

Cyber-Physical Communication for Cooperative Human-Robot Mobility Ella M. Atkins (PI, U. Mich.) and Hossein Rastgoftar (Co-PI, University of Arizona) Lightning Talk given by Matthew Romano (PhD Candidate, U. Mich.)

Challenge:

- Advance Continuum Deformation Theory for safe cooperative transport
- Advance Experimental UAS to validate use of multiple vehicles being guided by haptic feedback through a tethered instrumented payload

Solution:

- Use Continuum Deformation for autonomous collision-free swarm flight
- Haptic guidance for heads-up user interface
- Validate both in theory, benchtop tests, and flight tests

Award ID#: 1739525 Award Date: September 1, 2017 **Institution:** The University of Michigan **Contact:** E.M.Atkins









4) Control



Scientific Impact:

Broader Impact:

- vehicles

 Continuum Deformation theory advancement

 First Experimental Validation of **Continuum Deformation**

• Haptic Interface driven by Instrument Payload and Tethers

• Disaster Relief -Transport supplies Lower risk with many small -Heads-up interface aids in operator situational awareness Project engaged K-12 students in flight tests and research vision • Safe, open-source quadrotor design has been replicated at

other Universities