



UNIVERSITÀ DEGLI STUDI
DI TRENTO

Dipartimento di Ingegneria Civile,
Ambientale e Meccanica



EXTREME LOADING ANALYSIS OF PETROCHEMICAL
PLANTS AND DESIGN OF METAMATERIAL-BASED
SHIELDS FOR ENHANCED RESILIENCE
<http://r.unitn.it/en/dicam/xp-resilience>



AVVISO DI SEMINARIO

Si comunica che **mercoledì 26 aprile alle ore 15.30**
si terrà presso l'aula **B1** (via Mesiano 77) il seguente corso

Research on Multiscale and Multiphysics

Prof. Young W. Kwon

*Dept. of Mechanical and Aerospace Engineering, Naval Postgraduate School
(Monterey, California, USA)*

Abstract

Most science and engineering problems are multiscale and multiphysics, in nature. In order to better understand those, multiphysics and multiscale studies are critical. For example, composite structures consist of multiple hierarchies in the length scale. At the micro-level, fibers (or particles) and a matrix materials constitute the composite structures through various architectural forms in the next length scale. Likewise, a typical metal may be isotropic and homogenous at the macroscale, but it has polycrystalline structures at the microscale with grains, grain boundaries, dislocations, etc. Biological materials such as human bones and tissues are also good examples of multiscale hierarchical structures. For multiscale research, it is important to link the major characteristics in each length scale to understand their interaction in the material behavior and potential failure. Fluid-structure interaction is one of common examples for multiphysics. As a result, fluid-structure analysis of composite structures is presented. Because the density of water is comparable to densities of polymer composites, the fluid-structure interaction plays an important role. Both experimental and numerical studies are discussed. Some newly developed computational techniques are also presented.

Short Biography

Dr. Kwon is Distinguished Professor in the Mechanical and Aerospace Engineering Department of Naval Postgraduate School (NPS) in Monterey, California, USA. He also serves as Director of Materials Research Center at NPS and was a past Chair of the department. Additionally, he was also Professor and Chair of the Department of Mechanical Engineering and Energy Processes of Southern Illinois University Carbondale (SIUC). He received his Ph.D. degree from Rice University, and B.S. degree from Seoul National University, all in mechanical engineering. Before joining NPS, he was Assistant Professor at the University of Missouri-Rolla. His research interests include computational mechanics, multiscale modeling and simulation, composite materials, fracture and damage mechanics, multiphysics



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problems, and biomechanics. He has published extensively with many of them appeared in archived, refereed journals. He wrote the textbook, *Finite Element Method using MATLAB* which was also translated into Greek. He also authored a book entitled *Multiscale and Multiphysics Modeling: Techniques and Applications*. He has contributed chapters in multiple books and encyclopedias. He edited a book entitled “*Multiscale Modeling and Simulation of Composite Materials and Structures*” published by Springer. Prof. Kwon received various awards including the Cedric K. Ferguson Medal from Society of Petroleum Engineers, Menneken Faculty Award, Excellent Research Award from American Orthopedic Society of Sports Medicines, Outstanding Instruction and Research Awards, ASME Dedicated Service Award, ASME PVPD Outstanding Service Award, ASME Board of Governors Award, National Dean's List, etc. He is a fellow of American Society of Mechanical Engineers. Dr. Kwon is the technical editor for ASME Transactional, Journal of Pressure Vessel Technology, and also serves on the editorial boards of multiple journals. He is a past ASME PVP Division Chair.

Tutti gli interessati sono invitati a partecipare.

Il seminario è organizzato dal gruppo di ricerca di XP-RESILIENCE
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(O. S. Bursi, A. Gajo, N.Tondini, F. Cecinato, D. Zonta)