

Caroline J. Klivans

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Research Interests

Algebraic, Geometric, and Topological Combinatorics: simplicial complexes, matroids, hyperplane arrangements, polytopes, graph theory, shifting, phylogenetic trees, Combinatorial Laplacians

Appointments

Research Scholar and Senior Lecturer, The University of Chicago
Departments of Mathematics and Computer Science (2008 - present)

L.E. Dickson Instructor and VIGRE postdoctoral fellow, The University of Chicago
Departments of Mathematics and Computer Science (2004 - 2008)

Instructor, Cornell University
Computing and Information Science (2004)

Postdoctoral Fellow, MSRI
Special semester in Discrete and Computational Geometry (2003)

Education

Ph.D. Massachusetts Institute of Technology (2003)
Applied Mathematics department, Advisor: Richard Stanley
Thesis: Combinatorial Properties of Shifted Complexes

B.A. Cornell University (1999)
Mathematics Department, Advisor: Louis Billera

Teaching

The University of Chicago
Abstract Algebra (Regular and honors sequences) Winter 2006, 2007, 2008. Spring 2008.
Discrete Mathematics (Undergraduate and graduate versions) Autumn 2004, 2005, 2006, 2007, 2008.
Mathematical Methods for the Physical Sciences Winter 2005.
Combinatorics and Complexity in Game Theory (Topics in theoretical computer science) Spring 2005.
Hyperplane Arrangements (REU program) Summer 2005.

Cornell University
Information Modeling (School of computing and information sciences) Spring 2004

MIT (Teaching Assistant)
Calculus Spring 2003
Principles of Discrete Applied Mathematics Autumn 2002

Advising

Masters Thesis Advisor
Negar Mirsattari
The University of Chicago (2009)

Ph.D. Thesis committee member
Elliot Krop, Enumerating Matchings in Regular Graphs
University of Illinois - Chicago (2007)

Professional Activities

Program Committee Member
Formal Power Series and Algebraic Combinatorics (FPSAC) 2010

Co-organizer, Special Session on Geometric Combinatorics
AMS Regional Meeting, DePaul University (October 2007)

Member of The Women in the Physical Sciences Committee
University of Chicago (2005 - present)

Faculty Sponsor, AWM Student Chapter
University of Chicago (2005 - present)

Organizer, Zeilberger Miniconference
MIT (2003)

Awards and Honors

VIGRE Postdoctoral Fellowship (2004 - 2008)

NSF Graduate Fellowship (1999 - 2002)

Alice T. Schafer AWM National Mathematics Prize (1999)

Summer Research Assistant, DIMACS (1999)
(Center for Discrete Math and Theoretical Computer Science)
Project: Mobile Robotics Navigation, Advisor: Sven Dickinson

REU Student, DIMACS (1998)
Advisors: Sven Dickinson and Diane Souvaine

President, Undergraduate Math Club
Cornell University (1997-1999)

Rensselaer Medal Award (1995)

Andrew's Leaper (1994)
Summer program at Carnegie Mellon University

Publications

M. Drton, C. Klivans, A geometric interpretation for the coefficients of the characteristic polynomial of a reflection arrangement.
Submitted.

A. Duval, C. Klivans, and J. Martin, Cellular spanning trees and Laplacians of cubical complexes.
Submitted.

R. Basri, P. Felzenszwalb, R. Girshick, D. Jacobs, and C. Klivans, Visibility Constraints on Features of 3D Object.
IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2009.

A. Duval, C. Klivans, and J. Martin, Simplicial spanning trees and generalized matrix-tree theorems.
Transactions of the American Mathematical Society 361 (2009).

C. Klivans, K. Nyman, and B. Tenner, Relations on generalized degree sequences.
Discrete Mathematics Vol. 30, Issue 13, (2009).

C. Klivans, Shifted Matroid Complexes.
Submitted.

C. Klivans and V. Reiner, Shifted set families, degree sequences, and plethysm.
The Electronic journal of Combinatorics 15 no.1 2008.

C. Klivans, Threshold Graphs, Shifted Complexes, and Graphical Complexes.
Discrete Mathematics vol. 307 no. 21, 2007.

F. Ardila, C. Klivans, and L. Williams, The Positive Bergman Complex of an Oriented Matroid,
European Journal of Combinatorics, Volume 27, no. 4, 2006.

F. Ardila and C. Klivans, The Bergman Complex of a Matroid and Phylogenetic Trees,
Journal of Combinatorial Theory, Series B, Volume 96, Issue 1, 2006.
Also presented at FPSAC (Formal Power Series and Algebraic Combinatorics) 2004

C. Klivans, Obstructions to shiftedness,
Disc. and Compt. Geom. 33, no. 3, 2005.

C. Klivans, Combinatorial Properties of Shifted Complexes,
Ph.D. Thesis, MIT June 2003

C. Klivans, Mobile Robotics Navigation,
DIMACS Technical Report Summer 1998.

Invited Talks

2009 Combinatorial Geometry Workshop, IPAM

Mathematics Department Colloquium (Oliver Club), Cornell University

Discrete Geometry and Combinatorics Seminar, Cornell University

Special Session on Matroids in Algebra and Geometry, AMS regional meeting, SFSU

Algebra Seminar, IMPA, Rio de Janeiro

Analysis Seminar, PUC-Rio, Rio de Janeiro

Theoretical Computer Science Seminar, University of Chicago

2008 Special Session on Combinatorial Representation Theory, AMS regional meeting, Vancouver, BC

Lou Billera's Birthday Conference, Cornell University

Special Session on Combinatorial Representation Theory, Topological Combinatorics, and Interactions
between them, AMS regional meeting, Indiana University

Combinatorics Seminar, University of Washington

2007 Combinatorics Seminar, University of Illinois - Chicago

Combinatorics Seminar, MIT

Combinatorics Seminar, SUNY - Binghamton

Discrete Geometry and Combinatorics Seminar, Cornell

2006 Special Session on Geometric Combinatorics, AMS regional meeting, University of Cincinnati

Applied Mathematics Seminar, Illinois Institute of Technology

Combinatorics Seminar, University of Minnesota

Combinatorics Seminar, University of Kansas

- 2005 Special Session on Algebraic and Geometric Combinatorics, AMS regional meeting, Bard College
Combinatorics Seminar, University of Illinois - Chicago
Special Session on Curvature in Group Theory and Combinatorics, AMS regional meeting, UCSB
Combinatorics Seminar, Indiana University
Topology Seminar, University of Chicago
- 2004 Combinatorics Seminar, University of Illinois - Chicago
Richard Stanley's Birthday Conference, MIT
Combinatorics Seminar, MIT
Combinatorics Seminar, University of Michigan
Geometry Seminar, Courant Institute
Discrete Geometry and Combinatorics Seminar, Cornell University
Combinatorics Seminar, SUNY - Binghamton
- 2003 Combinatorics Seminar, University of California - Davis
Bay Area Discrete Math Day, San Francisco State University
Special Session on Topological Combinatorics, AMS regional meeting, SUNY - Binghamton
Combinatorics Seminar, University of California - Berkeley
Combinatorics Seminar, SUNY - Binghamton
Combinatorics Seminar, University of Washington - Seattle
Applied Mathematics Student Seminar (SPAMS), MIT (2000-2003)
- 2001 Pure Mathematics Student Seminar (Puma Grass), MIT
- 1999 Graph Theoretic Methods in Computer Vision, DIMACS Workshop
- 1998 Graph Theory and Combinatorial Optimization, DREI 98, DIMACS