UC San Diego JACOBS SCHOOL OF ENGINEERING Aiiso Yufeng Li Family Department of Chemical and Nano Engineering

Aiiso Yufeng Li Family Department of Chemical and Nano Engineering **DEPARTMENT SEMINAR** Wednesday, May 28th, 2025

11:00 AM - 12:00 PM SME 248

Dr. Adam Zlotnick, PhD



"Engineering Hepatitis B Virus capsids towards packaging and delivery of macromolecular cargo"

Distinguished Professor and Associate Chair Department of Molecular & Cellular Biochemistry Indiana University

Abstract: Hepatitis B virus is a small virus with a self-assembling protein capsid. In vivo it has evolved to package an RNA form of its genome along with reverse transcriptase, to interact with host and viral proteins, and to deliver and release the DNA from of the genome in its eventual host. To take advantage of the HBV capsid as a delivery platform, we need to replicate its functions in response to our signals. We combine chemical biology and physical chemical approaches to achieve this end. We have modified HBV sequence and chemistry to allow controlled assembly. We have developed means of tagging proteins to allow specific packaging of or decoration by macromolecular cargo. We have developed approaches to allow triggered capsid disassembly. Our goal is to provide a toolkit for making the HBV capsid a platform for delivery of macromolecules.

Bio: Adam Zlotnick is Distinguished Professor of Molecular and Cellular Biochemistry at Indiana University. A broad goal of his research is to relate the structure of virus capsid proteins to their self-assembly, with a focus on the core protein of Hepatitis B Virus. The Zlotnick lab has also worked on other icosahedral and non-icosahedral self-assembling viral systems. The opening line of his lab web site reads: "We take viruses apart. We put them back together. We make them make mistakes." To translate his academic research into therapeutics he co-founded Assembly Biosciences (2012) in and Door Pharmaceuticals (2018). Dr. Zlotnick earned his PhD at Purdue University under the guidance of Jack Johnson and was a NRC research fellow at the NIH, in both cases studying structural virology. He is also an elected fellow of the American Academy of Microbiology and of the American Association for the Advancement of Science.