ipam institute for pure & applied mathematics

Tensor Methods and their Applications in the Physical and Data Sciences

March 29 - April 01, 2021

Scientific Overview

This workshop aims to bring together experts from different communities working on tensor methods and their applications. Tensors and tensor networks are an important object of study in computational many-body physics and chemistry as well as quantum information theory. With the emergence of big data, methods and theory for tensor decomposition have become important in probability, statistics, and machine learning as well. Tensor methods have also received a fair amount of attention from the mathematical community due to their intriguing algebraic and geometric properties, as well as their relationship to computational complexity. This workshop will feature introductory talks from leading experts in all of these fields. The aim of the workshop is to initiate the exchange of ideas between the fields, lead to the beginnings of new interdisciplinary collaborations, and give a good start to the long-term program. This workshop will include a poster session; a request for posters will be sent to registered participants in advance of the workshop.

Long Program Schedule

This workshop is part of the long program on "Tensor Methods and Emerging Applications to the Physical and Data Sciences."

- Tensor Methods and Emerging Applications to the Physical and Data Sciences Opening Day : March 8, 2021
- Tensor Methods and Emerging Applications to the Physical and Data Sciences Tutorials : March 9 - 12, 2021
- **Workshop I: Tensor Methods and their Applications in the Physical and Data Sciences : March 29 - April 2, 2021**
- Workshop II: Tensor Network States and Applications : April 19 - 23, 2021
- Workshop III: Mathematical Foundations and Algorithms for Tensor Computations : May 3 - 7, 2021
- Workshop IV: Efficient Tensor Representations for Learning and Computational Complexity : May 17 - 21, 2021
- Tensor Methods and Emerging Applications to the Physical and Data Sciences Culminating Retreat at Lake Arrowhead : June 6 - 11, 2021

Participation

Additional information about this workshop including links to register and to apply for funding, can be found on the webpage listed below. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission, and we welcome their applications.
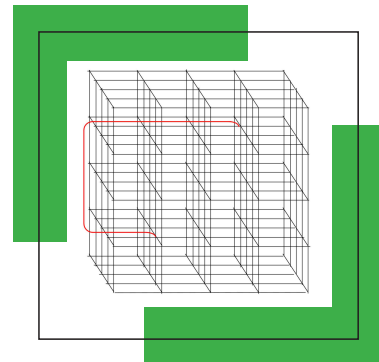
Organizers

Garnet Chan (Caltech), **Lieven De Lathauwer** (Katholieke Universiteit Lueven), **Ankur Moitra** (MIT), **Elina Robeva** (UBC), **Reinhold Schneider** (TU Berlin), and **Tao Xiang** (Chinese Academy of Sciences).

Speakers

Markus Bachmayr (Johannes Gutenberg-Univ.Mainz), **Peter Benner** (MPI, Dynamics of Complex Techinical Systems), **Nadav Cohen** (Tel Aviv Univ.), **Lieven De Lathauwer** (Kotholike Univ. Leuven), **Virginie Ehrlacher** (ENPC), **Lars Grasedyck** (RWTH Aachen Univ.), **Johnnie Gray** (Univ. College London), **Laura Grigori** (INRIA), **Aram Harrow** (MIT), **Vladimir Kazeev** (Univ. Wien), **Lek-Heng Lim** (Univ. of Chicago), **Nick Mayhall** (Virginia Tech), **Anthony Nouy** (Univ of Nantes), **Reinhold Schneider** (TU Berlin), **Ulrich Schollwöck** Univ. of Munich), **Miles Stoudenmire** (Flatiron Institute), **André Uschmajew** (MPI, Mathematik in den Naturwissenschaften), **Lei Wang** (Chinese Academy of Sciences), **Ming Yuan** (Columbia Univ.)

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