PLASTIC INSTABILITIES, DUCTILE DAMAGE, AND FRACTURE

L.E.B. DÆHLI[*], J.A. RODRIGUEZ-MARTINEZ [†], B. ERICE[††] AND A. BENALLAL[†††]

[*] Department of Structural Engineering, Norwegian University of Science and Technology
Richard Birkelands vei 1A, 7034 Trondheim
lars.e.dahli@ntnu.no

[†] Department of Continuum Mechanics and Structural Analysis
University Carlos III of Madrid
Avda. de la Universidad, 30. 28911 Leganés, Madrid, Spain
joseantonio.rodriguez@uc3m.es

[††] Mondragon Unibertsitatea, Faculty of Engineering,
Department of Mechanics and Industrial Production, Loramendi4, 20500 Mondragon, Spain
IKERBASQUE, Basque Foundation for Science, Bilbao, Spain
berice@mondragon.edu

[†††] LMPS, Paris Saclay University
Gif-sur-Yvette, France
benallal@ens-paris-saclay.fr

ABSTRACT

This symposium aims to convene leading researchers in mathematical and computational modeling, numerical simulations, and experimental methods to discuss recent advancements and ongoing challenges in understanding and predicting material failure, focusing on plastic instabilities, ductile damage, and fracture under quasi-static and dynamic loading conditions. The symposium aims to serve as an interdisciplinary platform for sharing and discussing the latest findings and for making connections between theory, modeling, and experiments. The scope is broad, encompassing studies ranging from microscopic experiments to large-scale numerical simulations of structures and structural components. We welcome experimental, theoretical, and numerical contributions, particularly those integrating experimental data with theoretical and computational modeling. Topics of interest include, but are not limited, to:

- Influence of material heterogeneities, such as grain structure, grain orientations, non-uniform sizes, shapes, and spatial particle distributions.
- Mechanisms and modeling of fracture at grain boundaries.
- Effects of loading rate and strain rate sensitivity on fracture behavior.
- Competition and interplay between ductile damage accumulation and localization phenomena.
- Effects of non-proportional loading paths on instabilities and fracture, and their incorporation into ductile damage and fracture models.
- Numerical simulations of large-scale structures and components using advanced constitutive, damage, and fracture models.
- Innovations in numerical methods and simulation techniques.
- Plastic structural collapse.