Mechanical Engineering Colloquium

September 19, 2014

Macdonald Engineering Building (MD) 267 from 11 - 12 pm

Professor Harry Dankowicz

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Discontinuity-induced Bifurcations in Models of Mechanical Contact, Capillary Adhesion, and Cell Division

Abstract: With examples from the analysis of intermittent mechanical contact in impacting systems, hysteretic capillary interactions in the operation of atomic force microscopes, and the cell cycle of eukaryotic cells, this talk highlights typical bifurcation scenarios of system behavior associated with the presence of discontinuities. An abstract mathematical framework for the parameter unfolding near periodic trajectories with tangential contact with such discontinuities is shown to predict changes in the existence and stability of the steady-state response that generalize across a broad range of physical, biological, and behavioral applications.

Biographical Sketch: Harry Dankowicz is professor of Mechanical Science and Engineering at the University of Illinois at Urbana-Champaign. He graduated from KTH Royal Institute of Technology in Stockholm, Sweden with a M.Sc. in Engineering Physics in 1991 and, subsequently, from Cornell University with a Ph.D. in Theoretical and Applied Mechanics in 1995. Following a post-doctoral appointment at KTH between 1995 and 1999, he joined the Department of Engineering Science and Mechanics at Virginia Polytechnic Institute and State University, where he remained until 2005. Prof. Dankowicz is a recipient of several prestigious faculty career awards, including a Junior Investigator Grant from the Swedish Foundation for Strategic Research, a CAREER award from the US National Science Foundation, a PECASE award from the US National Science Foundation, and the Fred Merryfield Design Award from the American Society for Engineering Education. He serves as Editor of Applied Mechanics Reviews and is the author of research monographs and textbooks on chaotic dynamics, multibody mechanics, and computational methods for nonlinear systems.