



102nd Journées Luxembourgeoises de Géodynamique (JLG) EFEHR Scientific Session 2024 27-29 November 2024

Organizers

European Center for Geodynamics and Seismology (ECGS)
European Facilities for Earthquake Hazard and Risk (EFEHR)
with the support of the European Seismological Commission (ESC)
Geo-INQUIRE

Location: Alvisse Parc Hotel, Luxembourg (www.parc-hotel.lu)
120, route d'Echternach; L-1443 Dommeldange; Luxembourg

Hosted by: ECGS

General overview: Multi-hazard and multi-risk assessment for geohazards

Risk assessment bridges the geo-hazards to their societal consequences. As such, it constitutes the most outward-facing component in the chain, starting from gathering the data and modeling the phenomenon towards understanding its consequences. This is where models meet reality; and the reality is invariably complex and multi-risk. In the past decades, the scientific community has established an understanding of single hazards and their direct consequences. However, there is still a lot to explore regarding the complex interactions between hazards and their consequences on society, those situations in which the union is larger than the simple mathematical sum, and where a direct cause and effect pattern can be sometimes difficult to establish.

In this session, we provide a brief outlook through some of the challenges that we face in multi-hazard and multi-risk analysis of geohazards and their consequences. We would like to address questions such as:

- What are the challenges, needs and gaps as seen from the “real world”? What is the point of view of stakeholders and the private sector?
- How can we make the most of multidisciplinary datasets?
- Towards multi-hazard or hazard-agnostic exposure models? Can multi-hazard vulnerabilities be possibly harmonised?
- What is the future of earthquake ground motion models?
- Which are the challenges for time-dependent seismic hazard assessment? Can short-term forecasting become operational?
- How to capture the interactions between slow-onset (e.g., sea-level rise, ageing, heat waves) and fast-onset events (e.g., tsunami, earthquakes, landslides)?
- Cross-cutting: how can Machine learning and AI help us with the above challenges?
- How to communicate our research with a broader audience?

We invite the EFEHR members, as well as researchers, practitioners, policymakers, and anyone passionate about the intersection of AI, Earth Sciences, and societal resilience to geo-hazards to participate in this enlightening and inspiring event.

Programme

Tuesday 26/11

18:30 - 21:00 Icebreaker upon arrival of participants, type “walking dinner”

Wednesday 27/11

09:00 - 09:15 **Opening** of JLG / EFEHR Scientific Session

Adrien Oth (ECGS) & Laurentiu Danciu (ETH)

09:15 - 10:45 **Block Ia Multirisk: Exposure and vulnerability to geohazards**

Moderators: Fatemeh Jalayer (UCL), Vitor Silva (University of Aveiro) & Radmila Salic (Ss. Cyril and Methodius University in Skopje)

- Warm-up (10-15 min): An interactive session with Mentimeter. The style is semi-structured and the aim is to hear from the community about the largest challenges, gaps.
- Intro and Narrative of the Multirisk Session (5 minutes)
- Short 15-min talks:
 1. Vitor Silva (University of Aveiro): *Multi-hazard Exposure Model of GEM*
 2. Gerard O'Reilly (EUCENTRE FOUNDATION): *Built environment data for multi-hazard vulnerability models within EPOS*
 3. Fatemeh Jalayer (UCL): *Multi-hazard vulnerability models within EPOS*
- Q/A Discussions (20-25 minutes)

10:45 - 11:15 Coffee + Posters

11:15 - 12:30 **Block Ib Multirisk: Exposure and multirisks**

Moderators: **Fatemeh Jalayer (UCL)**, Vitor Silva (University of Aveiro) & Radmila Salic (Ss. Cyril and Methodius University in Skopje)

- Short 15-min talks:
 1. Danijel Schorlemmer (GFZ/ETH): *Every building on Earth!*
 2. Subash Ghimire (ISTerre): *Evaluation of Machine Learning Models for Average Annual Losses Assessment and Comparison with ESRM20 Results in France*
 3. Salvatore Iacchetti (AXA XL): *Modelling earthquake risk and its secondary effects – The (Re)Insurance Industry Perspective and Needs*
- Q/A Discussions (25 minutes)

12:30 - 13:30 Lunch

13:30 - 15:00 **Block Ic Multirisk: Managing Georisks**

Moderators: Fatemeh Jalayer (UCL), **Vitor Silva (University of Aveiro)** & Radmila Salic (Ss. Cyril and Methodius University in Skopje)

- Warm-up (20 min): Second interactive session with Mentimeter. The style is semi-structured and the aim is to hear from the community about the largest challenges, gaps.
- Short 15-min talks:
 1. Radmila Salic Makreska (Ss. Cyril and Methodius University in Skopje, Institute of Earthquake Engineering and Engineering Seismology): *UCPM efforts in addressing multi-risk cross-border and multi-country challenges in the Western Balkans through several recent initiatives*
 2. Zuzana Stanton-Geddes (World Bank): *From data to decisions – using data and information for scaling up disaster and climate resilience*
 3. Alexandra Tsioulou (Gallagher RE): *Multi-risk perils: The view, needs and gap from the re(insurance) industry*
- *Q/A and Closing Discussions (25 minutes)* An interactive session summing up the discussions in the three multirisk sessions

15:00 - 15:30 Coffee

15:30 - 17:30 **Block II Communication Session**

Michèle Marti (ETH) and Sarah Dryhurst (UCL)

1. Design your own communication plan (45 minutes + 30 minutes break)
2. Best practices in launching seismic hazard and risk models (45 minutes)

Thursday 28/11

09:00 - 10:30 **Block III: Multidisciplinary Datasets (Interactive & Discussion)**

Moderators: Olga Ktenidou (NOA), Roberto Basili (INGV), Laurentiu Danciu (ETH)

Keynotes:

1. Susana Custodio (University of Lisbon): *Earthquake processes in Low-Strain Regions, Challenges and Opportunities: An example from West Iberia*
2. Panagiotis Elias (NOA / University of Patras): *Space geodesy for geohazards assessment and monitoring: Well established applications, new insights and potential*

10:30 - 11:00 Coffee + Posters

11:00 - 12:00 **Block III: Seismic Hazard (QA only)**

Keynote:

Stefan Wiemer / Leila Mizrahi (ETH): *Towards European Operational Earthquake Forecasting and Time-Dependent Hazard and risk Assessment*

12:00 - 12:30 **Block IV: Seismic Hazard (QA only)**

Keynote:

Francesco Visini (INGV): *Testing Seismic Hazard Models: lessons learned from Italy*

12:30 - 13:30 Lunch

13:30 - 15:30 **Block V: Ground Shaking (Interactive & Discussion)**

Moderators: Aybige Akinci (INGV), Carmine Galasso (UCL) & Adrien Oth (ECGS)

Keynotes:

1. Dino Bindi (GFZ): *From magnitude-distance scaling to the non-ergodic paradigm: the long journey of ground motion models*
2. Chiara Smerzini (Politecnico di Milano): *Physics-based numerical simulations: recent advances and challenges of a new frontier for earthquake ground motion prediction*
3. Filippo Gatti (CentraleSupélec): *Generative strategies to empower physics-based wave propagation with deep learning*
4. Carlos Molina Hutt (Univ. British Columbia): *Utilization of earthquake-induced ground motions in engineering practice and risk analysis*

Each speaker will conclude with 3-4 questions for the audience. Following the talks, there will be 4 breakout groups corresponding to talk topics. Breakout groups will then feed back into a general discussion at the end of the session.

15:30 - 16:00 Coffee

16:00 - 18:00 **Networking time for discussion, get-together**

18:30 - 19:30 **Social event** (Jeu de Quilles) + Apéritif

19:30 - **Meeting dinner**

Friday 29/11

09:30 - 10:30 **Block VI: National Contributions** (QA only)

- Carlo Meletti (INGV): *The legacy of MPS19, the useless Italian hazard model*
- António A. Correira (LNEC): *Increasing earthquake resilience in Almada, Portugal. Seismic risk assessment and communication*

10:30 - 11:00 Coffee

11:00 - 12:30 **Block VII: GEO-inquire Multi-hazard, multi-risk Services**
(Hands-on)

Hands-on: Andrea Rovida (INGV), Roberto Basili (INGV) & Laurentiu Danciu (ETH)

12:30 - 13:30 Lunch

13:30 - 14:00 End of Meeting, Departure of Participants

Posters

1. Pasquale, Cito, and Iunio Iervolino. *Drivers to seismic hazard curve slope.*
2. Melissianos, V.E., D. Vamvatsikos, L. Danciu and R. Basili. *Design displacement for lifelines at fault crossings: the code-based approach for Europe.*
3. Galasso, Carmine, Kenneth Otarola, Leandro Iannacone and Roberto Gentile. *Multi-hazard life-cycle consequence analysis of engineering systems.*
4. Vacareanu, Radu and Viorel Popa. *Seismic risk mitigation strategy of Romania.*
5. Gatti, Filippo, Fanny Lehmann, Hugo Gabrielidis, Michaël Bertin, and Didier Clouteau. *Fault-to-site data-enhanced high-fidelity earthquake simulator for regional ground motion prediction.*
6. Akinci, Aybige, Arben Pitarka and Pietro Artale Harris. *Comparing 1D/3D ground motion simulations for earthquakes in Central Italy.*
7. Manea, E. F., Danciu, L., Cioflan, C. O., Toma-Danila, D., Gerstenberger, M. *Testing the 2020 European seismic hazard model in Romania.*
8. Vanneste, Kris and Mahsa Onvani. *The BELSHAKE database of earthquake ground motion in Belgium.*
9. Onvani, Mahsa and Kris Vanneste. *Kappa computation and evaluation for the BELSHAKE dataset.*
10. Masson, Frédéric and the ATTS and Alceste teams. *Seismic hazard and risk activities within Epos-France and progress on the Alceste project.*
11. a) Grajcevci, Florim and Labeat Misini. *Seismic hazard of Kosovo.*
b) Grajcevci, Florim and Labeat Misini. *A targeted seismic upgrading method for precast roof-beam columns connections using adaptable seismic safety key devices.*
12. Xhahysa, A., N.Kuka, M.Pagani and K.Bayliss. *National seismic hazard model of Albania.*
13. Pandolfi, Claudia, Matteo Taroni, Rita de Nardis, Giusy Lavecchia, and Aybige Akinci. *Unveiling Seismic Hazard Merging Geophysical and Catalog-based Data into a 3D Seismic Rate Model: a Case Study from the Adriatic Thrust Zone (Italy).*
14. Gabrielli, Simona, Aybige Akinci and Edoardo Del Pezzo. *Unveiling Seismic Hazard Merging Investigating the impact of attenuation variations on ground motion models in Central Italy.*