SCHEDULE OF EVENTS

8:00 a.m.

Registration & Continental Breakfast Gallery, W.T. Young Library

8:50 a.m.

Welcome Prof. Lisa Cassis, PhD. Vice President for Research Auditorium, W.T. Young Library

9:00 a.m.

Prof. John A. Rogers Northwestern University W.T. Young Library Auditorium "Materials for Biodegradable Electronics"

A remarkable feature of modern integrated circuit technology is its ability to operate in a stable fashion, with almost perfect reliability and without physical or chemical change. Recently developed classes of electronic materials create an opportunity to engineer the opposite outcome, in the form of devices that can dissolve completely in water to yield completely benign end products. The enabled applications include zero-impact environmental monitors, 'green' consumer electronics, and bioresorbable biomedical implants - none of which is possible with technologies that exist today. This presentation describes foundational concepts in chemistry, materials science, and assembly processes for bioresorbable electronics, in 1D, 2D, and 3D architectures, the latter enabled by approaches that draw inspiration from the ancient arts of kirigami and origami. Wireless sensors of intracranial temperature, pressure, and electrophysiology designed for use in treatment of traumatic brain injury provide application examples.

10:00 a.m. Coffee Break & Refreshments

10:30 a.m.

Prof. Zhenan Bao Stanford University W.T. Young Library Auditorium "Skin-Inspired Organic Electronic Materials and

Devices"

Skin is the body's largest organ, and is responsible for the transduction of a vast amount of information. This conformable, stretchable and biodegradable material simultaneously collects signals from external stimuli that translate into information such as pressure, pain, and temperature. The development of electronic materials inspired by the complexity of this organ is a tremendous, unrealized materials challenge. However, the advent of organic-based electronic materials may offer a potential solution to this longstanding problem. In this talk, I will describe the design of organic electronic materials to mimic skin functions. These new materials enabled unprecedented performance or functions in medical devices, energy storage and environmental applications. 11:30 a.m. Lunch & Break

1:00 p.m.

Prof. George Malliaras Ecole des Mines de St. Etienne

W.T. Young Library Auditorium

"Interfacing with the Brain using Organic Electronics"

One of the most important scientific and technological frontiers of our time lies in the interface between electronics and the human brain. Interfacing the most advanced human engineering endeavor with nature's most refined creation promises to help elucidate aspects of the brain's working mechanism and deliver new tools for diagnosis and treatment of a host of pathologies including epilepsy and Parkinson's disease. Current solutions, however, are limited by the materials that are brought in contact with the tissue and transduce signals across the biotic/abiotic interface. Recent advances in electronics have made available materials with a unique combination of attractive properties, including mechanical flexibility, mixed ionic/electronic conduction, enhanced biocompatibility, and capability for drug delivery. I will present examples of novel devices for recording and stimulation of brain activity that go beyond the current state-of-the-art in terms of performance, compatibility with the brain, and from factor. I will show that modern electronic materials offer tremendous opportunities to design devices that improve our understanding of brain physiology and pathology, and can be used to deliver new therapies.

2:00 p.m. Coffee Break & Poster Session Set-up

2:30 p.m.

Prof. Alon Gorodetsky, Naff Young Investigator University of California, Irvine W.T. Young Library Auditorium

"Dynamic Materials Inspired By Cephalopods"

Cephalopods (squid, octopuses, and cuttlefish) have captivated the imagination of both the general public and scientists for more than a century due to their visually stunning camouflage displays, sophisticated nervous systems, and complex behavioral patterns. Given their unique capabilities and characteristics, it is not surprising that these marine invertebrates have recently emerged as exciting sources of inspiration for the development of unique materials. Within this context, our laboratory has explored the properties of structural proteins known as reflectins, which play crucial roles in the functionality of cephalopod skin. In this talk, I will discuss our work on new types of photonic and protonic devices fabricated from reflectin-derived and reflectin-inspired materials. Our findings hold implications for the development of adaptive camouflage systems, sensitive bioelectronic platforms, and renewable energy technologies.

3:30 p.m.

Poster Session Don & Cathy Jacobs Science Building Nonprofit Organization U.S. Postage PAID Lexington, KY Permit Number 51



Bioelectronics: Where Chemistry, Medicine, and Materials Meet

March 31, 2017

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43rd Naff Symposium Bioelectronics: Where Chemistry, Medicine, and Materials Meet March 31, 2017

GUEST SPEAKERS



ZHENAN BAO, PH.D. Stanford University

Professor in Chemical Engineering and by courtesy Professor of Chemistry and Materials Science and Engineering.



ALON GORODETSKY, PH.D. University of California, Irvine

Assistant Professor of Chemical Engineering and Materials Science, with a joint appointment in the Department of Chemistry.



GEORGE MALLIARAS, PH.D. Ecole des Mines de St. Etienne

Professor and Founding Director of the Department of Bioelectronics.



JOHN A. ROGERS, PH.D. Northwestern University

Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering, Mechanical Engineering, Electrical Engineering and Computer Science, Chemistry and Neurological Surgery; Founding Director of the Center on Bio-Integrated Electronics.

2017 Naff Committee Members Professor Chad Risko (Chemistry, Committee Chair), chad.risko@uky.edu Professor John Anthony (Chemistry) Professor Jason DeRouchey (Chemistry) Professor Kenneth Graham (Chemistry) Professor Susan Odom (Chemistry)



For more information, contact Dr. Chad Risko.