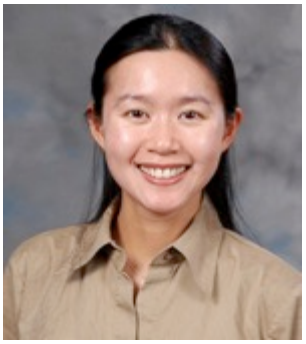
ELECTRICAL & COMPUTER ENGINEERING BIO-SEMINAR Spring 2018 ENGINEERING TEXAS A&M UNIVERSITY

When: **Friday 13:50 – 14:50**
Where: **ETB 1035**



Speaker: **Prof. Katy Kao**

Associate Professor
Department of Chemical Engineering
Texas A&M University

Title: **Harnessing the Power of Adaptive Evolution for Microbial Strain Development**

Date: **3-23-2018**

Abstract: Bio-based production of chemicals, fuels, and therapeutics can be a more sustainable and environmentally friendly alternative to the traditional petrochemical-based route. Rational strain engineering for biocatalysis requires *a priori* knowledge of the genes involved. Desirable strain characteristics (phenotypes) are also often complex, involving multiple genes. Due to the complexity of biological systems, the genetic determinants for most complex phenotypes are not known, posing a challenge for the rational engineering of biocatalysts. Evolutionary engineering, on the other hand, does not require *a priori* genetic or mechanistic knowledge of the desired traits, and is thus a powerful tool for strain development. In an evolving population, individuals with beneficial mutations are selected for, and become enriched, in the environment. However, the rate of adaptation can be limited by the frequency of beneficial mutations; and competition amongst co-occurring beneficial mutations can lead to a loss of information. However, traditional evolutionary engineering methods suffer from limitations such as lack of real-time indications of adaptive events, loss of beneficial mutations due to clonal interference as a result of asexual propagation, and the requirement of the desired phenotype to be growth-coupled. Motivated by these limitations, my lab is focused on the development of more effective and efficient strategies for both strain development and for the fundamental understandings of evolutionary processes in microbial systems. In this talk, I will present some of our efforts in this area.

Biography: Katy Kao is an associate professor in the Department of Chemical Engineering at Texas A&M University. She joined Texas A&M University in 2008. She received a B.S. degree in Chemical Engineering from the University of California, Irvine and a Ph.D. in Chemical Engineering from the University of California, Los Angeles. Her work focuses on microbial adaptation for biotechnology and biomedicine. She was awarded the National Research Service Award by the National Institutes of Health during her postdoctoral fellowship in the School of Medicine at Stanford University, the National Science Foundation CAREER Award, the TEES Young Select Faculty, and several teaching awards, including the Fluor Distinguished Teaching Award and the Association of Former Students Distinguished Achievement Award for teaching.