CHEMICAL AND BIOLOGICAL ENGINEERING

SEMINAR ANNOUNCEMENT

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“Computation, Memory, and Complexity: Design of Gene Regulatory Circuits in Eukaryotic Cells”

SEPTEMBER 30, 2019
12:00 NOON
SciTech Room 136
Eukaryotic organisms display diverse genetic responses to the environment. These complex responses are mediated by genetic regulatory circuits that enable cells to perform core functions, such as process signals, execute computations, and store memory. What molecular circuit designs enable these core functions, and how do regulatory circuits evolve? How do we engineer synthetic circuits to program desired cellular functionality? To address these questions, my lab primarily employs synthetic biology approaches and develops new laboratory technologies. This talk will explore eukaryotic transcriptional circuit design principles from a synthetic biology perspective. I will describe a new approach for engineering fully artificial transcriptional and epigenetic circuits that explore and exploit common natural regulatory features, such as cooperative transcription factor (TF) assembly and reading / writing chromatin modifications. In addition, I will present a highly flexible and automated, continuous culture platform we invented, called eVOLVER, that allows researchers to grow and experimentally evolve natural and synthetic cellular systems in highly defined growth conditions.