



Università
di Genova

DICCA DIPARTIMENTO
DI INGEGNERIA CIVILE, CHIMICA
E AMBIENTALE

DICCA SEMINAR SERIES 2022

PHILIPPE GUÉGUEN - Université Grenoble Alpes

“Slow dynamics and fluctuation-dissipation concepts for structural health monitoring”

The earthquake responses of existing structures are strongly dependent on their health and on the nature of the shaking. Nonlinear processes can be observed, by tracking the variations of the values of the elastic parameters that characterize their response (in particular, the resonance frequencies and the associated damping). Through new data collected in the structures (under weak and strong motion), these nonlinear processes can be physically interpreted in order to assess the health of the structures and to specify their behavior and their safety under earthquakes. In particular, during this talk, two processes observed in structures will be discussed: (1) that of fluctuation-dissipation to account for the activation of heterogeneities (and fracture density) under weak motion (ambient vibration) through damping variation interpretation, and (2) that of slow dynamics to analyze the activation (opening/closing) and emergence of fractures (and damage) under seismic loading. The presentation will be illustrated with examples from laboratory data sets and instrumented buildings (Japan, Ecuador, France, US...) in reinforced concrete, masonry or steel frame.

Short bio

Philippe GUEGUEN is the research director of the Earth Sciences Institute (ISTerre, Grenoble). In 2000, he got a PhD in Geophysics at the Joseph Fourier University in Grenoble. He has been working mainly as a researcher in engineering seismology and earthquake engineering. His research activity mainly focused on seismic ground motion and site effects, Site-City interaction, seismic vulnerability assessment of existing buildings, dynamics of structures and Structural Health Monitoring, damage assessment and seismic losses. His research is related with seismic vulnerability and strong ground motion, with a special emphasis on the effects of buildings on the free-field ground motion, the soil-structure interaction and the structural health monitoring. He was the Director of the French Accelerometric Network. Furthermore, he participated to various national and European projects (ANR-URBASIS ; Interreg RiskNat) and he is co-owner of a US and European Patent on ambient vibrations measurements tools. In 2007, prof. Gueguen won the first prize of the Association Française de Parasismique (AFPS). He published more than 40 papers in peer-review journals.

09/02/2022 - 9:30am (CET)

Villa Cambiaso - Salone Nobile, Via Montallegro 1 (GE)

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Streaming on Teams channel (CODE: wlp9vyt) or using this link:

<https://shorturl.at/jksH0>