Biography

Professor Deodatis received his Diploma in Civil Engineering from the National Technical University of Athens in Greece. He holds M.S. and Ph.D. degrees in Civil Engineering from Columbia University. He started his academic career at Princeton University where he served as a Postdoctoral Fellow, Assistant Professor and eventually Associate Professor. He then moved to Columbia University where he served as Associate Professor and Professor. He is currently the Santiago and Robertina Calatrava Family Professor at the Department of Civil Engineering and Engineering Mechanics of Columbia University. His research interests are in the general area of probabilistic methods in civil engineering and engineering mechanics. He has written over one hundred twenty technical papers. He has received the National Science Foundation Young Investigator Award, the International Association for Structural Safety and Reliability (IASSAR) Junior Research Prize, and the American Society of Civil Engineers (ASCE) Walter Huber Research Prize. He has served as the Chair of the ASCE Probabilistic Methods Committee and as the Associate Editor of the ASCE Journal of Engineering Mechanics. He is the Chair of the IASSAR Umbrella Committee on Stochastic Methods in Structural Engineering. While on the faculty at Princeton University, he was awarded the President's Award for Distinguished Teaching, Princeton's highest teaching honor. At Columbia University, he recently received the Engineering School Alumni Association Distinguished Faculty Teaching Award.

The Richard J. Carroll Memorial Lectureship

The Richard J. Carroll Memorial Lectureship in Civil Engineering was established at The Johns Hopkins University to commemorate one of Baltimore's leading structural engineers, Richard J. Carroll, P.E. The lectureship was endowed by the many friends and admirers of Mr. Carroll, who passed away in 1982. The endowment contributes to the ongoing guest seminars in the Department of Civil Engineering and provides for these special lectures.

Richard J. Carroll, P.E. received his bachelor of civil engineering degree from Villanova University in 1955 and studied advanced structural design at The Johns Hopkins University and George Washington University. He was chief structural engineer for the firms of Knoerle, Bender, Stone, and Associates, and Ewell, Bomhardt and Associates and chief field engineer for the Portland Cement Association. In 1964 he founded his own firm, Carroll Engineering, Inc., which grew to 26 employees under his leadership. Mr. Carroll made contributions to the civil engineering profession through his membership in numerous professional societies and he published several papers on concrete use and design with an emphasis on post-tensioned and pre-stressed concrete. He also taught courses in ultimate strength design and plastic design in steel. His untimely death at the age of 49 left a legacy of professionalism, integrity, and vigor.

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2009 Richard J. Carroll
Memorial Lectureship

SIMULATION OF STOCHASTIC PROCESSES AND FIELDS

by

George Deodatis, Ph.D.
Santiago and Robertina Calatrava Family Professor
Civil Engineering and Engineering Mechanics
Columbia University

Wednesday, April 8, 2009

JOHNS HOPKINS
UNIVERSITY

2009 Richard J. Carroll Memorial Lectureship

by

George Deodatis, Ph.D.

Santiago and Robertina Calatrava Family Professor
Civil Engineering and Engineering Mechanics
Columbia University

Wednesday, April 8, 2009
1:30 p.m. – 2:30 p.m.

The Johns Hopkins University
Homewood Campus
Hodson Hall, 3rd Floor Board Room

SIMULATION OF STOCHASTIC PROCESSES AND FIELDS

Uncertainty is routinely observed in a wide range of problems in engineering and science. When the uncertainty is manifested in quantities that are functions of time, stochastic processes can be used to model them, while when the uncertainty is manifested in quantities that are functions of space (in any number of dimensions), stochastic fields can be used to model them. Examples of stochastic processes include: wind velocity fluctuation time histories, ocean wave elevation time histories, seismic ground motion time histories, stock market and exchange rate fluctuations, and medical data such as a patient's EKG, blood pressure or temperature. Examples of stochastic fields include: material and geometric properties of structural systems, soil properties, variations of parameters such as temperature and salinity over a certain part of an ocean, random terrains (landscapes), etc.

A general methodology will be presented to simulate a wide range of stochastic processes and fields according to prescribed probabilistic characteristics. The cases considered include scalar processes, scalar fields in multiple dimensions, vector processes and fields, non-stationary scalar and vector processes, and non-Gaussian processes and fields (scalar and vector). Simulation is performed according to prescribed spectral characteristics (or equivalently correlation characteristics) and probability distribution information. The various algorithms presented are capable of generating sample realizations with great computational efficiency and with tightly controlled properties. One of the most common applications of such simulated processes and fields is Monte Carlo simulation, which is still the only universal method that can provide accurate solutions to certain complex stochastic problems.

ASCE Event Recognizing
the 2009 Richard J. Carroll Memorial
Lectureship Recipient

Wednesday, April 8, 2009
Engineering Society of Baltimore

11 W. Mount Vernon Place
Baltimore, MD

6:00 p.m. Cocktails
7:00 p.m. Dinner
8:00 p.m. After Dinner Seminar
by Professor Deodatis

Climate Change Risk Analysis of Urban Infrastructure Systems

This lecture presents a general methodology for risk analysis of urban infrastructure systems subjected to climate change. Risk is modeled as a function of the hazard, the assets under consideration, and the vulnerability of these assets to the hazard. In this case, the hazard is climate change and its various components are sea level rise, increase in temperature and other extreme events. The assets under consideration include the transportation infrastructure, the building portfolio, various lifelines, etc. The most critical part of such a risk analysis is establishing the vulnerability of the assets in terms of associated fragilities. Effects of climate change on the infrastructure are quantified over different time horizons accounting for various sources of uncertainty. A series of adaptation measures are considered from a cost-benefit point of view.