Sean O'Rourke

University of Colorado Boulder
Department of Mathematics
Campus Box 395
Boulder, CO 80309-0395

Email: `sean.d.orourke@colorado.edu`
Homepage: `http://math.colorado.edu/~seor3821/`
Phone: (303) 492-7716
Office: MATH 325

Education

Ph.D. Mathematics, University of California, Davis, 2011.

M.A. Mathematics, University of California, Davis, 2008.

B.S. Mathematics, California Polytechnic State University, 2006.

Appointments & Experience

University of Colorado Boulder Department of Mathematics Associate Professor	August 2021 – Present
University of Colorado Boulder Department of Mathematics Assistant Professor	August 2014 – August 2021
Yale University Department of Mathematics Postdoctorate Associate	August 2012 – July 2014
Rutgers University Department of Mathematics Triennial Assistant Professor of Mathematics	September 2011 – July 2012

Affiliated Faculty Appointment

University of Colorado Boulder Department of Applied Mathematics Affiliated Faculty	April 2017 – Present

Publications

1. Andrew Campbell, Sean O'Rourke and David Renfrew. Universality for roots of derivatives of entire functions via finite free probability. Submitted. Available at arXiv:2410.06403, 2024.

2. Sean O'Rourke and Noah Williams. An asymptotic refinement of the Gauss-Lucas Theorem for random polynomials with i.i.d. roots. Available at arXiv:2409.09538, 2024.

3. Marcus Michelen and Sean O'Rourke. On random polynomials with an intermediate number of real roots. *Proceedings of the American Mathematical Society*, 152 (2024), no. 11, 4933–4942.

4. Sean O'Rourke, Zhi Yin, and Ping Zhong. Spectrum of Laplacian matrices associated with large random elliptic matrices. Submitted. Available at arXiv:2308.16171, 2023.

5. Andrew Campbell, Sean O'Rourke, and David Renfrew. The fractional free convolution of *R*-diagonal operators and random polynomials under repeated differentiation. *International Mathematics Research Notices. IMRN*, 2024, no. 13, 10189–10218.

6. Sean O'Rourke, Van Vu, and Ke Wang. Optimal Subspace Perturbation Bounds under Gaussian Noise. *2023 IEEE International Symposium on Information Theory (ISIT)*, Taipei, Taiwan, 2023, pp. 2601–2606.

7. Andrew Campbell, Kyle Luh, and Sean O'Rourke (with an appendix by Santiago Arenas-Velilla and Victor Pérez-Abreu). Extreme eigenvalues of Laplacian random matrices with Gaussian entries. Submitted. Available at arXiv:2211.17175, 2022.

8. Andrew Campbell and Sean O'Rourke. Spectrum of Lévy-Khintchine Random Laplacian Matrices. *Journal of Theoretical Probability*, 37 (2024), no. 1, 933–973.

9. Isabelle Kraus, Marcus Michelen, and Sean O'Rourke. Sums of random polynomials with differing degrees. *Transactions of the American Mathematical Society*, 377 (2024), no. 5, 3325–3355.

10. Sean O'Rourke and Philip Matchett Wood. Quantitative results for banded Toeplitz matrices subject to random and deterministic perturbations. *Linear Algebra and its Applications*, 657 (2023), 50–126.

11. Richard Border, Sean O'Rourke, Teresa de Candia, Michael E. Goddard, Peter M. Visscher, Loic Yengo, Mathew Jones, and Matthew C. Keller. Assortative Mating Biases Marker-based Heritability Estimators. *Nature Communications* 13, 660 (2022).

12. Andrew Campbell and Sean O'Rourke. Spectrum of Heavy-Tailed Elliptic Random Matrices. *Electronic Journal of Probability*, 27 (2022), Paper No. 125, 56 pp.

13. Vishesh Jain, Indrajit Jana, Kyle Luh, and Sean O'Rourke. Circular law for random block band matrices with genuinely sublinear bandwidth. *Journal of Mathematical Physics*, 62, no. 8, Paper No. 083306 (2021).

14. Kyle Luh and Sean O'Rourke. Eigenvectors and controllability of non-Hermitian random matrices and directed graphs. *Electronic Journal of Probability*, 26, Paper No. 16, 1–43 (2021).

15. Sean O'Rourke and Noah Williams. Partial linear eigenvalue statistics for non-Hermitian random matrices. *Theory of Probability and its Applications*, 67 (2023), no. 4, 613–632.

16. Sean O'Rourke and Stefan Steinerberger. A nonlocal transport equation modeling complex roots of polynomials under differentiation. *Proceedings of the American Mathematical Society*, 149, no. 4, 1581–1592 (2021).

17. Sean O'Rourke and Tulasi Ram Reddy. Sums of random polynomials with independent roots. *Journal of Mathematical Analysis and Applications*, 495(1): 124719, 2021.

18. Sean O'Rourke and Noah Williams. On the local pairing behavior of critical points and roots of random polynomials. *Electronic Journal of Probability*, 25:no. 100, 68 pp., 2020.

19. Kyle Luh and Sean O'Rourke. Eigenvector delocalization for non-Hermitian random matrices and applications. *Random Structures & Algorithms*, 57(1):169–210, 2020.

20. Natalie Coston and Sean O'Rourke. Gaussian Fluctuations for Linear Eigenvalue Statistics of Products of Independent iid Random Matrices. *Journal of Theoretical Probability*, 33(3):1541–1612, 2020.

21. Sean O'Rourke, Van Vu, and Ke Wang. Matrices with Gaussian Noise: Optimal Estimates for Singular Subspace Perturbation. *IEEE Transactions on Information Theory*, to appear.

22. Phil Kopel, Sean O'Rourke, and Van Vu. Random matrix products: Universality and least singular values. *Annals of Probability*, 48(3):1372–1410, 2020.

23. Natalie Coston, Sean O'Rourke, and Philip Matchett Wood. Outliers in the spectrum for products of independent random matrices. *Annales de l'Institut Henri Poincaré Probabilités et Statistiques*, 56(2):1284–1320, 2020.

24. Sean O'Rourke and Behrouz Touri. Littlewood-Offord theory and controllability of random structures. In *2016 IEEE 55th Conference on Decision and Control (CDC)*, pages 5195–5200, Dec 2016.

25. Sean O'Rourke and Noah Williams. Pairing between zeros and critical points of random polynomials with independent roots. *Transactions of the American Mathematical Society*, 371(4):2343–2381, 2019.

26. Sean O'Rourke and Philip Matchett Wood. Low-degree factors of random polynomials. *Journal of Theoretical Probability*, 32(2):1076–1104, 2019.

27. Sean O'Rourke, Van Vu, and Ke Wang. Eigenvectors of random matrices: a survey. *Journal of Combinatorial Theory. Series A*, 144:361–442, 2016.

28. Sean O'Rourke and Behrouz Touri. On a conjecture of Godsil concerning controllable random graphs. *SIAM Journal on Control and Optimization*, 54(6):3347–3378, 2016.

29. Sean O'Rourke and Philip Matchett Wood. Spectra of nearly Hermitian random matrices. *Annales de l'Institut Henri Poincaré Probabilités et Statistiques*, 53(3):1241–1279, 2017.

30. Sean O'Rourke and Behrouz Touri. Controllability of random systems: Universality and minimal controllability. Available at arXiv:1506.03125, 2015.

31. Sean O'Rourke. Critical points of random polynomials and characteristic polynomials of random matrices. *International Mathematics Research Notices. IMRN*, (18):5616–5651, 2016.

32. Sean O'Rourke and David Renfrew. Central limit theorem for linear eigenvalue statistics of elliptic random matrices. *Journal of Theoretical Probability*, 29(3):1121–1191, 2016.

33. Sean O'Rourke, David Renfrew, Alexander Soshnikov, and Van Vu. Products of independent elliptic random matrices. *Journal of Statistical Physics*, 160(1):89–119, 2015.

34. Sean O'Rourke, Van Vu, and Ke Wang. Random perturbation of low rank matrices: improving classical bounds. *Linear Algebra and its Applications*, 540:26–59, 2018.

35. Sean O'Rourke and David Renfrew. Low rank perturbations of large elliptic random matrices. *Electronic Journal of Probability*, 19:no. 43, 65 pp., 2014.

36. Hoi H. Nguyen and Sean O'Rourke. On the concentration of random multilinear forms and the universality of random block matrices. *Probability Theory and Related Fields*, 162(1-2):97–154, 2015.

37. Sean O'Rourke and Van Vu. Universality of local eigenvalue statistics in random matrices with external source. *Random Matrices: Theory and Applications*, 3(2):1450005, 37 pp., 2014.

38. Sean O'Rourke and Alexander Soshnikov. Partial linear eigenvalue statistics for Wigner and sample covariance random matrices. *Journal of Theoretical Probability*, 28(2):726–744, 2015.

39. Hoi H. Nguyen and Sean O'Rourke. The elliptic law. *International Mathematics Research Notices. IMRN*, (17):7620–7689, 2015.

40. Sean O'Rourke. A note on the Marchenko-Pastur law for a class of random matrices with dependent entries. *Electronic Communications in Probability*, 17:no. 28, 13 pp., 2012.

41. Sean O'Rourke. Fluctuations of matrix entries of analytic functions of non-Hermitian random matrices. *Random Matrices: Theory and Applications*, 1(3):1250008, 22 pp., 2012.

42. Sean O'Rourke, David Renfrew, and Alexander Soshnikov. Fluctuations of matrix entries of regular functions of sample covariance random matrices. *Theory of Probability and its Applications*, 58(4):615–639, 2014.

43. Sean O'Rourke, David Renfrew, and Alexander Soshnikov. On fluctuations of matrix entries of regular functions of Wigner matrices with non-identically distributed entries. *Journal of Theoretical Probability*, 26(3):750–780, 2013.

44. Sean O'Rourke and Alexander Soshnikov. Products of independent non-Hermitian random matrices. *Electronic Journal of Probability*, 16:no. 81, 2219–2245, 2011.

45. Pierre Dueck, Sean O'Rourke, David Renfrew, and Alexander Soshnikov. Spectral properties of large random matrices with independent entries. In *Noncommutative harmonic analysis with applications to probability III*, volume 96 of *Banach Center Publ.*, pages 115–134. Polish Acad. Sci. Inst. Math., Warsaw, 2012.

46. Sean O'Rourke. Gaussian fluctuations of eigenvalues in Wigner random matrices. *Journal of Statistical Physics*, 138(6):1045–1066, 2010.

Honors, Awards, & Grants

PI of National Science Foundation (NSF) grant No. DMS-2143142, CAREER: Beyond Independence: Random Matrices and Applications, 2022–2027, $430,164.00.

PI of National Science Foundation (NSF) grant No. DMS-1810500, Eigenvectors of Large-Dimensional Random Matrices and Graphs, 2018–2023, $81,533.00.

Co-PI of National Science Foundation (NSF) grant No. ECCS-1610003, Stochastic Approach to Control of Large Scale Networks, 2016–2019, $296,558.00 (PI: Behrouz Touri).

AMS-Simons Travel Grant, July 2012 – June 2015.

Henry L. Alder Prize for Excellence in Teaching, University of California, Davis, 2010.

VIGRE Summer Research Fellowship, University of California, Davis, Summer 2010.

VIGRE Research Fellowship, University of California, Davis, Winter 2010.

VIGRE Summer Research Fellowship, University of California, Davis, Summer 2009.

VIGRE Research Fellowship, University of California, Davis, Spring 2009.

VIGRE Research Fellowship, University of California, Davis, Spring 2008.

Outstanding Mathematics Senior, California Polytechnic State University, 2006.

Dean's List, California Polytechnic State University, 2002 – 2006.

Presentations & Posters

Invited talk at the AMS Fall Western Sectional Meeting Special Session "Random matrices, related structures, and applications," October 2024.

Invited talk at the Institute for Computational and Experimental Research in Mathematics (ICERM) hot topic workshop "Random Matrices and Applications," May 2024.

Talk at the 2024 Rocky Mountain Section meeting of the MAA special session "Random Matrices and Free Probability Theory," April 2024.

Invited talk at the Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM) mini-symposium "Random matrix theory and connections," June 2023.

Invited talk at the University of Illinois at Chicago (UIC) Probability and Combinatorics Seminar, April 2023.

Invited talk at the University of Denver Analysis and Dynamics Seminar, November 2022.

Invited tutorial talks at the Conference on Random Matrix Theory and Numerical Linear Algebra, University of Washington, June 2022.

Invited tutorial talks at the Random Matrix EurAsia 2022 Workshop (held virtually), May 2022.

Invited talk at the Random Matrix EurAsia 2022 Workshop (held virtually), April 2022.

Invited talk at the University of Illinois at Chicago (UIC) Probability and Combinatorics Seminar, November 2021.

Invited talk at the University of Münster Probability Seminar, October 2021.

Invited talk at the AMS Fall Southeastern Sectional Meeting Special Session "Polynomials, Approximation Theory, and Potential Theory," October 2020.

Contributed (virtual prerecorded) talk at the Bernoulli-IMS One World Symposium Special Session "Random matrices," August 2020.

Invited talk at the AMS Fall Western Sectional Meeting Special Session "Random Matrices and Related Structures," November 2019.

Invited talk at the Yale University Analysis-Combinatorics Joint Seminar, October 2019.

Invited talk at the Workshop on High-Dimensional Covariance Operators and their Applications, Humboldt University, Berlin, September 2019.

Invited talk at the University of California, Irvine Probability Seminar, May 2019.

Invited talk at the Georgia Institute of Technology High Dimensional Seminar, April 2019.

Invited talk at the Harvard University Random Matrix & Probability Theory Seminar, November 2018.

Invited talk at the Princeton University Topics in Probability Seminar, November 2018.

Invited talk at the AMS Fall Central Sectional Meeting Special Session "Random Matrix Theory Beyond Wigner and Wishart," October 2018.

Invited talk at the Sums & Products of Random Matrices workshop at the ZiF Center for Interdisciplinary Research, Bielefeld University, Germany, August 2018.

Invited talk at the Case Western Reserve University Department of Mathematics, Applied Mathematics and Statistics Colloquium, April 2018.

Invited talk at the Colorado State University Applied Mathematics Seminar, March 2018.

Invited talk at the University of Colorado Boulder Applied Mathematics Stochastics Seminar, November 2017.

Invited talk at the AMS Fall Western Sectional Meeting Special Session "Random Matrices: Theory and Applications," November 2017.

Invited talk at the University of California, San Diego Electrical and Computer Engineering Colloquium, November 2017.

Invited talk at the University of Colorado Boulder Applied Mathematics Colloquium, October 2016.

Invited session talk at the World Congress in Probability and Statistics hosted by the Fields Institute, Toronto, July 2016.

Invited talk at the Ohio State University Combinatorics and Probability Seminar, June 2016.

Invited talk at the AMS Spring Western Sectional Meeting Special Session "Topics in Probability," April 2016.

Invited talk at the University of Denver Analysis and Dynamics Seminar, November 2015.

Minisymposium talk at the 2015 SIAM Conference on Applied Linear Algebra, October 2015.

Invited talk at the University of Colorado Colorado Springs (UCCS) Department of Mathematics Colloquium, September 2015.

Invited talk at the Random Matrices, Random Growth Processes and Statistical Physics Workshop at the Simons Center for Geometry and Physics, September 2015.

Contributed talk at the 17th International Conference on Random Structures and Algorithms (RS&A2015) at Carnegie Mellon University, July 2015.

Invited talk at the University of Colorado Boulder Probability Seminar, February 2015.

Invited talk at the University of Wisconsin-Madison Probability Seminar, September 2014.

Invited talk at the ICERM Workshop on Eigenvectors in Graph Theory and Related Problems in Numerical Linear Algebra, May 2014.

Invited talk at the Temple University Probability Seminar, April 2014.

Invited talk at the University of Michigan Analysis/Probability Seminar, April 2014.

Invited talk at the University of Virginia Harmonic Analysis and PDEs Seminar, March 2014.

Invited talk at the University of Mississippi Department of Mathematics, January 2014.

Invited talk at the University of Massachusetts Amherst Department of Mathematics and Statistics, January 2014.

Invited talk at Indiana University Bloomington Department of Mathematics, January 2014.

Invited talk at the University of Connecticut Department of Mathematics, January 2014.

Invited talk at the University of Rochester Department of Mathematics, January 2014.

Invited talk at the 2014 Joint Mathematics Meetings AMS Special Session on Random Matrices, January 2014.

Invited talk at the University of Colorado Boulder Department of Mathematics, December 2013.

Contributed talk at the 36th Conference on Stochastic Processes and their Applications, August 2013.

Invited talk at the University of California, Los Angeles Participating Analysis Seminar, March 2013.

Invited talk at the Yale University Combinatorics and Probability Seminar, November 2012.

Poster presentation for the Random Matrix Workshop at Hausdorff Center for Mathematics, May 2012.

Invited talk at the University of Pennsylvania Combinatorics and Probability Seminar, April 2012.

Invited talk at the University of Colorado Boulder Probability Seminar, March 2012.

Invited talk at the University of California, Davis Mathematical Physics & Probability Seminar, February 2011.

Invited talk at the University of Alberta Department of Mathematical and Statistical Sciences, January 2011.

Short talk at the Arizona School of Analysis with Applications, March 2010.

Poster presentation at the V Brunel Workshop on Random Matrix Theory, December 2009.

Talk at the University of California, Davis Student-Run Math Seminar, October 2009.

Talk at the University of California, Davis Student-Run Discrete Math Seminar, November 2007.

Teaching Experience

Courses Taught at the University of Colorado Boulder

Spring 2025:	MATH 4650: Intermediate Numerical Analysis 1
	MATH 6350: Functions of a Complex Variable 1
Fall 2024:	MATH 3001: Analysis 1
Spring 2024:	MATH 3001: Analysis 1
	MATH 4530: Foundations of Data Science
Fall 2023:	MATH 6534: Topics in Mathematical Probability
Spring 2022:	MATH 3001: Analysis 1
Fall 2021:	MATH 6310: Introduction to Real Analysis 1
Spring 2021:	MATH 3001: Analysis 1
Fall 2020:	FYSM (First Year Seminar): Impossible or Implausible: Paradoxes and Puzzles
	MATH 6350: Functions of a Complex Variable 1
Spring 2020:	MATH 2400: Calculus 3 (course coordinator and instructor for 2 sections)
Spring 2019:	MATH 4520: Introduction to Mathematical Statistics
Fall 2018:	FYSM (First Year Seminar): Impossible or Implausible: Paradoxes and Puzzles
Spring 2018:	MATH 4520: Introduction to Mathematical Statistics
	MATH 6320: Introduction to Real Analysis 2
Fall 2017:	MATH 4510: Introduction to Probability Theory
Fall 2016:	MATH 6350: Functions of a Complex Variable 1
Spring 2016:	MATH 3001: Analysis 1
	MATH 4520: Introduction to Mathematical Statistics
Fall 2015:	MATH 6310: Introduction to Real Analysis 1
Spring 2015:	MATH 3001: Analysis 1
	MATH 4510: Introduction to Probability Theory
Fall 2014:	MATH 6534: Topics in Mathematical Probability

Undergraduate Student Independent Study at the University of Colorado Boulder

Spring 2025:	The Probabilistic Method. Melanie Fouque
Spring 2022:	Enumerative Combinatorics. Lex Bradford
Spring 2021:	Controllability of Random Graph Laplacians (cont.). Kyle Schneider
Fall 2020:	Controllability of Random Graph Laplacians. Kyle Schneider
Fall 2019:	Random Graphs (cont.). Poramate Nakkirt
Spring 2019:	Random Graphs. Poramate Nakkirt
	Random Polynomials. Megan Collins
Spring 2018:	Spectral Properties of Random Graphs. Megan Sochinski
	The Probabilistic Method. Ian Gossett

Graduate Student Independent Study at the University of Colorado Boulder

Spring 2024:	Random Matrix Theory. Jackson Carpenter
	High dimensional Probability. Wilson Wu
Fall 2023:	Topics in Random Matrix Theory. Calum Shearer
	Random Matrix Theory. Aidan Powers
Spring 2023:	Topics in Random Matrix Theory. Jackson Carpenter
Spring 2019:	Probability Theory. Sangman Lee, Joel Ornstein, and Yu Wang
Fall 2018:	Entries of Functions of Random Matrices. Shumin Zeng
	Random Matrix Theory. Andrew Campbell
Spring 2015:	Markov Chains and Mixing Times. Natalie Coston and Noah Williams

Courses Taught at Rutgers University

Spring 2012:	Multivariable Calculus
	Mathematical Theory of Statistics
Fall 2011:	Introductory Linear Algebra
	Multivariable Calculus

Courses Taught at the University of California, Davis

Summer 2011:	Linear Algebra
Fall 2010:	Differential Calculus
Spring 2010:	Calculus for Biology and Medicine
Fall 2009:	Trigonometry
Fall 2008:	Precalculus
Summer 2008:	Linear Algebra
Fall 2007:	Trigonometry
Summer 2007:	Vector Analysis

Supervision

Completed Doctoral Graduate Students

Andrew Campbell, Ph.D. May 2023
Thesis: *Spectral Properties of Random Matrices with Dependent Entries*

Ali Lotfi, Ph.D. May 2022 (co-advised with Prof. Julien Langou)
Thesis: *Numerical Stability of the GSXO Orthogonalization Scheme*

Noah Williams, Ph.D. May 2019
Thesis: *On the pairing between zeros and critical points of random polynomials with independent roots*

Natalie Coston, Ph.D. May 2018
Thesis: *Spectral Properties of Products of Independent Random Matrices*

Current Doctoral Graduate Students

Jackson Carpenter, candidate

Isabelle Kraus, candidate

Calum Shearer, candidate

Completed Masters' Students

Yuwei Jia, M.A. 2021
Presentation: *Estimating covariance matrices*

Shumin Zeng, M.A. 2018
Presentation: *Matrix entries of analytic functions of random matrices*

Postdoctoral Scholars

Nhan Nguyen, 2023–Present

Philip Kopel, 2016–2018

Summer Research Experience Supervision

Summer 2024:   Derivatives of Random Polynomials (co-organized with Kyle Luh)
Jeff (JJ) Calhoun (CU undergraduate student), Mazzy Fennell (CU undergraduate student), Edouard Heitzmann (CU graduate student), Ellie Le (CU undergraduate student), Asa Morrison (CU undergraduate student), Tony Samour (CU undergraduate student)

Summer 2022:   Roots and critical points of random polynomials
Omar Almutawa (CU undergraduate), Lex Bradford (CU undergraduate), Jackson Carpenter (CU graduate student), Nicholas Christoffersen (CU graduate student), Charlotte Crotwell (CU graduate student), Zee Culwell (CU undergraduate), Tianna Juarez (CU undergraduate)

Summer 2020:   Sums of random polynomials
Gabriel Lopez (CU graduate student), Levi Lorenzo (CU graduate student), Franny McWilliams (CU undergraduate), Kyle Schneider (CU undergraduate)

Summer 2019:   Sums of random polynomials (as part of the CU Science Discovery STEM Research Experience Program)
Arjun Ramani (high school student), Eojin Lee (high school student)

Summer 2018:   Invertible random matrices
David Atkinson (CU undergraduate), Andrew Campbell (CU graduate student), Megan Collins (CU undergraduate), Christopher Dudley (CU undergraduate), Yueqi Pan (CU undergraduate)

Summer 2016:   Critical points of random polynomials and random matrices
Krisztina Dearborn (CU graduate student), Ian Gossett (CU undergraduate), Shen Lu (CU graduate student), Isaac Vance (CU undergraduate), Katherine Zagnoli (CU undergraduate), Shumin Zeng (CU undergraduate)

Summer Math Academy

Summer 2024:   Math academy and video game design summer course
Two week course on advanced mathematics and video game design for high school students as part of the CU Science Discovery program. Supervised 9 high school participants as well as 2 TAs.

Summer 2023:   Math academy and video game design summer course
Two week course on advanced mathematics and video game design for high school students as part of the CU Science Discovery program. Supervised 10 high school participants as well as 3 TAs.

Undergraduate Honors Thesis Supervision

Kyle Schneider - magna cum laude, May 2021
Thesis: *Uncontrollable Networks for Laplacian Leader-Follower Dynamics*

Megan Collins - summa cum laude, May 2020
Thesis: *Distribution and Properties of the Critical Values of Random Polynomials with Non-Independent and Non-Identically Distributed Roots*

Poramate Nakkirt - magna cum laude, December 2019
Thesis: *Limiting Moments of the Eigenvalue Distribution of the Watts–Strogatz Random Graph*

Megan Sochinski - magna cum laude, May 2018
Thesis: *Finding Planted Cliques in Erdős–Rényi Random Graphs: Improving previous methods and expanding applications*

Conference & Workshop Participation

(Upcoming) Second Conference on Random Matrix Theory and Numerical Linear Algebra, June 2025.

2024 Rocky Mountain Section meeting of the MAA, April 2024.

Conference on Random Matrix Theory and Numerical Linear Algebra at the University of Washington, June 2022.

Random Matrix EurAsia 2022, May 2022.

2022 Joint Mathematics Meetings, April 2022.

2020 Joint Mathematics Meetings, January 2020.

AMS Fall Western Sectional Meeting, November 2019.

High-Dimensional Covariance Operators and their Applications at Humboldt University, Berlin, September 2019.

41st Stochastic Processes and their Applications Conference, July 2019.

AMS Fall Central Sectional Meeting, October 2018.

Sums & Products of Random Matrices workshop at the ZiF Center for Interdisciplinary Research, Bielefeld University, Germany, August 2018.

AMS Fall Western Sectional Meeting, November 2017.

AMS Fall Western Sectional Meeting, October 2016.

World Congress in Probability and Statistics hosted by the Fields Institute, Toronto, July 2016.

AMS Spring Western Sectional Meeting, April 2016.

SIAM Conference on Applied Linear Algebra, October 2015.

Random Matrices, Random Growth Processes and Statistical Physics Workshop at the Simons Center for Geometry and Physics, September 2015.

17th International Conference on Random Structures and Algorithms (RS&A2015) at Carnegie Mellon University, July 2015.

ICERM Workshop on Eigenvectors in Graph Theory and Related Problems in Numerical Linear Algebra, May 2014.

2014 Joint Mathematics Meetings, January 2014.

36th Conference on Stochastic Processes and their Applications, August 2013.

AMS Short Course on Random Matrices at the 2013 Joint Mathematics Meetings, January 2013.

Random Matrix Workshop at the Hausdorff Center for Mathematics, May 2012.

105th Statistical Mechanics Conference, May 2011.

Random Matrices Workshop at the American Institute of Mathematics, December 2010.

Random Matrix Theory and its Applications II Workshop at MSRI, December 2010.

Random Matrix Theory and its Applications I Workshop at MSRI, September 2010.

Arizona School of Analysis with Applications, March 2010.

V Brunel Workshop on Random Matrix Theory, December 2009.

Random Matrix Theory Graduate Workshop at MSRI, July 2009.

Service & Leadership

Service to the Department of Mathematics at the University of Colorado Boulder

Primary Unit Evaluation Committee for Assistant Professor Kyle Luh's Comprehensive Review (Fall 2024) (chair).

Faculty hiring committee (Fall 2023).

Associate Chair for Undergraduate Studies (Spring 2022).

Kempner Colloquium Organizer (August 2015 – May 2022; January 2024 – July 2024).

Probability Seminar Organizer (August 2014 – Present).

Undergraduate Committee (August 2014 – July 2015; August 2017 – July 2018; August 2019 – July 2022; August 2023 – Present).

Primary Unit Evaluation Committee for Assistant Professor Agnés Beaudry's Tenure and Promotion to Associate Professor (Fall 2021).

Primary Unit Evaluation Committee for Dr. Albert Bronstein's Reappointment as Instructor (Fall 2020).

Faculty mentor to Kyle Luh (August 2020 – Present).

Course Coordinator, Calculus 3, 13 sections (Spring 2020).

Faculty Hiring Committee (September 2019 – January 2020).

Committee for Lower Division Curriculum Matters (August 2018 – July 2019).

Diversity Committee (August 2016 – July 2017).

Analysis Preliminary Examination Committees for Fall 2015, Fall 2016, Fall 2018, Fall 2020, Spring 2024, and Spring 2025 exams.

Service to Other Departments at the University of Colorado Boulder

Department of Electrical, Computer and Energy Engineering Faculty Search Committee (September 2017 – April 2018).

Service to the University of Colorado Boulder

Advisory Board for the First Year Seminar Program (Fall 2020).

Ph.D. Dissertation Committees at the University of Colorado Boulder

Isabelle Kraus, Department of Mathematics, Fall 2024 (advisor)

Charlie Carlson, Department of Computer Science, Summer 2023

Daniel Ferguson, Department of Applied Mathematics, Summer 2022

Krisztina Dearborn, Department of Mathematics, Summer 2022

Ali Lotfi, Department of Mathematics, Spring 2022 (advisor)

Zhe Feng, Department of Electrical, Computer and Energy Engineering, Spring 2021

Albany Thompson, Department of Mathematics, Spring 2021

Braden Balentine, Department of Mathematics, Spring 2021

Zhenhua Wang, Department of Mathematics, Spring 2020

Saeed Khalili, Department of Mathematics, Fall 2019

Noah Williams, Department of Mathematics, Spring 2019 (advisor)

Natalie Coston, Department of Mathematics, Spring 2018 (advisor)

Peter Willis, Department of Applied Mathematics, Spring 2018

Ian Long, Department of Mathematics, Fall 2017

Master's Defense Committees at the University of Colorado Boulder

Yuwei Jia, Department of Mathematics, Fall 2021 (advisor)

Richard Dyer, Department of Mathematics, Fall 2018

Shumin Zeng, Department of Mathematics, Fall 2018 (advisor)

Isabel Corona, Department of Mathematics, Spring 2018

Kellin Pelrine, Department of Mathematics, Spring 2018

Brendt Gerics, Department of Mathematics, Spring 2018

Patrick Normile, Department of Mathematics, Spring 2016

Xiaorong Lie, Department of Mathematics, Spring 2016

Undergraduate Honors Thesis Committees at the University of Colorado Boulder

Kyle Schneider, Department of Mathematics, Spring 2021 (advisor)

Megan Collins, Department of Mathematics, Spring 2020 (advisor)

Poramate Nakkirt, Department of Mathematics, Fall 2019 (advisor)

Megan Sochinski, Department of Mathematics, Spring 2018 (advisor)

Manna Chen, Department of Economics, Spring 2016

Comprehensive Examination Committees at the University of Colorado Boulder

Benjamin Kitchen, Department of Mathematics, Fall 2024

Nicholas Christoffersen, Department of Mathematics, Fall 2023

Daniel Ferguson, Department of Applied Mathematics, Fall 2021

Peter Rock II, Department of Mathematics, Fall 2021

Ian Miller, Department of Mathematics, Spring 2021

Isabelle Kraus, Department of Mathematics, Fall 2020 (advisor)

Zhe Feng, Department of Electrical, Computer and Energy Engineering, Fall 2019

Andrew Campbell, Department of Mathematics, Spring 2019 (advisor)

Albany Thompson, Department of Mathematics, Fall 2018

Krisztina Dearborn, Department of Mathematics, Spring 2018

Braden Balentine, Department of Mathematics, Fall 2017

Noah Williams, Department of Mathematics, Fall 2016 (advisor)

Saeed Khalili, Department of Mathematics, Fall 2016

Ian Long, Department of Mathematics, Fall 2015

Natalie Coston, Department of Mathematics, Fall 2015 (advisor)

Kathleen Smith, Department of Mathematics, Fall 2014

Special Session and Summer School Organization

Co-organizer of the workshop "Random Polynomials and their Applications" at the Institute for Computational and Experimental Research in Mathematics (ICERM), August 2025.

Co-organizer of the special session "Random Matrices and Free Probability Theory" at the 2024 Rocky Mountain Section meeting of the MAA, April 2024.

Co-organizer of the Summer School on Random Matrix Theory and Its Applications at the Ohio State University, May 2023.

Co-organizer of the AMS Special Session on Random Matrix Theory and its Applications at the 2022 Joint Mathematics Meetings, April 2022.

Co-organizer of the AMS Special Session on Random Polynomials and Related Models at the 2022 Joint Mathematics Meetings, April 2022.

Co-organizer of the Special Session "Random matrices and integrable systems" at the 2020 Joint Mathematics Meetings, January 2020.

Organizer of the Contributed Session "Random matrices" at the 41st Stochastic Processes and their Applications Conference, July 2019.

Co-organizer of the Special Session "Random matrices, integrable systems, and applications" at the AMS Fall Western Sectional Meeting, October 2016.

Co-organizer of the mini-symposium "Randomness in Spectral Analysis" at the SIAM Conference on Applied Linear Algebra, October 2015.

Referee

Member of grant review panel for the National Science Foundation, October 2022.

Ad hoc expert reviewer for National Science Foundation, March 2024.

Reviewer for Israel Science Foundation, March 2022, March 2023, and March 2024.

Reviewer for Swiss National Science Foundation, April 2020.

Referee for the following journals and conferences:

Annales de l'Institut Henri Poincaré, Probabilités et Statistiques

Annals of Applied Probability

Annals of Statistics

Bernoulli Journal

Communications in Contemporary Mathematics

Communications in Mathematical Physics

Discrete Mathematics

Duke Mathematical Journal

Electronic Communications in Probability

Electronic Journal of Probability

EPL (Europhysics Letters)

Forum of Mathematics, Sigma

Geometric And Functional Analysis (GAFA)

International Mathematics Research Notices

Israel Journal of Mathematics

Journal of Mathematical Analysis and Applications

Journal of Mathematical Physics

Journal of Statistical Physics

Journal of Statistical Planning and Inference

Journal of Theoretical Probability

Linear Algebra and its Applications

Potential Analysis

Probability Surveys

Probability Theory and Related Fields

Proceedings of the American Mathematical Society

Proceedings of Symposia in Applied Mathematics

Random Matrices: Theory and Applications

SIAM Journal on Matrix Analysis and Applications (SIMAX)

Statistics & Probability Letters

Transactions of the American Mathematical Society

Outside Thesis Committees

Andrei Florin Deneanu, Applied Mathematics, Yale University, Spring 2019 (Ph.D. thesis reader)

Alkéos Michaïl, Applied Mathematics, Paris Descartes University, Spring 2018 (Ph.D. thesis reader)

Oanh Nguyen, Mathematics, Yale University, Spring 2017 (Ph.D. thesis reader)

Jean Rochet, Applied Mathematics, Paris Descartes University, Spring 2016 (Ph.D. thesis reader)

Outreach Talks

Invited talk at the University of Colorado Boulder Math Club, October 2019

Invited talk at the Colorado Academy Math Club, December 2018

Invited talk at the Colorado Academy Math Club, December 2017

Invited talk at the University of Colorado Boulder Math Club, November 2016

Graduate Student Mentoring

Mentor to the following incoming graduate students: Zhenhua Wang (AY 2015–2016), Ian Miller (AY 2018–2019), Spencer Shortt (AY 2020–2021), Wilson Wu (AY 2023–2024), Storey Peacock (AY 2024–2025).

Professional Development Activities

University of Colorado Boulder

Faculty Teaching Excellence Program (FTEP): Flipping the Class for the Skeptic, December 2019

Faculty Teaching Excellence Program (FTEP): Designing a Syllabus for an Effective & Flexible Course, August 2018

First Year Seminar Training, June 2018 and August 2020.

Tenure and Promotion Workshops, October 2016, April 2018, and May 2020

Faculty Teaching Excellence Program (FTEP) Summer Assessment Institute: Achieving Course Goals: Gathering Evidence About Student Learning, May 2015

New Faculty Orientation, August 2014

Technical Skills

C, C++, LaTeX, Linux, HTML/CSS, MATLAB, Python, Rust.