Abstract
Since the launch of the first satellite (Sputnik 1) in 1957, humans have created a lot of objects in orbit around Earth. The number of space objects larger than 10 cm is presently approaching 21,000, the estimated population of objects between 1 and 10 cm is about 500,000, and for objects smaller than 1 cm the number exceeds 100 million. Both the number of space objects and the number of conflicts between these objects are increasing exponentially. This talk will be based on the research we have been pursuing on to address the Space Situation Awareness challenges, in particular, the parallel-structure Modified Chebyshev-Picard Iteration (MCPI) Methods for orbit propagation, a physics-based learning approach for orbit prediction, and trajectory planning of space-robotics systems for debris removal.

Bio
Xiaoli Bai has been an Assistant Professor in the department of Mechanical and Aerospace Engineering at Rutgers since July 2014. She obtained her PhD degree of Aerospace Engineering in 2010 from Texas A&M University. Prior to joining Rutgers, she was a research scientist at Optimal Synthesis Inc. in Los Altos, California, working with NASA Langley and NASA Ames on advanced research and development projects in the area of air traffic management systems. One consequence of her dissertation is a set of methods which significantly enhances and accelerates the fundamental processes underlying the creation and maintenance of space debris catalogs. Her research theme is Advanced Computational Methods for Dynamics and Control of Aerospace Systems. Current research projects include the followings: (i) Advanced Orbit Prediction for Resident Space Objects (RSOs); (ii) Unmanned Aerial Vehicle (UAV) navigation and control; and (iii) Space robotic guidance, control, dynamics. She was a recipient for The 2016 Air Force Office of Scientific Research (AFOSR) Young Investigator Research Program (YIP) award, the American Institute of Aeronautics and Astronautics (AIAA) Foundation John Leland Atwood Graduate Award, and Amelia Earhart Fellowship.