"Robust Navigation: From UAVs to Robot Swarms"

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Refreshments at 3:15, 116 Upson Hall

ABSTRACT
Robust navigation is critical and challenging for the ever-growing applications of robotics. We first present our recent work on robust UAV navigation. We deeply fuse GPS information with Lidar, camera vision and inertial measurements on the raw signal level. In addition, we turn the unwanted multipath signals into an additional useful signal source. Instead of one GPS receiver, we use multiple receivers either on the same UAV platform or across a wide area to further improve navigation accuracy, reliability and resilience to attacks.

The second part of the talk will address our work on navigating a swarm of 100 robots, designed and built in our lab. We call them “Shinerbots,” because they are inspired by the schooling behaviors of Golden Shiner Fish. We will demonstrate the successful navigation and environment exploration of our Shinerbot swarm.

BIOGRAPHICAL SKETCH
Grace Xingxin Gao is an assistant professor in the Aerospace Engineering Department at University of Illinois at Urbana-Champaign. She obtained her Ph.D. degree at Stanford University.

Prof. Gao has won a number of awards, including RTCA William E. Jackson Award and Institute of Navigation Early Achievement Award. She was named one of 50 GNSS Leaders to Watch by the GPS World Magazine. She has won Best Paper/Presentation of the Session Awards 11 times at ION GNSS+ conferences. She received the Dean's Award for Excellence in Research from College of Engineering, University of Illinois at Urbana-Champaign. For her teaching, Prof. Gao has been on the List of Teachers Ranked as Excellent by Their Students at University of Illinois multiple times. She won the College of Engineering Everitt Award for Teaching Excellence at University of Illinois at Urbana-Champaign in 2015, AIAA Illinois Chapter’s Teacher of the Year in 2016, and Engineering Council Award for Excellence in Advising in 2017.