

Morgan R. Frank

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Current Appointment

- Assistant Professor in the [Department of Informatics and Networked Systems](#), and the [Department of Information Culture and Data Stewardship](#) in the [School of Computing and Information](#) at the [University of Pittsburgh](#) (2020-present)
- [MIT Connection Science Fellow](#) (2020-present)
- Digital Fellow at the [Stanford Institute for Human-Centered Artificial Intelligence Digital Economy Lab](#)
- Non-Employee Researcher at the [Massachusetts General Hospital Center for Genomic Medicine](#) (November 2019-Present)
- Research Affiliate, [Institute for Cyber Law, Policy, and Security](#), University of Pittsburgh (2020-present)

Education

- Postdoctoral Associate at the MIT [Sociotechnical Systems Research Center \(SSRC\)](#) as part of MIT [Connection Science](#) with affiliations at the MIT [Institute for Data, Systems, and Society \(IDSS\)](#), the MIT Human Dynamics group at the [Media Laboratory](#), and the MIT [Initiative on the Digital Economy \(IDE\)](#). Postdoctoral advisor: Prof. Alex ‘Sandy’ Pentland (June 2019-2020)
- Received PhD from the [Media Laboratory](#) at the Massachusetts Institute of Technology (2014-2019). Dissertation Committee: Prof. Iyad Rahwan (MIT, Max Planck Institute), Prof. Alex ‘Sandy’ Pentland (MIT), & Prof. Erik Brynjolfsson (MIT).
- Received Master’s of Science in Applied Mathematics and a graduate certificate in Complex Systems from the [University of Vermont](#) (2012-2014)
- Received Bachelor of Science majoring in Mathematics and minoring in Computer Science, and Statistics from the [University of Vermont](#) (2008-2012)
- Received GED from [Holderness School](#) in Plymouth, NH (2004-2008)

Other Appointments:

- Visiting Scholar at Kellogg School of Management, Northwestern University (May 2018-2019)
- Technical consultant for Google ATAP (summer 2015)
- Data Science Intern at LinkedIn (summer 2014)

Teaching Experience

- Advising research of undergraduate research assistant through MIT’s UROP (March 2020-present)
- Teaching Assistant for Intro to Complex Systems at the Department of Civil and Environmental Engineering at MIT (spring 2014)
- Taught Math 010: Pre-calculus Mathematics at UVM (summer 2013)

Grants

- ”Workshop: Innovation, Cities, and the Future of Work.” National Science Foundation. June 7, 2017. Co-PI. **\$24,750.00**

Workshops and Conferences Organized:

- Web Chair for IC2S2 2020
- Fall 2017 Media Lab Members' Week Workshop on Future of Work: AI & the Ecology of Labor (2017)
- Co-PI for the Innovation, Cities, and the Future of Work workshop hosted at MIT IDSS (2017)

Publications

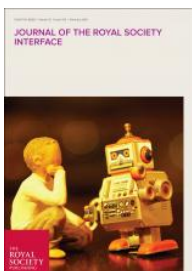
Note: journal images represent when listed publication was featured in the cover image for that issue.

Under Submission

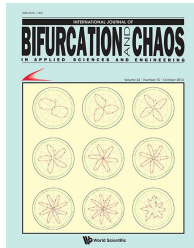
- *Network constraints on worker mobility: How workplace skills determine a worker's next move.* Morgan R. Frank, Esteban Moro, Alex Rutherford, Iyad Rahwan.
- *China's First Workforce Skill Taxonomy.* Weipan Xu, Xiaozhen Qin, Xun Li, Haohui Chen, Morgan R. Frank, Alex Rutherford, Andrew Reeson, Iyad Rahwan.
- *Allotaxonomy and rank-turbulence divergence: A universal instrument for comparing complex systems.* Peter Sheridan Dodds, Joshua R. Minot, Michael V. Arnold, Thayer Alshaabi, Jane Lydia Adams, David Rushing Dewhurst, Tyler J. Gray, Morgan R. Frank, Andrew J. Reagan, and Christopher M. Danforth.
- *Machine learning and the case for labor reorganization.* Erik Brynjolfsson*, Morgan R. Frank*, Tom Mitchell, Iyad Rahwan, Daniel Rock* (*authors contributed equally).
- *Universal resilience patterns in labor markets.* Esteban Moro*, Morgan R. Frank*, Alex 'Sandy' Pentland, Alex Rutherford, Manuel Cebrian, Iyad Rahwan.
- *Generalized word shift graphs: A method for visualizing and explaining pairwise comparisons between texts.* Ryan J. Gallagher, Morgan R. Frank, Lewis Mitchell, Aaron J. Schwartz, Andrew J. Reagan, Christopher M. Danforth, Peter Sheridan Dodds.

Appeared

1. [The universal pathway to innovative urban economies.](#) Inho Hong, Morgan R. Frank, Iyad Rahwan, Woo-Sung Jung, and Hyejin Youn. **Science Advances** (2020).
2. [Towards Understanding the Impact of AI on Labor.](#) Morgan R. Frank, David Autor, James E. Bessen, Erik Brynjolfsson, Manuel Cebrian, David J. Deming, Maryann Feldman, Matthew Groh, José Lobo, Esteban Moro, Dashun Wang, Hyejin Youn, Iyad Rahwan. **Proceedings of the National Academy of Science** (2019).
3. [The evolution of citation graphs in artificial intelligence research.](#) Morgan R. Frank, Dashun Wang, Manuel Cebrian, Iyad Rahwan. **Nature Machine Intelligence** (2019).
4. [Unpacking the polarization of workplace skills.](#) A. Alabdulkareem*, M. R. Frank*, L. Sun, B. AlShebli, C. Hidalgo, I. Rahwan (* contributed equally). **Science Advances** (2018).
5. [Small cities face greater impact from automation.](#) M. R. Frank, L. Sun, M. Cebrian, H. J. Youn, I. Rahwan. **Journal of the Royal Society Interface** (2018).
6. [Detecting reciprocity at global scale.](#) M. R. Frank, N. Obradovich, L. Sun, W. L. Woon, B. L. LeVeck, I. Rahwan. **Science Advances** (2018).
7. [Validating Bayesian truth serum in large-scale online human experiments.](#) M. R. Frank, M. Cebrian, G. Packard, I. Rahwan. **PLOS ONE** (2017).
8. [The Lexicocalorimeter: Gauging public health through caloric input and output on social media.](#) S. E. Alajajian, J. R. Williams, A. J. Reagan, S. C. Alajajian, M. R. Frank, L. Mitchell, J. Lahne, C. M. Danforth, P. S. Dodds. **PLOS ONE** (2016).



9. [Reply to Garcia et al.: Common mistakes in measuring frequency-dependent word characteristics](#). 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, & C. M. Danforth . **Proceedings of the National Academy of Science** (2015).
10. [Human language reveals a universal positivity bias](#). 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, C. M. Danforth. **Proceedings of the National Academy of Science** (2014).
11. [Standing Swells Surveyed Showing Surprisingly Stable Solutions for the Lorenz '96 system](#). M. R. Frank, L. Mitchell, P. S. Dodds, C. M. Danforth. **International Journal of Bifurcations and Chaos** (2014).
12. [An Evolutionary Algorithm Approach to Link Prediction in Dynamic Social Networks](#). C. A. Bliss, M. R. Frank, C. M. Danforth, P. S. Dodds. **Journal of Computational Science** (2013).
13. [Happiness and the Patterns of Life: A Study of Geolocated Tweets](#). M. R. Frank, L. Mitchell, P. S. Dodds, C. M. Danforth. **Nature Scientific Reports** (2013).
14. [The Geography of Happiness: Connecting Twitter sentiment and expression, demographics, and objective characteristics of place](#). L. Mitchell, K. D. Harris, M. R. Frank, P. S. Dodds, C. M. Danforth. **PLOS One** (2013).
15. [Enumerating Costas Latin Squares](#). M. R. Frank, J. Dinitz. **Journal of Combinatorial Mathematics and Combinatorial Computation** (accepted 2012).



Preprints

1. [Generalized word shift graphs: A method for visualizing and explaining pairwise comparisons between texts](#). R. J. Gallagher, M. R. Frank, L. Mitchell, A. J. Schwartz, A. J. Reagan, C. M. Danforth, P. S. Dodds. (2020)
2. [Constructing a taxonomy of fine-grained human movement and activity motifs through social media](#). M. R. Frank, J. R. Williams, L. Mitchell, J. P. Bagrow, P. S. Dodds, & C. M. Danforth. (2015)
3. [Shadow networks: Discovering hidden nodes with models of information flow](#). J. P. Bagrow, S. Desu, M. R. Frank, N. M. L. Mitchell, A. Reagan, E. Clark, L. B. Booker, L. K. Branting, M. J. Smith, B. F. Tivnan, C. M. Danforth, P. S. Dodds, J. C. Bongard. (2013)
4. [Automation Impacts on China's Polarized Job Market](#). H. Chen, X. Li, M.R. Frank, X. Qin, W. Xu, M. Cebrian, I. Rahwan. (2019)

Talks and Poster Presentations

- invited lecture for the Workshop on Technology, Business Practices, and Covid-19 Impacts on The Future of Work at Harvard (2020)
- invited presentation for the Australian Cyber Collaboration Centre (AC3) (2020)
- oral presentation NetSci (2020)
- oral presentation IC2S2 (2020)
- invited lecture for AI LA (2020)
- invited panel discussion at the 2020 Social Enterprise Conference at the Harvard Kennedy School and the Harvard Business School [note: cancelled for COVID-19]
- invited lecture for the workshop on *Building non-Euclidian spaces to measure, understand, and navigate complex social transitions* at the Complexity Science Hub, Vienna (2020) [note: cancelled for COVID-19]
- invited lecture for the Inter-American Development Bank (IDB) Skills Development workshop (2020)
- invited talk for Imagination in Action at the World Economic Forum Annual Meeting in Davos (2020)
- poster presentation at INFORMS (2019)

- data science seminar lecture at the University of Adelaide (2019)
- invited lecture at Bank SA/Westpac Australia (2019)
- invited talk at DisruptHR Boston (2019)
- oral presentation at the 2019 Conference on Complex Systems
- invited lecture at the Growth Lab Seminar at the Harvard Kennedy School (2019)
- invited lecture at the Harvard Business School Seminar in Economics of Science and Engineering (2019)
- invited talk at Universita LUM (2019)
- oral presentation at IC2S2 (2019)
- oral presentation at the annual update for MIT Connection Science (2019)
- invited talk at Imagination in Action (2019)
- invited lecture at the MIT Task Force on the Future of Work (2019)
- invited lecture at the Policy Summit at the Federal Reserve Bank of Cleveland (2019)
- two oral presentations at NetSci (2019)
- invited talk for the Labor Markets and Social Security Division of the Inter-American Developmental Bank (2018)
- invited talk at the Opportunity & Inclusive Growth Institute conference hosted by the Federal Reserve Bank of Minneapolis (2018) ([video](#))
- oral presentation at the MIT Sloan IDE Seminar series (2018)
- four abstracts accepted to IC²S² (2018)
- invited talk at the Harvard Biomathematics Group (2018)
- invited talk at Harvard-ILO Roundtable on the Future of Work (2017)
- two Oral presentations at IC²S² (2017)
- invited mini symposium talk at SIAM Annual Meeting (2016)
- oral presentation at IC²S² (2016)
- oral presentation at APCTP 2016 Workshop on Frontiers of Physics (2016)
- poster presentation at NetMob (2015)
- invited talk at Data Xu, Boston (2015)
- poster presentation at SIAM Dynamical Systems Conference (2013)
- poster at The Brown University Symposium for Undergraduates in the Mathematical Sciences (2012)
- poster presentation at UVM Student Poster Competition (2012)

Selected Press

- **Innovative cities follow a unique historical pattern, study shows.** Kellogg Insight (2020).
- **Augmentation: The Promise and Possibility of Human-Machine Collaboration.** *Invested.* The Federal Reserve Bank of Boston (2019).
- **How AI Helps Manage Complex IT Operations; AI, Social Sciences Gap Widens; Predicting Asset Prices.** Wall Street Journal (2019).
- **AI and the Social Sciences Used to Talk More. Now Theyve Drifted Apart.** Kellogg Insight (2019).

- **How cognitive tech is influencing the skills of the future.** Interview on the Capital H podcast from Deloitte (2019).
- **Why Poor Data Undermines Our Attempt To Understand The Future Of Work.** Forbes (2019).
- **Developing New Methodology to Measure Technology's Impact on the Future of Work.** SAGE Publishing (2019).
- **Distinct Workplace Skills Could Explain Disappearance of U.S. Middle Class.** American Association for the Advancement of Science (2018).
- **How Will Automation Affect Different U.S. Cities?** Kellogg Insight (2018).
- **Over 3M jobs will be at risk in the GCC if not adapted to AI advancements: The time is now.** Wamda (2018).
- **Intelligent Automation: Rethinking Work and Technology for the Digital Age.** Appia (2018).
- **Countries that play together stay together.** Nature Middle East (2018).
- **Automation Will Make Megacities Grow Way Faster.** MIT Tech Review (2017).
- **In These Small Cities, AI Advances Could Be Costly.** MIT Tech Review (2017).
- **The Regional Impact Of Automation.** The Huffington Post (2017).
- **Scientists Are Judging Your Diet Based On Your Tweets.** Men's Health (2017).
- **Instrument Measures Calorie Consumption By Monitoring "Tweets".** Nutrition Insight (2017).
- **Happy or sad, this is how the internet can tell.** The World Economic Forum (2017).
- **How Changing Economies Affect Local Communities.** The Huffington Post (2017).
- **Automation will have bigger impact on jobs in smaller cities.** New Scientist (2017).
- **How to Go On Staycation Without Feeling Cheated.** Fast Company (2016).
- **The Geography of Happiness According to 10 Million Tweets.** The Atlantic (2013).
- **Amy Drinks in Napa.** The Ellen Degeneres Show (2013).
- **New Study Uses Tweets to Rank America's Happiest Cities, States.** Time Magazine (2013).
- **The Saddest Tweeters Live in Texas.** National Geographic (2013).
- **Happiest Cities, Most Miserable Cities Lists Reveal Disparity in Bay Area.** Huffington Post (2013).
- **Study: geotagged tweets show we're happiest further from home.** Wired Magazine (2013).
- **We're Happier When We're Farther From Home, Twitter Patterns Show.** Discover Magazine (2013).
- **Pretty City Images Reveal How People Move.** Live Science (2013).
- **The Sentiments of Cities.** Wired Magazine (2012).
- **Social Scientists Wade into the Tweet Stream.** Science Magazine (2011).
- **Science Proves Twitter Really Has Become More Sad Since 2009.** Time Magazine (2011).

Honors and Awards

- winner of Best Poster at IC²S² (2018)
- Award for Excellence in Graduate Research in Mathematics at the University of Vermont (UVM) (2014)
- winner of the Siam Dynamical Systems "Red Sock" Award for the Poster Competition (2013)
- UVM CEMS Dean's Recognition Award (2012)
- winner of the UVM Student Research Poster competition (2012)
- UVM Graduate Student Senate Research Award (2012)
- completed Undergraduate Honors Program culminating in an honors thesis (2012)

I have reviewed articles for:

- ACM Conference on Computer-Supported Cooperative Work and Social Computing 2020
- the Journal of the Royal Society Interface
- Technological Forecasting and Social Change
- Journal of Computers in Industry
- IC2S2 2020
- 2020 Strategic Management Society Special Conference in Hangzhou
- Science Advances
- Nature Machine Intelligence
- PLOS ONE
- Journal of Computational Science
- WWW 2017
- ICWSM 2017
- International Journal of Information Technology and Decision Making (IJITDM)
- EPJ Data Science
- the Journal of the Royal Society Open Science

Other Service:

- Session Chair for the New Future of Work Symposium 2020 hosted by Microsoft Research
- Topic Editor, Research Topic in [Complex Networks and Economics](#), Frontiers in Big Data
- Session Chair ICCS 2020
- Organizing Committee Web Chair IC²S² 2020
- Conference Program Committee for Northeast Regional Conference on Complex Systems (NERCCS) 2020