BIOENGINEERING SEMINAR

March 27, 2017

3:00—4:00p.m.

Research Hall, 163

Dr. Ben E. Urban

Postdoctoral Research Fellow, Department of Biomedical Engineering

Northwestern University

Biography:

Dr. Ben E. Urban received his Ph.D. in Physics (Biomedical Optics and Biophotonics) at the University of North Texas where he developed cellular contrast agents, *in vivo* cell targeting technologies, and time-resolved microscopy techniques. During that time, he spent 2 years as an invited researcher at Shimane University and Tsukuba University in Japan developing nanoparticle probes for bioimaging. He is currently a postdoctoral research fellow in the lab of Hao Zhang (2013 – present) in the Department of Biomedical Engineering at Northwestern University. His research is focused on the development and application of bioimaging technologies, with a specific interest in developing imaging modalities to study the brain. He has published 14 peer-reviewed journal articles, including those in Nature Communications and PNAS. His research has been featured on the cover of the Journal of Biophotonics and his publication in PNAS received the 2016 Cozzarelli Prize for outstanding scientific excellence and originality in the field biomedical engineering. He has also been awarded fellowships from the National Science Foundation and the Japanese Society for the Promotion of Science.

"From Molecules to Mice: Investigating Structures at the Nanoscale"

ABSTRACT:

Bioimaging technologies have revolutionized our understanding of biology on the microscopic and macroscopic scales, revealing the relationship between structure and function. However, due to limited spatial resolution, current bioimaging technologies have difficulty investigating nanoscale structures and dynamics of living cells. Therefore, there is a critical gap in bioimaging technology which must be overcome to understand cellular behavior on a nanoscopic scale.

My research attempts to fill this gap in bioimaging by developing "super-resolution" light microscopy (SRLM) techniques. Conventional SRLM techniques can overcome the limited resolution of optical microscopy, but are more constrained in molecular contrast, imaging speed, and imaging depth. I first address these constraints by developing multiple SRLM techniques and then apply these techniques to investigate nanostructures in single cells and in the brain of living mice. My results have major implications for topics spanning from decoding genes to understanding neuronal function.