

BIOENGINEERING

PRESENTS

Modifying and Mimicking Biological Molecules for Applications in Molecular Imaging and Bottom-Up Synthetic Biology



THURSDAY, APRIL 20, 2017

12:00 – 1:00 PM

2101 ENGINEERING V

Neal Devaraj, Ph.D.

University of California, San
Diego

Associate Professor, Department of
Chemistry and Biochemistry, Department
of Bioengineering

ABSTRACT:

Our lab has developed a number of methods to modify RNA for imaging and manipulation. Recent studies have shown the ability to quantify microRNA and detect mRNA using highly selective modification with imaging agents. These tools can be used to detect clinically relevant RNA in patient fluid samples. We are also aiming to develop new methods to amplify clinical imaging signals for the detection of rare cells, and progress in this area will be discussed. Another major interest of our lab is the mimicking of cell membranes with the goal of pursuing the development of synthetic cells. I will discuss the in situ formation of artificial membranes and how these membranes can be used for the reconstitution of integral membrane proteins such as clinically relevant GPCRs. We have also been recently using microfluidic techniques to create capsules capable of prolonged gene expression, and I will show progress toward having populations of synthetic cells display behavior reminiscent of living tissues.

BIOGRAPHY:

Dr. Neal K. Devaraj received a dual B.S. in Chemistry and Biology from the Massachusetts Institute of Technology in 2002 and his Ph.D. in Biophysical Chemistry from Stanford University under the direction of James Collman and Christopher Chidsey in 2007. After a postdoctoral position in molecular imaging in the lab of Ralph Weissleder at the Harvard Medical School, he joined the faculty of the University of California, San Diego in 2011, where he is currently an associate professor of chemistry and biochemistry and bioengineering. His research interests are focused on the design of bioconjugation reactions for addressing problems in bottom-up synthetic biology and molecular imaging. He is the recipient of the 2017 ACS Award in Pure Chemistry sponsored by the Alpha Chi Sigma Fraternity and the Alpha Chi Sigma Educational Foundation and the 2016 National Fresenius Award sponsored by Phi Lambda Upsilon, The National Chemistry Honor Society.