COMPLEXITY COMMUNITY SHARING SESSION

SEPTEMBER 2018

25 SEP (TUE)
11:00AM - 1:00PM
VENUE : COMPLEXITY INSTITUTE
Academic Building North
Level 1 Section B Unit No. 7
(ABN-01B-07)

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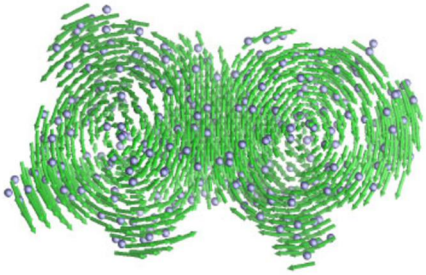

Topological Modeling and the Analysis of Complex Data in Biomolecules

The understanding of biomolecular structure, flexibility, function, and dynamics is one of the most challenging tasks in biological sciences. When it comes to biomolecular structure characterization, molecular topological fingerprints (MTFs), which are derived from persistent homology analysis, provide a unique representation that balances topological simplification and geometric details. Multidimensional persistent homology is proposed to quantitatively predict the stability of protein folding configurations, whereas multiresolution persistent homology is designed to handle extremely large biomolecular data.

The essential idea is to match the resolution with the scale of interest so as to represent large scale datasets with appropriate resolution, and this will be elaborated upon in my talk. I will also talk about how persistent homology based new strategies are used for topological denoising and for resolving ill-posed inverse problems in Cryo-EM data, as well as the recent progress of topological modeling in hydrogen-bonding network and drug design. These proposed topological methods have potential applications in arbitrary data sets such as social networks, biological networks and graphs.

Speaker : Asst. Prof. XIA Kelin

Dr. Xia is an Assistant Professor in the Division of Mathematical Sciences, School of Physical and Mathematical Sciences, Nanyang Technological University. He obtained his PhD degree from the Chinese Academy of Sciences, and was Visiting Scholar, and Visiting Assistant Professor in the Department of Mathematics at Michigan State University.

His research areas include mathematical molecular biology, scientific computation, and topological data analysis (TDA).

Agricultural Land Under Urban Pressures: An Approach Based on Farmers' Land Use and Land Cover Change Intentions

Land-Use/Cover Change (LUCC) is the result of a complex system intertwined with interactions of environmental, social and economic factors involving biota, soil, topography, surface and groundwater, human structures, and employment. Urbanisation is one of the most critical consequences of LUCC at a local level.

As a complex phenomenon, urbanisation has many socioeconomic and environmental impacts, often evolving in the form of urban sprawl. These consequences have an undesirable impact on public health and quality of life e.g. loss of farmlands, increased urban pollution, greater dependence on cars, or social fragmentation.

Land owners have a key role in LUCC. Farmers' participation in the real estate market as buyers, sellers or developers can have many impacts since they have the capacity to supply financial investment and control future land use. In this talk, I will provide a general introduction to this area of research and also illustrate my points with an empirical study done in a peri-urban area in Portugal.

Speaker : Eduardo GOMES

Eduardo Gomes is a PhD candidate at Sorbonne University and University of Lisbon. He is a geographer interested in complexity and systems thinking.

Author and reviewer of several scientific articles, Gomes' research work primarily involved the studying of urban and agricultural dynamics, while his work of late focuses on the design of computer-based modelling and collaborative simulation.

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