



Webinars and Doctoral Short Course
by Visiting Professor Manolis Veveakis (Duke University, USA)
University of Milan, June 2021

WEBINARS

- **8 June 2021, 13:30-15:30 CET. The mechanics of catastrophic landslides**

- Abstract - The mechanics underpinning the evolution of deep-seated landslides and their transition from creep to catastrophic collapse will be discussed. We will combine field data from active and past landslides, experimental results and mathematical modeling to develop a predictive approach for the time the landslides turn unstable and collapse. Examples will include the 1963 Vajont landslide in Italy, the currently active Shuping landslide in China and El Forn landslide in Andorra, and the 2017 Mud Creek slide in the US.
- Join the webinar on MS Teams:

URL: <https://msteams.link/5ISK> or scan QRcode above



- **11 June 2021, 11:30-13:30 CET. Mechanics and physics of chemically active shear zones**

- Abstract - The triggering and magnitude of earthquakes is determined by the friction evolution along faults, which in turn has been shown experimentally to experience a drastic decrease for velocities close to the maximum seismic one, independently of the material studied. Due to the extreme loading conditions during seismic slip, many competing physical phenomena occur (like mineral decomposition, nanoparticle lubrication, melting among others) that are typically thermal in origin and are changing the nature of the material. In this section we will show that a large set of experimental data for different rocks can be described by such thermally-activated mechanisms, combined with the production of weak phases. By taking into account the energy balance of all processes during fault movement, we will develop a framework that reconciles the data, and is capable of explaining the frictional behavior of faults, across the full range of slip velocities (10⁻⁹ to 10 m/s).
- Join the webinar on MS Teams:

URL: <https://msteams.link/SUYW> or scan QRcode above





14 June 2021, 11:30-13:30 CET. Multiphysics instabilities during diagenesis of shale gas reservoirs: Unlocking a clean energy

- Abstract - Understanding the formation, geometry and fluid connectivity of nominally impermeable unconventional shale gas and oil reservoirs is crucial for safe unlocking of these vast energy resources. In this section we will discuss the fundamental mechanisms and the critical parameters of fracture network formation in unconventional reservoirs. We show that for a reservoir under compaction, there exist certain ambient and permeability conditions at which diagenetic (fluid-release) reactions may provoke channelling (i.e. fracturing) localization instabilities. These channels are periodically interspersed in the matrix and represent areas where the excess fluid from the reaction is segregated at high velocity. We find that channelling instabilities are favored from pore collapse features for extremely low-permeability formations and fluid-release diagenetic reactions, therefore providing a natural, periodic network of efficient fluid pathways in an otherwise impermeable matrix (i.e. fractures). Such an outcome is of extreme importance for exploration and extraction phases of unconventional reservoirs.
- Join the webinar on MS Teams:
URL: <https://msteams.link/8EJD> or scan QRcode above



DOCTORAL SHORT COURSE

- **24 and 25 June 2021, 10:00-12:30 & 13:30-16:00 CET. Multiphysics Geomechanics for Earth Science applications: from resource engineering to fault mechanics**
 - Program - Presentation of experimental and field scale evidence of Multiphysics processes in earth science and engineering; Mathematical modeling foundations for Multiphysics Geomechanics; Applications and discussions on the predicting, forecasting and controlling capabilities for Earth science applications (energy production and storage, landslides, fault mechanics)
 - Join the course on MS Teams:
URL: <https://msteams.link/4C8R> or scan QRcode above
 - The course will be also delivered in-person at the premises of the University of Milan. Anyone interested in physically joining the class should contact francesco.cecinato@unimi.it





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SCIENZE DELLA TERRA "ARDITO DESIO"



Manolis Veveakis is currently an Associate Professor in the Department of Civil and Environmental Engineering, at Duke University. He earned a Ph.D. in 2010 from the Department of Mechanics of the National Technical University of Athens, Greece. Before joining Duke University, he was a Senior Lecturer at UNSW's School of Petroleum Engineering since 2014 and a Research Scientist in CSIRO's Division of Earth Sciences and Resource Engineering before that. Veveakis holds a Diploma (BSc+MEng) in Applied Mathematics and Physics (MEng in Materials Engineering), an MSc in Applied Mechanics and a PhD in Geomechanics.

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