

RESEARCH INTERESTS

I am interested in the underlying rules and organizing principles of complex physical and social systems. My work combines mathematical models with large-scale data analysis to better understand these systems, with a particular emphasis on network science and human dynamics. Other interests include stochastic and nonlinear dynamics, dynamical systems, and novel optimization and machine learning methods.

EXPERIENCE

Associate Professor, 2019 – present
Assistant Professor, 2013 – 2019
Mathematics and Statistics,
The University of Vermont, Burlington, VT, USA

Core Faculty, 2019 – present
VECTORS: Vermont’s Center for Sustainable and Resilient Systems, 2013 – present
Vermont Complex Systems Center,
The University of Vermont, Burlington, VT, USA

Research Assistant Professor, 2011 – 2013
Engineering Sciences and Applied Mathematics & Northwestern Institute on Complex Systems (NICO),
Northwestern University, Evanston, IL, USA

Visiting Researcher, 2009 – 2011
Dana-Farber Cancer Institute, Harvard University, Boston, MA, USA

Postdoctoral Researcher, 2008 – 2011
Center for Complex Network Research, Northeastern University, Boston, MA, USA

NSF Graduate Research Fellowship, Clarkson University, Potsdam, NY, USA 2006 – 2008
T-7 Summer Graduate Research, Los Alamos National Laboratory 2005

Graduate Teaching Assistantship, Clarkson University 2004 – 2006

NSF REU Internship, Rensselaer Polytechnic Institute, Troy, NY, USA 2002

Academic Peer Mentor, SUNY Cobleskill, Cobleskill, NY, USA 2000 – 2001

EDUCATION

Ph.D., Physics, Clarkson University, Potsdam, NY, USA 2004 – 2008
Dissertation Topic: “Analysis and Applications of Complex Networks”
Advisors: Daniel ben-Avraham, Erik Bollt

M.S., Physics, Clarkson University 2004 – 2005

B.S., Physics with Great Distinction, Clarkson University 2001 – 2004

A.S., Liberal Arts & Sciences, SUNY Cobleskill, Cobleskill, NY, USA 1999 – 2001

SUPPORT

Google Open Source, \$1,000,000 2020 – 2022
Open Source Complex Ecosystems and Networks (OCEAN),
PI

NASA ESPCoR, \$750,000	2020 – 2023
<i>New Unified Framework for Scalable, Risk-Aware, and Resilient Estimation and Control of Satellite Swarms,</i> Co-PI; Lead PI Hamid Ossareh	
Army CRREL Award, \$10M	2020 – 2024
ARPA-E NODES (PlusUp), \$3,400,000	2019 – 2021
<i>Packetized Energy Management: Coordinating Transmission and Distribution,</i> Co-I; PI Mads Almassalkhi	
CA Technologies research award, \$70,000	2018 – 2022
<i>GitHub public data as a vehicle for understanding individuals and teams: hypotheses, challenges, and proposed research,</i> PI	
NSF BIGDATA award, \$600,000	2014 – 2020
<i>Hunch & Crunch: Iterative Crowdsourced Hypothesis Generation,</i> PI	

PUBLICATIONS AND PREPRINTS

72. J. Bagrow and Y.-Y. Ahn, “**Network Cards: concise, readable summaries of network data.**” Preprint, 2022. [[arXiv:2206.00026](#)].
71. L. Hébert-Dufresne, G. St-Onge, J. Meluso, J. Bagrow, and A. Allard, “**Hierarchical team structure and multidimensional localization (or siloing) on networks.**” Preprint, 2022. [[arXiv:2203.00745](#)].
70. J. P. Bagrow and S. Lehmann, “**Recovering lost and absent information in temporal networks.**” In revision, 2021. [[arXiv:2107.10835](#)].
69. M. Z. Trujillo, L. Hébert-Dufresne, and J. Bagrow, “**The penumbra of open source: projects outside of centralized platforms are longer maintained, more academic and more collaborative,**” *EPJ Data Science* **11** no. 1, (2022) 31, [[arXiv:2106.15611](#)].
68. M. Warrick, S. F. Rosenblatt, J.-G. Young, A. Casari, L. Hébert-Dufresne, and J. Bagrow, “**The OCEAN mailing list data set: Network analysis spanning mailing lists and code repositories,**” in *2022 IEEE/ACM 19th International Conference on Mining Software Repositories (MSR)*, pp. 338–342. 2022.
67. A. Hotaling and J. Bagrow, “**Accurate inference of crowdsourcing properties when using efficient allocation strategies,**” *Nature Scientific Reports* **12** no. 1, (2022) 6849, [[arXiv:1903.03104](#)].
66. J. Meluso, J. Austin-Breneman, J. P. Bagrow, and L. Hébert-Dufresne, “**A review and framework for modeling complex engineered system development processes,**” *IEEE Transactions on Systems, Man, and Cybernetics: Systems* (2022) 1–13, [[arXiv:2103.12820](#)].
65. Z. Chen, S. Kelty, A. G. Evsukoff, B. F. Welles, J. Bagrow, R. Menezes, and G. Ghoshal, “**Contrasting social and non-social sources of predictability in human mobility,**” *Nature Communications* **13** no. 1, (2022) 1922, [[arXiv:2104.13282](#)].
64. S. S. Jónasdóttir, J. Bagrow, and S. Lehmann, “**Sleep during travel balances individual sleep needs,**” *Nature Human Behaviour* no. 5, (2022) 691–699.
★ *Cover article for the May 2022 “issue”.*
63. J. Meluso, S. Johnson, and J. Bagrow, “**Flexible Environments for Hybrid Collaboration: Redesigning Virtual Work Through the Four Orders of Design,**” *Design Issues* **38** no. 1, (01, 2022) 55–69, [[SocArXiv:wehsk](#)].

62. J. Meluso, L. Hébert-Dufresne, J. P. Bagrow, and R. Razzante, “**Masculinity contest cultures and inclusive cultures: Insights from an agent-based model of organizational socialization and promotion**,” in *The Future of Diversity & Inclusion*, E. B. King, Q. M. Roberson, and M. Hebl, eds., vol. 3 of *Research on Social Issues in Management*. Information Age Publishing, Charlotte, NC, USA, 2021.
61. J.-G. Young, A. Casari, K. McLaughlin, M. Z. Trujillo, L. Hébert-Dufresne, and J. P. Bagrow, “**Which contributions count? analysis of attribution in open source**,” in *2021 IEEE/ACM 18th International Conference on Mining Software Repositories (MSR)*, pp. 242–253. IEEE Computer Society, Los Alamitos, CA, USA, May, 2021. [arXiv:2103.11007].
★ FOSS Impact paper award.
60. T. Alshaabi, D. R. Dewhurst, J. P. Bagrow, P. S. Dodds, and C. M. Danforth, “**The sociospatial factors of death: Analyzing effects of geospatially-distributed variables in a bayesian mortality model for hong kong**,” *PLOS ONE* **16** no. 3, (03, 2021) 1–20, [arXiv:2006.08527].
59. J. P. Bagrow, “**TL;DR: how well do machines summarize our work? (correspondence)**,” *Nature* **590** (2021) 36.
58. A. Casari, K. McLaughlin, M. Z. Trujillo, J.-G. Young, J. P. Bagrow, and L. Hébert-Dufresne, “**Open source ecosystems need equitable credit across contributions**,” *Nature Computational Science* **1** no. 1, (2021) 2–2.
57. A. Hotaling and J. P. Bagrow, “**Efficient crowdsourcing of crowd-generated microtasks**,” *PLOS ONE* **15** no. 12, (2020) 1–18, [arXiv:1912.05045].
56. R. A. Baten, D. Bagley, A. Tenesaca, F. Clark, J. P. Bagrow, G. Ghoshal, and M. E. Hoque, “**Creativity in temporal social networks: how divergent thinking is impacted by one’s choice of peers**,” *J. R. Soc. Interface* **17** no. 20200667, (2020), [arXiv:1911.11395].
55. J. P. Bagrow, “**Democratizing AI: Non-expert design of prediction tasks**,” *PeerJ Computer Science* **6** (2020) e296, [arXiv:1802.05101].
54. T. Pond, S. Magsarjav, T. South, L. Mitchell, and J. P. Bagrow, “**Complex contagion features without social reinforcement in a model of social information flow**,” *Entropy* **22** no. 3, (2020) 265, [arXiv:2002.05035].
53. D. Berenberg and J. P. Bagrow, “**Inferring the size of the causal universe: features and fusion of causal attribution networks**.” In preparation, 2018. [arXiv:1812.06038].
52. J. P. Bagrow, D. Berenberg, and J. C. Bongard, “**Neural language representations predict outcomes of scientific research**.” In preparation, 2018. [arXiv:1805.06879].
51. J. P. Bagrow and E. M. Bollt, “**An information-theoretic, all-scales approach to comparing networks**,” *Applied Network Science* **4** no. 1, (2019) 45, [arXiv:1804.03665].
50. X. Liu and J. P. Bagrow, “**Autocompletion interfaces make crowd workers slower, but their use promotes response diversity**,” *Human Computation* **6** (2019), [arXiv:1707.06939].
49. J. P. Bagrow, X. Liu, and L. Mitchell, “**Information flow reveals prediction limits in online social activity**,” *Nature Human Behaviour* **3** no. 2, (2019) 122–128, [arXiv:1708.04575].
48. M. D. Wagy, J. C. Bongard, J. P. Bagrow, and P. D. Hines, “**Crowdsourcing predictors of residential electric energy usage**,” *IEEE Systems Journal* **12** no. 4, (2018) 3151–3160, [arXiv:1709.02739].
47. D. Berenberg and J. P. Bagrow, “**Efficient crowd exploration of large networks: The case of causal attribution**,” *Proc. ACM Hum.-Comput. Interact.* **2** no. CSCW, (2018), [arXiv:1810.03163].
★ Best Paper honorable mention.
46. J. P. Bagrow and L. Mitchell, “**The quoter model: A paradigmatic model of the social flow of written information**,” *Chaos* **28** no. 7, (2018) 075304, [arXiv:1711.00326].
45. J. P. Bagrow, “**Information spreading in emergencies and anomalous events**,” in *Complex Spreading Phenomena in Social Systems*, S. Lehmann and Y.-Y. Ahn, eds., pp. 269–286. Springer, 2018. [arXiv:1703.07362].

44. P. Shrestha, B. S. Lee, and J. P. Bagrow, “**Predicting an effect event from a new cause event using a semantic web based abstraction tree of past cause-effect event pairs,**” in *4th Annual International Symposium on Information Management and Big Data (SIMBig)*. 2017.
43. T. C. McAndrew, E. Guseva, and J. P. Bagrow, “**Reply & supply: Efficient crowdsourcing when workers do more than answer questions,**” *PLOS ONE* **12** no. 8, (2017) e69829, [arXiv:1611.00954].
42. J. P. Bagrow, C. M. Danforth, and L. Mitchell, “**Which friends are more popular than you?: Contact strength and the friendship paradox in social networks,**” in *Proceedings of the 2017 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining 2017*, pp. 103–108. ACM, 2017. [arXiv:1703.06361].
41. M. Korkali, J. G. Veneman, B. F. Tivnan, J. P. Bagrow, and P. D. Hines, “**Reducing cascading failure risk by increasing infrastructure network interdependence,**” *Nature Scientific Reports* **7** (2017) 44499.
40. T. C. McAndrew, J. C. Bongard, C. M. Danforth, P. S. Dodds, P. D. Hines, and J. P. Bagrow, “**What we write about when we write about causality: Features of causal statements across large-scale social discourse,**” in *2016 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, pp. 519–524. IEEE Computer Society, 2016. [arXiv:1604.05781].
39. E. M. Cody, J. C. Stephens, J. P. Bagrow, P. S. Dodds, and C. M. Danforth, “**Transitions in climate and energy discourse between Hurricanes Katrina and Sandy,**” *Journal of Environmental Studies and Sciences* (2016) 1–15, [arXiv:1510.07494].
38. M. Klug and J. P. Bagrow, “**Understanding the group dynamics and success of teams,**” *Royal Society Open Science* **3** no. 4, (2016), [arXiv:1407.2893].
37. J. R. Williams, J. P. Bagrow, A. J. Reagan, S. E. Alajajian, C. M. Danforth, and P. S. Dodds, “**Zipf’s law is a consequence of coherent language production.**” Preprint, 2016. [arXiv:1601.07969].
36. J. R. Williams, E. M. Clark, J. P. Bagrow, C. M. Danforth, and P. S. Dodds, “**Identifying missing dictionary entries with frequency-conserving context models,**” *Phys. Rev. E* **92** (2015) 042808, [arXiv:1503.02120].
35. J. R. Williams, P. R. Lessard, E. M. Clark, S. Desu, J. P. Bagrow, C. M. Danforth, and P. S. Dodds, “**Zipf’s law holds for phrases, not words,**” *Nature Scientific Reports* **4** no. 12209, (2015), [arXiv:1406.5181].
34. J. P. Bagrow, S. Lehmann, and Y.-Y. Ahn, “**Robustness and modular structure in networks,**” *Network Science* **3** (2015) 509–525, [arXiv:1102.5085].
33. P. S. Dodds, E. M. Clark, S. Desu, M. R. Frank, A. J. Reagan, J. R. Williams, L. Mitchell, K. D. Harris, I. M. Kloumann, J. P. Bagrow, K. Megerdooimian, M. T. McMahon, B. F. Tivnan, and C. M. Danforth, “**Reply to Garcia et al.: Common mistakes in measuring frequency-dependent word characteristics,**” *Proc. Natl. Acad. Sci. U. S. A.* **112** no. 23, (2015) E2984–E2985, [arXiv:1505.06750].
32. J. R. Williams, J. P. Bagrow, C. M. Danforth, and P. S. Dodds, “**Text mixing shapes the anatomy of rank-frequency distributions,**” *Phys. Rev. E* **91** (2015) 052811, [arXiv:1409.3870].
31. T. C. McAndrew, C. M. Danforth, and J. P. Bagrow, “**Robustness of spatial micronetworks,**” *Phys. Rev. E* **91** (2015) 042813, [arXiv:1501.05976].
30. P. S. Dodds, E. M. Clark, S. Desu, M. R. Frank, A. J. Reagan, J. R. Williams, L. Mitchell, K. D. Harris, I. M. Kloumann, J. P. Bagrow, K. Megerdooimian, M. T. McMahon, B. F. Tivnan, and C. M. Danforth, “**Human language reveals a universal positivity bias,**” *Proc. Natl. Acad. Sci. U. S. A.* **112** no. 8, (2015) 2389–2394, [arXiv:1406.3855].
29. L. Gao, C. Song, Z. Gao, A.-L. Barabási, J. P. Bagrow, and D. Wang, “**Quantifying information flow during emergencies,**” *Nature Scientific Reports* **4** no. 1, (2014) 3997.
28. M. Price, M. Evans, and J. P. Bagrow, “**PTSD symptoms, disability, and social support in the acute period after a traumatic injury: A preliminary investigation of competing hypotheses,**” *J Trauma Stress Disor Treat* **4** (2014)

27. M. R. Frank, J. R. Williams, L. Mitchell, J. P. Bagrow, P. S. Dodds, and C. M. Danforth, “**Constructing a taxonomy of fine-grained human movement and activity motifs through social media.**” Under review, 2014. [[arXiv:1410.1393](#)].
26. D. Wang, Y.-R. Lin, and J. P. Bagrow, “**Social networks in emergency response,**” in *Encyclopedia of Social Network Analysis and Mining*, R. Alhajj and J. Rokne, eds., pp. 1904–1914. Springer New York, 2014.
25. J. P. Bagrow, S. Desu, M. R. Frank, N. Manukyan, L. Mitchell, A. J. Reagan, E. E. Bloedorn, L. B. Booker, L. K. Branting, M. J. Smith, B. F. Tivnan, C. M. Danforth, P. S. Dodds, and J. C. Bongard, “**Shadow networks: Discovering hidden nodes with models of information flow.**” In preparation, 2013. [[arXiv:1312.6122](#)].
24. L. M. Shekhtman, J. P. Bagrow, and D. Brockmann, “**Robustness of skeletons and salient features in networks,**” *Journal of Complex Networks* **2** no. 2, (2014) 110–120, [[arXiv:1309.3797](#)].
23. O. Woolley-Meza, D. Grady, C. Thiemann, J. P. Bagrow, and D. Brockmann, “**Eyjafjallajökull and 9/11: The impact of large-scale disasters on worldwide mobility,**” *PLOS ONE* **8** no. 8, (2013) e69829.
22. C. Noble, J. P. Bagrow, and D. Brockmann, “**The role of caretakers in disease dynamics,**” *J. Stat. Phys.* **152** no. 4, (2013), [[arXiv:1209.2419](#)].
21. J. P. Bagrow and D. Brockmann, “**Natural emergence of clusters and bursts in network evolution,**” *Phys. Rev. X* **3** (2013) 021016, [[arXiv:1209.3307](#)].
20. S. Saavedra, S. Mukherjee, and J. P. Bagrow, “**Is coaching experience associated with effective use of timeouts in basketball?,**” *Nature Scientific Reports* **2** no. 676, (2012), [[arXiv:1205.1492](#)].
19. J. P. Bagrow, “**Communities and bottlenecks: Trees and treelike networks have high modularity,**” *Phys. Rev. E* **85** (2012) 066118, [[arXiv:1201.0745](#)].
18. J. P. Bagrow and Y.-R. Lin, “**Mesoscopic structure and social aspects of human mobility,**” *PLOS ONE* **7** no. 5, (2012) e37676, [[arXiv:1202.0224](#)].
17. Y.-R. Lin, J. P. Bagrow, and D. Lazer, “**Quantifying bias in social and mainstream media,**” *SIGWEB Newsletter* no. Summer, (2012) 5:1–5:6.
16. Y.-Y. Ahn, S. E. Ahnert, J. P. Bagrow, and A.-L. Barabási, “**Flavor network and the principles of food pairing,**” *Nature Scientific Reports* **1** no. 196, (2011), [[arXiv:1111.6074](#)].
15. L. S. Schulman, J. P. Bagrow, and B. Gaveau, “**Visualizing relations using the “observable representation,”**” *Advances in Complex Systems* **14** no. 6, (2011) 829–851.
14. Y.-R. Lin, J. P. Bagrow, and D. Lazer, “**More voices than ever? Quantifying bias in social and mainstream media,**” in *International AAAI Conference on Weblogs and Social Media*. 2011. [[arXiv:1111.1227](#)].
13. J. P. Bagrow, D. Wang, and A.-L. Barabási, “**Collective response of human populations to large-scale emergencies,**” *PLOS ONE* **6** no. 3, (2011) e17680, [[arXiv:1106.0560](#)].
12. J. P. Bagrow, Y.-Y. Ahn, and S. Lehmann, “**Link communities reveal multiscale complexity in networks,**” *Nature* **466** (2010) 761–764, [[arXiv:0903.3178](#)]. (All authors contributed equally and were listed alphabetically in the final publication.)
11. J. P. Bagrow and T. Koren, “**Investigating bimodal clustering in human mobility,**” *International Conference on Computational Science and Engineering* **4** (2009) 944–947, [[arXiv:0911.0674](#)].
10. J. Sun, J. P. Bagrow, E. M. Bollt, and J. D. Skufca, “**Dynamic computation of network statistics via updating schema,**” *Phys. Rev. E* **79** (2009) 036116, [[arXiv:0809.4707](#)].
9. J. M. Campuzano, J. P. Bagrow, and D. ben-Avraham, “**Kleinberg navigation on anisotropic lattices,**” *Research Letters in Physics* **2008** (2008), [[arXiv:0805.0807](#)].
8. J. P. Bagrow, J. Sun, and D. ben-Avraham, “**Phase transition in the rich-get-richer mechanism due to finite-size effects,**” *J. Phys. A: Math. Theor.* **41** (2008) 185001, [[arXiv:0712.2220](#)].
7. J. P. Bagrow, “**Evaluating local community methods in networks,**” *J. Stat. Mech.* **2008** no. 5, (2008) P05001, [[arXiv:0706.3880](#)].

6. J. P. Bagrow, E. M. Bollt, J. D. Skufca, and D. ben-Avraham, “**Portraits of complex networks**,” *Europhysics Letters* **81** (2008) 68004, [arXiv:cond-mat/0703470].
5. J. P. Bagrow, E. M. Bollt, and L. da F. Costa, “**Network structure revealed by short cycles**.” Unpublished, 2006. [arXiv:cond-mat/0612502].
4. J. P. Bagrow and D. ben-Avraham, “**On the google-fame of scientists and other populations**,” in *Proc. Am. Inst. of Physics Conf.*, vol. 779, pp. 81–89. 2005. [arXiv:physics/0504034].
3. J. P. Bagrow and E. M. Bollt, “**A local method for detecting communities**,” *Phys. Rev. E* **72** (2005) 046108, [arXiv:cond-mat/0412482].
2. J. P. Bagrow, H. D. Rozenfeld, E. M. Bollt, and D. ben-Avraham, “**How famous is a scientist? — Famous to those who know us**,” *Europhysics Letters* **67** (2004) 511, [arXiv:cond-mat/0404515].
1. M. K. Nordhaus, H. J. Newberg, J. P. Bagrow, C. Rider, D. Tucker, H. A. Rave, and J. A. Smith, “**Photometric separation of physical properties of stars**,” *American Astronomical Society, 201st AAS Meeting, #16.12; Bulletin of the American Astronomical Society* **34** (2002) 1126.

INVITED TALKS

Open Source and Open Science: data-enabled studies of thriving ecosystems and collaborations	6/2022
MIT Computational Social Science Lunch Talk, Online	
The Penumbra of Open Source: Public projects outside of centralized platforms	7/2021
Google State of the Ecosystem Special Guest talk, Online	
Exploring the OCEAN: Open source Complex Ecosystems and Networks	6/2021
NetOpen21, Satellite at Networks 2021, Online	
Exploring the OCEAN: Open source Complex Ecosystems and Networks	5/2021
(Keynote speaker) CompleNet 21: International Conference on Complex Networks, Online	
Information flow and prediction limits in online networks	3/2021
Computer Science Seminar Series, University of Exeter, Online	
Working with network data + data visualization—school speaker	1/2021
Complex Networks Winter Workshop, Online	
Introduction to network science—school speaker	4/2020
Northeast Region Conference on Complex Systems (NERCCS), Online (originally Buffalo, NY)	
Working with network data + data visualization—school speaker	12/2019
Complex Networks Winter Workshop, Québec City, Québec	
Measuring and Modeling Information Flow Online	10/2019
(Invited speaker) MB57 - Data Driven Disaster Resilience, Session at INFORMS 2019, Seattle, WA, USA	
Human-AI hybrid network exploration: the case of causal attribution	10/2019
(Invited speaker) Machine Learning and Modeling for Complex Systems, Satellite at Conference on Complex Systems 2019, Nanyang Technological University, Singapore	
Information flow and prediction limits in online networks	10/2019
(Invited speaker) Conference on Complex Systems 2019, Nanyang Technological University, Singapore	
Information flow and prediction limits in online networks	4/2019
Computational and Data-Enabled Science and Engineering (CDSE) Days, Research Symposium, University at Buffalo, Buffalo, NY, USA	
Information flow and prediction limits in online networks	4/2019
Department of Physics and Astronomy Colloquium, University of Rochester, Rochester, NY, USA	
Working with network data—school speaker	12/2018
Inaugural Complex Networks Winter Workshop, Québec City, Québec	
Hunch & Crunch: iterative crowdsourced hypothesis generation	10/2018
Inaugural Case Workshop on Digital Innovation, Weatherhead School of Management at Case Western Reserve University, Cleveland, OH, USA	
Hunch & Crunch: iterative crowdsourced hypothesis generation	7/2018
Crowdsourcing and Collective Intelligence (CCI) Workshop, Ninth International Conference on Complex Systems (ICCS), Boston, MA, USA	
Hunch & Crunch: iterative crowdsourced hypothesis generation	5/2018

NSF-sponsored Workshop on Converging Human and Technological Perspectives in Crowdsourcing Research, Alexandria, VA, USA	
Measuring and modeling the social flow of information	12/2017
Fall 2017 David A. Walsh '67 Arts and Science Seminar, Clarkson University, Potsdam, NY, USA	
Information flow and Prediction Limits in Online Social Networks	10/2017
Data Institute SF Annual Conference, University of San Francisco, San Francisco, CA, USA	
Information and Prediction Limits in Online Social Activity	7/2017
Center for Complex Networks Research seminar, Northeastern University, Boston, MA, USA	
Information and Prediction Limits in Online Social Activity	5/2017
MS135 Causation Inference and Information Flow in Dynamical Systems: Theory and Applications - Part I of II, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	
An introduction to network science	11/2016
Math Club, University of Vermont, Burlington, VT, USA	
Hunch & Crunch: iterative crowdsourced hypothesis generation	11/2016
28th Kavli Frontiers of Science Symposium (lightning talk), University of California, Irvine, CA, USA	
Models and Mechanisms in Network Science	10/2016
Complex Systems/Applied Math seminar, University of Vermont, Burlington, VT, USA	
An introduction to Network Science	10/2016
Burlington Data Science meetup, Burlington, VT, USA	
Machines, Algorithms, and Minority Report	5/2016
Burlington High School Year End Studies presentation, Burlington, VT, USA	
Data-driven approaches to studying human dynamics	7/2015
Center for Nonlinear Studies seminar, LANL, Los Alamos, NM, USA	
Data-driven approaches to studying human dynamics	6/2015
DTU Compute seminar, Department of Applied Mathematics and Computer Science, Technical University of Denmark	
Symbolic Regression: a tool to advance our understanding of complex systems	6/2015
NetSci Backstage 2015, NetSci 2015, Zaragoza, Spain	
Shadow Networks: Discovering Hidden Nodes with Models of Information Flow	5/2015
MS102 Complex Network Theory Based Approaches in the Analyses of Complex Systems and Data - Part II of II, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	
Shadow Networks: Discovering Hidden Nodes with Models of Information Flow	5/2015
Cambridge Networks Day 2015, University of Cambridge, Cambridge, UK	
Flight or Fight: Predicting Human Dynamics with Tweets and Phones	4/2014
Macmillan Symposium, University of Vermont, Burlington, VT, USA	
Natural emergence of clusters and bursts in network	11/2013
Physics Department Condensed Matter Theory, Weekly Seminar, University of Vermont, Burlington, VT, USA	
Mesoscopic Structure and Social Aspects of Human Mobility	5/2013
MS75 Computational Social Science: An Exploration of Human Dynamics, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	
Human dynamics through the lens of modern data	03/2013
University of Vermont, Burlington, VT, USA	
Natural emergence of clusters and bursts in network	1/2013
2013 ACCA Seminar Series on Systems Biology, Benedictine University, Lisle, IL, USA	
Natural emergence of clusters and bursts in network	10/2012
Networks and Complex Systems Talk Series, Indiana University, Bloomington, IN, USA	
Introduction to networks (half-day school)	6/2012
NetSci 2012 School, Lecturer, Northwestern University, Evanston, IL, USA	
Human dynamics through the lens of modern data	4/2012
Engineering Science and Applied Mathematics, Weekly seminar, Northwestern University, Evanston, IL, USA	
Cell phones, communities, and complex networks	1/2012
Northwestern Institute on Complex Systems (NICO), Weekly seminar, Northwestern University, Evanston, IL, USA	
Response of human populations to large-scale emergencies	10/2011
NetMob 2011, MIT, Boston, MA, USA	
Robustness of overlapping modular networks	5/2011
MS73: Collective Behavior - Part I of II, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	
Exploring mesoscopic structure in complex networks	5/2011
Senseable City, MIT, Boston, MA, USA	
Exploring mesoscopic structure in complex networks	5/2011

Northwestern Institute on Complex Systems, Northwestern University, Evanston, IL, USA	
Exploring mesoscopic structure in complex networks	4/2011
Center for Nonlinear Studies seminar, LANL, Los Alamos, NM, USA	
Communities and Complex Networks	4/2011
Network Science Class, Northeastern University, Boston, MA, USA	
Exploring mesoscopic structures in complex networks	10/2010
Department of Physics and Department of Mathematics and Computer Science, Joint Colloquium, Clarkson University, Potsdam, NY, USA	
Response of human populations to large-scale emergencies	4/2010
MIT Media lab, Boston, MA, USA	
Network Reading Group: Extracting the multiscale backbone of complex weighted networks	12/2009
Harvard Medical School, Boston, MA, USA	
A Toy Model of Animal Locomotion -or- Hey, what's that smell?	2/2009
JointNet Seminar, Northeastern University, Boston, MA, USA	
Communities and Complex Networks	10/2008
Center for International Development, Harvard University, Cambridge, MA, USA	
Detecting communities in complex networks	5/2007
Math department seminar, RIT, Rochester, NY, USA	
Methods for detecting communities	6/2005
Center for Nonlinear Science, Los Alamos National Laboratory, Los Alamos, NM, USA	
A local method for detecting communities	5/2005
CP43: Network Structures - Part II of II (presenter and session chair), SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	

PRESS COVERAGE

Our study “**Sleep during travel balances individual sleep needs**” was described in a [Research Highlight in Nature](#). We were also the [cover article](#) for the May 2022 “issue” of *Nature Human Behaviour*.

“**Information flow reveals prediction limits in online social activity**” received coverage in [Science](#), [Forbes](#), [Quartz](#), [COSMOS](#), [Reuters](#), [Marketplace](#), [Sky News](#), [Daily Mail \(UK\)](#), [Ars Technica](#), [CNET](#), and many other venues. [Even more press coverage.](#)

Our study “**Human language reveals a universal positivity bias**” on the Pollyanna principle, received quite a bit of press coverage, including [CBS This Morning \(YouTube\)](#), [NPR Marketplace](#), [Science Magazine](#), [The Atlantic](#), and [The New York Times](#), among others.

Our “**Shadow Networks**” project, on uncovering hidden nodes in networks, was covered by the [Nutonian blog](#).

“**Is coaching experience associated with effective use of timeouts in basketball?**” was featured in [Physics Buzz Blog at Physics Central](#) and [The Wall Street Journal](#).

My work with Yu-Ru Lin, “**Mesoscopic Structure and Social Aspects of Human Mobility**” was featured in [the Spring 2012 issue of McCormick Magazine](#), the biannual magazine of Northwestern University’s McCormick School of Engineering.

“**Flavor network and the principles of food pairing**” received quite a bit of attention. Outlets covering it include: [Wired](#), [Nature News](#), [NPR](#), [The Daily Mail](#), [MIT Technology Review](#), [Popular Science](#), [Inside Science](#), [Physorg.com](#), [Gizmodo](#), [The Huffington Post](#), [Chemistry World](#), [Flowingdata.com](#), [FoodNavigator.com](#), [Indiana University News Room](#), and [News@Northeastern](#). This paper received over 100,000 downloads in its first few months of publication at *Nature Scientific Reports*. During that time, it was the most downloaded article of any Nature Publishing Group journal, including Nature itself.

“**Collective response of human populations to large-scale emergencies**” was featured in [news@northeastern](#) and [physorg.com](#).

“**Link communities reveal multiscale complexity in networks**” was featured in [news@northeastern](#) and [Science On \(Hankyoreh\)](#).

My undergraduate project, “**How famous is a scientist? — Famous to those who know us**” was covered in [Nature News in Brief](#), Sci-Tech Today, [the Inquirer](#), NewsFactor Innovation, WebOptimiser, [physicsworld.com](#), Felix (student newspaper of Imperial College), and we were interviewed on “The Science Guy”, NewsTalk Radio KFRU.

COLLABORATORS (since 2018)

- Yong-Yeol Ahn¹
- Sebastian Ahnert²
- Sharon Alajajian³
- Antoine Allard⁴
- Thayer Alshaabi⁵
- Jesse Austin-Breneman⁶
- Daryl Bagley⁷
- Albert-László Barabási⁸
- Raiyan Baten⁷
- Daniel ben-Avraham⁹
- Daniel Berenberg⁵
- Eric Bloedorn¹⁰
- Erik Bollt⁹
- Joshua Bongard⁵
- Lashon Booker¹⁰
- Luther Branting¹⁰
- Dirk Brockmann¹¹
- J. Mauricio Campuzano¹²
- Amanda Casari¹³
- Zexun Chen¹⁴
- Eric Clark⁵
- Famous Clark⁷
- Emily Cody¹⁵
- Christopher Danforth⁵
- Suma Desu¹⁶
- David Dewhurst⁵
- Peter Dodds⁵
- Maggie Evans⁵
- Alexandre Evsukoff¹⁷
- Morgan Frank¹⁸
- Liang Gao¹⁹
- Ziyou Gao¹⁹
- Bernard Gaveau²⁰
- Gourab Ghoshal⁷
- Daniel Grady²¹
- Ryan Grindle⁵
- Elizaveta Guseva²²
- Kameron Harris²³
- Paul D.H. Hines⁵
- Mohammed Hoque⁷
- Abigail Hotaling⁵
- Laurent Hébert-Dufresne⁵
- Susan Johnson²⁴
- Sigga Jónasdóttir²⁵
- Sean Keltz⁷
- Isabel Kloumann²⁶
- Michael Klug³
- Tal Koren²⁷
- Mert Korkali²⁸
- David Lazer⁸
- Byung Suk Lee⁵
- Sune Lehmann²⁵
- Paul Lessard²⁹
- Yu-Ru Lin³⁰
- Xipei Liu⁵
- Saranzaya Magsarjav³¹
- Narine Manukyan³²
- Thomas McAndrew⁵
- Katie McLaughlin¹³
- Matthew McMahon¹⁰
- Karine Megerdooomian¹⁰
- John Meluso⁵
- Ronaldo Menezes³³
- Lewis Mitchell³¹
- Satyam Mukherjee³⁴
- Heidi Jo Newberg³⁵
- Charleston Noble³⁶
- Tyson Pond⁵
- Matthew Price⁵
- Rob Razzante³⁷
- Andrew Reagan⁵
- Samuel Rosenblatt⁵
- Hernán Rozenfeld³⁸
- Serguei Saavedra³⁹
- Lawrence Schulman⁹
- Louis Shekhtman⁴⁰
- Prajwal Shrestha⁵
- Joseph Skufca⁹
- Michael Smith¹⁰
- Chaoming Song⁴¹
- Tobin South³¹
- Guillaume St-Onge⁸
- Jennie Stephens⁸
- Jie Sun⁹
- Ashely Tenesaca⁷
- Christian Thiemann³⁴
- Brian Tivnan¹⁰
- Milo Trujillo⁵
- Jason Veneman¹⁰
- Mark Wagdy⁵
- Dashun Wang³⁴
- Melanie Warrick¹³
- Brooke Foucault Welles⁸
- Jake Williams⁴²
- Olivia Woolley-Meza⁴³
- Jean-Gabriel Young⁵

¹Indiana U ²Cambridge U ³U of California, Berkeley ⁴Université Laval ⁵U of Vermont ⁶U of Michigan ⁷U of Rochester
⁸Northeastern U ⁹Clarkson U ¹⁰MITRE Corporation ¹¹Humboldt U of Berlin, Robert Koch Institute ¹²Stevens Institute of Technology, Hoboken NJ ¹³Google ¹⁴U of Edinburgh ¹⁵Adobe Systems ¹⁶Apple, Inc. ¹⁷Federal U of Rio de Janeiro ¹⁸MIT Media Lab ¹⁹Beijing Jiaotong U ²⁰Laboratoire analyse et physique mathématique, Paris, France ²¹ID Analytics ²²Gartner, Inc. ²³U of Washington ²⁴Case Western Reserve U ²⁵Technical U of Denmark ²⁶Facebook ²⁷Verint Systems ²⁸Lawrence Livermore National Laboratory ²⁹U of Colorado, Boulder ³⁰U of Pittsburgh ³¹U of Adelaide ³²Champlain College ³³U of Exeter ³⁴Northwestern U ³⁵Rensselaer Polytechnic Institute ³⁶Harvard U ³⁷College of Wooster ³⁸Physical Review ³⁹Massachusetts Institute of Technology ⁴⁰Bar-Ilan U ⁴¹U of Miami, Coral Gables ⁴²Drexel U ⁴³ETH Zurich

COURSES TAUGHT

The University of Vermont, Burlington, Vermont

- S ‘22: Capstone Experience (STAT 281)
- S ‘22: Data Science II (STAT/CS 387)
- F ‘21: Data Science I (STAT/CS 287, CSYS 395, Online)
- (On sabbatical for Fall 2020 and Spring 2021)
- S ‘20: Data Science I (STAT/CS 287)
- S ‘20: Data Science II (STAT/CS 387)
- F ‘19: Data Science I (STAT/CS 287)
- S ‘19: Data Science II (STAT/CS 387)
- S ‘19: Advanced Engineering Mathematics (MATH 271)
- F ‘18: Data Science I (STAT/CS 287)

- S '18: Data Science II (STAT/CS 387)
- F '17: Data Science I (STAT/CS 287)
- S '17: Data Science II (STAT 387)
- S '17: Advanced Engineering Mathematics (MATH 271)
- F '16: Data Science I (STAT/CS 287)
- S '16: Data Science II (STAT 387)
- F '15: Data Science I (STAT/CS 287)
- S '15: Advanced Engineering Mathematics (MATH 271)
- F '14: Data Science II (MATH 295)
- S '14: Intro to Data Science and Visualization (MATH/CS 195/295)
- F '13: Calculus I (MATH 21)

(Developed Data Science I and II courses from scratch.)

POSTDOCTORAL SCHOLARS AND RESEARCH SCIENTISTS SUPERVISED

The University of Vermont, Burlington, Vermont

- John Meluso, Postdoctoral scholar, Google OCEAN (Prof. L. Hébert-Dufresne joint supervisor), 2020–2022,
- Himadri Basu, Postdoctoral scholar, NASA EPSCoR (Profs. H. Ossareh and M. Almassalkhi joint supervisors), 2020–2021.

STUDENTS ADVISED AND CO-ADVISED

The University of Vermont, Burlington, Vermont

- Milo Trujillo, PhD Complex Systems and Data Science (Prof. L. Hébert-Dufresne co-advisor), 2020–present,
- Ryan Grindle, MS Computer Science, MS Mathematics (Prof. J. Bongard co-advisor), 2017–2021,
- Tyson Pond, MS Mathematics, 2018–2020,
- Andrew Becker, MS Statistics (2018), 2017–2019,
- Abigail Hotaling, MS Statistics, 2017–2019,
- Olivia Hurd, undergraduate, 2018–2019,
- Daniel Berenberg, Accelerated Masters (AMP) Computer Science, 2017–2018,
- Brian Colombini, undergraduate, 2016–2018,
- Xipei Liu, MS Complex Systems and Data Science, 2016–2017,
- Thomas McAndrew, PhD Mathematics (Prof. C. Danforth co-advisor), 2014–2016.

THESIS AND DISSERTATION COMMITTEES

The University of Vermont, Burlington, Vermont

- 2016–present: Rubenstein School of Environmental and Natural Resources PhD Committee (External Faculty Chair), Lindsay Barbieri,
- 2020: EBE MS Committee ((External Faculty Chair), Aidan Laracy (May 5),
- 2018–2020: Math & Stats MS Committee, Tyson Pond (Mar. 23),
- 2019: Math BA / Data Science BS Honors Thesis Committee, Blake Williams (Apr. 11),
- 2018–2019: Math & Stats BS Honors Thesis Committee (Faculty advisor), Olivia Hurd (Apr. 10),
- 2017–2018: Math & Stats MS Committee, Ryan Grindle (Aug. 23),
- 2017–2018: Computer Science BS Honors Thesis Committee (Faculty advisor), Brian Colombini (Apr. 10),
- 2017: Math & Stats MS Committee, Christopher Fusting (Jul. 31),
- 2017: Computer Science Masters Project Committee, Prajwal Shrestha (May 5),
- 2016: Math & Stats PhD Committee, Thomas C. McAndrew (Oct. 7),
- 2015: Computer Science BS Honors Thesis Committee, Mariko Totten (Apr. 30),
- 2015: Math & Stats BS Honors Thesis Committee, Nicholas Strayer (Apr. 29),

- 2014: Math & Stats Masters Examining Committees, Oral Exams of Lindsay Van Leir (Mar. 12), Peter Froncek (Mar. 21), Brandon Tries (Apr. 1).

Clarkson University, Potsdam, New York

- 2018: Dept. Mathematics, PhD Examining Committee of B.M. Shandeepra Dilhani Wickramasinghe (Thesis: *Data and Complex Systems: from Modeling Social Spatial Complex Networks to Comparison-based Ranking and Sensor Localization*).

Technical University of Denmark (DTU), Copenhagen, Denmark

- 2015: DTU Compute (Dept. Applied Mathematics and Computer Science), PhD Examining Committee of Vedran Sekara (Thesis: *Dynamics of High-Resolution Networks*).

SERVICE

Editorial Board Member

- Nature Scientific Reports, Physics (2012–present)

Reviewer

- Proceedings of the National Academy of Sciences of the United States of America (PNAS)
- Nature Communications
- Science Advances
- Nature Machine Intelligence
- Physical Review Letters
- Physical Review E
- Physical Review X
- National Science Foundation
- Wellcome Trust
- Journal of the Royal Society Interface
- PLOS ONE
- Nature Scientific Reports
- SIAM Journal on Applied Mathematics (SIAP)
- New Journal of Physics
- Journal of Complex Networks
- Europhysics Letters (EPL)
- European Physical Journal B (EPJB)
- Journal of Statistical Physics
- IET Systems Biology
- Entropy
- Journal of Supercomputing
- Physics Letters A
- Internet Mathematics
- OTKA (Hungarian Scientific Research Fund)
- Chemical Engineering Science
- International Journal of Bifurcation and Chaos
- Networks and Spatial Economics
- ACM Transactions on Modeling and Computer Simulation (TOMACS)
- ACM Transactions on Knowledge Discovery from Data (TKDD)
- Journal of Selected Topics in Signal Processing
- Computational Intelligence
- Physica A
- Vermont Genetics Network

University of Vermont

- Interim Graduate Coordinator, Complex Systems and Data Science (2019–2020)

University of Vermont Committee Member

- Math & Stats Graduate (2013–2020)
- Math & Stats Undergraduate Curriculum (2014–2015, 2016–2017, 2021–present)
- Math & Stats Online & Hybrid Course (2014–2015, 2017–2020)
- Complex Systems & Data Science Curriculum (2014–2020, 2021–present)
- Data Science Undergraduate Curriculum (2014–2020, 2021–present)
- Ad Hoc Data Management Committee (2017)

Program Committee Member

- NetSci 2020 Network Science Conference (NetSci 2020)
- 10th International Conference on Complex Systems (ICCS2020)
- 6th International Conference on Computational Social Science (IC2S2 2020)
- Third Northeast Regional Conference on Complex Systems (NERCCS2020)

- NetSci-X 2020 Network Science Conference (NetSci-x2020)
- SIAM Workshop on Network Science (NS19)
- Second Northeast Regional Conference on Complex Systems (NERCCS2019)
- 10th International Conference on Complex Networks (CompleNet'19)
- 7th International Workshop on Complex Networks and their Applications (Complex Networks 2018)
- International Conference on Complex Systems 2018 (ICCS2018)
- NetSci-X 2018 Network Science Conference (NetSci-x2018)
- The Web Conference (formerly WWW) 2018, Social Network Analysis and Graph algorithms for the Web
- SIAM Workshop on Network Science (NS17)
- 2017 International School and Conference on Network Science (NetSci 2017)
- 6th International Workshop on Complex Networks and their Applications (Complex Networks 2017)
- International Workshop on Collaborative Internet Computing for Disaster Management (CIC-DM 2016)
- 5th International Workshop on Complex Networks and their Applications (Complex Networks 2016)
- SIAM Workshop on Network Science (NS16)
- 2016 International School and Conference on Network Science (NetSci 2016)
- 9th ACM International Conference on Web Search and Data Mining (WSDM 2016)
- Workshop on Complex Networks and their Applications, part of 11th International Conference on Signal Image Technology & Internet Based Systems (SITIS 2015)
- NetSci-X 2015 Network Science Conference (NetSci-x2015)
- 6th Workshop on Complex Networks (CompleNet 2015)
- SIAM Workshop on Network Science (NS14)
- 21st International World Wide Web Conference (WWW 2012)
- 5th International AAAI Conference on Weblogs and Social Media (ICWSM 2011)
- FindingNEMO 2011 workshop (part of ECML-PKDD 2011)

Organizer

- 2019 International School and Conference on Network Science (NetSci 2019), Program Committee Chair.
- 2014 International School and Conference on Network Science (NetSci 2014), Chair of Social Media.
- 2014 KDD Workshop on Learning about Emergencies from Social Information (KDD-LESI 2014), Co-Organizer with Yu-Ru Lin.

Industry

- Academic Advisor, MassMutual Data Engineering Development Program (2019)

In 2012, 2015, and 2018 I served on NSF multi-disciplinary grant review panels.

SOCIETY MEMBERSHIPS

Society of Industrial and Applied Mathematicians (SIAM)

American Physical Society (APS)

Society of Physics Students (SPS), formerly

HONORS AND AWARDS

- Received the FOSS Impact paper award for our MSR'21 paper on acknowledging contributions in Open Source, 2021
- International Visitor Award, The University of Sydney Mathematical Research Institute (SMRI), 2021
- Received a Best Paper honorable mention award for our CSCW'18 paper on crowdsourcing causal networks, 2018
- Outstanding Junior Faculty Performance Award, College of Engineering and Mathematical Sciences, University of Vermont, 2017
- Kavli Fellow, National Academy of Sciences, 2016
- Excellence in Teaching Award, UVM Graduate Student Senate, 2015–2016

- National Science Foundation Graduate Research Fellowship, 2006
- Presidential Scholar, Clarkson University, 2001-2004
- Elected to Phi Kappa Phi (all-discipline honor society), 2002
- Elected to Phi Theta Kappa (international two-year college honor society), 2000

REFERENCES

Dr. Albert-László Barabási — Research Supervisor

Robert Gray Dodge Professor of Network Science and a Distinguished University Professor
Director, Center for Complex Network Research
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Professor, APS Fellow
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Dr. Erik Bollt — Academic/Research Supervisor

W. Jon Harrington Professor of Mathematics
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Dr. Pieter Swart — Research Supervisor

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