UNIVERSITÉ DU LUXEMBOURG

Physics Colloquium

Monday 18th May 2020
at 4:00 pm
Campus Limpertsberg
Bâtiment des Sciences - Room BS 2.01

Talk by Associate Prof. Thierry EMONET
Yale University, New Haven, CT – USA
invited by Prof. Massimiliano ESPOSITO

Conflicts and synergies between individuality and collective behavior

Cells live in communities where they interact with each other and their environment. By coordinating individuals, such interactions often result in collective behavior that emerge on scales larger than the individuals that are beneficial to the population. At the same time, populations of individuals, even isogenic ones, display phenotypic heterogeneity, which diversifies individual behavior and enhances the resilience of the population in unexpected situations. This raises a dilemma: although individuality provides advantages, it also tends to reduce coordination. I will report on our recent experimental and theoretical efforts that use bacterial chemotaxis as model system to understand, the origin of individual cellular behavior and performance, and how populations of cells reconciliate individuality with group behavior. This study was supported by the National Institutes of Health grant R01GM106189, the Allen Distinguished Investigator Program (grant 11562) through The Paul G. Allen Frontiers Group, and the James S. McDonnell Foundation grant on Complexity.

Biography:

Thierry Emonet is a Tenured Associate Professor of Molecular Cellular and Developmental Biology & Physics at Yale University. Thierry studied physics at the ETH Zürich, and received his PhD in theoretical astrophysics from the University of La Laguna (Spain) in 1998, before doing postdocs at the National Center for Atmospheric Research, Boulder CO and The University of Chicago, discovering key mechanisms that enable magnetic field to float to the surface of the Sun to create Sunspots. In 2002, Thierry switched to biology. At Yale since 2007, his lab combines mathematical modeling and quantitative experiments to understand the biological computations that enable individuals and groups of organisms to sense and navigate their chemical environments. Chemical navigation involves many non-trivial computations and therefore provides a quantitative framework for discovering how biological systems compute, and how computations are implemented in molecular and cellular mechanisms. As model systems, the Emonet lab uses the well-characterized bacterial chemotaxis and fly olfaction systems, in which they can make multi-scale measurements and compare to quantitative mathematical models. The dual perspective of microbiology and neuroscience helps revealing general principles while fostering innovation by cross-pollinating ideas. His work is supported by NIH and he has received awards from the NSF, the Paul G Allen Family Foundation (Distinguished Allen Investigator), the Whitehall Foundation, the James S. McDonnell Foundation and the Alfred P. Sloan Foundation.

Outside of science, Thierry's main interest is art. He grew up at the intersection of science and art and he is married to renowned sculptor Susan Clinard

http://emonet.biology.yale.edu http://www.clinard.org