

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. My goal is to strengthen the connections between network data and network models. Other interests include stochastic and nonlinear dynamics, dynamical systems, and novel optimization and machine learning methods.

EXPERIENCE

Assistant Professor, Mathematics and Statistics & Vermont Complex Systems Center, The University of Vermont, Burlington, VT, USA.	08/2013 – present
Research Assistant Professor, Engineering Sciences and Applied Mathematics & Northwestern Institute on Complex Systems (NICO), Northwestern University, Evanston, IL, USA.	08/2011 – 07/2013
Visiting Researcher, Dana-Farber Cancer Institute, Harvard University, Boston, MA, USA.	06/2009 – 08/2011
Postdoctoral Researcher, Center for Complex Network Research, Northeastern University, Boston, MA, USA.	05/2008 – 08/2011
NSF Graduate Research Fellowship, Clarkson University, Potsdam, NY, USA.	06/2006 – 05/2008
T-7 Summer Graduate Research, Los Alamos National Laboratory.	06/2005 – 08/2005
Graduate Teaching Assistantship, Clarkson University	08/2004 – 05/2006
NSF REU Internship, Rensselaer Polytechnic Institute, Troy, NY, USA.	05/2002 – 08/2002
Academic Peer Mentor, SUNY Cobleskill, Cobleskill, NY, USA.	01/2000 – 05/2001

EDUCATION

Ph.D., Physics, Clarkson University, Potsdam, NY, USA Dissertation Topic: “Analysis and Applications of Complex Networks” Advisors: Daniel ben-Avraham, Erik Bollt	08/2004 – 05/2008
M.S., Physics, Clarkson University	08/2004 – 12/2005
B.S., Physics with Great Distinction, Clarkson University	08/2001 – 05/2004
A.S., Liberal Arts & Sciences, SUNY Cobleskill, Cobleskill, NY, USA	08/1999 – 05/2001

SUPPORT

NSF BIGDATA award, \$600,000 “Hunch & Crunch: Iterative Crowdsourced Hypothesis Generation”, PI	09/2014 – 08/2018
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PUBLICATIONS

52. D. Berenberg and J. P. Bagrow, “**Efficient crowd exploration of knowledge graphs: the case of causal attribution networks.**” In preparation, 2018.

51. A. J. Becker and J. P. Bagrow, “**Supervised learning with online crowdsourced predictors.**” In preparation, 2018.
50. J. P. Bagrow, X. Liu, and L. Mitchell, “**Information flow reveals prediction limits in online social activity.**” In preparation, 2018. [[arXiv:1708.04575](#)].
49. J. P. Bagrow, “**Crowd ideation of supervised learning problems.**” Under review, 2018. [[arXiv:1802.05101](#)].
48. X. Liu and J. P. Bagrow, “**Autocompletion interfaces make crowd workers slower, but their use promotes response diversity.**” Under review, 2017. [[arXiv:1707.06939](#)].
47. J. P. Bagrow and L. Mitchell, “**The quoter model: a paradigmatic model of the social flow of information,**” *Chaos* (2018) , [[arXiv:1711.00326](#)]. To appear.
46. M. D. Wagyu, J. C. Bongard, J. P. Bagrow, and P. D. Hines, “**Crowdsourcing predictors of residential electric energy usage,**” *IEEE Systems Journal* **PP** no. 99, (2017) 1–10, [[arXiv:1709.02739](#)].
45. 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.
44. 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](#)].
43. J. P. Bagrow, “**Information spreading in emergencies and anomalous events.**” Invited book chapter, 2017. [[arXiv:1703.07362](#)].
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. Megerdooomian, 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. 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) .
28. 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].
27. 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.
26. 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. 3997, (2014) , [arXiv:1401.1274].
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, (July, 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

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	07/2017
Center for Complex Networks Research seminar, Northeastern University, Boston, MA, USA	
Information and Prediction Limits in Online Social Activity	05/2017
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	05/2016
Burlington High School Year End Studies presentation, Burlington, VT, USA	
Data-driven approaches to studying human dynamics	07/2015
Center for Nonlinear Studies seminar, LANL, Los Alamos, NM, USA	
Data-driven approaches to studying human dynamics	06/2015

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	06/2015
NetSci Backstage 2015, NetSci 2015, Zaragoza, Spain	
Shadow Networks: Discovering Hidden Nodes with Models of Information Flow	05/2015
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	05/2015
Cambridge Networks Day 2015, University of Cambridge, Cambridge, UK	
Flight or Fight: Predicting Human Dynamics with Tweets and Phones	04/2014
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	05/2013
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	01/2013
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)	06/2012
NetSci 2012 School, Lecturer, Northwestern University, Evanston, IL, USA	
Human dynamics through the lens of modern data	04/2012
Engineering Science and Applied Mathematics, Weekly seminar, Northwestern University, Evanston, IL, USA	
Cell phones, communities, and complex networks	01/2012
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	05/2011
MS73: Collective Behavior - Part I of II, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA	
Exploring mesoscopic structure in complex networks	05/2011
Senseable City, MIT, Boston, MA, USA	
Exploring mesoscopic structure in complex networks	05/2011
Northwestern Institute on Complex Systems, Northwestern University, Evanston, IL, USA	
Exploring mesoscopic structure in complex networks	04/2011
Center for Nonlinear Studies seminar, LANL, Los Alamos, NM, USA	
Communities and Complex Networks	04/2011
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	04/2010
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?	02/2009
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	05/2007
Math department seminar, RIT, Rochester, NY, USA	
Methods for detecting communities	06/2005
Center for Nonlinear Science, Los Alamos National Laboratory, Los Alamos, NM, USA	
A local method for detecting communities	05/2005
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 “**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 2012)

- *Yong-Yeol Ahn*¹
- *Sebastian Ahnert*²
- *Sharon Alajajian*³
- *Albert-László Barabási*⁴
- *Daniel ben-Avraham*⁵
- *Eric Bloedorn*⁶
- *Erik Bollt*⁵
- *Joshua Bongard*⁷
- *Lashon Booker*⁶
- *Luther Branting*⁶
- *Dirk Brockmann*⁸
- *J. Mauricio Campuzano*⁹
- *Eric Clark*⁷
- *Emily Cody*¹⁰
- *Christopher Danforth*⁷
- *Suma Desu*¹¹
- *Peter Dodds*⁷
- *Maggie Evans*⁷
- *Morgan Frank*¹²
- *Liang Gao*¹³
- *Ziyu Gao*¹³
- *Bernard Gaveau*¹⁴
- *Daniel Grady*¹⁵
- *Elizaveta Guseva*¹⁶
- *Kameron Harris*¹⁷
- *Paul D.H. Hines*⁷
- *Isabel Kloumann*¹⁸
- *Michael Klug*³
- *Tal Koren*¹⁹
- *Mert Korkali*²⁰
- *David Lazer*⁴
- *Byung Suk Lee*⁷
- *Sune Lehmann*²¹
- *Paul Lessard*²²
- *Yu-Ru Lin*²³
- *Xipei Liu*⁷
- *Narine Manukyan*²⁴
- *Thomas McAndrew*⁷
- *Matthew McMahon*²⁵
- *Karine Megerdooian*²⁵
- *Lewis Mitchell*²⁶
- *Satyam Mukherjee*²⁷
- *Heidi Jo Newberg*²⁸
- *Charleston Noble*²⁹
- *Matthew Price*⁷
- *Andrew Reagan*⁷
- *Hernán Rozenfeld*³⁰
- *Serguei Saavedra*³¹
- *Lawrence Schulman*⁵
- *Louis Shekhtman*³²
- *Prajwal Shrestha*⁷
- *Joseph Skufca*⁵
- *Michael Smith*⁶
- *Chaoming Song*³³
- *Jennie Stephens*⁴
- *Jie Sun*⁵
- *Christian Thiemann*²⁷
- *Brian Tivnan*⁶
- *Jason Veneman*⁶
- *Mark Wagdy*⁷
- *Dashun Wang*²⁷
- *Jake Williams*³⁴
- *Olivia Woolley-Meza*³⁵

¹Indiana University ²Cambridge University ³University of California, Berkeley ⁴Northeastern University ⁵Clarkson University ⁶MITRE Corporation ⁷University of Vermont ⁸Humboldt University of Berlin, Robert Koch Institute ⁹Stevens Institute of Technology, Hoboken NJ ¹⁰Adobe Systems ¹¹Apple, Inc. ¹²MIT Media Lab ¹³Beijing Jiaotong University ¹⁴Laboratoire analyse et physique mathématique, Paris, France ¹⁵ID Analytics ¹⁶Gartner, Inc. ¹⁷University of Washington ¹⁸Facebook ¹⁹Verint Systems ²⁰Lawrence Livermore National Laboratory ²¹Technical University of Denmark ²²University

of Colorado, Boulder ²³University of Pittsburgh ²⁴Champlain College ²⁵MITRE Corporation ²⁶University of Adelaide
²⁷Northwestern University ²⁸Rensselaer Polytechnic Institute ²⁹Harvard University ³⁰Physical Review ³¹Massachusetts
Institute of Technology ³²Bar-Ilan University ³³University of Miami, Coral Gables ³⁴Drexel University ³⁵ETH Zurich

COURSES TAUGHT

The University of Vermont, Burlington, Vermont

- 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.)

THESIS AND DISSERTATION COMMITTEES

The University of Vermont, Burlington, Vermont

- 2017–2018: Computer Science BS Honors Thesis Committee (Faculty advisor), Brian Colombini (Apr. 10),
- 2016–present: Rubenstein School of Environmental and Natural Resources PhD Committee (External Faculty Chair), Lindsay Barbieri,
- 2017: Math & Stats MS Committee, Christopher Fusting (July 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).

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*).

STUDENTS ADVISED AND CO-ADVISED

The University of Vermont, Burlington, Vermont

- 2017–present Ryan Grindle, MS student (Prof. J. Bongard advisor),
- 2016–present, Brian Colombini, undergraduate,
- 2016–2017 Xipei Liu, MS Data Science,
- 2014–2016 Thomas McAndrew, PhD Mathematics (Prof. C. Danforth co-advisor).

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
- 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

UVM Committee Member

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

Program Committee Member

- 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

- 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.

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

SOCIETY MEMBERSHIPS

American Physical Society (APS)
Society of Industrial and Applied Mathematicians (SIAM)
Society of Physics Students (SPS), formerly

HONORS AND AWARDS

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

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<http://people.clarkson.edu/~dbenavra/> • benavraham@clarkson.edu

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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