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"Towards an Abiotic Biology"

Wednesday, February 4, 2009 at 11:00 AM
Suddath Seminar room (IBB 1128)
Georgia Institute of Technology

Abstract:

The hallmark of living systems is their ability to replicate. While replicators of different complexities exist, they all have in common the fact that different sequence variants have differential replicative success; that is, they evolve. Directed molecular evolution in the laboratory has some of the flavor of this process, but most molecular systems are very simple and are commonly based on nucleic acid machines. It should be possible to generate more complex systems that utilize protein machines, but that are wholly acellular. To this end, we have begun to develop and evolve synthetic genetic circuits that can be transcribed and translated within in vitro, cell-like compartments (oil-in-water emulsions). As examples, we will discuss selection schemes that involve genes that can capture themselves, genes that can amplify themselves, and genes that can regulate themselves. The control afforded by an abiotic biology is such that we can begin to imagine the wholesale re-engineering of 'lifelike' systems to utilize whatever chemistries we desire.

Host: Prof. Nick Hud 404.385.1162