

## Mechanical & Aerospace Engineering Colloquium Series Spring 2018 Program

Wednesday, March 7, 2018  
3:30 – 4:30 p.m. (refreshments/social hour at 4:30)  
Easton Hub Auditorium (in the Fiber Optics Building)

### **Thread Diagnostics: Sensors, Circuits, Microfluidics and Drug Delivery**

**Professor Sameer Sonkusale**

**Tufts University**

**Abstract:** This talk will explore the new realm of using threads as an ultimate platform for flexible and stretchable devices. Threads offer unique advantages of universal availability, low cost, material diversity and simple textile-based processing. In this talk, I will report reel-to-reel fabrication to make functional smart threads for variety of sensing and electronics application. For example I will report on nanomaterial-infused smart threads for strain and temperature sensing. Threads will be presented for sensing pH, glucose, and other chemical biomarkers. Interestingly, threads also provide an ideal platform for passive microfluidic sampling and delivery of analytes. I will show our recent work on using this toolkit of thread-based microfluidics, sensors and electronics for application as surgical sutures and flexible smart bandages for chronic wounds. Our recent work on using threads for closed loop spatiotemporal dosage controlled drug delivery will also be presented. I will conclude the talk by providing an outlook on future research directions in the field of textile-based flexible bioelectronics.

**Bio:** : Sameer Sonkusale is currently a Professor of Electrical and Computer Engineering at Tufts University with a joint appointment in the department of Biomedical Engineering. At Tufts University, Dr. Sonkusale directs an interdisciplinary research group Nano Lab with research focus on micro- and nano- fabrication, nanoscale sensors, biomedical microdevices, circuits and systems. Prior to coming to Tufts, he was an Assistant Professor at Texas A&M University from 2002 to 2004. Sonkusale also held the position of visiting associate professor of medicine at Harvard Medical School and Brigham and Women's Hospital for 2011-2012. Dr. Sonkusale received his MS and PhD in Electrical Engineering from the University of Pennsylvania. He has received several awards including the National Science Foundation CAREER award in 2010, the National Academy of Engineering US Frontiers of Engineering Fellowship in 2015, the National Academy of Sciences Arab-America Frontiers fellowship in 2014 and 2016, and several best paper awards at international conferences and meetings. Dr. Sonkusale is on the editorial boards of Nature Scientific Reports, IEEE Transactions on Biomedical Circuits and Systems and IET Electronic Letters. He is a senior member of the IEEE, OSA, MRS, BMES and AAAS.

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