

ALICE C. SCHWARZE

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SUMMARY OF CAREER HIGHLIGHTS

- Presented **48 research talks** including **1 conference keynote talk** at the Belgian Network Research Meeting and **25 invited talks** at workshops, conferences, and **13 universities**
- **Invited participant at 3 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

- 11/2019 DPhil (Mathematics) at the University of Oxford
Advisors: Mason A. Porter, Jonny Wray, Philip K. Maini
Thesis: “Robustness and entropy for dynamics on networks”
- 9/2014 M. Sc. (Theoretical Physics) at Technische Universität Berlin, grade¹ 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, grade¹ 1.2
Advisor: Tobias Brandes
Thesis: “Theorie der kontinuierlichen Messung” (“Theory of continuous quantum measurement”)

ACADEMIC POSITIONS

- SINCE 12/2021 Postdoctoral research affiliate at the Department of Mathematics at Dartmouth College
- 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:

- 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)
- 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)

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

- 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**, 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:

- ²M. 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](#))

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)
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

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

- 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 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

- 2022–2023 **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](#))
- SINCE 2022 **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
- SINCE 2020 **Mentor for international students** who seek internships, degree programs, and post-doctoral 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](#))
- SINCE 2020 **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 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 Institute 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”
- SINCE 2018 Reviewer at “Chaos: An Interdisciplinary Journal for Nonlinear Science” and “Physical Review E”

PRESENTATIONS AT CONFERENCES AND WORKSHOPS

- 2023 **ACS**: “Connecting Dynamics on and of Networks to Data: Motif-Based and Mean-Field Approaches” to be presented at
- Binghamton Center of Complex Systems, Binghamton University (invited talk)
 - Department of Mathematics and Statistics, University of Massachusetts Amherst (invited talk)
- 2023 **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)
- 2023 **ACS**: “A motif-based refinement of network inference from time-series data” presented at
- the Department of Statistics, University of Vermont (invited talk)

- 2023 **ACS**: “Paper unwind: The story behind “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**: “Motifs and network inference 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: “Weighted co-evolving social networks of students and drinking behavior” 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 talk³, 2022)
 - 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 talk³, 2022)
- 2022 **ACS**: “Dynamics on and of networks — 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” presented at:
- the SIAM Workshop on Network Science 2022 (contributed talk)
 - the Mathematics Colloquium at the Department 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** 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:
- 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: “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 talk³)
 - 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 talk³)
 - CompleNet 2018 (lightning talk & poster)
 - the Joint Mathematics Meeting 2018 (contributed talk in special session)
 - Dynamics Days 2018 (contributed talk³)
- 2017 **ACS**, M. A. Porter, J. Wray: “Structural robustness in function-specific protein–interaction networks” presented at:
- Symposium of Young Network Scientists 2017 (lightning talk³)
 - the 2017 NetSci Conference (poster³)
 - 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 talk³)
 - the SIAM Network Science Workshop 2016 (contributed talk³)

- 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

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)