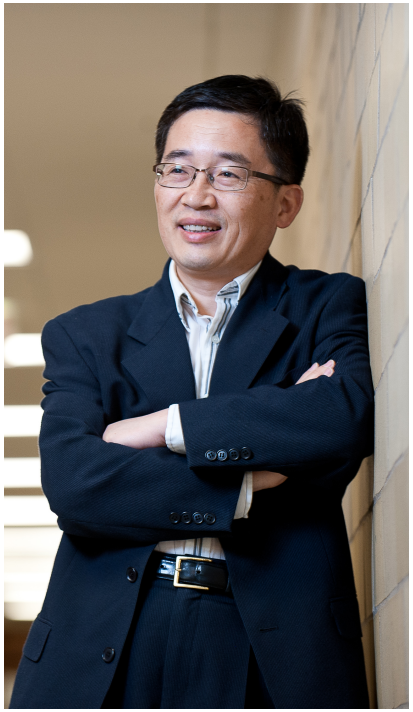
JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

Department of Civil Engineering and

CISMMS
Center for Integrated Structure-Materials Modeling and Simulation



Dr. Yonggang Huang
Walter P. Murphy Professor of Civil and Environmental Engineering and Mechanical Engineering, Northwestern University

GRADUATE SEMINAR

Mechanics-guided, Deterministic 3D Assembly

Complex three-dimensional (3D) structures in biology (e.g., cytoskeletal webs, neural circuits, and vasculature networks) form naturally to provide essential functions in even the most basic forms of life. Compelling opportunities exist for analogous 3D architectures in human-made devices, but design options are constrained by existing capabilities in materials growth and assembly. We report routes to previously inaccessible classes of 3D constructs in advanced materials, including device-grade silicon. The schemes involve geometric transformation of 2D micro/nanostructures into extended 3D layouts by compressive buckling. Demonstrations include experimental and theoretical studies of more than ˜100 representative geometries, from single and multiple helices, toroids, and conical spirals to structures that resemble spherical baskets, cuboid cages, starbursts, flowers, scaffolds, fences, and frameworks, each with single- and/or multiple-level configurations.

Yonggang Huang is interested in mechanics of stretchable and flexible electronics, and mechanically guided deterministic 3D assembly. He has published >500 journal papers, including 9 in *Science* and 3 in *Nature*. He is a member of the US National Academy of Engineering, and a member of European Academy of Sciences and Arts. His recent research awards include the Larson Award in 2003, Melville Medal in 2004, Richards Award in 2010, Drucker Medal in 2013, and Nadai Medal in 2016, all from American Society of Mechanical Engineers; Young Investigator Medal in 2006 and Prager Medal in 2017 from the Society of Engineering Sciences; International Journal of Plasticity Medal in 2007; Guggenheim Fellowship in 2008; and ISI Highly Cited Researcher in Engineering in 2009 and ISI Highly Cited Researcher in Materials Science in 2014 and 2015.

March 9, 2017 12-1 PM
JHU Homewood Campus, Hackerman Hall B-17

Seminar is FREE and open to the public. Attendance is required for all enrolled Civil Engineering graduate students. For parking please see link for visitors at www.jhu.edu and select information on Homewood Campus.