ALICE C. SCHWARZE

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SUMMARY OF CAREER HIGHLIGHTS

- Presented **57 research talks** including **1 conference keynote talk** at the Belgian Network Research Meeting and **29 invited talks** at workshops, conferences, and **13 universities**
- **Invited participant at 4 research workshops**, including workshops at the Banff International Research Station (Canada) and the Leibniz Centre for Informatics at Schloss Dagstuhl (Germany)
- Elected **president of the Women in Network Science Society** (international, interdisciplinary professional academic society and advocacy group with over 200 members; webpage), and appointed **board member for the Network Science Society** (webpage)
- **Organizer of 12 research meetings**, including several symposia and conference satellites, and a lead organizer for 8 of them

EDUCATION

07/2023	DPhil (Mathematics) at the University of Oxford Advisors: Mason A. Porter, Jonny Wray, Philip K. Maini Thesis: "Robustness and entropy for dynamics on networks" (degree requirements completed 11/2019, conferred 01/2021)
9/2014	M. Sc. (Theoretical Physics) at Technische Universität Berlin, grade[1] 1.1 Advisor: Eckehard Schöll Thesis: "Controlling desynchronisation in complex network topologies by the balance of excitation and inhibition"
9/2012	B. Sc. (Physics) at Technische Universität Berlin, grade[1] 1.2 Advisor: Tobias Brandes Thesis: "Theorie der kontinuierlichen Messung" ("Theory of continuous quantum measurement")

EMPLOYMENT

SINCE 9/2024	Head of Research at the AI Policy Office of the Utah Department of Commerce and Visiting Scholar at the Department of Mathematics at Dartmouth College
2021 – 2024	Postdoctoral research affiliate at the Department of Mathematics at Dartmouth College (includes 6 months of maternity leave in 2023)
2019 – 2021	Postdoctoral research scholar at the Department of Biology at the University of Washington (UW) and Data Science Postdoctoral Fellow at the UW eScience Institute

LIST OF PUBLICATIONS

PEER-REVIEWED PUBLICATIONS:

- Xie He, Amir Ghasemian, Eun Lee, **ACS**, Aaron Clauset, and Peter J. Mucha: "Link prediction accuracy on real-world networks under non-uniform missing-edge patterns. PLoS ONE 19(7): e0306883 (2024)
- N. W. Landry, M. Lucas, I. Iacopini, G. Petri, **ACS**, A. Patania, L. Torres: "*XGI: A Python package for higher-order interaction networks*" Journal of Open Source Software 8 (85), 5162 (2023)

[1] Grades given on a scale from 1 (best) to 5 (worst).

- B. Boyacıoğlu, **ACS**, B. W. Brunton, and K. A. Morgansen: "*Neural-inspired Measurement Observability*" Journal of Guidance, Control, and Dynamics 46 (7), 1378-1389 (2023)
- B. M. t' Hart, ..., **ACS**, ..., B. Wyble: "*Neuromatch Academy: a 3-week, online summer school in computational neuroscience*" Journal of Open Source Education 5:49 (2022)
- **ACS**, M. A. Porter: "*Motifs for processes on networks*" SIAM Journal on Applied Dynamical Systems, 20(4), 2516–2557 (2021)
- G. Cantwell, Y. Liu, B. F. Maier, **ACS**, C. A. Serván, J. Snyder, G. St-Onge: "*Thresholding normally distributed data creates complex networks*" Physical Review E, 101 (6), 062302 (2020)

Preprints and papers under review:

- **ACS**, M. Kawakatsu, S. Iams, N. H. Fefferman, and T. L. Eissa: "*Planned behavior, perceptual biases, and the dynamics of collective action*" arXiv preprint 2409.17573 (2024).
- **ACS**, J. Jiang, J. Wray, M. A. Porter: "*Structural robustness and vulnerability of networks*" arXiv preprint 2409.07498 (2024) [accepted for publication at Journal of Complex Networks]
- **ACS**, Sara M. Ichinaga, and B. W. Brunton: "*Network inference via process motifs for lagged correlation in linear stochastic processes*" arXiv preprint arXiv:2208.08871 (2022)
- **ACS**, P. S. Chodrow, M. A. Porter: "*Observations on the distribution of log-minors of positive-definite matrices and their implications for sampling mean subsystem entropy*" arXiv preprint arXiv:1901.09456 (2019)

Workshop and conference papers:

- [2]M. Jovanova, P. Pandey, Z. Boyd, **ACS**, Y. Kang, D. Cosme, D. Bassett, K. Ochsner, P. Mucha, D. Lydon-Staley, E. Falk: "*A person-specific approach to study health behavior: proof of concept with alcohol use*" 73rd Annual International Communication Association Conference (2023) (URL)
- M. Jovanova, Z. Boyd, **ACS**, T. Christensen, D. Cosme, K. Katch, J. Ahn, A. Resnick, N. Cooper, X. He, Y. Kang, S. Lomax, A. McGowan, L. Mwilambwe Tshilobo, O. Stanoi, P. Srivastava, K. Ochsner, D. Bassett, D. Lydon-Staley, E. Falk, P. Mucha: "*Integrating multimodal data and machine learning to predict individual differences in health behavior change*" 73rd Annual International Communication Association Conference (2023). (URL)
- U. Alvarez-Rodriguez, G. Bianconi, N. Przulj, M. Schich, **ACS**, L. Torres, and A. Wegner: "*Unification of Higher-Order Models*" in "*Higher-Order Graph models: From Theoretical Foundations to Machine Learning*", Dagstuhl Reports (2021). (PDF)
- M. Rosvall, R. Burkholz, T. LaRock, V. Latoria, K.-J. Lee, G. Petri, L. Pretrovic, M. Schaub, **ACS**, and M. Starnini: "*Learning and Model Selection in Higher-Order Networks*" in "*Higher-Order Graph models: From Theoretical Foundations to Machine Learning*", Dagstuhl Reports (2021). (PDF)
- **ACS**, Jonny Wray, M. A. Porter: "*A Motif-Based Approach to Processes on Networks: Process Motifs for the Differential Entropy of the Ornstein–Uhlenbeck Process*", IFAC (International Federation of Automatic Control) World Congress (2020). (PDF)

Code and Software Contributions

- Core member of "CompleX Group Interactions (XGI)" — a Python package for higher-order networks (webpage)

Fellowships, Scholarships, and Grants

2021	Grant from the Azure Cloud Computing Research Sponsorship Program ($13,500)
2020	Grant for Special Interest Group from the eScience Departmental Fund ($5,000)

[2]Selected as one of the "*Top Papers in Communication Science & Biology*" at the 73rd Annual International Communication Association Conference (2023)

2020	Individual Postdoctoral Grant from the eScience Postdoctoral Research Fund ($5,000)
2019	University of Washington Data Science Postdoctoral Fellowship ($2,500)
2014 – 2019	Clarendon Scholarship of the University of Oxford (ca. £55,000)
2014 – 2019	Studentship of the Engineering and Physical Sciences Research Council (ca. £10,000)
2009	Scholarship of the German Academic Exchange Service (€2,000)
2008 – 2011	Scholarship of the German National Academic Foundation (ca. €25,000)

Awards and Prizes

2019	SIAM Student Travel Award for the SIAM Conference on Dynamical Systems 2019
2018	Poster Slam Prize (best short presentation) at CompleNet 2018
2018	SIAM Student Travel Award for the SIAM Annual Meeting 2018
2018	Travel Award for Dynamics Days 2018
2017	PCMI Scholarship for the PCMI Summer School on Random Matrix Theory
2017	SYNS Student Travel Award for NetSci 2017
2016	SIAM Student Travel Award for the SIAM Network Science Workshop 2016
2015	Public Engagement Award of the Oxford University Doctoral Training Centre (DTC)

Teaching Experience

2024	Lecturer for "Math 76.01: Topics in Applied Mathematics — Mathematics and AI (Summer term)" at the Department of Mathematics at Dartmouth College
2024	Lecturer for "Math 8: Multivariate Calculus (Spring term)" at the Department of Mathematics at Dartmouth College
2023	Lecturer for "Math 3: Calculus (Winter term)" at the Department of Mathematics at Dartmouth College
2023	Guest Lecturer at Northeastern University in the "Foundational Ideas in Network Science" seminar
2020 – 2021	Neuromatch Academy Online Summer School on Computational Neuroscience, Content contributor (webpage)
2020	University of Washington, Department of Biology, Guest lecturer for the graduate course "BIO511 Topics in Mathematical Biology" (code repository)
2018	Santa Fe Institute, Complex Systems Summer School, Lecturer for tutorial on "Structural robustness of networks" (slides)
2017	University of Oxford, Mathematical Institute, Teaching assistant for third-year course on "Graph Theory Part B"
2016	University of Oxford, Doctoral Training Centre, Demonstrator for graduate course "Introduction to Systems Biology"
2016	University of Oxford, Doctoral Training Centre, Demonstrator for graduate course "Cells and Signalling"

Teaching Development Programs

2022 – 2023	"SIAM Project NExT Fellow" in the 2022 cohort of "Project New Experiences in Teaching" (Project NExT) of the Mathematical Association of America (webpage)
2016	Completion of the "Developing Learning and Teaching" (DLT) program at the University of Oxford (webpage)

Student Mentoring

2022–2024	**Jessica Jiang, undergraduate research student** Department of Mathematics at Dartmouth College Project title: "Robustness and dynamics on networks"
2022	**Moitrish Majumdar, undergraduate thesis student** Department of Mathematics at Dartmouth College Thesis title: "Dynamical systems on networks"
2022	**Allison Zhuang, undergraduate research student** Department of Mathematics at Dartmouth College Project title: "Random-graph models and robustness of networks"
2023	**Sara Ichinaga, undergraduate research student** Department of Applied Mathematics at the University of Washington Project title: "Inference of neuronal networks from widefield calcium-imaging data"

Initiatives Related to Increasing Diversity, Equity, and Inclusion in Academia

2023	**Lead organizer** of the **"WiNS Collabathon"** - a one-week in-person workshop for early-career women in network science to collaboratively learn about and use computational methods in their research (webpage)
2022–2023	**Co-creator and co-organizer** of the **"WiNS Pathways in Network Science"** career-talk series, in which well-established women researchers in network science reflect on their careers
2021 – 2022	**Creator and director of a mentored lightning-talk scheme** for the Women in Network Science satellite at Networks 2021, the Women in Network Science satellite and Diversify NetSci satellite at NetSci 2022, and the Women in Network Science showcase at Sunbelt 2022
2020–2023	**Mentor for international students** who seek internships, degree programs, and postdoctoral positions in the EU, UK, and USA; former mentees include Samarth Mathur, who successfully applied for a research internship at the University of Toronto (Canada), and Yu Tian, who accepted a postdoc position at the Nordic Institute for Theoretical Physics (NORDITA, Sweden)
Since 2020	**President of the Women in Network Science Society** (webpage); In this role, I have • initiated and organized the election of the first WiNS executive committee • initiated the first NetSci conference satellite for WiNS • was lead organizer of the 2-day conference satellite "WiNS@Networks 2021" and co-lead organizer of the 2-day conference satellite "WiNS@NetSci 2022" • consulted for several academic programs on increasing the diversity of lists of invited speakers and lists of prize nominees • advised members of the WiNS executive committee on the creation of a book club, the coordination of several conference meet-ups, and the design and publication of a podcast series (webpage) and a video blog series (webpage)

2020–2023 **Host of the Women in Network Science Seminar** at the University of Washington (webpage) and Dartmouth College (webpage); the seminar has provided a platform for over 30 women and nonbinary researchers and aims to be a model for inclusive reimbursement practices by offering to reimburse child-care expenses for talks that are given outside a speakers' typical office hours

Workshop and Session Organization

2023

Lead organizer

- Women in Network Science Collabathon 2023 (stand-alone workshop in Boston, MA, USA, webpage)

Co-organizer

- Workshop on Contagion on Complex Social Systems (CCSS) at the University of Vermont (Burlington, VT, USA, webpage)
- NetSci 2023 "Women in Network Science" poster session (Vienna, Austria, webpage)
- Minisymposium on "Women in Network Science" at SIAM Dynamical Systems (Seattle,WA, USA, webpage)

2022

Lead organizer

- NetSci 2022 "Women in Network Science & DiversifyNetSci" satellite (virtual)

Co-organizer

- SIAM Network Science Workshop 2022 (virtual, webpage)
- NetSci 2022 satellite on "HONS: Higher-order network science" (virtual, webpage)
- INSNA Sunbelt 2022 "Women in Network Science" session (virtual)
- JMM 2022 Special Session on "Mathematics of Complex Systems" (virtual)

2021

Lead organizer

- Networks 2021 "DynaMo: Dynamics and Motifs" satellite (virtual, webpage)
- Networks 2021 "Women in Network Science" satellite (virtual, webpage)

Co-organizer

- SIAM Applications of Dynamical Systems 2021 "Dynamics of Influence and Representation in Social Systems" minisymposium (virtual, webpage)

Other Academic Service

Since 2024 Reviewer at Proceedings of the Royal Society A

Since 2023 Reviewer at Proceedings of the National Academy of Sciences (PNAS) of the United States of America

Since 2022 Board member at the Network Science Society ("NetSci", webpage)

Since 2022 Co-Organizer of the "Applied and Computational Mathematics" seminar at the Department of Mathematics at Dartmouth College (webpage)

Since 2022 Editor for "Advances in Complex Systems" and "Network Letters"

2021–2022 Chair of the special interest group on "Graphs and Networks — Theory and Applications" at the e-Science Institue of the University of Washington (webpage)

Since 2021 Reviewer at "Communications Physics"

Since 2020	Reviewer at "Complex Networks", "EPJ Data Science", "IEEE Transactions on Network Science and Engineering", "Mathematical Medicine and Biology", "PLoS Computational Biology", and "PLoS ONE"
Since 2019	Reviewer at "Nature Communications" and "Chaos: An Interdisciplinary Journal for Nonlinear Science"
Since 2018	Reviewer at "Physical Review E"

Presentations at Conferences and Workshops

2024	**ACS**: "Mathematics and AI Policy" presented at • the conference of the SIAM Student Chapter at Brigham Young University (invited talk)
2024	**ACS**: "Dynamics of collective action and the theory of planned behavior" presented at • the workshop on "Modeling Multi-Scale Collective Intelligences" at the Institute for Pure and Applied Mathematics (IPAM) (invited talk)
2023/24	**ACS**: "Motifs for processes on networks and their application in network inference" presented at • the Department of Computational Mathematics, Science, and Engineering, Michigan State University (invited talk) • the School of Mathematical and Natural Sciences, Arizona State University (invited talk)
2023/24	**ACS**: "Connecting Dynamics on and of Networks to Data: Motif-Based and Mean-Field Approaches" presented at • Binghamton Center of Complex Systems, Binghamton University (invited talk) • Department of Mathematics and Statistics, University of Massachusetts Amherst (invited talk)
2023	**ACS**: "A motif-based refinement of network inference" presented at • the Department of Statistics, University of Vermont (invited talk)
2023	**ACS**: "Paper unwind: "Motifs for processes on networks"" presented at • the "Paper Unwind" Seminar series at the Network Science Institute at Northeastern University (invited talk)
2022/23	**ACS**: "Network Inference Via Process Motifs for Lagged Correlation in Linear Stochastic Processes" presented at: • the MILA (The Quebec AI Institute) Seminars on Neural AI (invited talk, 2023) • the Network Science Institute, Northeastern University (invited talk, 2023) • the SIAM Conference on Optimization 2023 (invited talk in minisymposium) • the Sydney University Systems Neuroscience and Complexity Seminars (invited talk, 2022, video) • School of Mathematical Sciences, University of Nottingham (invited talk, 2022)
2022/23	**ACS**, Peter J. Mucha: "Tolerance in weighted coevolving network dynamics" presented at: • the New England Regional Conference on Complex Systems (NERCCS) 2023 (contributed talk) • the Workshop on Contagion on Complex Social Systems at the University of Colorado, Boulder (contributed talk[3], 2022)

2022 **ACS**, Peter J. Mucha: "The coevolution of alcohol consumption and social networks of college students" presented at:

- the Workshop on Choice Theory and Network Dynamics at the University of Vermont (invited talk, 2022)
- the Aspen Center for Physics Winter Conference on "The Dynamics of Social Interactions" (contributed talk[3], 2022)

2022 **ACS**: "Connecting dynamics on and of networks to data — motif-based and mean-field approaches" presented at:

- the Networks Seminar at the University of Oxford (invited talk, 2022)
- the Banff International Research Station (BIRS) Workshop on "Building Networks: Women in Complex & Nonlinear Systems" (invited talk, 2022)

2022 **ACS**: "Motifs and synchrony-asynchrony transitions in neuronal networks" presented at:

- the 2022 SIAM Life Sciences Conference (invited talk in minisymposium)
- the Department of Applied Mathematics, University of Colorado Boulder (invited talk)

2021/22 **ACS**, S. Ichinaga, B. W. Brunton: "Network inference via process motifs for lagged correlation in linear stochastic processes" presented at:

- the SIAM Workshop on Network Science 2022 (contributed talk)
- the Mathematics Colloquium at the Deparment of Mathematics at Dartmouth College (invited talk, 2022)
- the Belgian Network Research Meeting (BENet) 2021 (keynote talk)
- the SIAM Conference on Applications of Dynamical Systems 2021 (invited talk in minisymposium, 2021)
- the Wolfram Centre for Mathematical Biology, University of Oxford (invited talk, 2021)

2021 **ACS**, S. I. Ichinaga, and B. Brunton: "Network Inference for Widefield Calcium Imaging Data" presented at:

- SIAM Conference on Dynamical Systems (contributed talk)

2021 **ACS** and S. Lehmann: "How to make friends and influence scientists: Informal methods of science communication?" presented at:

- the satellite of the Symposium of Young Network Scientists (SYNS) at Networks 2021 (invited talk)

2020/21 **ACS**, M. A. Porter: "Motifs for processes on networks" presented at:

- Dagstuhl Seminar 21352 on "Higher Order Graph Models: From Theoretical Foundations to Machine Learning", Leibniz Center for Informatics, Dagstuhl, Germany (invited talk)
- the Mathematical Institute, University of Oxford (invited talk, video)
- the Data Analytics Group, University of Wuppertal (invited talk)
- the satellite on "Multiscale & integrative complex networks" at the Conference on Complex Systems 2020 (invited talk)
- the Higher-order network science (HONS) Workshop at NetSci 2020 (invited talk, video)
- the Workshop on Methods of Information Theory in Computational Neuroscience at the Annual Computational Neuroscience Meeting 2020 (contributed talk, video)
- the SIAM Network Science Workshop 2020 (poster)
- Dynamics Days Digital 2020 (poster)

2020 **ACS**: "Dynamics on networks" presented at:

- the Diversify NetSci 2020 Showcase (1 of 2 showcase talks selected in competition)

2020 **ACS**, J. Wray, M. A. Porter: "A motif-based approach to processes on networks: Process motifs for the differential entropy of the Ornstein–Uhlenbeck process" presented at:

- the 2020 IFAC World Congress (minisymposium talk)
- the 2020 NetSci Conference (contributed talk)

2019 **ACS**, P. C. Chodrow, M. A. Porter: "Bounds on the Sampling Error of Mean Differential Entropy of Subgraphs" presented at:

- the SIAM Workshop on Network Science (contributed talk)

2019 **ACS**, J. Wray, M. A. Porter: "Entropy and functional redundancy in biological networks" presented at:

- SIAM Conference on Applications of Dynamical Systems (contributed talk^3)
- the Department of Biology, University of Washington (invited talk)
- the Department of Computing and Mathematical Sciences, California Institute of Technology (invited talk)

2018 **ACS**, M. A. Porter, J. Wray: "Structural and functional redundancy in biological networks" presented at:

- the SIAM Network Science Workshop 2018 (contributed talk)
- the SIAM Annual Meeting 2018 (contributed talk^3)
- International Conference of Discrete Models of Complex Systems 2018 (contributed talk)
- CompleNet 2018 (lightning talk & poster)
- the Joint Mathematics Meeting 2018 (contributed talk in special session)
- Dynamics Days 2018 (contributed talk^3)

2017 **ACS**, M. A. Porter, J. Wray: "Structural robustness in function-specific protein-interaction networks" presented at:

- Symposium of Young Network Scientists 2017 (lightning talk^3)
- the 2017 NetSci Conference (poster^3)
- the 2017 NetMed satellite at the 2017 NetSci Conference (contributed talk)

2016 **ACS**, M. A. Porter, J. Wray: "'Redundancy, degeneracy, and robustness in protein-interaction networks" presented at:

- the UK Workshop on Quantitative Systems Pharmacology 2016 (contributed talk[3])
- the SIAM Network Science Workshop 2016 (contributed talk[3])
- the SIAM Annual Meeting and Life Sciences Conference 2016 (poster)
- the 8th Internat. Conference on Discrete Models of Complex Systems (contributed talk)
- the 2016 Complenet conference (contributed talk)

Other Workshop and School Participation

2024	Institute for Pure and Applied Mathematics (IPAM) Workshop on "Modeling Multi-Scale Collective Intelligences" in the 2024 "Mathematical of Intelligences" Fall Program (invited participant)
2022	Banff International Research Station (BIRS) Workshop on "Building Networks: Women in Complex & Nonlinear Systems" (invited participant)
2022	University of Vermont, "Choice Theory and Network Dynamics" (invited participant)
2021	Leibniz Centre for Informatics at Schloss Dagstuhl, "Higher-Order Graph Models: From Theoretical Foundations to Machine Learning" (invited participant)
2021	University of Vermont, Winter Workshop on Complex Systems (CNWW)
2018	Santa Fe Institute (SFI), Complex Systems Summer School of the 2018
2017	Park City Mathematics Institute (PCMI), Summer School on Random Matrix Theory
2014	University of Crete, European Summer School on Mathematical Modelling of Complex Systems

Other Academic Employment and Research Training

2017 – 2019	University of California, Los Angeles, Department of Mathematics, Visiting Graduate Researcher
2011 – 2014	Technische Universität Berlin, Collaborate Research Center 910 "Control of self-organising nonlinear systems: Theoretical methods and concepts of application, student research assistant
2009 – 2011	Technische Universität Berlin, Research Training Group 1558 "Nonequilibrium collective dynamics in condensed matter and biological system", student research assistant
2009	Pennsylvania State University, Department of Physics, DAAD RISE Northamerica Intern

Outreach Activities

2021	Invited panelist in a panel on "Biological Networks" (webpage) at the exhibition "BarabásiLab. Hidden Patterns" at the Center for Art and Media Karlsruhe, Germany
2020	Content Coordinator for the Neuroscience Outreach Network (webpage)
Since 2019	Participating scientist at "Skype a Scientist" (webpage)
2008 – 2014	Instructor for Mathematics, Physics, and Neuroscience at Youth Camps organized by Mensa Germany

Media Features

2022	Featured in "Introduction of SIAM Project NExT Fellows" in "SIAM News" (link)
2021	Interview for "Too Lazy to Read the Paper" podcast with Sune Lehmann (audio/video)
2021	Interview for "Knitting Networks" podcast with Francisca Ortiz (audio)
2021	Interview for "Pushing the Glass Ceiling" podcast with Ana Maria Jaramillo and Mariana Macedo (video)
2016	Interview for "Wide Open Air Exchange" podcast with Christine Gallagher (audio)

References

- Peter J. Mucha, Professor, Department of Mathematics, Dartmouth College
  Email: peter.j.mucha@dartmouth.edu
- Mason A. Porter, Professor, Department of Mathematics, University of California Los Angeles
  Email: mason@math.ucla.edu
- Nina H. Fefferman, Professor, Department of Ecology and Evolutionary Biology, University of Tennessee Knoxville
  Email: nina.h.fefferman@gmail.com
- Brooke Foucault Welles, Associate Professor, Department of Communication Studies, Northeastern University
  Email: b.welles@northeastern.edu
- Ethan A. Levien, Assistant Professor, Department of Mathematics, Dartmouth College
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