

**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, with Laurent Hébert-Dufresne

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

## PUBLICATIONS AND PREPRINTS

69. M. Z. Trujillo, L. Hébert-Dufresne, and J. P. Bagrow, “**The penumbra of open source: projects outside of centralized platforms are longer maintained, more academic and more collaborative.**” In preparation, 2021. [[arXiv:2106.15611](https://arxiv.org/abs/2106.15611)].
68. Z. Chen, S. Kelty, B. Foucault Welles, J. P. Bagrow, R. Menezes, and G. Ghoshal, “**Contrasting social and non-social sources of predictability in human mobility.**” Under review, 2021. [[arXiv:2104.13282](https://arxiv.org/abs/2104.13282)].
67. J. Meluso, J. Austin-Breneman, J. P. Bagrow, and L. Hébert-Dufresne, “**A review & framework for modeling complex engineered system development processes.**” Under review, 2021. [[arXiv:2103.12820](https://arxiv.org/abs/2103.12820)].
66. S. S. Jónasdóttir, J. P. Bagrow, and S. Lehmann, “**Travel serves to balance skewed sleep patterns.**” Under review, 2021.
65. 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. In press.
64. 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](https://arxiv.org/abs/2103.11007)].  
★ *FOSS Impact paper.*
63. 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](https://arxiv.org/abs/2006.08527)].
62. J. P. Bagrow, “**TL;DR: how well do machines summarize our work? (correspondence),**” *Nature* **590** (2021) 36.
61. 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.

60. A. Hotaling and J. P. Bagrow, “**Efficient crowdsourcing of crowd-generated microtasks,**” *PLOS ONE* **15** no. 12, (2020) 1–18, [arXiv:1912.05045].
59. 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].
58. J. Meluso, S. Johnson, and J. P. Bagrow, “**Making virtual teams work: Scientifically redesigning virtual collaboration for the future.**” Under review, 2020. [osf.io/preprints/socarxiv/wehsk](https://osf.io/preprints/socarxiv/wehsk).
57. R. Grindle, J. P. Bagrow, and J. C. Bongard, “**Transfer learning capable symbolic regression.**” In preparation, 2020.
56. J. P. Bagrow, “**Democratizing AI: Non-expert design of prediction tasks,**” *PeerJ Computer Science* **6** (2020) e296, [arXiv:1802.05101].
55. 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].
54. 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].
53. J. P. Bagrow, D. Berenberg, and J. C. Bongard, “**Neural language representations predict outcomes of scientific research.**” In preparation, 2018. [arXiv:1805.06879].
52. A. Hotaling and J. P. Bagrow, “**Accurate inference of crowdsourcing properties when using efficient allocation strategies.**” In preparation, 2019. [arXiv:1903.03104].
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. Wagdy, 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. Megerdooian, 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. Megerdooian, 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

<b>Exploring the OCEAN: Open source Complex Ecosystems and Networks</b> NetOpen21, Satellite at Networks 2021, Online	6/2021
<b>Exploring the OCEAN: Open source Complex Ecosystems and Networks</b> (Keynote speaker) CompleNet 21: International Conference on Complex Networks, Online	5/2021
<b>Information flow and prediction limits in online networks</b> Computer Science Seminar Series, University of Exeter, Online	3/2021
<b>Working with network data + data visualization—school speaker</b> Complex Networks Winter Workshop, Online	1/2021
<b>Introduction to network science—school speaker</b> Northeast Region Conference on Complex Systems (NERCCS), Online (originally Buffalo, NY)	4/2020
<b>Working with network data + data visualization—school speaker</b> Complex Networks Winter Workshop, Québec City, Québec	12/2019
<b>Measuring and Modeling Information Flow Online</b> (Invited speaker) MB57 - Data Driven Disaster Resilience, Session at INFORMS 2019, Seattle, WA, USA	10/2019
<b>Human-AI hybrid network exploration: the case of causal attribution</b> (Invited speaker) Machine Learning and Modeling for Complex Systems, Satellite at Conference on Complex Systems 2019, Nanyang Technological University, Singapore	10/2019
<b>Information flow and prediction limits in online networks</b> (Invited speaker) Conference on Complex Systems 2019, Nanyang Technological University, Singapore	10/2019
<b>Information flow and prediction limits in online networks</b> Computational and Data-Enabled Science and Engineering (CDSE) Days, Research Symposium, University at Buffalo, Buffalo, NY, USA	4/2019
<b>Information flow and prediction limits in online networks</b> Department of Physics and Astronomy Colloquium, University of Rochester, Rochester, NY, USA	4/2019
<b>Working with network data—school speaker</b> Inaugural Complex Networks Winter Workshop, Québec City, Québec	12/2018
<b>Hunch &amp; Crunch: iterative crowdsourced hypothesis generation</b> Inaugural Case Workshop on Digital Innovation, Weatherhead School of Management at Case Western Reserve University, Cleveland, OH, USA	10/2018
<b>Hunch &amp; Crunch: iterative crowdsourced hypothesis generation</b> Crowdsourcing and Collective Intelligence (CCI) Workshop, Ninth International Conference on Complex Systems (ICCS), Boston, MA, USA	7/2018
<b>Hunch &amp; Crunch: iterative crowdsourced hypothesis generation</b> NSF-sponsored Workshop on Converging Human and Technological Perspectives in Crowdsourcing Research, Alexandria, VA, USA	5/2018
<b>Measuring and modeling the social flow of information</b> Fall 2017 David A. Walsh '67 Arts and Science Seminar, Clarkson University, Potsdam, NY, USA	12/2017
<b>Information flow and Prediction Limits in Online Social Networks</b> Data Institute SF Annual Conference, University of San Francisco, San Francisco, CA, USA	10/2017
<b>Information and Prediction Limits in Online Social Activity</b> Center for Complex Networks Research seminar, Northeastern University, Boston, MA, USA	7/2017
<b>Information and Prediction Limits in Online Social Activity</b> 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	5/2017
<b>An introduction to network science</b> Math Club, University of Vermont, Burlington, VT, USA	11/2016
<b>Hunch &amp; Crunch: iterative crowdsourced hypothesis generation</b> 28th Kavli Frontiers of Science Symposium (lightning talk), University of California, Irvine, CA, USA	11/2016
<b>Models and Mechanisms in Network Science</b> Complex Systems/Applied Math seminar, University of Vermont, Burlington, VT, USA	10/2016
<b>An introduction to Network Science</b> Burlington Data Science meetup, Burlington, VT, USA	10/2016
<b>Machines, Algorithms, and Minority Report</b> Burlington High School Year End Studies presentation, Burlington, VT, USA	5/2016
<b>Data-driven approaches to studying human dynamics</b> Center for Nonlinear Studies seminar, LANL, Los Alamos, NM, USA	7/2015
<b>Data-driven approaches to studying human dynamics</b>	6/2015

DTU Compute seminar, Department of Applied Mathematics and Computer Science, Technical University of Denmark	
<b>Symbolic Regression: a tool to advance our understanding of complex systems</b>	<b>6/2015</b>
NetSci Backstage 2015, NetSci 2015, Zaragoza, Spain	
<b>Shadow Networks: Discovering Hidden Nodes with Models of Information Flow</b>	<b>5/2015</b>
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	
<b>Shadow Networks: Discovering Hidden Nodes with Models of Information Flow</b>	<b>5/2015</b>
Cambridge Networks Day 2015, University of Cambridge, Cambridge, UK	
<b>Flight or Fight: Predicting Human Dynamics with Tweets and Phones</b>	<b>4/2014</b>
Macmillan Symposium, University of Vermont, Burlington, VT, USA	
<b>Natural emergence of clusters and bursts in network</b>	<b>11/2013</b>
Physics Department Condensed Matter Theory, Weekly Seminar, University of Vermont, Burlington, VT, USA	
<b>Mesoscopic Structure and Social Aspects of Human Mobility</b>	<b>5/2013</b>
MS75 Computational Social Science: An Exploration of Human Dynamics, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	
<b>Human dynamics through the lens of modern data</b>	<b>03/2013</b>
University of Vermont, Burlington, VT, USA	
<b>Natural emergence of clusters and bursts in network</b>	<b>1/2013</b>
2013 ACCA Seminar Series on Systems Biology, Benedictine University, Lisle, IL, USA	
<b>Natural emergence of clusters and bursts in network</b>	<b>10/2012</b>
Networks and Complex Systems Talk Series, Indiana University, Bloomington, IN, USA	
<b>Introduction to networks (half-day school)</b>	<b>6/2012</b>
NetSci 2012 School, Lecturer, Northwestern University, Evanston, IL, USA	
<b>Human dynamics through the lens of modern data</b>	<b>4/2012</b>
Engineering Science and Applied Mathematics, Weekly seminar, Northwestern University, Evanston, IL, USA	
<b>Cell phones, communities, and complex networks</b>	<b>1/2012</b>
Northwestern Institute on Complex Systems (NICO), Weekly seminar, Northwestern University, Evanston, IL, USA	
<b>Response of human populations to large-scale emergencies</b>	<b>10/2011</b>
NetMob 2011, MIT, Boston, MA, USA	
<b>Robustness of overlapping modular networks</b>	<b>5/2011</b>
MS73: Collective Behavior - Part I of II, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	
<b>Exploring mesoscopic structure in complex networks</b>	<b>5/2011</b>
Senseable City, MIT, Boston, MA, USA	
<b>Exploring mesoscopic structure in complex networks</b>	<b>5/2011</b>
Northwestern Institute on Complex Systems, Northwestern University, Evanston, IL, USA	
<b>Exploring mesoscopic structure in complex networks</b>	<b>4/2011</b>
Center for Nonlinear Studies seminar, LANL, Los Alamos, NM, USA	
<b>Communities and Complex Networks</b>	<b>4/2011</b>
Network Science Class, Northeastern University, Boston, MA, USA	
<b>Exploring mesoscopic structures in complex networks</b>	<b>10/2010</b>
Department of Physics and Department of Mathematics and Computer Science, Joint Colloquium, Clarkson University, Potsdam, NY, USA	
<b>Response of human populations to large-scale emergencies</b>	<b>4/2010</b>
MIT Media lab, Boston, MA, USA	
<b>Network Reading Group: Extracting the multiscale backbone of complex weighted networks</b>	<b>12/2009</b>
Harvard Medical School, Boston, MA, USA	
<b>A Toy Model of Animal Locomotion -or- Hey, what's that smell?</b>	<b>2/2009</b>
JointNet Seminar, Northeastern University, Boston, MA, USA	
<b>Communities and Complex Networks</b>	<b>10/2008</b>
Center for International Development, Harvard University, Cambridge, MA, USA	
<b>Detecting communities in complex networks</b>	<b>5/2007</b>
Math department seminar, RIT, Rochester, NY, USA	
<b>Methods for detecting communities</b>	<b>6/2005</b>
Center for Nonlinear Science, Los Alamos National Laboratory, Los Alamos, NM, USA	
<b>A local method for detecting communities</b>	<b>5/2005</b>
CP43: Network Structures - Part II of II (presenter and session chair), SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	

## PRESS COVERAGE

“**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 [Nutionian 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 Ahn<sup>1</sup>
- Sebastian Ahnert<sup>2</sup>
- Sharon Alajajian<sup>3</sup>
- Thayer Alshaabi<sup>4</sup>
- Jesse Austin-Breneman<sup>5</sup>
- Daryl Bagley<sup>6</sup>
- Albert-László Barabási<sup>7</sup>
- Raiyan Baten<sup>6</sup>
- Daniel ben-Avraham<sup>8</sup>
- Daniel Berenberg<sup>4</sup>
- Eric Bloedorn<sup>9</sup>
- Erik Bollt<sup>8</sup>
- Joshua Bongard<sup>4</sup>
- Lashon Booker<sup>9</sup>
- Luther Branting<sup>9</sup>
- Dirk Brockmann<sup>10</sup>
- J. Mauricio Campuzano<sup>11</sup>
- Amanda Casari<sup>12</sup>
- Eric Clark<sup>4</sup>
- Famous Clark<sup>6</sup>
- Emily Cody<sup>13</sup>
- Christopher Danforth<sup>4</sup>
- Suma Desu<sup>14</sup>
- David Dewhurst<sup>4</sup>
- Peter Dodds<sup>4</sup>
- Maggie Evans<sup>4</sup>
- Morgan Frank<sup>15</sup>
- Liang Gao<sup>16</sup>
- Ziyou Gao<sup>16</sup>
- Bernard Gaveau<sup>17</sup>
- Gourab Ghoshal<sup>6</sup>
- Daniel Grady<sup>18</sup>
- Ryan Grindle<sup>4</sup>
- Elizaveta Guseva<sup>19</sup>
- Kameron Harris<sup>20</sup>
- Paul D.H. Hines<sup>4</sup>
- Mohammed Hoque<sup>6</sup>
- Abigail Hotaling<sup>4</sup>
- Laurent Hébert-Dufresne<sup>4</sup>
- Susan Johnson<sup>21</sup>
- Sigga Jónasdóttir<sup>22</sup>
- Isabel Kloumann<sup>23</sup>
- Michael Klug<sup>3</sup>
- Tal Koren<sup>24</sup>
- Mert Korkali<sup>25</sup>
- David Lazer<sup>7</sup>
- Byung Suk Lee<sup>4</sup>
- Sune Lehmann<sup>22</sup>
- Paul Lessard<sup>26</sup>
- Yu-Ru Lin<sup>27</sup>
- Xipei Liu<sup>4</sup>
- Saranzaya Magsarjav<sup>28</sup>
- Narine Manukyan<sup>29</sup>
- Thomas McAndrew<sup>4</sup>
- Katie McLaughlin<sup>12</sup>
- Matthew McMahon<sup>30</sup>
- Karine Megerdooimian<sup>30</sup>
- John Meluso<sup>4</sup>
- Lewis Mitchell<sup>28</sup>
- Satyam Mukherjee<sup>31</sup>
- Heidi Jo Newberg<sup>32</sup>
- Charleston Noble<sup>33</sup>
- Tyson Pond<sup>4</sup>
- Matthew Price<sup>4</sup>
- Rob Razzante<sup>34</sup>
- Andrew Reagan<sup>4</sup>
- Hernán Rozenfeld<sup>35</sup>
- Serguei Saavedra<sup>36</sup>
- Lawrence Schulman<sup>8</sup>
- Louis Shekhtman<sup>37</sup>
- Prajwal Shrestha<sup>4</sup>
- Joseph Skufca<sup>8</sup>



- Michael Smith<sup>9</sup>
- Chaoming Song<sup>38</sup>
- *Tobin South*<sup>28</sup>
- Jennie Stephens<sup>7</sup>
- Jie Sun<sup>8</sup>
- *Ashely Tenesaca*<sup>6</sup>
- Christian Thiemann<sup>31</sup>
- Brian Tivnan<sup>9</sup>
- *Milo Trujillo*<sup>4</sup>
- Jason Veneman<sup>9</sup>
- *Mark Wagy*<sup>4</sup>
- Dashun Wang<sup>31</sup>
- Jake Williams<sup>39</sup>
- Olivia Woolley-Meza<sup>40</sup>
- *Jean-Gabriel Young*<sup>4</sup>

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

## COURSES TAUGHT

### The University of Vermont, Burlington, Vermont

- 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–present,
- Himadri Basu, Postdoctoral scholar, NASA EPSCoR (Profs. H. Ossareh and M. Almassalkhi joint supervisors), 2020–present.

## 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, PhD Mathematics (Prof. J. Bongard co-advisor; MS Mathematics, 2018), 2017–present,
- 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

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Proceedings of the National Academy of Sciences of the United States of America (PNAS)</li> <li>• Nature Communications</li> <li>• Science Advances</li> <li>• Nature Machine Intelligence</li> <li>• Physical Review Letters</li> <li>• Physical Review E</li> <li>• Physical Review X</li> <li>• National Science Foundation</li> <li>• Wellcome Trust</li> <li>• Journal of the Royal Society Interface</li> <li>• PLOS ONE</li> </ul> | <ul style="list-style-type: none"> <li>• Nature Scientific Reports</li> <li>• SIAM Journal on Applied Mathematics (SIAP)</li> <li>• New Journal of Physics</li> <li>• Journal of Complex Networks</li> <li>• Europhysics Letters (EPL)</li> <li>• European Physical Journal B (EPJB)</li> <li>• Journal of Statistical Physics</li> <li>• IET Systems Biology</li> <li>• Entropy</li> <li>• Journal of Supercomputing</li> <li>• Physics Letters A</li> <li>• Internet Mathematics</li> </ul> |
|--|---|

- 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 (joint with J. Bongard), 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)
- Math & Stats Online & Hybrid Course (2014–2015, 2017–2020)
- Complex Systems & Data Science Curriculum (2014–2020)
- 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

Department of Physics

Northeastern University, Boston, MA, USA

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**Dr. Daniel ben-Avraham** — Academic/Research Supervisor

Professor, APS Fellow

Department of Physics

Clarkson University, Potsdam, NY, USA

<http://people.clarkson.edu/~dbenavra/> • [benavraham@clarkson.edu](mailto:benavraham@clarkson.edu)

**Dr. Erik Bollt** — Academic/Research Supervisor

W. Jon Harrington Professor of Mathematics

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**Dr. Pieter Swart** — Research Supervisor

Group Leader

Applied Mathematics and Plasma Physics T-5

Los Alamos National Laboratory, Los Alamos, NM, USA

<http://math.lanl.gov/~swart/> • [swart@lanl.gov](mailto:swart@lanl.gov)