Philip S. Chodrow

Assistant Professor of Computer Science
Middlebury College

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Experience

Assistant Professor of Computer Science	*2022 – present*
MIDDLEBURY COLLEGE	*Middlebury, VT*
Hedrick Visiting Assistant Adjunct Professor of Mathematics	*2020 – 2022*
UNIVERSITY OF CALIFORNIA, LOS ANGELES	*Los Angeles, CA*

Education

PhD in Operations Research	*2015-2020*
MASSACHUSETTS INSTITUTE OF TECHNOLOGY	*Cambridge, MA*
BA in Mathematics and Philosophy	*2008-2012*
SWARTHMORE COLLEGE	*Swarthmore, PA*

Grants, Fellowships and Funding

RUI: Network Evolution with Unobserved Mechanisms ($287,522)	*2024-2027*
NATIONAL SCIENCE FOUNDATION (NSF)	*Middlebury, VT*
Graduate Research Fellowship ($138,000)	*2017-2020*
NATIONAL SCIENCE FOUNDATION (NSF)	*Cambridge, MA*
Fulbright Research Award (~$28,000)	*2012-2013*
US-NORWAY FULBRIGHT FOUNDATION	*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

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 Kritschgau, 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 Structures for Learning and Reasoning

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 CTLR 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

Spring 2026	CSCI 0451: *Machine Learning* (planned)
Winter 2026	CSCI 100x: *Applied Data Science* (planned)
Fall 2025	CSCI 0200: *Mathematical Foundations of Computing* (x2) (planned)
Spring 2025	CSCI 0451: *Machine Learning*
	CSCI 0442: *Network Science*
Winter 2025	CSCI 0702: *Senior Thesis*
Fall 2024	CSCI 0200: *Mathematical Foundations of Computing* (x2)
	CSCI 0702: *Senior Thesis*
	CSCI 0500: *Advanced Study*
Spring 2024	CSCI 0451: *Machine Learning*
	CSCI 0702: *Senior Thesis*
Winter 2024	CSCI 0702: *Senior Thesis*
Fall 2023	CSCI 0200: *Mathematical Foundations of Computing* (x2)
Spring 2023	CSCI 0451: *Machine Learning* (x2)
Fall 2022	CSCI 0145: *Introduction to Computing* (x2)

University of California, Los Angeles

Spring 2022	MATH 168: *Introduction to Networks*
Winter 2022	PIC 16B: *Python Programming with Applications II*
Fall 2021	PIC 16B: *Python Programming with Applications II*
	PIC 16A: *Python Programming with Applications I*
Spring 2021	PIC 16B: *Python Programming with Applications II*
	PIC 16A: *Python Programming with Applications I*
Winter 2021	PIC 16A: *Python Programming with Applications I*
Fall 2020	PIC 16A: *Python Programming with Applications I*

Thesis and Research Students

PhD Committees

2025   William Thompson   UVM

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*

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*)

Other Middlebury Research Students

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

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

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

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*