

## PHOTONICS SEMINAR

# Professor Brian Cunningham

Four Orders of Magnitude: Nanophotonics Biosensors for Detection of Molecules to Tissues

Faculty Host: Professor Selim Unlu

*October 1, 2014*

*11:00 a.m.-12:00 p.m.*

*Room 901*

*Photonics Center*

*8 Saint Mary's Street*

*Refreshments will  
be served!*



Using nanostructured surfaces that can harness light, and concentrate its electromagnetic fields into extremely small volumes, optics-based sensors offer an effective route for measuring light-matter interactions. This talk will highlight recent developments in the Nano Sensors Group at the University of Illinois in which photonic crystals, photonic nanodome arrays, and plasmon-resonant nanoparticles are used for applications in biosensing. In addition to the nanostructures themselves, it is also critical to develop detection instrumentation that can effectively couple light into the nanostructures, and to detect properties of light that is transmitted, scattered, or reflected from the sensor.

Brian T. Cunningham is a Professor in the Department of Electrical and Computer Engineering and the Department of Bioengineering at the University of Illinois at Urbana-Champaign, where he serves as the Interim Director of the Micro and Nanotechnology Laboratory, and as Director of the NSF Center Innovative Instrumentation Technology (CiiT). Professor Cunningham is the founding Director of the professional Master's degree program in Bioinstrumentation at Illinois. His research is in the development of biosensors and detection instruments for pharmaceutical high throughput screening, disease diagnostics, point-of-care testing, life science research, and environmental monitoring.

He has published 137 peer-reviewed journal articles, and is an inventor on 77 issued US patents. Prior to joining the faculty of Illinois in 2004, Professor Cunningham was a co-founder of SRU Biosystems in 2000. He founded Exalt Diagnostics in 2012 to commercialize photonic crystal enhanced fluorescence technology for disease biomarker detection. Acoustic MEMS biosensor technology that he developed in his early career at Draper Laboratory has been licensed and commercialized by Bioscale, Inc. for applications in pathogen detection and diagnostics. Professor Cunningham's work has recently been recognized with the IEEE Sensors Council Technical Achievement Award for the invention, development, and commercialization of sensors based upon photonic crystals, and with the IEEE EMBS Technical Achievement Award for his research in nanostructured optical sensors and detection instrumentation. He is a Fellow of IEEE, OSA, AIMBE, and is a member of the National Academy of Inventors. Additional information on his research can be found on his website: <http://nano.ece.illinois.edu>.