DEPARTMENT OF MECHANICAL & AEROSPACE ENGINEERING
WILLIAM MAXWELL REED SEMINAR SERIES

"Integrating Structure and Control Design Using the Least Necessary Resources for Deployable Space Systems."

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Abstract:

After about sixty years of space exploration, the belief has been shared to some degree but made concrete by the Apollo program that humankind will leave the earth's cradle and destine for stars. Designing space systems to support the ambitions of humans, we engineer from different disciplines devote ourselves to solving problems by using the isolated discipline we learned from school to the finest. But are we doing it the right way? A misconception is that "The best system is made from the best components." That is certainly not true. Often, we gain more in integrating two disciplines than in making exceptional improvements in one discipline.

The existing design approaches deal with what is sufficient rather than necessary, locked into the classical thinking of component technology. We believe that the next great challenge in engineering is integrating the different disciplines to embrace the much more general problem for our space system designs. The lightweight, volume compact, low control energy & instrument cost, and computational saving requirements of the space systems have constantly been pushing us to design mass-saving, tunable structural parameters, extensive morphing capabilities, and adaptive structural control structures. This talk will present approaches to achieving these goals with the least necessary resources (mass, dampers, control energy, sensors/actuators, and computing resources) with guaranteed performances. Examples include deployable solar panels, space robotics, lunar towers, space habitats with artificial gravity, morphing airfoils, and automated space drilling rigs.

Speaker Bio:

Dr. Muhao Chen is a Postdoctoral Researcher in the Department of Aerospace Engineering at Texas A&M University (TAMU), College Station, TX. He obtained his BS and MS degrees from the Huazhong University of Science and Technology in 2013 and 2016. He had work experience at National Instruments (2013-1014). He won National Scholarship for Graduate Students in 2015. Then, he got his Ph.D. degree from TAMU in May 2021. He was awarded TAMU AERO Graduate Excellence Fellowship Award twice. His research focuses on integrating structure and control design, tensegrity, controls, and system design for lightweight automated deployable space systems and space robotics.

Date: Tuesday, February 7, 2023
Time: 3:00 PM EST
Place: Whitehall Classroom Building 114
Contact: Dr. Sean Bailey

Attendance open to all interested persons

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