Space Risk and Disaster Reduction MSc
2019/20 entry
www.ucl.ac.uk/rdr/

Artists impression of space weather impact on satellites, image: ESA - Pierre Carril
In an increasingly technological and globally connected world, risks to space-based communications systems and critical infrastructure are emerging threats to national security and businesses. In a programme that unites emergency response, disaster risk reduction and space technology, you will learn about satellite technology, mission design, hazards and vulnerabilities unique to outer space, disaster response, and the monitoring of hazards on Earth from outer space.

Programme themes

**Hazards of Outer Space**
- Space weather, radiation, debris
- Emerging risks and the future of disaster monitoring

**Satellite Design and Operations in Space**
- Learn how to design and operate a satellite from the largest university space science department in the UK

**Understanding Vulnerability**
- From fragility curves describing damage to buildings to social vulnerability of individuals and society

**Quantifying Risk**
- What is risk and how to measure it?
- Components of risk: exposure, hazard, vulnerability

**Multidisciplinary Holistic Approaches**
- Integrating scientific knowledge into disaster risk reduction, policy and practice
- Communicating with stakeholders

**Managing Disasters**
- How to apply plans to manage real emergencies

Teaching and learning

**Learn** from world-class researchers and professionals delivering the programme through a combination of lectures, class discussions, problem-solving exercises, practicals, field trips, directed reading, student-led dialogue, and a practitioner-led real-time disaster scenario event.

**Assessment** is by individual and group presentations, coursework, written examinations and a research project.

Why study at UCL?

UCL is one of the world's leading universities, regularly featuring in the top 10 in global rankings.

The **Institute for Risk and Disaster Reduction (IRDR)**, leads multidisciplinary research, knowledge exchange and advanced teaching across UCL. As a student, you will be encouraged to join our active seminar series, high-profile public discussion meetings and the networking events we host.

The **Department of Space and Climate Physics (SCP)**, with its Mullard Space Science Laboratory (MSSL), is one of the largest space science labs in the world. It has led and participated in more than 35 satellite missions. MSSL scientists and engineers work together to produce instruments at the forefront of research.

**London** is one of the world's great cosmopolitan cities. It is an international hub for global finance and risk management, NGOs, and engineering consultancies. The IRDR nurtures networks across London, and beyond.

"London itself is an unparalleled breeding ground of ideas for anyone interested in research" (MSc student 2015/16).

Careers

Whether you wish to start a new career in risk and disaster reduction or you already have experience we are here to support you. With an MSc in Risk, Disaster and Resilience you will have excellent academic credibility coupled with practical and analytical skills.

We run an annual **Careers and Opportunities Forum** which offers expert and targeted advice, and hosts stalls from a range of employers and headhunters in the field of risk and disaster reduction. Our graduates are highly sought-after in the following sectors: insurance, risk management, satellite industry, data science, NGOs, government agencies, finance, consultancy and academic research.

Some career destinations of recent IRDR graduates:
- Disaster Risk Management Consultant, World Bank
- Project Officer, Global Risk Forum Davos
- Global Engagement Fellow, Interpeace
- Civil Contingencies Coordinator, UK Local Government
- Project Officer, Cairo Local Government
- Reinsurance Claims Management Executive AXA Global Re, Paris
- Business Continuity Consultant, Arup
- Business Continuity & Resilience Consultant, PwC
- Space Engineering, Airbus
- Space Engineering, AstroSat
Modes of study: Full time: 1 year. Part time: 2 years
Students take eight taught modules and an independent research project.
A Postgraduate Diploma comprising eight taught modules can be taken full-time or part-time over two years.
For further information see www.ucl.ac.uk/rdr/

## Degree Programme Modules

### Six compulsory taught modules (15 credits each)

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<thead>
<tr>
<th>1 Integrating Science into Risk and Disaster Reduction</th>
<th>2 Emergency and Crisis Management</th>
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<tbody>
<tr>
<td>Quantitative risk assessment</td>
<td>Risk transfer &amp; communication</td>
</tr>
<tr>
<td>3 The Variable Sun: Space Weather and You</td>
<td>4 Space Science, Environment and Satellite Missions</td>
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<tr>
<td>Satellite vulnerability</td>
<td>Risks to critical infrastructure</td>
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<tr>
<td>5 Space Systems Engineering</td>
<td>6 Practice and Appraisal of Research</td>
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<tr>
<td>Systems lifecycle</td>
<td>Project management</td>
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### Two optional taught modules (15 credits each) from

<table>
<thead>
<tr>
<th>1 Space-based Communications Systems</th>
<th>2 Space Instrumentation and Applications</th>
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<tbody>
<tr>
<td>Ground stations, data handling and link design</td>
<td>Telecoms infrastructure, Iridium, applications</td>
</tr>
<tr>
<td>3 Mechanical Design of Spacecraft</td>
<td>4 Spacecraft Design - Electronic Sub-systems</td>
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<tr>
<td>Design considerations</td>
<td>Mechanical and thermal engineering</td>
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<tr>
<td>5 Catastrophe Risk Modelling</td>
<td>6 Digital Health: Epidemics and Emergencies</td>
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<tr>
<td>Probabilistic modelling</td>
<td>Hazard &amp; physical vulnerability</td>
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<td>7 Gender, Disaster and Conflict</td>
<td>8 Business Continuity Management and Organisational Resilience</td>
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<tr>
<td>Gender responsiveness</td>
<td>Structural vulnerabilities</td>
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<tr>
<td>9 Risk Analysis for Disaster Science</td>
<td>10 Natural and Anthropogenic Hazards and Vulnerability</td>
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<tr>
<td>Earthquake science</td>
<td>Statistical geophysics</td>
</tr>
<tr>
<td>11 Emergency and Crisis Planning</td>
<td>12 Data Analysis and Interpretation</td>
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<tr>
<td>Methodology and techniques</td>
<td>Policy and legal contexts</td>
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<tr>
<td>13 Global Monitoring and Security *</td>
<td>14 Decision and Risk (Statistics) *</td>
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<tr>
<td>Global Earth Observation Systems / GMES</td>
<td>Societal benefits of space observation</td>
</tr>
<tr>
<td>15 Principles and Practice of Remote Sensing *</td>
<td>Geometric principles</td>
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### Independent project (60 credits)

The independent research project culminates in a 10,000 to 12,000 word dissertation and poster presentation. Projects may be laboratory, field, theory or modelling based and can be conducted in collaboration with external industry, international research organizations or NGO partners.

### Field studies and group working

Current field visits include: the Thames Barrier and disaster management; Cambridge flood hazard; a disaster scenario exercise with NGO Rescue Global; the Blacknest Seismological Observatory; the Met Office; Southwest England for integrated group projects covering hazard mapping, vulnerability assessment, and critical infrastructure assessment, with Hinkley Point nuclear power station as an example.
MSc Space Risk and Disaster Reduction

Key information

Programme starts
September 2019

Modes and duration
Full time: 1 year          Part time: 2 years

Tuition fees (2019/20)
UK/EU:   £10,150 (FT) £5,100 (PT)
Overseas: £24,250 (FT) £12,110 (PT)

Scholarships
UCL offers a selection of scholarships for supporting postgraduate studies. Details of funding opportunities can be found at: www.ucl.ac.uk/scholarships. Further advice and programme-specific scholarships information can be obtained from the Masters Programmes section of the IRDR website.

Application dates
Open: 15 October 2018     Close: 26 July 2019

Note on fees: The tuition fees shown are for the year indicated above. Fees for subsequent years may increase or otherwise vary. Further information on fee status, fee increases and the fee schedule can be viewed on the UCL Current Students website.

Entry requirements
Normally a minimum of an upper second-class UK Bachelor's degree in a relevant science discipline, engineering or mathematics, or an equivalent overseas qualification.

Mathematics requirements
Mathematical methods taken in science or engineering degrees is sufficient (Enquire if in doubt).

English language requirements
If your education has not been conducted in the English language, you will be expected to demonstrate evidence of an adequate level of English proficiency.

The English language level for this programme is: Good

Further information can be found on our website.

International students
Country-specific information, including details of when UCL representatives are visiting your part of the world, can be obtained from the UCL International Students website.