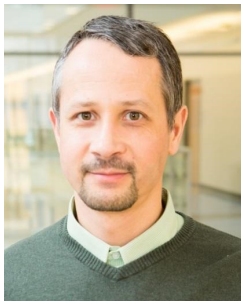
Stony Brook University

Biomedical Informatics Grand Rounds



Gábor Balázsi, *PhD; Henry Laufer Associate Professor*

From Synthetic Biology to the Evolution of Drug Resistance

Wednesday, April 3rd, 2019 3pm—4pm

BMI Conference Room HSC-L3 Room 045

Abstract: Synthetic biology is a new scientific field that designs and builds artificial biological systems, using principles from engineering, mathematics and physics. Recent success stories from other laboratories include the massive, low-cost synthesis of the anti-malaria drug artemisinin, and the construction of genetic switches, oscillators and logic gates. In my laboratory we build synthetic gene circuits and use them as new tools to precisely perturb cells and watch how they respond. This way, we hope to develop a predictive, quantitative understanding of biological processes such as drug resistance and cancer progression. We have developed an expanding library of synthetic gene regulatory circuits first in yeast, and then in human cells for this purpose. I will present a couple of examples of how we can gain a deeper understanding of microbial and mammalian drug resistance using synthetic gene circuits.

Bio: Gábor Balázsi received his undergraduate Physics degree at the Babeş-Bolyai University in Kolozsvár, Romania. He completed a Physics PhD at the University of Missouri at Saint Louis, where he studied perturbation propagation and synchronization in normal and epileptic neurons and glial cells. In 2005 he became a postdoctoral fellow in Synthetic Biology at the Center for Biodynamics at Boston University. There he designed synthetic gene circuits to study how cellular diversity promotes drug resistance. He continued and expanded these efforts in his own laboratory over the last 13 years (8 of which were at the University of Texas MD Anderson Cancer Center in Houston, Texas), building a growing library of synthetic gene circuits first in yeast, and then in cancer cells. As the Henry Laufer Associate Professor of Physical and Quantitative Biology at Stony Brook University he leads an interdisciplinary research group, which utilizes synthetic gene circuits to control gene expression in yeast and human cells. The goal of his laboratory is to combine synthetic biology and physical modeling to understand fundamental biological processes underlying microbial drug resistance and cancer progression. Dr. Balázsi was a recipient of the 2009 NIH Director's New Innovator Award. His research group is part-experimental and part-computational, fostering interdisciplinary training while advancing the frontiers of quantitative biology.

****CME Credit Available****

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