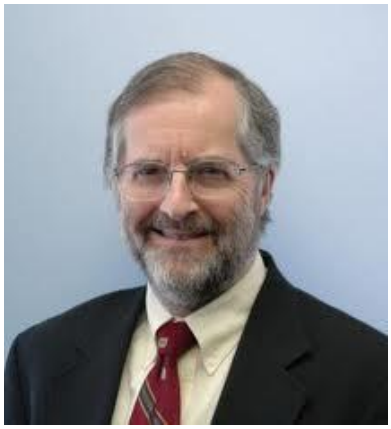
NORTHEASTERN UNIVERSITY

Department of Civil and Environmental Engineering

College of Engineering Distinguished Seminar

Performance-based engineering for multiple hazards: The role of structural reliability and risk assessment



Thursday, April 4, 2013
105 Shillman Hall
3:00 p.m.

Dr. Bruce Ellingwood, Ph.D., P.E., N.A.E., Dist. M. ASCE, F. SEI
School of Civil and Environmental Engineering
Georgia Institute of Technology

Abstract: Civil infrastructure facilities must be designed to withstand demands imposed by their service requirements and by environmental events such as windstorms or earthquakes. Design provisions found in current codes and standards are prescriptive in nature. While buildings and other structures designed by current prescriptive provisions usually possess adequate levels of safety, extreme environmental or man-made events may cause them to suffer severe damage and economic losses. In an era of heightened public awareness of infrastructure performance, structural engineers now are seeking improvements to building and construction practices to achieve levels of performance beyond what currently is provided by prescriptive code provisions and to better meet owner, occupant and public expectations. Structural reliability methods have matured in the past four decades to the point that they now provide the framework for addressing safety and serviceability issues in modern codified structural design. Many countries have already adopted probability-based limit states design methods. The new paradigm of performance-based engineering enables structural engineers to achieve more reliable prediction and control of civil infrastructure performance across a range of hazards. Modern probabilistic risk assessment methods will be essential to the successful implementation of performance-based engineering in providing a framework for managing the impact of uncertainties on performance and for guiding engineering decisions in an era of technological innovation, competition and financial constraints.

Bio: Dr. Ellingwood is College of Engineering Distinguished Professor at the Georgia Institute of Technology, where he also holds the Raymond Allen Jones Endowed Chair in Civil Engineering. He is internationally recognized as an authority on load modeling and structural reliability and risk analysis of engineered facilities, and is a leader in the technical development and implementation of probability-based codified design standards for building structures. He directed the development of the probability-based load criteria for limit states design that appear in *ASCE Standard 7 on Minimum Design Loads*, the AISC *Specification for Structural Steel Buildings*, *ASCE Standard 16 on LRFD for Engineered Wood Construction*, and *ACI Standard 318 on Structural Concrete*. Dr. Ellingwood has authored approximately 400 research papers and reports, is Editor of *Structural Safety*, and serves on six other editorial boards. He has held numerous leadership positions in professional societies, and his research and professional service have garnered numerous awards from the American Society of Civil Engineers, the American Institute of Steel Construction, the International Association for Structural Safety and Reliability, and other professional organizations. He is a member of the National Academy of Engineering, a Distinguished Member of ASCE, and an Inaugural Fellow of ASCE's Structural Engineering Institute.

Thursday
April 4, 2013
3:00 p.m. – 4:00 p.m.
105 Shillman Hall

Reception to follow
4:00 p.m. – 5:00 p.m.
4th Floor Lobby
Snell Engineering Center