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

Details

<table>
<tr><td>WORK
EXPERIENCE</td><td>Research Assistant Professor
Network Systems Science and Advanced Computing (NSSAC)
University of Virginia</td><td>2018 − 2022</td></tr>
<tr><td></td><td>Research Assistant Professor
Senior Research Associate
Postdoctoral Associate
Network Dynamics and Simulation Science Laboratory
Biocomplexity Institute of Virginia Tech</td><td>Jul 2016 − Oct 2018
May 2014 − Jul 2016
October 2011 − May 2014</td></tr>
<tr><td></td><td>Research Associate
Dept. of Computer Science and Automation, IISc</td><td>March 2011 − September 2011</td></tr>
<tr><td></td><td>Beceem Communications Pvt Ltd
Algorithm design for WiMax (802.16)</td><td>August 2004 − July 2006</td></tr>
<tr><td></td><td>Project Associate
Project Associate
Dept. of Electrical Engineering, IISc</td><td>October 2003 − April 2004
October 2000 − August 2001</td></tr>
<tr><td>EDUCATION</td><td>**PhD:**
Dept. of Computer Science and Automation
Indian Institute of Science, Bangalore, India</td><td>August 2006 − March 2011</td></tr>
<tr><td></td><td>**Master of Science (Engg):**
Dept. of Electrical Engineering,
Indian Institute of Science, Bangalore, India</td><td>August 2001 − August 2003</td></tr>
<tr><td></td><td>**Bachelor of Engineering:**
Bangalore University (B.M.S. College of Engineering)
Telecommunication Engineering</td><td>1996 − 2000</td></tr>
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GRANTS

- USDA NIFA Foundational and Applied Science Program: *Network Models of Food Systems and their Application to Invasive Species Spread*, Amount: $400,000; Duration: Sep'19–Aug'23, Role: PI

- USAID IPM Innovation Labs: *Assessment of Invasive Alien Species Distribution in the Chitwan-Annapurna-Landscape (CHAL) Region, Nepal*, Amount: $150,000; Duration: Jan'19–Nov'21, Role: Co-PI

- USAID Egypt Mission: *Pest Risk Assessment of the Fall Armyworm, Spodoptera frugiperda in Egypt*, Amount: $18,000; Duration: Oct'17–Dec'17, Role: Co PI

- USAID IPM Innovation Labs: *A High-resolution Interaction Based Approach to Modeling the Spread of Agricultural Invasive Species*, Amount: $1,000,000 ($800,000 for Virginia Tech); Duration: Oct'15–Nov'21, Role: PI

IMPACT

- IrrMap: A Large-Scale Comprehensive Dataset for Irrigation Method Mapping selected to appear in the Association for Computing Machinery (ACM) Showcase on Kudos.

- USAID and USDA invasive species projects featured in Agrilinks, Wisconsin Farmer, Charlottesville News, Knowable Magazine, and Virginia Tech news.
- USAID project mentioned in the USAID Center for Emerging Threats of Crops Notice of Funding Opportunity as a project that has informed the US of emerging threats and helped prepare for impending invasion.
- Supported BII's COVID-19 response efforts in (i) network construction, analysis, and validation and (ii) simulation analytics.
- Invited talks in Egypt and Indian Council of Agricultural Research, India. Talks in various conferences in national and international venues on invasive species modeling: Ethiopia, India, International Congress of Entomology (Orlando), Symposium on Integrated Pest Management (Washington DC).
- Webinar: New Approaches to Control the South American Tomato Leaf Miner *Tuta absoluta*, April 2018

SELECTED AWARDS
- KDD-25 Excellent reviewer (top 10%–20%).
- IJCAI-22 Distinguished PC Member (top 3%).
- My student Nicholas Palmer (coadvised by Madhav Marathe) won the Outstanding Undergraduate Research Award, 2022 – given by the Computer Science department at UVA – for his work on invasive species spread modeling.
- IJCAI-21 Distinguished SPC Member.
- "Honorable Mention For Outstanding Novelty of Research Question" award for the paper "Sensitivity of Diffusion Dynamics to Network Uncertainty" in AAAI'13.

TALKS
1. Presented poster on "Agricultural Assets Mapping" at the Environmental Futures Forum, Environmental Institute, UVA, September 2025.
2. Unraveling Complexity with Network Science: Structure, Dynamics and Emergent Behavior, Jawaharlal Nehru Planetarium, Bengaluru, India, July 2025.
3. US-Scale High Resolution Digital Twin of Coupled Livestock, Wild Birds, and Human Populations Ecosystem, CDC (six presentations), September to December 2024.
4. 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.
5. Identifying Complicated Contagion Scenarios from Cascade Data, 29th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, August 2023.
6. A Robust Deep Learning Framework Reveals the Spread of Multiple Invasive Plants in a Biodiversity Hotspot using Satellite Imagery, The Workshop on Artificial Intelligence for Social Good (in AAAI'23), February 2023.
7. (**Invited**) How to Stop an Epidemic? Network Dynamics and Simulation Systems, CheckedIt, India (virtual), February 2022.
8. (**Invited**) Learning the Local and Global Behavior of Dynamical Systems on Networks, Workshop on AI Socio-écosysteme et résilience, Montpellier, France (virtual), November 2021.
9. Boolean Games: Inferring Agents' Goals Using Taxation Queries, International Joint Conference on Artificial Intelligence (IJCAI'20) (virtual), January 2021.
10. A Deep Learning Framework for Invasive Species Mapping using High-Resolution Satellite Imagery, ASPRS 2020 Annual Conference (virtual), June 2020.

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

12. Modern AI Techniques to Understand the Spatio-temporal Spread of Invasive Alien Plants: Approaches and Challenges, International Plant Protection Congress, Hyderabad, India, November 2019.

13. Modeling the multi-pathway spread of agricultural pests using network science, International Plant Protection Congress, Hyderabad, India, November 2019.

14. Understanding the Role of Seasonal Food Trade Networks in Invasive Species Spread, SIAM Network Science, Snowbird, Utah, May 2019.

15. (**Invited**) How to stop an epidemic? Networked dynamical systems, games and near-optimal algorithms, Indian Institute of Technology, Dharwad, October 2018.

16. (**Invited**) Multi-pathway models to assess the threat of invasive species spread, Indian Agricultural Research Institute, Delhi, October 2018.

17. Multi-pathway models to understand the spread and impact of *Tuta absoluta*, International Conference on Biological Control (ICBC), September 2018.

18. (**Webinar**) New Approaches to Control the South American Tomato Leaf Miner *Tuta absoluta*, April 2018

19. Monitoring the spread of *Tuta absoluta* using a multi-layered network based modeling framework, *9th International IPM Symposium*, Baltimore, March 2018

20. (**Invited**) Modeling the Spread of Fall Armyworm, *Fall Armyworm Workshop*, Adis Ababa, 2017

21. (**Invited**) Understanding the role of human-mediated pathways in pest spread: Case study of *Tuta absoluta*, *12th Arab Congress of Plant Protection*, Hurghada, 2017

22. Monitoring spread of T. absoluta using a multi-layered network based modeling framework, *Symposium on Global Spread and Management of the South American Tomato Leafminer, Tuta absoluta. International Congress of Entomology*, Orlando, 2016

23. (**Invited**) How to stop an epidemic? Games and near-optimal algorithms, *Dept. of Computer Science and Automation, Indian Institute of Science*, Bangalore, 2014

24. (**Invited**) Sensitivity of Dynamical Properties to Network Uncertainty, *Dept. of Computer Science and Automation, Indian Institute of Science*, Bangalore, 2013

PROGRAMMATIC CONTRIBUTIONS

○ I have led the 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, I have 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), presenting in annual meetings, data exploration, providing content for news reports, mentoring students, and preparing annual reports. It has resulted in publications in top venues including Proceedings of the Royal Society Biology, Journal of Pest Science, Journal of Crop Protection and IEEE BigData conference.

○ COVID-19 response: I led the modeling and development of certain modules in the synthetic population generation pipeline. This work has contributed to the generation of US domestic networks as well as global networks. Also, I developed a network analysis tool set, which is used to validate our networks and for comparative analysis. These tools have been applied (i) to provide weekly inputs to

various agencies during certain periods of the year 2020-21, and (ii) in manuscripts submitted/under preparation.

○ DARPA NGS2: I contributed significantly to the theoretical aspects of this project. Our work on inferring graphical dynamical systems 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. This was funded by USAID mission in Egypt.

SOFTWARE AND DATASETS

○ Multi-pathway simulator: I have led the development of a simulation framework to study the multi-pathway spread of invasive species. It consists of a simulator of a generic network diffusion process implemented using vectorized methods in Python, a multi-scale temporal network module, implementation of algorithms for calibration and interventions, modules for model space exploration using computing clusters, regression tests, and various visualization tools. Domestic trade networks have been constructed for several countries using multiple datasets and expert knowledge. The resulting simulation framework has been applied in multiple studies. The simulator and synthetic datasets are publicly available and are constantly updated.

○ High-resolution synthetic population models and datasets: Our group (NSSAC) has been synthesizing highly-detailed population models from multiple data sources for more than 15 years. Over the years, these datasets have been applied in epidemiology (COVID-19, Ebola, influenza, malaria, etc.), transportation, disaster preparedness, resilience and sustainability. I have played a prominent part in the Biocomplexity Institute's COVID-19 response on the modeling and development of the synthetic population networks. I co-led the design and implementation of the physical contact network construction module. I applied concepts from geometric intersection graphs and parallelization to speed up the network generation. I have also developed a tool for analyzing the generated networks. It has been regularly applied to compare different networks, visualize, and validate our models. This software has been well integrated in to our synthetic population pipeline.

○ Deep learning and remote sensing: We have developed a convolutional neural network (CNN) framework to predict the distribution of invasive plants using multispectral satellite images and field survey data. Our robust training and evaluation framework employs multiple hold-out approach for model selection and transfer learning to cope with data challenges imposed by field survey and imagery constraints. Multi-spectral remote-sensed images from multiple satellites were used in this study. We have developed the framework for optical calibration, sharpening, and interpolation of the images towards feature vector extraction. Popular deep neural networks had to be adapted for satellite images. Transfer learning approaches were applied. The framework is applied to study the distribution of multiple invasive plants in the Chitwan-Annapurna Landscape of Nepal, a biodiversity hotspot.

TRANSDISCIPLINARY TEAM SCIENCE

My work involves leading and being part of large teams of researchers from different fields. As PI of two USAID and USDA projects, I have led BII's research in the area of invasive species modeling. As PI, I have initiated multiple projects collaborating with researchers from several countries (US, France, Senegal, India, Nepal, and Bangladesh). Example projects include (i) modeling the spread of a pest of the tomato plant, *Tuta absoluta* in Southeast Asia and West Africa involving entomologists, economists, modelers and computer scientists and (ii) mapping invasive plants in Nepal using remote-sensing and machine learning involving botanists and geoinformation specialists. I play a major role is several large team projects in the Biocomplexity Institute as

well. These include studies related to computational epidemiology such as COVID-19 response, disaster preparedness, and computational social science.

PROFESSIONAL SERVICE

○ Professional service:
  - Grant review panel (NSF 1, USDA 5, FONDECYT Chile 1)
  - Senior TPC (3) and TPC (25)
  - Reviewed papers for several journals and conferences spanning multiple domains such as Nature comm. Bio., Journal of Pest Science, JPDC, ACM Trans. on Algo, Journal of Royal Soc. Interface, etc.

○ Biocomplexity Institute:
  - Student and postdoc hiring committee in NSSAC 2018–2020.
  - Student and postdoc hiring committee in NDSSL 2017–2018.
  - Member of graduate students admission team in NDSSL for the Fall'16 admissions

AWARDS & ACHIEVEMENTS

○ KDD-25 Excellent reviewer (top 10%–20%).
○ IJCAI-22 Distinguished PC Member (top 3%).
○ My student Nicholas Palmer (coadvised by Madhav Marathe) won the Outstanding Undergraduate Research Award, 2022 – given by the Computer Science department at UVA – for his work on invasive species spread modeling.
○ IJCAI-21 Distinguished SPC Member.
○ "DSFEW Early Career Researchers Travel Fund", KDD 2016.
○ "Honorable Mention For Outstanding Novelty of Research Question" award for the paper "Sensitivity of Diffusion Dynamics to Network Uncertainty" in AAAI'13.
○ Infosys Fellow: awarded to select PhD candidates in IISc by Infosys Technologies Ltd.
○ Secured All India Rank of 34 in GATE 2000 (EC), a national level entrance exam for post graduate studies.
○ Ranked 7th in Bangalore University in Telecommunication Engg. (Year 2000).

PUBLICATIONS

Journal articles

32. S. A. Moon, R. Datta, T. Ferdousi, H. Baek, A. Adiga, A. Marathe, and A. Vullikanti. Graph-based prediction of spatio-temporal vaccine hesitancy from insurance claims data. *IEEE Access*, 2025

31. J. Chen, P. Bhattacharya, S. Hoops, D. Machi, A. Adiga, H. Mortveit, S. Venkatramanan, B. Lewis, and M. Marathe. Role of heterogeneity: National scale data-driven agent-based modeling for the us covid-19 scenario modeling hub. *Epidemics*, 2024

30. P. Bhattacharya, D. Machi, J. Chen, S. Hoops, B. Lewis, H. Mortveit, S. Venkatramanan, M. L. Wilson, A. Marathe, P. Porebski, et al. Novel multi-cluster workflow system to support real-time hpc-enabled epidemic science: Investigating the impact of vaccine acceptance on covid-19 spread. *Journal of Parallel and Distributed Computing*, 2024

29. P. Bhattacharya, J. Chen, S. Hoops, D. Machi, B. Lewis, S. Venkatramanan, M. L. Wilson, B. Klahn, A. Adiga, B. Hurt, et al. Data-driven scalable pipeline using national agent-based models for real-time pandemic response and decision support. *The International Journal of High Performance Computing Applications*, 2023

28. A. Adiga, N. Palmer, Y. Y. Baek, H. Mortveit, and S. Ravi. Network models and simulation analytics for multi-scale dynamics of biological invasions. *Frontiers in big Data*, 2022

27. 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

26. J. Chen, S. Hoops, A. Marathe, H. Mortveit, B. Lewis, S. Venkatramanan, A. Haddadan, P. Bhattacharya, A. Adiga, A. Vullikanti, et al. Prioritizing allocation of covid-19 vaccines based on social contacts increases vaccination effectiveness. *MedRxiv*, 2021

25. M. R. de Campos, P. Béarez, E. Amiens-Desneux, L. Ponti, A. P. Gutierrez, A. Biondi, A. Adiga, and N. Desneux. Thermal biology of tuta absoluta: demographic parameters and facultative diapause. *Journal of Pest Science*, 2021

24. A. S. Poudel, B. B. Shrestha, M. D. Joshi, R. Muniappan, A. Adiga, S. Venkatramanan, and P. K. Jha. Predicting the current and future distribution of the invasive weed ageratina adenophora in the chitwan–annapurna landscape, nepal. *Mountain Research and Development*, 2020

23. V. Cedeno-Mieles, Z. Hu, Y. Ren, X. Deng, A. Adiga, C. Barrett, N. Contractor, S. Ekanayake, J. M. Epstein, B. J. Goode, et al. Networked experiments and modeling for producing collective identity in a group of human subjects using an iterative abduction framework. *Social Network Analysis and Mining*, 2020

22. S. Venkatramanan, S. Wu, B. Shi, A. Marathe, M. Marathe, S. Eubank, L. Sah, A. Giri, L. Colavito, K. Nitin, et al. Modeling commodity flow in the context of invasive species spread: Study of tuta absoluta in nepal. *Crop Protection*, 2020

21. 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

20. A. Adiga, C. J. Kuhlman, M. V. Marathe, H. S. Mortveit, S. Ravi, and A. Vullikanti. Graphical dynamical systems and their applications to bio-social systems. *International Journal of Advances in Engineering Sciences and Applied Mathematics*, 2019

19. S. Maharjan, B. B. Shrestha, M. D. Joshi, A. Devkota, R. Muniappan, A. Adiga, and P. K. Jha. Predicting suitable habitat of an invasive weed parthenium hysterophorus under future climate scenarios in chitwan annapurna landscape, nepal. *Journal of Mountain Science*, 2019

18. A. Adiga, S. Chu, S. Eubank, C. J. Kuhlman, B. Lewis, A. Marathe, M. Marathe, E. K. Nordberg, S. Swarup, A. Vullikanti, et al. Disparities in spread and control of influenza in slums of delhi: findings from an agent-based modelling study. *BMJ open*, 2018

17. A. Adiga, J. Babu, and L. S. Chandran. Sublinear approximation algorithms for boxicity and related problems. *Discrete Applied Mathematics*, 2018

16. A. Adiga, H. Galyean, C. J. Kuhlman, M. Levet, H. S. Mortveit, and S. Wu. Activity in boolean networks. *Natural Computing*, 2017

15. A. Fayad and A. Adiga. Monitoring the spread and management of tuta absoluta. *Current Science (00113891)*, 2017

14. M. R. Campos, A. Biondi, A. Adiga, R. N. Guedes, and N. Desneux. From the western palaearctic region to beyond: Tuta absoluta 10 years after invading europe. *Journal of Pest Science*, 2017

13. A. Adiga, C. J. Kuhlman, M. V. Marathe, S. Ravi, D. J. Rosenkrantz, and R. E. Stearns. Inferring local transition functions of discrete dynamical systems from observations of system behavior. *Theoretical Computer Science*, 2017

12. Y. Zhang, A. Adiga, S. Saha, A. Vullikanti, and B. A. Prakash. Near-optimal algorithms for controlling propagation at group scale on networks. *IEEE Transactions on Knowledge and Data Engineering*, 2016

11. A. Adiga, L. S. Chandran, and N. Sivadasan. Lower bounds for boxicity. *Combinatorica*, 2014

10. A. Adiga, J. Babu, and L. S. Chandran. A constant factor approximation algorithm for boxicity of circular arc graphs. *Discrete Applied Mathematics*, 2014

9. A. Adiga, L. S. Chandran, and R. Mathew. Cubicity, degeneracy, and crossing number. *European Journal of Combinatorics*, 2014

8. A. Adiga and L. S. Chandran. Representing a cubic graph as the intersection graph of axis-parallel boxes in three dimensions. *SIAM Journal on Discrete Mathematics*, 2014

7. S. Wu, A. Adiga, and H. S. Mortveit. Limit cycle structure for dynamic bithreshold systems. *Theoretical Computer Science*, 2014

6. A. Adiga, C. J. Kuhlman, H. S. Mortveit, and A. K. S. Vullikanti. Sensitivity of diffusion dynamics to network uncertainty. *Journal of Artificial Intelligence Research*, 2014

5. A. Adiga, D. Bhowmick, and L. S. Chandran. Boxicity and poset dimension. *SIAM Journal on Discrete Mathematics*, 2011

4. A. Adiga and L. S. Chandran. Cubicity of interval graphs and the claw number. *Journal of Graph Theory*, 2010

3. A. Adiga, D. Bhowmick, and L. S. Chandran. The hardness of approximating the boxicity, cubicity and threshold dimension of a graph. *Discrete applied mathematics*, 2010

2. A. Adiga and L. S. Chandran. Cubicity of interval graphs and the claw number. *Electronic Notes in Discrete Mathematics*, 2009

1. A. Adiga. Cubicity of threshold graphs. *Discrete mathematics*, 2009

Refereed conference proceedings

49. 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

48. 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

47. 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

46. Z. Qiu, A. Adiga, M. V. Marathe, S. Ravi, D. J. Rosenkrantz, R. E. Stearns, and A. Vullikanti. Learning the topology and behavior of discrete dynamical systems. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 2024

45. T. Ferdousi, A. Adiga, M. Wilson, S. Ravi, A. Vullikanti, M. V. Marathe, S. Swarup, M. Liu, K. Rajagopalan, and J. Adam. A machine learning framework to explain complex geospatial simulations: A climate change case study. In *2023 Winter Simulation Conference (WSC)*, 2023

44. 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

43. Y. Trabelsi, A. Adiga, S. Kraus, S. Ravi, and D. J. Rosenkrantz. Resource sharing through multi-round matchings. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 2023

42. 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

41. A. A. Aljundi, G. Harrison, J. Chen, M. V. Marathe, H. Mortveit, A. Vullikanti, and A. Adiga. A network-based analytics framework for high-resolution agent-based epidemic simulation ensembles. In *2023 Winter Simulation Conference (WSC)*, 2023

40. A. Adiga, N. Palmer, S. Sinha, P. Waghalter, A. Dave, D. P. Lazarte, T. Brévault, A. Apolloni, H. Mortveit, Y. Y. Baek, et al. Realistic commodity flow networks to assess vulnerability of food systems. In *Complex Networks & Their Applications X: Volume 1, Proceedings of the Tenth International Conference on Complex Networks and Their Applications COMPLEX NETWORKS 2021 10*, 2022

39. R. Mishra, S. Eubank, M. Nath, M. Amundsen, and A. Adiga. Community detection using moore-shannon network reliability: application to food networks. In *International Conference on Complex Networks and Their Applications*, 2022

38. J. Chen, S. Hoops, A. Marathe, H. Mortveit, B. Lewis, S. Venkatramanan, A. Haddadan, P. Bhattacharya, A. Adiga, A. Vullikanti, et al. Effective social network-based allocation of covid-19 vaccines. In *Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, 2022

37. Y. Trabelsi, A. Adiga, S. Kraus, and S. Ravi. Maximizing resource allocation likelihood with minimum compromise. In *Proceedings of the 21st International Conference on Autonomous Agents and Multiagent Systems*, 2022

36. D. J. Rosenkrantz, A. Adiga, M. Marathe, Z. Qiu, S. Ravi, R. Stearns, and A. Vullikanti. Efficiently learning the topology and behavior of a networked dynamical system via active queries. In *International Conference on Machine Learning*, 2022

35. Y. Trabelsi, A. Adiga, S. Kraus, and S. Ravi. Resource allocation to agents with restrictions: Maximizing likelihood with minimum compromise. In *European Conference on Multi-Agent Systems*, 2022

34. P. Bhattacharya, D. Machi, J. Chen, S. Hoops, B. Lewis, H. Mortveit, S. Venkatramanan, M. L. Wilson, A. Marathe, P. Porebski, et al. Ai-driven agent-based

models to study the role of vaccine acceptance in controlling covid-19 spread in the us. In *2021 IEEE International Conference on Big Data (Big Data)*, 2021

33. S. Hoops, J. Chen, A. Adiga, B. Lewis, H. Mortveit, H. Baek, M. Wilson, D. Xie, S. Swarup, S. Venkatramanan, et al. High performance agent-based modeling to study realistic contact tracing protocols. In *2021 Winter Simulation Conference (WSC)*, 2021

32. A. Adiga, C. J. Kuhlman, M. V. Marathe, S. Ravi, D. J. Rosenkrantz, R. E. Stearns, and A. Vullikanti. Learning coalition-based interactions in networked social systems. In *Association for the Advancement of Artificial Intelligence Conference 2020*, 2020

31. A. Adiga, S. Kraus, O. Maksimov, and S. S. Ravi. Boolean games: Inferring agents' goals using taxation queries. In *Proceedings of the Twenty-Ninth International Joint Conference on Artificial Intelligence*, 2020

30. A. Adiga, C. Kuhlman, M. Marathe, S. Ravi, D. Rosenkranz, R. Stearns, and A. Vullikanti. Bounds and complexity results for learning coalition-based interaction functions in networked social systems. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 2020

29. V. Cedeno-Mieles, Z. Hu, X. Deng, Y. Ren, A. Adiga, C. Barrett, S. Ekanayake, G. Korkmaz, C. J. Kuhlman, D. Machi, et al. Mechanistic and data-driven agent-based models to explain human behavior in online networked group anagram games. In *Proceedings of the 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, 2019

28. M. Nath, S. Venkatramanan, B. Kaperick, S. Eubank, M. V. Marathe, A. Marathe, and A. Adiga. Using network reliability to understand international food trade dynamics. In *Complex Networks and Their Applications VII: Volume 1 Proceedings The 7th International Conference on Complex Networks and Their Applications COMPLEX NETWORKS 2018 7*, 2019

27. A. Adiga, C. J. Kuhlman, M. V. Marathe, S. Ravi, D. J. Rosenkrantz, and R. E. Stearns. Using active queries to learn local stochastic behaviors in social networks. In *Complex Networks and Their Applications VII: Volume 2 Proceedings The 7th International Conference on Complex Networks and Their Applications COMPLEX NETWORKS 2018 7*, 2019

26. G. Fox, J. A. Glazier, J. Kadupitiya, V. Jadhao, M. Kim, J. Qiu, J. P. Sluka, E. Somogyi, M. Marathe, A. Adiga, et al. Learning everywhere: Pervasive machine learning for effective high-performance computation. In *2019 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, 2019

25. A. Adiga, C. Barrett, S. Eubank, C. J. Kuhlman, M. V. Marathe, H. Mortveit, S. Ravi, D. J. Rosenkrantz, R. E. Stearns, S. Swarup, et al. Validating agent-based models of large networked systems. In *2019 Winter Simulation Conference (WSC)*, 2019

24. A. Adiga, C. J. Kuhlman, M. Marathe, S. Ravi, and A. Vullikanti. Pac learnability of node functions in networked dynamical systems. In *International Conference on Machine Learning*, 2019

23. Z. Hu, X. Deng, B. J. Goode, N. Ramakrishnan, P. Saraf, N. Self, A. Adiga, G. Korkmaz, C. J. Kuhlman, D. Machi, et al. On the modeling and agent-based simulation of a cooperative group anagram game. In *2019 Winter Simulation Conference (WSC)*, 2019

22. A. Adiga, C. Kuhlman, M. Marathe, R. SS, D. Rosenkrantz, and R. Stearns. Learning the behavior of a dynamical system via a "20 questions" approach. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 2018

21. A. Adiga, V. Cedeno-Mieles, C. J. Kuhlman, M. V. Marathe, S. Ravi, D. J. Rosenkrantz, and R. E. Stearns. Inferring probabilistic contagion models over networks using active queries. In *Proceedings of the 27th ACM International Conference on Information and Knowledge Management*, 2018

20. A. Adiga, A. D. Friedman, and S. Raghvendra. A k-median based online algorithm for the stochastic k-server problem. In *International Workshop on Approximation and Online Algorithms*, 2017

19. S. Venkatramanan, S. Wu, B. Shi, A. Marathe, M. Marathe, S. Eubank, L. P. Sah, A. Giri, L. A. Colavito, K. Nitin, et al. Towards robust models of food flows and their role in invasive species spread. In *2017 IEEE International Conference on Big Data (Big Data)*, 2017

18. A. Adiga and A. Vullikanti. Temporal vaccination games under resource constraints. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 2016

17. A. Adiga, S. Venkat, and A. Vullikanti. To delay or not: temporal vaccination games on networks. In *IEEE INFOCOM 2016-The 35th Annual IEEE International Conference on Computer Communications*, 2016

16. A. Adiga, R. Beckman, K. Bisset, J. Chen, Y. Chungbaek, S. Eubank, H. Marathe, E. Nordberg, C. Rivers, P. Stretz, et al. Synthetic populations for epidemic modeling. In *Proceedings of the International Conference on Computation and Social Sciences (ICCSS), Helsinki, Finland*, 2015

15. Y. Zhang, A. Adiga, A. Vullikanti, and B. A. Prakash. Controlling propagation at group scale on networks. In *2015 IEEE International Conference on Data Mining*, 2015

14. A. Adiga, C. J. Kuhlman, M. V. Marathe, S. Ravi, D. J. Rosenkrantz, and R. E. Stearns. Complexity of inferring local transition functions of discrete dynamical systems. In *Implementation and Application of Automata: 20th International Conference, CIAA 2015, Umeå, Sweden, August 18-21, 2015, Proceedings 20*, 2015

13. A. Adiga, C. J. Kuhlman, H. S. Mortveit, and S. Wu. Effect of graph structure on the limit sets of threshold dynamical systems. In *Cellular Automata and Discrete Complex Systems: 21st IFIP WG 1.5 International Workshop, AUTOMATA 2015, Turku, Finland, June 8-10, 2015. Proceedings 21*, 2015

12. S. Saha, A. Adiga, B. A. Prakash, and A. K. S. Vullikanti. Approximation algorithms for reducing the spectral radius to control epidemic spread. In *Proceedings of the 2015 SIAM International Conference on Data Mining*, 2015

11. A. Adiga, H. Galyean, C. J. Kuhlman, M. Levet, H. S. Mortveit, and S. Wu. Network structure and activity in boolean networks. In *Cellular Automata and Discrete Complex Systems: 21st IFIP WG 1.5 International Workshop, AUTOMATA 2015, Turku, Finland, June 8-10, 2015. Proceedings 21*, 2015

10. S. Saha, A. Adiga, and A. Vullikanti. Equilibria in epidemic containment games. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 2014

9. A. Adiga and A. K. S. Vullikanti. How robust is the core of a network? In *Machine Learning and Knowledge Discovery in Databases: European Conference, ECML PKDD 2013, Prague, Czech Republic, September 23-27, 2013, Proceedings, Part I 13*, 2013

8. A. Adiga, A. K. S. Vullikanti, and D. Wiggins. Subgraph enumeration in dynamic graphs. In *2013 IEEE 13th International Conference on Data Mining*, 2013

7. A. Adiga, M. Marathe, H. Mortveit, S. Wu, and S. Swarup. Modeling urban transportation in the aftermath of a nuclear disaster: The role of human behavioral responses. In *The Conference on Agent-Based Modeling in Transportation Planning and Operations, Blacksburg, VA*, 2013

6. A. Adiga, J. Babu, and L. S. Chandran. Polynomial time and parameterized approximation algorithms for boxicity. In *International Symposium on Parameterized and Exact Computation*, 2012

5. A. Adiga and S. L. Chandran. Representing a cubic graph as the intersection graph of axis-parallel boxes in three dimensions. In *Proceedings of the twenty-eighth annual symposium on Computational geometry*, 2012

4. A. Adiga, D. Bhowmick, and L. S. Chandran. Computing with cells: membrane systems. In *Proceedings of the 16th annual international conference on Computing and combinatorics*, 2010

3. A. Adiga, D. Bhowmick, and L. S. Chandran. Boxicity and poset dimension. In *International Computing and Combinatorics Conference*, 2010

2. A. Adiga, R. Chitnis, and S. Saurabh. Parameterized algorithms for boxicity. In *International Symposium on Algorithms and Computation*, 2010

1. A. Adiga, K. R. Ramakrishnan, and B. Adiga. A design and implementation of orthonormal symmetric wavelet transform using prcc filter banks. In *2003 IEEE International Conference on Acoustics, Speech, and Signal Processing, 2003. Proceedings.(ICASSP'03).*, 2003

Workshop/Extended abstract

4. O. B. Hoque, S. Swarup, A. Adiga, S. K. Nouwakpo, and M. Marathe. Irrnet: Advancing irrigation mapping with incremental patch size training on remote sensing imagery. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2024

3. A. Adiga, C. Kuhlman, M. Marathe, S. Ravi, D. Rosenkrantz, and D. Stearns. Inferring users' choice functions in networked social systems through active queries. In *The 7th International Workshop on Computational Social Choice (COMSOC-2018)*, 2018

2. S. Venkatramanan, A. Adiga, A. Marathe, S. Eubank, M. Marathe, and R. Muniappan. Towards an integrated network-based approach to modeling the dynamics of invasive plant pests. In *KDD'2016 Workshop on Data Science for Food, Energy and Water (DS-FEW)*, 2016

1. A. Adiga, H. S. Mortveit, and S. Wu. Route stability in large-scale transportation systems. In *The Workshop on Multiagent Interaction Networks (MAIN), held in conjunction with AAMAS*, 2013

Reports

2. E. Heinrichs, J. Sidhu, R. Muniappan, A. Fayad, A. Adiga, A. Marathe, J. Mcnitt, and S. Venkatramanan. Pest risk assessment of the fall armyworm, spodoptera frugiperda in egypt. *Feed the Future. The US Government's Global Hunger and Food Security Initiative*, 2018

1. A. Adiga, A. Agashe, S. Arifuzzaman, C. L. Barrett, R. J. Beckman, K. R. Bisset, J. Chen, Y. Chungbaek, S. G. Eubank, S. Gupta, et al. Generating a synthetic population of the united states. *Network Dynamics and Simulation Science Laboratory, Tech. Rep. NDSSL*, 2015

STUDENTS CURRENT/PAST	**PhD** (GRA) Oishee Bintey Hoque (Thesis committee) (Fall'23–) (Adviser: Madhav Marathe), Nibir Chandra Mandal (Fall'24–) (Adviser: Madhav Marathe), Amro Aljundi (Spring'23–) (Adviser: Madhav Marathe), Zirou Qiu (Thesis committee) (Adviser: Madhav Marathe), **Ritwick Mishra** (Spring'23–) (Co-adviser with Anil Vullikanti), Galen Harrison (Adviser: Madhav Marathe), Rituparna Datta (Adviser: Anil Vullikanti), Prathyush Sambaturu (Thesis committee), Sichao Wu (Adviser: Henning Mortveit)

Masters (GRA)
Hongze Chen (Spring'24–)
Ritwick Mishra (Fall'21–Spring'23) (Co-adviser with Anil Vullikanti),
Sanchit Sinha (Spring'21)
Aniruddha Dave (Fall'20)
Manisha Sudhir (Spring'20–Spring'21) (Co-adviser with Anil Vullikanti),
Daniel Perez Lazarte (Fall'19, Spring'20)
Joseph McNitt (Thesis adviser: Henning Mortveit)

Undergraduates
Alex Fetea (Summer'23–Fall'24) (Co-adviser Samarth Swarup) Alexander Yao (Summer'24) (Co-adviser Samarth Swarup) Chris Goodhart (Summer'23) (Co-adviser Samarth Swarup), Andrew Ma (Summer'23) (Co-adviser Samarth Swarup), William Mueller (Summer'22, Fall'22), Clark Mollencop (Summer'22), Neha Pattanaik (Summer'21), Penina Waghalter (Summer'21), Nicholas Palmer (Summer'21), Johnny Yang (Fall'20, Spring'21), Surbhi Singh (Fall'19–Spring'20), Ethan Choo (Summer'19), Katie Liu (Summer'19), Bryan Kaperick (Spring'16–Spring'17), and Amleshwar Kumar (Intern: Fall'16)

High school
Alexis Fox (Fall'23–Sprint'24) (Co-adviser Samarth Swarup)
Manu Amundsen (Spring'21)

Student thesis/project committee
Tanay Mehta (PhD, Northeastern University), Sudip Saha (PhD, Virginia Tech)

PROFESSIONAL SERVICE	**Guest editor** Journal of Indian Institute of Science (2021) **Senior Technical Program Committee member** IJCAI (2021–2023) **Technical Program Committee member** BigData (2024,2026), KDD (2025,2026), AAAI (2021–2026), NeurIPS (2025), IJCAI (2024,2025), IJCAI AI and Social Good (2025), KDD Data Track (2025), AAMAS (2025), ICLR (2025), HiPC (2024), ANNSIM (2021), AIKE (2018–2021), PhD-ASONAM (2020), INFOCOM (2019), CSoNet (2016), CONECCT (2015), SDM-Networks (2015), SIAMNS (2015) **Grant Review** USDA (2020–2026) (Grant review panelist) NSF (2018) (Grant review panelist) National Fund for Scientific and Technological Development (FONDECYT), Chile **Reviewer** JAAMAS (2026), Preventive Veterinary Medicine (2025), NITK thesis (2025), SODA (2025), ICML (2024), Plos Comp. Bio. (2023), AAAI (2023), SNAM (2022), Entomologia Generalis (2022), Entomologia Generalis (2022), PlosOne (2022), ICML (2022 multiple

papers), Biological Control (2022), Applied Network Science (2019–2022), Nature Comm. Biology (2021), Journal of Pest Science (2020, 2018), WG (2020), International Journal of epidemiology (2019), Pest Management Science (2019), Journal of Parallel and Distributed Computing (2019), Australasian Journal of Combinatorics (2018, 2015), FPSAC (2017), ACM Transactions on Algorithms (2017), Journal of Royal Society Interface (2017), INFOCOM (2016, 2015), Order (2015), Algorithmica (2014), Journal of Autonomous Agents and Multi-Agent Systems (2013), Information Processing Letters (2012), Graphs and Combinatorics (2011), CATS (2011)

Advisory Committee
E^2JDJ

Miscellaneous

○ Student and postdoc hiring committee in NSSAC 2018-2021

○ Student and postdoc hiring committee in NDSSL 2017-2018

○ Member of graduate students admission team in NDSSL for the Fall'16 admissions

○ Organized NDSSL graduate seminar series for the academic year 2013-2014