# Physics Colloquium


## John A. Rogers

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## Soft, Biocompatible Optoelectronic Interfaces to the Brain


Advanced optoelectronic systems capable of intimate integration onto the surface or into the depth of the brain have the potential to accelerate progress in neuroscience research and to spawn new therapies in clinical medicine. Specifically, capabilities for injecting electronics, light sources, photodetectors, multiplexed sensors, programmable microfluidic networks and other components into precise locations of the deep brain and for softly laminating them onto targeted regions of the cortical surface will open up unique and important opportunities in stimulation, inhibition and real-time monitoring of neural circuits. In this talk, we will describe foundational concepts in materials science and assembly processes for these types of technologies, in 1D, 2D and 3D architectures. Examples in system level demonstrations include experiments on freely moving animals with 'cellular-scale', injectable optofluidic neural probes for optogenetics research and with bioresorbable, implantable intracranial sensors for treatment of traumatic brain injury.


## Thursday Sep. 7, 2017 at 4:10PM in LL. 316

**John A. Rogers** obtained BA and BS degrees in chemistry and in physics from the University of Texas, Austin, in 1989. From MIT, he received SM degrees in physics and in chemistry in 1992 and the PhD degree in physical chemistry in 1995. From 1995 to 1997, Rogers was a Junior Fellow in the Harvard University Society of Fellows. He joined Bell Laboratories as a Member of Technical Staff in the Condensed Matter Physics Research Department in 1997, and served as Director of this department from the end of 2000 to 2002. He then spent thirteen years on the faculty at University of Illinois, most recently as the Swanlund Chair Professor and Director of the Seitz Materials Research Laboratory. In 2016, he joined Northwestern University as the Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering and Medicine, with affiliate appointments in Mechanical Engineering, Electrical and Computer Engineering and Chemistry, where he is also Director of the newly endowed Center for Bio-Integrated Electronics. He has published nearly 600 papers and is co-inventor on more than 100 patents. His research has been recognized by many awards including a MacArthur Fellowship (2009), the Lemelson-MIT Prize (2011), and the Smithsonian Award for American Ingenuity in the Physical Sciences (2013). He is a member of the National Academy of Engineering, the National Academy of Sciences, the National Academy of Inventors and the American Academy of Arts and Sciences.