



Department of
Biomedical Engineering
UNIVERSITY OF WISCONSIN-MADISON

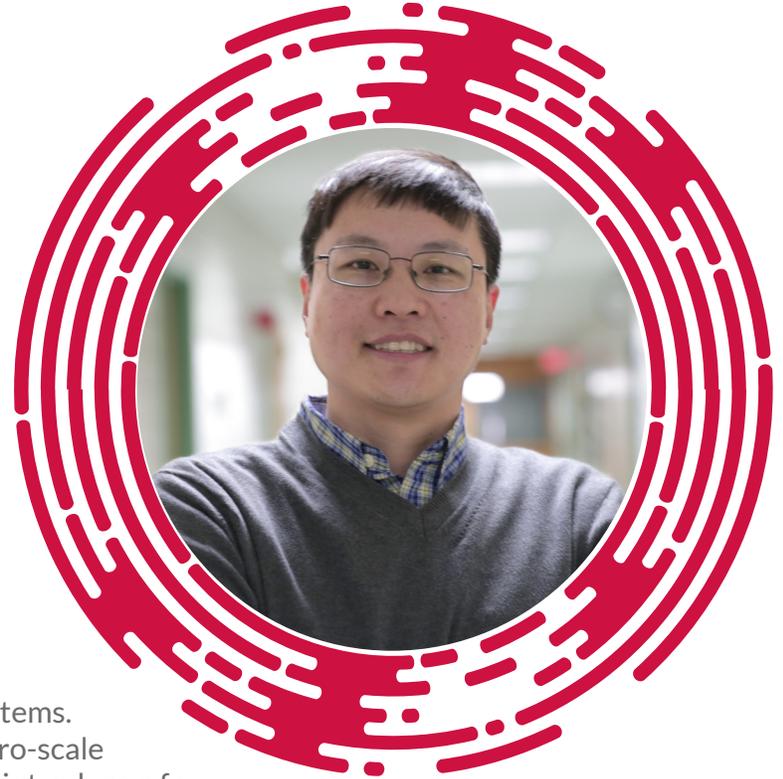
Fall 2018 Seminar Series

Bio-inspired Micro-Optical Imaging

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Optical detection and imaging have wide applications. With continuing miniaturization effort to realize integrated microsystems, the importance of micro-scale optical components become more and more prominent. On the other hand, natural visualization systems provide many intriguing optical designs and unique properties, which serve as a great source of inspiration for micro-optical devices and systems. In this talk, I will present our work on bio-inspired micro-scale components and resultant imaging systems. I will first introduce a few types of microlenses and microlens arrays, including tunable liquid microlenses actuated by hydrogels, and through electrowetting and dielectric force. I will show a few examples of micro cameras integrating these optical devices. My talk will also include a few examples of biomedical applications of these technologies, including endoscopes, laparoscopes, and remote axial focusing for 3D microscopy. I will also discuss artificial compound eyes mimicking reflecting superposition compound eyes found in some decapods, as well as all-optical photosensitivity enhancer inspired by the retina of elephant nose fish.

Hongrui Jiang received the B.S. degree in physics from Peking University, Beijing, China, and the M.S. and Ph.D. degrees in electrical engineering from Cornell University, Ithaca, NY, in 1999 and 2001, respectively. He was a Postdoctoral Researcher at the Berkeley Sensor and Actuator Center, University of California-Berkeley, Berkeley, from 2001 to 2002. He is currently the Lynn H. Matthias Professor in Engineering and the Vilas Distinguished Achievement Professor at the University of Wisconsin-Madison. He is with the Department of Electrical and Computer Engineering and is also a Faculty Affiliate with the Departments of Biomedical Engineering and Ophthalmology and Visual Sciences, a faculty member of the Materials Science and Engineering, and the McPherson Eye Research Institute. He is a member of the Editorial Board of the Journal of Microelectromechanical Systems, Micromachines, and Scientific Reports. Professor Jiang is a Fellow of the Institute of Physics, the Royal Society of Chemistry, the American Institute for Medical and Biological Engineering, and the Institute of Electrical and Electronics Engineers. He received numerous awards, including the National Science Foundation CAREER Award and the DARPA Young Faculty Award in 2008, the University of Wisconsin H.I. Romnes Faculty Fellowship in 2011, the National Institute of Health Director's New Innovator Award in 2011, the University of Wisconsin Vilas Associates Award in 2013, and the Research to Prevent Blindness Stein Innovation Award in 2016.



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12 PM in Tong Auditorium (1003 Engineering Centers)