

INSTITUT D'ETUDES SCIENTIFIQUES DE CARGESE

Cargèse International School 2017

2017 Cargese Summer School on Theoretical Biophysics

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Web site

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From the point of view of physics, biological systems stand out due to their complexity and heterogeneity. Living systems span many length and timescales, and are constantly kept out of equilibrium by active energy-consuming processes. Understanding their functioning poses a major challenge to traditional physical approaches. It is often difficult to predict the overall behavior of a biological system just from knowing, often partially, the behavior of their individual components. Can we understand how a cell tissue collectively moves in response to an external stimuli, merely based on the contacts between neighboring cells? Similarly, can one predict how a swarm of birds or insects react to a threat? On another scale, how do interactions between pairs of amino acids in a protein determine its function? How does a neural network encode information about the collective activity of these cells? Can we predict the next dominant strain of influenza by studying its evolution in response to immune defenses of infected populations? Despite their diversity, these questions have in common the emergence of a global and collective phenomenon from a sum of local interactions. Can we formulate these problems in a common language, and use it to make relevant and reliable biological predictions?

Main topics will include

- evolution
- neuroscience
- regulation
- cellular signaling
- collective behaviour

Core lecturers

Ila Fiete (UT Austin US), Irene Giardina (La Sapienza Rome IT), Michael Laessig (Univ Cologne DE), Rémi Monasson (ENS Paris FR), Pieter ten Wolde (AMOLF Amsterdam NL), Erik Van Nimwegen (Univ Basel CH), Massimo Vergassola (UC San Diego US).

Seminar speakers

Danielle Bassett (Univ. of Pennsylvania US), Simona Cocco (ENS Paris FR), Thierry Emonet (Yale Univ US), Jordi Ojalvo Garcia (Univ Pompeu Fabra ES), Leonid Mirny (MIT US), Stephanie Palmer (Univ Chicago US), Silvia Santos (Imperial College London UK), David Schwab (Northwestern Univ US), Agnese Seminara (Univ Nice FR)

Organization Committee

Thierry Mora (ENS Paris FR), Ilya Nemenman (Emory Univ. US), Aleksandra Walczak (ENS Paris FR)

Application and registration

<http://cargesebiophysics.wikispaces.com/home>

Contact: cargesebiophysics2017@gmail.com

Deadline: 26 March 2017

Registration Fees: 850EUR (financial help is available upon request)



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