



Department of
Biomedical Engineering
UNIVERSITY OF WISCONSIN-MADISON

Spring 2018 Seminar Series



Systems Approaches for Understanding Antimicrobial Efficacy

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All living organisms possess the incredible ability to integrate several diverse, dynamic and often contradictory biochemical signals in eliciting complex responses. Cellular responses to environmental cues underlie human health and disease processes and constrain the in vivo efficacy of disease therapeutics. Antimicrobial therapeutics are a cornerstone of modern medicine and are being threatened by the rise of resistance, which outpaces drug discovery.

While the biological targets of antimicrobial agents are well known, the mechanisms responsible for their in vivo efficacy remain unclear. Here, we will discuss systems approaches for understanding the mechanistic basis of in vivo antimicrobial efficacy. We will first describe insights gained on bacterial physiology, immune cell physiology and the host-pathogen interface by biochemically profiling a peritoneal infection in mice using mass spectroscopy. We will next discuss how genomescale models of physiology may be used to enrich the information content in biological screens; and describe insights gained on metabolic processes contributing to antibiotic lethality using models of bacterial metabolism. Finally, we will discuss how these approaches may be extended to complex human diseases and be applied to discover next-generation therapies.

Dr. Jason Yang is currently a NIH K99-funded postdoctoral associate working with Dr. James Collins in the Biological Engineering Department at MIT and the Infectious Disease and Microbiome Program at the Broad Institute. There, he has been investigating the mechanisms underlying context-dependence in antimicrobial efficacy.

Jason received his Ph.D. in Biomedical Engineering from the University of Virginia as the first graduate student of Dr. Jeffrey Saucerman, studying the mechanisms underlying context dependence in cardiac cell signaling. He received his Bachelor's with a double major in Biomedical Engineering and Electrical Engineering, working with Dr. Raimond Winslow on building models of calcium handling and electrophysiology in cardiac myocytes.



Monday, February 5, 2018
12 PM in Tong Auditorium (1003 Engineering Centers)