



**UCL**



**RDR**

UCL Institute for Risk  
and Disaster Reduction

## Annual Report 2017

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and Rebekah Yore

[www.ucl.ac.uk/rdr/](http://www.ucl.ac.uk/rdr/)



## From the Director

The UCL Institute for Risk and Disaster Reduction (IRDR) was launched in 2010 with a mission from the Provost to lead research, knowledge exchange and advanced teaching in risk and disaster reduction across UCL.

Budding off from the IRDR, the Humanitarian Institute, we launched this year, aims to mobilise UCL's research, expertise, teaching and the student body to impact global humanitarian challenges and to promote education for global citizenship and the connected curriculum at UCL. Co-produced teaching and research programmes will span natural, social, engineering and medical sciences, built environment, humanities, laws and ethics. Expansion of the IRDR and Humanitarian Institute were prioritised in the 2017 Faculty Strategic Plan presented to the Provost. We have set ourselves a target to double in size in 3 to 5 years to fulfil our mission. Specifically we aim to:

- Provide a cross-UCL platform for winning research funding from the £1.5 billion **Global Challenge Research Fund** (GCRF), focusing on, 1) building disaster resilience in developing countries and, 2) humanitarian challenges and migration.
- Launch a **Humanitarian Tech Hub**, to support innovative solutions to humanitarian challenges, which build on existing technological developments across UCL, fusing UCL's science, social science, engineering and health expertise, to innovate products, systems and training.
- Support the development of UCL students as global citizens, with the introduction of **elective modules in humanitarian issues** for all year across UCL
- Establish a centre for doctoral research in humanitarian challenges, with international partners.
- Support the establishment of trans-disciplinary research centres, themed around **Digital Global Health and Emergencies** and **Gender Responsive Resilience**.
- Develop **innovative masters teaching** in risk and data science and in humanitarian crisis and response, linking across to the Institute for Mathematical and Statistical Science and the Institute for Global Health.

These are ambitious tasks and aspire to the vision of UCL in 2034, for creating a global university champion for the UK in humanitarian response and disaster risk reduction. If this vision appeals to you, we invite you to join with us.

Peter Sammonds

Director, UCL Institute for Risk and Disaster Reduction

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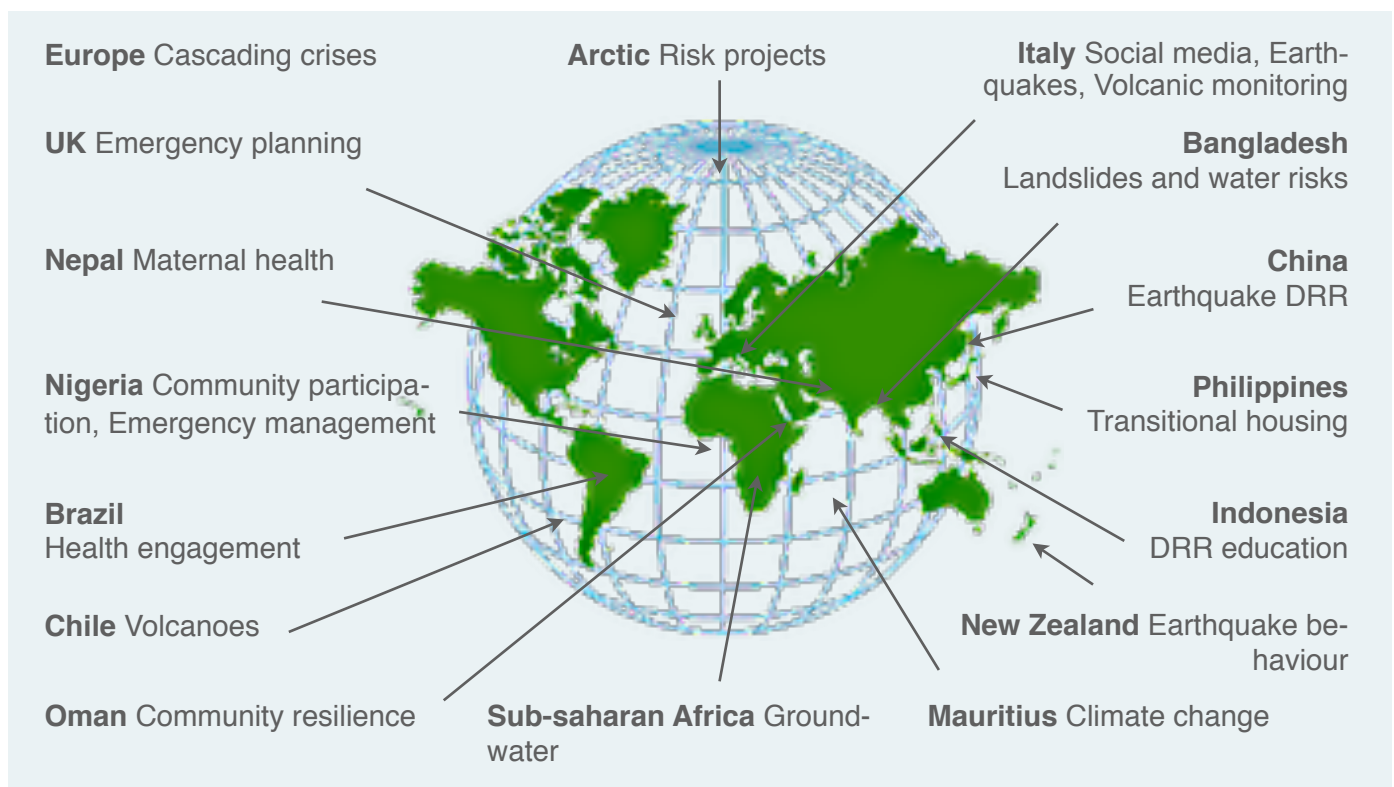
Cover image: Solar Flare (courtesy of NASA)

# IRDR at a Glance in 2017

Below we highlight some of the developments and achievements within the IRDR during 2016-17:

- ❑ Launched the UCL Humanitarian Institute with a Town Hall Meeting in October and the first Humanitarian Summit in June.
- ❑ Welcomed the appointment of Maureen Fordham, Patty Kostkova, Bayes Ahmed and Sonja Mueller as research staff; Katerina Stavrianaki as Teaching Fellow, Yasmine Boudiaf as Finance/IT Officer; Ben Wisner as Visiting Professor; and the promotion of Joanna Faure Walker and Carmine Galasso to Senior Lecturers.
- ❑ Congratulated Luke Wedmore and Serena Tagliacozzo on graduating with PhDs, while welcoming Mark Shortt, Patrizia Duda, Kholoud Mohsin Al Mufarraj, Saqar Alzaabi and Michiko Shinta as new IRDR students.
- ❑ PhD student Amy Chadderton was a finalist at L'Oréal-UNESCO for Women in Science.
- ❑ Launched the new PhD Risk and Disaster Reduction.
- ❑ Launched the new MSc Risk and Disaster Science.
- ❑ Won Motorola Solutions Foundation Scholarships for masters students.
- ❑ 600 participants attended IRDR events from UCL and beyond.
- ❑ Won 7 research grant awards from the RCUK Global Challenge Research Fund.
- ❑ Undertook fieldwork in the Italy, Japan, China, the Philippines, Indonesia, Nepal, Bangladesh, Nigeria, New Zealand, Mexico and Chile.
- ❑ Our researchers joined the EEFIT post-earthquake disaster mission to Italy.
- ❑ Published over 70 papers and book chapters in 2016-17.
- ❑ Joined the UCL-Lancet Commission on Migration and Health.
- ❑ Expansion of the IRDR and Humanitarian Institute prioritised in the 2017 Faculty Strategic Plan presented to the Provost.

## IRDR Global Reach





# Public Engagement

A key aim of the IRDR is to engage in public debate on issues in risk and disaster reduction, creating a space for academic discourse in the public policy and political arenas, and raising the profile of UCL. To achieve this we organise discussion meetings, lectures and symposia open to the UCL community and the general public and participate in external public engagement events.

Despite decades of gender work, around 50% of the world's population remain marginalized to varying degrees, and viewed through a gender-responsive lens, resilience remains a highly contested notion. The IRDR's strategy includes launching a new Centre for Gender Responsive Resilience at UCL. In building this initiative, Maureen Fordham, IRDR research professor and founder of the Gender and Disaster Network, delivered a special seminar at our first public event of 2016-17.



Continuing our close involvement with the Fukushima Prefecture in Japan following the 2011 Tohoku Earthquake and Tsunami, the IRDR co-hosted the UCL-Japan Youth Challenge with 35 school students and representatives from Fukushima. Around 200



people attended a public symposium on *Facing Disasters: International Disaster Management and Humanitarian Responses*, addressed by IRDR researchers, and a reception.

Building on our growing research focus in the developing world and our emerging consultancy activity in this area, we ran a public panel discussion on *Risk Finance for the Developing World* in partnership with DAI, a development consultancy organisation.

IRDR Reader, Ilan Kelman joined the *Pint of Science* festival to talk about disaster basics in a local pub!

## Public Events in 2016-17

**June 2016:** *IRDR Sixth Annual Conference*, attended by 180 people, with a keynote speech by Saleh Saeed, CEO, Disasters Emergencies Committee. Sessions included early warnings for disasters, emergency planning, and Dame Nicola Brewer *in conversation* on rights and resilience.

**June 2016:** *Fourth Academic Summit on Disaster Risk Reduction and Human Mobility*, attended by 100 academics and practitioners from across the UK and Europe.

**July 2016:** *UCL-Japan Youth Challenge*.

**October 2016:** UCL IRDR Special Seminar: *Gender Responsive Resilience*.

**January 2017:** *Haiti Earthquake 7th Anniversary Reception and Fundraiser*. Co-produced by UCL IRDR, UCL Humanitarian Institute and Thinking Development. Attended by over 100 people and opened by the Provost.

**March 2017:** *IRDR Careers and Opportunities Fair* with exhibitors from the public and private sector and attended by 120 graduates and students.

**March 2017:** IRDR partnered with DAI to produce a public Panel Discussion on *Risk Finance for the Developing World*, attended by 180 people.

## Making Impact

In January 2017, IRDR and the Humanitarian Institute partnered with *Thinking Development* to run a fundraising event to mark the 7<sup>th</sup> anniversary of the Haiti earthquake. Thinking Development is an NGO that emerged from the UCL student body following the disaster. The event showcased the work that Thinking Development has led on the design and construction of a disaster resilient girls school in Haiti. We have worked with Thinking Development since their launch in 2010 and were delighted to support their final event as their project is now complete.



*Courtesy Thinking Development*

IRDR's Joanna Faure Walker, David Alexander, Carmine Galasso, Zoe Mildon, and Serena Tagliacozzo joined the EEFIT earthquake engineering field mission in Central Italy following the devastating earthquake of 24<sup>th</sup> August 2016. Luke Wedmore joined follow-up fieldwork. Their

work has contributed to an analysis of the earthquake, response and impact of the disaster.

IRDR's space weather researcher and lecturer, Robert Wicks, is the Instrument Scientist for the Turbulent Electron Analyser for the European Space Agency's THOR mission, launched in March and June 2017. Robert has managed instrumentation development for the first CubeSat built by UCL - UCLSat.

IRDR researchers Patty Kostkova and Maureen Fordham are developing a mobile app to support mother and newborn child health in Nepal for use during and after disasters.

Dunedin Academic Press published a new practical guide by David Alexander, Professor of Risk and Disaster Reduction on *How to Write an Emergency Plan*.

IRDR PhD student, Danielle Charlton is a Member of the Working Group on Hazard Mapping (IAVCEI Commission on Volcanic Hazards and Risk); Gianluca Pescaroli is working to integrate cascading disasters into London's response and preparedness Strategies; Rebekah Yore works with NGO, Rescue Global. PhD student Patrizia Duda has led a big drive to increase IRDR social media reach.

## Media Engagement

The IRDR maintains a high-profile media strategy, providing both immediate comment during disasters, and features for documentaries and magazines.

Following the Accumoli (Amatrice) Earthquake in August 2016, Joanna Faure Walker and Carmine Galasso were much in demand by TV channels (including BBC News Channel, Channel 5, BBC World service) and print media (the Guardian, and TIME magazine). The IRDR also produced our own website news article to provide information to the public.

Robert Wicks described NASA's next solar mission and how it will help understanding of space weather on BBC World.



At IRDR Enterprise and Innovation we are motivated by our passion for bridging the gap between practice and academia.

IRDR enterprise focuses on:

- Promotion
- Consultancy
- Partnership
- Sponsorship
- Philanthropy
- Continuing professional development

## Humanitarian Tech Hub

Following the award of 2016-2019 UCL Provost Strategic Discretionary Funding to develop a Humanitarian Institute, we invite the UCL community and their collaborators to join a Humanitarian Tech Hub. Launching at the Humanitarian Summit on 22nd June 2017, we aim to draw on the expertise of UCL researchers and our partners to identify key areas of humanitarian need and to identify technological solutions. We will underpin all developments with a robust understanding of the challenges to be addressed, and will consider how existing technology might be redirected or adapted to meet these needs. We will address initially:

- Spaces of refuge: health, wellbeing and infrastructure
- Migration: tracking migration, managing logistics, and allocating resources
- Affordable healthcare
- Technology to deliver education.

[www.ucl.ac.uk/humanitarian](http://www.ucl.ac.uk/humanitarian)

## Motorola Solutions Foundation Sponsorship

We were delighted to secure and award two Motorola Solutions Foundation scholarships for 2017-18, for public safety professionals to study full time on the IRDR MSc in Risk, Disaster and Resilience. We are pleased to announce scholarships were awarded to Irene Naa Quartey, a senior disaster control officer from the National Disaster Management Organisation of Ghana; and Catherine Howes, a senior humanitarian programmes assistant at Muslim Aid.

## Consultancy: Safer Schools Programme in Pakistan

We are evaluating the School Safety Framework pilot for the *National Disaster Management Authority, Pakistan*. This evaluation will inform policy guidance and set national standards on the implementation of a comprehensive School Safety Framework at the national, provincial, district and school levels.

## Consultancy: Community-based Disaster Risk Management

Working for *Save the Children*, Ilan Kelman, David Alexander and Rebekah Yore have produced a research-to-practice brief on community-based disaster risk management.

## Consultancy: Food Security



UCL researchers, including Mohammed Shamsudduha, are working alongside Bangladesh government partners to explore the limits of the valuable groundwater resource and its impact on food security in Bangladesh.

## Knowledge Exchange: Data Sharing for Humanitarian Emergencies

Patty Kostkova is working on a knowledge exchange project with Medecins Sans Frontieres (MSF) to develop a framework for data sharing to mitigate, prevent or better manage humanitarian emergencies.



## Humanitarian Institute

Peter Sammonds and Rosanna Smith, Director and Deputy Director of the IRDR, won the backing from the Provost to launch a Humanitarian Institute for UCL as a top ranked strategic development priority. Its mission is to mobilise UCL's research, expertise and teaching to impact global humanitarian challenges and to promote education for global citizenship, through co-produced programmes spanning natural, social, engineering and medical sciences, built environment, humanities, laws and ethics, creating a global university champion.

An Advisory Board and Management Committee have been established. Rosanna has taken on the role of Coordinator and Bayes Ahmed has been appointed as knowledge exchange and research associate. In October 2016, a Town Hall meeting was held to present the new initiative and consult the UCL community on its direction, attended by 100 people. On 22 June 2017 a Humanitarian Summit will launch the institute. For more information email [humanitarian-info@ucl.ac.uk](mailto:humanitarian-info@ucl.ac.uk) [www.ucl.ac.uk/humanitarian](http://www.ucl.ac.uk/humanitarian)

## Doctoral Research Centre

The IRDR has a well-established Doctoral Research Centre, with over 20 research students who are cross-disciplinary and international in perspective and are making a real societal impact. In 2016-17 we launched a new PhD in Risk and Disaster Reduction which has resulted in a rise in applications particularly from international students. Our PhD students are a great asset to the IRDR, and contribute substantially to the IRDR mission. With cross-disciplinary supervisory panels, an educational programme in DRR and participation in the IRDR Student Forum, Spring Academy and Annual Conference, we

are fostering a new type of graduate student who is comfortable working in a trans-disciplinary and international environment.



Spring Academy 2017

## Graduate Careers

There is strong demand for our graduates. We organise an annual *IRDR Careers and Opportunities Fair*, targeted at the risk and disaster reduction sector to help inform both students and employers. In 2017 the event was attended by over 100 students and graduates, with specialist exhibitors/recruiters that included organisations from the NGO, insurance, catastrophe modelling, financial risk and education sectors. Speakers included IRDR alumni in the private and public sectors. Recruiters and delegates remarked at

the effectiveness and focus of the event. Students attending these fairs have found employment directly as a result of these events.



Teaching is a core part of our mission. We have established Risk and Disaster Reduction as a taught discipline, and our masters student numbers have grown to 25 over the first five years. We launched MRes (Master of Research) in Risk and Disaster Reduction in 2012, MSc Risk, Disaster and Resilience in 2013 and MSc Risk and Disaster Science in 2016. In 2017 we will be admitting our first students onto MSc Space Risk and Disaster Reduction. There are associated Postgraduate Diploma and Postgraduate Certificates for students who wish to follow only part of these programmes. These fill needs identified by practitioners and trained researchers who wish to gain a sound underpinning in the subject.

In 2017-2018 we are enriching our programmes with three new modules in 'Catastrophe Risk Modelling', 'Earthquake Risks' and 'Digital Public Health: Epidemics and Emergencies in the era of Big Data'. Student learning on all our programmes is enhanced through day field trips and a scenario exercise run by Rescue Global.



*IRDR Masters students participating in a scenario exercise run by Rescue Global*

Students from MSc and MSci programmes across UCL attend our modules (notably Earth Sciences and Engineering). IRDR staff also direct MSc Earthquake Engineering and teach on MSc Geophysical Hazards and other programmes.

IRDR MSc programmes are one-year full-time

(or two-year part-time) taught masters programmes. Each programme includes the following four compulsory modules:

- Integrating Science into Risk and Disaster Reduction*
- Emergency and Crisis Management*
- Risk and Disaster Reduction Research Tools*
- Research Proposal and Appraisal.*

Programmes comprise of two further programme-specific compulsory modules, and a choice of two optional modules from a list including modules taught by other departments across UCL. All MSc students undertake an *independent research project*, which cumulates in a research report and presentation and an independent project.

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## **MSc Risk, Disaster and Resilience**

**Director: Dr Joanna Faure Walker**

Students explore the characterisation, quantification, management and reduction of risk and disasters, and their associated impacts from a diverse range of perspectives. Programme-specific compulsory modules are:

- Natural and Anthropogenic Hazards and Vulnerability*
- Emergency and Crisis Planning*

*Optional modules are available from among the following:*

- Conflict, Humanitarianism, and Disaster Risk Reduction*
- The Variable Sun: Space Weather and You*
- Disaster Risk Reduction in Cities*
- Post Disaster Recovery*
- Adapting Cities to Climate Change*
- Decision and Risk Statistics*
- Earthquake Risks*
- Risk, Power, and Uncertainty (Anthropology)*
- Risk and Contingency Planning (Security and Crime Science)*
- Perspectives on Terrorism (Security and Crime Science)*
- Catastrophe Risk Modelling*



## MSc Risk and Disaster Science

Director: Prof Peter Sammonds

This is a complementary programme to the MSc Risk, Disaster and Resilience but with a stronger emphasis on the physical science of natural hazards, and provides an opportunity for in-depth study of the statistics of risk and disasters.

Programme-specific compulsory modules are:

- Earthquake Risks*
- The Variable Sun: Space Weather and You*

Optional modules are available from among the following:

- Catastrophe Risk Modelling*
- Digital Health: Epidemics and Emergencies*
- Decision and Risk Statistics*
- Seismic Risk Assessment*
- Climate Risks to Hydro-ecological Systems*
- Natural and Anthropogenic Hazards and Vulnerability*
- Conflict, Humanitarianism, and Disaster Risk Reduction*
- Emergency and Crisis Planning*

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## MSc Space Risk and Disaster Reduction

Director: Dr Robert Wicks

Our newest MSc programme draws upon UCL multidisciplinary expertise in risk, disasters and space science from the IRDR and the Mullard Space Science Laboratory. Compulsory modules are:

- The Variable Sun: Space Weather and You*
- Space Science, Environment and Satellite Missions*
- Space Systems Engineering*

Optional modules include a selection from among the following:

- Decision and Risk Statistics*
- Catastrophe Risk Modelling*
- Earthquake Risks*
- Space-Based Communication Systems*



Image - courtesy of NASA

- Space Instrumentation and Applications*
- Spacecraft Design – Electronic Sub-systems*
- Mechanical Design of Spacecraft*
- Global Monitoring and Security*
- Natural and Anthropogenic Hazards and Vulnerability*
- Emergency and Crisis Planning*

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## MRes Risk and Disaster Reduction

Director: Prof David Alexander

This MRes is a research intensive programme to train experts to analyze and provide solutions to complex issues relating to risk and disasters. Students undertake a substantial research project in addition to the taught component that comprises five modules. This includes two skills modules:

- Risk and Disaster Reduction Research Tools*
- Research Proposal and Appraisal.*

Students pick three further IRDR modules from:

- Integrating Science into Risk and Disaster Reduction*
- Emergency and Crisis Management*
- Emergency and Crisis Planning*
- Natural and Anthropogenic Hazards and Vulnerability*

*Please note the contents of our programmes may change from time to time and some optional modules may be unavailable. Students should consult the IRDR website for the latest information.*

## Research Profile

**Professor Peter Sammonds's** research includes earthquake and volcano hazards, Arctic risks and Increasing Resilience to Environmental Hazards in Border Conflict Zones (funded by the Global Challenge Research Fund). Building resilience in a frontier conflict zone is subject to multiple environmental hazards. In a joint project between the natural, social and historical sciences in the Hindu-Kush Himalaya region, vulnerabilities and social relations of communities in Ladakh are assessed, including cross-borders links, relations with other communities and migration. The outcome of this project will be an understanding, in the historical context, of a border conflict zone, how changing social relations increase or decrease social capital and vulnerability to environmental hazard risks. It is a key aim to build partnerships between researchers and practitioners across disciplines, across the Hindu Kush-Himalaya and with policy-makers, engineers, educators, NGOs, local communities, businesses and schools.



**Professor David Alexander** has been developing the recently founded IRDR Cascading Disasters Research Group to create theory and methodology for the study of cascading events, with special reference to critical infrastructure and metropolitan areas. The group has been working closely with European partners and the London emergency planning and response authorities. David's new book "How to Write an Emergency Plan" is selling well and he has begun to write a sister volume entitled "How to Manage an Emergency or Disaster". David has completed a long review of the problem of

corruption in disasters, which will appear in the Oxford Encyclopaedia of Natural Hazard Governance. Through the Earthquake Engineering Field Investigation Team (EEFIT), he is conducting empirical research on the position and role of organised volunteerism in major earthquake disasters in Italy.



**Professor Maureen Fordham** is a Professorial Research Associate at the IRDR. She is currently leading the MANTRA (Maternal and Newborn Technology for Resilience in rural Areas) project, which aims to build the resilience of pregnant and newly delivered women by improving access to information before, during and after disasters by developing an app to support public health interventions, especially in rural areas of Nepal. It aims to better understand and characterise risk, culture and knowledge; use local voices and images of risk and risk reducing behaviour; strengthen the capacities of women and their support networks including Female Community Health Volunteers (FCHVs); and improve communication of risk, resilience and response. The main vehicle for doing this is through the development and validation of a mobile app, tailored to local needs in terms of mobile connectivity and technology, levels of education and literacy, and local language and imagery. The research will have both academic and non-academic beneficiaries, and collate local health and environmental risk knowledge, stories and experiences from women and FCHVs.

## Research Profile

**Dr Ilan Kelman** is a Reader appointed 50:50 between IRDR and UCL Institute for Global Health. His research programme is combining disaster research and health research, including the integration of climate change challenges and opportunities into both topics. Two main areas of case studies are priorities: Small Island Developing States, and the poles, so the Arctic and the Antarctic. Much of the work relates to the Many Strong Voices ([www.manystrongvoices.org](http://www.manystrongvoices.org)) programme working with Arctic and island communities to address climate change in the context of wider development and sustainability challenges. In addition to highly cited, world-leading publications, this research's impact has been better connecting climate change, disaster risk reduction, and development for policy and practice. Future work will be focused on engaging more with health researchers and health practitioners.

**Patty Kostkova** is a Principal Research Associate in Global health and emergencies. Her role in UCL IRDR includes research into the global health digital interventions and Big Data potential for outbreaks and emergencies, looking into game-based training and community mobilisation and resistance building using mobile technology



and big data. In particular, she is co-I on the NERC funded research project MANTRA (Increasing maternal and child health resilience before, during and after disasters using mobile technology in Nepal) and GADSA (Gamified Antimicrobial Stewardship (AMS) decision support app for prescribing behaviour change in Nigeria) and a

knowledge exchange project on Data sharing for humanitarian emergencies with Medecins Sans Frontieres (MSF). She will also be chairing the interdisciplinary 7th International Digital Health conference in July 2017 ([www.acm-digitalhealth.org](http://www.acm-digitalhealth.org)).

**Dr Joanna Faure Walker's** research focus is



on continental settings that are experiencing extension, in particular the Italian Apennines. Her work has shown the importance of measuring long-term (thousands of years) rates of motion across faults in order to gain a more complete appreciation of the earthquake hazard in a region. She has further shown the importance of detailed measurements of the rate and direction of slip along an individual fault, as these parameters can affect calculations of fault recurrence intervals and hence quantifications of seismic hazard. Governments, industrial stakeholders and residents use seismic hazard and risk maps to make disaster risk management decisions. Her work has shown that profiles of fault throw-rates along a fault are complicated by local changes in fault geometry and slip vectors. This has been confirmed by a detailed LiDAR study along a fault in central Italy.

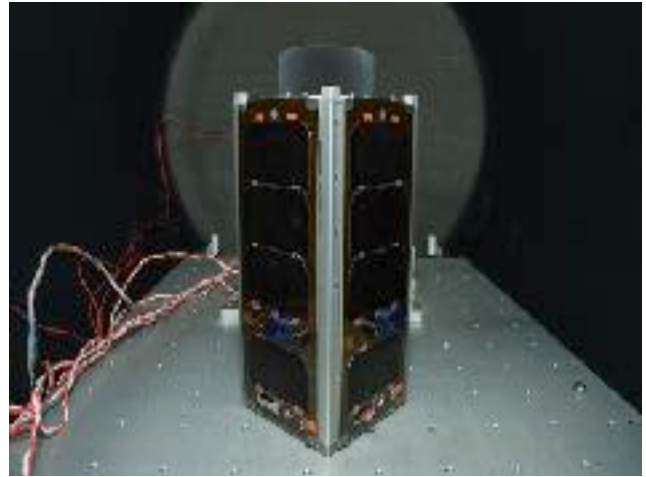


## Research Profile

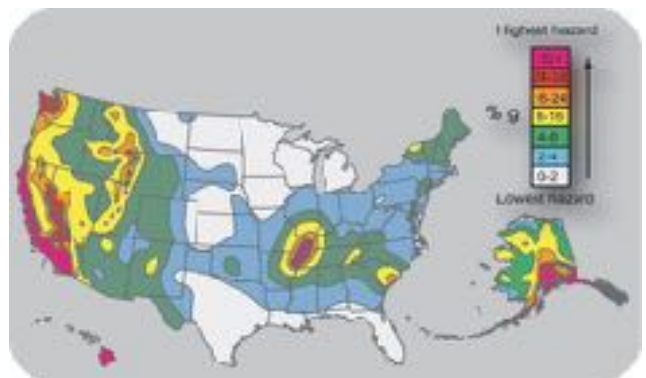
**Dr Carmine Galasso** is a lecturer in Catastrophe Risk Engineering with a joint appointment at UCL's Department of Civil, Environmental and Geomatic Engineering (CEGE) and UCL IRDR. He is also a member of the EPICentre research group and Degree Programme Director of the MSc in Earthquake Engineering with Disaster Management. His research focusses on the development and use of probabilistic and statistical tools for modelling and managing risk caused by extreme loads on the built environment. His emphasis lies on developing new tools for hazard-consistent seismic input assessment, engineering applications of earthquake early warning systems, structural reliability and flood risk assessment.

His recent consultancies include the *Assessment of the Multi-Hazard Vulnerability of Priority Cultural Heritage Structures in the Philippines* in support of the Department of Tourism, and *Building Urban Resilience to Disasters in the Kyrgyz Republic* in support of the Kyrgyz Republic State Agency for Architecture, Construction and Communal Services.

**Dr Robert Wicks** is a Lecturer in Space Weather and Risk, appointed 50:50 to UCL IRDR and UCL Department of Space and Climate Physics in March 2015. The Sun is the source of the solar wind, a supersonic flow of plasma that buffets the Earth. Dr Wicks' research focuses on understanding the fundamental plasma physics of how space plasmas are heated, accelerated, and interact when pushed together, which helps to understand and predict the impacts of changing solar output on the Earth. He also works on satellite hardware projects. Dr Wicks is the Instrument Scientist for the Turbulent Electron Analyser (TEA) for the ESA M4 mission THOR, project managing the assembly, testing, and delivery of 12 miniature Ion-Neutral Mass Spectrometers (INMS) for the EU FP7 project QB50 and the first CubeSat built by UCL, UCLSat.



**Dr Gordon Ross** is a lecturer in Statistics and Risk Analysis, appointed 50:50 between UCL IRDR and the Department of Statistical Science. Given that the quality of human life is periodically disrupted by large-scale disasters, which may be either natural (e.g. earthquakes, hurricanes) or man-made (e.g. terrorism), his interest lies in hazard modelling that involves predicting the probability of such disasters happening within a given time period. Although it is usually impossible to make deterministic predictions about the occurrence of specific disasters, it is often possible to make statistical predictions about the aggregate probability of such events occurring. His research aims to develop a general class of statistical point process models which can be applied to hazard modelling across a variety of different fields.



**Dr Mohammad Shamsudduha (“Shams”)** is leading research at the institute and collaborating with a number of UCL departments on water risks to human health and food security. Shams is currently working as the Project Manager of a UK-government funded 4-year (2015–2019) consortium research project called GroFutures (Groundwater Futures in Sub-Saharan Africa; [www.grofutures.org](http://www.grofutures.org)) that includes a number of African countries – Ethiopia, Tanzania, Niger and Nigeria. UCL researchers in collaboration with other UK research and academic institutes and several African countries are currently developing the scientific basis and participatory management processes by which groundwater resources can be used sustainably to alleviate poverty in rural areas in Sub-Saharan Africa. Shams is working on another research project concerning water, climate and policy for food production in a drought-prone region of Bangladesh that is funded by UCL under its Grand Challenges programme.



**Dr Simon Day** is a senior research associate in the IRDR. His current work focusses on the 2004 Sumatra-Andaman tsunami, which killed around 15,000 people on the Eastern coast of India, especially from vulnerable communities. The project takes an interdisciplinary approach that brings together natural scientific modelling of hazards, social analysis of urban development dynamic, and decision-theoretic (including ethical) evaluation of the aims of mitigation policies. In this first short-term study, we focus on two coastal towns in India (Kochi and Navi Mumbai), to lay down the foundations for a more ambitious future study. By doing an initial study of this kind, the feasibility of in depth mitigation planning that

is sensitive to scientific uncertainty and to community values can be assessed, trialling a multi-disciplinary approach to managing natural hazards.

**Dr Jessica Field** is a Researcher and historian at the IRDR and Assistant Professor at Jindal Global University. She works on the



Increasing Resilience to Environmental Hazards in Border Conflict Zones.

**Sonja Mueller** is a Researcher at the IRDR, working on (1) Increasing Resilience to Environmental Hazards in Border Conflict Zones, (2) MANTRA: Increasing maternal and child health resilience before, during and after disasters using mobile technology in Nepal, and (3) Gamified antimicrobial stewardship decision support app for prescribing behaviour change. Within these diverse collaborative projects, she coordinates and supports the development of research tools, fieldwork programs, logistics, and documentation. Her focus areas are geophysical hazards and forensic workshops.





**Alexandra Tsioulou:** “Simulated ground motions for catastrophe risk engineering” (Start: Sept 2014)

Funding: UCL Department of Civil, Environmental and Geomatic Engineering

There has been an increasing interest in recent years in the use of synthetic ground motions for loss estimation. The aim of this research is to develop a ground motion simulation methodology and incorporate it in a seismic risk assessment framework.

**Amy Chadderton:** “The influence of temperature on permeability evolution in Volcán Chaitén rhyolite” (Start: April 2013)

Funding: UCL IRDR - Earth Sciences Studentship

The permeability of fracture networks that act as fluid flow pathways is key to understanding eruptive behaviour at silicic volcanoes. Experimental results from this project indicate a complex permeability evolution that includes a reduction in permeability with increasing temperature.

**Bayes Ahmed:** “Community Vulnerability to Landslides in the Chittagong Hill Districts of Bangladesh” (Start: October 2013)

Funding: Commonwealth Scholarship

This research focuses on the multi-dimensional facets of vulnerability at community level to identify, address and understand the root causes of landslides in Bangladesh.

**Ching-Eye Rhea Leung:** “Mitigation and disaster preparedness measures enacted in remote mountainous areas affected by earthquake-triggered geohazards” (Start: October 2014)

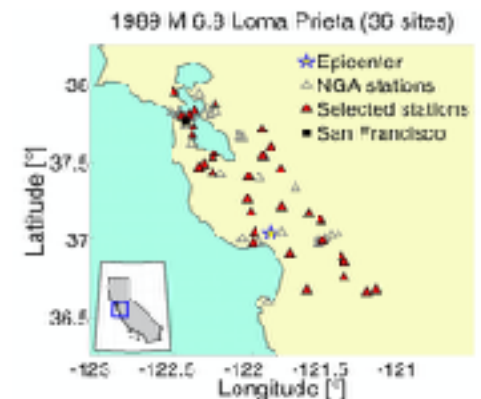
Funding: Self-funded (Part-time)

The 2008 Wenchuan earthquake has triggered numerous geohazard risks in Sichuan Province, China. The main objective of this research is to investigate the post-earthquake geohazard risk and to evaluate the effectiveness of subsequent mitigation and disaster preparedness measures.

**Danielle Charlton:** “The impact of volcanic activity to major urban centres” (Start: May 2014)

Funding: UCL Impact studentship and Aon Benfield reinsurance intermediaries.

Campi Flegrei is one of the most dangerous volcanoes in Europe, we can help manage the hazard and risk by understanding the needs of different audiences and designing new maps.





**Emmanuel Agbo C:** “Enhancing community participation in emergency response and management: with case of Nigerian flood vulnerability” (Start: July 2015)

Funding: TETFund, Nigeria

While half the global disasters and 84% disaster deaths are attributed to flood, the rapid growth in population and urbanisation disposes more percentage of the low-income citizens in the developing countries to low-lying coastal and other flood risk zones.



**Gianluca Pescaroli:** “The vulnerability of critical infrastructure in cascading disasters” (Start: May 2014)

Funding: EU FP7 FORTRESS (previously), UCL (now)

This research developed a new theoretical approach on cascading disasters, translating it into practices for emergency planning. An operational focus has been made in London to understand the stakeholders’ perceptions of cascading risk and their preparedness against power failures.



**Gillian Dacey:** “Self-protective behaviour during earthquake shaking” (Start: November 2013) Part-time

Funding: Self

This research seeks to determine whether earthquake self-protective behaviour is effective in improving survivability from damaging earthquakes, by conducting a comparative study with earthquakes from New Zealand and Japan.



**Janto S. Hess:** “Financing adaptation in Small Island Developing States: Investigating tourism related adaptation funds.” (Start: September 2015) Part-time

Funding: UCL IRDR partial studentship

This study links the topics of island studies, climate change, and tourism in perspective to financing climate change adaptation. In many Small Island Developing States (SIDS), tourism is the main economic sector and driver for development.



**Justine Uyimleshi Usile:** “Effectiveness of the Nigerian emergency management system in respect to building collapses, human stampedes and electrical power failures.” (Start: April 2015)

Funding: Petroleum Technology Development Fund, Nigeria

Several human-induced hazards have befallen Nigeria over the years. Building collapses, human stampedes and electric power failures are the major challenge. To improve preparedness and planning, it is essential to understand their root causes and the capability of the emergency jurisdiction.



**Katerina Stavrianaki:** “The clustering of earthquake magnitudes: From laboratory fracture to earth scale.” (Start: September 2013)

Funding: UCL IRDR Studentship

The clustering of earthquakes in time and space is widely accepted, however the existence of correlations in earthquake magnitudes is more questionable. This study aims to observe any trend of dependency between the magnitudes of aftershock earthquakes and the earthquakes that trigger them.

**Khuloud Al Mufarraji:** “Building community resilience via integrating voluntarism within civil protection system” (Start: October 2016)

Funding: Ministry of Higher Education – Sultanate of Oman

This research is focusing on reviewing the existing literature on voluntarism and to study some countries which incorporated voluntarism within their civil protection system. The research will finally aim to develop a model that integrates voluntarism within the civil protection system in order to achieve better community resilience.

**Mark Shortt:** “Consolidation and strength of thick sea ice features - risks in the offshore Arctic” (Start: August 2017)

Funding: UCL/SAMCoT Impact Studentship

Thick ice features (ridging/rafting) pose a formidable hazard to offshore structures in the Arctic, The aim of this project is to determine the strength of these ice features using a combination of laboratory testing and mechanical modelling.

**Melodie Vanderpuye:** “Investigating spatio-temporal randomness of large earthquakes” (Start: March 2013) Part-time

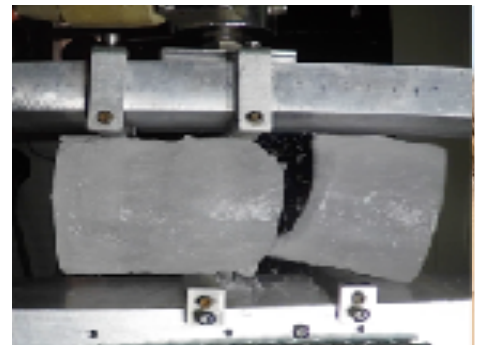
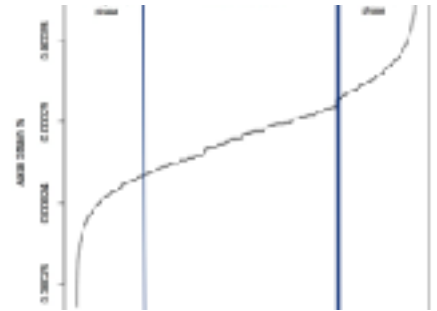
Funding: Qatar Re

This project uses proxies such as sub-marine deposit as a method to extend earthquake records at subduction zones. The eventual aim will be to suggest alternative distributions to those currently used that better reflect the behaviour of these extreme events.

**Michiko Shinta:** “Measuring the risk and resilience of urban systems” (Start: April 2017)

Funding: LPDP (Indonesia Endowment Fund for Education)

The object of this research is to develop a method to measure risk and resilience for urban systems to climate change impact and natural hazards that can capture an understanding of their complexity. This should generate no-regret resilience to minimise the culture of power towards the well being of vulnerable systems.





**Nathanael Harwood:** “A rise in the frequency of extreme weather in response to Arctic amplification and its implications for European decision-making” (Start: March 2016)

Funding: London NERC DTP Studentship

Bayesian Networks are being used to investigate changes in weather patterns at midlatitudes, with a focus on if and how an increase in extreme weather can be robustly linked to ongoing environmental changes in the Arctic.



**Nurmalahayati Nurdin:** “Disaster Education in Secondary High School Curriculum in Indonesia” (Start: January 2014)

Funding: Indonesia Government, Ministry of Religious Affairs

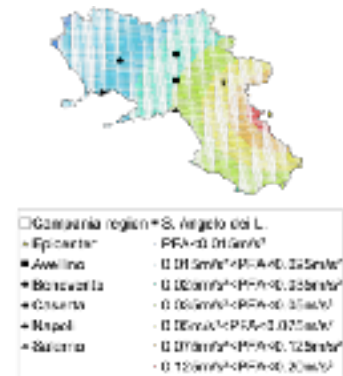
This research focuses on examining the Disaster Risk Reduction aspect of the national curriculum and investigates whether the implementation of school disaster based preparedness improves students understanding of DRR.



**Omar Velazquez:** “Engineering Applications of Earthquake Early Warning Systems” (Start: April 2015)

Funding: CONACYT (Mexico), IRDR

This research focuses on the design of Engineering Applications of Earthquake Early Warning Systems for real-time seismic risk mitigation. The main aim is to integrate the estimations provided by the systems in real-time engineering applications for reducing human and economic losses in civil structures.



**Patrizia Isabelle Duda:** “Informal Governance in Cross-Border Disaster Risk Reduction and Response in the Arctic” (Start: July 2016)

Funding: Self-Funded

Exploring the case study of the Arctic Finland-Norway-Russia tripoint, this project focuses on whether, why and how local stakeholders engage in informal cross-border disaster risk reduction and response and the relationship of such informal governance with formal disaster governance.



**Rebekah Yore:** “The Impact of Microinsurance on the Transitional Phase to Recovery” (Start: July 2015)

Funding: UCL IRDR Impact Studentship, co-sponsored by Rescue Global

Investigating the potential of microinsurance as a sustainable, long-term resilience strategy supporting the mechanism for rebuilding homes and livelihoods in low-income, disaster affected populations.





**Rory Walshe:** “Ground-truthing the assumptions of climate change impacts on small island states by cross-referencing multiple methods” (Start: March 2016)

Funding: London NERC DTP Studentship

This research will investigate the impacts of climate change on Mauritius and Tobago and will challenge assumptions regarding the effect of and response to anthropogenic climate change in this context.



**Sally Scourfield:** “The deformation and consolidation of brash ice” (Start: April 2014)

Funding: Total and UCL Impact Studentship

This project investigates the physical properties of brash ice (ice rubble generated when a ship passes through a region of sea ice cover), in particular, the effect it has on ice-ice friction, through lab and field experiments and modelling.



**Saqar Alzaabi:** “A Multi-Perspective Vulnerability Assessment of Muscat Coastal Areas to Cyclone Hazards” (Start: October 2016)

Funding: Government of Oman

This research aims to classify the vulnerability of selected Muscat coastal areas to hazards triggered by cyclones based on two different scenarios. Once this is accomplished, the research aims to identify underlying causes of these results.



**Serena Tagliacozzo:** “Communication practices and social media usage by government agencies and citizens during post-disaster reconstruction” (Start: September 2013)

Funding: IRDR-MAPS

This research explores how government agencies and citizens communicate and use social media platforms during long-term disaster recovery, also known as post-disaster reconstruction phase.



**Tasnuva Tabassum:** “Assessing seismic hazards from a Bayesian perspective” (Start: Sept. 2015)

Funding: Commonwealth Scholarship Commission

Epidemic Type Aftershock Sequence (ETAS) model has been widely used to forecast aftershocks. The study aims to estimate the Bayesian confidence intervals of the magnitude of the largest aftershock for several sequences of aftershock through using the ETAS model.



**Zoe Mildon:** “Structural geology and recurrence intervals of active normal faults in the central and northern Italian Apennines” (Start: Oct. 2013)

Funding: NERC

My research is focussed on studying the geometry of active normal faults in Italy and investigating the effects of coulomb stress transfer following earthquakes on these faults.



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**3-5 July 2017**

**7th Digital Health Conference**

Chaired by: Dr Patty Kostkova  
[p.kostkova@ucl.ac.uk](mailto:p.kostkova@ucl.ac.uk)

**10 October 2017**

**Special Seminar: Future for risk auditing:  
harnessing catastrophe models to measure  
progress in disaster risk reduction**

Speaker: Dr Robert Muir Wood, RMS  
Convenor: Dr Rosanna Smith  
[rosanna.smith@ucl.ac.uk](mailto:rosanna.smith@ucl.ac.uk)

**20 October 2017**

**Humanitarian Institute Masterclass in  
Global Citizenship for Students**

Developing international schools' programmes  
Convenor: Katerina Stavrianaki  
[k.stavrianaki@ucl.ac.uk](mailto:k.stavrianaki@ucl.ac.uk)

**21 November 2017**

**Alumni Roundtable Dinner**

For our alumni, visiting staff and members.  
Roundtable discussion and awards  
Convenor: IRDR Administrator  
[irdr-enquiries@ucl.ac.uk](mailto:irdr-enquiries@ucl.ac.uk)

**17 January 2018**

**IRDR PhD Student Forum**

Convenor: Dr Ilan Kelman  
[i.kelman@ucl.ac.uk](mailto:i.kelman@ucl.ac.uk)

**28 February 2018**

**IRDR Careers & Opportunities Fair**

To register as exhibitor / delegate, email:  
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**7 March 2018 (Provisional)**

**IRDR Public Meeting on Low Cost Disaster  
Risk Reduction Solutions**

Convenor: Prof. David Alexander  
[irdr-enquiries@ucl.ac.uk](mailto:irdr-enquiries@ucl.ac.uk)

**23-24 April 2018**

**IRDR Spring Academy**

For IRDR academic and research staff and  
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Convenor: Dr Ilan Kelman  
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**IRDR Eight Annual Conference (UCL)**

A day of thought-provoking lectures and dis-  
cussions, open to the UCL community and the  
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Convenor: Dr Rosanna Smith  
[rosanna.smith@ucl.ac.uk](mailto:rosanna.smith@ucl.ac.uk)

**21 June 2018**

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Convenor: Bayes Ahmed  
[humanitarian-info@ucl.ac.uk](mailto:humanitarian-info@ucl.ac.uk)

**Monthly IRDR Invited Seminar Series**

Convenor: Prof Peter Sammonds  
[p.sammonds@ucl.ac.uk](mailto:p.sammonds@ucl.ac.uk)

**IRDR Discussion Forum Series**

Informal - fortnightly

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We have the following opportunities:

**IRDR Forums** with partners and funders to foster cross-disciplinary collaboration. The format is three lead presentations, then brief talks by researchers and open discussion followed by a drinks reception.

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**IRDR Annual Conference** sessions on a research theme. The format may be presentations, panel discussion, keynote lecture or “*in conversation*” interview.

**IRDR Sponsorship** of launch events, conferences or workshops at UCL, where we can provide logistical support.

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Feng Yu

Ting Kan

## PhD Research Students

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Bayes Ahmed

Saqar Alzaabi

Amy Chadderton

Danielle Charlton

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Janto Hess

Zoe Mildon

Kholoud M Al Mufarraji

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## Annual Report 2017



UCL Institute for Risk  
and Disaster Reduction


UCL Institute for Risk and Disaster Reduction  
University College London  
Gower Street, London WC1E 6BT  
United Kingdom

Location: Bloomsbury Campus, South Wing (2nd floor)



*Informal housing along the coastlines in the Eastern and Central Visayas region of the Philippines leaves large populations exposed to storms and sea level rising (2016).*

**BECOME A MEMBER OF THE IRDR.** Reducing global risks and disasters presents a colossal challenge that requires coordinated and collaborative action. UCL is uniquely well placed to respond to this challenge with at least 70 academics across 12 departments and 7 faculties involved in world-class research, teaching and practice in the field. The IRDR aims to bring together this wealth of knowledge and expertise, and through research, teaching and knowledge exchange aims to overcome the barriers to understanding risk and reducing the impact of disasters.

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