

# Centre for Biosystems Science and Engineering

## SEMINAR

at 11:00 AM on July 22<sup>nd</sup>, 2015 (Wednesday)  
MRDG Seminar Hall, First Floor Biological Sciences

### Immunity Guided Engineering and Engineering Immunity: two sides of the same coin

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#### Abstract:

The advent of biological engineering has brought researchers from biology and traditional engineering fields closer together, resulting in novel approaches to study biological systems and develop innovative medical technologies. However, a critically limiting factor to the application of these technologies in humans is our incomplete understanding of the behavior of immune cells at the crucial biological-synthetic interface, established when biomedical devices are implanted in vivo. This seminar will describe work on characterizing immune responses to implanted devices and using synthetic systems to regulate immunity.

The first part of the talk will focus on the behavior of neutrophils at the biological-synthetic interface, as studied using a model of microcapsule implantation in mice and catheter implantation in humans. Specifically, evidence will be presented to demonstrate a previously unheralded role for these cells while responding to biomedical device implants; formation of neutrophil extracellular traps (NETs) on device surfaces. The second part of the talk will focus on using synthetic systems to modulate granulopoiesis, with particular emphasis on the role of splenic progenitors in maintaining neutrophils at elevated levels during chronic inflammation. Finally, the implications of these results in the context of developing new biologically-compatible devices for use in diverse therapeutic applications, including the modulation of immunity, will be discussed