

UC SAN DIEGO NANOENGINEERING
CENTER OF WEARABLE SENSORS
Wednesday, February 22, 2017
Joint Seminar Presentation: 11:00am – 12:00pm
Cymer Conference Center, SME 248

Soft Electronics for the Human Body

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Abstract:

Biology is soft, curvilinear and transient; modern semiconductor technologies are rigid, planar and everlasting. Electronic and optoelectronic systems that eliminate this profound mismatch in properties create opportunities for devices that can intimately integrate with the body, for diagnostic, therapeutic or surgical function with important, unique capabilities in biomedical research and clinical healthcare. Over the last decade, a convergence of new concepts in mechanical engineering, materials science, electrical engineering and advanced manufacturing has led to the emergence of diverse, novel classes of 'biocompatible' electronic platforms. This talk describes the key ideas, with examples ranging from wireless, skin-like electronic 'tattoos' for continuous monitoring of physiological health, to multiplexed, conformal sensor sheets for mapping cardiac electrophysiology, to bioresorbable intracranial sensors for treating traumatic brain injury.

Biosketch:

Professor John A. Rogers obtained BA and BS degrees in chemistry and in physics from UT at Austin, in 1989, SM degrees in physics and chemistry in 1992 and PhD in physical chemistry in 1995 from MIT. From 1995-1997, 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 served as faculty at University of Illinois at Urbana/Champaign, most recently as the Swanlund Chair Professor, the highest chaired position at the university, with a primary appointment in the Department of Materials Science and Engineering, with joint appointments in the Departments of Chemistry, Bioengineering, Mechanical Science and Engineering, and Electrical and Computer Engineering, where he also served as 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, Mechanical Engineering, Electrical Engineering and Computer Science, Chemistry and Medicine, where he is also the founding Director of the newly endowed Center on Bio-Integrated Electronics.

Rogers' research includes fundamental and applied aspects of nano and molecular scale fabrication as well as materials and patterning techniques for unusual electronic and photonic devices, with an emphasis on bio-integrated and bio-inspired systems. He has published more than 550 paper and is an inventor on over 100 patents and patent applications, more than 70 of which are licensed or in active use by large companies and startups that he has co-founded. His research has been recognized with many awards including the Mid-Career Researcher Award from the Materials Research Society (2013), the Lemelson-MIT Prize (2011), a MacArthur Fellowship from the John D. and Catherine T. MacArthur Foundation (2009). Rogers is a member of the National Academy of Engineering (NAE; 2011), the National Academy of Sciences (NAS; 2015) and the American Academy of Arts and Sciences (AAAS; 2014), a Fellow of the Institute for Electrical and Electronics Engineers (IEEE; 2009), the American Physical Society (APS; 2006), the Materials Research Society (MRS; 2007), the American Association for the Advancement of Science (AAAS; 2008) and the National Academy of Inventors (NAI; 2013). He received an Honoris Causa Doctorate from the Ecole Polytechnique Federale de Lausanne (EPFL; 2013), and holds Honorary Professorships at Fudan University (2013) and Zhejiang University (2016).