



Columbia University CEEM Seminar Lecture



**Friday, September 18, 2009; 2:30 P.M.
Room 627- Mudd Building**

Intelligent Infrastructure

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The author presents the concept of intelligent infrastructure, a new vision and way of designing and managing the civil infrastructure of the nation. The premise of intelligent transportation systems (ITS) is intelligent and maximum utilization of the existing freeway systems rather than adding to them thereby minimizing the destruction of the nature and resulting in environmentally conscious and sustainable designs and solutions. In a smart structure intelligent sensors and actuators are integrated for health monitoring and vibration control of structures under extreme external loading. The health of such a smart structure is continuously monitored in real time by sensors and its behavior is actively controlled in an effective and efficient way through properly designed actuators. The author has been advancing a multi-paradigm approach for development of intelligent systems and solution of complicated and intractable dynamic pattern recognition problems employing chaos theory, wavelets, dynamic neural networks, and evolutionary computing. Examples of recent research in the areas of ITS and smart structures subjected to wind and earthquake loading performed by the author and his research associates are presented.

Hojjat Adeli is also Professor of Aerospace Engineering, Biomedical Engineering, Biomedical Informatics, Electrical and Computer Engineering, Neurological Surgery, and Neuroscience by courtesy. He is the founder and Editor-in-Chief of *Computer-Aided Civil and Infrastructure Engineering*, now in 24th year of publication and *Integrated Computer-Aided Engineering*, now in 17th year of publication, and the Editor-in-Chief of *International Journal of Neural Systems*. He has authored 230 journal articles and 13 books. In 1998 he received the *Distinguished Scholar Award* from OSU “in recognition of extraordinary accomplishment in research and scholarship.” In 2005 he was elected Honorary/Distinguished Member, ASCE, “for wide-ranging, exceptional, and pioneering contributions to computing in civil engineering and extraordinary leadership in advancing the use of computing and information technologies in many engineering disciplines throughout the world”.