CHEMICAL ENGINEERING

FACULTY SEMINAR

JAMES CAROTHERS

Monday, May 14, 2018

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RNA architectures for engineering and analyzing metabolism on a large scale

ABSTRACT: Microbes have the potential to produce a vast array of valuable chemical compounds starting from a variety of carbon sources. The development and optimization of microorganisms for bioproduction typically require lengthy and extensive study and manipulation, oftentimes because metabolic gene and regulatory networks are large and complex. In principle, synthetic multi-gene programs could be constructed to perturb these networks and improve the yields of engineered microbes. In practice, the genetic design spaces are very large and there is a great need for new molecular architectures that can be used to rapidly engineer and analyze metabolic systems on a large scale. In this presentation, I will describe on-going efforts to develop novel RNA architectures as platforms for regulating multi-gene CRISPR-Cas transcriptional programs and as aptamer biosensors for high-throughput production analysis.

BIO: James Carothers is an Assistant Professor of Chemical Engineering, Adjunct Assistant Professor of Bioengineering, and Member of the Molecular Engineering & Sciences Institute and Center for Synthetic Biology at the University of Washington. Previously, Carothers was a postdoctoral fellow and research scientist with Jay D. Keasling, Professor of Chemical Engineering at the University of California Berkeley, CEO of the DOE Joint BioEnergy Institute, member of the National Academy of Engineering, and pioneer in the use of synthetic biology for metabolic engineering. Carothers was a graduate student at Harvard, where he earned a Ph.D. with Jack W. Szostak, a 2009 Nobel Prize winner. He has a B.S. in Molecular Biophysics and Biochemistry from Yale. Recently, his work in synthetic biology has been recognized by the University of Washington Presidential Innovation Award, the University of Washington College of Engineering Junior Faculty Award, and the Alfred P. Sloan Research Fellowship.

RECEPTION 3:30 | LECTURE 4:00 – 5:00
PHYSICS ASTRONOMY BLDG. (PAA) A118

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