Evidence for Policy in Disaster Risk Management Summer School 2023

29-31 May 2023

Scuola Superiore Sant'Anna
Pisa, Italy

Outline of the Masterclasses

Union Civil Protection Knowledge Network

CIVITAS SOTERIA

Masterclasses

Masterclass 1 - Managing available information on climate and weather changes

Room
Aula Magna Storica

Masterclass team
Coordinator: Dr. Erika Coppola (Research scientist, International Center for Theoretical Physics Earth System Physics) **Assistant:** Dr. Chiara Tea Antoniazzi (Post-doctoral researcher, Sant'Anna School of Advanced Studies)

Aim(s) of the Masterclass
In order to manage climate and weather hazards, as well as the connected social and economic consequences, two things are necessary: first, a good understanding of the state of the climate and how it has been and will be affecting countries; and second, where to find and how decision makers can make good use of the available information produced by scientists who observe these phenomena. This Masterclass will provide participants with basic scientific information relating to the state of the climate and its predicted changes; illustrate what type of options are available for decision makers, their added value and limitations; and discuss the interpretation and use of the relevant climate and weather information for action in disaster risk management.

Contents and structure of the Masterclass
The Masterclass includes a lecturing phase (1 hour), a team-work phase (1.5 hours, including a coffee break), and a final discussion phase (1 hour). **Introduction & keynote speeches (1 h)** • From climate projections to policy relevant information (*Erika Coppola*) • Assessing the impact of climate change on cities: analysis of Urban Heat Islands vulnerability at regional scale in Italy (*Gianmarco Paris*) • Using climate and weather information in rescue services in Finland (*Anna Eskelinen*)

In the first lecture, we will learn how an IPCC report is written and how the regional climate hazards and risk assessment is derived, and the uncertainty estimate considered. In the second lecture, we will analyse a spatially explicit methodology, that combines climate, census, and land use/coverage data, to assess the vulnerability of an Italian region to the Urban Heat Island effect. In the third lecture, we will present the decision maker perspective and discuss how climate and weather information are used in rescue services.

Interactive teamwork session (1 h 30 min)

- Introduction: teams' composition and presentation of the case studies *(10 min)*
- Teamwork *(1 h 20 min, including a 15 min coffee break)*

Plenary discussion (1 h)

- Each team will report to plenary *(30 min)*
- Plenary discussion *(30 min)*

The participants will be divided into teams of maximum five members. In the first part of the teamwork exercise, each team will be assigned one of two prepared case studies to analyse and discuss, with a few questions to address. Then, in the plenary discussion, each team will report their answers and thoughts, and discuss them with all the other participants. The three speakers/facilitators will be available to support the teamwork, if needed, and will coordinate the plenary discussion.

- **Case-study 1** will focus on how best to use the information produced by scientists and included in the Summary for Policy Makers (SPM) Reports of the Assessment Report 6th of the Intergovernmental Panel on Climate Change (IPCC). More specifically, it will simulate the workflow to designate a new policy (for example for water usage or energy production), or to modify an existing one, by means of the information available in the most recent IPCC SPMs. The exercise should focus on how the information can be used, what is missed and is essential to produce the workflow; and which kind of data could be used or analysed to support the decision to have a new or modified policy.
- **Case-study 2** will focus on how best to assess cities' vulnerability to heat waves. Today, about 56% of the global population lives in cities, which during heatwaves can experience temperatures that are many degrees higher than the countryside. This is particularly felt in Europe, due to the fact that the European region is one of the world climate hot spots (see, e.g., what has been experienced in the summer of 2022). The teamwork will

consist of a critical analysis of the methodology developed by Regione Lombardia (Italy), as part of its regional vulnerability analysis. The methodology was aimed at evaluating the vulnerability to the Urban Heat Island effect of the entire Lombardia territory. Participants will be tasked to assess whether the methodology can be improved, and what scientific data might be useful to support a decision-making process aimed at protecting the population, and at setting up adaptation policies and strategies against heat waves and heat islands in cities.

Outputs of the Masterclass

The outputs of this Masterclass will be:

- Understanding what an Earth-system model is, and what type of data it can produce.
- Understanding what information policy and decision makers can extract from the IPCC reports, and how they can use this information in designing new policies.
- Understanding how weather and climate data can be used to assess weather risk, with a particular focus on cities vulnerability to heat waves, and to design adaptation policies.
- Understanding what are the key issues linked to decision making to manage weather and climate risk, and how to deal with uncertain information (e.g. uncertain future climate projections).

Speakers

Dr. Erika Coppola (coppolae@ictp.it)

Erika received the Laurea (Master) in Physics from the University of L'Aquila, and a PhD in Meteorology from the University of Reading, UK. She is currently a research scientist at the International Center for Theoretical Physics Earth System Physics (ICTP ESP) section, which she joined in September 2006. She contributed as a lead author to the IPCC 6th Assessment Report of Working Group I, coordinated the assessment of regional climate information across all continents and contributed to the development of an updated IPCC risk assessment framework. Her current research activity is focusing on the climate change impact on hazards at the regional scale by means of regional climate models and hydroclimate models.

Dr. Gianmarco Paris (gianmarco.paris@landmarkstudio.it)

Gianmarco is an environmental consultant and a senior environmental analyst. He graduated in Biology and obtained a PhD in Ecology. Since 1997 he has been developing Geographic Information System (GIS) applications to applied ecology, environmental assessment and management, spatial planning, and renewable energy sources. He has been teaching GIS and Ecology at both undergraduate and graduate levels since 1994. In 2016 he joined the European Institute of Innovation and Technology (EIT) Climate-KIC Network of Climate Coaches. Since 2018 he has been a trainer for Italy of the Climate Data Store of the Copernicus Climate Change Service.

Ms. Anna Eskelinen (anna.eskelinen@pshyvinvointialue.fi)

Anna Eskelinen is Head of Rescue Services Situation Center of Eastern Finland. She has worked in the rescue sector, for example, as a supervisor, fire and safety inspector, and a senior teacher. Anna takes part in a task force, formed by the Ministry of the Interior of Finland, assigned to develop, and standardize the rescue services management system nationwide. She graduated from the Emergency Services Academy with a bachelor's degree in Fire Engineering and is currently doing her postgraduate Master of Engineering degree in Technology Leadership. Thanks to her rich and varied experience, Anna has a broad understanding of the Finnish rescue industry and the Situation Center operations that are an integral part of it. In rescue services, predictive weather and climate data is utilized, for example, in coordinating and optimizing the available resources and rescue personnel in a preventive way.

Recommended readings

Recommended readings *before* the Masterclass

- IPCC (2021b) Working Group I – Regional fact sheet: Urban areas.
- IPCC (2021c) Working Group I – Frequently asked questions.
- UNEP Report (2021) Beating the heat: a sustainable cooling handbook for cities.

Additional recommended readings

- IPCC (2021a) Working Group I report - Summary for policy makers.
- IPCC (2022a) Working Group II report - Summary for policy makers.

- IPCC (2022b) Working Group III report - Summary for policy makers.

Masterclass 2 - Understanding and applying foresight in disaster risk management

Room

Room 3

Masterclass team

Coordinators: Dr. Jacqueline Whyte (Policy Analyst- Scientific Editor, European Commission's Joint Research Centre) and Ms. Greta Hauer (Policy Analyst-Designer, European Commission's Joint Research Centre)

Assistant: Dr. Riccardo Luporini (Post-doctoral researcher, Sant'Anna School of Advanced Studies)

Aim(s) of the Masterclass

Foresight can help decision-makers to increase their preparedness when traditional 'predict and control' approaches fail. This is often the case in times of turbulence, uncertainty, novelty, and ambiguity; which are conditions impacting Disaster Risk Management. This Masterclass aims to give an overview of Foresight methods and how they can support Disaster Risk Management. We will look at Horizon Scanning and Futures Wheels methods, and we will review some recent work on Global Catastrophic Risks (GCRs), Existential Risks (X-risks) and governance of GCRs.

This Masterclass will also give participants the chance to participate in a hands-on Foresight exercise. The main part of the class will be dedicated to an interactive, guided discussion about risks and consequences (in groups of approximately 5 participants). We will explore how current developments could lead to risks and opportunities for the EU.

Contents and structure of the Masterclass

Keynote speech (*Clarissa Rios Rojas*)

a. Foresight in existential risk research (*40 min*)
b. Introduction to Horizon Scanning (*10 min*)

5-Minute break

Workshop: Horizon scanning on future risks

a. Getting to know the signs of new (*30 min*)
   Horizon scanning is a structured activity whose objective is to detect and analyse emerging 'game changers' that could have significant impact on society and policy, at an early stage. Beyond seeking and identifying emerging trends, horizon scanning helps us to assess and prioritise early signals for decision-making, and those that warrant further examination and analysis. In this workshop we will look at the outputs of an established horizon scanning process (i.e. recently identified signals of change from the European Strategy Policy Analysis System's Horizon Scanning process), and apply them in a practical workshop to explore potential future risks.
b. Development of Futures Wheels
   Futures Wheels are a foresight tool that can help us to explore potential futures. They help to structure discussions and explore emerging issues, imagine new possibilities and identify risks and opportunities by thinking through first-, second-, and third-order impacts in a structured way. This is a type of 'future impact' workshop.
   How does it work? You start by placing the pre-identified signal of change/important change/driver/scenario, or other issue, in the centre of the wheel. Participants then brainstorm potential first-order impacts in a facilitator-led discussion. Then you will continue to brainstorm second- and third-order impacts.

   Discussion of first order impacts (*30 min*)
   Discussion of second order impacts (*30 min*)

10-Minute break

c. Discussion of third order impacts (*35 min*)
d. Feedback to plenary (*20 min*)

Outputs of the Masterclass

- Understanding of Foresight and a selection of foresight methods.
- Several Futures Wheels, depending on the overall number of participants/groups. These future wheels will have explored the knock-on impacts of changes and the resulting risks and opportunities for the EU.
- Hands-on experience of the application of Foresight on the topic future risks.

Speakers

Dr. Clarissa Rios Rojas (clarissajaz@gmail.com)

Dr. Clarissa Rios Rojas is a science diplomat, government science advisor, and a Research Affiliate at the Centre for the Study of Existential Risk (University of Cambridge). Her work bridges the gap between science and policymaking, focusing on the risks posed by emerging technologies. Clarissa has also built Science-Policy interfaces for various stakeholders. She has worked closely with international organizations such as UN Women, WEF's Future Councils, and the G20 and WHO on foresight, economic transformation, and frontier risks. Clarissa is an expert advisor for organizations such as the OECD, the UN Secretary-General's High-Level Advisory Board, the UK parliament, and the UNDRR. She has a PhD in Molecular Biology and a master's in biomedicine & neuroscience. She has previously worked at the Ministry of Environment (Peru), the European Commission's science and knowledge service, the Geneva Centre for Security Policy, and the University of Queensland. Her website is www.clarissarios.com.

Dr. Jacqueline Whyte (jacqueline.whyte@ec.europa.eu)

Dr. Whyte trained as a cell biologist and worked on cell division for many years, in academia and biotech. In a return to early 'science and society' interests, she changed career direction and started working with experts and advisory committees on life sciences-related issues in EU policymaking in Brussels. She has been working to advocate for science and ensure collective intelligence and foresight inform decision making since 2014. She works collaboratively with experts at the Competence Centre for Foresight of the European Comission's Joint Research Centre, (on health-policy related foresight, horizon scanning, megatrends and emerging future risks).

Ms. Greta Hauer (greta.hauer@ec.europa.eu)

Greta Hauer is a Design researcher whose theoretically grounded works span experimental methods and speculative thinking to imagine alternative futures. Her work focuses on the Enactment of scenarios that are often presented though a wide range of media including film, object and scripted spaces. She has previously worked at Goldsmiths University, London College of Communication and University of Technology Sydney amongst others. At the Joint Research Centre, she is part of the Design Team at the Policy Lab.

Recommended readings

Recommended readings *before* the Masterclass

- List of Signals of Change (will be sent before the workshop)

Additional recommended readings

- Rios Riojas et. al (2023) Building a Science-Policy Interface for tackling the Global Governance of Catastrophic and Existential Risks, https://www.cser.ac.uk/media/uploads/files/UCA970_Report_on_the_challenge_of_GCRs_v10_AW_FOR_EMAILDOWNLOAD.pdf
- Bengston (2016) The Futures Wheel: A Method for Exploring the Implications of Social–Ecological Change, *Society & Natural Resources* 29(3): 374-379, DOI: https://doi.org/10.1080/08941920.2015.1054980
- Störmer et al (2020) Foresight – Using Science and Evidence to Anticipate and Shape the Future, Science for Policy Handbook Chapter 12, https://doi.org/10.1016/B978-0-12-822596-7.00012-7
- Wilkinson et al (2017) Strategic Foresight Primer, EPRS, https://cor.europa.eu/Documents/Migrated/Events/EPSC_strategic_foresight_primer.pdf
- JRC, Competence Centre on Foresight – Horizon Scanning, https://knowledge4policy.ec.europa.eu/foresight/topic/horizon-scanning_en
- ESPAS, Horizon Scanning, https://espas.eu/horizon.html

Masterclass 3 - Can hybrid experts help bridge the science-policy gap?

Room
Room 4

Masterclass team
Coordinators: Dr. Daniela Di Bucci ("Hybrid expert", Italian Civil Protection Department) and Ms. Marzia Santini ("Hybrid expert", European Commission's Joint Research Centre) **Assistant:** Ms. Marybelle Cherfan (Programme coordinator, Sant'Anna School of Advanced Studies)

Aim(s) of the Masterclass
The aim of this Masterclass is to let participants experience first-hand the decision-making related to the different phases and scales of the DRM process,

allowing them to interpret the three different roles of scientist, decision-maker and hybrid expert.

Hybrid experts are civil servants who have a solid expertise in both research and public administration, can understand and use the language of the two fields, see their expertise recognised by both the scientific and the decision-making communities, and are called upon to play an interface role. They may work either in research institutions or public administrations and can facilitate the interaction between decision-makers (political and technical) and scientific institutions for the definition of civil protection policies and decisions.

The Masterclass starts with two key notes of broad perspective, followed by an interactive phase on three scenarios. The experience ends with a general discussion on the topics addressed and the roles played.

Contents and structure of the Masterclass

Keynote speeches (40 min)

- Keynote speech on the Masterclass topic from the national perspective (*Mauro Dolce, 20 min*)
- Keynote speech on the Masterclass topic from the international perspective (*Néstor Alfonzo Santamaría, 20 min*)

Interactive session (2 h 15 min)

Practical exercise-based session on three case studies for which all participants will in turn play the role of scientists, decision-makers, hybrid experts. Each case study is 40 min (5 min setting the scene, 30 min interactive activity, 5 min wrap up main results) – plus 15 min coffee break:

a. Risk prevention and mitigation, national level: the case of Stromboli volcano (Italy)
b. Preparedness and response, European level: the case of the exceptional flood event of July 2021 in central Europe (Belgium, western Germany, Luxembourg, and the Netherlands)
c. Response to a large event, international level: the case of Türkiye/Syria earthquake

General discussion and conclusions (35 min)

Outputs of the Masterclass

The outputs of this Masterclass will be:

- A list of the main issues encountered by scientists, policy-makers and hybrid experts, related to the necessity to make science-based decisions in the different phases of the DRM cycle under uncertainty conditions.
- A summary of pros and cons related to the role played by the hybrid experts.
- Suggestions and recommendations on how to improve the effectiveness of the hybrid experts in the role of hinge between scientists and policy-makers.

Speakers

Prof. Mauro Dolce (mauro.dolce@unina.it)

Mauro Dolce is Professor of Structural Engineering, University of Naples Federico II, and was Director General at Italian Department of Civil Protection (DPC) (2006-2021) and Councilor for Infrastructures and Public Works at the Regione Calabria (2021-2023). He coordinated the Civil Protection monitoring and mitigation activities in the field of seismic risk and the technical management in the emergency of the 2009 Abruzzi, 2012 Emilia, 2016-17 Central Italy Earthquakes. He also coordinated the Italian seismic prevention program and the relationships of DPC with competence centres for seismic and volcanic risks and with the Major Risk Commission. Research activities have been mainly related to Earthquake Engineering and Seismic Vulnerability and Risk assessment of buildings, bridges and cultural heritage, resulting in about 500 scientific papers, 15 books, 17 volumes, 8 patents.

Mr. **Néstor Alfonzo Santamaría** (nestor.alfonzosantamaria@oecd.org)

Néstor Alfonzo Santamaría is an expert on risk governance and disaster risk reduction/management currently on loan to the Organisation for Economic Co-operation and Development (OECD), serving as a senior advisor on risk governance in the Public Governance Directorate. Before his current position, he worked on resilience policy and disaster management at the UK Cabinet Office, as well as in various UK ministries, the government of the City of London and the United Nations Development Programme (UNDP). Nestor has also advised the European Union, various UN agencies, the World Bank and the Inter-American Development Bank on disaster management issues. Néstor regularly speaks at international events (such as thematic events of the Group of 20 and the Group of 7) and is also a visiting lecturer at several universities worldwide.

Dr. Daniela Di Bucci (daniela.dibucci@protezionecivile.it)

Structural Geologist, PhD in Earth Sciences, Master's degree in Behavioural Sciences and Administrations, National Scientific Habilitation as Full Professor of Structural Geology. Current job at the International Relations and Activities Unit

of the Italian Civil Protection Department. Expert in geo-hazards and, more generally, in the relationship between the scientific community and policy makers in the field of disaster risk reduction and civil protection. Author of more than 110 peer-reviewed scientific publications, national and international, of more than 180 participations in conferences and congresses, and of technical and educational publications.

Ms. Marzia Santini (Marzia.SANTINI@ec.europa.eu)

Currently employed by the European Commission Joint Research Centre as leader of the European Crisis Management Laboratory - ECML (Disaster Risk Management Unit of the Directorate Space Security & Migration). More than 10 years of experience with science-based disaster risk management and civil protection, nationally and internationally as previously served in the Civil Protection Department of the Italian Presidency of Council of Ministers (2010-2019). Have also worked on various international projects under the EU Civil Protection Mechanism, and the UNESCO-led Inter-governmental Coordination Group for the establishment of a tsunami warning and mitigation system in the North East Atlantic, Mediterranean and connected seas region (ICG/NEAM TWS). Has a PhD in Geology, MSc in Coordination of Civil Protection Activities, MSc in Public Administration's Policies and Management, and MSc in Geology.

Recommended readings

Recommended readings (optional)

- Dolce and Di Bucci (2014) Risk management: roles and responsibilities in the decision-making process. In: Peppoloni and Wyss (eds.) Geoethics: Ethical Challenges and Case Studies in Earth Science. Section IV: Communication with the Public, Officials and the Media. Chapter 18, 211-221. Elsevier. Publication Date: November 18, 2014 | ISBN-10: 0127999353 | ISBN-13: 978-0127999357 | Edition: 1
- D'Angelo, Dolce, Pagliara, Di Bucci, Panunzi, Santini, Scalzo (2018) The Italian Alert System for Tsunamis: the SiAM Directive (2017) and its implementation. Extended abstract. 37° Convegno Nazionale GNGTS. Bologna, 19-21 November 2018. Volume dei Riassunti Estesi GNGTS 2018, Sessione 2.1, 328-333. https://gngts.ogs.it/archivio/files/2018/S21/Riassunti/DAngelo.pdf
- Dolce, Miozzo, Di Bucci, Alessandrini, Bastia, Bertuccioli, Bilotta, Ciolli, De Siervo, Fabi, Madeo, Panunzi, Silvestri (2020) Civil Protection in Italy. Civil Protection Department – Presidency of the Council of Ministers. First edition: September 2022. ISBN: 9791281195011. Published online on the website of the Civil Protection Department on 14 September 2022. https://www.protezionecivile.gov.it/it/pubblicazione/civil-protection-italy-basic-training-civil-protection

- Dolce and Di Bucci (2022) Building an effective collaboration between civil protection decision-makers and scientists for DRR: the Italian experience. Contributing paper to the UN Global Assessment Report on Disaster Risk Reduction (GAR) 2022. UNDRR, 22 pp. https://www.undrr.org/publication/building-effective-collaboration-between-civil-protection-decision-makers-and
- Italian Civil Protection Department. Stromboli. https://rischi.protezionecivile.gov.it/en/volcanic/volcanoes-italy/stromboli/
- JRC (2023) Scientific Analyses for the M7.8 and M7.5 Earthquakes in Türkiye and Syria, https://www.gdacs.org/documentmaps_IP.aspx?eventid=1357560&eventtype=EQ
- EFAS (2021) FAQ on EFAS and the recent flood events, https://www.efas.eu/en/news/faq-efas-and-recent-flood-events
- Lengfeld, Voit, Kaspar and Heistermann (2023) Brief communication: On the extremeness of the July 2021 precipitation event in western Germany, https://nhess.copernicus.org/articles/23/1227/2023/
- Mohr et al (2023) A multi-disciplinary analysis of the exceptional flood event of July 2021 in central Europe – Part 1: Event description and analysis, https://nhess.copernicus.org/articles/23/525/2023/nhess-23-525-2023.html

Masterclass 4- Developing a balanced behavioural and risk communication approach that engages the public

Room
Room 6

Masterclass team
Coordinator: Ms. Petra van Nierop (Lead analyst, ICF) **Assistant:** Mr. Roberto Talenti (PhD candidate, Sant'Anna School of Advanced Studies)

Aim(s) of the Masterclass
When responding to a sudden onset crisis, but also when having to prepare for a crisis which is unfolding more slowly, such as climate change, policymakers face two big challenges when having to decide on measures that will affect the wider community. Firstly, there may be 'tension' between the findings emerging from different types (e.g., natural and social) of science, or the scientific evidence on the systemic risks may be difficult to interpret when policymakers are planning and communicating measures to the public. The COVID-19 pandemic for example made it necessary for policymakers to understand and combine the recommendations from virologists with those from communication scientists and behaviouralists, which sometimes proved to be problematic. Secondly, policy makers need to find the right narrative when communicating with the public about a disaster, and involve the right stakeholders, including civil society, to ensure engagement and prevent panic or disobedience. This Masterclass will provide participants with practical examples and theoretical insights on how to best address these challenges.

Contents and structure of the Masterclass
This Masterclass is divided in two parts. The first part consists of three keynote speeches, each considering specific aspects of the challenges outlined above. The first keynote speak will provide an overview of the state of art regarding risk communication and risk perception, with a particular focus on natural disasters, while second keynote speech will present a practical experience related to understanding and combining scientific evidence and recommendations during a disaster, and communicating with the public during COVID-19. The third keynote speaker will focus on how to build an engaging narrative when communicating about disasters to the public.

The second part of the Masterclass will be dedicated to the scenario related to the floodings in Pisa presented in the Plenary, which however, in a later instance will worsen significantly, to now also include a fast-spreading form of malaria. Participants will first be asked to work on a communication and engagement plan based on the original scenario, and when the latter escalates, to not only adapt this plan but to also consider how to understand and manage 'conflicting' advice, all based on scientific evidence.

Part I: Introduction & Keynote Speakers (75 min)

Introduction by Coordinator, Petra van Nierop *(5 min)*

a. Overview of the state of art regarding risk communication and risk perception - *Samuel Ruffat* (*20 min*)

b. Lessons learned from the COVID-19 response in Italy– *Agostino Miozzo* (*20 min*)

c. Engaging the Public: Developing an Effective Narrative for Disaster Risk Communication - *Alexa Weik von Mossner* (*20 min*)

Questions & Answers (*15 min*)

Part II: Interactive Sessions (135 min):

The group will be split into two teams (one with policymakers, the other with scientists) and each will be asked to prepare a presentation on a laptop (a PPT template, and if needed a laptop, will be provided).

Facilitators: *Samuel Ruffat and Alexa Weik von Mossner*

a. **Introduction:** 'Setting the Scene' *(5 min)*

   The coordinator reminds the teams of the scenario presented during the plenary, and provides further relevant details for the exercise

b. **Interactive breakout session 1:** "Preparing a communication and engagement plan" *(30 min)*

   Based on the information provided, the teams will be asked to jointly prepare a communication and stakeholder engagement plan, asking the following questions:

   - How to best communicate to the public, when announcing the response and recovery measures that have been decided?
   - How to maximise public engagement?

c. **Group discussion**: 'Present a first draft of the plan' (*15 min*)

The breakout teams will be asked to briefly present their first drafts to each other. This will provide a first occasion to contrast and compare.

Coffee break: 15 min

d. **Interactive breakout session 2:** "The crisis worsens" *(30 min)*

After the break, the scenario will take a dramatic turn, as introduced by the facilitators. A fast-spreading malaria-like virus has been detected. The scientific advice is now conflicting, virologists don't agree on the type of malaria, but recommend a lock-down, while other multi-disciplinary scientists (meteorologists, hydrologists, etc.) forecast worse weather conditions and thus an increase in the floods, requiring an evaluation of a large part of the city. Behaviouralists warn for the potential panic and disruption that both approaches could cause, given the overall limited communication so far by the public authorities, and with the first deaths due to the virus having occurred, with rumours spreading fast about the virus being something that escaped from the university.

When back in the smaller breakout teams, participants are not only asked to update their communication and engagement plan in light of these new developments, but also to ask to review the new scientific evidence, and on that basis decide on what measures to take viz the public.

e. **Group discussion:** 'Working together on the Plan' *(45 min)*

The facilitators ask each team to present their communication and engagement plan, also providing a rationale for the decisions made on the public measures. They then facilitate a discussion between the teams of scientists and the team of policy-makers, to come to a solution on which both can agree. They will also be asked to consider on which aspects consensus can be reached easily, and on which aspects this is more difficult.

Outputs of the Masterclass

The outputs of this Masterclass will be:

- Considerations of the main commonalities and differences, and their underlying reasons, of the approaches that scientists and policy-makers would take towards disaster risk management.
- Suggestions on how to understand scientific evidence from different sources and manage conflicting advice when having to decide on matters that affect the public.

- Recommendations on how to best communicate and engage with the public in disaster risk management.

Speakers

Prof. Samuel Rufat (samuel.rufat@u-cergy.fr)

Professor of Geography at the Institut Universitaire de France and CY Cergy Paris University in France. He is a Disaster Resilient Society for Europe (DRS) expert at the EU Community for European Research and Innovation for Security (CERIS). He has published about fifty scientific papers and eight books on vulnerability, urban resilience, disaster risk perception, climate change adaptation, disaster risk reduction, disaster risk and emergency management. With over 15 years of interdisciplinary experience, including the participation in EU-funded Disaster Resilient Societies and Cooperation in Science and Technology projects, he is currently leading an ERC Consolidator project on climate change and disaster risk perception and adaptation in large European cities. He also contributes to foster bridges between the academic community, decision-makers and practitioners from the local to the international level, most notably the Council of the Paris Flood Prevention Strategy, the AFPCNT, the EU CERIS, the United Nations University (UNU) or the OECD GEM Foundation.

Mr. Agostino Miozzo (miozzomaster@gmail.com)

Agostino Miozzo has extensive experience in crisis management and international relations. He is Advisor to the President of Regione Calabria, for crisis management and international relations. He worked as the Coordinator of the Technical Scientific Committee – Presidency of the Council of Minister for the COVID Emergency and he has been Director General at the Presidency of the Council of Ministers, Civil Protection Department. Additionally, he has held various positions in national and international organizations, including coordinating emergency operations for the Italian Civil Protection Department and the Italian Development Cooperation. Agostino Miozzo has actively participated in international meetings and conferences on emergency response, humanitarian aid, and civil protection.

Prof. Alexa Weik von Mossner (Alexa.WeikvonMossner@aau.at)

Associate Professor of American Studies at the University of Klagenfurt in Austria and an expert in the narrativization of environmental risk. Her interdisciplinary research, which draws on findings in neuroscience and cognitive psychology, explores such processes of narrativization with a focus on affect and emotional engagement. Among her recent book publications are *Affective Ecologies: Empathy, Emotion, and Environmental Narrative* (2017) and the edited volume *Empirical Ecocriticism: Environmental Narratives for Social Change* (2023). She is currently involved in several interdisciplinary research projects that aim to improve environmental risk communication and has given

related talks at the Warning Research Center, University College London, and at the 6th DRMKC Annual Seminar of the European Commission's Disaster Risk Management Knowledge Centre, "Advancing Evidence-Based Policy and Practice."

Recommended readings

Recommended readings *before* the Masterclass

- OECD (2015a) Scientific Advice for Policy Making: The Role and Responsibility of Expert Bodies and Individual Scientists, OECD Science, Technology and Industry Policy Papers, No. 21, OECD Publishing, Paris, https://doi.org/10.1787/5js33l1jcpwb-en.
- Weik von Mossner (2018) Green States of Mind? Cognition, Emotion, and Environmental Framing, *Green Letters: Studies in Ecocriticism* 22(3): 313-323.
- Weik von Mossner (2017) Affective Ecologies: Empathy, Emotion, and Environmental Narrative. Columbus: Ohio State University Press.
- Rufat, Robinson and Botzen (2023) Insights into the complementarity of natural disaster insurance purchases and risk reduction behavior. *Risk Analysis*, 14130.
- Fekete and Rufat (2023) Should everyone in need be treated equally? A European survey of expert judgment on social vulnerability to floods and pandemics to validate multi-hazard vulnerability factors, *International Journal of Disaster Risk Reduction*, 103527.
- Rufat and Botzen (2022) Drivers and dimensions of flood risk perceptions: Revealing an implicit selection bias and lessons for communication policies. *Global Environmental Change* 73, 102465.
- Albert, Rufat and Kuhlicke (2021) Five principles for climate-resilient cities. *Nature* 596(7873): 486-486.

Masterclass 5- Understanding the role of International Disaster Law for scientists and policymakers

Room
Room 10

Masterclass team

Coordinator: Dr. Christine Bakker (Visiting research fellow, BIICL; and Affiliated researcher, Sant'Anna School of Advanced Studies)

Assistant: Dr. Luca Poltronieri Rossetti (Post-doctoral researcher, Sant'Anna School of Advanced Studies)

Aim(s) of the Masterclass

The norms of International Disaster Law (IDL) and the relevant international bodies in this field provide the legal and institutional framework for developing disaster risk reduction and preparedness strategies and actions. The applicable framework is a complex patchwork of international, regional, sub-regional and national norms, as well as several non-binding soft law instruments.

This Masterclass will provide participants with a deeper understanding of the linkages among these different layers of obligations, also considering national perspectives and implementing practices. With the aid of case-studies and reflecting on recent lessons learned, participants will better understand the concrete influence of IDL on the science-policy interface and explore new and creative avenues to implement disaster risk reduction policies that are adequately informed by available science, within the given legal framework.

Contents and structure of the Masterclass

Introduction & keynote speeches (1 h)

Introduction by Coordinator (*Christine Bakker, 5 min*)

International Disaster Law: Overview and Current Challenges

a. The international and EU legal frameworks related to disaster management: A general introduction (*Andrea de Guttry, 20 min)*
   - General overview of the main international and EU normative instruments of IDL (both legally binding, and "soft law" instruments); main principles of IDL

b. Implementing International Disaster Law: Ensuring coherence with Human Rights and International Health Law (*Therese O'Donnell, 20 min)*
   - Brief introduction on the relevance of other bodies of international law for IDL and on challenges for achieving consistency between them; examples from practice at the regional and national levels.

c. International Disaster Law: Challenges for scientists and policymakers (*Christine Bakker, 10 min*)

- What does IDL say about the role of science and scientists in disaster management?

Interactive sessions *(2 h 30 min)*

Facilitators: *Therese O'Donnell and Christine Bakker*

Introduction: "Setting the Stage" *(Christine Bakker, 5 min)*

Interactive session 1: "IDL – Perspectives from Scientists" *(40 min)*

Introduction by Facilitator *(Christine Bakker, 5 min)*

Case-study based on an example from practice *(25 min)*

- Based on lessons learned from the criminal prosecution of scientists and policymakers for their failure to adequately inform the public and competent authorities on earthquake risks in l'Aquila in 2009, this case-study will address potential legal issues that both scientists and policymakers may face related to their role in disaster risk management, based on national law, and International Disaster Law.
- The focus of this session is to identify possible legal issues and challenges for *scientists*, and to consider how policymakers can help solve them.

Concluding discussion and formulation of points to present to plenary meeting *(10 min)*

Coffee break: 30 min

Interactive session 2: "IDL - Perspectives from Policymakers" *(40 min)*

Introduction by Facilitator *(Therese O'Donnell, 5 min)*

Case-study based on an example from practice *(25 min)*

- A new virus emerges and rapidly causes another global pandemic (with different characteristics and associated risks than COVID).
- Policymakers struggle to adopt adequate response measures, due to a lack of scientific knowledge on this specific virus, and to uncertainties about States' obligations under IDL.
- The focus of this session is to identify issues/challenges for *policymakers*, and to consider how scientists can help solve them.

Concluding discussion and formulation of points to present at plenary meeting *(10 min)*

Interactive session 3: "Towards improved cooperation: Ways forward" *(35 min)*

Introduction by Facilitators *(Therese O'Donnell and Christine Bakker, 5 min)*

Group discussion based on the "Flood threat of the Arno River in Pisa" scenario, focusing on legal issues, and on ways to improve cooperation between scientists and policymakers *(25 min)*

Formulation of points to present at plenary meeting *(5 min)*

Outputs of the Masterclass

The outputs of this Masterclass will be:

- A list of the main issues encountered by scientists and policymakers related to legal aspects of DRR activities, and to the implementation of IDL.
- A list of suggestions and recommendations on how to improve cooperation between scientists and policymakers in DRR related to legal issues and the implementation of IDL.

Speakers

Prof. Andrea de Guttry (Andrea.deGuttry@santannapisa.it)

Full Professor of Public International Law, Scuola Superiore Sant'Anna, Pisa, Italy where he is also the Director of the International Training Programme for Conflict Management. He has over 25 years of international experiences in researching and training in the area of international disaster response law, EU and International Organisations Law. He is the author/co-author of more than 150 publications, including the books on "International Disaster Response Law", Springer 2012 and on "International Law and Chemical, Biological, Radio-Nuclear (CBRN) Events. Towards an All-Hazards Approach", Brill, 2022.

Ms. Thérèse O'Donnell (therese.odonnell@strath.ac.uk)

Reader in the Law School at the University of Strathclyde in Glasgow, Scotland. Thérèse obtained her LL.B. from Strathclyde Law School and successfully undertook postgraduate study at the University of Cambridge (Newnham College) and the University of Dublin (Trinity College). Thérèse has a particular expertise in Public International Law, Human Rights Law and International Disaster Law. Thérèse's research ranges across law's encounters with history and critical geography, and she has published extensively in the disaster field. Thérèse has written regarding an affected state's right to refuse aid, duties of co-operation, the coincidence of disaster aid and security issues and the question of whether there is (or should be) an emerging legal duty to offer aid. She has also considered, among others, how disaster law re-contours the role of

NGOS, whether there is a role for mediation in disasters and how disaster law itself may be reconceived.

Dr. Christine Bakker (christine.bakker@eui.eu)

Visiting Research Fellow, British Institute of International and Comparative Law (BIICL, London) and Affiliated Researcher, Sant'Anna School of Advanced Studies. Christine holds a PhD in Law from the European University Institute (EUI, Florence). Her main areas of research are human rights law including children's rights, international environmental law, and climate change. In recent years, she has contributed to various research, teaching, and professional training activities in the field of international disaster law. She has recently co-edited the book *Climate Change Litigation: Global Perspectives* (Brill Publ., 2021). She previously worked as Temporary Agent at the European Commission (DG Development), Research Fellow (EUI, Florence), Adjunct Professor (LUISS University, Rome), and Visiting Lecturer (University of Rome-3; School of Advanced Studies (Pisa).

Recommended readings

Recommended readings *before* the Masterclass

- Zorzi Giustiniani (2021) The Complex Legal Framework Governing Disaster Response: A General Overview. In: International Law in Disaster Scenarios. Springer, Cham, pp. 25-37. https://link.springer.com/chapter/10.1007/978-3-030-50597-4_2#Sec1
- Imperiale and Vanclay (2019) Reflections on the L'Aquila trial and the social dimensions of disaster risk, *Disaster Prevention and Management* 28(4): 434-445. https://doi.org/10.1108/DPM-01-2018-0030.
- Généreux, Lafontaine and Eykelbosh (2019) From Science to Policy and Practice: A Critical Assessment of Knowledge Management before, during, and after Environmental Public Health Disasters, *Int J Environ Res Public Health* 16(4): 587, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6407109/

Additional recommended readings

- O'Donnell (2019) Vulnerability and the International Law Commission's Draft Articles on the Protection of Persons in the Event of Disasters, *International and Comparative Law Quarterly* 68: 573-610.
- Lauta (2018) Disasters and Responsibility. Normative Issues for Law Following Disasters. In: O'Mathúna, Dranseika and Gordijn (eds.) Disasters: Core Concepts and Ethical Theories. Advancing Global Bioethics, vol 11. Springer, Cham. https://doi.org/10.1007/978-3-319-92722-0_4

- Bartolini (2020) Are You Ready for a Pandemic? The International Health Regulations Put to the Test of Their 'Core Capacity Requirements' https://www.ejiltalk.org/are-you-ready-for-a-pandemic-the-international-health-regulations-put-to-the-test-of-their-core-capacity-requirements/
- Nifosi-Sutton (2020) Realising the Right to Health during the COVID-19 Pandemic: An Antidote to the Pandemic and the Catalyst for Fulfilling a Long-Neglected Social Right?, *Yearbook of International Disaster Law* 3: 126-153. https://brill.com/view/journals/yido/3/1/article-p126_5.xml?language=en

Masterclass 6- Understanding the Economics of disaster risk management and its valorisation

Room
Room 5

Masterclass team
Coordinator: Prof. Francesco Lamperti (Associate Professor, Institute of Economics, Sant'Anna School of Advanced Studies) **Assistant**: Mr. Alberto Baldini (Master's student, Sant'Anna School of Advanced Studies)

Aim(s) of the Masterclass
Effective disaster risk management requires the integration of scientific evidence across several fields and disciplines into practical policymaking. In this process, the procedures of public finance management and the mapping of budgetary constraints should be merged with state-of-the-art scientific assessments of the risks and opportunities linked to disaster prevention, management, and relief. This Masterclass aims to leverage key academic studies along with socio-economic and natural disaster data to provide participants with a better understanding of the economics of disaster management and with operative tools to evaluate the short and long-run economic impacts of natural disasters as well as the social and economic benefits of investments in this area.

Contents and structure of the Masterclass

This Masterclass is divided in two parts. The first part consists of three frontal talks: a short introduction to the key concepts of the economics of natural disasters and two keynote speeches, each addressing a self-consistent set of specific issues that are instrumental to the second part of the Masterclass. In particular, the keynote speeches focus on (i) the assessment of the socio-economic and financial costs of natural disasters and (ii) the adaptation to such events. The second part of the Masterclass is devoted to interactive sessions having the goal of guiding the participants through the simulation of a specific disaster affecting a regional economy. The Masterclass will leverage a specific online simulation game and let the participants interact in groups to design an effective adaptation strategy under budget constraints. The game will then proceed with the simulation of the disaster and the assessment of the strategy proposed by each group. This activity will be followed by a discussion. Groups will be designed ex-ante to mix scientists and policymakers. Finally, an anonymous real-time survey will be completed about (i) the group interactions that occurred in the process of strategy design and (ii) the criteria to be used to evaluate the strategy outcome, and its results discussed by way of concluding the Masterclass.

Introduction & keynote speeches (1 h 15 min)

Introduction by Coordinator (*Francesco Lamperti, 10 min)*

- Short introduction
- The "aftermath" window: asking participants about the horizons they work with.

The Economics of Natural Disasters and Adaptation

a. The current state of the art (*Francesco Lamperti, 5 min*)
   - General overview of the main theories and empirical evidence about the effects of natural disaster on regional economies
   - The projection of economic costs from natural disasters: accounting for existing trends

b. The economic and financial costs of natural disasters (*Antoine Mandel, 25 min*)
   - Direct losses, indirect losses and their propagation
   - Modelling loss propagation in networks

c. Adapting local economies to natural disasters *(Tatiana Filatova, 25 min*)
   - The institutional arrangements improving resilience to disaster risk
   - The behavioural economics of coping with natural disasters

d. Challenges in integration of sound economics to daily policymaking (*Juha-Pekka Jäpölä, 10 min*)

Interactive sessions (2 h 15 min)

This part of the Masterclass will require the use of a mobile device with access to the internet (either a mobile phone, tablet or laptop). It is not necessary that each participant is equipped with a device; one device per group is fully sufficient for the session. If necessary, devices will be provided to groups by the facilitator.

Facilitator: Francesco Lamperti

a. **Introduction:** "Setting the Stage", composing groups (policymakers, scientists, mixed groups – 6 groups in total) (*Francesco Lamperti, 5 min)*

b. **Interactive session 1:** "Introduction to the disaster simulation game**"** *(25 min)*

   This session will introduce participants to the online simulation game, showcase what variables are involved, which decisions can be taken to cope with disaster risk and which dimensions can be considered to evaluate the success or failure of a certain adaptation strategy.

   - Introduction by Facilitator *(Francesco Lamperti, 5 min)*
   - Simulating a disaster – part I: explore the local consequences of disasters in a simulated game *(10 min)*
   - Simulating a disaster – part II: explore the management of natural disasters and its economic consequence in a simulated game (*10 min)*

Coffee break: 15 min

c. **Interactive session 2:** "Simulating a disaster, designing adaptation strategies and evaluating its aftermath: the case of a flood**"** *(1 h)*

   In this session groups of participants will be introduced to the same scenario (a flood in a local economy) and asked to design a specific adaptation strategy, which will be then tested online and discussed in plenary.

   - Description of the main scenario: flood *(5 min)*
   - Group strategy design *(40 min)*
   - Reporting from group activity, general discussion, comparative evaluation of the effectiveness of each group's strategy and selection of points to present at the plenary meeting *(20 min)*

d. **Interactive session 3:** "Tacking stock of the simulation results" *(30 min)*

In this session, a real-time survey will be carried out through a dedicated online software (i.e. Mentimeter; please note that a mobile phone with access to the internet is necessary to participate in the survey) to collect anonymised information about the interactions that occurred in the previous session and the evaluation of the outcomes. Results will be discussed in plenary.

- Individual online survey on the outcome of the disaster management simulation game, strategy design and group dynamics *(15 min)*
- Survey assessment, open discussion, emphasis on role of scientists and policymakers during the simulation, selection of points to present at the plenary meeting *(15 min)*

Outputs of the Masterclass

The outputs of this Masterclass will be:

- An overview of the main issues encountered by scientists and policymakers related to the economic aspects of natural disaster risk management.
- A list of the main elements characterising the interaction of policy makers and scientists in making economic decisions related to disaster risk management.
- Key suggestions and recommendations on how to improve cooperation between scientists and policymakers in disaster risk management.

Speakers

Prof. Francesco Lamperti (f.lamperti@santannapisa.it)

Francesco Lamperti is Associate Professor at the Institute of Economics, Scuola Superiore Sant'Anna (Pisa) and Scientist at EIEE (Milan). His research interests are mainly focused on macroeconomics, agent based and integrated assessment modelling, climate change economics and dynamics of natural disasters. He holds a Bachelor and a Master of Science in Economics from Bocconi University (Milan) and, in 2016, he obtained a Ph.D. in Economics from Scuola Superiore Sant'Anna (Pisa). In his doctoral thesis, titled "Climate Change and Macroeconomic Dynamics: a Complex System Perspective" he has developed DSK, a global-scale agent-based integrated assessment model. Francesco has been involved in different FP7 and H2020 European projects and has published in a variety of international scientific journals.

Prof. Tatiana Filatova (T.Filatova@tudelft.nl)

Tatiana Filatova is Professor of Economics at TU Deft and University of Technology Sydney. Her research interests span environmental and climate economics, disaster risk management, agent-based modelling and behavioural policy assessment. In particular, she specialises in the economics of climate change, focusing on flood and drought management. She is interested in the feedback between policies and aggregated outcomes of individual decisions in the context of spatial and environmental policymaking. Tatiana is the recipient of an ERC Starting Grant and has published in a number of prestigious journals such as Nature Climate Change.

Prof. Antoine Mandel (Antoine.Mandel@univ-paris1.fr)

Antoine Mandel is Professor of Applied Mathematics at University Paris 1 Panthéon-Sorbonne and a research fellow at the Centre d'économie de la Sorbonne (UMR CNRS 8174). His research focuses on socio-economic dynamics in the context of climate change and natural disasters. He is a member of two of the leading global Think Tanks on climate policy: Climate Strategies and the Global Climate Forum. Antoine has participated in number of national and international research projects and has published in prestigious journals including Nature Climate Change, Climatic Change and the International Journal of Disaster Risk Reduction.

Mr. Juha-Pekka Jäpölä (Juha-Pekka.JAPOLA@ec.europa.eu)

Juha-Pekka Jäpölä (or J-P, as he is usually called for ease) is a Project Officer at the European Commission's DG ECHO working currently on the Knowledge Network's science pillar and previously on designing criteria for humanitarian aid funding and beneficiary estimation. He holds a Bachelor and a Master of Administrative Sciences from the University of Tampere and is attempting to complete a PhD in Applied Economics at the University of Antwerp on forecast-based funding for climate change adaptation in disaster aid. Before the EU, he served in different public sector roles, such as impact and threat foresight at the Prime Minister's Office of Finland, international security analysis at Police of Finland and OSCE, or military assignment under NATO, EU and UN in Afghanistan and Chad.

Recommended readings

Recommended readings (optional)

- Hallegatte and Przyluski (2010) The economics of natural disasters: concepts and methods. World Bank Policy Research Working Paper 5507.
- Botzen, Deschenes and Sanders (2019) The economic impacts of natural disasters: A review of models and empirical studies. *Review of Environmental Economics and Policy* 13(2), pp. 167-188.

- Coronese, Lamperti, Keller, Chiaromonte and Roventini (2019) Evidence for sharp increase in the economic damages of extreme natural disasters. Proceedings of the National Academy of Sciences (PNAS), 116 (43), 21450-21455.
- World Bank/International Bank for Reconstruction and Development (2021a) Financial Risk and Opportunities to Build Resilience in Europe, Economics for Disaster Risk Prevention and Preparedness - Full report, https://civil-protection-knowledge-network.europa.eu/economics-disaster-prevention-and-preparedness
- World Bank/International Bank for Reconstruction and Development (2021b) Investment in Disaster Risk Management in Europe Makes Economic Sense – Summary report, https://civil-protection-knowledge-network.europa.eu/economics-disaster-prevention-and-preparedness
- Reports collected at the EC & WB Economics for Disaster Prevention and Preparedness programme site: https://civil-protection-knowledge-network.europa.eu/economics-disaster-prevention-and-preparedness