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Shah Distinguished Lecture New Approaches for Tsunami Impact Assessment

Professor Tiziana Rossetto

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Tsunami waves have relatively small wave heights (typically 0.5-2m), but very long wavelengths offshore. As they approach the shoreline and enter shallower waters, their wavelength reduces and their wave heights increase dramatically. The resulting waves can cause violent impacts on infrastructure and buildings, and the long wavelengths lead to extensive inundation inland causing destruction over large areas of coast as seen recently in Japan (2011). Yet it is still unclear how to assess forces on buildings and coastal defences from tsunami and assess their effects. This paper presents an overview of the work carried out to date at UCL EPICentre to systematically analyse the physics of tsunami flows in and around buildings, the forces and pressures they produce on structures and the assessment of buildings for these actions. New formulations for tsunami loads on buildings and coastal defences are presented that draw upon empirical observations from the Japan (2011) tsunami, numerical analyses and small scale experiments designed to study tsunami-like flows on building-like structures, and a set of unique large scale experiment observations of tsunami inundation flows interacting with coastal defences, single and multiple buildings on rigid bases or sediment beaches. The latter experiments are carried out at a world-leading facility for the simulation of tsunami-like waves at HR Wallingford (UK). The findings of preliminary investigations into structural analysis approaches for determining the performance of buildings under tsunami loads are also presented, together with an initial framework for simplified structural analysis suitable for the derivation of tsunami fragility functions.

Lecture: **Free Shah Distinguished Lecture:** World renowned earthquake/tsunami researcher, Prof. Tiziana Rossetto, is the director of the Epicenter disaster research center at University College of London (<https://www.ucl.ac.uk/epicentre>). On February 21st she will be in the Bay area to present the Shah Distinguished Lecture at Stanford University. This highly prestigious Blume Center Award is made to outstanding disaster mitigation researchers. Dr. Rossetto will present the Shah Distinguished Lecture at UH as she starts a year of presentations around the World.

Date: **Friday, February 24th, 2017. 1:00 to 2:30PM**

Location: **University of Hawaii at Manoa, Holmes Hall Room 244**
Parking Available at the UH Lower Campus Structure (\$5.00 for the day).

Speaker Bio:

Tiziana Rossetto is a Professor in Earthquake Engineering in the Department of Civil, Environmental and Geomatic Engineering (CEGE) at UCL where she directs the Earthquake and People Interaction Centre (EPICentre, www.ucl.ac.uk/epicentre). EPICentre, founded in 2007 with seed funding from an EPSRC Challenging Engineering grant, is now the largest earthquake and tsunami risk research centre in the UK, with 13 academics, 30 research staff/PhD students and an MSc programme in Earthquake Engineering with Disaster Management. Tiziana is acknowledged as an expert in the assessment of the seismic vulnerability of buildings and is a leader in the field of tsunami engineering, as proven by her award of a European Research Council (ERC) Starting Grant. She has also worked in collaboration with Psychologists on earthquake risk representations in lay-people and the implications for risk reduction programmes. She has participated in 8 post-earthquake reconnaissance missions with the UK Earthquake Engineering Field Investigation Team (Institution of Structural Engineers). She is a Fellow of the UK Institution of Civil Engineers (ICE), Chair of the Society of Earthquake and Civil Engineering Dynamics (SECED, ICE) and sits on the British Standards Institute Committee for the application of the European Seismic Code (EC8).



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