UC San Diego
JACOBS SCHOOL OF ENGINEERING
NanoEngineering

# UC SAN DIEGO NANOENGINEERING

**Monday, February 6, 2017**
**Seminar Presentation: 11:00am – 12:00pm**
**Cymer Conference Center, SME 248**

## Assembling nanomaterial regulators in tissue and immune development

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**Abstract**
Cellular responses that induce repair and confer immunity against pathogens are fundamental to sustaining living systems. Understanding how materials can be organized to function as chemical and molecular regulators may provide insight into directing tissue repair and immune reactions in injury and disease. In this seminar, I will highlight concepts for the assembly of biomaterials as a means to provide cellular instruction. I will describe the tuning of electrostatic interactions between proteins and polymers through nanoscale polyelectrolyte complexes to initiate and direct wound healing in otherwise intractable tissue injury. I will then outline a complementary approach for assembling materials to concentrate stem cells and facilitate molecular interactions with developmental and differentiation cues. The results of the latter approach reveal new methods for generating immunity against cancer and infections. Materials design grounded in physical phenomena will be explored and the impact on regulation of cell behavior for repairing injury and building immunity will be discussed.

**Bio**
Dr. Nisarg Shah is a Cancer Research Institute Irvington Postdoctoral Fellow at the Wyss Institute and the School of Engineering and Applied Sciences at Harvard University. His research, in the laboratories of Professors David Mooney and David Scadden, is aimed at engineering materials to stimulate immune responses. He obtained his doctoral degree in Chemical Engineering from MIT. His graduate research in Professor Paula Hammond's laboratory focused on developing nanoscale polymer films and colloidal particles for repairing musculoskeletal tissues. He received his Bachelor of Science degree in Chemical and Biomolecular Engineering from Johns Hopkins University. Dr. Shah has received numerous awards, including the Materials Research Society Graduate Student Silver Award, the Collegiate Inventors Competition Silver Medal, the American Chemical Society Graduate Polymer Research Award and the Biomedical Engineering Society Graduate Design and Research Award.