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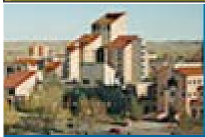

AEROSPACE ENGINEERING SCIENCES

Seminar

Natasha Bosanac

Purdue University

Navigating Chaos: Applications of Dynamical Systems Theory to Astrodynamics and Celestial Mechanics

Spacecraft technology is currently in the midst of significant advance, driven by the miniaturization of satellites, interest in on-orbit servicing, and demonstrated success in robotic exploration. Continued innovation in spacecraft technologies demands the design of trajectories for spacecraft that require fewer resources, possess longer lifetimes, and visit farther destinations. By actively leveraging structures such as periodic orbits, quasi-periodic orbits and manifolds, techniques from dynamical systems theory can facilitate the design of complex paths within cislunar and interplanetary space. Many techniques employed in trajectory design are also useful in modeling natural celestial transport within various systems, providing further information about the formation and evolution of the universe. In fact, combining insight from dynamical systems theory with methods that leverage discrete variational mechanics enables the study of celestial motion, including potential orbits of an exoplanet near a binary star system. As demonstrated during this talk, progress in the study of multi-body dynamical environments facilitates advances in both astrodynamics and celestial mechanics, while also supporting new and exciting missions for individual spacecraft and distributed systems.

Monday, April 4, 2016
12:00 Noon
Onizuka Conference Room

Refreshments!

Bio: Natasha Bosanac is currently a Ph.D. candidate at Purdue University. She has previously earned a Bachelor of Science in Aerospace Engineering from the Massachusetts Institute of Technology, and a Masters degree from Purdue University. Natasha's research involves applying dynamical systems theory and geometric mechanics to problems in astrodynamics and celestial mechanics. Recently, such problems have included: the analysis of the impact of a many-body interaction in binary star systems, the design and construction of an interactive orbit catalog for trajectory design, and the formulation of a trajectory design framework for a low-thrust enabled CubeSat mission.