

## Dr. Michelle Delcourt

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Birmingham, England *E-mail:* M.Delcourt@bham.ac.uk  
B15 2TS *WWW:* <http://web.mat.bham.ac.uk/~delcourt/>
- EDUCATION** **University of Illinois at Urbana–Champaign**, Urbana, IL (USA)  
**Ph.D.**, Mathematics August 2011 – May 2017  
• Thesis title: “Viewing extremal and structural problems through a probabilistic lens”  
• Adviser: József Balogh  
**M.S.**, Mathematics December 2012  
**Georgia Institute of Technology (Georgia Tech)**, Atlanta, GA (USA)  
**B.S.**, Discrete Mathematics August 2007 – May 2011  
• Graduated with Highest Honor.
- EMPLOYMENT** **University of Waterloo**, Waterloo (Canada)  
**Research Assistant Professor**, Combinatorics and Optimization Sept. 2018 – August 2021  
**Research Fellow**, Mathematics September 2017 – August 2018  
• Supervisor: Will Perkins
- GRANTS (OVER \$180,000)** American Mathematical Society and Simons Foundation  
• **AMS-Simons Travel Grant (\$4,000)** ..... 2018–2020  
University of Birmingham, Birmingham (UK)  
• **PERCAT Career Development Award** ..... 2018  
US National Science Foundation  
• **Graduate Research Fellowship (\$130,000)** ..... 2011–2016  
Mathematical Association of America  
• **Dolciani Math Enrichment Grant (Co-author \$6,000)** ..... 2016  
Oberwolfach (Germany)  
• **US Junior Oberwolfach Fellowship** ..... 2015  
University of Illinois, Urbana, IL  
• **2015 Public Engagement Grant (PI, \$8,000)**, Office of Public Engagement ..... 2014  
• **2014 Public Engagement Grant (PI, \$6,500)**, Office of Public Engagement ..... 2013  
• **UIUC REGS1 Summer Research Fellowship (\$4,500)**, Department of Mathematics .. 2012  
• **UIUC REGS0 Summer Research Fellowship (\$4,000)**, Department of Mathematics .. 2011
- AWARDS** University of Illinois, Urbana, IL  
• **Graduate Student Leadership Award**, The Graduate College ..... 2016  
• **Graduate Teacher Certificate Award**, Center for Innovation in Teaching and Learning 2013  
**Georgia Tech**, Atlanta, GA  
• **Outstanding Undergraduate Researcher Award**, College of Sciences ..... 2011  
• **Exceptional Research and Service Award**, School of Mathematics ..... 2011
- JOURNAL PUBLICATIONS** 9. Bernshteyn, A, **M. Delcourt**, H. Towsner, and A. Tserunyan. A Nonalgorithmic Short Proof of the Containers Theorems for Hypergraphs. *Submitted*.  
8. Bi, J, R. Davidson, **M. Delcourt**, R. Guzman, C. Monical, J.A. Sanchez, Y. Ren, and S. Zha. A combinatorial method for connecting BHV spaces representing different numbers of taxa. *Submitted*.  
7. **Delcourt, M** and L. Postle. Random 4-regular graphs have 3-star-decompositions asymptotically almost surely. *European Journal of Combinatorics*, 72C (2018), 97–111.

6. Balogh, J, **M. Delcourt**, B. Lidický, and C. Palmer. Counting rainbow copies of  $C_4$  in edge-colored hypercubes. *Discrete Applied Mathematics*, 210 (2016), 35–37.
5. **Delcourt, M** and A. Ferber. On a Conjecture of Thomassen. *Electronic Journal of Combinatorics*, Volume 22, Paper 3.2 (2015), 1–8.
4. Balogh, J, S. Das, **M. Delcourt**, H. Liu, and M. Sharifzadeh. Intersecting families of discrete structures are typically trivial. *J. Comb. Theory Ser. A*, **132** (2015), 224–245.
3. Calkin, N.J., J. Davis, **M. Delcourt**, Z. Engberg, J. Jacob, and K. James. Taking the Convolution out of Bernoulli Convolutions: A Discrete Approach. *Integers*, 13 (2013), no. 19, 1–12.
2. Carraher, J, I. Choi, **M. Delcourt**, L. Erickson, and D.B. West. Locating a robber on a graph via distance queries. *Journal of Theoretical Computer Science*, Vol. 463, 7 Dec. 2012, 54–61.
1. Calkin, N.J., J. Davis, **M. Delcourt**, Z. Engberg, J. Jacob, and K. James. Discrete Bernoulli Convolutions. *Proceedings of the AMS*, Vol. 139, No. 5, May 2011, 1579–1584.

CONFERENCE  
PUBLICATIONS

3. **Delcourt, M**, G. Perarnau, and L. Postle. Rapid mixing of Glauber dynamics for colorings below Vigoda’s  $\frac{11}{6}$  threshold. *Submitted*.
2. **Delcourt, M** and L. Postle. On the List Coloring Version of Reed’s Conjecture. *Elec. Notes in Discrete Mathematics*, Vol. 61 (2017), 343–349.
1. **Delcourt, M** and L. Postle. On Star Decompositions of Random Regular Graphs. *Elec. Notes in Discrete Mathematics*, Vol. 61 (2017), 339–342.

COLLOQUIUM  
TALKS

2. **Random colorings of bounded degree graphs** ..... May 2018  
Colloquia in Combinatorics, London School of Economics (**UK**)
1. **Introduction to Extremal and Probabilistic Combinatorics** ..... Sept. 2016  
Graduate Student Colloquium, University of Illinois

INVITED  
CONFERENCE  
TALKS

10. **On the List Coloring Version of Reed’s Conjecture** ..... Jun. 2017  
CanaDAM, Ryerson University (**Canada**)
9. **Intersecting Families of Permutations** ..... Apr. 2017  
AMS Sectional, Indiana University
8. **Star decompositions of random regular graphs** ..... Nov. 2016  
AMS Sectional, North Carolina State University
7. **Decomposing 4-Regular Random Graphs into Claws** ..... Jun. 2016  
SIAM Discrete Math, Georgia State University
6. **Claw decompositions of random 4-regular graphs** ..... Apr. 2016  
AMS Sectional, North Dakota State University
5. **The Typical Structure of Intersecting Families** ..... Apr. 2015  
Atlanta Lecture Series, Georgia Tech
4. **Real Stable Polynomials and Van der Waerden’s Conjecture** ..... Apr. 2015  
Kadison-Singer Conjecture, Oberwolfach (**Germany**)
3. **A Discrete Approach to Bernoulli Convolutions** ..... Mar. 2014  
Workshop in Combinatorics, University of Szeged (**Hungary**)

SELECT  
CONTRIBUTED  
CONFERENCE  
TALKS

2. **Taking the Convolted out of Bernoulli Convolutions** ..... Jun. 2010  
Mini-Conference on Additive Combinatorics, Georgia Tech
1. **Taking the Convolted out of Bernoulli Convolutions** ..... Oct. 2008  
Mini-Conf. on Discrete Math and Algorithms, Clemson University
10. **Random colorings of bounded degree graphs** ..... Jul. 2018  
ICGT, Université Lyon (France)
9. **On Star Decompositions of Random Regular Graphs** ..... Aug. 2017  
EuroComb, TU Wien (Austria)
8. **On the List Coloring Version of Reed’s Conjecture** ..... Aug. 2017  
Random Structures and Algorithms, Inst. of Eur. Culture (Poland)
7. **Containers-type results in algebraic geometry** ..... Jul. 2017  
SiGMa, University of Waterloo (Canada)
6. **Intersecting families in random settings** ..... Jul. 2015  
Random Structures and Algorithms, Carnegie Mellon University
5. **Intersecting Families of Permutations** ..... Jun. 2015  
Conn. in Discrete Mathematics, Simon Fraser University (Canada)
4. **Infinite Families of Ramanujan Hypergraphs** ..... May 2015  
28th Cumberland Conference, University of South Carolina
3. **Counting rainbow copies of  $C_4$  in hypercubes** ..... Jul. 2014  
SUMMIT 240, Eötvös Loránd University (Hungary)
2. **Discrete Bernoulli Convolutions** ..... Jul. 2013  
7th Czech-Slovak Int. Symp., P.J. Šafárik University (Slovakia)
1. **Discrete Bernoulli Convolutions** ..... Apr. 2013  
Graduate Student Combinatorics Conf., University of Minnesota

INVITED  
SEMINAR TALKS  
AWAY FROM  
HOME  
INSTITUTION

14. **University of Bristol (UK)**, Combinatorics Seminar ..... Mar. 2018
13. **University of Warwick (UK)**, DIMAP Seminar ..... Oct. 2017
12. **Oxford (UK)**, Combinatorial Theory Seminar ..... Oct. 2017
11. **London School of Economics (UK)**, Combinatorics, Games and Optimisation .. Oct. 2017
10. **Université de Bordeaux (France)**, Graphes et Optimisation ..... Sept. 2017
9. **University of Washington**, UW Combinatorics Seminar ..... Mar. 2017
8. **University of Waterloo (Canada)**, Graphs & Matroids Seminar ..... Nov. 2016
7. **Iowa State University**, Discrete Math Seminar ..... Apr. 2016
6. **University of Waterloo (Canada)**, Graph Theory Seminar ..... Nov. 2015
5. **University of Szeged (Hungary)**, Komb. Bonyolultságelmélet Szem. .... Jul. 2015
4. **University of Nebraska-Lincoln**, Discrete Math Seminar ..... Jan. 2015
3. **University of Szeged (Hungary)**, Komb. Bonyolultságelmélet Szem. .... Jul. 2014
2. **ETH Zürich (Switzerland)**, Mittagsseminar ..... Jun. 2014
1. **ENS de Lyon (France)**, Séminaire Graphes et structures discrètes ..... Apr. 2014

INVITED SEMINAR	<b>University of Birmingham</b> , Birmingham (UK) Combinatorics and Probability Seminar ..... Oct. 2017
TALKS AT HOME INSTITUTION	<b>University of Illinois</b> , Urbana, IL Algebra, Geometry and Combinatorics Seminar ..... Nov. 2016 Graph Theory and Combinatorics Seminar ..... Oct. 2016, Nov. 2014 Graduate Student Number Theory Seminar ..... Oct. 2015, Oct. 2013
	<b>Georgia Tech</b> , Atlanta, GA Undergraduate Research Seminar Seminar ..... Dec. 2009 Senior Seminar Series ..... Nov. 2008
ADVISING AND MENTORING	<b>Mentor</b> , Nebraska Conference for Undergraduate Women in Math, UNL ..... Jan. 2015 <b>Undergraduate Research</b> <ul style="list-style-type: none"> <li>• <b>J. Bi and J.A. Sanchez and Y. Ren and S. Zha</b> ..... Fall 2016 Undergraduate students in mathematics, physics, and computer science, University of Illinois. Illinois Geometry Lab project using combinatorics to analyze phylogenetic methods from mathematical biology. With research meetings twice a week, the project resulted in a conference poster and one paper. Primary advisers: Ruth Davidson and Rosemary Guzman.</li> <li>• <b>K. Hou and Y. Song and Z. Wang</b> ..... Fall 2013 Undergraduate students in mathematics, physics, and computer science, University of Illinois. Illinois Geometry Lab project studying percolation theory including conductors and infectious diseases. With research meetings once a week, the project resulted in Mathematica tutorials, laser cut plastic models, and a conference poster. Primary adviser: Kay Kirkpatrick.</li> </ul>
SERVICE	<b>Outreach Grants</b> <b>Dolciani Math Enrichment Grant (Co-author \$6,000)</b> , Math. Association of America ... 2016 <b>2015 Public Engagement Grant (PI, \$8,000)</b> , University of Illinois ..... 2014 <b>2014 Public Engagement Grant (PI, \$6,500)</b> , University of Illinois ..... 2013 <b>Outreach Awards</b> <b>Graduate Student Leadership Award</b> , University of Illinois ..... Apr. 2016 <b>Exceptional Research and Service Award</b> , School of Mathematics, Georgia Tech ..... 2011 <b>Volunteer</b> , Gathering for Gardner, University of Illinois ..... 2017 <b>Volunteer</b> , Central Illinois Day of the Girl ..... 2014 <b>Oral Judge</b> , ICTM State Math Contest Finals ..... 2012–2013 <b>Illinois Geometry Lab</b> , University of Illinois <i>Outreach Manager</i> ..... 2014–2016 <i>Associate Manager</i> ..... 2013–2014 <ul style="list-style-type: none"> <li>• Planned and implemented outreach activities in local elementary, middle, and high schools.</li> <li>• Conducted over thirty field trips to schools in Urbana-Champaign and under-served communities in Chicago, reaching over two thousand participants.</li> <li>• Led six training sessions to show local high school teachers and university instructors how to incorporate active learning techniques in the classroom.</li> <li>• Archived authored materials: <a href="http://faculty.math.illinois.edu/~delcour2/service.html">http://faculty.math.illinois.edu/~delcour2/service.html</a></li> </ul> <b>Association for Women in Mathematics</b> , University of Illinois <i>Outreach Chair</i> ..... 2015–2016 <i>President</i> ..... 2014–2015 <i>Vice President</i> ..... 2012–2014 <ul style="list-style-type: none"> <li>• Organized weekly academic, outreach, and social events for graduate students.</li> </ul>

- Wrote grants, procured other institutional funding, and monitored the budget.
- Arranged professional development opportunities including informal chats with colloquium speakers, panel discussions, and tutorials.

**Sonia Kovalevsky Math Day, University of Illinois**

- Organizer* ..... 2013–2017
- Founded Sonia Kovalevsky Math Days at the University of Illinois, a free day long event to introduce high school girls to higher level mathematics.
  - Procured funding, developed lesson plans, advertised, recruited volunteers, and organized a total of eight SKM Days on topics such as “Math and Magic,” “Logic in Wonderland,” and “Mathematical Paradoxes.”
  - Archived materials at: <https://faculty.math.illinois.edu/~delcour2/service.html>

**Girls Engaged in Math and Science (GEMS), University of Illinois**

- Organizer* ..... 2014–2015
- Founded GEMS at the Orpheum Children’s Science Museum, a free four day long workshop for middle school girls.
  - Procured funding, developed lesson plans, advertised, recruited volunteers, and organized a total of three GEMS Workshops on topics such as “Geometry and Art.”
  - Archived materials at: <https://faculty.math.illinois.edu/~delcour2/service.html>

**Summer Illinois Math Camp, University of Illinois**

- Organizer* ..... 2015
- Instructor, Number Theory* ..... 2015
- Co-founded and procured funding for SIM Camp at the University of Illinois, a free week-long workshop for middle school and high school students.
  - Taught part of a course on “Making and breaking codes: Cryptography.”

**Georgia Tech High School Math Competition, Georgia Tech**

- Organizer* ..... 2008–2011
- Only undergraduate member of the committee responsible for organizing, funding, and running the HSMC for 450 high school students.
  - Responsible for organizing volunteers and compilation of competition exams.
  - Wrote questions, proctored competition, graded, and tabulated scores.

TEACHING  
EXPERIENCE

**Teaching Awards**

- Graduate Teacher Certificate Award**, University of Illinois ..... Apr. 2013
- On List of Teachers Ranked as Outstanding (top 10%)**, University of Illinois .... Spring 2017
- On List of Teachers Ranked as Excellent (top 30%)**, University of Illinois Spring 2012, Fall 2016

**University of Birmingham, Birmingham, England**

- Guest Lecturer* ..... **Oct. 2017**
- Math 2S: Statistics
    - Undergraduate course in statistics (250 students)
    - Main instructor: W. Perkins, Lecture: “The Second Moment Method”

**University of Illinois, Urbana, IL**

- Instructor, with Curriculum Responsibilities* ..... **Aug. 2016 to May 2017**
- Instructor for Math 181: A Mathematical World ..... **Fall 2016, Spring 2017**
    - Undergraduate course for non-math majors (30 students).

- Developed and implemented inquiry-based lessons on topics such as the Game Theory of Game Shows, TSP and Pokémon Go, Non-transitive Dice and Paradoxes in Voting Theory. Materials: <http://faculty.math.illinois.edu/~delcour2/math181spring2017.html>
- Supervised student projects consisting of an essay, educational lesson, piece of artwork, or musical composition relating to some aspect of mathematics.
- Wrote, proctored, and graded weekly quizzes and exams.

*Guest Lecturer* ..... **Oct. 2014**

- Math 580: Introduction to Combinatorics
  - Graduate comprehensive course in combinatorics (40 students)
  - Main instructor: J. Balogh, Lecture: “Menger’s Theorem”

*Teaching Assistant* ..... **Aug. 2011 to May 2012**

- TA for Math 241: Calculus III ..... **Spring 2012**
  - Responsible for two 1-hour recitations twice a week (for two classes, 30 students each).
  - Held office hours for two hours a week.
  - Wrote weekly quizzes, proctored and graded tests.
- TA for Math 221: Calculus I ..... **Fall 2011**
  - Responsible for 1-hour recitations twice a week (for two classes, 30 students each).
  - Held office hours for two hours a week.
  - Wrote weekly quizzes, proctored and graded tests.

**Georgia Tech, Atlanta, GA**

*Teaching Assistant* ..... **Aug. 2009 to Dec. 2009**

- TA for Math 2401: Calculus III ..... Fall 2009
  - Responsible for 1-hour recitations twice a week (35 students).
  - Held office hours for one hour a week.
  - Tutored for all first- and second-year courses for one hour a week in the Tutoring Center.
  - Proctored and graded tests.

*Grader* ..... **Jan 2010 to Dec. 2010**

- Math 3012: Applied Combinatorics ..... Fall 2010
- Math 3012: Applied Combinatorics ..... Spring 2010

**PROFESSIONAL SERVICE**    **Service Awards**

- Outstanding Referee Award**, Discrete Mathematics ..... 2017
- Exceptional Research and Service Award**, School of Mathematics, Georgia Tech ..... 2011

**Referee Service**

- *Journal of Combinatorial Theory, Series B*
- *Combinatorics, Probability and Computing*
- *European Journal of Combinatorics*
- *Electronic Journal of Combinatorics*
- *Journal of Graph Theory*
- *Discrete Mathematics*
- *SIAM Journal on Discrete Mathematics (SIDMA)*

**Conference Service**

- Co-organizer (with Luke Postle): Mini-symposium on Graph Coloring, CanaDAM, Ryerson University (Canada) June 11–13, 2017.

**Committee Service**

**University of Illinois, Urbana, IL**

- Illinois Geometry Lab Selection Committee ..... **Aug. 2013-May 2016**
  - Responsible for reviewing undergraduate applications (over 150) and placing applicants into vertically-integrated research teams.
- Undergraduate Affairs Committee ..... **Jan. 2016 to May 2016**
  - Only graduate member of committee in charge of oversight and advisory for the undergraduate advising, honors, and courses.
- Graduate Affairs Committee ..... **Aug. 2013 to Dec. 2013**
  - One of only two graduate student members of committee in charge of reviewing availability and staffing of graduate courses as well as creation of new courses.

**Georgia Tech, Atlanta, GA**

- Georgia Tech High School Math Competition Committee ..... **Aug. 2008-May 2011**
  - Only undergraduate member of the committee responsible for organizing and running.
  - Responsible for organizing volunteers and compilation of competition exams.
  - Wrote questions, proctored competition, graded, and tabulated scores.

PROFESSIONAL **University of Birmingham, Birmingham, England**  
EXPERIENCE

- Postdoctoral Scholar* ..... **Sep. 2017 to Present**
- Supervisor: Will Perkins
  - Using approaches motivated from statistical physics to study graph coloring questions.

**University of Waterloo, Waterloo, Canada**

- Vising Scholar* ..... **May 2017 to Aug. 2017**

**United States National Science Foundation**

- NSF Graduate Research Fellow* ..... **Aug. 2011 to Jul. 2016**
- \$130,000 total (for three years over period of five years)
  - Tuition and fees (paid to the institution for three years)

**University of Szeged, Szeged, Hungary**

- Vising Scholar* ..... **Feb. 2014 to Aug. 2014**

**University of Illinois, Urbana, Illinois**

- Research Assistant* ..... **Sep. 2013 to Jul. 2014**

SELECT  
WORKSHOPS  
ATTENDED

- Graph Theory Workshop, Oberwolfach (**Germany**) ..... Jan. 2019
- Barbados Workshop on Structural Graph Theory, Bellairs Research Inst. (**Barbados**) .. Apr. 2018
- Barbados Workshop on Structural Graph Theory, Bellairs Research Inst. (**Barbados**) .. Mar. 2017
- Ergodic theory and Combinatorics Conf., University of Agder (**Norway**) ..... Jun. 2015
- Kadison-Singer Conjecture, Oberwolfach (**Germany**) ..... Apr. 2015
- Graph limits, groups and stochastic processes, Rényi Institute (**Hungary**) ..... Jun. 2014
- Program for Women and Math, IAS and Princeton ..... May 2013
- Séminaire de Mathématiques Supérieures, Université de Montréal (**Canada**) ..... Jul. 2012
- Second Montreal Spring School in Graph Theory, McGill (**Canada**) ..... Jun. 2012
- Summer School in Combinatorics, University of Waterloo (**Canada**) ..... Jul. 2010

PROFESSIONAL **Member, Association for Women in Mathematics (AWM)**  
MEMBERSHIPS **Member, American Mathematical Society (AMS)**