

Workshop II: Integrability and Algebraic Combinatorics

APRIL 15 - 19, 2024

Scientific Overview

The workshop will focus on recent interactions between integrable probability and algebraic combinatorics.

In one direction we have seen many applications of tools and emergence of objects from algebraic combinatorics in integrable models in statistical mechanics. The major applications concern recent advances in [colored] vertex models and interacting particle systems using symmetric functions, specifically Schur and Macdonald polynomials and their generalizations. Another example is the study of various exclusion processes (e.g. TASEP and its relatives) and their steady states where polynomials of algebro-combinatorial significance emerge (e.g. Schubert polynomials). The third example is the emergence of dimer models and electrical networks from the algebra of the positive Grassmannian.

In the opposite direction, tools and ideas from probability and statistical physics have seen application in problems from Algebraic Combinatorics. Two examples are the asymptotics of various structure constants of representation theoretic significance (e.g. Kostka, Littlewood-Richardson, and Kronecker coefficients) and symmetries of polynomials and rational functions arising from Yang-Baxter equations. We have seen how probability motivates new research directions in algebraic combinatorics and how algebraic combinatorics leads to new discoveries in probability. The aim of the workshop is to further stimulate the cross-infiltration of the ideas between two fields.

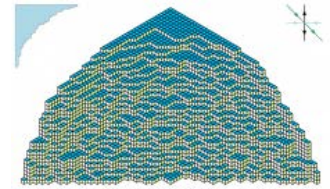
Long Program Schedule

This workshop is part of the long program Geometry, Statistical Mechanics, and Integrability

- Geometry, Statistical Mechanics, and Integrability Opening Day : March 11, 2024
- Geometry, Statistical Mechanics, and Integrability Tutorials : March 12-15, 2024
- Workshop I: Statistical Mechanics and Discrete Geometry : March 25-29, 2024
- **Workshop II: Integrability and Algebraic Combinatorics : April 15-19, 2024**
- Workshop III: Statistical Mechanics Beyond 2D : May 6-10, 2024
- Workshop IV: Vertex Models: Algebraic and Probabilistic Aspects of Universality : May 20-24, 2024
- Geometry, Statistical Mechanics, and Integrability Culminating Workshop at Lake Arrowhead : June 9-14, 2024

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

Vadim Gorin (University of California, Berkeley)
Alejandro Morales (Uni. of Massachusetts Amherst)
Greta Panova (University of Southern California)

Invited Speakers

Arvind Ayer (Indian Institute of Science)
Houcine Ben Dali (Université de Lorraine)
Jacopo Borga (Stanford University)
Alexey Bufetov (Leipzig University)
Swee Hong Chan (Rutgers University)
Cesar Cuenca (Ohio State University)
Maciej Dolega (Polish Academy of Sciences)
Jehanne Dousse
Laura Escobar (Washington Uni. in St. Louis)
Valentin Feray (Université de Lorraine)
Pavel Galashin (UCLA)
Sergei Korotkikh (UC Berkeley)
Jonathan Leake (University of Waterloo)
Olya Mandelshtam (University of Waterloo)
Jonathan Novak (UCSD)
Igor Pak (UCLA)
Leonid Petrov (University of Virginia)
Jessica Striker (North Dakota State University)
Harriet Walsh (Université d'Angers)
Anna Weigandt (University of Minnesota, Twin Cities)
Lauren Williams (Harvard University)
Paul Zinn-Justin (University of Melbourne)



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For more information, visit the program web page:

www.ipam.ucla.edu/GSIWS2