UC Irvine Samueli
Department of Chemical and Biomolecular Engineering

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Building of EvolvR, a Cell Diversity Generating Tool, and Demonstrating Its Applications in Therapeutics Development

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Abstract: Directed evolution is a powerful strategy for improving biological traits of interest. In this talk, I will present EvolvR, a technology I co-developed with David Schaffer and talented former students Shakked Halperin, Juan Hurtado, and Adam Schieferecke. EvolvR is a CRISPR-based, in-cell diversifier that combines a nicking Cas9 for guide RNA targeting with an error-prone, nick-translating DNA polymerase to introduce SNPs within the targeted window. I will first describe the design and functionality of EvolvR in its original E. coli host and then explain how we recently adapted it for application in mammalian cells. We found that much of the diversity that is generated is gaited by the specificity of the CRISPR nickase. Finally, I will discuss how we further adapted EvolvR for the engineering of an oncolytic virus for improved delivery of therapeutic cargos to solid tumors.

Bio: John Dueber is the Lloyd Distinguished Professor of Bioengineering at the University of California, Berkeley. He received his B.S. in Biochemistry at U. Delaware in 1999 and earned his Ph.D. in 2005 in Prof. Wendell Lim's lab at UCSF, where he developed an interest in forward engineering cellular behaviors. As a QB3 Distinguished Fellow at U.C. Berkeley, mentored by Prof. Jay Keasling, he applied synthetic biology approaches to enhance engineered metabolic pathway performance. Since establishing his lab in 2010, he has focused on developing technologies that increase engineering control over cellular function for a wide range of engineering applications. He has been awarded an NSF CAREER, DOE Early Career, and the Bakar Fellow award. His trainees have gone on to found five companies spanning cellular therapeutics to the fermentation-based production of commodity chemicals.

Hosted by: *Prof. Han Li*