UCLA Engineering
HENRY SAMUELI SCHOOL OF
ENGINEERING AND APPLIED SCIENCE

BIOENGINEERING

PRESENTS

Engineering Approaches to Persistent Bacteria

Monday, March 6, 2017
12:00 – 1:00 PM
2101 ENGINEERING V

Kyle Allison, Ph.D.
Columbia University
DSB Fellow, Department Systems Biology

ABSTRACT:

Antibiotics, which initiated the field of chemotherapy, have transformed human health and support nearly every branch of medicine. Challenges like antibiotic tolerance, genetic antibiotic resistance, and off-target drug toxicity demonstrate that current therapies are imperfect and that optimization of existing drugs is critical. My research has focused on reverse engineering drug tolerance and developing novel antibacterial approaches. In my talk, I will discuss two representative projects focusing on persistent bacteria, a form of phenotypic heterogeneity in which a subpopulation of cells are highly tolerant to antibiotic treatment despite lacking genetic resistance mechanisms. The first project was the development of a metabolite-based approach to eradicate antibiotic persistent bacteria using aminoglycoside antibiotics. The second project utilized large-field microscopy to study the single-cell dynamics of persistent bacteria. Overall, my research uses systems approaches to understand and optimize antibiotic chemical biology, and will be extended to additional forms of chemotherapy.

BIOGRAPHY:

Dr. Kyle Allison holds a BSE in Chemical Engineering from the University of Michigan, a MA in Literature from Royal Holloway University of London, and PhD in Biomedical Engineering from Boston University. While a graduate student in Professor James Collins Lab, he developed a method to eradicate persistent bacteria.

For this research, he won the 2011 Collegiate Inventors Competition and was named to the 2012 Forbes 30-under-30 list. Additionally, using systems biology approaches, he has demonstrated a role for bacterial communication in antibiotic tolerance and further elucidated the mode of action of bactericidal antibiotics.

Shortly after joining Professor Saeed Tavazoie's lab at Columbia University, he received an NIH Director's Early Independence Award, designed to advance early-career scientists to independence and forgo post-doctoral training. As a Systems Biology Fellow at Columbia, he directs an independent lab that uses single-cell and systems biology techniques to both elucidate antibiotic mechanism and drug tolerance, and to optimize antibiotic therapies.