

## Curriculum Vitae

Keith Burghardt

### **Contact Information:**

Information Sciences Institute,  
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### **General Information:**

#### **Education:**

- Ph.D.      Physics, University of Maryland, College Park, MD. June 2016.  
              Thesis advisors: Profs. Michelle Girvan and William Rand
- B.S.      Physics, University of Maryland, College Park, MD. June 2012.  
              *Magna Cum Laude with High Honors in Physics*  
              Undergraduate thesis advisor: Prof. Ho Jung Paik

#### **Professional Experience:**

- 2018-Present: Computer Scientist, USC Information Sciences Institute, Marina del Rey, CA  
2016-2018:    Postdoctoral Researcher, University of California, Davis, CA

#### **Prizes, Awards, and Scholarships**

- 2022:      ASONAM 2022 Runner-Up Best Paper Award  
2021:      ISI Meritorious Service Award  
2018:      SIAM Travel Award - NS18  
2018:      International Conference on Computational Social Science (IC2S2)  
              Scholarship  
2016:      ISI Director's Intern Award  
2015:      Conference on Complex Systems Starred Paper Award  
2012-2014: University of Maryland Dean's Fellowship

### **Research:**

#### **Publications:**

##### Referenced Conference and Workshop Proceedings:

1. **Burghardt, K.**, Rao, A., Guo, S., He, Z., Chochlakis, G., Sabyasachee, B., Rojecki, A., Narayanan, S., & Lerman, K. (2024). Socio-Linguistic Characteristics of Coordinated Inauthentic Accounts. In: *ICWSM 2024*, (in press).
2. Hickey, D., Schmitz, M., Fessler, D., Smaldino, P. E., Muric, G., & **Burghardt, K.** (2023). Auditing Elon Musk's Impact on Hate Speech and Bots. In: *ICWSM 2023*, 17(1), 1133-1137.
3. Chochlakis, G., Mahajan, G., Baruah, S., **Burghardt, K.**, Lerman, K., & Narayanan, S. (2023). Leveraging Label Correlations in a Multi-Label Setting: A Case Study in Emotion. In: *ICASSP 2023*, Rhodes Island, Greece, 2023, 1-5, doi: 10.1109/ICASSP49357.2023.10096864.

4. Chochlakis, G., Mahajan, G., Baruah, S., **Burghardt, K.**, Lerman, K., & Narayanan, S. (2023). Using Emotion Embeddings to Transfer Knowledge Between Emotions, Languages, and Annotation Formats. In: *ICASSP 2023*, Rhodes Island, Greece, 2023, 1-5, doi: 10.1109/ICASSP49357.2023.10095597.
5. Schmitz, M., Murić, G., & **Burghardt, K.** (2023). Detecting Anti-Vaccine Users on Twitter. In: *ICWSM 2023*, 17(1), 787-795.
6. Schmitz, M., Murić, G., & **Burghardt, K.** (2022). Quantifying How Hateful Communities Radicalize Online Users. In: *ASONAM 2022*, 139-146. IEEE.
7. He, Y., **Burghardt, K.**, Guo S., & Lerman, K. (2022). Learning Fairer Interventions. In: *Proceedings of the 2021 AAAI/ACM Conference on AI, Ethics, and Society*, 317–323.
8. Guo, S., **Burghardt, K.**, Rao A., & Lerman, K. (2022). Emotion Regulation and Dynamics of Moral Concerns During the Early COVID-19 Pandemic. In: *Proceedings of the 2022 16th International AAAI Conference on Web and Social Media: SocialSens Workshop*, doi:10.36190/2022.28.
9. He, Y., Rao, A., **Burghardt, K.**, & Lerman, K. (2021). Identifying Shifts in Collective Attention to Topics on Social Media. In: *SBP-BRiMS 2021, Lecture Notes in Computer Science*, 12720. Springer, Cham.
10. **Burghardt, K.**, Tavabi, N., Ferrara, E., Narayanan, S., & Lerman, K. (2021). Having a Bad Day? Detecting the Impact of Atypical Events Using Wearable Sensors. In: *SBP-BRiMS 2021. Lecture Notes in Computer Science*, Vol. 12720. Springer, Cham.
11. He, Y., Tran, C., Jiang, J., **Burghardt, K.**, Ferrara, E., Zheleva, E., & Lerman, K. (2021). Heterogeneous Effects of Software Patches in a Multiplayer Online Battle Arena Game. In: *Foundations of Digital Games (FDG '21)*. Association for Computing Machinery, New York, NY, USA, Article 11, 1–9.
12. Santos, T., **Burghardt, K.**, Lerman, K., & Helic, D. (2021). Limiting Tags Fosters Efficiency. In: *13th ACM Web Science Conference 2021 (WebSci'21)*, 46-55.
13. **Burghardt, K.**, Hogg, T., D'Souza, R., Lerman, K., & Posfai, M. (2020). Origins of Algorithmic Instabilities in Crowdsourced Ranking. In: *Proceedings of the ACM on Human-Computer Interaction (CSCW 2020)*, 1-20.
14. Santos, T., **Burghardt, K.**, Lerman, K., & Helic, D. (2020). Can Badges Foster a More Welcoming Culture on Q&A Boards? In: *Proceedings of the International AAAI Conference on Web and Social Media (ICWSM 2020)*, 14: 969-973.
15. He, Y., **Burghardt, K.**, & Lerman, K. (2020). A Geometric Solution to Fair Representations In: *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society (AIES 2020)*, 279-285.
16. **Burghardt, K.**, Hogg, T., & Lerman, K. (2018). Quantifying the Impact of Cognitive Biases in Question-Answering Systems. In: *Proceedings of the Twelfth International AAAI Conference on Web and Social Media (ICWSM)*, 12(1) 568-571.
17. Ferrara, E., Alipoufard, N., & **Burghardt, K.**, Gopal, C., Lerman, K. (2017). Dynamics of Content Quality in Collaborative Knowledge Production. In: *Proceedings of the Eleventh International AAAI Conference on Web and Social Media (ICWSM)*, 520-523.
18. Agarwal, T., **Burghardt, K.**, & Lerman, K. (2017). On Quitting: Performance and Practice in Online Game Play. In: *Proceedings of the Eleventh International AAAI Conference on Web and Social Media (ICWSM)*, 11(1), 452-455.

Journal Publications:

1. Schmitz, M., Muric, G., Hickey, D., & **Burghardt, K.** (2023). Do Users Adopt Extremist Beliefs from Exposure to Hateful Subreddits? *Social Network Analysis and Mining*, (in press).
2. Ruprecht, T., **Burghardt, K.**, Helic, D. (2023). Poor attention: The wealth and regional gaps in event attention and coverage on Wikipedia. *PLOS ONE*, (in press).

3. Pi, H., **Burghardt, K.**, Percus, A. G., & Lerman, K. (2023). Clique densification in networks. *Phys. Rev. E*, 107(4): L042301.
4. He, Y., **Burghardt, K.**, & Lerman, K. (2022). Leveraging Changepoint Detection to Discover Natural Experiments in Data. *EPJ-Data Science*, 11(49).
5. Abram, M., **Burghardt, K.**, Steeg, G.V., Galstyan, A., & Dingreville, R. (2022). Inferring topological transitions in pattern-forming processes with self-supervised learning. *NPJ Computational Materials*, 8(205).
6. **Burghardt, K.**, Uhl, J. H., Lerman, K., & Leyk, S. (2022). Road network evolution in the urban and rural United States since 1900. *Computers, Environment and Urban Systems*, 95: 101803.
7. **Burghardt, K.**, Guo, S., & Lerman, K. (2021). Unequal impact and spatial aggregation distort COVID-19 growth rates. *Philos. Trans. Royal Soc. A*, 380:20210122.
8. **Burghardt, K.**, He, Z., Percus, A. G., & K. Lerman. (2021). The emergence of heterogeneous scaling in research institutions. *Communications Physics*, 4(189).
9. Rao, A., Morstatter, F., Hu, M., Chen, E., **Burghardt, K.**, Ferrara, E., & Lerman, K. (2021). Political Partisanship and Anti-Science Attitudes in Online Discussions about Covid-19. *J Med Internet Res*, 23(6):e26692.
10. Ngo, S.C., Percus, A. G., **Burghardt, K.**, & Lerman, K. (2020). The Transsortative Structure of Networks. *Proc. R. Soc. A*, 476: 20190772.
11. **Burghardt, K.** & Maoz, Z. (2020). Dyadic imbalance in networks. *Journal of Complex Networks*, 8(1): cnaa001.
12. **Burghardt, K.**, Rand, W., & Girvan, M. (2019). Inferring models of opinion dynamics from aggregated jury data *PLOS ONE*, 14(7):e0218312.
13. Turaliska, M., **Burghardt, K.**, Rohden, M., Swami, A., & D'Souza, R. M. (2019). Cascading failures in scale-free interdependent networks. *Phys. Rev. E*, 99(3): 032308.
14. **Burghardt, K.** & Maoz, Z. (2018). Partial Shocks on Cooperative Multiplex Networks with Varying Degrees of Noise. *Sci. Rep.*, 8(1): 13619.
15. Lin, Y., **Burghardt, K.**, Rohden, M., Noel, P.-A., & D'Souza, R. M. (2018). Self-organization of dragon-king failures. *Phys. Rev. E*, 98(2): 022127.
16. **Burghardt, K.**, Alsina, E., Lerman, K., Rand, W., & Girvan, M. (2017). Myopia of Crowds: A Study of Community Evaluation on Stock Exchange. *PLOS ONE*, 12(3): e0173610.
17. **Burghardt, K.**, Verzijl, C., Huang, J., Ingram, M., Song, B., & Hasne, M. (2016). Testing Modeling Assumptions in the West Africa Ebola Outbreak. *Sci. Rep.*, 6: 34598 EP.
18. **Burghardt, K.**, Rand, W., & Girvan, M. (2016). Competing Opinions and Stubbornness: Connecting Models to Data. *Phys. Rev. E*, 93(3): 032305.

Book Chapters and Other One-Time Publications:

1. Alipourfard, N., **Burghardt, K.**, & Lerman, K. (2021). Disaggregation via Gaussian Regression for Robust Analysis of Heterogeneous Data. In: *Handbook on Computational Social Science Vol 2*. Eds: Uwe Engel, Anabel Quan-Haase, Xun Liu, Lars Lyberg.
2. **Burghardt, K.** (2017). 2017 Conference on Complex Systems Report, *SIAM DSWeb* [Online] <https://bit.ly/2VSSTOG>.

Internal Report:

**Burghardt, K.**, & Girvan, M. (2013). Clustering Faculty in the Biosciences. *University of Maryland, College Park Internal Report*.

**Presentations:**

- 2022: Invited seminar talk at Computer Vision for Cultural Heritage SIG at the Turing  
Invited talks at the ICWSM SocialSens Workshop, and Symposium of USC-  
Amazon Center on Trustworthy AI
- 2021: Invited seminar talk at USC Information Sciences Institute  
Invited talks at SBP-BRiMS 2021, AI Futures Symposium (August), Networks
- 2020: Invited talks at GRIDS@USC and NetSci 2020
- 2019: Invited talk at GRIDS@USC
- 2018: Invited seminars at Northeastern; UC Merced; USC Information Sciences  
Institute  
Invited talks at APS Far West Section Fall Meeting; 4<sup>th</sup> Annual International  
Conference on Computational Social Science; SIAM Workshop on Network  
Science; 4<sup>th</sup> Annual Postdoctoral Research Symposium
- 2017: Invited talks at Conference on Complex Systems, International School and  
Conference on Network Science (2017)
- 2016: Invited seminar at Information Sciences  
Invited talks at GRAD Presentation, Northeastern Presentation
- 2015: Invited talks at Complexity in Business Conference; Conference on Complex  
Systems; SIAM Workshop on Network Science; Maryland-Mason Meeting
- 2014: Invited talks at Complexity in Business Conference; CAM Graduate Workshop
- 2013: Invited talk at Complexity in Business Conference

**Posters:**

- 2018: Twelfth International AAAI Conference on Web and Social Media (ICWSM)  
Title: “Quantifying the Impact of Cognitive Biases in Question-Answering  
Systems”
- 2017: 3<sup>rd</sup> Annual Postdoctoral Research Symposium (2017)  
Title: “Cooperation Network Responses to Shocks”
- 2013: Ki-Net Young Researcher Workshop (2013)  
Title: “Influence and Rumor Propagation in Equilibrium on Networks”

**Grants and Contracts:**

- 2023: **Co-PI:** USC ISI Exploratory Research Award for “A.I.-Driven Meal  
Prescriptions To Meet Sociocultural and Nutritional Dietary Needs,” \$100K,  
May-1-22 to May-1-23
- 2022: **Co-PI:** DARPA AIE EMPATH. \$1.0M, Aug.-1-22 – Feb.-23-24  
**Co-PI:** Southern California Center for Chronic Health Disparities in Latino  
Children and Families Pilot Project for “Analyzing Digital Menu,” \$50K, June-1-  
22 to May-31-23.  
**Co-PI:** USC ISI Exploratory Research Award for “Why Resilience in Innovation  
is Necessary and How to Foster It,” \$100K, May-1-22 to May-1-23
- 2021: **PI:** USC-Amazon Center for Secure and Trusted Machine Learning Award for  
“Fast Fair Decentralized Learning,” \$50K, Sept-1-21 to Sept-30-22
- 2021: **PI:** USC ISI Exploratory Research Award for “Identifying Populations  
Susceptible to Anti-Science,” \$100K, May-1-21 to May-1-22
- 2021: **Co-PI:** USC ISI Research Award for “FairPRS: Fairly Predicting Genetic Risks  
for Personalized Medicine,” \$100K, May-1-21 to May-1-22
- 2020: **PI:** Sandia National Laboratories contract for “Unsupervised and Semi-  
Supervised Inference of Material States,” \$20K, Jan-1-21 to Jun-1-21

2019: **Co-PI:** DARPA contract for “Bespoke: Learning bespoke interventions for optimizing performance in heterogenous populations,” HR0011990114, \$1.0M, Jul-23-2019 to May-31-2021

## **Service:**

### **Professional:**

2020-present: Co-Organizer of USC CKIDS Student research project  
Organizer of Fairness and Bias ISI Internal Seminar Series

2022: Co-organizer of the INTERSPEECH Special Session “Inclusive and Fair Speech Technologies”  
Session chair of WebConf 2022 Social Network Analysis and Graph Algorithms Track  
Judge for ACM TrojanHacks Hackathon; judge for GRIDS MindSpark Hackathon

2020-2021: Organizer of USC ISI’s AI Seminar Series

2020: Organizer of Summer School on Sensor-Based Behavioral Machine Learning (S3B2-ML)

2018: Organizer of UC Davis Complex Systems Working Group

2015: Project leader: Santa Fe Institute Complex Systems Summer School Research Project

### **Reviewing:**

2022: ICWSM, WSDM, ICDM, SBP-BRiMS, PNAS Nexus, OSNEM, Communications in Nonlinear Science and Numerical Simulation, EPJ Data Science, PLOS ONE, Physical Review E, Frontiers in Public Health, Information and Software Technology, Data in Brief

2021: KDD, ICWSM, Nature Communications, Communications Physics, Inf. Process. Manage., OSNEM, Scientific Reports

2020: The WebConf (formally WWW), AAAI, KDD, WSDM, CMAME, Proc. Royal Society A, EPJ Data Science, 6G Series IEEE Vehicular Technology Magazine, JSTAT, Inf. Process. Manage., Frontiers in Physics  
**Panel review:** “AI for Decision Support” (DOE)

2019: ICWSM, WWW, KDD, WebSci, Frontiers of Big Data, Chaos, CMAME  
**Proposal review:** NSF MMS

2018: Scientific Reports, Frontiers of Big Data, Chaos

2017: Scientific Reports, PLOS ONE, IEEE Transactions on Computational Social Systems, Phys. Rev. E

### **Teaching:**

Spring 2023: Co-lecturer DSCI 531 “Fairness in Artificial Intelligence”

Spring 2022: Co-lecturer DSCI 550 “Data Science at Scale”

Spring 2021: Co-lecturer DSCI 552 “Machine Learning for Data Science”

Fall 2019: Co-lecturer INF 553 “Foundations and Applications of Data Mining”