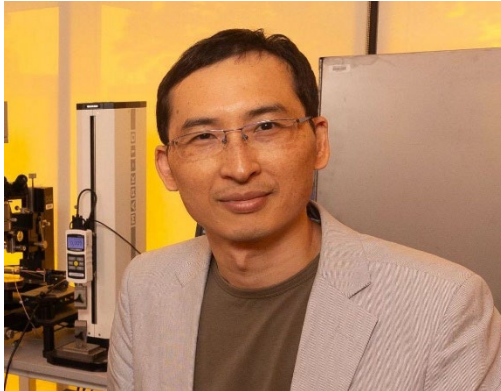


Friday, March 28, 2025

11:15 am ITE 336

(Refreshments in ITE 301 at 11 am)



Borrowing from Biosystems for Engineering Electronics and Bioelectronics

Prof. Jun Yao

Biological systems are an enormous source of inspiration for engineering electronic/bioelectronic devices. In one theme, we directly borrow biosynthetic materials—protein nanowires synthesized by microorganism *Geobacter sulfurreducens* – to explore the potential of making ‘green’ electronic devices. These include ‘Air-gen’ devices that can continuously harvest electricity from air humidity for the potential of ubiquitous powering, and memristors and artificial neurons that function with bio-amplitude signals (~100 mV) for ultralow-power electronics. In another theme, we seek to emulate biological sensory structures to enhance sensor functionalities. These include a 3D nanowire sensor that can converge electrical and mechanical sensing to simultaneously monitor cellular bioelectrical and biomechanical activities, and a 3D mesh sensing platform that mimics tissue scaffolds for probing the correlated excitation-contraction dynamics in 3D tissues.

Bio:

Dr. Jun Yao is an Associate Professor of Electrical and Computer Engineering at UMass Amherst. His is also jointly appointed in the Institute for Applied Life Sciences (IALS). He received his B.S. in Electrical Engineering and M.S. in Physics from Fudan University, Ph.D. in Applied Physics from Rice University, and postdoctoral training in Chemistry and Chemical Biology at Harvard University. He is a recipient of a NSF CAREER award (2019), a Sony faculty innovation award (2021), a Barbara H. & Joseph J. Goldstein Outstanding Junior Faculty Award from UMass College of Engineering (2020-21), a NIH Trailblazer R21 award (2022), and a Alfred P. Sloan Fellowship (2022).

<https://www.junyaoumass.org/>