

# Loss-Based Design frameworks in earthquake - and multi-hazard settings

**Federico Gusella<sup>1</sup>, Roberto Gentile<sup>2</sup>, Gianni Bartoli<sup>1</sup>**

1 Department of Civil and Environmental Engineering, University of Florence, Italy

2 Department of Risk and Disaster Reduction (IRDR), University College London, London, UK

*federico.gusella@unifi.it, r.gentile@ucl.ac.uk, gianni.bartoli@unifi.it*

International design codes currently focus on preserving life safety as the primary objective, leading to structures that resist several static and dynamic loads and survive many different extreme events with partial or total damage without collapse. Although this engineering philosophy has served society well, recent events have revealed that society demands going beyond the life safety paradigm, prioritising resilience and, in turn, explicitly controlling losses. Those may refer to people (e.g., lost functionality and human displacement during repairs), the planet (e.g., greenhouse gasses embodied in repairs), and to prosperity (e.g., economic cost of repairs, reduced household income).

This Special Session invites academics and practitioners to contribute with theoretical frameworks and/or case-study applications that incorporate loss-based principles in the design of new structures and infrastructures or in the retrofitting of existing ones. Some examples include (but are not limited to):

- (a) Economic loss-based seismic design or retrofit applied to structures and infrastructures;
- (b) Structural and/or non-structural optimisation targeting acceptable seismic loss thresholds;
- (c) Design or retrofit to control earthquake recovery time and/or resilience;
- (d) Multi-criteria decision-making to design to simultaneously consider multiple loss metrics;
- (e) Loss-based design for multi-hazard settings in which earthquakes constitute the “dominant” hazard.