# Philip S. Chodrow

**Assistant Professor of Computer Science**
**Middlebury College**

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## Experience _____

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|---|---|
| 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 _____

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|---|---|
| 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 _____

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|---|---|
| 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. **PSC** (2025): Equivalence of Informations Characterizes Bregman Divergences. doi:10.48550/arXiv.2501.02104

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 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.

## Other Writings

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

## 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

## 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

## Random Graphs for Data Science

2020    UCLA Network Science Seminar

2020    MIT ORC Student Seminar

2019    Northeastern University Network Science Seminar

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

## Public Talks: Data Science and AI

2023    Middlebury DLINQ Summer Workshop

2023    Middlebury TEDx

2023    Middlebury Faculty At Home

# Other Professional Events

### Workshops

**2025** Complex Networks Winter Workshop
*Quebec City, CA*

**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

**2019** Complex Networks Winter Workshop
*Quebec City, CA*

### 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*

# 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

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|---:|:---|
| 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

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| 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

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|---|---|---|
| 2025 | William Thompson | Complex Systems, University of Vermont |

## Middlebury Thesis Advisees

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| 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

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

## Middlebury Thesis Committees

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|---|---|---|
| 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

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| 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

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|---|---|---|
| *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* | *Discrete Mathematics* |
| *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*