transmission systems. This study analyzes the impact of extreme space weather on the northern part of the European power transmission grid for different transformer designs to understand its vulnerability in case of an extreme event.

https://www.swsc-journal.org/articles/swsc/abs/2018/01/swsc160049/swsc160049.html

Useful links to publications:

http://publications.jrc.ec.europa.eu/repository/

## Institutional Capacity Development Activities and International Opportunities

Temporary job opportunities, such as trainee or visiting scientist positions are available frequently. Calls are published:

https://ec.europa.eu/jrc/en/working-with-us/jobs/temporary-positions

A Joint Doctoral Partnership programme will be launched in 2018.

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# Department of Earth Sciences, University of Florence

# Italy

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The Department of Earth Sciences of the University of Firenze (DST-UNIFI) is an Italian center for research and higher training which counts 45 units of academic staff, 26 units of administrative staff and 100 non-permanent staff (such as PhD students and assistant researchers).

In 2016, it was appointed as UNESCO chair on Prevention and sustainable management of geo-hydrological hazards (www.unesco-geohazards.unifi.it). This Chair is dedicated to applied research in the field of Geo-hydrological Hazards threatening the human life, property, cultural heritage and the natural and built environment. The Chair mission follows the Sendai Partnership 2015-2025 launched by the International Strategy for Disaster Reduction (ISDR) and by the International Consortium on Landslides (ICL) and promote the prevention and management of geo-hydrological hazards in order to support policies and actions of risk reduction.

For the 2008-2011 triennium, the DST-UNIFI was entitled as a World Centre of Excellence (WCoE) on Landslide Risk Reduction by the Global Promotion Committee of International Programme on Landslides of UN-ISDR (confirmed also for 2011-2014 and 2014-2017).

Since 2015, the DST-UNIFI is the official Centre of Competence of the Italian Civil Protection for Remote Sensing and Geo-hydrological hazards.

DST-UNIFI is member of several international consortiums and agreements:

- Founding member of the International Consortium on Landslides (ICL), an International non-governmental and non-profit scientific organization supported by UNESCO, WMO, FAO and UNISDR (since 2002).
- Member of the International Consortium on Geo-disaster Reduction (ICGdR) that aims to promote the reduction of disasters triggered by geological and geophysical events on Earth (since 2014).
- Founding member of the Global Alliance of Disaster Research Institutes (GADRI) established at the 2nd Global Summit of Research Institutes for Disaster Risk (since 2015).
- Co-founder of the JIC-Nh (Joint International Center on Natural Hazards) with the Shimane University (Japan) and the Beijing University of Technology (China) (since 2016), a collaborative platform for engaging discussion, sharing knowledge and promoting networks on topics related to risk reduction and resilience to disasters.

Professor Nicola Casagli

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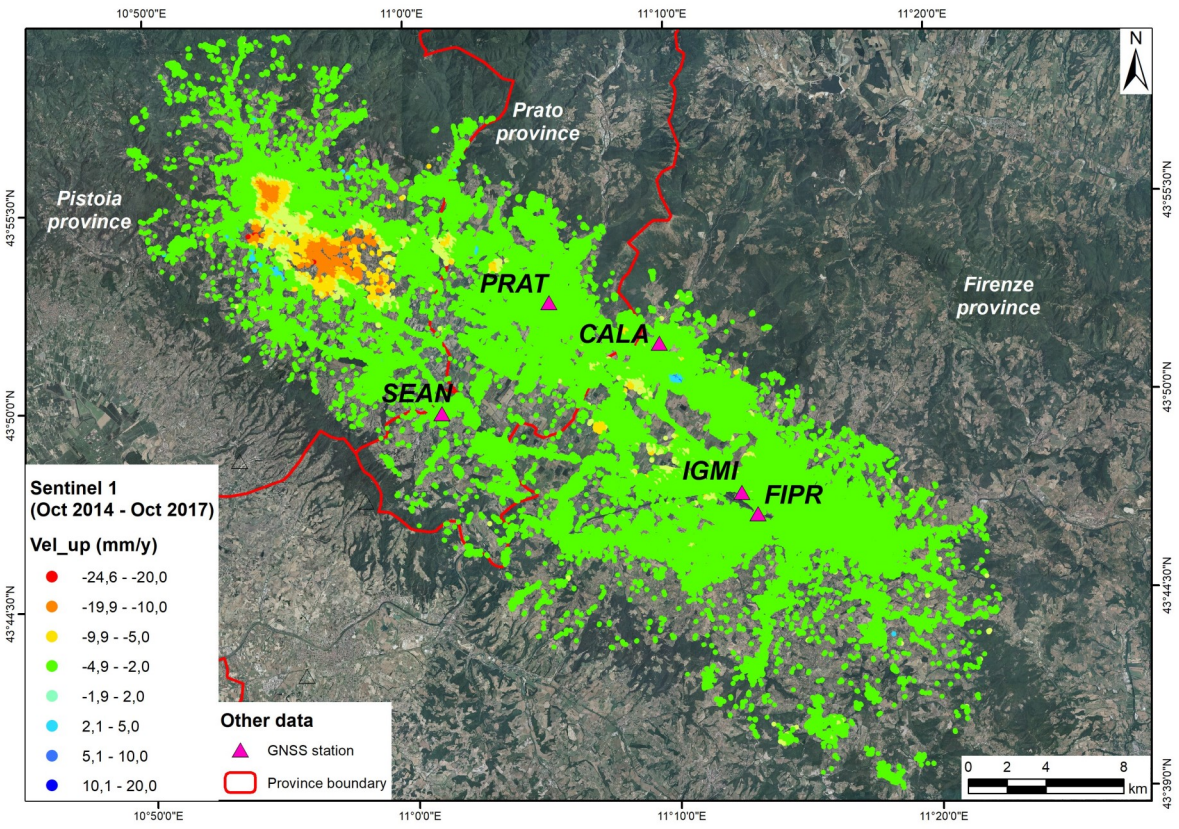
## Research Focus

The Department interests are focused at promoting Research and Development (R&D) for the prevention and management of geo-hydrological hazards, with special emphasis to landslides, subsidence and floods, in order to support policies and actions of risk reduction. To comply with these intentions, the specific objectives were focused:

- to promote the development of innovative technologies for the prevention and mitigation of geo-hydrological hazards;
- to develop tools and procedures for supporting risk reduction policies and the management of emergencies for the safety of human life;
- to promote the protection of cultural heritage threatened by geo-hydrological hazards;
- to promote research at the international level by offering scientific facilities to postgraduate students and visiting researchers.

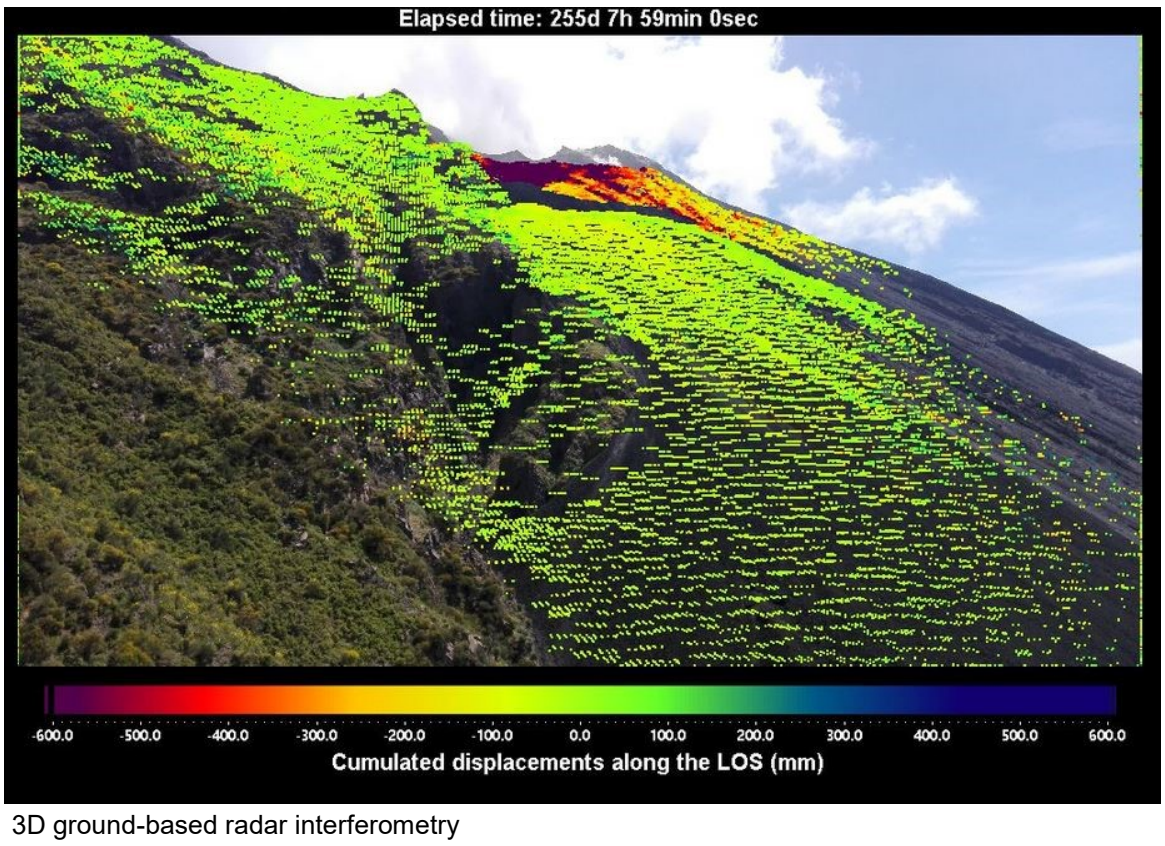


Satellite PSInSAR

The main lines of research are:

a) **Innovative technologies for landslide monitoring and early warning**: This activity focus on the application of innovative monitoring techniques in order to estimate the deformational evolution of the landslide masses and the successive operative implementation of Early Warning Systems (EWS). The activity deals with the optimization and validation of the operational protocols for technical and scientific support in areas at risk and on the definition of rapid procedures for assessing landslide risk and proper managing of each emergency. This is achieved by the synergistic use of rapid mobile units for localized survey based on terrestrial, marine and airborne sensors. They are: Ground-Based Radar (GB-InSAR), Wireless Sensor Networks (WSN), Laser Scanner (LIDAR and TLS), Thermographic Camera, Robotic Total Station (TPS), unmanned aerial vehicle (UAV) and Remotely operated underwater vehicle (ROV).

**EO (Earth Observation) data and technology to detect, map, monitor and forecast ground deformations**: This activity deals with the exploitation of the large data archives of EO data for geo-hazards mapping. The aim is devoted to improving the satellite surveillance system based on all the EO data (radar, multi- and hyperspectral) already available from several satellites (ERS, ENVISAT, RADARSAT, COSMO-SkyMed). Such integrated system is designed for the identification, rapid mapping, monitoring and analysis of risk scenarios. Under the European program, called Copernicus, the recent launch of the SENTINEL-1 satellite offers new opportunities for monitoring the Earth's surface and for the evaluation of ground movements.



3D ground-based radar interferometry

Ground-based radar interferometry

c) **Regional landslide forecasting models**: The activity is focusing on the optimization of the regional early warning system for landslide risk by means of meteorological nowcasting and real-time forecasting of slope movements that are characterized by rapid and very fast kinematic. In particular the research activities were mainly focused on the individual and combined development of the following models: i) physically-based model (HIRESS), created for the prediction of shallow landslides induced by rainfall; ii) statistical forecasting models based on rainfall thresholds (SIGMA and MACUMBA models), developed for the identification of rainfall thresholds for landslides triggering, both at regional and national level.

The Department interests are focused at promoting a wide range of facilities, based on laboratories and technical equipment, supports this research activity.

**Laboratories**:

- GIS and thematic mapping laboratory;
- Remote Sensing laboratory specialized on SAR interferometry, optical and hyperspectral remote sensing;
- Rock and Soil mechanics laboratory.

**Equipment:**

- GBInSAR monitoring system;
- UAV (Unmanned Aerial Vehicle, SATURN patent);
- Airborne multi-sensor surveyer;
- Compact submarine remotely controlled (NEMO-ROV patent);
- Long range 3D laser scanner;
- Robotized total station;
- GPS and topographical survey instrumentation;
- Fieldspec spectroradiometer;
- Infrared Thermal Camera;
- Electrical resistivity, electromagnetic and seismic surveying instrumentation;
- Rock and soil mechanics field and laboratory equipment;
- Advanced geotechnical and hydrogeological modelling software;
- Access to real-time meteorological services.

## Institutional Capacity Development Activities

From 29 May to 2 June 2017, the Department participated in the organization of the fourth World Landslides Forum (WLF4), held in Ljubljana (Slovenia), which hosted over 600 participants among researchers, geologists, engineers and policy makers from all over the world (https://www.wlf4.org/).

Currently, the Department is involved in the planning of the forthcoming fifth World Landslides Forum (WLF5), scheduled in Kyoto, Japan, 2-6 November 2020 (http://icl.iplhq.org/).

### Training Opportunities

#### i) Education leading to certificate

New International Academic Master Degree (in English language) on "*Geoengineering"* (GEMs) with the joint competences of the all core members of the UNESCO chair and mainly focusing to train experts on prevention, management and mitigation of geo-hydrological risks. The master started in the academic year 2017/2018 and will be repeated in the following years. Currently applications for a.y. 2018/2019 are open (time frame: 2 years).

Web page and training offer: https://www.ing-gem.unifi.it/

#### ii) Short term training

Each year several lectures and presentations are organized, aiming at promoting a knowledge sharing network, through capacity building and dissemination towards different actors. Training were addressed to academics, scientific organizations, Italian and foreign students. They usually last a day or few days and participation is free.

Announcements at: https://www.dst.unifi.it/changelang-eng.html

## Internship/exchange opportunities

Actually the Department has several worldwide active bilateral agreements with other Universities and research centers, within the framework of shared educational paths of Earth Sciences, Engineering and Environmental Geology such as:

- Department of Geografy - University of Scutari (Albania)
- Universität für Bodenkultur Wien (Austria)
- Laboratorio de Geotecnia, Universidad Mayor de San Simón - (Bolivia)
- Department of Civil and Environmental Engineering, University of Alberta (Canada)
- Department of Geological Engineering - Southwest Jiatong University (China)
- Tongji University, Shanghai (China)
- Project Center on Natural Disaster Reduction of Shimane University (China)
- Department of Geoinformation Engineering Sejong University (South Korea)
- Instituto de Investigaciones en Ciencias de la Tierra, Universidad Michoacana de San Nicolás de Hidalgo, Morelia (Mexico)
- Institute of Geology - Università Autonoma di San Luis de Potosì (Mexico)
- Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Barcellona (Spain)
- University of Lausanne - (Swiss)

In this framework interuniversity exchange, involving visiting PhD students and researchers/professors from Universities and research centers, is very effective.

## Latest Publications

The Department, through the activity of the UNESCO Chair, aims to implement the Sendai Partnership 2015-2025 for the global promotion of disaster risk understanding and reduction, launched at the 3rd World Conference on Disaster Risk Reduction in Sendai (March 11-15, 2015). The Sendai Partnership is promoted by the International Strategy for Disaster Reduction (ISDR) and the International Consortium on Landslides (ICL), and has been accepted and signed at the United Nations World Conference on Disaster Risk Reduction (WCDRR). The signatories of this partnership are 17 interested stakeholders, both worldwide and national, including UNESCO, the Italian Government and the United Nations (UN) organization.

In June 2017, during the WLF4, the "Ljubljana Declaration" on the reduction of landslide risk was signed by this Department and by all participants at the forum as further commitment by the global scientific community on landslides at the Sendai partnership for the reduction of risks of disasters.

From 5 to 7 July 2017, the department participated, as a UNESCO chair, in the World Conference of UNESCO Chairs and the UNITWIN Networks in the field of Natural Sciences "Mobilizing the UNESCO Chairs in Natural Sciences for political action towards the 2030 Agenda" (held in Geneva). The results of deliberations and reflections have been expressed in the form of the "Geneva Milestone", a document whose guidelines describe how the UNESCO Chairs can contribute to the achievement of the 2030 Agenda, for a Sustainable Development through the "Sustainable Development Goals" (SDG). The latter, also known as Global Goals, are devoted to poverty reduction in developing countries, and are flanked by strategies to create economic development and combat climate change, protect the environment, and solve social problems including education, health, social protection, and equal job opportunities.

The department, as a member of the ICL, is contributing to drafting the “Kyoto 2020 declaration”. This commitment is aimed at promoting global disaster risk reduction as a contribution to the ISDR-ICL Sendai Partnership and will be signed by all participants in the fifth World Landslides Forum (WLF 5), scheduled for Kyoto in 2020.

In the framework of the international risk reduction policies, the department has contributed to the publication of two special volumes:

- Landslide Dynamics - ISDR-ICL Landslide Interactive Teaching Tools - Volume 1 (Fundamentals, Mapping and Monitoring) www.springer.com/gp/book/9783319577739;
- Landslide Dynamics - ISDR-ICL Landslide Interactive Teaching Tools - Volume 2 (Testing, Risk Management and Country Practices) http://www.springer.com/gp/book/9783319577760.

These are interactive publications, organized by the ICL, within the framework of the IPL (International Program on Landslides) and ISDR, which represent a summary of the foundations of the typology and dynamics of landslides on analysis, mapping, monitoring and risk management. They are addressed to the international scientific community, but in particular to all users engaged in policies of hydrogeological risk mitigation. Such volumes also provide a set of PPT and PDF files and text tools for the education and capacity building in the field of landslide analysis. All this material is the core of the Sendai partnership activity, and will be regularly updated and improved in the coming years, based on feedback from users and the experiences gained during its application.

At the European level, the department has contributed to the volume "Science for disaster risk management 2017", created by the Joint Research Center's Disaster Risk Management Knowledge Center. This is a leading scientific report, as a contribution to the Science and Technology Roadmap in the context of the Sendai Partnership. This report is the result of the multisectoral and multidisciplinary networking process, and represents the combined effort of over two hundred world experts in the field of natural disasters. (https://ec.europa.eu/jrc/en/publication/science-disaster-risk-management-2017-knowing-better-and-losing-less).

## Other Useful Information

Useful links to publications

Publications of the contact person an related structured teaching staff:

- Nicola Casagli:

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=56962779300

  SCHOLAR https://scholar.google.it/citations?user=0Ih3hOwAAAAJ&hl=it

- Filippo Catani

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=7003483555

  SCHOLAR https://scholar.google.it/citations?user=AO05VgQAAAAJ&hl=it

- Sandro Moretti

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=7103215933

  SCHOLAR https://scholar.google.it/citations?user=cP2ZmV8AAAAJ&hl=it

- Riccardo fanti

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=7003322469

  SCHOLAR https://scholar.google.it/citations?user=0IrBTSoAAAAJ&hl=it

- Giovanni Gigli

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=56273361300

  SCHOLAR https://scholar.google.it/citations?user=lOicqJMAAAAJ&hl=it

- Veronica Tofani

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=12752338800

  SCHOLAR https://scholar.google.it/citations?user=UBm2WQ4AAAAJ&hl=it

- Stefano Morelli

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=35790025800

  SCHOLAR https://scholar.google.it/citations?user=s8EpzvAAAAAJ&hl=it

- Federico Raspini

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=54795664100

  SCHOLAR https://scholar.google.it/citations?user=_GcWBIoAAAAJ&hl=it

- Silvia Bianchini

  SCOPUS https://www.scopus.com/authid/detail.uri?authorId=54930204200

  SCHOLAR https://scholar.google.it/citations?user=SEDsYwIAAAAJ&hl=it

Other Contact Information:

**Protection of cultural heritage**

The Department, as UNESCO Chair, participates to several national and international missions, in collaboration with UNESCO and official partners, to promote the protection of the World's cultural heritage threatened by geo-hydrological hazards. Some of the visited places are part of the UNESCO World Heritage list and are located in developing countries: Afghanistan (Bamyan, Herat, Shar-E-Zohak), Kyrgyzstan, Mongolia, Georgia (Vardzia and Katskhi), Giordania (Petra), Egypt, Ethiopia (Lalibela), Madagascar (Antananarivo), North Korea (Kogurio), Myanmar (Kyaiktiyo Pagoda), Nepal (Lumbini), Bolivia (Tiwanaku), Chile (Rapa Nui, Easter Island).

## Research Unit Contacts

- UNESCO chair on Prevention and sustainable management of geo-hydrological hazards (www.unesco-geohazards.unifi.it).
- Non-profit association GEOAPP ONLUS It pursues aims of social solidarity for the construction of a conscious society about the culture of Knowledge and environmental safety (http://www.geoapp-onlus.org/).

**Prof. Nicola CASAGLI**

Professor of Engineering Geology

University of Florence, Department of Earth Sciences

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UNESCO Chair Associate, University of Florence

Prevention and sustainable management of geo-hydrological hazards

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Web Facebook

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Vice President International Consortium on Landslides (ICL)

Vice President International Consortium on Geo-disaster Reduction (ICGdR)

# Faculty of Security Engineering
# University of Zilina, Slovakia

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Website: http://fbi.uniza.sk/

The Faculty of Security Engineering, University of Žilina, (FSE UNIZA) prepares security engineering experts with knowledge in methods of crisis management that are able to identify, analyze and assess risks in various types of environment, and to manage preventive activities and adequate response. It educates crisis managers, rescue service workers and experts in managing the processes of protection of persons and property. The Faculty is more than sixty years old and has established a stable position in the professional security and safety community in Slovakia and abroad.
It has developed cooperation with educational and research institutions, public administration institutions and business companies in the respective fields. The activities of the Faculty have been positively evaluated, even in the external environment. It has been continuously holding the 2nd place in the respective subject field in the academic ranking of Slovak universities, based on comparison of indicators of education and research activities.

Departments:

- Department of Security Management,
- Department of Crisis Management,
- Department of Fire Engineering,
- Department of Technical Sciences and Informatics,
- Department of Security and Safety Research.

FSE UNIZA in numbers:

- 47 faculty staff,
- 5 researchers,
- 39 Ph.D. students,
- 362 students at Masters level,
- 568 students at Bachelor level.

Further information: http://fbi.uniza.sk/en/

## Research Focus

The Faculty of Security Engineering has four departments specializing in different areas of security and safety and one Department of Security and Safety research.

**Department of fire engineering** research activities include organisational and technical aspects of fire safety, fire engineering, fire safety and prevention of technological processes, fire-fighting equipment, integrated rescue system and rescue services management.

**Department of security management** is involved in development of persons and property protection, primarily in the technical and technological areas. Alongside technical research, managerial and societal aspects of security are investigated.

**Department of technical sciences and informatics** is focused primarily on topics relevant to the protection of critical infrastructure elements, primarily in the energetics and transport.

**Department of crisis management** focuses primarily on the theory of crisis management, dealing with crisis events and clarification of their economic, social, psychological and other aspects. Furthermore, government-related topics of crisis management are integral part of department research.

Prof. Katarina Holla

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**DEPARTMENT OF SECURITY AND SAFETY RESEARCH**

Department prepares and solves research, developmental and educational domestic and foreign projects focused on basic areas of institutional research - improving crisis and security management in public administration and business companies, improving the level of fire safety, and comprehensive protection of persons, property, information and environment. The role of the department is identification of relevant funding schemes and calls, potential project partnerships, gathering and presentation of basic information about the possibilities of involving the faculty departments in research project activities. The department also provides support during the project proposal preparation and implementation phases.

**LABORATORY OF CRITICAL INFRASTRUCTURE OBJECT PROTECTION AND SECURITY RESEARCH**

The laboratory enables creation of training centers of protection systems for experimental research of resistance, efficiency and reliability of elements of alarm systems and mechanical barriers. The main purpose is to acquire input


data of simulation tools for quantitative assessment of protection level of strategic state facilities. The Laboratory enables measurement and assessment of: probability of intruder detection by alarm systems (electrical security systems, CCTV security systems, access control systems, electric fire alarms, alarm transmission systems), breakthrough resistance of mechanical barriers (opening fillers, locking systems, storage facilities), reliability of management and alarm systems in relation to the change of operation all conditions.

**LABORATORY OF CRISIS EVENTS SIMULATION**

The laboratory enables efficient and comprehensive preparation of crisis management experts for solving crisis phenomena using simulation technology. It is a unique department in Slovakia and in the European Union. Its main purpose is to increase the efficiency of decision making in application of intelligent systems. It enables simulation of various crisis phenomena in social, technical and natural environment. The optimized solution of emergencies requires to prepare crisis scenarios. They simulate negative effects of crisis phenomena on processes and prepare means and resources for their solution. Thanks to simulation technology, it is possible to verify and optimize the proposed measures and continuously improve the prevention measures.

**FIRE AND CHEMISTRY LABORATORY**

is a facility for small-scale fire testing including reaction -to-fire tests, determination of selected physical, chemical and fire properties of solid and liquid combustibles, analysis of behaviour of combustibles exposed to thermal stress and flame, and efficacy analysis of liquid hazardous substances neutralisation agents and sorbents.

Further information: http://fbi.uniza.sk/en/index.php?option=com_k2&view=item&layout=item&id=480&Itemid=543

## Jobs and Internship Opportunities

International mobilities on FSE UNIZA

Students (mainly Erasmus +):

incoming (Finland, Holland, Portugal, Estonia, Italy, Slovenia...),

outgoing (studying mobilities - almost the same number as for practical internships each academic year),

other mobilities (e.g. research internship on Iceland).

Teachers and other staff (Erasmus+, business trips, invited presentation):

incoming (e.g. Czech republic, Poland, Ukraine, Finland, Germany),

outgoing (e.g England, Czech republic, Bulgaria, Croatia, Poland, Estonia),

other mobilities (USA, Japan, Europe, Russia...)

Further information: http://fbi.uniza.sk/en/index.php?option=com_k2&view=item&layout=item&id=466&Itemid=526

## Otehr Useful Information

FSE UNIZA annually organizes several promotional and social events for students and general public. The Day of Open Doors is a biggest promotional activity not only for potential students of FSE UNIZA but also general public. Job opportunities, traineeships and study mobilities are presented on Career Days and Mobility Day at the Faculty. Other events, for example Team Rescuer, Blood Donation Day, FSE Student Dance Ball, Researcher's Night are very popular among the members of the academic community.

Further information of Facebook page:

https://www.facebook.com/Fakulta-bezpe%C4%8Dnostn%C3%A9ho-in%C5%BEinierstva-%C5%BDilinsk%C3%A1-univerzita-v-%C5%BDiline-1573477692932374/

# Stockholm Environment Institute (SEI) Sweden

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Website: https://www.sei.org/

Established in 1989 by the Swedish Government, the Stockholm Environment Institute (SEI) is an international non-profit research and policy organization that tackles environment and development challenges. We connect science and decision-making to develop solutions for a sustainable future for all.,

Over the decades, SEI has built a reputation for rigorous and objective scientific analysis in the field of environment and development. SEI is:

international – SEI is distributed across nine locations around the world, SEI works locally, regionally and globally, and has a diverse international staff.

trusted – both policy-makers and the academic community recognize us as an independent and non-partisan institute.

credible – our research is objective and supported by a rigorous system of internal and external peer review.

integrated – only joined-up research can solve joined-up problems. SEI places a strong emphasis on making connections across the natural, physical, and social sciences, allowing us to approach sustainability challenges from new angles and offer robust and insightful policy advice.

Today SEI operates through its eight centres around the world in Sweden, the UK, the US, Thailand, Kenya, Estonia and Colombia.

For more about SEI, please visit https://www.sei.org/

## Research Focus

SEI´s mission is 'to support decision-making and induce change towards sustainable development around the world by providing integrative knowledge that bridges science and policy in the field of environment and development'. SEI combines scientific research with policy analysis, turning knowledge into action by connecting its work to decision-makers and civil society, linking science with development, and promoting social and environmental sustainability. SEI always takes a highly collaborative approach: stakeholder involvement has always been at the heart of our efforts to build capacity, strengthen institutions, and equip partners for the long term.

Our work spans from climate, water, air, and land-use issues, and integrates evidence and perspectives on governance, to the economy, gender and human health. Specifically concerning disaster risk reduction, our recent work has been focusing on transforming the relationship between development and disaster risks, as well as integrating the global agendas on SDGs, Climate and the SFDRR.

For more about SEI, please visit https://www.sei.org/

SEI has eight globally distributed centers. For details and contact info for each of the centers, please see https://www.sei.org/about-sei/centres/

Ms. Karlee Johnson

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Ms. Guoyi Han

E-mail: guoyi.han@sei.org

## Latest Publications

The SEI Initiative on Transforming Development and Disaster Risk (TDDR) has been working to advance scientific knowledge and support policy and practice to enact transformations in disaster risk reduction (DRR) and sustainable development towards more equitable, resilient and sustainable societies.

For more: https://www.sei.org/projects-and-tools/projects/sei-initiative-on-transforming-development-and-disaster-risk/ and https://www.sei.org/publications/enabling-ambitious-agenda-transformation-development-disaster-risk/

## Institutional Capacity Development Activities

In recognition of our work, the Integrated Research on Disaster Risk (IRDR) programme – a decade-long research programme co-sponsored by the International Science Council (ISC) and the United Nations Office for Disaster Risk Reduction (UNISDR) – endorsed SEI as the host of the International Centre of Excellence on Transforming Development and Disaster Risk (ICoE-TDDR). ICoE-TDDR seeks to integrate development and DRR through combined approaches and action in scientific research, policy engagement and capacity development.

To lean more about ICoE-TDDR https://www.sei.org/projects-and-tools/projects/sei-initiative-on-transforming-development-and-disaster-risk/

## Jobs and international Opportunities

SEI frequently hosts interns. However, SEI does not have a global application process for internships, as internships are arranged directly with the different SEI centres.

For up-to-date listing: https://www.sei.org/people/jobs/

# Institute of Earth Sciences (ISTE)
# Faculty of Geosciences, University of Lausanne
# Switzerland

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Website: https://www.unil.ch/gse/fr/home/menuinst/faculte/english.html

**Mission statement**

At Institute of Earth Sciences (ISTE) we perform cutting-edge fundamental research to explore our planet's surface and interior and its evolution through space and time. We integrate fundamental research across all major domains within the Earth Sciences, and we investigate all spatial scales through time (full 4-D approach). We apply innovative methods in fieldwork-oriented, quantitative, experimental and computational Earth Sciences in order to generate an integrated understanding of the fundamental physical, chemical and biological processes that shape our planet. We aim to be among the leading Earth Science institutes worldwide in order to conserve current knowledge and to generate new fundamental knowledge. Our research and research-driven teaching programs address also the pressing societal needs for solutions of a challenging future in terms of natural hazards, CO2 storage, radioactive waste management, infrastructure in mountain regions, environmental and groundwater protection, natural resources and alternative energies, such as hydropower and geothermal energy. It is clear that a formidable challenge of mankind is the ever-increasing demand on water, mineral and energy supplies. Meeting this challenge is also a fundamental goal of our research and teaching programs in which we train the next generation of Earth Scientists who may eventually occupy leadership positions in industry, government and academia.

**Who we are**

The current organisational structure of ISTE was established in 2014 and includes members of four former institutes of the Faculty of Geosciences and Environment, namely the Institute of Geology and Paleontology, Institute of Mineralogy and Geochemistry, Institute of Geophysics and the Institute of Geomatics and Analysis of Risk. ISTE comprises currently ca. 110 collaborators with a working contract including 17 permanent research and teaching staff (Prof/MER/MA) and 21 PAT-collaborators (scientific, technical and administrative). The non-permanent members include currently one SNF-Professor, typically between 20 and 30 Postdocs (currently 24 including Premier Assistants, researchers with SNF-Ambizione grants and non-permanent PAT researchers, i.e. chargé de recherche) and between 35 and 55 PhD students (currently 50). Other collaborators are student assistants, persons doing community service and trainees. Furthermore, ISTE has more than 15 state-of-the-art-laboratories, two computational clusters and one scientific library, which also supports the scientific and teaching efforts of the Institute of Earth Surface Dynamics (IDYST) at UNIL and the School of Architecture, Civil and Environmental engineering (ENAC) at EPFL.

**The main research poles:**

ISTE has five general research pillars:

- Applied and Environmental Geophysics
- Geochemistry and Petrology of Earth Systems
- Geodynamics of Mountain Belts
- Geohazards and Risks in Mountainous Areas
- Paleoenvironment, Evolution of Life and Ocean Dynamics

Researchers from ISTE work on earth processes that can generate disasters such as:

- Landslides
- Risk analysis
- Earthquakes

They tackle such topics by field works, modeling and remote sensing survey. More specifically the research include also development about risk analysis and risk communications.

Prof. Michel Jaboyedoff

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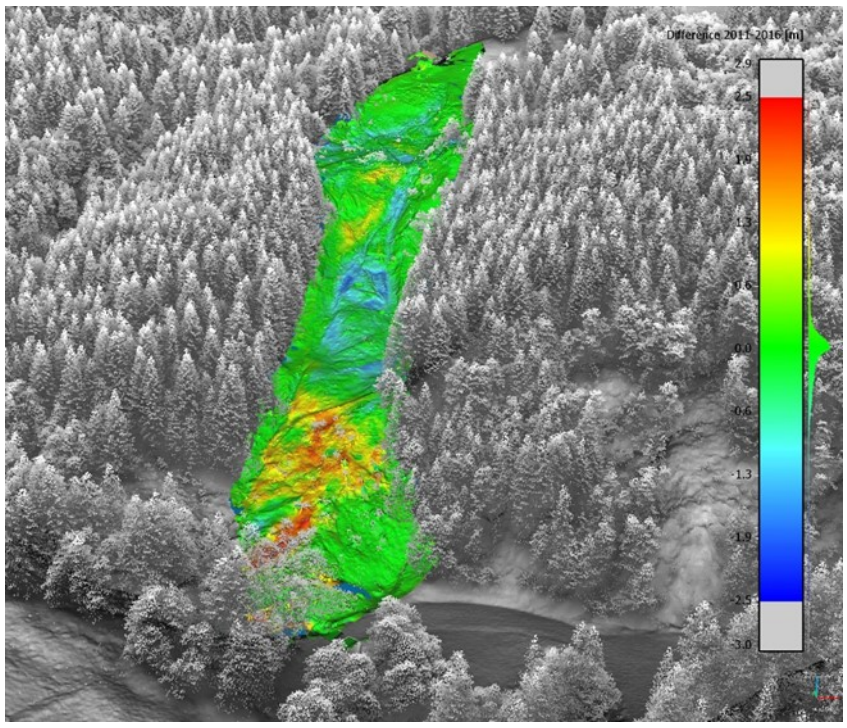
## Research Focus

**Geohazards and Risks in Mountainous Areas:**

The research has for its main goal the development of innovative solutions to (i) characterize slope mass movement processes (landslides, rockfalls, etc.) and sediment transfers, (ii) improve techniques of slope processes monitoring and 3D modeling of geological objects, (iii) provide hazard and risk assessments related to gravitational phenomena and (iv) support decision making in natural hazard mitigation and management. This is achieved by developing a fundamental process understanding. Various approaches are used for this purpose, combining fieldwork, remote sensing (with a strong focus on laser scanning), geomechanical analyses, numerical and analogic simulations and development of computer models.

The group is the former Institute of Geomatics and Risk Analysis. Risk analysis is mainly oriented toward the study of natural and environmental risks and their perception in the society, particularly by studying the phenomena on earth's surface and atmosphere that induce these risks. The research aims to quantify degradation, alteration and dismantling phenomena in the Alpine chain and other mountainous areas and to analyze the dangers and their impact on society. The teaching of the group turns towards the management of environmental risks and their societal impact.




Comparison between TLS point clouds of Pont Bourqin landslide (Switzerland) of April 2011 and May 2016 draped on Hi-Resolution DEM (Modified from Bièvre et al., 2018)

Train derailed in February 2013 (Switzerland), because of a wall failure caused by heavy rainfall, demonstrating the effect of aging of infrastructures.

## Latest Publications

- **Projects:**
- Rockfall susceptibility in Yosemite valley
- Pont Bourquin Landslide monitoring
- Rockfall modelling
- Landslide Hazard in Korbus (Tunisia)
- Lidar data analysis

**Publications in peer reviewed ranked journals**

**2019**


- Kouame A.A., Jaboyedoff M., Goula Bi Tie A., Derron M.-H, Kouame J. K., Meier C. (2019): Assessment of the potential pollution of the Abidjan unconfined aquifer by hydrocarbons. Geosciences 2019, 9(2), 60; https://doi.org/10.3390/geosciences9020060
- Le Breton M., Baillet L., Larose E., Rey E., Benech P., Jongmans D., Guyoton F., Jaboyedoff M. (2019): Passive radio-frequency identification ranging, a dense and weather-robust technique for landslide displacement monitoring. Eng. Geol., 1-10. doi.org/10.1016/j.enggeo.2018.12.027.


**2018**


- Voumard J., Derron M.-H., Jaboyedoff M., Bornemann P. and Malet J.-P. (2018): Pros and cons of SfM embarked on a vehicle to survey slopes along transportation lines using 3D georeferenced and coloured point clouds. Remote Sens. 2018, 10(11), 1732; https://doi.org/10.3390/rs10111732
- Ravanel L., Lambiel C., Duvillard P.-A., Jaboyedoff M. (2018): Recent evolution of an ice-cored moraine at the Gentianes pass, 2894 m a.s.l., Valais Alps, Switzerland. Land Degradation & Development: 29 (10), 3693-3708. doi.org/10.1002/ldr.3088
- Bièvre G., Franz M., Larose E., Carrière S., Jongmans D. and Jaboyedoff M. (2018): Influence of environmental parameters on the seismic velocity changes in a clayey mudflow (Pont-Bourquin Landslide, Switzerland). Eng. Geo., 245, 248-257. doi: doi.org/10.1016/j.enggeo.2018.08.013
- Voumard, J., Derron, M.-H., and Jaboyedoff, M. (2018): Natural hazard events affecting transportation networks in Switzerland from 2012 to 2016, Nat. Hazards Earth Syst. Sci., 18, 2093-2109, https://doi.org/10.5194/nhess-18-2093-2018.

- Carrière S.R., Jongmans D., & Bièvre G., Lanson B., Chambon G., Bertello L., Berti M., Jaboyedoff M., Malet J.P., Chambers J.E. (2018): Rheological properties of clay soils originating from flow-like landslides. Landslides, 15: 1615–1630.
- Matasci B., Stock G. M., Jaboyedoff M., Carrea D., Collins B.D., Guérin A., Matasci G., Ravanel L. (2018): Assessing rockfall susceptibility in steep and overhanging slopes using three-dimensional analysis of failure mechanisms. Landslides: 15:859–878. DOI 10.1007/s10346-017-0911-y
- Devkota, S.; Shakya, N.M.; Sudmeier-Rieux, K.; Jaboyedoff, M.; Van Westen, C.J.; Mcadoo, B.G.; Adhikari, A. (2018). Development of Monsoonal Rainfall Intensity-Duration-Frequency (IDF) Relationship and Empirical Model for Data-Scarce Situations: The Case of the Central-Western Hills (Panchase Region) of Nepal. Hydrology, 5, 27.
- Vulliez C., Tonini M., Sudmeier K., Devkota S., Derron M.-H., Jaboyedoff M. (2018): Land use changes, landslides and roads in the Phewa Watershed, Western Nepal from 1979 to 2016. Applied Geography: 94,.30-40.
- Tomás R., Abellán A., Cano M., Riquelme A., Tenza-Abril A. J., Baeza-Brotons,Saval J. M., Jaboyedoff M. (2018): A multidisciplinary approach for the investigation of a rock spreading on an urban slope. Landslides, 15:199–217, DOI 10.1007/s10346-017-0865-0
- Horton H., Jaboyedoff M., Obled C. (2018): Using genetic algorithms to optimize the analogue method for precipitation prediction in the Swiss Alps. Journal of Hydrology. 556: 1220–1231. https://doi.org/10.1016/j.jhydrol.2017.04.017

- **2017**

- Buckley, S. J., T. H. Kurz, M. Jaboyedoff, M.-H. Derron, and J. H. Chandler (2017): Virtual Geoscience Conference 2016: where geomatics meets geoscience, The Photogrammetric Record, 32(160), 346-349, doi:10.1111/phor.12220.
- Voumard, J., Abellán, A., Nicolet, P., Penna, I., Chanut, M.-A., Derron, M.-H., and Jaboyedoff, M. (2017): Using street view imagery for 3-D survey of rock slope failures, Nat. Hazards Earth Syst. Sci., 17, 2093-2107, https://doi.org/10.5194/nhess-17-2093-2017.
- Schmid-Siegert, E., et al. (2017): Low number of fixed somatic mutations in a long-lived oak tree. Nature Plants, 3(12), 926-929, doi:10.1038/s41477-017-0066-9.
- Losasso, L., Jaboyedoff M., and Sdao F. (2017): Potential rock fall source areas identification and rock fall propagation in the province of Potenza territory using an empirically distributed approach. Landslides, 14:1593–1602, DOI:10.1007/s10346-017-0807-x.
- Hermanns R.L., Oppikofer T., Jaboyedoff M., Clague J.J., Scarascia-Mugnozza G. (2017): Editorial: Introduction to the Special Issue “Slope Tectonics: Inherited Structures, Morphology of Deformation and Catastrophic Failure”, Geomorphology, 289, 1-2, DOI: 10.1016/j.geomorph.2017.05.011.
- Guerin, A., Abellán, A., Matasci, B., Jaboyedoff, M., Derron, M.-H., and Ravanel, L. (2017): Brief communication: 3-D reconstruction of a collapsed rock pillar from Web-retrieved images and terrestrial lidar data – the 2005 event of the west face of the Drus (Mont Blanc massif), Nat. Hazards Earth Syst. Sci., 17, 1207-1220, https://doi.org/10.5194/nhess-17-1207-2017.
- Nicolet, P., Choffet M., Derron M.-H., Jaboyedoff M., and Lauraux B. (2017): Evaporite sinkhole risk for a building portfolio, Environmental Earth Sciences, 76(12), 416, doi:10.1007/s12665-017-6730-6.
- Horton, P., Obled, C., and Jaboyedoff, M. (2017): The analogue method for precipitation prediction: finding better analogue situations at a sub-daily time step, Hydrol. Earth Syst. Sci., 21, 3307-3323, https://doi.org/10.5194/hess-21-3307-2017.
- Penna, I. Abellán Fernández A., Humair F., Jaboyedoff M., Fauqué L. (2017): The role of tectonic deformation on the occurrence of rock avalanche at Pampeanas Ranges (Argentina). Geomorphology, 289: 18-26. dx.doi.org/10.1016/j.geomorph.2016.07.006
- Rouyet L., Kristensen L., Derron M.-H., Michoud C., Blikra L.H., Jaboyedoff M., Lauknes T.R. (2017): Evidence of rock slope breathing using Ground-Based InSAR. Geomorphology, 289: 152-169. dx.doi.org/10.1016/j.geomorph.2016.07.005
- Kromer, R. A., Abellán, A., Hutchinson, D. J., Lato, M., Chanut, M.-A., Dubois, L., and Jaboyedoff, M. (2017): Automated terrestrial laser scanning with near-real-time change detection – monitoring of the Séchilienne landslide, Earth Surf. Dynam., 5, 293-310, doi:10.5194/esurf-5-293-2017.
- Horton P. H., Jaboyedoff M. J., and Obled C. O. (2017): Global Optimization of the Analogue Method by Means of Genetic Algorithms. Monthly Weather Review: 145 (4), 1275-1294. DOI: dx.doi.org/10.1175/MWR-D-16-0093.1
- Olyazadeh, R., Sudmeier-Rieux, K., Jaboyedoff, M., Derron, M.-H., and Devkota, S. (2017): An offline–online Web-GIS Android application for fast data acquisition of landslide hazard and risk, Nat. Hazards Earth Syst. Sci., 17, 549-561, doi:10.5194/nhess-17-549-2017.
- Ciurean R.L, Hussin H.Y., van Westen C.J., Jaboyedoff M., Nicolet P., Chen L., Frigerio S., Glade T. (2017): Multi-scale debris flow vulnerability assessment and direct loss estimation of buildings in the Eastern Italian Alps. Nat. Haz.,85: 929–957. doi:10.1007/s11069-016-2612-6

**Articles in edited books**

**2019**

- Jaboyedoff M. and Derron M.-H. (Accepted): Landslide analysis using laser scanner. In Tarolli P. (Ed.) Remote Sensing of Geomorphology. Elsevier.

**2018**

- Jaboyedoff M., Abellán A., Carrea D, Derron M.-H., Matasci B. and Michoud C. (2018): LiDAR Use for Mapping and Monitoring of Landslides. In Encyclopaedia of Natural Hazards, Singh R., Bartlett D. (Eds.). Taylor & Francis, p. 397-420.

## Institutional Capacity Development Activities

**Only in Lausanne in 2019: Laram School dedicated to landslide risks**

**LARAM School 2019 @ Lausanne - Switzerland (NEW)**

The next Edition of LARAM School will be held

@ University of Lausanne, Switzerland

**2 - 13 September 2019**

**http://www.laram.unisa.it/**

LARAM is an International School on "LAndslide Risk Assessment and Mitigation" of the Geotechnical Engineering Group (GEG) of the University of Salerno.

The 2-week long school for PhD students and young doctors is the main yearly initiative of LARAM.

For each edition of the school, 40 PhD students are selected to attend the residential courses, selected among applicants working in civil engineering, environmental engineering, engineering geology or related fields. The School can be also attended by 10 (max.) Young Doctors who defended their PhD thesis in the previous 5 years.

The courses include formal lessons, tutorials and field training.

## Contact Details

**Risk-group - Institute of Earth Sciences**

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http://www.unil.ch/risk/

# Evidence Aid, United Kingdom

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Website: http://
www.evidenceaid.org/

https://www.evidenceaid.org/who-we-are/

Evidence Aid was established following the tsunami in the Indian Ocean in December 2004. It uses knowledge from systematic reviews to provide reliable, up-to-date evidence on interventions that might be considered in the context of natural disasters and other major healthcare emergencies. Evidence Aid seeks to highlight which interventions work, which don't work, which need more research, and which, no matter how well meaning, might be harmful; and to provide this information to agencies and people planning for, or responding to, disasters. Our origins and research priorities are detailed on our website.

Our mission statement is "to inspire and enable those guiding the humanitarian sector to apply an evidence-based approach in their activities and decisions."

Our vision is that "those in need receive humanitarian aid in the most timely, effective and appropriate way possible."

Our objectives are as follows:

1.Establish Evidence Aid as the influential 'go-to' organisation for the evidence based approach towards humanitarian action.

2.Uphold and promote the value of evidence in health outcomes across sectors.

3.Identify the gaps in evidence for humanitarian aid and build the resources and network to address them.

Raise the capacity and commitment of those who guide the humanitarian sector to implement an evidence based approach.

## Research Focus

We know from bitter experience in health care that no matter how good the intentions, some interventions are useless or even harmful. Interventions that are not based on evidence can waste vast resources and hinder effective approaches that would speed up recovery and improve health outcomes. Decision-makers need access to relevant and reliable information to make the best possible choices. Evidence Aid exists to meet this need.

Since Evidence Aid was established in December 2004, nearly 1.6 billion people have been affected by disasters globally, with the estimated total cost of damages totalling over $1.3 trillion (USD) for the same period (2005-2013). Despite this real and pressing need, it is currently difficult to find information that might support informed decision-making in disasters and humanitarian emergencies. Relevant research is scattered across many academic journals and reports (both published and unpublished) and is produced by a wide variety of researchers and organisations from many countries.

Evidence Aid collates and analyses information so that it is easier to find, access, understand and use. Alongside this important work, the organisation identifies where new research is needed and facilitates systematic reviews as well as advocating for use of evidence to guide decisions. People are dying needlessly after disasters because of a shortage of what should be regarded as a human right: access to knowledge.

There is increasing recognition of the need to use research-based evidence in decision-making before, during and after the response to disasters and humanitarian emergencies. Evidence Aid is a flagship organisation meeting this demand. Making the best decisions amidst the stress and chaos of disasters and humanitarian emergencies is not easy. Evidence Aid will lead the transformation from decisions that are often based on opinion to those that are evidence-based.

Dr. Claire Allen, Operations Manager

E-mail: callen@evidenceaid.org

In 2013, Evidence Aid worked with individuals and organisations from around the world to prioritise the needs for evidence. A list of 30 priority questions was produced in June 2013 and the top 10 topics for research and reviews relevant to interventions and actions in disaster were agreed upon. The 10 priority research areas identified, and some of the key questions, are shown below. Some of these questions have been answered by the Humanitarian Evidence Programme, but many are yet to be systematically reviewed:

1. Water and sanitation – What are the most effective sanitation and hygiene related personal behaviours after a disaster?
2. Disaster preparedness – How effective and cost-effective is disaster preparedness in low and middle-income countries for reducing excess mortality?
3. Disaster response – What human resources and competencies are needed for each phase of disasters?
4. Nutrition and food security – What are the effects of emergency feeding programs (including the provision of food, cash and vouchers) during humanitarian emergencies?
5. Maternal and child health – Which interventions do most to reduce childhood morbidity and mortality, and improve wellbeing after a disaster?
6. Co-ordination of humanitarian relief – How should humanitarian aid be coordinated after a disaster?
7. Quality of data, assessment tools, evaluation and impact – Which health and non-health indicators should be used to measure outcomes for people in humanitarian emergencies?
8. Shelter – Which shelter and settlement strategies are optimal under which circumstances?
9. Disaster recovery – What is the most effective way of ensuring a continuum of care between the response and recovery phases after a disaster?
10. Mental health – How should existing mental health and psychosocial support interventions be adapted culturally for use in humanitarian emergencies?

Evidence Aid's work will reduce mortality and morbidity and speed recovery through the use of evidence-informed interventions, actions and strategies to help ensure that donors' resources will go further and do more to improve the health of affected populations. There is no equivalent to Evidence Aid or the vision we have for the disaster management field.

Whilst we have no dedicated research units, as you can see from the above, Evidence Aid works with researchers around the world to make systematic reviews relevant to the humanitarian sector available free at the point of use. We summarise each review with a short summary, and those short summaries are translated into Spanish and French.

We also produce Collections of evidence relevant to specific need – such as "The Health of Refugees and Asylum Seekers in Europe", "Zika", "Ebola", "Earthquakes", "Post Traumatic Stress Disorder", "Flooding and Poor Water Sanitation", "Burns" and "Windstorms". We are currently working on a collection "Nutrition in Emergencies" which will be published in early 2018.

## Institutional Capacity Development Activities and Jobs/Internship Opportunities

Evidence Aid provides training two or three times a year. The course title is "An introduction to systematic reviews in the humanitarian sector". This training opportunity is open to everyone (some have fees attached whilst some do not), and we hope, in 2019, to expand our courses to include "Conducting trials and evaluations in complex situations". All training opportunities currently on offer can be found here: http://www.evidenceaid.org/events-and-training/internal-training-events/

Any job vacancies are posted on our website here: http://www.evidenceaid.org/who-we-are/join-us/. We always have opportunities open for volunteers to join our team, and have hosted a Queen Elizabeth Scholar (2017) which we would be open to doing again (or equivalent).

## Useful links to Publications:

Our publications can all be found on our website as follows: http://www.evidenceaid.org/news/

**Other useful information:**

Information about Evidence Aid can be found on our website: http://www.evidenceaid.org/.

Our contact information can be found on our website: http://www.evidenceaid.org/contact-us/.

# Institute for Risk and Disaster Reduction (IRDR) University College of London United Kingdom

Gower Street, London WC1E 6BT
Tel: +44 (0)20 7679 2000
Website: https://www.ucl.ac.uk/rdr

Reducing the impact of disasters globally presents a colossal challenge that requires coordinated and collaborative action. The UCL Institute for Risk and Disaster Reduction (IRDR) brings together the wealth of knowledge and expertise across the university, and through research, teaching, public engagement and knowledge exchange aims to improve the understanding of risk and overcome the barriers to increasing resilience to disasters. Natural hazards such as earthquakes, volcanic eruptions, tsunami, floods and storms destroy lives and damage economies across the globe; pandemics have the potential to bring death and suffering on an unprecedented scale; while climate change may increase the severity of both natural and health disasters. How society sees risk, how to link understanding of the causative mechanics to statistical approaches, and how to increase resilience and reduce the risk of disasters are common themes cutting across research in natural, environmental, health and technological hazards. UCL is uniquely well-placed to lead research and teaching in risk and disaster reduction, with at least 70 academics across 12 departments and seven faculties involved in world-class research and practice in the field. The IRDR, with its new academic staff, many jointly appointed with key UCL departments, its rapidly growing trans-disciplinary PhD research centre, integrative masters teaching, programme of public events and partnerships with humanitarian, financial, research and civil protection organisations, seeks to bring together this diverse expertise at UCL. We aim to maximise the impact and value of UCL activities and to increase and enhance cross-disciplinary collaboration and cooperation globally. We are part of the UCL Grand Challenges of Global Health, Sustainable Cities, Intercultural Interaction and Human Wellbeing.

## Research Focus

Risk society

- public perception of risk
- how diverse societies deal with disaster

Understanding natural hazards: Geological and meteorological

- field and satellite observations
- laboratory simulations
- computational and statistical modelling

Understanding health risks and pandemics

- transmission characteristics of the infectious agents
- epidemiology of pandemics

Technological hazards

- risks to radioactive waste and CO2 repositories
- complex engineered systems

Understanding climate change and natural hazards

- extreme weather
- climate forcing of geological hazards

Engineering for hazards and disasters

- planning and design codes
- innovative design and construction

Managing hazards and disasters

- disaster risk reduction
- resilience and recovery

Prof. David Alexander
E-mail: david.alexander@ucl.ac.uk
Prof. Peter Sammonds
E-mail: p.sammonds@ucl.ac.uk

## Research Unit Contacts

- IRDR Centre for Gender and Disaster. Prof Maureen Fordham. m.fordham@ucl.ac.uk
- IRDR Centre for Digital Public Health in Emergencies. Dr Patty Kostkova p.kostkova@ucl.ac.uk
- Cascading Disaster Research Group. Dr Gianluca Pescaroli. gianluca.pescaroli.14@ucl.ac.uk
- Conflict and Disaster Hub. Dr Bayes Ahmed. bayes.ahmed@ucl.ac.uk

## Latest Research Reports / Results

UCL IRDR academics contribute to commission that finds that harmful, unfounded myths about migration and health have become accepted and used to justify policies of exclusion. 6 December 2018

Press release on UCL Lancet Commission on migration and health

UCL IRDR academics contribute to commission that finds that harmful, unfounded myths about migration and health have become accepted and used to justify policies of exclusion. 6 December 2018

Disaster Science is one of five key themes for partnership between UCL and Tohoku University

UCL and Tohoku University signed a Memorandum of Understanding on Thursday 11th October 2018 as part of the kickoff partnership event. 25 October 2018

**Rohingya Journeys of Violence and Resilience in Bangladesh and its Neighbours**

University College London (UCL) - Institute for Risk and Disaster Reduction and Humanitarian Institute - was successful in being awarded a project, "Rohingya Journeys of Violence and Resilience in Bangladesh and its Neighbours: 4 October 2018

UCL Institute for Risk and Disaster Reduction awarded funding for research into Rohingya Crisis

Professor Peter Sammonds (UCL IRDR) and his team have been awarded funding by the British Academy to pursue research designed to help tackle the United Nations' Sustainable Development Goals. 3 October 2018


IRDR Publishes in the Lancet Global Health on Rohingya Crisis

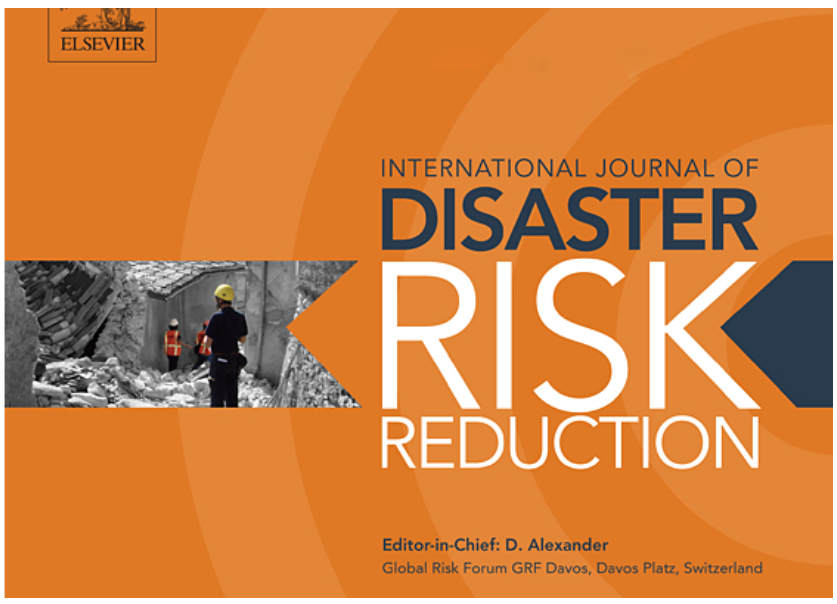
UCL Institute for Risk and Disaster Reduction (IRDR) in collaboration with colleagues from the UCL Institute for Global Health (IGH) has published a comment on Rohingya issues in the Lancet Global Health Journal (Impact factor of 17·686). 9 May 2018

**IRDR MSc student alumni publishes paper on Early Warning and Temporary Housing based on his MSc project**

A collaboration between UCL-IRDR and IRIDeS-Tohoku University Angus Naylor, an IRDR Masters student alumni and Masters Prize Winner, has published the research conducted for his Independent Research Project in the International Journal of Disaster  5 June 2018

**New Risk and Disaster Management pathway available for 2018/19**

For next year, 2018-19, a Risk and Disaster Management optional pathway will become available in the IRDR MSc Risk and Disaster Science where students will be able to select up to 2 optional modules from the UCL School of Management. 23 May 2018




**SI on Cascading Crises IJDRR-New Papers Online**

The papers of the Special Issue "Understanding and mitigating cascading crises in the global interconnected system", hosted by the International Journal of Disaster Risk Reduction, have been released online. 25 March 2018

**Tracing how disaster impacts escalate will improve emergency responses**

Mapping common pathways along which the effects of natural and man-made disasters travel allows more flexible and resilient responses in the future, according to UCL researchers. 11 January 2018

## Institutional Capacity Development Activities

- MSc Risk, Disaster and Resilience
- MSc Risk and Disaster Science
  - Management Pathway
  - Data Science Pathway
- MSc Space Risk and Disaster Reduction
- MRes Risk and Disaster Reduction
- PhD Risk and Disaster Reduction
- (all for 1 year duration, September 2019 start)
- Humanitarian Masterclasses (1 day – 4 per year)
- Enterprise Workshops (1/2 – 1 day – 4 per year)

## Jobs/ internship/ exchange opportunities

Exchange researchers and students hosted throughout year.

# Risk and Resilience Programme
# Overseas Development Institute (ODI)
# United Kingdom

203 Blackfriars Rd, London SE1 8JN, United Kingdom

Tel: +44 (0) 207 922 0300

Fax: +44 (0) 207 922 0399

Website: https://www.odi.org/our-work/programmes/risk-and-resilience

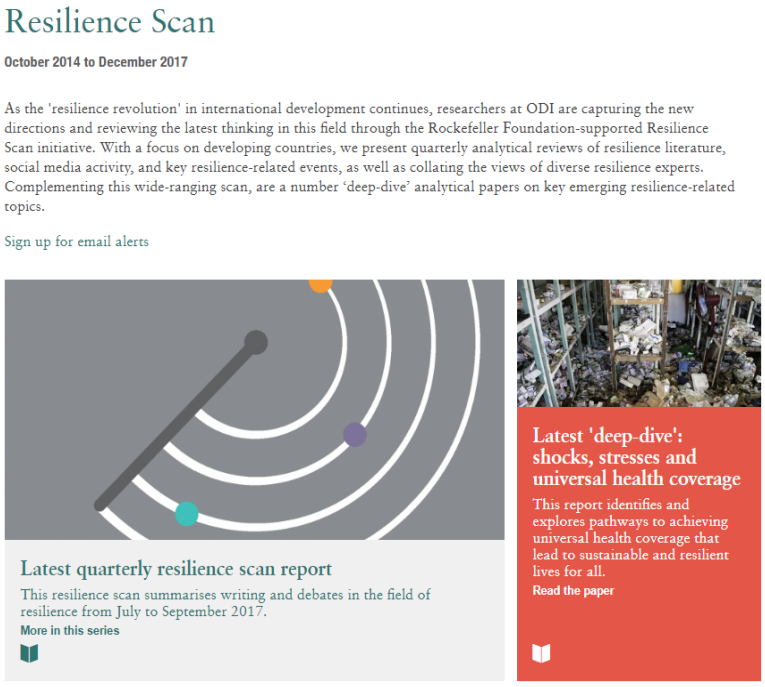
The Overseas Development Institute (ODI) is a leading independent think tank on international development and humanitarian issues. Our mission is to inspire and inform policy and practice which lead to the reduction of poverty, the alleviation of suffering and the achievement of sustainable livelihoods in developing countries.

We do this by locking together high-quality applied research, practical policy advice and policy-focused dissemination and debate.

ODI tailors its research products to different audiences. Alongside rigorous research reports, ODI has a strong focus on the production of policy- and practitioner-focused documents and events, including policy briefs and briefing papers in accessible formats. These include our ODI Insights series, which provides short, relevant and actionable recommendations for policy-makers, and our 10 things publications, which support the dissemination of important messages and facts in an engaging infographic format.

ODI works across a range of sectors that have a direct impact on the well-being of the poorest people in developing countries. This work is governed by a set of six core values:

- Independence – Our work is independent from our funders. Staff are able to challenge donor thinking and policy and the wider development consensus.
- High quality – We ensure best practice, innovative approaches and continuous improvement in our research, policy advice and public affairs.
- Fairness, diversity and equality – We treat all staff and partners fairly and with respect.
- Working together – We continuously work to foster better relationships throughout the organisation. We believe that, by working together in a supportive environment, we will achieve more and have greater impact.
- Transparency and accountability – We report openly on our use of public funds, and fully communicate our work to our donors, research subjects and partners.
- Sustainability – We use resources in a sustainable way, conscious of our impact on the environment.




ODI's **Risk and Resilience Programme** delivers high-quality research, analysis and policy advice on the distribution of risk, the impacts of climate, weather extremes and other hazards on development and the political economy of resilience strategies.

## Research Focus

ODI has more than 230 staff, including researchers and specialist communications and support staff. Working with partners across the public and private sectors, we help to bridge the gap between research and policy, using innovative communications to mobilise and inform a range of different audiences.

The focus of ODI's Risk and Resilience research is to:

- Understand current and emerging risks at the global, regional, national and sub-national levels, and their implications for poverty, vulnerability, economic growth and sustainable development.
- Analyse the distribution and differential impacts of risk management strategies.
- Identify strategies for building resilience in relation to risks in areas ranging from climate, extreme weather events and geophysical hazards to infrastructure investment, urbanisation, rural livelihoods and disasters.
- Develop analytical frameworks that explore inequalities in the distribution of risk and risk management capabilities.

Dr. Emma Lovell, Research Fellow

E-mail: e.lovell@odi.org.uk

Examples include:

ODI's policy advice and outreach has supported governments, donors and practitioners across the world to improve the uptake of risk management and resilience-building approaches. In addition to bespoke advice and projects, ODI has achieved this through our role in major networks including the Climate and Development Knowledge Network (CDKN).

ODI has played (and continues to play) a critical role in promoting adaptation and resilience in post-2015 disaster, climate and development agreements, including shaping the outcomes of the Sendai Framework for Disaster Risk Reduction and the World Humanitarian Summit.

We have a strong track record in knowledge dissemination, partnering and acting as intermediaries between climate scientists, social scientists and decision-makers, including in our role as the Knowledge Manager for the BRACED programme (Building Resilience and Adaptation to Climate Extremes and Disasters) and as the lead institute for PRISE (Pathways to Resilience in Semi-arid Economies).

We also provide regular insights and analysis to deepen and broaden knowledge of resilience across sectors and disciplines, including leading the Resilience Scan initiative.

Specific expertise within the Risk and Resilience programme includes:

Disaster risk reduction, community resilience and the socio-economic impact of disasters.

Resilience in difficult environments, including conflict-affected and fragile states.

Urbanisation and the governance of climate and disaster risk.

Governance and institutional change.

Climate risk information and communications technology.

Frameworks and measurement.

Gender equality and social inclusion.

Semi-arid economies and ecosystems.

Research Unit Contacts\

ODI has 14 core **research programmes**:

Agricultural Development and Policy

Chronic Poverty Advisory Network

Climate and Energy

Development Strategy and Finance

Growth, Poverty and Inequality

Humanitarian Policy Group

International Economic Development Group

Politics and Governance

Public Finance and Institutions

Research and Policy in Development

Risk and Resilience

Social Development

Social Protection and Social Policy

Water Policy

ODI also hosts a number of flagship projects

ALNAP

Budget Strengthening Initiative

Building Resilience and Adaption to Climate Extremes and Disaster (BRACED)

Chronic Poverty Advisory Network

Climate and Development Knowledge Network

Climate Funds Update

Deliver2030.org

Development Progress

DFID-ESRC Growth Research Programme (DEGRP)

Evidence-based Policy in Development Network

Gender and Adolescence: Global Evidence (GAGE)

Humanitarian Practice Network

New Climate Economy

Pathways to Resilience in Semi-Arid Economies (PRISE)

Secure Livelihoods Research Consortium

Supporting Economic Transformation (SET)

We also run the ODI Fellowship Scheme. Read more in our Annual Report.

## Institutional Capacity Development Activities

We run an intensive senior-level course for humanitarian professionals taught by the Humanitarian Policy Group (HPG) and the London School of Economics and Political Science (LSE). The next course will be held on 18–22 June 2018.

## Latest Publications

ODI's Risk and Resilience Programme published a range of reports and working papers in 2017, notably Delivering disaster risk reduction by 2030: pathways to progress, which examined countries' individual progress and reporting under the Hyogo Framework for Action, and how lessons can be drawn to help achieve the Sendai Framework for Disaster Risk Reduction 2015–2030. Case studies covered a range of examples from low - and middle-income countries, each with varied risk levels, starting points and trajectories of progress.

In 2017, we undertook a project to understand people's choices and efforts to rebuild following disasters in Nepal and the Philippines, and produced a working paper looking at how households recover from disasters in situations where little or no support is available from humanitarian agencies. We also produced a report with UNDP examining the links between climate change, migration and displacement, breaking down the often sensational claims made by the media and examining the complex links between the effects of climate change and human mobility. Other research explored the next frontier for disaster risk reduction: tackling disasters in fragile and conflict-affected contexts.

Our Resilience Scan initiative (supported by The Rockefeller Foundation) has delivered a series of quarterly publications reviewing and summarising the latest trends in resilience from grey and academic literature, debates and social media, alongside expert views on:

i) self-recovery for resilience;

ii) transboundary adaptation; and iii) coastal resilience. We also produced several 'deep-dives' on key emerging resilience-related topics in 2017, including how i) universal health coverage; ii) risk insurance; and iii) solar household systems can support overall resilience.

Highlights from two other long-term programmes, Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) and Pathways to Resilience in Semi-arid Economies (PRISE), both of which began in 2014, are provided below.

BRACED aims to build people's resilience across the Sahel, East Africa and Asia. ODI leads the BRACED Knowledge Manager, which generates evidence and learning on resilience and adaptation in partnership with BRACED projects and the wider resilience community. In 2017, BRACED launched The Resilience Exchange, which looks at what has been learned across the diverse projects, presenting stories, research, evidence and learning. BRACED has recently been awarded a 21-month extension, taking the programme to the end of 2019.

PRISE works with decision-makers in local and national governments, businesses, business support agencies and trade bodies in semi-arid regions of Senegal, Burkina Faso, Kenya, Tanzania, Ethiopia, Pakistan, Tajikistan and Kyrgyzstan to build climate-resilient economic development. In 2017, PRISE published a range of publications, including Value Chain Analysis for Resilience in Drylands (VC-ARID): Identification of adaptation options in key sectors, which identifies opportunities for economic transformation and diversification in semi-arid areas of PRISE countries by integrating sectors rooted in semi-arid lands, including cotton and livestock, into national economies.

ODI researchers also took part in several high-level meetings in 2017, including the Global Platform for Disaster Risk Reduction and the United Nations Climate Change Conference (COP23). For more information about our publications, research and events, please visit odi.org.uk.

## Job/internship opportunities

Our **online job application system** list current job opportunities at ODI and details on how to apply: https://jobs.odi.org.uk

We also run a Fellowship Scheme, open to candidates of all nationalities provided they have a master's degree or PhD in economics, statistics or a related discipline. The Fellowship Scheme gives postgraduate economists and statisticians the chance to work in developing country public sectors as local civil servants on two-year contracts. For more information on the fellowship scheme and how to apply, please visit: https://www.odi.org/fellowship-scheme/apply

**Other Useful Contact Information:**

Overseas Development Institute (ODI)

203 Blackfriars Road

London SE1 8NJ

UK

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Fax: +44 (0)20 7922 0399

General enquiries: odi@odi.org

Twitter: @odidev and @odiclimate

# Disaster and Development Network (DDN), Department of Geography and Environmental Sciences, Northumbria University United Kingdom

B308 Ellison Building, Newcastle upon Tyne NE1 8ST, UK

Tel: +44-0191 227 4215

Website: https://www.northumbria.ac.uk/ddn

Disaster and Development Network (DDN):

*'Engaging research, policy, practice and civil society in disaster reduction and sustainable development'*

The Disaster and Development Network (DDN) aims to develop through research, teaching and learning, the knowledge and skills to address hazards, disasters and complex emergencies from the perspective of different development debates and experiences. The Network undertakes research, teaching and learning activities that encompass disaster reduction, sustainable development and resilience building. By necessity an inter-disciplinary field of inquiry, disaster and development studies at Northumbria address human security and wellbeing for individuals, groups and institutions in contexts of current and potential crises. Northumbria University launched the DDN in 2004 in association with its acclaimed postgraduate programme in Disaster Management and Sustainable Development that is hosted by the Department of Geography and Environmental Sciences. Our work has included research, enterprise and capacity building activities in 25 countries for multiple national, international and local organisations since 2000. This includes regularly hosting and developing major events associated with this field in locations around the world.

The work of the DDN has been supported by the Department for International Development, European Union, Economic and Social Research Council (ESRC), Natural Environment Research Council (NERC), British Council, UK Knowledge Transfer Partnerships, United Kingdom Research and Innovation and various institutions of the United Nations amongst other sources. It has contributed to numerous key policy processes including placing disaster risk reduction within outputs from the Intergovernmental Panel on Climate Change (IPCC), the International Strategy for Disaster Reduction, World Health Organisation, United Nations Development Programme and other regional, national and global institutional contexts. Project work is also often typically grounded within local community and household level actions.

Disaster Management and Sustainable Development at Northumbria has delivered over 300 MSc and doctoral students into related State, NGO, private and academic sectors around the world.

Prof. Andrew Collins

E-mail: andrew.collins@northumbria.ac.uk

## Research Focus

The DDN focuses on key themes of hazard, risk reduction, sustainable development, resilience and well-being to provide an evidence base for influencing policy and new practices. The approach extends regularly into transdisciplinary approaches that are closely linked to bringing a people centred framing of risk, adaptation and disaster management for societal transitioning and transformation. This in particular includes building the knowledge base from project outcomes that increase understanding of vulnerability, sustainability, resilience, engagement, health and communication in changing human and physical environmental conditions. The work of the DDN from Northumbria spans the following main interest areas:

• **Disaster Resilience and Human Security** - including; Community Based Disaster Reduction, Disaster Education and Communication, Sustainable Livelihood Security, Natural Resources Management, Rights Based and Conflict Risk Reduction  Approaches to Peace.

• **Health Centred Disaster Risk Reduction** - including; Health Security, Infectious Disease Risk Management, Integrated Approaches to Mental Health and Well-being in Contexts of Recovery.

• **Wellbeing in Disaster and Development** - including; Social Care in Disaster and Development, Gender and Disaster, Migration and Displacement.

♦**Disaster Response and Adaptation** - including; Integrated Emergency Management,  Relief and Restoration and Climate Change Adaptation, Engagement and Impact.

Examples of current activity:

### Global Challenges Research Fund (UKRI - GCRF) Multi-hazard Urban Disaster Risk Transitions Hub

This GCRF Hub led by Edinburgh University for which Northumbria's DDN is a CI Institution will begin from 1st March, 2019. This is a £19.54 million interdisciplinary grant with many partners and will run for five years focusing on five urban areas: Nairobi, Kathmandu, Istanbul, Quito and Managua.

### UN STAG Data Working Group – United Nations International Strategy for Disaster Reduction

The DDN is researching 'Action Data' for the UNISDR Science and Technology Advisory Group's steering of implementation of the Sendai Framework for Disaster Risk Reduction (SFDRR, 2015 – 2030). The aim of this research, which is a part of the wider role in leading the Data Working Group is to deepen understanding of how data is contributing to the expected outcomes of the SFDRR. The initial survey process begins as qualitative so as to collate insight from a wide range of those engaged in allied aspects of disaster risk reduction globally.

### Risk Communication – No Strings International

Research with DDN partner organisation No Strings International was supported through much of 2018 through the ELRHA Humanitarian Innovation Fund (HIF) with whom there is ongoing field engagement and follow up. The research included a combination of desk based work and up to two field visits to East Africa during this year. The project has been transitioning boundaries of community based theories of behaviour change in contexts of structural depravation and hygiene management; it is also linked to earlier DDN development work on Infectious Disease Risk Management (IDRM) supported by DFID and on Health Security for Disaster Resilience (ESRC). Following the work in Nairobi suburbs one of our researchers, Becky Richardson, has been continuing the 'puppet lead people's facilitation and communication' investigations alongside No Strings amongst Rohingya refugees in southern Bangladesh.

Evaluative research with the United Nations Development Programme (UNDP) programme in Mozambique on 'strengthening national capacities and frameworks for disaster risk reduction and climate change adaptation' was successfully concluded in March 2018. This work built upon an earlier DDN round of research with the UNDP of its national strategy carried out in 2012.

### Domestic Sprinklers Draft Action Plan for Tyne and Wear Fire and Rescue Service post evaluation research study

This initiative, led by Richard Kotter, was concluded during 2018 and is likely to help continue the close association over the years with the TWFRS, UK. The research helped TWFRS with their Organisational Action Plan that was updated following the fallout from the Grenfell disaster. The study highlighting experiences, costs, benefits, challenges, opportunities and learning points associated with the successful Domestic Sprinkler Partnership launched by Tyne and Wear Fire and Rescue Service (TWFRS) in 2012 as part of its Ultimate Protection Policy. This aims to prevent and protect those most vulnerable in its communities, for whom the risk of fire may be greater and its effects potentially more damaging.

## Latest Publications

- Abedin, A., Collins, A.E., Hababi, U. and Shaw, R. (2019) 'Climate Change, Water Scarcity, and Health Adaptation in Southwestern Coastal Bangladesh', *International Journal of Disaster Risk Science*, 10:1, pp.28-42.
- Taylor, P.J., Obrien, G. and O'Keefe, P. (2019) *Jane Jacobs and Anthropogenic Climate Change: From Urban Demand to Terminal Consumption*, (in press).
- Brauch, H.G., Oswald Spring, U., Collins, A.E. and Serrano Oswald, S.E. (Eds.)(2018) *Climate Change, Disasters, Sustainability Transition and Peace in the Anthropocene*, Springer.
- Roosli, R. Rusdi, Mohd Sanusi, M., Ahamad, S. and Collins, A.E. (2018) *An Indonesian Study of Mixed Methods: An Example of Methodological Triangulation*, Cambridge Scholars Publishing, UK.
- Eburn, M., Collins, A.E. and Da Costa, K. (2018) 'Recognising limits of international law in DRR as problem and solution', in Samuel, K., Aronsson-Storrier, M. and Bookmiller, K.N. (Eds.) *The Cambridge Handbook of Disaster Risk Reduction and International Law,* CUP.
- Collins, A.E. (2018) 'Advancing Disaster and Conflict Risk Reduction', in Brauch, H.G., Oswald Spring, U., Collins, A.E. and Serrano Oswald, S.E. (Eds.) *Climate Change, Disasters, Sustainability Transition and Peace in the Anthropocene*, Springer. pp.7-26.
- Collins, A.E. (2018) 'Advancing the disaster and development paradigm', *International Journal of Disaster Risk Science*, 9:4, pp.486-95.
- Collins, A.E. (2017) 'Applications of disaster risk reduction principles and operational mechanisms to migration in contexts of instability', in Sudmeier-Rieux, K., Jaboyedoff, M., Fernandez, M., Penna, I. and JC Gaillard (Eds.) *Identifying Emerging Issues in Disaster Risk Reduction, Migration, Climate Change and Sustainable Development'*, Springer. pp.127-44.
- Rahman, G., Rahman, A., Khan, S. and Collins, A.E. (2017) 'Geospatial analysis of landslide susceptibility and zonation in Shahpur Valley, Eastern Hindu Kush using frequency ration model', *Proceedings of the Pakistan Academy of Sciences*, 54:3, pp.149-163.
- Mavhura, E., Manyena, S.B. and Collins, A.E. (2017) 'Measuring social vulnerability in context: the case of Muzarabani in Zimbabwe', *Geoforum*, 86, pp.103-114.
- Collins, A.E., Tatano, H., James, W., Wannous, Cl, Takara, K., Murray, V., Scawthorn, C., Mori, J., Aziz, S., Mosalam, K.M., Hochrainer-Stigler, S., Alcántara-Ayala, I., Krausmann, E., Li, W.S., Cruz, A.M., Samaddar, S., De-Groeve, T., Ono, Y., Berryman, K., Suzuki, K., Parry, M.A., McGowran, P., and Rees, J.G. (2017) 'The 3rd Global Summit of Research Institutes for Disaster Risk Reduction: Expanding the Platform for Bridging Science and Policy Making', *International Journal of Disaster Risk Science*, 8:2, pp.224-230.

## Institutional Capacity Development Activities

- MSc Disaster Management and Sustainable Development

  https://www.northumbria.ac.uk/study-at-northumbria/courses/disaster-management-and-sustainable-development-with-advanced-practice-msc-ft-dtsdds6/
- MSc Safety, Health and Environmental Management
- MSc Environmental Monitoring, Modelling and Reconstruction
- PhD Programme in Disaster Management, Sustainable Development and related areas.

## Internships and Job Opportunities

The DDN comprises internal affiliates of the University of Northumbria and external affiliates.

The DDN also hosts visiting professorships and visiting research fellowships that are appointed by the Universities Visiting Title scheme.

# Global Public Health, Public Health England PHE) United Kingdom

Wellington House, 133-155 Waterloo Road, London
SE1 8UG

Tel: +41 020 7654 8000

Fax: +44 (0)1792 513100

Website: https://www.gov.uk/government/organisations/public-health-england

Public Health England (PHE) is an executive agency of the UK Department of Health, and a distinct delivery organisation with operational autonomy to advise and support the government, local authorities and the NHS in a professionally independent manner.

PHE was established on 1 April 2013 to bring together public health specialists from than 70 organisations into a single public health service.

PHE employs 5,500 staff (full-time equivalent), mostly scientists, researchers and public health professionals.

PHE has 8 local centres, plus an integrated region and centre for London, and 4 regions (north of England, south of England, Midlands and east of England, and London).

PHE works closely with public health professionals in Wales, Scotland and Northern Ireland, and internationally.

PHE's research within global disaster risk reduction aims to ensure public health and science has a prominent role in the Sendai framework. A review of the work undertaken by Public Health England under the Sendai Framework for Disaster Risk Reduction 2015 to 2030 was published in 2017: **Public Health England and the Sendai Framework for Disaster Risk Reduction 2015-2030.** To achieve this, PHE regularly conducts robust, evidence-based research into disaster risk reduction. Our research is conducted on the understanding that disasters don't recognise borders, and so protecting the health and wellbeing of the UK involves a commitment research on global issues.

## Research Focus

The Public Health England (PHE) research annual review includes information about strategy, funding and peer reviewed publications. The latest annual review summary is provided below:

**PHE research 2017 to 2018: annual review** which states:

**Public Health England: a leader in public health research**

During 2017 to 2018, Public Health England (PHE) continued to enhance its status as an excellent research organisation, undertaking a very wide range of studies, and publishing findings in 910 peer reviewed papers, many in the world's most acclaimed scientific and clinical journals.

This report profiles research carried out by PHE, often in partnership with academics, clinicians and field researchers from across the globe which was supported by funding from the public and other sectors. It shows how this research has yielded evidence that underpins the development of programmes to protect and improve public health. It also shows how PHE discharges its responsibilities as a public health organisation.

PHE also offers a very rich learning and training environment which offers a step-up for public health researchers towards a rewarding career. PHE contributes significantly to training the next generation of researchers, with just over 70 PhD students from institutions across the globe spending a significant portion of their training time in PHE.

These students, while bringing their expertise to the UK, in return gain insights into how research informs practice and policy, either in national or local public health programmes or in mitigation of the impacts of outbreaks, disasters and other emergencies globally.

Key findings published by PHE and collaborators during the year came from work done during the response to the 2013 to 2016 West African Ebola virus outbreak. PHE staff undertook critical roles by being directly deployed overseas to front line diagnostics laboratories and treatment centres. The ongoing Ebola outbreak in the Democratic Republic of Congo (DRC), which is now the second largest in history, highlights the continued threat from this pathogen.

Whether for Ebola or Zika, immunization or antibiotics, radiation or physical activity, research is essential for a public health organisation to move forward, allowing it to develop and apply its evidence base and expertise. Every health improvement programme, every emergency response is a learning opportunity but only if we apply appropriate research methodologies with scientific rigour so that the knowledge we gain document and disseminate is reliable.

The following case studies provide just a few key highlights from the wide range of activities that PHE are involved in. We are proud to be among the world's most research active health agencies.

Prof. Virginia Murray

E-mail: Virginia.Murray@phe.gov.uk

**Case study 1**

*1.1 How do we know if vaccine programmes are effective?*

PHE provided early analysis of vaccine effectiveness for the teenage MenACWY vaccination programme, instigated as an emergency response to the rapid increase in cases of meningitis and septicaemia caused by a highly virulent group W meningococcal (MenW) strain in healthy children and adults. The UK experience has served to aid decision-making in other countries across Europe and Australia where the same hypervirulent MenW strain emerged.

*The challenge*

In February 2015, the UK expert Joint Committee on Vaccination and Immunisation recommended that teenagers and new university entrants should be offered MenACWY vaccine as an emergency response to an outbreak of MenW disease with a high case fatality rate.

The programme was announced by the (then) Department of Health in June 2015 and immunisation of the oldest teenage cohort began in August that same year. The timeline was critical for offering protection to new university entrants during their period of highest risk.

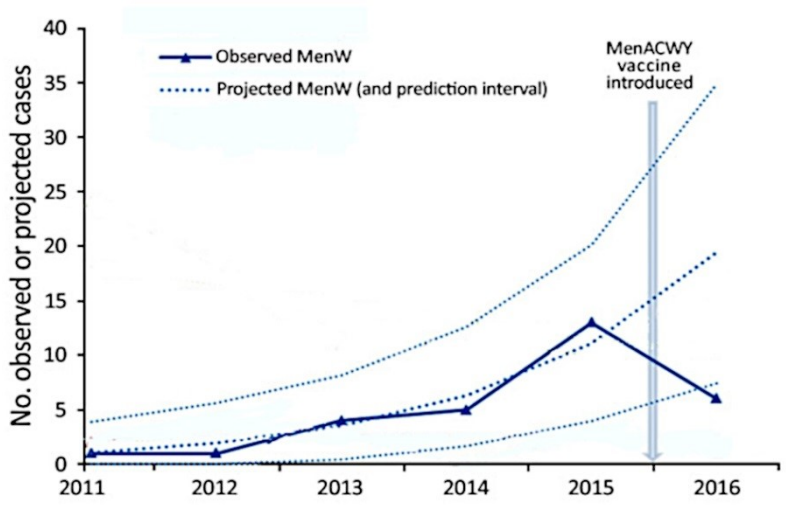
There were challenges in motivating older teenagers to take up the offer of MenACWY vaccination despite PHE previously describing the serious consequences of MenW disease in this age group.

The approach taken in the UK was different from that employed in Chile, where children under 5 years were targeted for the same vaccine and disease reduction was observed only in the vaccinated age groups. The UK programme offered the vaccine to teenagers who have the highest meningococcal carriage rates, meaning that the programme would not only provide direct protection for the teenagers but broader population protection through interruption of carriage.

Impact—This early analysis of the MenACWY programme in England provided clear evidence of the direct impact on the first cohort of teenagers to be offered vaccination: cases were 69% lower compared to the predicted numbers of cases in 2015 to 2016 (see figure below). So far, there have been no cases of group A, C, W or Y meningococcal disease in teenagers who were vaccinated under the programme, providing evidence of high vaccine effectiveness. The acceleration in MenW cases across all age groups has also declined, which is consistent with population protection predicted by the teenage immunisation programme.

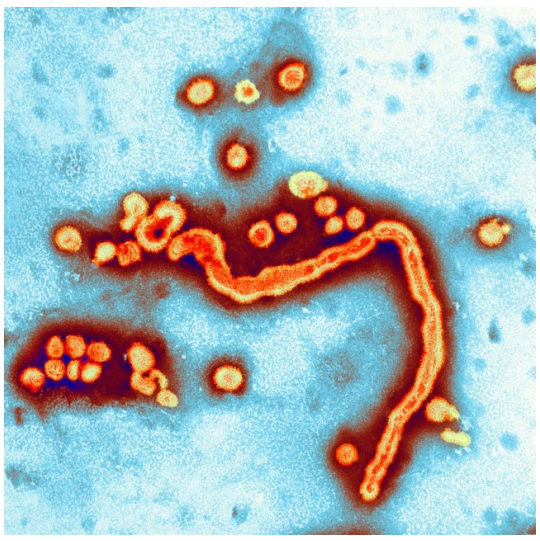
The experience in the UK has been important in informing other countries where this hypervirulent strain later emerged. Western Australia has recently initiated a MenACWY vaccination programme and the Netherlands has agreed that an adolescent MenACWY programme should be implemented.

Source: DOI: 10.3201/eid2307.170236




Significant reduction in MenW incidence by 2016 as a result of vaccination.

**Case study 2**



Transmission electron micrograph image of an Influenza virus A.

*2.1 Predictors of self and parental vaccination decisions in England*

PHE, in collaboration with University College London, investigated the predictors of vaccination decisions during the 2009 influenza pandemic.

*The challenge*

During the 2009 H1N1 influenza pandemic (commonly known as swine flu), UK uptake of the pandemic influenza vaccine was very low. The vaccination programme aimed to achieve 75% vaccine uptake among priority groups but, in England, an overall uptake of 34% was attained including just 23% in children under 5.

Influenza remains the most significant civil emergency risk to the UK. Given the threat posed by a future influenza pandemic and the low uptake of vaccination in the prior pandemic (particularly among young children), further understanding of vaccine uptake among all ages of the UK general population during the H1N1 pandemic is critical.

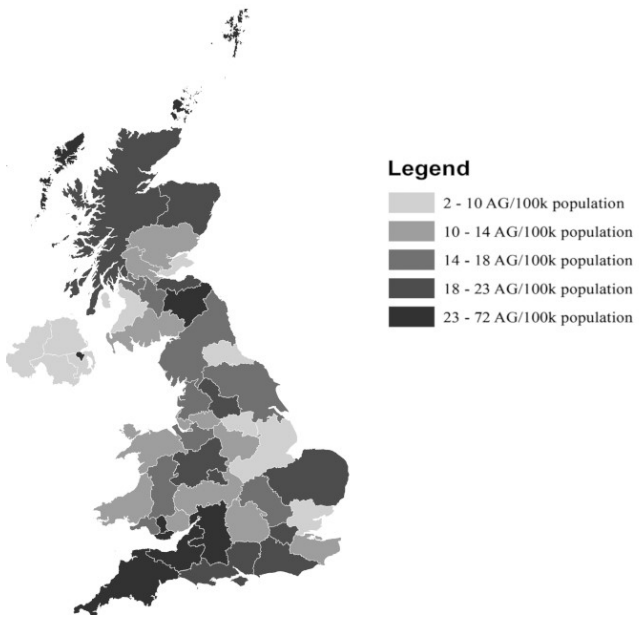
Flu Watch was a study of households in England run between 2006 and 2011 to help improve understanding of influenza burden and the factors (demographic, social, and behavioural) associated with influenza transmission.

Impact—This research represents the first attempt to explicitly consider predictors of both adult self-vaccination and parental vaccination among the UK general population during the H1N1 pandemic. The central findings suggest that concerns over the efficacy and safety of the vaccine, as well as concerns regarding the perceived risk of pandemic influenza, are critical determinants in both self-vaccination and parental-vaccination. Future development of pandemic influenza plans should consider the potential for multicomponent interventions that specifically target perceptions of vaccination effectiveness and safety, as well as the perceived risk of contracting influenza, to increase uptake of a pandemic influenza vaccination.

Source: DOI: 10.1016/j.vaccine.2017.05.061

**Case study 3**

*3.1 Engaging people to combat antimicrobial resistance: a process evaluation of the UK-wide Antibiotic Guardian campaign*




Distribution of Antibiotic Guardians as of 20 January 2015 in England, Wales, Scotland and Northern Ireland by NHS Area Teams and Devolved Administration equivalent NHS boundaries.

PHE developed and led a new UK-wide pledge campaign aiming to improve behaviours around the use and prescription of antibiotics.

*The challenge*

Both healthcare professionals and the public have a role in preventing the spread of drug-resistant infections. In the past, antibiotic awareness campaigns in the UK have used posters and leaflets in GP surgeries and pharmacies and adverts in newspapers.

PHE developed the Antibiotic Guardian campaign to move from raising awareness to increasing engagement, knowledge and stimulating behaviour change. Antibiotic Guardian is an intervention to improve knowledge and behaviours regarding antibiotic prescribing and use through an online action-based pledge system.

The objective for the first year of the campaign was to engage with 10,000 healthcare professionals and members of the public to pledge on AntibioticGuardian.com.

Impact—The campaign achieved over 12,000 pledges on AntibioticGuardian.com, and although 95% of pledges came from the UK, the campaign secured pledges from 81 different countries.

This study demonstrates, for the first time, measurable engagement in an antimicrobial resistance public health campaign. Demonstrating direct impact of the campaign on


**Case study 4**

*4.1 Ebola Virus research*

Though PHE has supported the clinical evaluation of the most advanced vaccine in development, there is an urgent need to perform further research to ensure licensure of vaccines and improve the response to control future Ebola incidents.

PHE staff co-authored 30 research papers on Ebola virus in 2017 concerning vaccine assessment, diagnostics, host immunity and infection, and response evaluation to the 2013 to 2016 outbreak. In addition, to support continuing global research efforts to prevent or prepare for future Ebola outbreaks, PHE is working with the Sierra Leone Ministry of Health and Sanitation to operate a biobank of biological samples from people who presented at clinics with symptoms suggestive of Ebola virus disease (EVD).

With funding from the Wellcome Trust, biobank samples are being shared with researchers who have been awarded funding from prestigious organisations. Their findings will be shared with PHE and collated in an openly-accessible resource to inform other researchers and public health colleagues, ultimately to the benefit of people potentially at risk from future Ebola outbreaks, whether in Sierra Leone or elsewhere.

*4.2 Asymptomatic EVD and transmission*

*The challenge*—Several articles, including those authored by PHE, have highlighted the existence of asymptomatic EVD but little is known about the potential of such individuals to transmit the disease. In 2016 the death of a 9-month-old baby in Guinea was associated with Ebola virus infection. Interviews with the parents revealed no prior experience of EVD however analysis of the mother's breast milk and father's semen, supported by PHE staff within the European Mobile Laboratory, revealed the presence of Ebola virus.

Subsequent in-field sequencing using the mobile MinION device revealed that the asymptomatic father had infected his wife who subsequently transmitted the virus her to baby resulting in a lethal outcome.

Impact These 2 key studies provide additional evidence of asymptomatic EVD infections and provide the first report that such individuals can transmit Ebola virus. This work builds on our collaborative revolutionary application of mobile sequencing to provide real-time molecular epidemiological capability in outbreak settings.

*4.3 EVD co-infections and predictors of clinical outcome*

*The challenge*—Is it possible to identify the people most likely to be susceptible to EVD?

Using data from an earlier PHE collaborative study, to assess the rate of mutations occurring the Ebola virus, the cellular immune response of EVD patients could be assessed at a very precise, genomic level. This study, in association with the National Institute for Health Research (NIHR) Health Protection Research Unit for Emerging and Zoonotic Infections, revealed 10 genes that were significantly upregulated in individuals with a lethal outcome.

Impact—The highlighted genes were associated with blood coagulation and liver damage, and could be used to rapidly and accurately identify patients at EVD treatment centres during triage to assist in determining the most effective use of resources and treatment pathways. In an associated study, the details of co-infections experienced by individuals with EVD were revealed. Importantly, the prior reports of malaria co-infection associated with improved survival were not supported. Additionally, the existence of several bacterial species associated with normal GI tract flora, in the blood of EVD patients, suggested translocation from the gut at the early stages of disease. These studies performed in collaboration with the EMLab and MSF should improve patient care during future outbreaks.

*4.4 Ebola exposure and illness experience in volunteer responders*

The international response to the Ebola epidemic resulted in the deployment of emergency teams to Liberia, Guinea and Sierra Leone. Volunteers included water, sanitation, hygiene and laboratory workers, epidemiologists, engineers, logisticians, and operations staff as well as clinicians. The World Health Organization (WHO) reported that 40 organisations from 19 countries sent volunteers to West Africa, with over 3,000 individuals deployed by the US Centers for Disease Control and Prevention alone.

*The challenge*

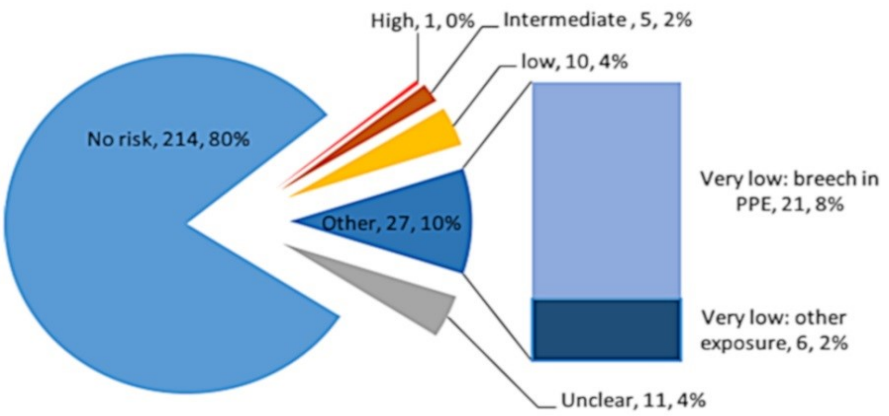
Only a small number of international staff were diagnosed with EVD, but as asymptomatic or unrecognised infections can occur, it is possible that some infections in volunteers were missed.

PHE, in collaboration with the London School of Hygiene & Tropical Medicine, carried out an online survey and testing of oral fluid samples from 268 individuals who returned to the UK and Ireland after working in West Africa during the Ebola outbreak. Of the 268 who were tested for antibodies (as an indicator of exposure to the Ebola virus), 2 had initial positive test results. Further testing suggested this was a false-positive result, perhaps due to molecular interactions within the test, and neither exhibited any symptoms of the illness. A high number of other near-miss events were reported, and less than a third of individuals who experienced illness whilst in West Africa or soon after return were tested for Ebola virus while they were unwell.

Source: journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002300

*Impact*—This was the first study of the prevalence of Ebola virus infection in international responders. It demonstrated that asymptomatic Ebola virus infection was rare in international healthcare and other workers who responded to the epidemic in West Africa. There was no evidence of infection with Ebola in individuals who were considered to have had a risk of transmission, such as who had experienced a near-miss or exposure event.

The descriptions of near-miss events and the finding that many of those who experienced illness were not tested at the time




Risk of Ebola virus disease transmission in 268 individuals who travelled to West Africa in response to the 2014 to 2016 Ebola epidemic. PPE= personal protective equipment.

suggest that protocols for the management of possible exposure to Ebola virus and for the management of illness should be reviewed and standardised across organisations that deploy staff to outbreaks.

Sources for case study 4 Ebola Virus research:

- Efficacy and effectiveness of an rVSV-vectored vaccine in preventing Ebola virus disease: final results from the Guinea ring vaccination, open-label, cluster-randomised trial (Ebola Ça Suffit!)
- Asymptomatic infection and unrecognised Ebola virus disease in Ebola-affected households in Sierra Leone: a cross-sectional study using a new non-invasive assay for antibodies to Ebola virus
- Persistence and clearance of Ebola virus RNA from seminal fluid of Ebola virus disease survivors: a longitudinal analysis and modelling study.
- Ebola Virus Persistence in Breast Milk After No Reported Illness: A Likely Source of Virus Transmission From Mother to Child.
- Multiplex PCR method for MinION and Illumina sequencing of Zika and other virus genomes directly from clinical samples.
- Deep Sequencing of RNA from Blood and Oral Swab Samples Reveals the Presence of Nucleic Acid from a Number of Pathogens in Patients with Acute Ebola Virus Disease and Is Consistent with Bacterial Translocation across the Gut article. and https://www.ncbi.nlm.nih.gov article
- Nature International journal of science.
- Ultra-fast electronic detection of antimicrobial resistance genes using isothermal amplification and Thin Film Transistor sensors.

**Case study 5**

*5.1 Lessons from an international public health emergency*

PHE has examined the reasons why Zika was declared a Public Health Emergency of International Concern, why it stopped being one and what we can learn from this for the future.

*The challenge*

The association of Zika infection with clusters of microcephaly and other neurological disorders was originally declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization on 1 February 2016 and was in place for 9 months until November 2016.

Zika was first identified in Uganda in 1947 and was considered a mild illness with clinical similarities to dengue and many other tropical infectious diseases. The first large human outbreak was in Micronesia in 2007.

An outbreak in French Polynesia between November 2013 and February 2014 was the first associated with increased incidence of neurological complications, including Guillain-Barré syndrome.

Zika appears to have arrived in Brazil by early 2015 and by October 2015 an increase in notifications of microcephaly in newborn babies were reported. This escalated so rapidly that on 11 November 2015 microcephaly was declared a national public health emergency in Brazil. The rise in microcephaly was linked by time and place with a rise in Zika infection.

The original Public Health Emergency of International Concern declaration was based on the increase in microcephaly notifications in Brazil, and the possibility of this being linked to Zika infection in pregnancy.

*Impact*—The purpose of the PHEIC declaration was to stimulate global action to define the nature of the relationship between Zika and microcephaly, as well as to identify appropriate public health actions to mitigate the risk, particularly for pregnant women. The declaration was not primarily declared to stop the spread of the outbreak (unlike the earlier Ebola emergency).

Despite global efforts to predict future outbreaks, the link between Zika infection and microcephaly was an unexpected finding. In the absence of a vaccine, public health agencies, governments and doctors had little to offer women, apart from advice on avoiding mosquito bites, delaying pregnancy or avoiding travel to areas with active Zika transmission. Although better planning for an emerging infection might not have increased the options available for patients, it could have facilitated the development of better risk communication strategies.

The response to Zika highlighted differences in approaches between countries and public health agencies and the challenges of maintaining a 'pure' public health approach to advice. One example was the use of insecticide (disinsection) to decontaminate planes travelling from Zika-affected countries. Although disinsection of planes is routinely practiced in many countries as part of a malaria control strategy, the Zika response illustrated that the evidence base for this approach is not robust.

The Zika outbreak demonstrated again the challenges in maintaining a clear evidence-based approach to outbreak response and the challenge to ensure that advice is not contrary to the evidence.

Source: DOI: 10.1016/j.puhe.2017.05.008

**6. Case study 6**

*6.1 Understanding knowledge, skills and confidence gaps to move the nation*

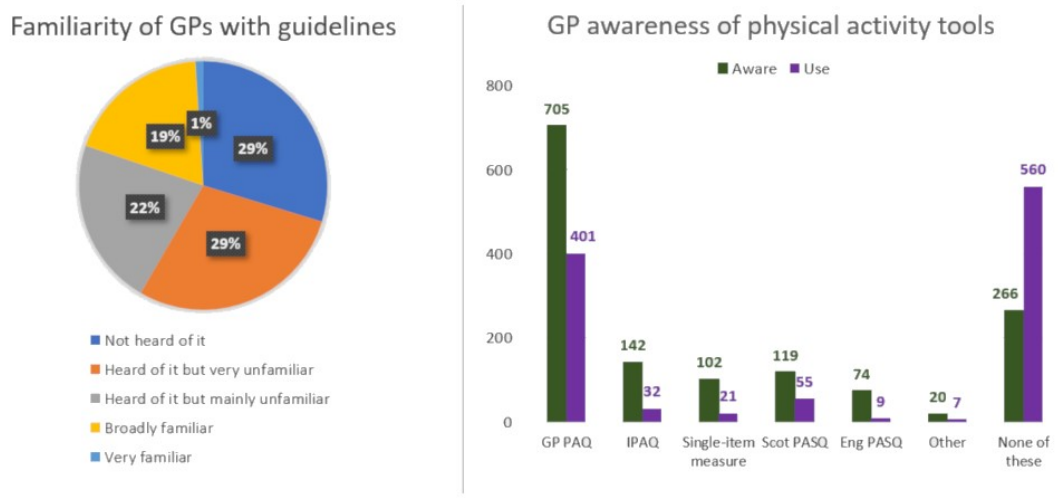
PHE undertook primary research to understand GPs' knowledge, confidence in and use of national physical activity and health guidelines, in order to develop a new, whole-system approach for embedding brief advice on physical activity into routine clinical practice.

*The challenge*

In 2011, the UK Chief Medical Officers issued age-specific guidelines on physical activity for the general population. Inactivity is among the top 10 risk factors for disease and disability in England.

One in 4 people say they would be more active if advised by a GP or nurse. Health professional-led physical activity interventions are very effective, with brief advice for physical activity up to 10 times more effective than brief advice about smoking. Advice about physical activity as a routine part of healthcare services has been identified as one of the best investments for increasing physical activity levels in patients. Behaviour change is best supported by repeated routine advice, supplemented by assessment tools to reinforce progress and achievement.

The aim of this study was to assess GP knowledge, confidence in physical activity guidelines and assessment tools.




Surveyed familiarity of GPs with the Chief Medical Officers' physical activity guidelines (left panel) and awareness and use of physical activity tools by GPs (right panel). Source: Robin Chatterjee, Tim Chapman, Mike GT Brannan and Justin Varney. GPs' knowledge, use, and confidence in national physical activity and health guidelines and tools: a questionnaire-based survey of general practice in England, Br J Gen Pract 2017. (GP PAQ = General Practice Physical Activity Questionnaire; IPAQ = International Physical Activity Questionnaire; Scot PASQ = Scottish Physical Activity Screening Question; Eng PASQ = English Physical Activity Screening Question).

Source: doi.org/10.3399/bjgp17X692513

*Impact*—The research elicited over 1000 responses. As shown in the figure below, only 20% of respondents were 'broadly or very familiar' with the national physical activity guidelines. While many GPs were aware of the recommended physical activity questionnaire for use with patients, a significant proportion was not aware of the associated assessment tools. Over half of respondents reported that they had not undertaken any training about how to encourage physical activity.

This study highlighted the need for significant improvement in knowledge, skills and confidence to maximise the potential for physical activity advice during GP consultations. PHE used this work to develop a multi-strand approach to closing this gap through the Moving Healthcare Professionals Programme.

The Moving Healthcare Professionals Programme is a partnership programme with Sport England about embedding physical activity teaching resources in medical undergraduate education for doctors. The programme has delivered face to face training to over 4,000 doctors, embedded undergraduate resources in 17 out of 35 medical schools and seen over 80,000 e-learning modules completed.

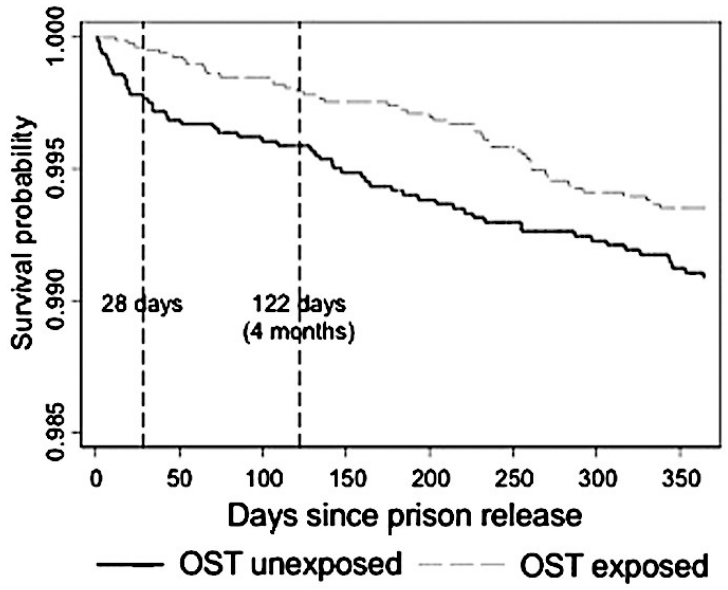
Source: bjgp.org/content/67/663/e668

**Case study 7**

*7.1 Prison-based opioid substitution treatment and risk of death*

PHE, in collaboration with King's College London, University of Bristol, University of New South Wales and the University of Manchester investigated the effectiveness of prison-based opioid substitution treatment (OST) in reducing the risk of death after release from prison.

*The challenge*—Illicit heroin is associated with a high risk of death (particularly among people who inject drugs) and this increases with age especially among men. The leading cause of death in this population is accidental poisoning (overdose). Prisoners with opioid use disorder face an acute risk of death on their release to the community, particularly in the first month. In this large-scale national study we investigated whether prison-based OST at release reduced post-release mortality and whether OST improved engagement with community-based treatment services.




Survival curve during the year following release for prison inmates exposed and not exposed to opioid substitution treatment.

*Impact*—PHE research observed that OST was associated with a 75% reduction in all-cause mortality and an 85% reduction in drug-related poisoning mortality in the month following release. The strengths of our study include: findings based on a large sample of prisoners with opioid use disorder (OUD); the use of administrative databases for recording OST exposure; outcome estimates subject to confounder control; and clinically important findings which apply to both the prison and community drug misuse treatment systems in England and elsewhere. Our study shows that prison-based OST is a highly effective means of reducing the risk of death in the first 4 weeks after release.

This study was awarded the 2018 European Monitoring Centre for Drugs and Drug Addiction scientific award for demand reduction interventions research.

Sources:

- www.emcdda.europa.eu/activities/scientific-award_en#pane0
- DOI: 10.1111/add.13779

**Case study 8**

*8.1 Is cancer the only significant health risk from occupational radiation exposure?*

*The challenge*—Radiation protection legislation is primarily focused on protecting against excess risks of cancers however at therapeutic dose levels there is good evidence that radiation can damage the heart and circulatory system. Recent papers have also shown evidence of radiation related risks of heart disease mortality in Japanese atomic bomb survivors. Do excess risks occur among occupationally exposed workers and the public who are exposed to much lower chronic doses?

*Impact*—The INWORKS project is a collaboration between PHE, the International Agency for Research on Cancer and several other leading research groups in France and the USA. Its aim is to investigate and provide evidence of radiation risks based on the pooling of data from occupational cohorts in the UK, France and the USA. The UK component is based on the National Registry for Radiation Workers that is run by PHE.

PHE has led on the part of the work investigating the effects of radiation on non-cancer disease risk. This research published at BioOne Complete has identified a significantly raised risk of circulatory disease risk that appears to be driven by raised risks from cerebrovascular disease and ischemic heart disease. The estimates are generally consistent with those observed in studies on atomic bomb survivors. These earlier studies have been the main source of evidence upon which the UK radiation protection regulations are based. However, the current study also provide evidence that the risks are not well defined and that further research is needed to better characterise non-cancer risks.

**9. Case study 9**

*9.1 Benefits of sunlight on blood pressure*

Research at PHE confirms the ability of sunlight to cause skin cells to produce chemicals that can relax blood vessels and reduce their pressure

*The challenge*—Elevated blood pressure is a major contributory factor for many diseases and in the UK, it is the third biggest risk factor for disease after smoking and poor diet. Over 12.5 million people in the UK have high blood pressure, and over 7 million have been diagnosed with cardiovascular disease, a common consequence of high blood pressure. Measures that can mitigate high blood pressure even to a modest level would have a very significant overall national impact. Further, cardiovascular disease alone costs the NHS over £8 billion a year, a significant part of which is for medication that relaxes blood vessels.

*Impact*—Research in PHE demonstrated that some parts of the sunlight spectrum can stimulate skin cells to produce chemicals such as nitric oxide (NO) which is highly effective in relaxing blood vessels, thereby enabling blood pressure to decrease. This beneficial feature of sunlight has to be balanced against the known risk of skin cancer, including melanoma. Researchers filtered out the harmful portions of sunlight that are linked with melanoma development and demonstrated that the far less harmful parts of sunlight were still highly effective in stimulating NO release from skin cells. Further investigations are continuing in order to understand the practical applications of this knowledge such as the optimal amount of sunlight exposure, the duration of effectiveness, the variations with seasons and the potential influence of diet on the observed effect of sunlight. This information will be used to formulate new guidance on how we can stay safe and benefit from healthy sun exposure.

Source: DOI:10.1038/s41598-017-11567-5

**Case study 10**

*10.1 Controlling Tuberculosis*

Tuberculosis (TB) is the leading cause of death globally due to an infectious disease and despite major international efforts this disease remains a major threat to public health.

In 2017, PHE reported that sustained progress in the control of TB in the UK was being made with a 30% decline in incidence between 2011 and 2015. This decline was attributable to a combination of global and national initiatives and in particular, action taken as a part of the national tuberculosis strategy, developed by PHE and NHS England between 2013 and 2015. The collaborative strategy identified areas for action and priorities such as addressing latent TB in new entrants to the UK and the identification and management of cases in vulnerable groups and those with social risk factors.

The WHO End TB strategy requires a 10% annual decline in cases globally by 2025 and the promising data from PHE and its partners indicate that this is achievable by combining expertise, knowledge and political commitment. Such levels of effort and commitment must be maintained in the UK and other countries, but the more ambitious WHO target to achieve an annual decline in cases of 17% from 2025 to 2035 will only be achieved by the introduction of new tools, including better diagnostics and drugs and new vaccines.

*10.2 Promising new vaccines on the horizon*

PHE researchers are key partners in collaborative projects aimed at identifying novel vaccination strategies, including prophylactic and post-exposure vaccines. The TBVAC2020 project is the latest of a series of EU-funded consortia which bring together a breadth of expertise in vaccine discovery and development in order to identify potential candidates for clinical testing.

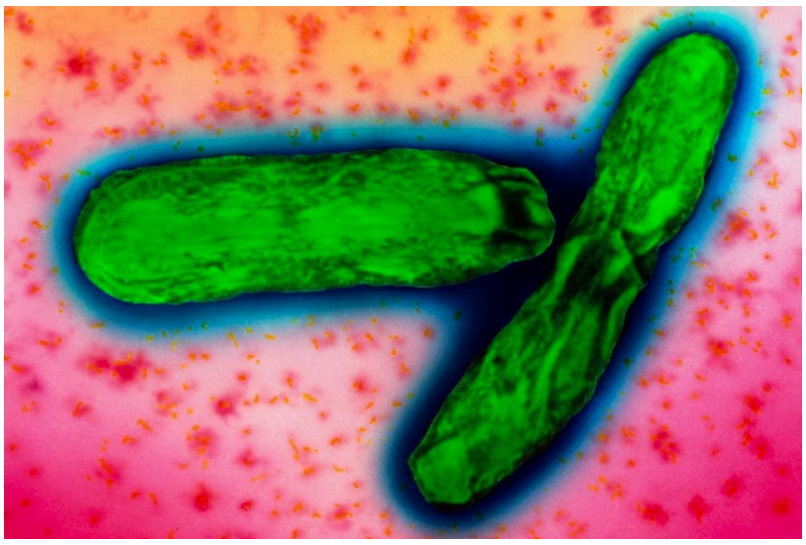
*The challenge*—The current vaccine, BCG, is effective at protecting infants against severe forms of TB but it has variable and globally insufficient efficacy against pulmonary TB in adults. There is therefore an urgent need for a safe and efficacious vaccine that is superior to BCG with regards to preventing infection or disease in the various at-risk populations. Given the complexity and variability of the disease in these different populations and geographical settings, a multi-pronged approach is required, with a single vaccine being unlikely to be suitable for all forms of TB.

Impact—PHE provides specialised, pre-clinical testing that enables the identification of the most efficacious vaccines and which supports their progression to the clinic. The vaccines are tested in an un-biased manner and often in studies where several candidates are tested head-to-head, enabling prioritisation. Many of the vaccines currently in clinical trials were previously screened by PHE researchers who are now supporting the development of several promising new candidates and concepts. This includes 1 vaccine, MTBVAC, an attenuated version of Mycobacterium tuberculosis which was shown to offer strong protection when used in a re-vaccination approach with BCG.

*10.3 Studies of BCG vaccination in the UK informs new vaccination strategies*

*The challenge*—Whilst progress is being made in identifying novel and promising vaccine candidates, the pace of their clinical development is slow. This is due to many factors including the nature of the disease which may develop months or years after initial infection, limited resources and the lack of a correlate of protection. Gaining information from clinical studies involving the existing BCG vaccine could be highly informative for the testing of new vaccines.

*Impact*—A study involving PHE aimed to assess the duration of protection of infant and school-age BCG vaccination against TB in the UK. The conclusion was that vaccination of infants in a high-risk population provided protection for at least 10 years, whereas BCG given to school-age children gave protection for at least 20 years. This evidence may indicate a benefit of vaccinating with BCG or a novel vaccine at school age in order to extend the duration of protection into adulthood.



Transmission electron micrograph image of a mycobacterium tuberculosis.

*10.4 A tool to measure vaccine-induced functional immune responses*

*The challenge*—There is no single validated indicator with which to measure the efficacy of new TB vaccines in stimulating protective immune responses. Thus, the only way to demonstrate efficacy is to conduct studies which show that the vaccine protects against challenge with the pathogen.

These are lengthy and costly studies and therefore the number of candidates and parameters that can be tested is limited by resources. Development of an assay to measure a vaccine-induced functional biological response representative of protection against infection or TB disease would represent a major advance in the effort to develop TB vaccines. Mycobacterial growth inhibition assays (MGIAs) represent 1 such clinically relevant approach.

*Impact*—The MGIA Project brought together an international group of scientific experts, including PHE researchers, to work on growth inhibition assays. Using whole blood or peripheral blood mononuclear cells (a type of white blood cells), the MGIA provides an unbiased measure of the vaccine-induced antigen-specific immune response. The results indicated that the MGIA has promise as a functional assay for the assessment of TB vaccines and is a potential model for investigating the mechanisms involved in anti-mycobacterial immunity.

**impact through training**

*11.1 by Faye Lanni, PhD student*

Tuberculosis is currently the leading cause of death worldwide by an infectious disease. PHE has a world class TB research group at Porton which I joined, after completing my MSc, to work in a team developing improved tools to accelerate the development of new anti-TB drugs.

PHE offers an opportunity for staff to register for part-time PhDs via the Open University. So, when I had the idea for my PhD studies I approached Dr. Ann Rawkins who supported me through writing the proposal and establishing a supervisory team.

The idea behind my project is to improve the accuracy and relevance of pre-clinical studies by using microdialysis to quantify the concentration of drugs over time and at the target site of action. This technique has never been used for anti-TB drugs and if successful would significantly improve the ability to optimise complex dosing schedules and reduce drug toxicity; factors that are very important in TB treatment.

This technique and the skills needed to develop it were new to the site and this posed many challenges. The enthusiasm of the Biological Investigations Group, the Supervisory Team as well as PHE colleagues both within and outside of the TB group is unrivalled. I have been fortunate enough to present this novel and exciting project both at national and international conferences.

A part time PhD is often thought to be a very daunting task, and although I am not denying it is difficult, there are many advantages to completing a PhD whilst being in full time employment such as career development and progression, improving generic laboratory skills, developing a publication record not dependant on PhD results, and having more opportunities for collaborations, not to mention flexibility with funding and time scales.

PHE have given me a wonderful opportunity to conduct a part time PhD and the very best start to what I hope will be a long and exciting career.

Additional data can be found below:

- Annex A: Awards to PHE in 2017 to 2018
- Annex B: PHE research 2017 to 2018 annual review
- Annex C: Internal funding awards 2017 to 2018
- Annex D: Studies reviewed by PHE Research Ethics and Governance Group (REGG) 2017
- Annex E: PHE research 2017 to 2018 annual review

## Latest Publications

- Murray V, Linares Gil L & Hess J with Ismail R, Chi Hung Leung C, Ma W, Scherdel L and Waite TD. (2018) Heat and extreme events in UNEP 2018. The Adaptation Gap Report 2018. United Nations Environment Programme (UNEP), Nairobi, Kenya.
- Street R.B, Buontempo C, Mysiak J., Karali E., Pulquério M., Murray V., Swart R. (2018) How could climate services support Disaster Risk Reduction in the 21st century *Inl J of Disaster Risk Reduction* PII: S2212-4209 (18)30937-3 DOI: https://doi.org/
- Ahmad Balsam and Virginia Murray. Disaster risk reduction and sustainable development: the role for occupational health. Occupational Medicine, Volume 68, issue 7, 13 September 2018, Pages 422–424, https://doi.org/10.1093/occmed/kqy058
- Man Ralph Xiu-Gee, Lack David A, Wyatt Charlotte E, Murray Virginia. The effect of natural disasters on cancer care: a systematic review Lancet Oncology Volume 19, ISSUE 9, Pe482-e499, September 01, 2018 DOI:https://doi.org/10.1016/S1470-2045(18)30412-1
- Richardson T, Hayward G, Blanchard K, Murray V. An Evaluation of Global Hazard Communication with Ethical Considerations. PLOS Currents Disasters. 2018 Aug 7 . Edition 1. doi: 10.1371/currents.dis.47581b109e865f7b64d831f86a7fd7f4.
- Clarke L, Blanchard K, Maini R, Radu A, Eltinay N, Zaidi Z, Murray V. Knowing What We Know – Reflections on the Development of Technical Guidance for Loss Data for the Sendai Framework for Disaster Risk Reduction. PLOS Currents Disasters. 2018 Aug 2 . Edition 1. doi: 10.1371/currents.dis.537bd80d1037a2ffde67d66c604d2a78.
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- Dell'Aringa M, Ranzani O, Bierens J, Murray V. Rio's Mountainous Region ("Região Serrana") 2011 Landslides: Impact on Public Mental Health System. PLOS Currents Disasters. 2018 Jan 25. Edition 1. doi: 10.1371/currents.dis.156b98022b9421098142a4b31879d866.
- Etinay N, Egbu C, Murray V Building Urban Resilience for Disaster Risk Management and Disaster Risk Reduction Procedia Engineering Volume 212, 2018, Pages 575-582 https://doi.org/10.1016/j.proeng.2018.01.074
- Berry HL., Waite TD, Dear KBG, Capon AG, Murray V The case for systems thinking about climate change and mental health *Nature Climate Change* volume 8, pages282–290 (2018) doi:10.1038/s41558-018-0102-4)
- Murray V, Maini R, Eltinay N – Cultural heritage science and technology and Sendai Framework for Disaster Risk Reduction 2015-2030 *(pp 39-56)* in Florence 1966-2016 resilience art of cities to natural catastrophes: the role of academies Accademia Nazionale dei Lincei, Atti dei Convegni Lincei and InterAcademy Partnership, Bardi Edizioni 2018. ISBN 978-88-218-1157-9
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# Energy and Environment Research Group
# Swansea University United Kingdom

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Website: https://www.swansea.ac.uk/

Swansea University is a research-led university that has been making a difference since 1920. The University community thrives on exploration and discovery, and offers the right balance of excellent teaching and research, matched by an enviable quality of life. The University has enjoyed a period of tremendous growth, and we have achieved our ambition to be a top thirty research University, soaring up the 2014 Research Excellence Framework league table to 26th in the UK from 52nd in 2008. Additionally, an ambitious Campus Development Programme is well underway - one of the largest knowledge economy projects in the UK and within the top five in Europe. It involves the creation of the Bay Campus, a brand new £450 million development on the eastern approach to the city, together with the transformation of our existing Singleton Park Campus. Swansea's multicultural dual-campus community provides a global perspective and opportunities to gain skills that last a lifetime. True to the vision of its industrial founders in 1920 Swansea University will: Provide an environment of research excellence, with research that is world-leading, globally collaborative and internationally recognised; Deliver an outstanding student experience, with research-led and practice-driven teaching of the highest quality that produces global graduates educated and equipped for distinguished personal and professional achievement; Use its research strength, collaboration with industry and global reach, to drive economic growth, foster prosperity, enrich the community and cultural life of Wales and, contribute to the health, leisure and wellbeing of its citizens. You can also read about the University's history, ambitions, and management.

## Research Focus

- Coastal Morphodynamic modelling
- Wave and tidal modelling
- Storm impacts and coastal disasters
- Wave overtopping
- Coastal flood risk
- Coastal defense
- Climate change impacts on the coastal environment
- Hydrometeorology

## Research Unit Contract

Energy and Environment Research Group

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## Latest Publications


- Umeda, S., Yushi, M. and Karunarathna, H. 2018. Seasonal to decadal variability of shoreline position on a multiple sandbar beach, Journal of Coastal Research, SI 85, 21-25.
- Thompson, D., Karunarathna, H. and Reeve, D.E. 2017. Modelling Extreme Wave Overtopping at Aberystwyth Promenade, Water Science and Engineering (accepted).
- Xuan, Yunqing., Abbas, Salam., Song, Xiaomeng. & Reeve, Dominic. (2017). Quantile regression based method for investigating rainfall trends associated with flooding and drought conditions. European Water 59, 137-143.
- Bennett, W.G., Karunarathna, H., Mori, N. and Reeve, D.E. 2016. Climate Change Impacts on Future Wave Climate around the UK, Special Issue: Modeling of Waves in Coasts and Estuaries, Journal of Marine Science and Engineering.
- Karunarathna, H., Horrillo-Caraballo, J.M., Burningham, H., Pan, S. and Reeve, D.E. Two-dimensional reduced-physics model to describe historic morphodynamic behaviour of an estuary inlet, Marine Geology, Vol. 182, pp.200-209.
- Karunarathna, H., Horrillo-Caraballo, J.M., Kuriyama, Y. Mase, H., Ranasinghe, R. and Reeve, D.E. 2016. Linkages between sediment composition, wave climate and beach profile variability at multiple timescales, Marine Geology, 381, pp.194-208.
- Horrillo-Caraballo, J.M., Karunarathna, H., Pan, S. and Reeve, D.E. 2016. Performance of a data-driven technique to changes in wave height and its effect on beach response, Water Science and Engineering, 9(1), pp. 42-51.
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- Fairley, I., Masters I. and Karunarathna, H. 2016. Numerical modelling of storm and surge events on offshore sandbanks, Marine Geology, 371, 106-119.
- Reeve, D., Karunarathna, H., Pan, S., Horrillo-Caraballo, J.M., Różyński, G. and Ranasinghe, R., 2016, Data-driven and hybrid coastal morphological prediction methods for mesoscale forecasting, Geomorphology, 256, pp. 49-67.
- X Ding, Y Chen, Y Pan, D Reeve, 2016. “Fast ensemble forecast of storm surge along the coast of China”, Journal of Coastal Research, pp.1077-1081.


## Jobs and Internship Opportunities

All available opportunities will appear in the college of engineering webpage:

**https://www.swansea.ac.uk/engineering/**

# Oceania


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The Centre for Disaster Studies is a multi-disciplinary research unit within the College of Science and Engineering at James Cook University. The Centre has acted as the university's face to the public and the professionals in the Emergency Management and Meteorology fields, city councils and other researchers since its establishment in 1979.

The Centre for Disaster Studies was formally established a few years after James Cook University opened. The catalysts for the development of a research centre dedicated to study of the impact of disaster were two major cyclones; Althea which devastated Townsville in 1971 and Tracy in which destroyed Darwin in 1974. These events generated strong research interest in cyclones and natural hazards.

Formerly funded by an annual grant from the Queensland Department of Emergency Services, the Centre is now primarily supported through individual and government research grants and projects. Presently Associate Professor David King (Director) provides direction for the Centre through his leadership and guidance of our multidisciplinary research team.

Members have extensive research expertise, field work experience and professional teaching capacity in community based disaster management (all hazards).

## multi-disciplinary research units

### Research Focus

Academic research members have a strong foundation in the following research areas (both domestic and international):

- Integrated disaster risk reduction and climate change adaptation
- Land use planning for disaster risk reduction (DRR) and climate change
- Building resilience in the built, natural and social environment
- Tourism crisis and disaster management
- Vulnerability and capacity assessment (community mapping for DRR and recovery)
- Social network analysis for disaster governance, risk reduction and resilience
- Post disaster assessment for response and recovery
- Sustainable development/redevelopment and livelihoods

Affiliate members of the Centre also conduct relevant research in the fields of engineering, public health, nursing, journalism/media, psychology, education, anthropology, human geography and the broader social sciences.

The Centre has extensive experience in the translation of research and science into effective policy recommendations and action.

Dr. Yetta Gurtner

Coordinator, Centre for Disaster Studies

James Cook University

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## Institutional Capacity Development Activities

- PhD and Masters by research opportunities are available with the Centre refer to link for application process: https://www.jcu.edu.au/graduate-research-school

- Master of Planning and Urban Design has a major in Disaster Resilience with 4 subjects to be offered in flexible delivery/external/online mode from next year:
- https://www.jcu.edu.au/course-and-subject-handbook/courses/postgraduate-courses/majors-and-minors/mturp-disaster-resilience-major

## Latest Research Results

### 2018


- Boon, Helen J. (2018) “Modeling disaster resilience”. In: Madu, Christian N., and Kuei, Chu-Hua, (eds.) Handbook of Disaster Risk Reduction and Management. World Scientific Publishing, New York, NY, USA, pp. 407-431.


### 2017


- Goudie D. (2017) “Natural Disasters and Evacuations as a Communication and Social Phenomenon”. In: Springer Science+Business Media LLC 2017 R.A. Meyers (ed.), Encyclopedia of Complexity and Systems Science, DOI 10.1007/978-3-642-27737-5_186-4 Pp1-40.
- King, D & Gurtner, Y. (2017) "Utilising post disaster surveys to understand the social context of floods – experiences from Northern Australia" Flood Damage Survey and Assessment-New Insights from Research and Practice AGU Wiley
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- Vachette, A. (2017) “Integrating Disaster Risk Reduction and Climate Change Adaptation in Vanuatu: The Art and Practice of Building Resilience to Hazards.” In Weal Filho, W. (Ed.) Climate Change Adaptation in Pacific Countries: Fostering Resilience and Up-keeping Life Quality. Springer Berlin Heidelberg, Berlin.
- Gurtner, Y., and Vachette A (2017) “Community Post Impact Assessment – Rapid Appraisal. Tropical Cyclone Debbie”. Centre for Disaster Studies, James Cook University
- Gurtner, Y., and Vachette A (2017) “Lessons Learnt from Community Recovery”. Tropical Cyclone Debbie. Tropical Cyclone Debbie Forum. *Queensland Tropical Cyclone Consultative Committee* Kedron 6 June 2017
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## Contact information

- College of Public Health, Medical & Vet Sciences - Professor Peter Leggat, Sandra Downing
- College of Health Care Sciences - Associate Professor Caryn West, Dr Connar McShane, Dr Anne Swinbourne
- College of Science and Engineering – Dr Doug Goudie
- College of Art, Society and Education – Professor Rosita Henry, Dr Maxine Newlands
- Cyclone Testing Station – Dr David Henderson, Professor John Ginger,
- The Cairns Institute – Professor Allan Dale, Dr Margaret Gooch
- CSIRO – Dr Erin Bohensky
- Faculty of Life and Environmental Sciences, University of Iceland - Dr Deanne Bird
- Department of Geography and Planning, Macquarie University - Dr Katharine Haynes
- Further information: https://www.jcu.edu.au/centre-for-disaster-studies/outcomes/publications
- Visiting professor/scholar or research internships: yetta.gurtner@jcu.edu.au

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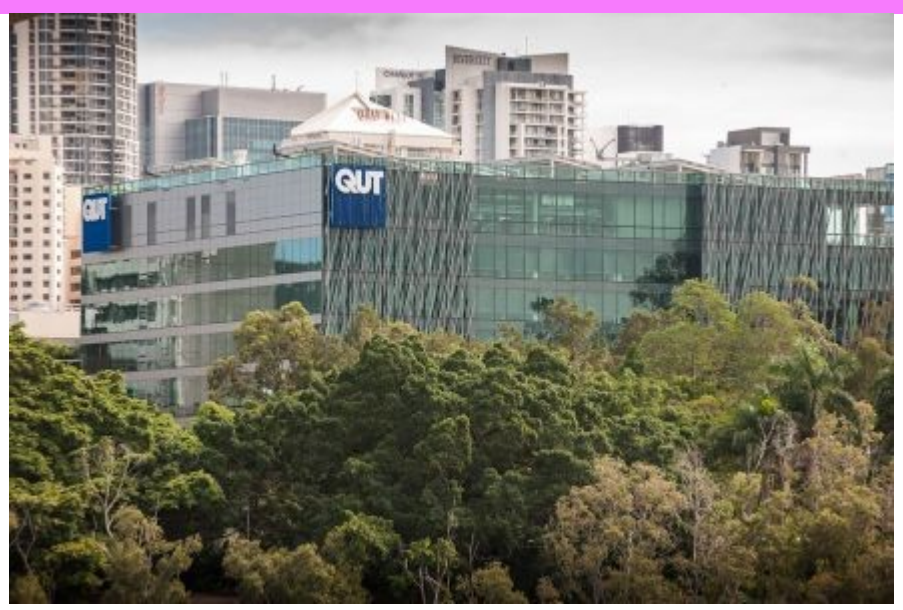


We are a team of academics who are actively engaged in research, teaching, and professional service across sub-disciplines of civil engineering. We have strong connections to the community of practicing civil engineers, as well as leadership roles within the international academic community. Our researchers are involved in cutting-edge research programs, topics and projects across all of our sub-disciplines. Our research has made significant contributions to QUT's Excellence in Research for Australia (ERA) ratings. We received a 4 (above world standard) in environmental engineering, and a 3 (at world standard) for civil engineering. ERA (Excellence in Research for Australia)

## Research Focus:

- Infrastructure resilience to natural disasters
- Social resilience assessment to natural disasters
- Engaging vulnerable populations in disaster preparedness and response

## Latest Publications:

Journal papers:

- Teo, M., Goonetilleke, A., Ahankoob., A., Deilami, K. and Lawie, M., 2018, Disaster Awareness and Information Seeking Behaviour among Residents from Low Socio-Economic Backgrounds, International Journal of Disaster Risk Reduction, Vol. 31, pp. 1121-1131.

- Aslam Saja, A. M., Teo, M., Goonetilleke, A. and Ziyath, A. M., 2018, An inclusive and adaptive framework for measuring social resilience to disasters, International Journal of Disaster Risk Reduction, Vol. 28, pp. 862-873.

- Teo, M. M., Lawie, M., Goonetilleke, A., Ahankoob, A., Deilami, K., 2018, Engaging vulnerable populations in disaster preparedness and response: A local government context, Australian Journal of Emergency Management, Vol. 33(1), pp. 38-47.

Prof. Ashantha Goonetilleke
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The Charles Darwin University RISCK Centre (Resilience Implementation applying Social and Community Knowledges) will commence operations in 2019. An update will be sent once the details are finalized.

## Research Focus:

The CDU RISCK Centre will focus on developing and applying theories of how social and community (particularly Indigenous) knowledge informs understanding of disaster risk reduction and recovery. In addition to operating in Northern Australia, the Centre includes a cross-cultural focus and operates on Taiwan and Indonesia. Further details will be made available once the Centre has been formally established in 2019.

Prof. Douglas Paton

E-mail: douglas.paton@cdu.edu.au

## Latest Publications:

### Current projects include:

- Art, DRR and Disaster Recovery: A comparative study of Indigenous peoples in Australia and Taiwan.
- Quality of Life in Communities Permanently Relocated Following Disaster.
- Transformation in Disaster Risk Reduction Theory and Practice: Signs for success from case studies in Taiwan, Indonesia, Australia and Japan.

### Publications:

- Adhikari, M., Paton, D., Johnston, D., Prasannaa, R. & McColl, S.T. (2018) Modelling predictors of earthquake preparedness in Nepal. *Procedia Engineering, 212*, 910-917.
- Ejeta, L.T., Ardilan, A., Paton, D. & Yaseri, M. (2018) Emotional and Cognitive Factors Influencing Flood Preparedness in Dire Dawa town, Ethiopia. *Natural Hazards, 93*, 715-737 https://doi.org/10.1007/s11069-018-3321-0
- Feng, S., Hussain, L & Paton, D. (2018) Harnessing informal disaster education for community resilience. *Disaster Prevention and Management*, *27*, 43-59 https://doi.org/10.1108/DPM-07-2017-0157
- Kwok, A.H., Paton, D., Becker, J., Hudson-Doyle, E.E. & Johnston, D. (2018) A bottom-up approach to developing a neighbourhood-based resilience measurement framework, *Disaster Prevention and Management, 27*, 2, 255-270, https://doi.org/10.1108/DPM-07-2017-0169
- Ranjbar, M., Soleimani, A.A., Sedghpour, B.S., Shahboulaghi, F.M., Paton, D., & Noroozi, M. (2018) The predictors of earthquake preparedness in Tehran households. *Electronic Physician* (ISSN: 2008-5842), 10, 6478-6486
- Ranjbar, M., Soleimani, A.A., Sedghpour, B.S., Shahboulaghi, F.M., Paton, D., & Noroozi, M. (2018) Associating Factors with Public Preparedness Behavior Against Earthquake: A review of Iranian research literature. *Health in Emergencies and Disasters Quarterly, 3*, 67-76.
- Tedim, F., Leone, V., Amraoui, M., Bouillon, C., Coughlan, M.R., Delogu, G.M, Fernandes, P.M., Ferreira, C., McCaffrey, S., McGee, T.K., Parente, J., Paton, D., Pereira, M.G., Ribeiro, L.M., Viegas, D.X. & Xanthopoulos, G. (2018) Defining Extreme Wildfire Events: Difficulties, Challenges, and Impacts. *Fire*, 1, 9; doi:10.3390/fire1010009
- Wisner, B., Paton, D., Alisic, S., Eastwood, O., Shreve, C. & Fordham, M. (2018) Communication with children and families about disaster: Reviewing multi-disciplinary literature 2015-2017. *Current Psychiatry Reports, 20:73.* *https://doi.org/10.1007/s11920-018-0942-7*
- 羅錦福(Douglas Paton), (Rey Sheng-Her) 何日生, 張麗珠編著(Li-Ju, Jang) (2018) 降低社區災害風險與災後復原 (Community-Based Disaster Risk reduction and Recovery: Integrating community development and risk management). 版權所有 翻印必究: Taipei, Taiwan.
- Paton, D. & Sagala, S. (2018) *Disaster Risk Reduction in Indonesia*. Springfield, Ill., Charles C. Thomas.
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- Sagala, S., Sullivan, G., Wulandari, Y. & Paton, D. (2018) Comparative Study of Community Resilience to Volcanic Hazards in Indonesia. In 羅錦福(Douglas Paton), (Rey Sheng-Her) 何日生, 張麗珠編著(Li-Ju, Jang) 降低社區災害風險與災後復原 (Community-Based Disaster Risk reduction and Recovery: Integrating community development and risk management). 版權所有 翻印必究: Taipei, Taiwan.
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- Wimbardana, R., Sagala, S. & Paton, D. (2018) Community Resilience to Volcanic Disaster at Mount Merapi, Indonesia. In D. Paton and S. Sagala (Eds). *Disaster Risk Reduction in Indonesia*. (pp. 45-60) Springfield, Ill., Charles C. Thomas.
- Sutton, S., Buergelt, P.T., Paton, D. & Sagala, S. (2018) Cultural Drivers of Disaster Risk Reduction Behaviour: The Case of Pulau Simeulue. In D. Paton and S. Sagala (Eds). *Disaster Risk Reduction in Indonesia*. (pp. 167-185) Springfield, Ill., Charles C. Thomas.
- Paton, D. & Sagala, S. (2018) Disaster Risk Reduction in Indonesia: Moving Forward. In D. Paton and S. Sagala (Eds). *Disaster Risk Reduction in Indonesia*. (pp. 244-256) Springfield, Ill., Charles C. Thomas.
- Paton, D., Johnston, D., Rossiter, K., Buergelt, P.T., Richards, A. & Anderson, S. (2018) Tsunami risk in Australia: Facilitating community understanding. *Asia Pacific Fire, 64*, 74-76.

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# New Zealand

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GNS Science, Te Pū Ao, is New Zealand's leading provider of Earth, geoscience and isotope research and consultancy services. Our purpose is to understand natural Earth system processes and resources, and to translate these into economic, environmental and social benefits.

**Demonstrating scientific excellence since 1865.**

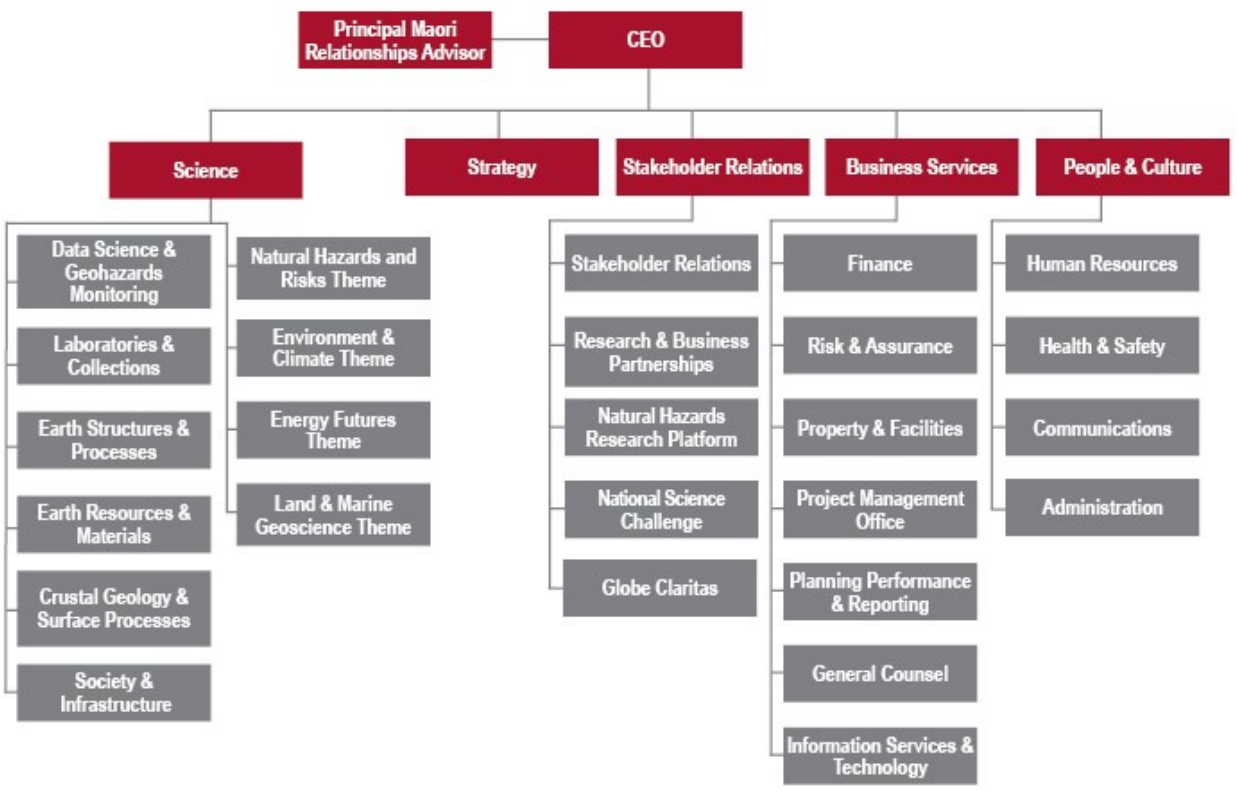
Since 1865 we have demonstrated scientific excellence in a country that straddles two tectonic plates, where earthquakes were first associated with geological faulting, and whose first Nobel Laureate, Ernest Rutherford, saw that radioactive isotopes could be used for geological dating.

Today, we continue these investigations, from the atomic to the planetary scale. These activities are expressed through our Māori name, Te Pū Ao, which means "the foundation, origin, and source of the world".

We are proud of our 140-year-old heritage inherited from *New Zealand Geological Survey* [1865-1990], *DSIR Geophysics Division* [1951-1990], *Institute of Nuclear Sciences* [1959-1992], and *DSIR Geology and Geophysics* [1990-1992].

In 1992, Crown Research Institutes (CRI) were established by the New Zealand Government.

While our registered company name remains the *Institute of Geological and Nuclear Sciences Limited*, in 2006 we re-branded to become *GNS Science*.

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## Research Focus:

We apply our scientific knowledge from the atomic to the planetary scale, to create wealth, protect the environment, and improve the safety of people.

**Land and Marine Geoscience**
Understanding earth processes to underpin exploration and geohazards.

- Earth's Magnetic Field
- Fossils
- Ocean Floor Exploration
- Plate Tectonics
- Regional Geology

**Natural Hazards & Risk**

Understanding, monitoring and planning for community protection.

- Earthquakes
- Landslides
- Tsunami
- Volcanoes
- Risk & Society

**Energy Futures**

Sustainable energy development and resource use for wealth creation.

- Gas Hydrates
- Geothermal
- Minerals
- Oil & Gas

**Environment & Climate**

Innovations for industry, authentication, climate change and environment.

- Advanced Materials
- Air Quality
- Climate Change
- Extremophiles
- Isotope Science
- Groundwater

## Institutional Capacity Development Activities or training opportunities:

**Training**
Courses and programmes on offer at GNS Science

**Radiation License "Core of Knowledge" Training**
*GNS Science provides regular training courses for people planning to apply for radiation licenses.*

Courses are a day long, and usually held at GNS Sciences National Isotope Centre in Lower Hutt. However, courses are also held on request at locations around New Zealand for companies requiring in-house staff training. Details here:

**Quaternary Techniques**
This short course is intended for students and researchers in all areas of earth and environmental sciences who are faced with questions such as:

- What types of archives contain paleoenviromental information?
- What is the most appropriate environmental indicator at my site?
- What proxies are used for climate change?
- How do I interpret these isotope data?
- What techniques are best for which type of stratigraphic records?

www.gns.cri.nz/qtshortcourse

## Other useful information and contacts:

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