

# Undergraduate Colloquium

March 24, 4pm, PGH646

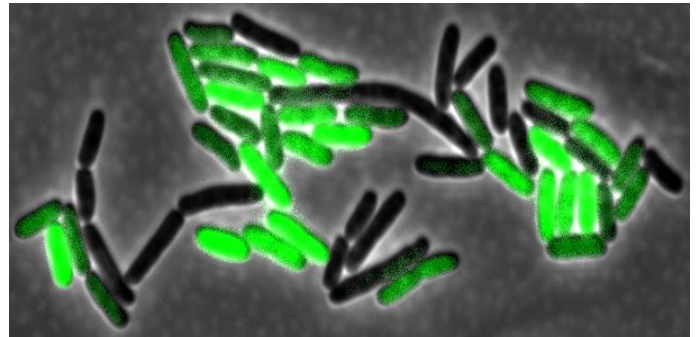
<http://www.math.uh.edu/colloquium/undergraduate/>



## **The mathematics of synthetic biology: A quantitative perspective on engineering biological complexity**

Matthew Bennett, Rice University

Synthetic biology is the engineering and construction of novel cellular systems through genetic manipulation. However, the complex interactions between genes, proteins, metabolites, and cells form intricate networks that are difficult to understand in the absence of mathematical modeling. In this talk, I will discuss my lab's work to understand, both theoretically and experimentally, the basic principles underlying synthetic gene circuits. These investigations have led us to a better understanding of the impact that nonlinearity, stochasticity, and delay have on the dynamics of gene networks. Further, we have used these principles to design bigger and more complicated synthetic systems that span large populations of different bacterial cells types. These systems, called synthetic microbial consortia, are among the most complex forms of synthetic life and their behaviors strain our ability to accurately model their dynamics. I will describe our recent efforts to effectively model these multi-scale spatiotemporal systems and outline the current challenges in the field.



**Pizza and refreshments will be served**