



Birck Nanotechnology Center



Nanomanufacturing Preeminent Team Faculty Seminar Yasser Khan

Thursday, February 22, 2018

9:30am – 10:30am

BRK 1001

Integration of printed sensors to flexible hybrid electronics for wearable health monitoring

In the era of "electronic skin" and "human intranet", the potential of wearable sensors that can monitor vital signs, analytes in bodily fluids, and biosignals is immense. Fabrication of wearables to date heavily relies on conventional semiconductor processing, which is expensive and has limited large-area scalability. Taking advantage of the unique manufacturing capabilities of printed electronics, we can now design wearables that are soft, lightweight, and skin-like. In addition, using soft and conformable sensors, we can significantly improve the signal-to-noise ratio (SNR) due to the high fidelity sensor-skin interface. In this talk, I will first present printed and flexible all-organic optoelectronic oximeter sensors, which can measure pulse rate and oxygenation accurately both in the transmission and reflection mode. Then I will introduce the design and fabrication of flexible and printed gold electrode arrays that are ideal for bioimpedance tomography, electrocardiography (ECG) and electromyography (EMG). Finally, a key enabling technology for wearables - flexible hybrid electronics (FHE) will be presented. The implementation of FHE in an integrated multi-sensor platform will be discussed, where sensors fabricated using solution processable functional inks are interfaced to rigid electronics for health and performance monitoring.

Yasser Khan is a Ph.D. candidate in the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley, in Prof. Ana Claudia Arias' Group. He received his B.S. in Electrical Engineering from the University of Texas at Dallas in 2010, and M.S. in Electrical Engineering from King Abdullah University of Science and Technology in 2012. Yasser's research focuses mainly on wearable medical devices, with an emphasis on flexible bioelectronic and biophotonic sensors. Yasser received the EECS departmental fellowship at UC Berkeley, discovery scholarship and graduate fellowship at KAUST, and best presentation and poster awards at MRS meetings. He is a big proponent of flexible hybrid electronics, which brings together flexible sensors and silicon ICs under the same platform and utilizes these two different technologies to their strengths. His research vision is to implement a massive number of flexible and printed sensors for medical, structural, and industrial monitoring.