



Department of Civil Engineering and Engineering Mechanics  
Columbia University

**Thursday, January 26, 2012 (2:30-3:30 pm)**

**Schapiro 414**

**DYNAMIC PERFORMANCE OF CIVIL ENGINEERING STRUCTURES  
UNDER HUMAN-INDUCED EXCITATION**



**Dr. Vitomir Racic**  
*University of Sheffield*  
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In civil engineering dynamics, human-induced vibrations have become an increasingly important serviceability and safety issue in the last decade. This area is rapidly gaining in importance due to strong trends towards increased slenderness and reduced mass, stiffness and damping of long-span floors, footbridges and assembly structures (e.g. grandstands and spectator galleries) which are by their very nature occupied and dynamically excited by people. The case of the excessive lateral sway of the infamous London Millennium Bridge under pedestrian crowd loading during its opening day in 2000 is the best publicly known illustration of the depth of the misunderstanding of what large civil engineering structures might do when dynamically excited by humans.

To compound the problem, in the last years this has been coupled with the contradictory requirements to reduce and control structural vibrations when humans and/or sensitive processes are vibration receivers. This is mainly due to increased human expectations from high-quality infrastructure and the development of advanced technological processes, such as microelectronics manufacturing or particle physics research, requiring sub-micron positional precision.

Human-induced dynamic excitation (e.g. due to walking, running and jumping), prediction of vibration response and mitigation of excessive vibrations are the subject of this seminar.

(Host: Prof. Andrew Smyth)  
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