

The Department of Civil and Environmental Engineering at the University of Houston presents...

CIVE 6111 Graduate Seminar

Structural Testing at the Micro and Nano Scales: Breaking Invisible Specimens with Zero Force



Dr. Roberto Ballarini

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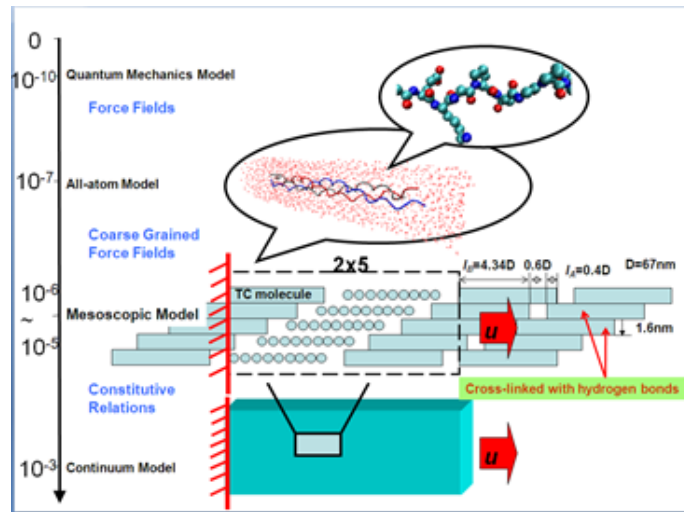
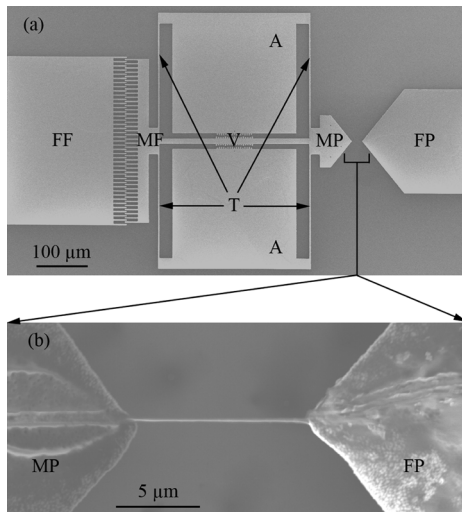
Friday, January 28, 2022 - 2:45pm-3:45pm

Classroom Business Building (CBB) - Room 122

Zoom Link: <https://uh-edu-cougarnet.zoom.us/j/92521018462>

Abstract

I will describe how a bunch of clever and hardworking students and research associates have pioneered the use of microelectromechanical systems (MEMS) platforms to measure the mechanical response of materials and structures at the micro and nano scales. Selected examples include measurements of strength, toughness, high cycle and static fatigue of brittle MEMS materials, the strength, ultimate strain capacity and viscoelastic response of individual collagen fibrils, and the fracture energy of the carbon nanotube-epoxy matrix interface. A brief description of several the theoretical and computational models that were inspired by the experimental observations will also be presented.



Bio

Dr. Roberto Ballarini is Thomas and Laura Hsu Professor and Chair of the Civil and Environmental Department at the University of Houston and Director of the University of Houston-Dalian Maritime University Institute (UH-DMU). Ballarini's multidisciplinary research focuses on the development and application of theoretical, computational and experimental techniques to characterize the response of materials to mechanical, thermal, and environmental loads. He is particularly interested in formulating analytical and computational models for characterizing fatigue and fracture of materials and structures. Ballarini's research has been applied to problems arising in civil engineering, mechanical and aerospace engineering, materials science, microelectromechanical systems, biological tissues and prosthetic design. He has published more than one hundred papers in refereed journals, including Science and Nature, and several of his research projects have been featured in the popular press, including the New York Times Science Times, American Scientist, Business Week, Financial Times, and Geo. Ballarini is Past-President of the ASCE Engineering Mechanics Institute, and served as Editor-in-Chief of the ASCE Journal of Engineering Mechanics. He is a Distinguished Member of ASCE, received the 2019 ASCE Raymond D. Mindlin Medal, and is recipient of the Case Western Reserve University-wide John S. Diekhoff Award for Distinguished Graduate Teaching.