MATH-IMS Joint Applied Mathematics Colloquium Series
The Chinese University of Hong Kong

This MATH-IMS Joint Colloquium Series is organized by Center for Mathematical Artificial Intelligence (CMAI), under Department of Mathematics and Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong. The colloquium series focuses on mathematics and applications of artificial intelligence, big data and related topics.

Date: April 21, 2023 (Friday)
Time: 18:00-19:00 (Hong Kong Time)
Zoom Link: https://cuhk.zoom.us/j/92775210812
Physics-inspired learning on graphs
Speaker: Professor Michael Bronstein
University of Oxford

Abstract: The message-passing paradigm has been the "battle horse" of deep learning on graphs for several years, making graph neural networks a big success in a wide range of applications, from particle physics to protein design. From a theoretical viewpoint, it established the link to the Weisfeiler-Lehman hierarchy, allowing to analyse the expressive power of GNNs. We argue that the very "node-and-edge"-centric mindset of current graph deep learning schemes may hinder future progress in the field. As an alternative, we propose physics-inspired "continuous" learning models that open up a new trove of tools from the fields of differential geometry, algebraic topology, and differential equations so far largely unexplored in graph ML.

Bio: Michael Bronstein is the DeepMind Professor of AI at the University of Oxford and Head of Graph Learning Research at Twitter. He was previously a professor at Imperial College London and held visiting appointments at Stanford, MIT, and Harvard, and has also been affiliated with three Institutes for Advanced Study (at TUM as a Rudolf Diesel Fellow (2017-2019), at Harvard as a Radcliffe fellow (2017-2018), and at Princeton as a short-time scholar (2020)). Michael received his PhD from the Technion in 2007. He is the recipient of the Royal Society Wolfson Research Merit Award, Royal Academy of Engineering Silver Medal, five ERC grants, two Google Faculty Research Awards, and two Amazon AWS ML Research Awards. He is a Member of the Academia Europaea, Fellow of IEEE, IAPR, BCS, and ELLIS, ACM Distinguished Speaker, and World Economic Forum Young Scientist. In addition to his academic career, Michael is a serial entrepreneur and founder of multiple startup companies, including Novafora, Invision (acquired by Intel in 2012), Videocites, and Fabula AI (acquired by Twitter in 2019).