

Philip S. Chodrow

Assistant Professor of Computer Science
Middlebury College

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Experience

Assistant Professor of Computer Science
MIDDLEBURY COLLEGE

2022 – present
Middlebury, VT

Hedrick Visiting Assistant Adjunct Professor of Mathematics
UNIVERSITY OF CALIFORNIA, LOS ANGELES

2020 – 2022
Los Angeles, CA

Education

PhD in Operations Research
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

2015-2020
Cambridge, MA

BA in Mathematics and Philosophy
SWARTHMORE COLLEGE

2008-2012
Swarthmore, PA

Grants, Fellowships and Funding

RUI: Network Evolution with Unobserved Mechanisms (\$287,522)
NATIONAL SCIENCE FOUNDATION (NSF)

2024-2027
Middlebury, VT

Graduate Research Fellowship (\$138,000)
NATIONAL SCIENCE FOUNDATION (NSF)

2017-2020
Cambridge, MA

Fulbright Research Award (~\$28,000)
US-NORWAY FULBRIGHT FOUNDATION

2012-2013
Oslo, Norway

Papers

In Review

2. Izabel Aguiar, **PSC** and Johan Ugander (2025): The Illusion of Households as Entities in Social Networks. doi:10.48550/arXiv.2502.14764
1. Xie He, **PSC** and Peter J. Mucha (2025): Hypergraph Link Prediction via Hyperedge Copying. doi:10.48550/arXiv.2502.02386 (two equal first authors)

Peer Reviewed

15. **PSC**, Harlin Lee, Natalie Lao and Vincent Monardo (2025): Active Learning for Reducing Gender Gaps in Undergraduate Computing and Data Science. *Advances in Data Science: Women in Data Science and Mathematics (WiSDM) 2023* 37, 362.

14. Heather Z. Brooks, **PSC** and Mason A. Porter (2024): Emergence of Polarization in a Sigmoidal Bounded-Confidence Model of Opinion Dynamics. *SIAM Journal on Applied Dynamical Systems* 23, 1442–1470.
13. Jürgen Krietschgau, Daniel Kaiser, Oliver Alvarado Rodriguez, Ilya Amburg, Jessalyn Bolkema, Thomas Grubb, Fangfei Lan, Sepideh Maleki, **PSC** and Bill Kay (2024): Community Detection in Hypergraphs via Mutual Information Maximization. *Scientific Reports* 14, 6933.
12. Quindel Jones, Andrés R. Vindas-Meléndez, Ariana Mendible, Manuchehr Aminian, Heather Z. Brooks, Nathan Alexander, Carrie Diaz Eaton and **PSC** (2023): Data Science and Social Justice in the Mathematics Community. *Notices of the American Mathematical Society* 70, 1.
11. **PSC**, Nicole Eikmeier and Jamie L. Haddock (2023): Nonbacktracking Spectral Clustering of Nonuniform Hypergraphs. *SIAM Journal on Mathematics of Data Science* 5, 251–279.
10. Mary Angelique G. Demetillo, Colin Harkins, Brian C. McDonald, **PSC**, Kang Sun and Sally E. Pusede (2021): Space-based Observational Constraints on NO₂ Air Pollution Inequality from Diesel Traffic in Major US Cities. *Geophysical Research Letters* 48, e2021GL094333.
9. **PSC**, Nate Veldt and Austin R. Benson (2021): Generative Hypergraph Clustering: From Blockmodels to Modularity. *Science Advances* 7, eabh1303.
8. Mari Kawakatsu, **PSC**, Nicole Eikmeier and Daniel B. Larremore (2021): Emergence of Hierarchy in Networked Endorsement Dynamics. *Proceedings of the National Academy of Sciences* 118, e2015188118. (three equal first authors)
7. **PSC** (2020): Configuration Models of Random Hypergraphs. *Journal of Complex Networks* 8, cnaa18.
6. **PSC** (2020): Moments of Uniform Random Multigraphs with Fixed Degree Sequences. *SIAM Journal on Mathematics of Data Science* 2, 1034–1065.
5. **PSC** and Peter J. Mucha (2020): Local Symmetry and Global Structure in Adaptive Voter Models. *SIAM Journal on Applied Mathematics* 80, 620–638.
4. **PSC** and Andrew Mellor (2020): Annotated Hypergraphs: Models and Applications. *Applied Network Science* 5, 9.
3. **PSC** (2017): Structure and Information in Spatial Segregation. *Proceedings of the National Academy of Sciences* 114, 11591–11596.
2. **PSC**, Zeyad Al-Awwad, Shan Jiang and Marta C. González (2016): Demand and Congestion in Multiplex Transportation Networks. *PloS ONE* 11, e161738.
1. **PSC**, Cole Franks and Brian Lins (2013): Upper and Lower Bounds for the Iterates of Order-Preserving Homogeneous Maps on Cones. *Linear Algebra and its Applications* 439, 999–1005.

Working Papers

3. **PSC**, Heather Z. Brooks, Harlin Lee, Anna Haensch, Juan G. Restrepo and Mason A. Porter: Dynamics of Female Gender Representation in Academic Mathematics. *In progress*.
2. Yifei Luo*, Nicholas W. Landry and **PSC**: Efficient Sampling of Configuration-Model Hypergraphs. *In progress*. (*Undergraduate mentee)
1. William Thompson, Moyi Tian, Thomas Gebhart, Linh Huynh, Alexander Wiedemann, Vicki Modisette, **PSC** and Heather Z. Brooks: Inferring Interaction Kernels from Stochastic Opinion Dynamics on Networks. *In progress*.

Other Writings

4. **PSC** (2025): Equivalence of Informations Characterizes Bregman Divergences. doi:10.48550/arXiv.2501.02104
3. **PSC**, Manuchehr Aminian, Carlos Paniagua and Jude Higdon (2021): Persons Charged with Violations of 21 U.S.C. §846: Poverty, Unemployment, Education, and Sentences.
2. **PSC**, Mari Kawakatsu, Nicole Eikmeier and Daniel B. Larremore (2021): Networks, Dynamics, and Prestige: How Hierarchies Emerge from Individual Choices. *SIAM News Blog*.
1. **PSC** (2017): Divergence, Entropy, Information: An Opinionated Introduction to Information Theory. *arXiv: 1708.07459*.

Invited Talks

Dynamics of Gender Representation in Professional Mathematics

- 2025 SIAM Conference on Applied Dynamical Systems
- 2025 Michigan State University CMSE Seminar
- 2024 Tufts University Applied Mathematics Seminar

Connection, Computation, and Complex Systems in Undergraduate Education

- 2024 Conference on Network Science (NetSci)

Edge-Correlated Growing Hypergraphs

- 2025 CIRRELT Network Science Workshop
- 2024 BRAINS Seminar: Bridging AI, Networks and Hypergraphs

Challenges and Opportunities in Hypergraph Network Data Science

- 2023 Vermont-KIAS Workshop on Group Interactions in Network Science
- 2023 Joint Math Meetings: Special Session on Hypergraph Data Science

Feedback Loops from Ranking in Networks

- 2023 Smith College Mathematics Seminar
- 2021 REU on Kaczmarz Methods for Large-Scale Data Analysis, Claremont Colleges

- 2021 UCLA Undergraduate Mathematics Student Association

Generative Hypergraph Clustering: Scalable Hueristics and Sparse Thresholds

- 2024 Toronto Metropolitan University Network Science Seminar
- 2023 University of Vermont Joint Lab Seminar
- 2023 University of Edinburgh Informatics Seminar
- 2023 University of Glasgow Computer Science Seminar
- 2022 Oxford University Networks Seminar
- 2022 Swarthmore College Mathematics Seminar
- 2022 Middlebury College Computer Science Seminar
- 2022 Colgate University Computer Science Seminar
- 2022 Wesleyan University Computer Science Seminar
- 2021 Canadian Mathematical Society Winter Meeting
- 2021 Claremont Center for the Mathematical Sciences
- 2021 UCLA Undergraduate Mathematics Student Association
- 2021 Grinnell College Computer Science Seminar
- 2021 Conference on Network Science (NetSci): Satellite on Higher-Order Models in Network Science
- 2021 Association for the Advancement of Artificial Intelligence (AAAI): Workshop on Graphs and Complex Systems

Random Graphs for Data Science

- 2020 UCLA Network Science Seminar
- 2020 MIT ORC Student Seminar
- 2019 Northeastern University Network Science Seminar

Public Talks: Data Science and AI

- 2023 Middlebury DLINQ Summer Workshop
- 2023 Middlebury TEDx
- 2023 Middlebury Faculty At Home

Other Professional Events

Invited Panels

- 2022 Panel on Academic Job Interviews
Pomona REU
- 2022 Data Science and the Social Sciences
UCLA Data Science Union
- 2021 Early-Career Research Panel
Northeastern Regional Conference on Complex Systems
- 2021 Perspectives on Graphs and Complex Structures for Learning and Reasoning
AAAI

Workshop Participation

- 2025 Collective Social Phenomena: Dynamics and Data
Casa Matemática Oaxaca (CMO)
- 2023 Data Science and Social Justice: Networks, Policy, and Education
ICERM
- 2023 AMS Mathemematics Research Community: Mathematics of Complex Social Systems
- 2022 Data Science and Social Justice: Networks, Policy, and Education
ICERM
- 2022 AMS Mathemematics Research Community: Models and Methods for Sparse (Hyper)Network Science

Recognition

Finalist Nominee, Inclusive Design for Learning Award

2025

MIDDLEBURY CTRLR AND ADVISORY GROUP ON DISABILITY, ACCESS, AND INCLUSION

Middlebury, VT

"...highlights an instructor's embrace of Inclusive Design and the role of Inclusive Design in high quality instruction."

Liggett Instructor Distinguished Faculty Teaching Award

2022

DEPARTMENT OF MATHEMATICS, UCLA

Los Angeles, CA

"Recognizing excellence in contribution to the instructional mission of the Department."

Ivy Award

2012

SWARTHMORE COLLEGE

Swarthmore, PA

"Recognizing the man of the graduating class who is outstanding in leadership, scholarship, and contributions to the Swarthmore College community."

Travel and Conference Awards

- 2022 SIAM Travel Award, *SIAM Conference on Mathematics of Data Science*
2021 SIAM Travel Award, *SIAM Conference on Applications of Dynamical Systems*
2020 Best Poster Award, *Northeastern Regional Conference on Complex Systems*

Teaching

Middlebury College

- S25 CSCI 0442: *Network Science*
S23×2, S24, S25, S26×2 CSCI 0451: *Machine Learning*
W26 CSCI 1010: *Applied Data Science*
F23×2, F24×2, F25×2 CSCI 0200: *Mathematical Foundations of Computing*
W24, S24, F24, W25 CSCI 0702: *Senior Thesis*
F24 CSCI 0500: *Advanced Study*
F22×2 CSCI 0145: *Introduction to Computing*

University of California, Los Angeles

- S22 MATH 168: *Introduction to Networks*
S21, F21, W22 PIC 16B: *Python Programming with Applications II*
F20, W21, S21, F21 PIC 16A: *Python Programming with Applications I*

Thesis and Research Students

PhD Committees

- 2025 William Thompson Complex Systems, University of Vermont

Middlebury Thesis Advisees

- 2025 Violet Ross *Growing Hypergraphs with Node Attributes*
2024 Bell Luo *Efficient Sampling from Hypergraph Configuration Models*
Jamie Hackney *Opinion Dynamics and Electoral Systems*

Other Middlebury Research Students

- 2025 Francis Cataldo *Community Detection in Growing Hypergraphs*
2024 Justin Corke *Degree Assortativity of Union Hypergraphs*

Middlebury Thesis Committees

2025 Alex Takoudes (*Earth and Climate Science*)
 Liam Patty (*Computer Science*)
 Alexis Ballo (*Computer Science*)
 2024 Toby Pouler (*Computer Science*)
 Otis Milliken (*Computer Science*)
 2023 Ben Rahill (*Computer Science*)

Professional Development

2024 – present Cultural Competency in Computing (3C) Fellowship
 2023 Middlebury College Engaged Listening Project
 2021 MAA Project NeXT
 2020 UCLA CEILS Introduction to Evidence-Based Pedagogy

Professional Service

Scholarly Reviews

<i>SIAM Review</i>	<i>SIAM J. Math. Data Sci.</i>	<i>SIAM J. Appl. Dyn. Sys.</i>
<i>SIAM J. Matrix Analysis</i>	<i>Nature Communications</i>	<i>Science Advances</i>
<i>Proc. Nat. Acad. Sci. (PNAS)</i>	<i>J. Appl. & Comp. Topology</i>	<i>Physical Review Letters</i>
<i>Physical Review X</i>	<i>Physical Review E</i>	<i>Discrete Mathematics</i>
<i>IEEE Trans. Network Sci. & Eng.</i>	<i>Nature Human Behavior</i>	<i>EPJ Data Science</i>
<i>Social Network Analysis & Mining</i>	<i>Networks & Spatial Economics</i>	<i>Chaos</i>
<i>Int'l J. Geo. Info. Sys.</i>	<i>PLoS One</i>	

Grant Review Panels

Applied and Computational Mathematics	2025
NSF DIVISION OF MATHEMATICAL SCIENCES (DMS)	Online
Applied and Computational Mathematics	2022
NSF DIVISION OF MATHEMATICAL SCIENCES (DMS)	Online

Events Co-Organized

Minisymposium on Mathematics of Network Science	2025
SIAM ANNUAL MEETING	Montreal, QC
Minisymposium on Data, Inference, and Dynamics in Complex Social Systems	2025
SIAM CONFERENCE ON APPLIED DYNAMICAL SYSTEMS	Denver, CO
Minisymposium on Tensor Methods in Network Science	2022
SIAM CONFERENCE ON MATHEMATICS OF DATA SCIENCE	San Diego, CA

Southern California Applied Mathematics Symposium (SoCAMS)	2022
HARVEY MUDD COLLEGE	Claremont, CA
MAA Project NExT Workshop on Projects Across the Mathematics Curriculum	2022
JOINT MATH MEETINGS	Online
Workshop on Graphs and Complex Structures for Learning and Reasoning	2022
ASSOCIATION FOR THE ADVANCEMENT OF ARTIFICIAL INTELLIGENCE (AAAI)	Vancouver, CA

Other Professional Service

Poster Session Judge	2025
SIAM CONFERENCE ON APPLIED DYNAMICAL SYSTEMS	Denver, CO

Professional Societies

Society for Industrial and Applied Mathematics (SIAM)	Mathematical Association of America (MAA)
Association for Women in Mathematics (AWM)	National Association of Mathematicians (NAM)

Institutional Service

Committee Membership

Ad Hoc Committee on Curricular Requirements	2024-
MIDDLEBURY COLLEGE	Middlebury, VT
Steering Committee of Midd.Data	2023-
MIDDLEBURY COLLEGE	Middlebury, VT