Abhijin Adiga

CONTACT INFORMATION	Biocomplexity Institute University of Virginia https://abhijin.github.io	`email:` abhijin@virginia.edu `phone:` +1 540 204 6679

CURRENT POSITION

Research Associate Professor 2022 –
Biocomplexity Institute
University of Virginia

RESEARCH INTERESTS AND FOCUS

I develop computational frameworks to study complex systems that emerge from large-scale interactions across diverse domains, including infectious disease dynamics, socio-environmental resilience, agriculture, and other socio-technical systems. Central to my research are the development of realistic synthetic datasets (like digital twins) and data-driven simulation models, the design of domain-informed algorithms, and the advancement of theoretical foundations underlying these complex systems. This research draws on and contributes to network science, simulation modeling, machine learning, algorithm design, and game theory.

EDUCATION

PhD: August 2006 – March 2011
Dept. of Computer Science and Automation
Indian Institute of Science, Bangalore, India

PUBLICATIONS COUNT

Journals: 32
Conference proceedings: 49
Workshops/posters/abstract: 14

GRANTS SUMMARY

PI: USAID $1,100,000; USDA $400,000
Co-PI: Two USAID grants $170,000

MENTORSHIP

○ Co-advisor for two Masters students (Thesis accepted) and one PhD student.
○ Part of thesis committee for five PhD students. I advised on several parts of the thesis of three of them.
○ Research assistants (PhD 1 and Masters students 4)
○ Undergraduates: 9
○ High-school: 3

PROGRAMMATIC CONTRIBUTIONS

○ Development of a livestock digital twin/similar for addressing applications related to public health and environmental safety. I have presented multiple times to CDC on this topic.
○ As PI and Co-PI of the USAID and USDA projects, led the research in the area of invasive species modeling. This includes collaborating with people from multiple domains and countries (France, Senegal, India, Nepal, Bangladesh, and US).

- COVID-19 response: I led the modeling and development of certain modules in the synthetic population generation pipeline. These tools have been applied to provide weekly inputs to various agencies during certain periods of the year 2020-21.
- DARPA NGS2: I contributed significantly to the theoretical aspects of this project. Our work has resulted in five publications in top AI venues and several workshop presentations.
- Fall armyworm in Egypt: In a collaborative effort, I led the modeling effort to assess the possible spread of Fall armyworm in Egypt.

SELECTED TALKS

1. (**Invited**) Unraveling Complexity with Network Science: Structure, Dynamics and Emergent Behavior, Jawaharlal Nehru Planetarium, Bengaluru, India, July 2025.

2. US-Scale High Resolution Digital Twin of Coupled Livestock, Wild Birds, and Human Populations Ecosystem, CDC (six presentations), September to December 2024.

3. US-Scale High Resolution Digital Twin of Coupled Livestock, Wild Birds, and Human Populations Ecosystem, Spillover from Highly Pathogenic Avian Influenza, LANL, National Press Club, September 2024.

4. (**Invited**) How to Stop an Epidemic? Network Dynamics and Simulation Systems, CheckedIt, India (virtual), February 2022.

5. (**Invited**) Learning the Local and Global Behavior of Dynamical Systems on Networks, Workshop on AI Socio-écosysteme et résilience, Montpellier, France (virtual), November 2021.

6. (**Invited**) Network Dynamical Systems: Theory and Applications, Indian Institute of Technology, Hyderabad, India, November 2019.

SELECTED PUBLICATIONS

1. N. C. Mandal, O. B. Hoque, A. Adiga, S. Swarup, M. L. Wilson, L. Feng, Y. Ji, M. Zhang, G. Fox, and M. Marathe. Irrmap: A large-scale comprehensive dataset for irrigation method mapping. In *Proceedings of the 31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining V. 2*, 2025

2. A. Fox, S. Swarup, and A. Adiga. A unifying information-theoretic perspective on evaluating generative models. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 2025

3. A. Adiga, Y. Trabelsi, T. Ferdousi, M. Marathe, S. Ravi, S. Swarup, A. K. Vullikanti, M. L. Wilson, S. Kraus, R. Basu, et al. Value-based resource matching with fairness criteria: Application to agricultural water trading. In *AAMAS*, 2024

4. R. Mishra, J. Heavey, G. Kaur, A. Adiga, and A. Vullikanti. Reconstructing an epidemic outbreak using steiner connectivity. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 2023

5. G. Harrison, A. Alabsi Aljundi, J. Chen, S. Ravi, A. K. Vullikanti, M. V. Marathe, and A. Adiga. Identifying complicated contagion scenarios from cascade data. In *Proceedings of the 29th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, 2023

6. A. Adiga, C. J. Kuhlman, M. V. Marathe, S. Ravi, D. J. Rosenkrantz, and R. E. Stearns. Using active queries to infer symmetric node functions of graph dynamical systems. *Journal of Machine Learning Research*, 2022

7. J. McNitt, Y. Y. Chungbaek, H. Mortveit, M. Marathe, M. R. Campos, N. Desneux, T. Brévault, R. Muniappan, and A. Adiga. Assessing the multi-pathway threat from an invasive agricultural pest: Tuta absoluta in asia. *Proceedings of the Royal Society B*, 2019