

**Amgen Seminar Series in Chemical Engineering**  
in  
Cherry Auditorium, Kirk Hall, 12:45 PM

**Presents on November 21, 2019**

**Near-Infrared Fluorescent Carbon Nanotubes;  
A New Paradigm in Disease Detection and Biological Imaging**

By



**Moein Safaee**  
PhD Candidate  
Chemical Engineering Department  
University of Rhode Island

The bandgap near-infrared photoluminescence from the semiconducting single-walled carbon nanotubes is photostable, tunable, and sensitive to the local environment. Over the last 15 years, significant progress has been made in applying carbon nanotube photoluminescence toward a range of in vitro and in vivo biomedical applications. My research at URI NanoBio Engineering Lab encompasses the design and implementation of implantable and wearable biosensors in addition to developing in vitro molecular probes, based on single-walled carbon nanotubes. We engineer the molecular corona of the SWCNTs to significantly enhance their selectivity to multiple disease biomarkers, so their spectral variations can be utilized for biomarker detection and quantification, down to nanomolar concentrations. We then embed these nanomaterials into biocompatible scaffolds to provide implantable and wearable sensing platforms. We also utilize a variety of imaging, spectroscopy, and other analytical techniques to investigate the fundamental interactions between our engineered nanomaterials and biological systems. Using a specialized near-infrared fluorescence hyperspectral imaging system, we are able to collect the emission spectra from single carbon nanotubes within live cells. By fully characterizing these types of nanobio interactions, we aim to construct highly robust bio-analytical probes while simultaneously mitigating toxicological concerns.

This series at the University of Rhode Island is made possible through the generosity of Amgen, West Greenwich, R.I.

Refreshments provided by the Joseph Estrin Endowment.