Sponsored by the SIAM Activity Group on Discrete Mathematics

The SIAG on Discrete Mathematics focuses on combinatorics, graph theory, cryptography, discrete optimization, mathematical programming, coding theory, information theory, game theory, and theoretical computer science, including algorithms, complexity, circuit design, robotics, and parallel processing. This activity group provides an opportunity to unify pure discrete mathematics and areas of applied research such as computer science, operations research, combinatorics, and the social sciences. It organizes the SIAM Conference on Discrete Mathematics; co-sponsors, with ACM SIGACT, the annual Symposium on Discrete Algorithms; and sponsors minisymposia at SIAM meetings and conferences. The activity group also runs DM-Net, an electronic forum; publishes an electronic newsletter; and maintains a website and a member directory. Every two years, the activity group also awards the Dénes König Prize to a young researcher for outstanding research in the area of discrete mathematics.
Table of Contents

Program-At-A-Glance ................................................... 2
General Information.................................................. 2
Get-togethers ......................................................... 4
Invited Plenary Presentations ..................................... 5
Prize ........................................................................... 8
Program Schedule....................................................... 11
Speaker and Organizer Index ...................................... 45
Conference Budget ... Inside Back Cover
Hotel Floor Plan ....................................................... Back Cover

Local Organizing Committee

Michael Ferrara
University of Colorado Denver, USA

Stephen Hartke
University of Colorado Denver, USA

Michael Jacobson
University of Colorado Denver, USA

Florian Pfender
University of Colorado Denver, USA

Conference Themes

Discrete Mathematics, including:
Algebraic Combinatorics
Combinatorial Algorithms
Combinatorial Number Theory
Design Theory
Discrete Geometry
Enumeration
Extremal Combinatorics
Graph Theory
Matroids
Ordered Sets
Probabilistic Combinatorics
Ramsey Theory
Topological and Analytical Techniques in Combinatorics

With connections to other disciplines, including:
Computational Biology
Combinatorial Scientific Computing
Computer Science
Game Theory
Network Theory
Optimization
Probability
Statistical Physics

Organizing Committee

Co-Chairs
Jerry Griggs
University of South Carolina, USA

Ravi Kumar
Google, Mountain View, USA

Bonnie Berger
Massachusetts Institute of Technology, USA

Jennifer Tour Chayes
Microsoft Research New England, USA

Bill Chen
Center for Combinatorics, Nankai University, China

Julia Chuzhoy
Toyota Technological Institute at Chicago, USA

David Conlon
University of Oxford, United Kingdom

Daniela Kühn
University of Birmingham, United Kingdom

David Shmoys
Cornell University, USA

Angelika Stege
ETH Zürich, Switzerland

Prasad Tetali
Georgia Institute of Technology, USA

Michelle Wachs
University of Miami, USA

Conference Location

All sessions and on-site registration will take place on the University of Colorado, Denver campus located in the Tivoli Student Union and North Classroom Building.

SIAM Registration Desk

The SIAM registration desk locations and hours are listed below:

Monday, June 4
7:00 AM – 8:30 AM
Tivoli Student Union Turnhalle (TV 250) Atrium
9:00 AM – 4:30 PM
North Classroom 1130 Entry

Tuesday, June 5
7:30 AM – 3:30 PM
North Classroom 1130 Entry

Wednesday, June 6
7:30 AM – 3:30 PM
North Classroom 1130 Entry

Thursday, June 7
7:30 AM – 3:30 PM
North Classroom 1130 Entry

Friday, June 8
7:30 AM – 10:30 AM
North Classroom 1130 Entry

Child Care

Conference attendees interested in child care services can visit www.care.com. Attendees are responsible for making their own child care arrangements.
Corporate Members and Affiliates

SIAM corporate members provide their employees with knowledge about, access to, and contacts in the applied mathematics and computational sciences community through their membership benefits. Corporate membership is more than just a bundle of tangible products and services; it is an expression of support for SIAM and its programs. SIAM is pleased to acknowledge its corporate members and sponsors. In recognition of their support, non-member attendees who are employed by the following organizations are entitled to the SIAM member registration rate.

Corporate/Institutional Members

The Aerospace Corporation
Air Force Office of Scientific Research
Amazon
Aramco Services Company
Bechtel Marine Propulsion Laboratory
The Boeing Company
CEA/DAM
Department of National Defence (DND/CSEC)
DSTO- Defence Science and Technology Organisation
Exxon Mobil
Hewlett-Packard
Huawei FRC French R&D Center
IBM Corporation
IDA Center for Communications Research, La Jolla
IDA Center for Communications Research, Princeton
IFP Energies nouvelles
Institute for Defense Analyses, Center for Computing Sciences
Lawrence Berkeley National Laboratory
Lawrence Livermore National Labs
Lockheed Martin
Los Alamos National Laboratory
Max-Planck-Institute for Dynamics of Complex Technical Systems
Mentor Graphics
National Institute of Standards and Technology (NIST)
National Security Agency (DIRNSA)
Naval PostGrad
Oak Ridge National Laboratory, managed by UT-Battelle for the Department of Energy
Sandia National Laboratories
Schlumberger-Doll Research
United States Department of Energy
U.S. Army Corps of Engineers, Engineer Research and Development Center
US Naval Research Labs

List current April 2018.

Funding Agency

SIAM and the conference organizing committee wish to extend their thanks and appreciation to the U.S. National Science Foundation for its support of this conference.

Join SIAM and save!

Leading the applied mathematics community . . .

SIAM members save up to $140 on full registration for the 2018 SIAM Conference on Discrete Mathematics! Join your peers in supporting the premier professional society for applied mathematicians and computational scientists. SIAM members receive subscriptions to SIAM Review, SIAM News and SIAM Unwrapped, and enjoy substantial discounts on SIAM books, journal subscriptions, and conference registrations.

If you are not a SIAM member and paid the Non-Member or Non-Member Mini Speaker/Organizer rate to attend the conference, you can apply the difference between what you paid and what a member would have paid ($140 for a Non-Member and $70 for a Non-Member Mini Speaker/Organizer) towards a SIAM membership. Contact SIAM Customer Service for details or join at the conference registration desk.

If you are a SIAM member, it only costs $15 to join the SIAM Activity Group on the Discrete Mathematics (SIAG/DM). As a SIAG/DM member, you are eligible for an additional $15 discount on this conference, so if you paid the SIAM member rate to attend the conference, you might be eligible for a free SIAG/DM membership. Check at the registration desk.

Free Student Memberships are available to students who attend an institution that is an Academic Member of SIAM, are members of Student Chapters of SIAM, or are nominated by a Regular Member of SIAM.

Join onsite at the registration desk, go to www.siam.org/joinsiam to join online or download an application form, or contact SIAM Customer Service:

Telephone: +1-215-382-9800 (worldwide); or 800-447-7426 (U.S. and Canada only)
Fax: +1-215-386-7999
E-mail: membership@siam.org
Standard Audio-Visual Set-Up in Meeting Rooms
SIAM does not provide computers for any speaker. When giving an electronic presentation, speakers must provide their own computers. SIAM is not responsible for the safety and security of speakers’ computers. A data (LCD) projector and screen will be provided in all technical session meeting rooms. The data projectors support both VGA and HDMI connections. Presenters requiring an alternate connection must provide their own adaptor.

Internet Access
All conference attendees will have access through an open network called “Cu Denver Guest.”

Registration Fee Includes
• Admission to all technical sessions
• Business Meeting (open to SIAG/DM members)
• Coffee breaks daily
• Room set-ups and audio/visual equipment
• Welcome Reception

Job Postings
Please check with the SIAM registration desk regarding the availability of job postings or visit http://jobs.siam.org.

SIAM Books and Journals
Display copies of books and complimentary copies of journals are available on site. SIAM books are available at a discounted price during the conference. Titles on display forms are available with instructions on how to place a book order.

Table Top Display
Cambridge University Press

Conference Sponsors
(Sponsor of the Dénes König Prize)

ELSEVIER

Microsoft

Name Badges
A space for emergency contact information is provided on the back of your name badge. Help us help you in the event of an emergency!

Comments?
Comments about SIAM meetings are encouraged! Please send to: Cynthia Phillips, SIAM Vice President for Programs (vpp@siam.org).

Get-togethers
Welcome Reception
Monday, June 4
5:15 PM – 7:15 PM

Business Meeting
(open to SIAG/DM members)
Wednesday, June 6
5:30 PM – 6:30 PM
Complimentary refreshments will be served.

Statement on Inclusiveness
As a professional society, SIAM is committed to providing an inclusive climate that encourages the open expression and exchange of ideas, that is free from all forms of discrimination, harassment, and retaliation, and that is welcoming and comfortable to all members and to those who participate in its activities. In pursuit of that commitment, SIAM is dedicated to the philosophy of equality of opportunity and treatment for all participants regardless of gender, gender identity or expression, sexual orientation, race, color, national or ethnic origin, religion or religious belief, age, marital status, disabilities, veteran status, field of expertise, or any other reason not related to scientific merit. This philosophy extends from SIAM conferences, to its publications, and to its governing structures and bodies. We expect all members of SIAM and participants in SIAM activities to work towards this commitment.

Please Note
SIAM is not responsible for the safety and security of attendees’ computers. Do not leave your personal electronic devices unattended. Please remember to turn off your cell phones and other devices during sessions.

Recording of Presentations
Audio and video recording of presentations at SIAM meetings is prohibited without the written permission of the presenter and SIAM.

Social Media
SIAM is promoting the use of social media, such as Facebook and Twitter, in order to enhance scientific discussion at its meetings and enable attendees to connect with each other prior to, during and after conferences. If you are tweeting about a conference, please use the designated hashtag to enable other attendees to keep up with the Twitter conversation and to allow better archiving of our conference discussions. The hashtag for this meeting is #SIAMDM18. SIAM’s Twitter handle is @TheSIAMNews.

Changes to the Printed Program
The printed program and abstracts were current at the time of printing, however, please review the online program schedule (http://meetings.siam.org/program.cfm?CONFCODE=DM18).
Invited Plenary Speakers

Monday, June 4

8:15 AM - 9:00 AM
IP1 Analytic Methods in Graph Theory
Daniel Kral, University of Warwick, United Kingdom
Tivoli Student Union Turnhalle (TV 250)

1:30 PM - 2:15 PM
IP2 Interpolation Polynomials, Operator Method, and Theory of Enumeration
Catherine Yan, Texas A&M University, USA
Tivoli Student Union Turnhalle (TV 250)

Tuesday, June 5

8:15 AM - 9:00 AM
IP3 Title Not Available at Time of Publication
Anna R. Karlin, University of Washington, USA
North Classroom 1130
Invited Plenary Speakers

Wednesday, June 6

8:15 AM - 9:00 AM
IP4 Waiter-Client Games

Michael Krivelevich, Tel Aviv University, Israel
North Classroom 1130

1:30 PM - 2:15 PM
IP5 New Developments in Hypergraph Ramsey Theory

Andrew Suk, University of California, San Diego, USA
North Classroom 1130
Invited Plenary Speakers

Thursday, June 7
8:15 AM - 9:00 AM

IP6 Random Graph Processes

Robert Morris, Institute for Pure and Applied Mathematics - IMPA, Brazil
North Classroom 1130

1:30 PM - 2:15 PM

IP7 Deciphering Cellular Networks: From Normal Functioning to Disease

Mona Singh, Princeton University, USA
North Classroom 1130

Friday, June 8
8:15 AM - 9:00 AM

IP8 Algorithms for the Asymmetric Traveling Salesman Problem

Ola Svensson, École Polytechnique Fédérale de Lausanne, Switzerland
North Classroom 1130
** The Dénes König Prize Lecture will take place in North Classroom 1130**

**Tuesday, June 5**  
1:30 PM – 2:15 PM

SP1 2018 Dénes König Prize Lecture:  
Pseudorandom Graphs and the Green-Tao Theorem  
Yufei Zhao, Massachusetts Institute of Technology, USA
SIAM PRESENTS IS AN AUDIO-VISUAL ARCHIVE

COMPRISED OF MORE THAN 2,000 PRESENTATIONS
POSTED IN OVER 40 SEARCHABLE TOPICS, INCLUDING:

- algebraic geometry
- atmospheric and oceanographic science
- computational science
- data mining
- geophysical science
- optimization
- uncertainty quantification and more...

The collection, Featured Lectures from our Archives, includes audio and slides from more than 50 conferences since 2008, including talks by invited and prize speakers, select minisymposia, and minitutorials. Presentations from SIAM meetings are being added throughout the year.

In addition you can view short video clips of speaker interviews from sessions at Annual Meetings starting in 2010.

Plans for adding more content are on the horizon. Keep an eye out!

The audio, slide, and video presentations are part of SIAM’s outreach activities to increase the public’s awareness of mathematics and computational science in the real world, and to bring attention to exciting and valuable work being done in the field. Funding from SIAM, the National Science Foundation, and the Department of Energy was used to partially support this project.

New presentations are posted every few months as the program expands with sessions from additional SIAM meetings. Users can search for presentations by category, speaker name, and/or key words.

www.siam.org/meetings/presents.php
SIAM Activity Group on Discrete Mathematics (SIAG/DM)

www.siam.org/activity/dm

A GREAT WAY TO GET INVOLVED!

Collaborate and interact with mathematicians and applied scientists whose work involves Discrete Mathematics

ACTIVITIES INCLUDE:

• Special Sessions at SIAM meetings
• Biennial conference
• Dénes König Prize

BENEFITS OF SIAG/UQ MEMBERSHIP:

• Listing in the SIAG’s online membership directory
• Additional $15 discount on registration at the SIAM Conference on Discrete Mathematics
• Electronic communications about recent developments in your specialty
• Eligibility for candidacy for SIAG/DM office
• Participation in the selection of SIAG/DM officers

ELIGIBILITY:

• Be a current SIAM member.

COST:

• $15 per year
• Student members can join 2 activity groups for free!

2018-19 SIAG/DM OFFICERS

Chair: Bojan Mohar, Simon Fraser University
Vice Chair: Blair Sullivan, North Carolina State University
Program Director: Seshadhri Comandur, University of California, Santa Cruz
Secretary: Richard Brewster, Thompson Rivers University

TO JOIN:

SIAG/DM: my.siam.org/forms/join_siag.htm
SIAM: www.siam.org/joinsiam
SIAM Conference on Discrete Mathematics

June 4-8, 2018
University of Colorado, Denver
Denver, Colorado, USA
The tenth Gene Golub SIAM Summer School will take place in France, at the Paul Langevin conference center in Aussois, in the French Alps.

The focus of the school will be on large-scale data analytics, which lies at the intersections of data analytics algorithms and high performance computing. Students will be introduced to problems in data analytics arising from both the machine learning and the scientific computing communities. The school will include perspectives from industry, such as Amazon, Google, and IBM, as well as from academic instructors.

Students will be exposed to “end-to-end” multidisciplinary topics, which span several traditionally disparate areas. The series of lectures will develop background on methods and algorithms for data analytics, approximation algorithms to deal with large volumes of data, languages and tools for implementing those algorithms on large scale computers, and data-driven applications from scientific computing and machine learning.

The summer school is being organized by Laura Grigori (Inria and Sorbonne University), Matthew Knepley (University at Buffalo) Olaf Schenk (Università della Svizzera Italiana), and Rich Vuduc (Georgia Institute of Technology).

The intended audience is intermediate graduate students (students with a Master’s degree, 2nd-3rd year Ph.D. students without an MS, or equivalent). Applicants selected to participate pay no registration fee. Funding for local accommodations and meal expenses will be available for all participants.

Application deadline: February 1, 2019
As information becomes available on how to apply, it will be posted at:

http://www.siam.org/students/g2s3/

Sponsored by SIAM through an endowment from the estate of Gene Golub.
For more information about prior summer schools and Professor Gene Golub go to

http://www.siam.org/students/g2s3/

Society for Industrial and Applied Mathematics
3600 Market Street, 6th Floor • Philadelphia, PA 19104-2688 USA • +1-215-382-9800

siam@siam.org • www.siam.org
Monday, June 4

Registration
7:00 AM-8:30 AM
Room: Tivoli Student Union Turnhalle (TV 250) Atrium
At 8:30 AM, registration will move to North Classroom 1130 Entry.

Opening Remarks
8:00 AM-8:15 AM
Room: Tivoli Student Union Turnhalle (TV 250)

IP1
Analytic Methods in Graph Theory
8:15 AM-9:00 AM
Room: Tivoli Student Union Turnhalle (TV 250)
Chair: To Be Determined
The theory of graph limits provides analytic tools to study large graphs. Such tools have found applications in various areas of computer science and mathematics; they are also closely linked to the flag algebra method, which changed the landscape of extremal combinatorics. We will present an introduction to this rapidly developing area of graph theory and survey some of the recent results obtained in the area.

Daniel Kral
University of Warwick, United Kingdom

Coffee Break
9:00 AM-9:30 AM
Room: Tivoli Student Union Turnhalle (TV 250) Atrium

MS1
Combinatorics of Partially Ordered Sets - Part I of III
9:30 AM-12:00 PM
Room: North Classroom 1604
For Part 2 see MS6

Over the past 10 years there has been a resurgence of research into the combinatorics of partially ordered sets, including significant progress on old conjectures, applications of classical techniques to seemingly unrelated problems in other areas of mathematics, and novel connections between well-studied areas. The goal of this mini-symposium is to continue the growth of this area by bringing together senior and junior researchers working on the combinatorics of partially ordered sets.

Organizer: Mitchel T. Keller
Washington and Lee University, USA
Organizer: Stephen J. Young
Pacific Northwest National Laboratory, USA

9:30-9:55 Hereditary Semiorders and Enumeration of Semiorders by Dimension (Part I)
Mitchel T. Keller, Washington and Lee University, USA; Stephen J. Young, Pacific Northwest National Laboratory, USA

10:00-10:25 Hereditary Semiorders and Enumeration of Semiorders by Dimension (Part II)
Mitchel T. Keller, Washington and Lee University, USA; Stephen J. Young, Pacific Northwest National Laboratory, USA

10:30-10:55 A Simple Proof Characterizing Interval Orders with Interval Lengths between 1 and k
Simona Boyadzhyska, Freie Universitaet Berlin, Germany; Garth T. Isaak, Lehigh University, USA; Ann N. Trenk, Wellesley College, USA

11:00-11:25 A Note on the Size of N-free Families
Shantse Walker and Ryan R. Martin, Iowa State University, USA
Monday, June 4

**MS2**

Structural Graph Theory - Part I of III
9:30 AM-12:00 PM
Room: North Classroom 1130

For Part 2 see MS7

Structural theorems in graph theory seek to describe all the graphs with satisfying some desirable property by showing such graphs either fall into one of a number of basic classes or can be decomposed into smaller graphs. The methodology has shown to be extremely effective in proving both theoretical results as well as in the development of efficient algorithms.

Organizer: Paul Wollan
University of Rome La Sapienza, Italy

9:30-9:55 Large Independent Sets in Triangle-free Graphs Avoiding a Clique-minor
Zdenek Dvorak, Charles University, Czech Republic; Liana Yepremyan, University of Oxford, United Kingdom

10:00-10:25 Hereditary Families with Atypical Structure
Sergey Norin, McGill University, Canada; Yelena Yuditsky, Karlsruhe Institute of Technology, Germany

10:30-10:55 Polynomial-time Algorithm for Maximum Weight Independent Set on P6-free Graphs
Andrzej Grzesik, University of Warwick, United Kingdom; Tereza Klimosova, Charles University, Czech Republic; Marcin Pilipczuk and Michal Pilipczuk, University of Warsaw, Poland

11:00-11:25 Erdős-Pósa Property of Chordless Cycles and its Applications
O-Joung Kwon, Incheon National University, Korea; Eun Jung Kim, Université Paris Dauphine and CNRS, France

11:30-11:55 The Grid Theorem for Rank-Width
Jim Geelen, University of Waterloo, Canada; O-Joung Kwon, Incheon National University, Korea; Rose McCarty, University of Waterloo, Canada; Paul Wollan, University of Rome La Sapienza, Italy

---

Monday, June 4

**MS3**

Graph Coloring - Part I of II
9:30 AM-12:00 PM
Room: North Classroom 1005

For Part 2 see MS8

Graph coloring is a central area of discrete mathematics, and it is widely studied. In this minisymposium we will hear about recent developments in the area.

Organizer: Daniel Cranston
Virginia Commonwealth University, USA

9:30-9:55 Acyclic Edge-coloring of Planar Graphs: Delta Colors Suffice when Delta is Large
Daniel Cranston, Virginia Commonwealth University, USA

10:00-10:25 Characterization of Cycle Obstruction Sets for Improper Coloring Planar Graphs
Ilkyoo Choi, Hankuk University of Foreign Studies, Korea

10:30-10:55 Distributed Coloring with Fewer Colors
Marthe Bonamy, LaBRI, Université de Bordeaux, and CNRS, France

11:00-11:25 Vector Coloring the Categorical Product of Graphs
Robert Šámal, Charles University, Czech Republic

11:30-11:55 Vertex Partition with Average Degree Constraint
Hehe Wu, Shanghai Center for Mathematical Sciences, China

---

Monday, June 4

**MS4**

Discrete Random Processes - Part I of II
9:30 AM-12:00 PM
Room: North Classroom 1003

For Part 2 see MS10

The analysis of discrete random processes is a central topic in the fields of probabilistic combinatorics and random graph theory, and has important applications to extremal combinatorics. In this minisymposium, researchers will share recent results in the area including dynamic concentration and the so-called “differential equations method” and its applications.

Organizer: Deepak Bal
Montclair State University, USA

9:30-9:55 Acyclic Edge-coloring of Planar Graphs: Delta Colors Suffice when Delta is Large
Daniel Cranston, Virginia Commonwealth University, USA

10:00-10:25 Characterization of Cycle Obstruction Sets for Improper Coloring Planar Graphs
Ilkyoo Choi, Hankuk University of Foreign Studies, Korea

10:30-10:55 Distributed Coloring with Fewer Colors
Marthe Bonamy, LaBRI, Université de Bordeaux, and CNRS, France

11:00-11:25 Vector Coloring the Categorical Product of Graphs
Robert Šámal, Charles University, Czech Republic

11:30-11:55 Vertex Partition with Average Degree Constraint
Hehe Wu, Shanghai Center for Mathematical Sciences, China
**Monday, June 4**

### MS5

**Extremal Problems Involving Cycles and Trees - Part I of II**

9:30 AM-11:30 AM

**Room:** North Classroom 1806

**For Part 2 see MS11**

Extremal combinatorics is the study of questions of the form “How large does a parameter of a graph G need to be to guarantee that G contains a certain substructure?” In addition to being interesting on their own right, problems in extremal combinatorics are important because they occur in many other branches of mathematics as well as computer science. Additionally, many useful methods, such as the probabilistic method and regularity, have arisen from the study of extremal combinatorics. The aim of this minisymposium is to bring together promising young researchers in extremal combinatorics. We will discuss recent progress on important conjectures, new methods developed to solve them, and interesting new problems in the area. We will particularly focus on extremal problems involving sparse structures such as cycles, trees and hypercubes. Such problems are usually much harder then ones involving dense structures. However, recently various new methods have been found for studying sparse structures e.g. the hypergraph container method. We hope that gathering researchers working on such problems will encourage the exchange of ideas, leading to further progress in the area.

**Organizer:** Shoham Letzter  
*University of Cambridge, United Kingdom*

**Organizer:** Alexey Pokrovskiy  
*ETH Zürich, Switzerland*

#### 9:30-9:55 Rainbow Trees

Alexey Pokrovskiy, ETH Zürich, Switzerland

#### 10:00-10:25 Three Colour Bipartite Ramsey Number of Cycles and Paths

Matija Bucic, Shoham Letzter, and Benjamin Sudakov, ETH Zürich, Switzerland

#### 10:30-10:55 A Stability Theorem for Small Cycle Covers

Frank Mousset, Tel Aviv University, Israel

#### 11:00-11:25 Linear Cycles of Consecutive Lengths in Linear Hypergraphs

Liana Yepremyan, University of Oxford, United Kingdom

### CP1

**Networks**

9:30 AM-11:10 AM

**Room:** North Classroom 1606

**Chair:** To Be Determined

9:30-9:45 Algebraic Analysis of Spiking Neural Networks for Graph Partitioning

Kathleen Hamilton, Catherine Schuman, and Travis Humble, Oak Ridge National Laboratory, USA

9:50-10:05 Approximating Sparse Graphs: the Random Overlapping Communities Model

Samantha N. Pettit and Santosh Vempala, Georgia Institute of Technology, USA

10:10-10:25 Robust Maximal Independent Sets

Kevin C. Halasz, Simon Fraser University, Canada; Arnaud Casteigts, Universite de Bordeaux I, France; Luis Goddyn, Simon Fraser University, Canada

10:30-10:45 Large Degree Asymptotics and the Reconstruction Threshold of Asymmetric Ising Model on Regular D-Ary Trees

Wenjian Liu, City University of New York, USA

10:50-11:05 Dynamical Stability Despite Time-Varying Network Structure

David Reber and Benjamin Webb, Brigham Young University, USA

### CP2

**Directed Graphs**

9:30 AM-11:10 AM

**Room:** North Classroom 1607

**Chair:** To Be Determined

9:30-9:45 Proper Orientations of Planar Bipartite Graphs

Sebastian Gonzalez Hermosillo De La and Fiachra Knox, Simon Fraser University, Canada; Naoki Matsumoto, Seikei University, Japan; Bojan Mohar, Simon Fraser University, Canada; Claudia Linhares Sales, Federal University of Ceará, Brazil

9:50-10:05 Cyclic Triangle Factors in Regular Tournaments

Theodore Molla, University of South Florida, USA; Lina Li, University of Illinois at Urbana-Champaign, USA

10:10-10:25 A Matrix Approach to p-Competition Graphs

Taehee Hong, Suh-Ryung Kim, and Seung Chul Lee, Seoul National University, Korea

10:30-10:45 On 1-Factors with Prescribed Lengths in Tournaments

Dongyeap Kang, Korea Advanced Institute of Science and Technology, Korea; Jaehoon Kim, University of Birmingham, United Kingdom

10:50-11:05 Simple Transformation for Finding a Maximum Weighted Matching in General Digraphs

Choon Sung Lim, Bank of Korea, South Korea

#### Lunch Break

12:00 PM-1:30 PM

**Attendees on their own**
IP2
Interpolation Polynomials, Operator Method, and Theory of Enumeration
1:30 PM-2:15 PM
Room:Tivoli Student Union Turnhalle (TV 250)
Chair: To Be Determined
Goncarov Polynomials are the basis of solutions of the classical Goncarov Interpolation Problem, which have been studied extensively by analysts due to their significance in the interpolation theory of smooth and analytic functions. These Polynomials also play an important role in combinatorics due to their close relations to parking functions. This is not just a coincidence. In this talk we will present the interpolation problems with delta-operators, develop the algebraic and analytic theory of delta-Goncarov polynomials, and apply these results to problems in binomial enumeration and order statistics.
Catherine Yan
Texas A&M University, USA

Coffee Break
2:15 PM-2:45 PM
Room:Tivoli Student Union Turnhalle (TV 250) Atrium

Monday, June 4

MS6
Combinatorics of Partially Ordered Sets - Part II of III
2:45 PM-5:15 PM
Room:North Classroom 1604
For Part 1 see MS1
For Part 3 see MS12
Over the past 10 years there has been a resurgence of research into the combinatorics of partially ordered sets, including significant progress on old conjectures, applications of classical techniques to seemingly unrelated problems in other areas of mathematics, and novel connections between well-studied areas. The goal of this mini-symposium is to continue the growth of this area by bringing together senior and junior researchers working on the combinatorics of partially ordered sets.
Organizer: Mitchel T. Keller
Washington and Lee University, USA
Organizer: Stephen J. Young
Pacific Northwest National Laboratory, USA
2:45-3:10 Local Dimension is Unbounded for Planar Posets
Bartlomiej Bosek, Jagiellonian University, Poland; Jaroslaw Grytczuk, Warsaw University of Technology, Poland; William T. Trotter, Georgia Institute of Technology, USA
3:15-3:40 Fractional Local Dimension
Fidel Barrera-Cruz, Thomas Prag, Heather C. Smith, and William T. Trotter, Georgia Institute of Technology, USA
3:45-4:10 Dimension and Subdivision of K_4 Free Posets
Adam Banforth, University of Louisville, USA
4:15-4:40 Partially Ordered Sets and Finite Topologies
Emilie Purvine, Cliff Joslyn, and Brenda Praggastis, Pacific Northwest National Laboratory, USA; Michael Robinson, American University, USA
4:45-5:10 A Random Version of the r-fork-free Theorem
Kirsten Hogenson, Colorado College, USA

Monday, June 4

MS7
Structural Graph Theory - Part II of III
2:45 PM-4:45 PM
Room:North Classroom 1130
For Part 1 see MS2
For Part 3 see MS13
Structural theorems in graph theory seek to describe all the graphs with satisfying some desirable property by showing such graphs either fall into one of a number of basic classes or can be decomposed into smaller graphs. The methodology has shown to be extremely effective in proving both theoretical results as well as in the development of efficient algorithms.
Organizer: Paul Wollan
University of Rome La Sapienza, Italy
2:45-3:10 Scattered Classes of Graphs
O-Joung Kwon, Incheon National University, Korea; Sang-Il Oum, KAIST, Korea
3:15-3:40 On the Genus of the Complete 3-uniform Hypergraph
Bojan Mohar and Yifan Jing, Simon Fraser University, Canada
3:45-4:10 The Genus of a Random Bipartite Graph
Yifan Jing and Bojan Mohar, Simon Fraser University, Canada
4:15-4:40 Half-integral Linkages in Highly Connected Directed Graphs
Irene Muci, University of Warsaw, Poland; Paul Wollan, University of Rome La Sapienza, Italy; Katherine Edwards, Nokia Bell Labs, USA
Monday, June 4

**MS8**

Graph Coloring - Part II of II
2:45 PM-5:15 PM
Room: North Classroom 1539
For Part 1 see MS3
Graph coloring is a central area of discrete mathematics, and it is widely studied. In this minisymposium we will hear about recent developments in the area.

Organizer: Daniel Cranston
Virginia Commonwealth University, USA

2:45-3:10 Bounding the Chromatic Number by a Fraction of the Maximum Degree for Graphs with no Large Cliques
Thomas Kelly, University of Waterloo, Canada

3:15-3:40 Circular Flow and Circular Coloring of Graphs
Jiaao Li, West Virginia University, USA

3:45-4:10 4-coloring $P_6$-free Graphs
Sophie Spirkl, Princeton University, USA

4:15-4:40 Clustered Coloring, Hajos’ Conjecture and Gerards-Seymour Conjecture
Chun-Hung Liu, Princeton University, USA

4:45-5:10 Coloring $(2K_2, W_4)$-Free Graphs
Aurélie Lagoutte, University Clermont-Auvergne, France

continued in next column
Monday, June 4

**MS10**

Discrete Random Processes - Part II of II

2:45 PM-4:45 PM

*Room: North Classroom 1003*

*For Part 1 see MS4*

The analysis of discrete random processes is a central topic in the fields of probabilistic combinatorics and random graph theory, and has important applications to extremal combinatorics. In this minisymposium, researchers will share recent results in the area including dynamic concentration and the so-called “differential equations method” and its applications.

**Organizer: Deepak Bal**

*Montclair State University, USA*

**Organizer: Patrick Bennett**

*Western Michigan University, USA*

2:45-3:10 Embedding the Uniform Random Graph into the Bipartite Regular Random Graph

Tereza Klimosova, Charles University, Czech Republic; Christian Reiher, University of Hamburg, Germany; Andrzej Rucinski, Adam Mickiewicz University, Poland, and Emory University, USA; Matas Sileikis, Czech Academy of Sciences, Czech Republic

3:15-3:40 Packing Nearly Optimal Ramsey $R(3,t)$ Graphs

He Guo and Lutz Warnke, Georgia Institute of Technology, USA

3:45-4:10 Assessing Significance in a Markov Chain Without Mixing

Wes Pegden, Carnegie Mellon University, USA

4:15-4:40 Minimizing the Number of 5-cycles in Graphs with Given Edge-density

Andrzej Dudek, Western Michigan University, USA

---

Monday, June 4

**MS11**

Extremal Problems Involving Cycles and Trees - Part II of II

2:45 PM-4:45 PM

*Room: North Classroom 1806*

*For Part 1 see MS5*

Extremal combinatorics is the study of questions of the form “How large does a parameter of a graph $G$ need to be to guarantee that $G$ contains a certain substructure?” In addition to being interesting on their own right, problems in extremal combinatorics are important because they occur in many other branches of mathematics as well as computer science. Additionally, many useful methods, such as the probabilistic method and regularity, have arisen from the study of extremal combinatorics. The aim of this minisymposium is to bring together promising young researchers in extremal combinatorics. We will discuss recent progress on important conjectures, new methods developed to solve them, and interesting new problems in the area. We will particularly focus on extremal problems involving sparse structures such as cycles, trees and hypercubes. Such problems are usually much harder then ones involving dense structures. However, recently various new methods have been found for studying sparse structures e.g. the hypergraph container method. We hope that gathering researchers working on such problems will encourage the exchange of ideas, leading to further progress in the area.

**Organizer: Shoham Letzter**

*University of Cambridge, United Kingdom*

**Organizer: Alexey Pokrovskiy**

*ETH Zürich, Switzerland*

2:45-3:10 Path Partitions of Regular Graphs

Shoham Letzter, University of Cambridge, United Kingdom

3:15-3:40 Generalized Turan Problem for Trees

Clara Shikhelman, Tel Aviv University, Israel

3:45-4:10 Maximising the Number of Induced Cycles in a Graph

Natasha Morrison, University of Cambridge, United Kingdom

4:15-4:40 Incomplete Tilings

Vytautas Gruslys, University of Cambridge, United Kingdom

continued in next column
Monday, June 4

**CP3**

**Algebraic Combinatorics/Geometry**

2:45 PM-5:15 PM

*Room:* North Classroom 1607

*Chair:* To Be Determined

2:45-3:00 Solving Tropical Linear Systems in Terms of the Shortest Path Problem

Yuki Nishida, Doshisha University, Japan; Sennosuke Watanabe, National Institute of Technology, Oyama College, Japan; Yoshihide Watanabe, Doshisha University, Japan

3:05-3:20 Topology and Holomorphic Invariants Using the Application of Combinatorics

Abdulsalam G. Ya’u, Abubakar Tafawa Balewa University Bauchi, Nigeria; Mohammed Abdulhameed, Federal Polytechnic Bauchi, Nigeria

3:25-3:40 Many \( k \)-Neighborly Polytopes from Quivers

Daniel Mckenzie, University of Georgia, USA; Patricio Gallardo, Washington University, St. Louis, USA

3:45-4:00 On Generalized Quadrangles and Girth Eight Algebraically Defined Graphs

Brian Kronenthal, Kutztown University of Pennsylvania, USA; Felix Lazebnik, University of Delaware, USA; Jason Williford, University of Wyoming, USA

Welcome Reception

5:15 PM-7:15 PM

*Room:* Tivoli Brewing Company

---

Tuesday, June 5

**MS12**

**Combinatorics of Partially Ordered Sets - Part III of III**

9:30 AM-11:30 AM

*Room:* North Classroom 1604

**For Part 2 see MS6**

Over the past 10 years there has been a resurgence of research into the combinatorics of partially ordered sets, including significant progress on old conjectures, applications of classical techniques to seemingly unrelated problems in other areas of mathematics, and novel connections between well-studied areas. The goal of this mini-symposium is to continue the growth of this area by bringing together senior and junior researchers working on the combinatorics of partially ordered sets.

*Organizer:* Mitchel T. Keller
Washington and Lee University, USA

*Organizer:* Stephen J. Young
Pacific Northwest National Laboratory, USA

9:30-9:55 On the Dimension of Random Posets

Csaba Biro, University of Louisville, USA; Peter Hamburger, Western Kentucky University, USA; H. A. Kierstead, Arizona State University, USA; Attila Por, Western Kentucky University, USA; William T. Trotter and Ruidong Wang, Georgia Institute of Technology, USA

10:00-10:25 The Width of Down Sets in Boolean Lattices

Dwight Duffus, Emory University, USA; David M. Howard, Colgate University, USA; Imre Leader, University of Cambridge, United Kingdom

10:30-10:55 Minimum Saturated Families of Sets

Tuan Tran, Matija Bucic, Shoham Letzter, and Benny Sudakov, ETH Zürich, Switzerland

11:00-11:25 Whitney Duals of Graded Posets

Joshua Hallam, Wake Forest University, USA

---

Tuesday, June 5

**IP3**

**Title Not Available at Time of Publication**

8:15 AM-9:00 AM

*Room:* North Classroom 1130

Chair: To Be Determined

Abstract Not Available At Time Of Publication.

Anna R. Karlin
University of Washington, USA

Coffee Break

9:00 AM-9:30 AM

*Room:* North Classroom 1130 Atrium
Tuesday, June 5

**MS14**  
**Graph Colouring - Part I of II**  
9:30 AM-12:00 PM  
Room: North Classroom 1539

For Part 2 see MS17  
In it’s broadest definition, graph coloring involves assigning labels (which might be colors, numbers, lists) to each vertex or edge of a graph using stated restrictions, rules, and goals. Each type of graph coloring has its own uses and motivations. There are many forms of graph coloring. ‘Proper’ coloring, list coloring, path coloring, fractional coloring, distinguishing coloring are just a few of these. Graph theorists who study various graph colorings often find it useful to learn each other’s motivations and methods. This session brings together researchers from a variety of types of graph colorings in order to encourage such sharing and productive cross fertilization.

Organizer: Debra L. Boutin  
Hamilton College, USA

Organizer: Gary MacGillivray  
University of Victoria, Canada

9:30-9:55 Acyclic Colouring of Graphs on Surfaces  
Shayla Redlin and Luke Postle, University of Waterloo, Canada

10:00-10:25 The Distinguishing Cost of Graph Products  
Debra L. Boutin, Hamilton College, USA

10:30-10:55 On Uniquely k-List Colorable Graphs  
Joaan P. Hutchinson, Macalester College, USA; Ebad Mahmoodyan, Sharif University of Technology, Iran

11:00-11:25 Distinguishing Numbers of Partially Ordered Sets  
Karen Collins, Wesleyan University, USA; Ann N. Trenk, Wellesley College, USA

11:30-11:55 Arithmetic Progressions in Graphs  
Michael Young, Iowa State University, USA

---

Tuesday, June 5

**MS15**  
**Computational Biology - Part I of II**  
9:30 AM-12:00 PM  
Room: North Classroom 1003

For Part 2 see MS18  
This minisymposium surveys a host of different topics where graph theory, combinatorics, and discrete mathematics more generally are making contributions to computational biology. Part I focuses on the analysis of biological networks. Part II looks at a range of topics from biological networks to sequence analysis, and circles back to new mathematical problems inspired by the biology.

Organizer: Lenore J. Cowen  
Tufts University, USA

9:30-9:55 Random Walk Methods and Their Application to Biological Networks  
Lenore J. Cowen, Tufts University, USA

10:00-10:25 Synthesizing Signaling Pathways from Temporal Phosphoproteomic Data  
Anthony Gitter, University of Wisconsin, Madison, USA

10:30-10:55 Integration and Dissection of Molecular Networks for Functional Analysis and Disease Modeling  
Jian Peng, University of Illinois at Urbana-Champaign, USA

11:00-11:25 A Multi-Species Functional Embedding Integrating Sequence and Network Structure  
Mark Leiserson, University of Maryland, College Park, USA

11:30-11:55 Denoising Large Scale Molecular Profiling Data Using Network Filters  
Andrew J. Kavran and Aaron Clauset, University of Colorado Boulder, USA
Tuesday, June 5

**MS16**

**New Trends in Enumerative Combinatorics - Part I of II**

9:30 AM - 12:00 PM

*Room: North Classroom 1806*

**For Part 2 see MS19**

The origin of algebraic combinatorics lies in the desire to bring coherence and unity to the discipline of combinatorics, in particular, enumeration, and to incorporate it into the mainstream of contemporary mathematics.

Today Algebraic and Enumerative Combinatorics concerns itself with the study of combinatorial problems arising from other branches of mathematics and, on the other hand, with the application and use of techniques coming from other parts of mathematics to combinatorial problems. At the heart of the subject there is the development of algebraic theories for the solution to such problems. The implied interactions with other fields are mutually beneficial and concern particularly Algebra, Geometry, Topology, Computer Science, Probability Theory and Statistics. The development of combinatorics requires a familiarity of several mathematical branches for its researchers. This minisymposium is proposed to facilitate the contact between Enumerative and Algebraic Combinatorics and other fields in an effective way. It is aimed to bring together a strong group of active researchers in Algebraic Combinatorics with an emphasis on Enumeration, as well as other areas of mathematical sciences in which substantial enumerative questions with a strong algebraic or geometric foundation have arisen.

**Organizer:** Catherine Yan  
*Texas A&M University, USA*

**Organizer:** Yue Cai  
*Texas A&M University, USA*

---

**9:30-9:55 Parking Distributions on Trees**  
*Catherine Yan, Texas A&M University, USA*

---

**10:00-10:25 Barely Set-valued Tableaux and Nonintersecting Paths in Young Diagrams**  
*Peter L. Guo, Nankai University, China*

---

**10:30-10:55 Mahonian-Stirling Statistics on Labeled Trees**  
*Svetlana Poznanovikj and Amy Grady, Clemson University, USA*

---

**11:00-11:25 Log-behavior of Partition Function**  
*Xingwei Wang, Nankai University, China*

---

**11:30-11:55 Counting with Borel's Triangle**  
*Yue Cai and Catherine Yan, Texas A&M University, USA*

---

**Tuesday, June 5**

**CP4**

**Algorithms and Applications**

9:30 AM - 11:50 AM

*Room: North Classroom 1606*

**Chair:** To Be Determined

**9:30-9:45 Polynomial Time Solution to the Domino Puzzle**  
*Ivan Avramovic, George Mason University, USA*

---

**9:50-10:05 The Solution Attractor Theory of Local Search System: The Traveling Salesman Problem Case**  
*Weiqi Li, University of Michigan-Flint, USA*

---

**10:10-10:25 Efficient Methods for Enforcing Contiguity in Geographic Districting Problems**  
*Sheldon H. Jacobson, University of Illinois at Urbana-Champaign, USA; Douglas King, University of Illinois, USA; Edward Sewell, Southern Illinois University, Edwardsville, USA*

---

**10:30-10:45 Optimizing Order Picking Problem By a New Scalable Method**  
*Arash Ghasemi, University of Tennessee, Chattanooga, SimCenter, USA*

---

**10:50-10:55 The Fullerene Project**  
*Elizabeth Hartung, Massachusetts College of Liberal Arts, USA; Jack Graver, Syracuse University, USA*  

**Lunch Break**

12:00 PM - 1:30 PM

*Attendees on their own*
Tuesday, June 5

**SP1**

2018 Dénes König Prize Lecture: Pseudorandom Graphs and the Green-Tao Theorem
1:30 PM-2:15 PM
Room: North Classroom 1130
Chair: To Be Determined

The celebrated Green-Tao theorem states that there are arbitrarily long arithmetic progressions in the primes. I will explain some of the main ideas of the proof from a graph theoretic perspective, with a focus on the role of pseudorandomness in the proof. (Based on joint work with David Conlon and Jacob Fox)

Yufei Zhao
Massachusetts Institute of Technology, USA

Coffee Break
2:15 PM-2:45 PM
Room: North Classroom 1130 Atrium

Tuesday, June 5

**MS17**

Graph Colouring - Part II of II
2:45 PM-5:15 PM
Room: North Classroom 1539

For Part 1 see MS14

This 2-part minisymposium will showcase some of the many faces of graph colouring, arguably one of the most studied topics in graph theory. Part I features talks on distinguishing colourings where the colouring breaks the graph symmetry, list colourings where lists of colours are assigned to each vertex, and polychromatic colourings where given subgraphs must contain an element of each colour class. Part II features the following topics: a coloring game, colourings in which colour classes may induce cliques or independent sets, the chromatic number of subgraphs of a clustered graph, colouring with restrictions on the number of times each colour can appear in any neighborhood, and structures that forbid generalized colourings (i.e., homomorphisms) of graphs with two edge sets.

Organizer: Debra L. Boutin
Hamilton College, USA

Organizer: Gary Macgillivray
University of Victoria, Canada

2:45-3:10 The Slow-Coloring Game
Douglas B. West, Zhejiang Normal University, China and University of Illinois, USA

3:15-3:40 New Directions in Deconvolving Genomic Mixtures of Copy Number Variation Data
Haoyun Lei, Theodore Roman, Jesse Eation, and Russell Schwartz, Carnegie Mellon University, USA

3:45-4:10 Two Problems on Tree-based Networks
Megan Owen, City University of New York, USA

4:15-4:40 The Language of RNA Base Pairings
Christine Heitsch, Georgia Institute of Technology, USA; Svetlana Poznanović, Clemson University, USA; Torin Greenwood, Georgia Institute of Technology, USA

4:45-5:10 Multi de Bruijn Sequences
Glenn Tesler, University of California, San Diego, USA

Tuesday, June 5

**MS18**

Computational Biology - Part II of II
2:45 PM-5:15 PM
Room: North Classroom 1003

For Part 1 see MS15

This minisymposium surveys a host of different topics where graph theory, combinatorics, and discrete mathematics more generally are making contributions to computational biology. Part I focuses on the analysis of biological networks. Part II looks at a range of topics from biological networks to sequence analysis, and circles back to new mathematical problems inspired by the biology.

Organizer: Lenore J. Cowen
Tufts University, USA

2:45-3:10 Network-based Investigation of Mutational Profiles Reveals Cancer Genes
Borislav Hristov, Princeton University, USA

3:15-3:40 New Directions in Deconvolving Genomic Mixtures of Copy Number Variation Data
Haoyun Lei, Theodore Roman, Jesse Eation, and Russell Schwartz, Carnegie Mellon University, USA

3:45-4:10 Two Problems on Tree-based Networks
Megan Owen, City University of New York, USA

4:15-4:40 The Language of RNA Base Pairings
Christine Heitsch, Georgia Institute of Technology, USA; Svetlana Poznanović, Clemson University, USA; Torin Greenwood, Georgia Institute of Technology, USA

4:45-5:10 Multi de Bruijn Sequences
Glenn Tesler, University of California, San Diego, USA
New Trends in Enumerative Combinatorics - Part II of II
2:45 PM-5:15 PM
Room: North Classroom 1806
For Part I see MS16
The origin of algebraic combinatorics lies in the desire to bring coherence and unity to the discipline of combinatorics, in particular, enumeration, and to incorporate it into the mainstream of contemporary mathematics. Today Algebraic and Enumerative Combinatorics concerns itself with the study of combinatorial problems arising from other branches of mathematics and, on the other hand, with the application and use of techniques coming from other parts of mathematics to combinatorial problems. At the heart of the subject there is the development of algebraic theories for the solution to such problems. The implied interactions with other fields are mutually beneficial and concern particularly Algebra, Geometry, Topology, Computer Science, Probability Theory and Statistics. The development of combinatorics requires a familiarity of several mathematical branches for its researchers. This minisymposium is proposed to facilitate the contact between Enumerative and Algebraic Combinatorics and other fields in an effective way. It is aimed to bring together a strong group of active researchers in Algebraic Combinatorics with an emphasis on Enumeration, as well as other areas of mathematical sciences in which substantial enumerative questions with a strong algebraic or geometric foundation have arisen.

Organizer: Catherine Yan
Texas A&M University, USA

Organizer: Yue Cai
Texas A&M University, USA

continued in next column
Tuesday, June 5

**CP5**

Hypergraphs, Ordered Sets, Extremal Combinatorics
2:45 PM-3:45 PM

*Room:* North Classroom 1604

*Chair:* To Be Determined

2:45-3:00 The Zarankiewicz Problem in 3-Partite Graphs
*Craig Timmons,* California State University, Sacramento, USA; *Michael Tait,* Carnegie Mellon University, USA

3:05-3:20 Decomposition of Random Hypergraphs
*Xing Peng,* Tainjin University, China

3:25-3:40 The Saturation Number, Extremal Number, Spectral Radius, and Family of k-Edge-Connected Graphs
*Suil O,* State University of New York, USA; *Hui Lei* and *Yongtang Shi,* Nankai University, China; *Douglas B. West,* Zhejiang Normal University, China and University of Illinois, USA; *Xuding Zhu,* Zhejiang Normal University, China

Tuesday, June 5

**CP6**

Computational Geometry/ Words
2:45 PM-3:25 PM

*Room:* North Classroom 1606

*Chair:* To Be Determined

2:45-3:00 An Algorithm to Find Maximum Area Polygons Circumscribed About a Convex Polygon
*Zsolt Langi,* Budapest University of Technology and Economics, Hungary

3:05-3:20 Circular Repetition Thresholds for Small Alphabets
*James D. Currie,* Lucas Mol, and *Narad Rampersad,* The University of Winnipeg, Canada

Wednesday, June 6

Registration
7:30 AM-3:30 PM

*Room:* North Classroom 1130 Entry

Announcements
8:10 AM-8:15 AM

*Room:* North Classroom 1130
Wednesday, June 6

**IP4**

**Waiter-Client Games**

8:15 AM-9:00 AM  
Room: North Classroom 1130  
Chair: To Be Determined

Waiter-Client games (also called Picker-Chooser games) is a type of positional games that gained popularity recently. When played on the edge set of a graph $G$ (typically a complete graph $K_n$, or a random graph drawn from $G(n,p)$), the game goes as follows. For a positive integer $q$ (the so called game bias), in each round Waiter offers to Client $q+1$ previously unoffered edges of $G$. Client chooses one of the edges offered, the rest go to Waiter. Waiter wins the game if by the time every edge of $G$ has been claimed, Client’s graph possesses a given graph theoretic property $P$. Client wins otherwise. We will present several recent results about Waiter-Client games played on complete and random graphs and discuss the role of the so called probabilistic intuition in their analysis. Based on joint works with M. Bednarska-Bzdaga, D. Hefetz, T. Łuczak, W. E. Tan, N. Trumer.

**Coffee Break**

9:00 AM-9:30 AM  
Room: North Classroom 1130 Atrium

---

**MS21**

**Edge Colouring and Related Notions - Part I of II**  
9:30 AM-11:30 AM  
Room: North Classroom 1003

**For Part 2 see MS28**

Speakers will discuss problems related to edge colouring, including but not limited to: the classification problem, the Goldberg--Seymour conjecture, edge list colouring, matchings, and rainbow/antirainbow subgraphs in edge-coloured graphs.

Organizer: Gregory J. Puleo  
Auburn University, USA

Organizer: Jessica McDonald  
Auburn University, USA

9:30-9:55 t-Cores for $(\Delta+t)$-edge-colouring  
Jessica McDonald and Gregory J. Puleo, Auburn University, USA

10:00-10:25 Star Edge-colorings of Subcubic Multigraphs  
Zixia Song, University of Central Florida, USA

10:30-10:55 Delay Edge-colouring Bipartite Graphs  
Katherine Edwards and William Kennedy, Nokia Bell Labs, USA

11:00-11:25 Recent Progress Toward Goldberg’s Conjecture  
Guantao Chen, Georgia State University, USA

**MS22**

**Theoretical Computer Science as a New Discovery Engine of Discrete Mathematics**  
9:30 AM-12:00 PM  
Room: North Classroom 1607

Theoretical Computer Science has a close relationship with discrete mathematics. The recent developments and breakthroughs in theoretical computer science can lead to surprising new progress of discrete mathematics. This session is a collection of some such amazing breakthroughs and connections.

Organizer: Rupei Xu  
University of Texas at Dallas, USA

Organizer: Andrea Lincoln  
Massachusetts Institute of Technology, USA

9:30-9:55 Fine-grained Complexity, Meta-algorithm and their Connections with Extremal Graph Theory  
Rupei Xu and András Faragó, University of Texas at Dallas, USA

10:00-10:25 The 4/3 Additive Spanner Exponent Is Tight  
Amir Abboud, IBM Research, USA; Greg Bodwin, Massachusetts Institute of Technology, USA

10:30-10:55 A Fast New Algorithm for Weak Graph Regularity  
Jacob Fox, Stanford University, USA; László M. Lovász, University of California, Los Angeles, USA; Yufei Zhao, Massachusetts Institute of Technology, USA

11:00-11:25 Explicit Constructions of Ramsey Graphs via Randomness Extractors  
Xin Li, Johns Hopkins University, USA

Jeff Erickson, University of Illinois at Urbana-Champaign, USA; Kyle Fox, University of Texas, Dallas, USA; Luvsandondov Lkhamsuren, Airbnb, USA
MS23
Reconfiguration Problems
9:30 AM-12:00 PM
Room: North Classroom 1604

Given two feasible solutions to a (combinatorial) problem, reconfiguration is the process of modifying the first into the second through a sequence of allowed steps while ensuring all intermediate configurations are feasible. A common framework for studying reconfiguration is to build a graph whose vertices are feasible solutions and adjacency indicates two solutions differ by a single reconfiguration step. Natural questions include studying the algorithmic complexity of finding reconfiguration sequences, conditions for the existence of reconfiguration sequences, and properties of reconfiguration graphs. Reconfiguration problems are interesting in their own right. They are also naturally applied to problems where one wishes to incrementally improve an existing solution while maintaining feasibility. Typically NP-hard problems lead to PSPACE-complete reconfiguration problems. A surprising example 3-colouring: it is NP-complete to determine if a graph admits a 3-colouring, but it is polynomial to determine if one colouring reconfigures to the another. This mini-symposium includes an introductory talk, and talks on reconfiguration of matroids, homomorphisms, matching, and dominating sets.

Organizer: Richard Brewster
Thompson Rivers University, Canada

9:30 AM-9:55 Invitation to Combinatorial Reconfiguration
Takehiro Ito, Tohoku University, Japan

10:00 AM-10:25 Reconfiguring Graph Colourings and Homomorphisms
Richard Brewster, Thompson Rivers University, Canada; Jae-Baek Lee, Kyungpook National University, Korea; Sean Mcguinness, Thompson Rivers University, Canada; Benjamin Moore, University of Waterloo, Canada; Jonathan A. Noel, University of Warwick, United Kingdom; Mark Siggers, Kyungpook National University, Korea

10:30 AM-10:55 The Independent Domination Graph
Laura E. Teshima, University of Victoria, Canada; Richard Brewster, Thompson Rivers University, Canada; Kieka Mynhardt, University of Victoria, Canada

11:00 AM-11:25 Hamilton Connectedness of Sdr Graphs
Stefan Bard, University of Victoria, Canada

11:30 AM-11:55 Reconfiguration of Common Independent Sets of Matroids
Moritz Muehlenthaler, TU Dortmund, Germany

continued in next column

Wednesday, June 6
MS24
Analytic and Probabilistic Techniques in Combinatorics - Part I of II
9:30 AM-12:00 PM
Room: North Classroom 1005

For Part 2 see MS30

Contemporary combinatorics is an exciting and rapidly growing discipline on the frontier of mathematics and computer science. Many new techniques in combinatorics rely on applications of tools from other mathematical areas such as algebra, analysis and probability. In the last decade, various powerful novel methods have emerged. For example, recent works in the probabilistic method that culminated with the celebrated container method which answered many long-standing open Ramsey-type and extremal questions, new developments of algebraic techniques that were crucial in settling famous conjectures in design theory and number theory, and analytic approaches to Szemerédi’s regularity lemma that served as the cornerstone of graph limits, which then spin-off to techniques for large networks and development of flag algebras. In this mini-symposium, we aim to bring mostly junior researchers in combinatorics in order to present further developments and applications of these methods, as well as talk about completely new approaches. We will discuss relevant open problems, exchange research ideas, and initiate new collaborations.

Organizer: Andrzej Grzesik
University of Warwick, United Kingdom

Organizer: Jan Volec
McGill University, Canada

9:30 AM-9:55 Extremal Graph Theory and Finite Forcibility
Andrzej Grzesik and Daniel Král, University of Warwick, United Kingdom; László M. Lovász, University of California, Los Angeles, USA

continued on next page
10:30-10:55 Large Multipartite Subgraphs of H-Free Graphs
Jan Volec, McGill University, Canada; Bernard Lidicky, Iowa State University, USA; Taisa Martins, University of Warwick, United Kingdom; Sergey Norin, McGill University, Canada; Ping Hu, University of Warwick, United Kingdom

11:00-11:25 Forcing Oriented Cycles
Roman Glebov, Hebrew University of Jerusalem, Israel; Andrzej Grzesik, University of Warwick, United Kingdom; Jan Volec, McGill University, Canada

11:30-11:55 Step Sidorenko Property and Non-Norming Edge-Transitive Graphs
Daniel Král, Taisa Martins, and Péter Pál Pach, University of Warwick, United Kingdom; Marcin Wrochna, University of Warsaw, Poland

---

10:30-10:55 Pebbling on Semi-2-Trees
Liliana Alcon and Marisa Gutierrez, Universidad Nacional de La Plata, Argentina; Glenn Hurlbert, VCU, Center for the Study of Biological Complexity, USA

11:00-11:25 Pebbling on Graph Products and More!
John Asplund, Dalton State College, USA; Franklin Kenter, United States Naval Academy, USA; Glenn Hurlbert, Virginia Commonwealth University, USA

11:30-11:55 Pebbling on Split Graphs
Liliana Alcon and Marisa Gutierrez, Universidad Nacional de La Plata, Argentina; Glenn Hurlbert, Virginia Commonwealth University, USA

---

9:30-9:55 A Brief Introduction to Graph Pebbling
Franklin Kenter, United States Naval Academy, USA

10:00-10:25 Graph Pebbling Algorithms, Doppelgangers, and Lemke Graphs
Charles A. Cusack, Hope College, USA

continued in next column
The Ramsey number $r_k(s,n)$ is the minimum integer $N$, such that for any red/blue coloring of the $k$-tuples of $\{1,2,\ldots,N\}$, there are $s$ integers such that every $k$-tuple among them is red, or there are $n$ integers such that every $k$-tuple among them is blue. In this talk, I will discuss new lower bounds for $r_k(s,n)$ which nearly settles a question of Erdős and Hajnal from 1972. I will also discuss a more general function introduced by Erdős and Hajnal, and several interesting open problems in the area. This is joint work with Dhruv Mubayi.

Andrew Suk
University of California, San Diego, USA
Wednesday, June 6

MS27
Modification Problems to Discrete Structures - Part I of II
2:45 PM-5:15 PM
Room: North Classroom 1604
For Part 2 see MS34

A surprisingly high number of the interesting computational problems arising from theory and applications can be formulated as graph/matrix modification problems. In a graph modification problem, we are given as input a graph G, and the goal is to apply certain operations on G (such as vertex deletions, edge deletions, additions or contractions) in order to obtain a graph H with some particular property. A matrix modification problem is defined analogously. For an example the classical Vertex Cover problem can be formulated as trying to change G into an edgeless graph by deleting the minimum number of vertices. The treewidth problem is essentially a graph modification problem, where we add edges to make a graph chordal and having the minimum clique number, while the classic matrix rigidity problems is nothing but a matrix modification problem. These problems have been studied quite extensively, and both algorithms for these problems and structural aspects have been thoroughly explored. We plan to bring together experts in algorithms and experts in graph classes and structural graph theory to join forces on graph modification problems.

Organizer: Yixin Cao
Hong Kong Polytechnic University, China
Organizer: Saket Saurabh
Institute of Mathematical Sciences, India

2:45-3:10 Modifications to Chodal Graphs
Saket Saurabh, Institute of Mathematical Sciences, India

3:15-3:40 Dynamic Parameterized Problems and Algorithms
Josh Alman, Massachusetts Institute of Technology, USA

3:45-4:10 Solving Feedback Vertex Set via Half-Integral Relaxation
Yоichi Iwata, National Institute of Informatics, Japan

4:15-4:40 Delta Decomposition
Ross McConnell, Colorado State University Fort Collins, USA

continued in next column
MS29
Spatial Random Networks
2:45 PM-5:15 PM
Room: North Classroom 1606

The application of random graphs to the analysis of complex networks has led to many new mathematical models. Of special interest are spatial random graph models, where the vertices of the graphs are embedded in a metric space, and link formation depends on the distance of the vertices in the space. Spatial models are especially suited for the modelling of complex networks, such as social networks, biological networks, and Web-based networks such as Wikipedia. The underlying metric space represents the feature space, in which vertices are placed according to their defining properties. Vertices that are close together represent entities that are similar and so are more likely to be linked. This minisymposium aims to give an overview of the many different aspects of spatial random graphs. The simplest spatial graph model is the random geometric graph, where vertices are connected if and only if they are within a threshold distance of each other. The study of spatial random graphs is flourishing, and some of our speakers will give the latest results, including research on infinite random geometric graphs. A fundamental question addressed by some of our speakers is whether a large finite or infinite graph embodies the characteristics of the underlying metric space. Finally, some speakers will present state-of-the-art research using spatial random graphs to simulate the properties of real-life networks.

Organizer: Jeannette Janssen
Dalhousie University, Canada

Organizer: Anthony Bonato
Ryerson University, Canada

2:45-3:10 Infinite Random Geometric Graphs
Jeannette Janssen, Dalhousie University, Canada

3:15-3:40 Random Geometric Graphs in Normed Spaces
Karen Gunderson, University of Manitoba, Canada

3:45-4:10 Geometric Networks and Graph Limits
Mahya Ghandehari, University of Delaware, USA

4:15-4:40 On Geometric Embedding of Graphs and Random Graphs
Huda Chuangpishit, Ryerson University, Canada

4:45-5:10 Layout of Random Circulant Graphs
Israel S. Rocha, Czech Academy of Sciences, Czech Republic

MS30
Analytic and Probabilistic Techniques in Combinatorics - Part II of II
2:45 PM-5:15 PM
Room: North Classroom 1539

For Part I see MS24

Contemporary combinatorics is an exciting and rapidly growing discipline on the frontier of mathematics and computer science. Many new techniques in combinatorics rely on applications of tools from other mathematical areas such as algebra, analysis and probability. In the last decade, various powerful novel methods have emerged. For example, recent works in the probabilistic method that culminated with the celebrated container method which answered many long-standing open Ramsey-type and extremal questions, new developments of algebraic techniques that were crucial in settling famous conjectures in design theory and number theory, and analytic approaches to Szemerédi’s regularity lemma that served as the corner-stone of graph limits, which then spin-off to techniques for large networks and development of flag algebras. In this mini-symposium, we aim to bring mostly junior researchers in combinatorics in order to present further developments and applications of these methods, as well as talk about completely new approaches. We will discuss relevant open problems, exchange research ideas, and initiate new collaborations.

Organizer: Andrzej Grzesik
University of Warwick, United Kingdom

Organizer: Jan Volec
McGill University, Canada
2:45-3:10 Thresholds for Random Pebbling
Neal Bushaw, Virginia Commonwealth University, USA

3:15-3:40 Optimal Pebbling Number of Graphs with Given Minimum Degree
Andrzej Czygrinow, Arizona State University, USA

3:45-4:10 The Weight Function Lemma and Its Applications
Glenn Hurlbert, Virginia Commonwealth University, USA

4:15-4:40 Distance Pebbling on Directed Cycle Graphs
Michael P. Knapp, Loyola University Maryland, USA

4:45-5:10 A Graph Pebbling Algorithm on Weighted Graphs
Nandor Sieben, Northern Arizona University, USA

Wednesday, June 6

**MS31**

**Graph Pebbling - Part II of III**

2:45 PM-5:15 PM

*Room: North Classroom 1130*

For Part 1 see MS25
For Part 3 see MS37

The subject of graph pebbling encompasses a broad spectrum of concepts regarding the movement of pebbles through a graph, with many diverse applications to areas such as computational complexity, graph rigidity, large sparse matrix storage, and combinatorial number theory, among others. Modern graph pebbling also fits under the umbrella of network optimization, as a model for the transportation of limited and consumable resources. One of the main goals of this minisymposium is to attract new researchers to the field. Graph pebbling utilizes many techniques, including those from probabilistic combinatorics, linear optimization, discharging, domination, and more, making it naturally attractive to a wide audience. The topic has also supported a great amount of undergraduate research since the 1990s. Dozens of papers in this area have been written by participants in various REUs and such. We intend to introduce many new problems that are accessible to this population.

**Organizer:** John Asplund  
*Dalton State College, USA*

**Organizer:** Carl Yerger  
*Davidson College, USA*

**Organizer:** Glenn Hurlbert  
*Virginia Commonwealth University, USA*

**Organizer:** Franklin Kenter  
*United States Naval Academy, USA*

continued in next column
<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Location</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wednesday, June 6</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MS32</strong></td>
<td>2:45 PM-4:45 PM</td>
<td>North Classroom 1806</td>
<td><strong>Matroid Theory - Part II of II</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Matroid Theory is a vibrant and growing subject with connections across</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mathematics to graph theory, projective geometry, lattice theory, design</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>theory, coding theory, combinatorial optimization etc. Groups of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>researchers in matroids and related objects tend to develop topic-specific</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>language that obscures the interrelations. This minisymposium brings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>together researchers from different areas of matroid theory with the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>purpose of seeking commonalities and exploring connections between</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>matroids and other areas of combinatorics.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Organizer:</strong> Sandra Kingan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>City University of New York, Brooklyn, USA</strong></td>
</tr>
<tr>
<td></td>
<td>2:45-3:10</td>
<td></td>
<td><strong>Deletion Sets in Binary Matroids</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sandra Kingan, City University of New York, Brooklyn, USA</td>
</tr>
<tr>
<td></td>
<td>3:15-3:40</td>
<td></td>
<td><strong>Efficient Enumeration of Binary Matroids Using a New Canonical Form</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ken Sugimori, University of Tokyo, Japan; Sonoko Moriyama, Nihon</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>University, Japan; Kunihiko Sadakane, University of Tokyo, Japan</td>
</tr>
<tr>
<td></td>
<td>3:45-4:10</td>
<td></td>
<td><strong>Beta Invariants of 3-Connected Matroids</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sooyeon Lee, University of Mississippi, USA</td>
</tr>
<tr>
<td></td>
<td>4:15-4:40</td>
<td></td>
<td><strong>Triangle Roundedness in Matroids</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Joao Paulo Costalonga, Federal University of Espirito Santo, Brazil</td>
</tr>
<tr>
<td><strong>CP8</strong></td>
<td>2:45 PM-4:05 PM</td>
<td>North Classroom 1607</td>
<td><strong>Enumeration</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2:45-3:00 Some Partitions Identities Between ( P(n,m) - P(n-1,m) ) and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( P(n,m-1) )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acadia B. Larsen, The University of Texas Rio Grande Valley, USA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3:05-3:20 Enumeration of Unsensed Orientable Maps on Surfaces of a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Given Genus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Evgeniy Krasko and Alexander Omelchenko, St. Petersburg University,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Russia</td>
</tr>
<tr>
<td></td>
<td>3:25-3:40</td>
<td></td>
<td><strong>Tools for Enumerating Graphs with Prescribed Degree Sequences</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>David Burstein, Swarthmore College, USA; Jonathan E. Rubin, University</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>of Pittsburgh, USA</td>
</tr>
<tr>
<td></td>
<td>4:45-5:00</td>
<td></td>
<td><strong>Intermission</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5:15 PM-5:30 PM</td>
</tr>
<tr>
<td><strong>SIAG/DM Business Meeting</strong></td>
<td>5:30 PM-6:30 PM</td>
<td>North Classroom 1130</td>
<td>Complimentary refreshments will be served.</td>
</tr>
<tr>
<td><strong>Thursday, June 7</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Registration</strong></td>
<td>7:30 AM-3:30 PM</td>
<td>North Classroom 1130 Entry</td>
<td></td>
</tr>
<tr>
<td><strong>Announcements</strong></td>
<td>8:10 AM-8:15 AM</td>
<td>North Classroom 1130</td>
<td></td>
</tr>
<tr>
<td><strong>IP6</strong></td>
<td>8:15 AM-9:00 AM</td>
<td>North Classroom 1130</td>
<td><strong>Random Graph Processes</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chair: To Be Determined</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>When dealing with random objects, it is often useful to reveal the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>randomness gradually, rather than all at once; that is, to turn a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>static random object into a random process. In this talk we will</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>describe some classical proofs of this type, and a few more recent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>applications, for example to Ramsey numbers, and to determining</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>sharp thresholds in ( G(n,p) ) and in random sets of integers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Various parts of the talk are based on joint work with Paul Balister,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Béla Bollobás, Asaf Ferber, Gonzalo Fiz Pontiveros, Simon Griffiths,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Oliver Riordan, Wojciech Samotij, and Paul Smith.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Robert Morris</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Institute for Pure and Applied Mathematics - IMPA</strong>, Brazil</td>
</tr>
<tr>
<td><strong>Coffee Break</strong></td>
<td>9:00 AM-9:30 AM</td>
<td>North Classroom 1130 Atrium</td>
<td></td>
</tr>
</tbody>
</table>
Thursday, June 7

MS33
The Structure of Families of Finite Sets - Part I of II
9:30 AM-12:00 PM
Room: North Classroom 1539

For Part 2 see MS39
The theme of this minisymposium is the research on ordered sets in recent years, mainly on the structure of families of finite sets. In the last decade, more and more results on the problems related to finding the families of subsets avoiding a given pattern have been discovered and published. In the two sessions, we invite international researchers to give talks on the problems and results of determining the largest size of P-free families (avoiding the poset P as a subfamily) for general posets, for the specific posets, and for the induced subposets. In addition, we also invite the researchers to give talks addressing the results on antichains as well as the Ramsey-type results in Boolean lattices. We expect this minisymposium will enhance the development of new theory of the structures of finite sets and draw attention to more people who may be interested in this type of problems.

Organizer: Wei-Tian Li
National Chung-Hsing University, Taiwan

9:30-9:55 An Improvement on the Intersecting Shadow Theorem
Gyula Katona, Renyi Institute, Hungary

10:00-10:25 Problems and Results Related to Maximal Antichains
Uwe Leck, Europa-Universitaet Flensburg, Germany

10:30-10:55 On Difference Graphs and the Local Dimension of Posets
Ryan R. Martin, Iowa State University, USA; Jinha Kim, Seoul National University, Korea; Tomas Masarik, Charles University, Czech Republic; Warren Shull, Emory University, USA; Heather C. Smith, Georgia Institute of Technology, USA; Andrew Uzzell, Grinnell College, USA; Zhiyu Wang, University of South Carolina, USA

11:00-11:25 Forbidden Induced Subposets
Istvan Tomon, Ecole Polytechnique Federale de Lausanne, Switzerland

11:30-11:55 Ramsey-Type of Problems on Posets in the Boolean Lattices
Wei-Tian Li, National Chung-Hsing University, Taiwan

continued in next column

Thursday, June 7

MS34
Modification Problems to Discrete Structures - Part II of II
9:30 AM-12:00 PM
Room: North Classroom 1604

For Part I see MS27
A surprisingly high number of the interesting computational problems arising from theory and applications can be formulated as graph/matrix modification problems. In a graph modification problem, we are given as input a graph G, and the goal is to apply certain operations on G (such as vertex deletions, edge deletions, additions or contractions) in order to obtain a graph H with some particular property. A matrix modification problem is defined analogously. For an example the classical Vertex Cover problem can be formulated as trying to change G into an edgeless graph by deleting the minimum number of vertices. The treewidth problem is essentially a graph modification problem, where we add edges to make a graph chordal and having the minimum clique number, while the classic matrix rigidity problems is nothing but a matrix modification problem. These problems have been studied quite extensively, and both algorithms for these problems and structural aspects have been thoroughly explored. We plan to bring together experts in algorithms and experts in graph classes and structural graph theory to join forces on graph modification problems.

Organizer: Yixin Cao
Hong Kong Polytechnic University, China

Organizer: Saket Saurabh
Institute of Mathematical Sciences, India

9:30-9:55 An $O(k^4)$ Kernel for Unit Interval Vertex Deletion
Yixin Cao, Hong Kong Polytechnic University, China

10:00-10:25 Complexity Dichotomies for H-free Edge Modification Problems
R B Sandeep, Indian Institute of Information Technology, India

10:30-10:55 Modification of Matroids and Matrices
Meirav Zehavi, Ben-Gurion University, Israel

11:00-11:25 A Polynomial Kernel of Distance-Hereditary Vertex Deletion
Eun Jung Kim, Universite Paris Dauphine and CNRS, France; O-Joung Kwon, Incheon National University, Korea

11:30-11:55 Maximum Induced Matching Algorithms via Vertex Ordering Characterizations
Lalla Mouatadid, University of Toronto, Canada
MS35
Modeling and Mining Network Data - Part I of II  
9:30 AM-12:00 PM  
Room: North Classroom 1806

Organizer: Austin Benson  
Cornell University, USA

9:30-9:55 New Perspectives on Measuring Network Clustering  
Austin Benson, Cornell University, USA; Hao Yin and Jure Leskovec, Stanford University, USA

10:00-10:25 Hypergraph Kronecker Models for Networks  
David F. Gleich and Nicole Eikmeier, Purdue University, USA

10:30-10:55 Mitigating Overexposure in Viral Marketing  
Rediet Abebe, Cornell University, USA; Lada Adamic, The University of Michigan, Ann Arbor, USA; Jon M. Kleinberg, Cornell University, USA

11:00-11:25 Modeling and Mining Dynamic Competition Networks  
Anthony Bonato, Ryerson University, Canada

11:30-11:55 Tuning the Activity of Neural Networks at Criticality  
Kathleen Finlinson, University of Colorado Boulder, USA

For Part 2 see MS40  

Discrete mathematics is at the heart of challenging data-driven problems. Many discrete datasets look like networks, a mathematical formalism for modeling complex systems by interactions between entities. This minisymposium highlights several recent advances in modeling and mining network data with an underlying theme of connecting theory and applications with real data. The theoretical tools are quite diverse and include extremal graph theory, numerical linear algebra, and algorithm design. The applications are equally diverse, drawing from marketing, machine learning, and social network analysis, using data from protein interactions, neural systems, email communications, transportation systems, and more. This minisymposium will showcase the exciting opportunities at the intersection of discrete mathematics and data science.

Organizer: Austin Benson  
Cornell University, USA

MS36
Open Problems in Combinatorics on Words  
9:30 AM-12:00 PM  
Room: North Classroom 1806

Combinatorics on words is a rapidly growing field at the border of mathematics and computer science. Roughly speaking, it is the study of words (finite lists of symbols) and their combinatorial properties. Our minisymposium will center around the theme of open problems in combinatorics on words. We propose to have speakers discussing (1) the additive $k$'th power problem: does there exist an infinite word over a finite subset of $Z$ avoiding $k$ consecutive blocks of the same size and the same sum? Recently this problem was (positively) resolved for $k = 3$, but the problem for $k = 2$ is still open. (2) discrete tilings and their relationship to combinatorics on words. Here the principal open problem is Nivat's conjecture about two-dimensional periodicity. (3) automatic sequences (sequences generated by finite automata) and their generalizations. Here we propose to have speakers addressing generalizations of Cobham's theorem and $p$-adic properties.

Organizer: Jeffrey Shallit  
University of Waterloo, Canada

10:00-10:25 Generalizations of Cobham's Theorem  
Jakub Byszewski, Jagiellonian University, Poland

10:30-10:55 The Additive $k$'th Power Problem and Generalizations  
Matthieu Rosenfeld, LIMOS- UCA, France

11:00-11:25 Decidability and the Ostrowski Numeration System  
Philipp Hieronymi, University of Illinois, Urbana-Champaign, USA

11:30-11:55 Automatic Sequences and $p$-adic Asymptotics  
Eric Rowland, Hofstra University, USA

For Part 2 see MS31  

The subject of graph pebbling encompasses a broad spectrum of concepts regarding the movement of pebbles through a graph, with many diverse applications to areas such as computational complexity, graph rigidity, large sparse matrix storage, and combinatorial number theory, among others. Modern graph pebbling also fits under the umbrella of network optimization, as a model for the transportation of limited and consumable resources. One of the main goals of this minisymposium is to attract new researchers to the field. Graph pebbling utilizes many techniques, including those from probabilistic combinatorics, linear optimization, discharging, domination, and more, making it naturally attractive to a wide audience. The topic has also supported a great amount of undergraduate research since the 1990s. Dozens of papers in this area have been written by participants in various REUs and such. We intend to introduce many new problems that are accessible to this population.

Organizer: John Asplund  
Dalton State College, USA

Organizer: Carl Yerger  
Davidson College, USA

Organizer: Glenn Hurlbert  
Virginia Commonwealth University, USA

Organizer: Franklin Kenter  
United States Naval Academy, USA

continued on next page
Each cell in our body accomplishes its functions via a complex network of molecular interactions. Analyses of these networks are thus key to understanding cellular functioning (and, in the case of disease, malfunctioning). I will overview what has been discovered about the basic structure and organization of cellular networks, and present frameworks and algorithms that leverage these properties in order to gain a better understanding of diseases such as cancer.

Mona Singh
Princeton University, USA

Lunch Break
12:00 PM-1:30 PM
Attendees on their own

Thursday, June 7

CP9
Coloring
9:30 AM - 10:30 AM
Room: North Classroom 1606
Chair: To Be Determined
9:30 - 9:45 A k-Partite Generalization of Chordal Bipartite Graphs
Terry McKee, Wright State University, USA
9:50 - 10:05 Properly Colored Connections in Graphs
Wayne Goddard and Robert Melville, Clemson University, USA
10:10 - 10:25 An Asymptotic Bound for the Strong Chromatic Number
Allan Lo and Nicolás Sanhueza-Matamala, University of Birmingham, United Kingdom

Coffee Break
2:15 PM - 2:45 PM
Room: North Classroom 1130 Atrium
### MS39
#### The Structure of Families of Finite Sets - Part II of II

2:45 PM-5:15 PM  
Room: North Classroom 1539

**For Part 1 see MS33**

The theme of this minisymposium is the research on ordered sets in recent years, mainly on the structure of families of finite sets. In the last decade, more and more results on the problems related to finding the families of subsets avoiding a given pattern have been discovered and published. In the two sessions, we invite international researchers to give talks on the problems and results of determining the largest size of $P$-free families (avoiding the poset $P$ as a subfamily) for general posets, for the specific posets, and for the induced subposets. In addition, we also invite the researchers to give talks addressing the results on antichains as well as the Ramsey-type results in Boolean lattices. We expect this minisymposium will enhance the development of new theory of the structures of finite sets and draw attention to more people who may be interested in this type of problems.

Organizer: Wei-Tian Li  
National Chung-Hsing University, Taiwan

<table>
<thead>
<tr>
<th>2:45-3:10 Sizes of Maximal Antichains in $B_n$</th>
<th>4:15-4:40 A Generalization of Sperner’s Theorem for Convex Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jerry Griggs, University of South Carolina, USA; Thomas Kalinowski, University of New England, Armidale, Australia; Uwe Leck, Europa-Universitaet Flensburg, Germany; Ian Roberts, Charles Darwin University, Australia; Michael Schmitz, Europa-Universitaet Flensburg, Germany</td>
<td>Lili Mu, Liaoning Normal University, China</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3:15-3:40 Proof of Komlos’s Conjecture on Hamiltonian Subsets</th>
<th>3:45-5:10 Isoperimetric Stability for the Cube</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaehoon Kim, University of Birmingham, United Kingdom; Hong Liu and Maryam Sharifzadeh, University of Warwick, United Kingdom; Katherine L. Staden, University of Oxford, Oxford, United Kingdom</td>
<td>Peter Keevash and Eoin Long, University of Oxford, United Kingdom</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3:45-4:10 On Subgraphs of 2k-cycle-free Graphs and Some Generalised Turán Problems</th>
<th>4:45-5:10 An Algorithm Approach to Bounding Families of Subsets Avoiding a Subposet in Boolean Lattices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abhishek Methuku, Central European University, Hungary</td>
<td>Hong-Bin Chen, Feng-Chia University, Taiwan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nathan Keller and Noam Lifshitz, Bar-Ilan University, Israel</td>
<td>Dániel Grósz, Universitas di Pisa, Italy; Abhishek Methuku, Central European University, Hungary; Casey Tompkins, Renyi Institute, Hungary</td>
</tr>
</tbody>
</table>

---

*continued in next column*
Thursday, June 7

**MS40**

**Modeling and Mining Network Data - Part II of II**

2:45 PM-4:45 PM

Room: North Classroom 1604

For Part 1 see MS35

Discrete mathematics is at the heart of challenging data-driven problems. Many discrete datasets look like networks, a mathematical formalism for modeling complex systems by interactions between entities. This minisymposium highlights several recent advances in modeling and mining network data with an underlying theme of connecting theory and applications with real data. The theoretical tools are quite diverse and include extremal graph theory, numerical linear algebra, and algorithm design. The applications are equally diverse, drawing from marketing, machine learning, and social network analysis, using data from protein interactions, neural systems, email communications, transportation systems, and more. This minisymposium will showcase the exciting opportunities at the intersection of discrete mathematics and data science.

Organizer: Austin Benson
Cornell University, USA

2:45-3:10 Graph Matching Via Low Rank Factors
Huda Nassar, Purdue University, USA

3:15-3:40 Risk-Averse Matchings over Uncertain Graph Databases
Charalampos Tsourakakis, Boston University and Harvard University, USA

3:45-4:10 Detectability of Hierarchical Community Structure in Preprocessed Multilayer Networks
Dane Taylor, State University of New York, Buffalo, USA; Peter J. Mucha, University of North Carolina at Chapel Hill, USA

4:15-4:40 Evaluating Overfit and Underfit in Models of Network Community Structure
Amir Ghasemian, University of Colorado Boulder, USA; Homa Hosseinmardi, University of Southern California, USA; Aaron Clauset, University of Colorado Boulder, USA

continued in next column
Thursday, June 7

**CP10**

**General Graph Theory**

2:45 PM-4:05 PM

Room: North Classroom 1607

Chair: To Be Determined

2:45-3:00 Limited Broadcast Domination and Multipacking

*Frank Yang*, University of Victoria, Canada

3:05-3:20 On Essentially 4-Edge-Connected Cubic Bricks

*Nishad Kothari*, University of Vienna, Austria; *Marcelo de Carvalho*, Universidade Federal do Mato Grosso do Sul, Brazil; *Charles Little*, Massey University, New Zealand; *Claudio Lucchesi*, University of Campinas, Brazil

3:25-3:40 Vertex Disjoint Paths Covers of Rectangular Grids, Tori, and Hypertori

*Wing Hong Tony Wong*, Kutztown University of Pennsylvania, USA

3:45-4:00 A Local Chordalization Approach to the Hadwiger Conjecture and the Erdős-Faber-Lovász Conjecture

*Soogang Eoh*, Seoul National University, Korea; *Jihoon Choi*, Cheongju University, South Korea; *Suh-Ryung Kim*, Seoul National University, Korea

**Intermission**

5:15 PM-5:30 PM

**SP2**

**Hot Topics Session**

5:30 PM-6:30 PM

Room: North Classroom 1130

Chair: To Be Determined

Abstract Not Available At Time Of Publication.

*Henry Cohn*, Microsoft Research New England, USA
Friday, June 8

Registration
7:30 AM-10:30 AM
Room: North Classroom 1130 Entry

Closing Remarks
8:10 AM-8:15 AM
Room: North Classroom 1130

IP8
Algorithms for the Asymmetric Traveling Salesman Problem
8:15 AM-9:00 AM
Room: North Classroom 1130
Chair: To Be Determined

The traveling salesman problem is one of the most fundamental optimization problems. Given n cities and pairwise distances, it is the problem of finding a tour of minimum distance that visits each city once. In spite of significant research efforts, current techniques seem insufficient for settling the approximability of the traveling salesman problem. The gap in our understanding is especially large in the general asymmetric setting where the distance from city i to j is *not* assumed to equal the distance from j to i. In this talk, we will give an overview of old and new approaches for settling this question. We shall, in particular, talk about our new approach that gives the first constant-factor approximation algorithm for the asymmetric traveling salesman problem. This is based on joint work with Jakub Tarnawski and László Végh.

Ola Svensson
École Polytechnique Fédérale de Lausanne, Switzerland

Coffee Break
9:00 AM-9:30 AM
Room: North Classroom 1130 Atrium

continued in next column
This minisymposium brings together researchers in the areas of structured families of graphs and posets, including basic graph properties, graph minors and interval orders. These structured families are utilized to organize and analyze data. Key goals include characterization; recognition and translation from one setting to another. Some families can be recognized in polynomial time and others not.

Organizer: Karen Collins
Wesleyan University, USA

Organizer: Ann N. Trenk
Wellesley College, USA

9:30-9:55 Structured Graphs and Posets Overview
Karen Collins, Wesleyan University, USA

10:00-10:25 Hereditary Families and the Dominance Order
Michael D. Barrus, University of Rhode Island, USA

10:30-10:55 Hamiltonian Path Variants in Structured Graph Families
Garth T. Isaak, Lehigh University, USA

11:00-11:25 Using Three-Sided Brambles to Bound Treewidth in Planar Graphs
Brett Smith, Yale University, USA

11:30-11:55 Non-monochromatic Triangles in 2-edge-coloured Graphs
Jessica McDonald, Auburn University, USA

continued in next column
Friday, June 8

**MS46**

**Computational Methods in Discrete Mathematics**

9:30 AM-12:00 PM

Room: North Classroom 1207

Computational methods in discrete mathematics have become more widely used in recent years. Such approaches have had some stunning successes, such as the Four Color Theorem, the nonexistence of the projective plane of order 10, and the proof of the Kepler Conjecture, but these methods are now becoming part of the toolbox of the everyday working mathematician. This minisymposium will showcase recent results in the area.

Organizer: Stephen Hartke
University of Colorado, USA

9:30-9:55 **Chromatic Folkman Numbers and Some Related Computational Challenges**

Xiaodong Xu, Guangxi Academy of Sciences, Guangxi, China; Meilian Liang, Guangxi University, China; Stanislaw Radziszowski, Rochester Institute of Technology, USA

10:00-10:25 **Computational Bounds on Classical Ramsey Numbers**

Brendan McKay, Australian National University, Australia

10:30-10:55 **Generating New Patterns for Antique Lace**

Veronika Irvine, University of Waterloo, Canada

11:00-11:25 **On Small k-chromatic Graphs of Girth g**

Geoffrey Exoo, Indiana State University, USA

11:30-11:55 **Rotation Systems for Hamilton Cycles**

Aaron Williams, Bard College at Simon’s Rock, USA

---

Friday, June 8

**MS47**

**Foundations of Data Science - Part II of II**

9:30 AM-12:00 PM

Room: North Classroom 1130

For Part 1 see MS41

In support of the NSF initiative on Transdisciplinary Research in Principles of Data Science (TRIPods) and tapping into the broader research interest and investment from research labs across the nation, this minisymposium will feature lectures on frontier research in foundational aspects of data science. A primary goal is to feature a diverse set of speakers from computing, engineering and statistics who will help identify algorithmic and mathematical challenges confronting the current state of this fast growing, exciting interdisciplinary field. Topics will include nonlinear optimization and high-dimensional statistics, statistical and large-scale machine learning, data-driven algorithm design, scalable learning algorithms, automation of data analysis, neural nets and deep learning, structured sparsity and compressed sensing, submodular optimization, and analysis of complex, high-dimensional data sets, large networks and computational phylogeny.

Organizer: Prasad Tetali
Georgia Institute of Technology, USA

Organizer: Jennifer Chayes
Microsoft Research, USA

Organizer: David Shmoys
Cornell University, USA

9:30-9:55 **Robustness and Submodularity**

Stefanie Jegelka and Matthew Staib, Massachusetts Institute of Technology, USA; Bryan Wilder, University of Southern California, USA

10:00-10:25 **Statistical Estimation Under Group Actions: The Sample Complexity of Multi-Reference Alignment**

Afonso Bandeira, Courant Institute of Mathematical Sciences, New York University, USA

10:30-10:55 **Differential Privacy for Growing Databases**

Rachel Cummings, Georgia Institute of Technology, USA; Sara Krehbiel, University of Richmond, USA; Kevin Lai and Uthaipon (Tao) Tantipongpipat, Georgia Institute of Technology, USA

11:00-11:25 **Title Not Available At Time Of Publication**

Hanie Sedghi, Google, Inc., USA

11:30-11:55 **Catalyst, Generic Acceleration Scheme for Gradient-based Optimization**

Zaid Harchaoui, University of Washington, USA; Hongzhou Lin, Massachusetts Institute of Technology, USA; Courtney Paquette, Lehigh University, USA; Julien Mairal, Inria, France; Dmitriy Drusvyatskiy, University of Washington, USA

---

continued in next column
For a variety of combinatorial problems, such as network reliability and graph colourings, the models turn out to be graph polynomials. On the other hand, the investigation of various subgraph properties (such as independence and domination) leads one to explore the associated combinatorial sequences by formulating generating polynomials. In all cases, polynomials carry useful or even essential information about the underlying combinatorics, and the connections allow one to draw on classical areas of mathematics, such as analysis and algebra, in the investigations. Combinatorial properties such as unimodality and log-concavity of various graphical sequences can surprisingly be extracted from the location of the roots of such polynomials. Different graph properties can also lead to interesting analytical and algebraic properties of the polynomials as well, such as factorability, the distribution of roots in the complex plane, and even fractals appearing in their roots. We aim to draw on the research of people working on a variety of graph polynomials to share techniques and methods to help advance the study of each polynomial.

Organizer: Ben R. Cameron  
Dalhousie University, Canada

Organizer: Jason Brown  
Dalhousie University, Canada

9:30-9:55 The Theory of Network Reliability  
Jason Brown, Dalhousie University, Canada

10:00-10:25 Counting Increasing Spanning Forests in Graphs  
Joshua Hallam, Wake Forest University, USA;  
continued in next column

Jeremy Martin, University of Kansas, USA; Bruce Sagan, Michigan State University, USA

10:30-10:55 On the Stability of Independence Polynomials  
Ben R. Cameron and Jason Brown, Dalhousie University, Canada

11:00-11:25 Chromatic Symmetric Functions and e-Positivity  
Samantha Dahlberg, University of British Columbia, Canada

11:30-11:55 On the Roots of Wiener Polynomials of Graphs  
Jason Brown, Dalhousie University, Canada; Lucas Mol, The University of Winnipeg, Canada; Ortrud R. Oellermann, The University of Winnipeg, Canada
SIAM Conference on Discrete Mathematics

Organizer and Speaker Index

SIAM Conference on
DISCRETE MATHEMATICS
June 4-8, 2018
University of Colorado, Denver
Denver, Colorado, USA
<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abebe, Rediet</td>
<td>MS35</td>
<td>10:30 Thu</td>
</tr>
<tr>
<td>Alman, Josh</td>
<td>MS27</td>
<td>3:15 Wed</td>
</tr>
<tr>
<td>Asplund, John</td>
<td>MS25</td>
<td>9:30 Wed</td>
</tr>
<tr>
<td>Asplund, John</td>
<td>MS25</td>
<td>11:00 Wed</td>
</tr>
<tr>
<td>Asplund, John</td>
<td>MS31</td>
<td>2:45 Wed</td>
</tr>
<tr>
<td>Asplund, John</td>
<td>MS37</td>
<td>9:30 Thu</td>
</tr>
<tr>
<td>Avramovic, Ivan</td>
<td>CP4</td>
<td>9:30 Tue</td>
</tr>
<tr>
<td>Bal, Deepak</td>
<td>MS4</td>
<td>9:30 Mon</td>
</tr>
<tr>
<td>Bal, Deepak</td>
<td>MS10</td>
<td>2:45 Mon</td>
</tr>
<tr>
<td>Bamforth, Adam</td>
<td>MS6</td>
<td>3:45 Mon</td>
</tr>
<tr>
<td>Bandeira, Afonso</td>
<td>MS47</td>
<td>10:00 Fri</td>
</tr>
<tr>
<td>Bard, Stefan</td>
<td>MS23</td>
<td>11:00 Wed</td>
</tr>
<tr>
<td>Barrus, Michael D.</td>
<td>MS44</td>
<td>10:00 Fri</td>
</tr>
<tr>
<td>Bennett, Patrick</td>
<td>MS4</td>
<td>9:30 Mon</td>
</tr>
<tr>
<td>Bennett, Patrick</td>
<td>MS4</td>
<td>9:30 Mon</td>
</tr>
<tr>
<td>Bennett, Patrick</td>
<td>MS10</td>
<td>2:45 Mon</td>
</tr>
<tr>
<td>Benson, Austin</td>
<td>MS35</td>
<td>9:30 Thu</td>
</tr>
<tr>
<td>Benson, Austin</td>
<td>MS35</td>
<td>9:30 Thu</td>
</tr>
<tr>
<td>Benson, Austin</td>
<td>MS40</td>
<td>2:45 Thu</td>
</tr>
<tr>
<td>Biro, Csaba</td>
<td>MS12</td>
<td>9:30 Tue</td>
</tr>
<tr>
<td>Bodwin, Greg</td>
<td>MS22</td>
<td>10:00 Wed</td>
</tr>
<tr>
<td>Boettcher, Julia</td>
<td>MS38</td>
<td>2:45 Thu</td>
</tr>
<tr>
<td>Bonamy, Marthe</td>
<td>MS3</td>
<td>10:30 Mon</td>
</tr>
<tr>
<td>Bonato, Anthony</td>
<td>MS29</td>
<td>2:45 Wed</td>
</tr>
<tr>
<td>Bonato, Anthony</td>
<td>MS35</td>
<td>11:00 Thu</td>
</tr>
<tr>
<td>Borgs, Christian</td>
<td>MS41</td>
<td>3:15 Thu</td>
</tr>
<tr>
<td>Bosek, Bartlomiej</td>
<td>MS6</td>
<td>2:45 Mon</td>
</tr>
<tr>
<td>Bouin, Debra L.</td>
<td>MS14</td>
<td>9:30 Tue</td>
</tr>
<tr>
<td>Bouin, Debra L.</td>
<td>MS14</td>
<td>10:00 Tue</td>
</tr>
<tr>
<td>Bouin, Debra L.</td>
<td>MS17</td>
<td>2:45 Tue</td>
</tr>
<tr>
<td>Boyle, Elette</td>
<td>MS9</td>
<td>4:15 Mon</td>
</tr>
<tr>
<td>Brewster, Richard</td>
<td>MS17</td>
<td>4:15 Tue</td>
</tr>
<tr>
<td>Brewster, Richard</td>
<td>MS23</td>
<td>9:30 Wed</td>
</tr>
<tr>
<td>Briggs, Joseph G.</td>
<td>CP7</td>
<td>10:50 Wed</td>
</tr>
<tr>
<td>Brinkov, Boris</td>
<td>MS42</td>
<td>2:45 Thu</td>
</tr>
<tr>
<td>Brown, Jason</td>
<td>MS48</td>
<td>9:30 Fri</td>
</tr>
<tr>
<td>Brown, Jason</td>
<td>MS48</td>
<td>9:30 Fri</td>
</tr>
<tr>
<td>Bucic, Matija</td>
<td>MS5</td>
<td>10:00 Mon</td>
</tr>
<tr>
<td>Burstein, David</td>
<td>CP8</td>
<td>3:25 Wed</td>
</tr>
<tr>
<td>Bushaw, Neal</td>
<td>MS31</td>
<td>2:45 Wed</td>
</tr>
<tr>
<td>Butler, Steve</td>
<td>MS20</td>
<td>2:45 Tue</td>
</tr>
<tr>
<td>Butler, Steve</td>
<td>MS42</td>
<td>2:45 Thu</td>
</tr>
<tr>
<td>Byszewski, Jakub</td>
<td>MS36</td>
<td>10:00 Thu</td>
</tr>
<tr>
<td>Cai, Yue</td>
<td>MS16</td>
<td>9:30 Tue</td>
</tr>
<tr>
<td>Cai, Yue</td>
<td>MS16</td>
<td>11:30 Tue</td>
</tr>
<tr>
<td>Cameron, Ben R.</td>
<td>MS48</td>
<td>9:30 Fri</td>
</tr>
<tr>
<td>Cameron, Ben R.</td>
<td>MS48</td>
<td>10:30 Fri</td>
</tr>
<tr>
<td>Cao, Yixin</td>
<td>MS27</td>
<td>2:45 Wed</td>
</tr>
<tr>
<td>Cao, Yixin</td>
<td>MS34</td>
<td>9:30 Thu</td>
</tr>
<tr>
<td>Cao, Yixin</td>
<td>MS34</td>
<td>9:30 Thu</td>
</tr>
<tr>
<td>Chatayes, Jennifer</td>
<td>MS41</td>
<td>2:45 Thu</td>
</tr>
<tr>
<td>Chatayes, Jennifer</td>
<td>MS47</td>
<td>9:30 Thu</td>
</tr>
<tr>
<td>Chen, Guantao</td>
<td>MS21</td>
<td>11:00 Wed</td>
</tr>
<tr>
<td>Chen, Hong-Bin</td>
<td>MS39</td>
<td>3:15 Thu</td>
</tr>
<tr>
<td>Chen, Ricky X.</td>
<td>CP4</td>
<td>11:10 Thu</td>
</tr>
<tr>
<td>Choi, Ilkoo</td>
<td>MS3</td>
<td>10:00 Mon</td>
</tr>
<tr>
<td>Chuangpishit, Huda</td>
<td>MS29</td>
<td>4:15 Wed</td>
</tr>
<tr>
<td>Chung, Fan</td>
<td>MS45</td>
<td>11:30 Fri</td>
</tr>
<tr>
<td>Cioaba, Sebastian</td>
<td>MS20</td>
<td>2:45 Tue</td>
</tr>
<tr>
<td>Cohn, Henry</td>
<td>SP2</td>
<td>5:30 Thu</td>
</tr>
<tr>
<td>Collins, Karen</td>
<td>MS14</td>
<td>11:00 Tue</td>
</tr>
<tr>
<td>Collins, Karen</td>
<td>MS44</td>
<td>9:30 Fri</td>
</tr>
<tr>
<td>Collins, Karen</td>
<td>MS44</td>
<td>9:30 Fri</td>
</tr>
<tr>
<td>Condon, Padraig</td>
<td>CP7</td>
<td>9:30 Wed</td>
</tr>
<tr>
<td>Constantine, Paul</td>
<td>CP8</td>
<td>3:45 Wed</td>
</tr>
<tr>
<td>Costalonga, Joao Paulo</td>
<td>MS32</td>
<td>4:15 Wed</td>
</tr>
<tr>
<td>Cowen, Lenore J.</td>
<td>MS15</td>
<td>9:30 Tue</td>
</tr>
<tr>
<td>Cowen, Lenore J.</td>
<td>MS15</td>
<td>9:30 Tue</td>
</tr>
<tr>
<td>Cowen, Lenore J.</td>
<td>MS18</td>
<td>2:45 Tue</td>
</tr>
<tr>
<td>Cranston, Daniel</td>
<td>MS3</td>
<td>9:30 Mon</td>
</tr>
<tr>
<td>Cranston, Daniel</td>
<td>MS3</td>
<td>9:30 Mon</td>
</tr>
<tr>
<td>Cranston, Daniel</td>
<td>MS8</td>
<td>2:45 Mon</td>
</tr>
<tr>
<td>Cummings, Rachel</td>
<td>MS47</td>
<td>10:30 Fri</td>
</tr>
<tr>
<td>Currie, James D.</td>
<td>MS36</td>
<td>9:30 Thu</td>
</tr>
<tr>
<td>Currie, James D.</td>
<td>MS36</td>
<td>9:30 Thu</td>
</tr>
<tr>
<td>Cusack, Charles A.</td>
<td>MS25</td>
<td>10:00 Wed</td>
</tr>
<tr>
<td>Czygrinow, Andrzej</td>
<td>MS31</td>
<td>3:15 Wed</td>
</tr>
<tr>
<td>Dahlberg, Samantha</td>
<td>MS48</td>
<td>11:00 Fri</td>
</tr>
<tr>
<td>Davies, James G.</td>
<td>CP7</td>
<td>9:50 Wed</td>
</tr>
<tr>
<td>Davis, Robert</td>
<td>MS19</td>
<td>4:15 Tue</td>
</tr>
<tr>
<td>Du, Ruoxia</td>
<td>MS19</td>
<td>3:45 Tue</td>
</tr>
<tr>
<td>Dudek, Andrzej</td>
<td>MS10</td>
<td>4:15 Mon</td>
</tr>
<tr>
<td>Duffus, Dwight</td>
<td>MS12</td>
<td>10:00 Tue</td>
</tr>
<tr>
<td>Dvorak, Zdenek</td>
<td>MS2</td>
<td>9:30 Mon</td>
</tr>
<tr>
<td>Edwards, Katherine</td>
<td>MS21</td>
<td>10:30 Wed</td>
</tr>
<tr>
<td>Ekim, Tinaz</td>
<td>MS17</td>
<td>3:45 Tue</td>
</tr>
<tr>
<td>El Rouayheb, Salim</td>
<td>MS9</td>
<td>3:15 Mon</td>
</tr>
<tr>
<td>Eoh, Soogang</td>
<td>CP10</td>
<td>3:45 Thu</td>
</tr>
<tr>
<td>Eslava, Laura</td>
<td>MS4</td>
<td>11:00 Mon</td>
</tr>
<tr>
<td>Exoo, Geoffrey</td>
<td>MS46</td>
<td>11:00 Fri</td>
</tr>
<tr>
<td>Finlinson, Kathleen</td>
<td>MS35</td>
<td>11:30 Thu</td>
</tr>
<tr>
<td>Floresz, Rigoiberto</td>
<td>MS26</td>
<td>11:30 Wed</td>
</tr>
<tr>
<td>Fox, Kyle</td>
<td>MS22</td>
<td>11:30 Wed</td>
</tr>
<tr>
<td>Frazier, Peter L.</td>
<td>MS41</td>
<td>2:45 Thu</td>
</tr>
<tr>
<td>Gao, Pu</td>
<td>MS4</td>
<td>10:00 Mon</td>
</tr>
<tr>
<td>Garcia Trillos, Nicolas</td>
<td>MS45</td>
<td>10:30 Fri</td>
</tr>
<tr>
<td>Ghandehari, Mahya</td>
<td>MS29</td>
<td>3:45 Wed</td>
</tr>
<tr>
<td>Ghasemi, Arash</td>
<td>CP4</td>
<td>10:30 Tue</td>
</tr>
<tr>
<td>Ghaseemian, Amir</td>
<td>MS40</td>
<td>4:15 Thu</td>
</tr>
<tr>
<td>Gimbel, John</td>
<td>MS17</td>
<td>3:15 Tue</td>
</tr>
<tr>
<td>Gitter, Anthony</td>
<td>MS15</td>
<td>10:00 Tue</td>
</tr>
<tr>
<td>Gleich, David F.</td>
<td>MS35</td>
<td>10:00 Thu</td>
</tr>
<tr>
<td>Goddard, Wayne</td>
<td>CP9</td>
<td>9:50 Thu</td>
</tr>
<tr>
<td>Goldwater, John L.</td>
<td>MS28</td>
<td>4:45 Wed</td>
</tr>
<tr>
<td>Gonzalez Hermosillo DeLa, Sebastian</td>
<td>CP2</td>
<td>9:30 Mon</td>
</tr>
<tr>
<td>Gruslys, Vytautas</td>
<td>MS11</td>
<td>4:15 Mon</td>
</tr>
</tbody>
</table>

**Italicized names indicate session organizers**
Martin, Ryan R., MS33, 10:30 Thu
Martino, Ivan, MS26, 11:00 Wed
Martins, Taisa, MS24, 11:30 Wed
McCarty, Rose, MS2, 11:30 Mon
McConnell, Ross, MS27, 4:15 Wed
McDonald, Jessica, MS21, 9:30 Wed
McDonald, Jessica, MS28, 2:45 Wed
McDonald, Jessica, MS44, 11:30 Fri
McKay, Brendan, MS46, 10:00 Thu
McKee, Terry, CP9, 9:30 Thu
Mckenzie, Daniel, CP3, 3:25 Mon
Methuku, Abhishek, MS38, 3:45 Thu
Mohar, Bojan, MS7, 3:15 Mon
Mol, Lucas, CP6, 3:05 Tue
Mol, Lucas, MS48, 11:30 Fri
Molla, Theodore, CP2, 9:50 Mon
Morris, Robert, IP6, 8:15 Thu
Morrison, Natasha, MS11, 3:45 Mon
Morse, Ada, MS26, 10:30 Wed
Mouatadid, Lalla, MS34, 11:30 Thu
Mousset, Frank, MS5, 10:30 Mon
Mu, Lili, MS39, 4:15 Thu
Mubayi, Dhruv, MS43, 10:00 Fri
Muehlehntaler, Moritz, MS23, 11:30 Wed
Muzi, Irene, MS7, 4:15 Mon

N
Nassar, Huda, MS40, 2:45 Thu
Nelsen, Lauren M., MS20, 3:45 Tue
Nishida, Yuki, CP3, 2:45 Mon
Noel, Jonathan A., MS23, 10:00 Wed
Norin, Sergey, MS2, 10:00 Mon

O
O, Suil, CP5, 3:25 Tue
Oum, Sang-II, MS7, 2:45 Mon
Owen, Megan, MS18, 3:45 Tue

P
Papp, Laszlo F., MS37, 10:00 Thu
Pegden, Wes, MS10, 3:45 Mon
Peng, Jian, MS15, 10:30 Tue
Peng, Xing, CP5, 3:05 Tue
Perez-Gimenez, Xavier, MS4, 11:30 Mon
Petti, Samantha N., CP1, 9:50 Mon
Pfender, Florian, MS24, 10:00 Wed
Pierro, Théo, MS28, 3:15 Wed
Pokrovskiy, Alexey, MS5, 9:30 Mon
Pokrovskiy, Alexey, MS5, 9:30 Mon
Pokrovskiy, Alexey, MS11, 2:45 Mon
Poznanovikj, Svetlana, MS16, 10:30 Tue
Puleo, Gregory J., MS21, 9:30 Thu
Puleo, Gregory J., MS21, 9:30 Wed
Puleo, Gregory J., MS28, 2:45 Wed
Purvine, Emilie, MS6, 4:15 Mon

R
Radziszowski, Stanis[1]aw, MS46, 9:30 Fri
Ralli, Peter, MS45, 10:00 Fri
Rampersad, Narad, MS36, 9:30 Thu
Rawat, Ankit, MS9, 2:45 Mon
Reber, David, CP1, 10:50 Mon
Redlin, Shayla, MS14, 9:30 Tue
Reid, Talmage J., MS26, 9:30 Wed
Rigollet, Philippe, MS41, 3:45 Thu
Rocha, Israel S., MS29, 4:45 Wed
Rodriguez, Cynthia, CP7, 10:10 Wed
Rosenfeld, Matthieu, MS36, 10:30 Thu
Rowland, Eric, MS36, 11:30 Thu

S
Šamal, Robert, MS3, 11:00 Mon
Sandee, R B, MS34, 10:00 Thu
Sanhueza-Matamala, Nicolás, CP9, 10:10 Thu
Santana, Michael, CP7, 10:30 Wed
Saurabh, Saket, MS27, 2:45 Wed
Saurabh, Saket, MS27, 2:45 Wed
Saurabh, Saket, MS34, 9:30 Thu
Schmitt, John, MS37, 11:00 Thu
Sedghi, Hanie, MS47, 11:00 Fri
Servatius, Brigitte, MS26, 10:00 Wed
Shallit, Jeffrey, MS36, 9:30 Thu
Shan, Songling, MS28, 3:45 Wed
Shikhelman, Clara, MS11, 3:15 Mon
Shmoys, David, MS41, 2:45 Thu
Shmoys, David, MS47, 9:30 Fri
Sieben, Nandor, MS31, 4:45 Wed
Sileikis, Matas, MS10, 2:45 Mon
Singh, Mona, IP7, 1:30 Thu
Smith, Brett, MS44, 11:00 Fri
Song, Zixia, MS21, 10:00 Wed
Sprikol, Sophie, MS8, 3:45 Mon
Sprikol, Sophie, MS13, 10:00 Tue
Staden, Katherine L., MS38, 3:15 Thu
Stein, Maya, MS43, 9:30 Fri
Sugimori, Ken, MS32, 3:15 Wed
Suk, Andrew, IP5, 1:30 Wed
Svensson, Ola, IP8, 8:15 Fri

T
Tait, Michael, MS20, 2:45 Tue
Tait, Michael, MS42, 3:45 Thu
Taylor, Dane, MS40, 3:45 Thu
Teshima, Laura E., MS23, 10:30 Wed
Tesler, Glenn, MS18, 4:45 Tue
Tetali, Prasad, MS41, 2:45 Thu
Tetali, Prasad, MS47, 9:30 Fri
Timmons, Craig, CP5, 2:45 Tue
Tomon, Istvan, MS33, 11:00 Thu
Tompkins, Casey, MS39, 3:45 Thu
Tran, Tuan, MS12, 10:30 Tue
Trenk, Ann N., MS1, 10:30 Mon
Trenk, Ann N., MS44, 9:30 Fri
Trotter, William T., MS6, 3:15 Mon
Tsourakakis, Charalampos, MS40, 3:15 Thu

U
Uyyasathian, Chariya, CP7, 11:10 Wed
Uzzell, Andrew, MS42, 4:45 Thu
## DM18 Budget

**Conference Budget**  
**SIAM Conference on Discrete Mathematics**  
**June 4-8, 2018**  
**Denver, Colorado**

### Expected Paid Attendance

- 300

### Revenue

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Income</td>
<td>$83,865</td>
</tr>
</tbody>
</table>

**Total** $83,865

### Expenses

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printing</td>
<td>$1,900</td>
</tr>
<tr>
<td>Organizing Committee</td>
<td>$2,700</td>
</tr>
<tr>
<td>Invited Speakers</td>
<td>$10,200</td>
</tr>
<tr>
<td>Food and Beverage</td>
<td>$18,000</td>
</tr>
<tr>
<td>Room Rental</td>
<td>$0</td>
</tr>
<tr>
<td>Advertising</td>
<td>$3,300</td>
</tr>
<tr>
<td>Conference Labor (including benefits)</td>
<td>$29,535</td>
</tr>
<tr>
<td>Other (supplies, staff travel, freight, misc.)</td>
<td>$6,425</td>
</tr>
<tr>
<td>Administrative</td>
<td>$6,813</td>
</tr>
<tr>
<td>Accounting/Distribution &amp; Shipping</td>
<td>$4,456</td>
</tr>
<tr>
<td>Information Systems</td>
<td>$7,538</td>
</tr>
<tr>
<td>Customer Service</td>
<td>$2,907</td>
</tr>
<tr>
<td>Marketing</td>
<td>$4,758</td>
</tr>
<tr>
<td>Office Space (Building)</td>
<td>$3,091</td>
</tr>
<tr>
<td>Other SIAM Services</td>
<td>$3,802</td>
</tr>
</tbody>
</table>

**Total** $105,425

### Net Conference Expense

- ($21,560)

### Support Provided by SIAM

- $21,560

**Total** $0

### Estimated Support for Travel Awards not included above:

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Career and Students</td>
<td>27</td>
<td>$21,190</td>
</tr>
</tbody>
</table>

---

**SIAM Conference on Discrete Mathematics**  
**49**  
**DM18 Budget**