

# SRINIVASAN VENKATRAMANAN

## CONTACT INFO

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## Research Interests

Computational Modeling, Network Epidemiology, Stochastic processes, Agent-based models, Network Science, Optimization, Optimal Control

## Education

**Aug. 2008 - April 2014**

**Ph.D.**

Department of ECE, Indian Institute of Science, Bangalore

*Advisor:* Prof. Anurag Kumar

*Thesis Title:* Influence Dynamics on Social Networks (CGPA: 7/8)

Developed novel applications of traditional mathematical models to study dynamics of influence spread on online social networks.

**Aug. 2004 - June. 2008**

**B.E. (ECE)**

*College:* College of Engineering Guindy, Anna University, Chennai, India.

*Thesis Title:* Cooperative Diversity in Wireless Sensor Networks (CGPA: 9.12/10)

Obtained heuristic algorithms for efficient relay selection for forwarding in wireless sensor networks.

## Professional Experience

**Oct 2018 - present**

**Research Scientist**

Network Systems Science & Advanced Computing Division, Biocomplexity Institute & Initiative, Univ. of Virginia.

**Dec 2017 - Oct 2018**

**Computational Health Data Scientist**

Network Dynamics and Simulation Science Laboratory, Biocomplexity Institute of Virginia Tech.

*Mentor:* Bryan Lewis, MPH, PhD

Responsible for assisting and leading applied research projects using computational modeling, HPC simulations and Big Data analysis to address public health policy questions especially involving infectious disease dynamics.

**Feb 2015 - Nov 2017**

**Postdoctoral Associate**

Network Dynamics and Simulation Science Laboratory, Biocomplexity Institute of Virginia Tech.

*Mentor:* Prof. Anil Vullikanti

Responsible for designing, analyzing and implementing provable algorithms for analyzing complex networks and graph dynamical systems, in particular those arising in the study of large socio-technical, biological and information systems.

**May 2014 - Nov 2014**

**Research Assistant**

Department of Information Engineering, Chinese University of Hong Kong.

*Mentor:* Prof. Dah Ming Chiu

Responsible for developing and testing mathematical models for structure, dynamics and evolution of data arising from large scale academic social networks.

**May 2007 - Aug 2007**

**Student Intern**

Bell Research Labs, Bangalore, India.

Involved in design and development of cloud storage and streaming of media content for mobile applications (Network iPod).

## Journal articles

1. Srinivasan Venkatramanan, Jiangzhuo Chen, Arindam Fadikar, Sandeep Gupta, Dave Higdon, Bryan Lewis, Madhav Marathe, Henning Mortveit, Anil Vullikanti, “*Optimizing spatial allocation of seasonal influenza vaccine under temporal constraints*”, PLOS Computational Biology (2019).
2. Srinivasan Venkatramanan, Sichao Wu, Bowen Shi, Achla Marathe, Madhav Marathe, Stephen Eubank, Lalit Sah, A.P. Giri, Luke Colavito, Nitin S, Sridhar V, Asokan R, Rangaswamy Muniappan, George Norton, and Abhijin Adiga, “*Modeling commodity flow in the context of invasive species spread: Study of Tuta absoluta in Nepal.*”, Elsevier Journal of Crop Protection (2019).
3. Arindam Fadikar, Dave Higdon, Jiangzhuo Chen, Bryan Lewis, Srinivasan Venkatramanan, and Madhav Marathe, “*Calibrating a Stochastic, Agent-Based Model Using Quantile-Based Emulation.*”, SIAM/ASA Journal on Uncertainty Quantification 6, no. 4 (2018): 1685-1706.
4. Qiu Fang Ying, Dah Ming Chiu, Srinivasan Venkatramanan, and Xiaopeng Zhang, “*User modeling and usage profiling based on temporal posting behavior in OSNs.*”, Online Social Networks and Media 8 (2018): 32-41.
5. Wu Yan, Srinivasan Venkatramanan, and Dah-Ming Chiu, “*A Population Model for Academia: Case Study of the Computer Science Community using DBLP Bibliography 1960-2016.*”, IEEE Transactions on Emerging Topics in Computing (2018).
6. Srinivasan Venkatramanan, Bryan Lewis, Jiangzhuo Chen, Dave Higdon, Anil Vullikanti, Madhav Marathe, “*Using data-driven agent-based models for forecasting emerging infectious diseases*”, Elsevier Epidemics, Volume 22, Pages 43-49, March 2018
7. Farzaneh Sadat Tabataba, Prithwish Chakraborty, Naren Ramakrishnan, Srinivasan Venkatramanan, Jiangzhuo Chen, Bryan Lewis and Madhav Marathe, “*A Framework for Evaluating Epidemic Forecasts*”, BMC Infectious Diseases 17:345, 2017
8. Wu Yan, Srinivasan Venkatramanan and Dah Ming Chiu, “*Research collaboration and topic trends in Computer Science based on top active authors.*”, PeerJ Computer Science 2:e41, 2016
9. Srinivasan Venkatramanan and Anurag Kumar, “*Co-Evolution of Content Spread and Popularity in Mobile Opportunistic Networks.*”, IEEE Transactions on Mobile Computing 13(11): 2498-2509, February 2014

## Conference/Workshop papers

1. Madhurima Nath, Srinivasan Venkatramanan, Bryan Kaperick, Stephen Eubank, Madhav Marathe, Achla Marathe and Abhijin Adiga, “*Using Network Reliability to Understand International Food Trade Dynamics*”, to be presented at COMPLEX NETWORKS 2018.
2. Qiufang Ying, Dah Ming Chiu, Srinivasan Venkatramanan, and Xiaopeng Zhang, “*Profiling OSN Users Based on Temporal Posting Patterns*”, WWW '18 Companion Proceedings of the The Web Conference 2018 Pages 1451-1456.
3. Srinivasan Venkatramanan, Sichao Wu, Bowen Shi, Achla Marathe, Madhav Marathe, Stephen Eubank, Lalit Sah, A.P. Giri, Luke Colavito, Nitin S, Sridhar V, Asokan R, Rangaswamy Muniappan, George Norton, and Abhijin Adiga, “*Towards Robust Models of Food Flows and Their Role in Invasive Species Spread*”, IEEE International Conference on Big Data (IEEE Big Data), 2017.
4. Farzaneh Sadat Tabataba, Milad Hosseinipour, Bryan Lewis, Foroogh Sadat Tabataba, Srinivasan Venkatramanan, Dave Higdon, Jiangzhuo Chen, and Madhav Marathe, “*Epidemic Forecasting by Combining Agent-Based Models and Smart Beam-Particle Filtering Framework*”, IEEE International Conference on Data Mining (ICDM) short paper, 2017
5. Venkatramanan S, Chen J, Gupta S, Lewis B, Marathe M, Mortveit H, Kumar VS Anil, “*Spatio-temporal optimization of seasonal vaccination using a metapopulation model of influenza*”, IEEE International Conference on Healthcare Informatics (ICHI), 2017
6. Srinivasan Venkatramanan et al., “*Towards an Integrated Network-based Approach to Modeling the Dynamics of Invasive Plant Pests*”, poster presented at KDD 2016 Workshop on Data Science for Food, Energy and Water, San Francisco, August 2016
7. Wu Yan, Srini Venkat, and Dah Ming Chiu, “*Get To the Top and Stay There: A Study of Citation Rank Dynamics in Academia*”, Proceedings of the 25th International Conference Companion on World Wide Web (BigScholar), 2016

8. Abhijin Adiga, Srinivasan Venkatramanan, Anil Vullikanti, “*To delay or not: Temporal Vaccination Games on Networks*”, IEEE INFOCOM 2016
9. Wu Yan, Srinivasan Venkatramanan and Dah Ming Chiu, “*Research Collaboration and Topic Trends in Computer Science - An Analysis Based on UCP Authors*”, Proceedings of the 25th International Conference Companion on World Wide Web (SAVE-SD), 2015
10. Qiu Fang Ying, Srinivasan Venkatramanan and Dah Ming Chiu, “*Modeling and Analysis of Scholar Mobility on Scientific Landscape*”, Proceedings of the 24th International Conference Companion on World Wide Web (BigScholar), 2015
11. Srinivasan Venkatramanan and Anurag Kumar, “*Competition for Content Spread over Multiple Social Networks*”, Workshop on Social Networks in Science and Engineering (SCINSE'14), co-held with COMSNETS 2014
12. Eitan Altman, Parmod Kumar, Srinivasan Venkatramanan and Anurag Kumar, “*Competition over Timeline in Social Networks*”, Workshop on Social Network Analysis and Algorithms (SNAA), co-held with IEEE/ACM ASONAM 2013
13. Srinivasan Venkatramanan and Anurag Kumar, “*Co-evolution of Content Popularity and Delivery in Mobile P2P Networks*”, IEEE INFOCOM mini-Conference, 2012
14. Srinivasan Venkatramanan and Anurag Kumar, “*Information Dissemination in Socially Aware Networks under the Linear Threshold model*”, National Conference on Communication(NCC), 2011

### Technical Reports

1. Sambaturu P, Bhattacharya P, Chen J, Lewis B, Marathe M, Venkatramanan S, Vullikanti A “*An automated approach for finding spatio-temporal patterns in disease spread*”, JMIR Preprints. 20/11/2018:12842
2. Heinrichs, E.A., Sidhu Jaspreet, Muniappan,R., Fayad,Amer, Adiga, Abhijin, Marathe, Achla, Mcnitt Joseph, Venkatramanan, Srinivasan, “ *Pest Risk Assessment of the Fall Armyworm, Spodoptera frugiperda in Egypt*”, report published by Feed the Future Innovation Lab for Integrated Pest Management (NDSSL TR 2017-1138).
3. Srinivasan Venkatramanan and Anurag Kumar, “*Influence Spread in Social Networks: A Study via a Fluid Limit of the Linear Threshold Model*”, arXiv:1405.7096 (2014)
4. Srinivasan Venkatramanan and Anurag Kumar, “*New Insights from an Analysis of Social Influence Networks under the Linear Threshold model*”, arXiv:1002.1335 (2010)

### Invited Talks/Posters

1. “*Computing for Health: In silico approaches for health sciences*”, invited talk at the Indian Institute of Science, Bangalore, Jan 2019.
2. “*Exploring optimal vaccine allocation using a national model of influenza*”, poster presented at UNC Going Viral Symposium, Chapel Hill, NC, Apr 2018
3. “*iFlu, e-Flu: where from and where to?*”, invited talk at Schiffert Health Center, Virginia Tech, Mar 2018.
4. “*Resource optimization problems using a mathematical model of influenza*”, talk given at the 6th Annual MIDAS Outreach Conference, Harvard T.H. Chan School of Public Health, Boston, Nov 2017
5. Srinivasan Venkatramanan et al., “*Hybrid models for ecological and anthropogenic drivers of pest invasion: Case study of Tuta Absoluta in Nepal*”, presented at International Conference on Biodiversity, Climate Change Assessment and Impacts on Livelihood, Kathmandu, Nepal, Jan 2017
6. “*Modeling in the Time of Ebola: Using HPC Simulations to Understand Infectious Disease Dynamics*”, talk given at IISc. Bangalore and IIT Madras, Feb 2016
7. “*Calibration and Forecasting Framework for Infectious Diseases*”, poster presented at International Symposium for Next Generation Infrastructure (ISNGI), Washington D.C., Sep 2015
8. “*Delay-Cost Optimal Coupon Delivery in Mobile Opportunistic Networks*”, talk at the High Dimensional Network Analytics Workshop, IISc. Bangalore, Dec 2013
9. “*Influence Spread in Social Networks*”, poster presented at TechVista 2010 organized by Microsoft Research, India, Jan 2010

## Funding

- Co-PI: Smart Targeting and Optimization for the Mitigation and Prevention of Influenza (STOMP-flu). Center for Disease Control and Prevention (CDC) (\$454,427, 2019-2020)
- Co-PI: Network-based Mobility Modeling for Complex Humanitarian Emergencies. Global Infectious Diseases Institute, University of Virginia (\$98,750, 2019-2020)
- Co-PI: AccuWeather License to Use, Market and Resell 4-Week Influenza Forecast. AccuWeather (\$55,000, 2018-2019)
- Co-PI: Assessment of Invasive Alien Species Distribution in the Chitwan-Annapurna-Landscape (CHAL) Region, Nepal. United States Agency for International Development (USAID) (\$135,458, 2018-2019)
- Postdoc/key personnel: A High-resolution Interaction Based Approach to Modeling the Spread of Agricultural Invasive Species. United States Agency for International Development (USAID) (\$1,000,000, 2015-2019)

## Press Coverage

- *“UVA Researchers Harnessing Big Data’s Power to Fight the Flu”*, UVA Today, October 25th, 2019.
- *“Modelling epidemics: the maths behind disease outbreaks”*, Elsevier, February 2019
- *“Researchers at Virginia Tech’s Biocomplexity Institute work to forecast flu - like weather”*, Collegiate Times, Feb 19, 2018.
- *“Virginia Tech flu forecasting technology to be used by AccuWeather”*, WSL10, Dec 6, 2017.
- *“Virginia Tech researchers develop computer model to predict Zika movement”*, WSET, June 21st 2016

## Responsibilities

- TPC Member: COMSNETS 2015, COMSNETS 2016, COMSNETS 2018 Graduate Forum
- Reviewer: IEEE TMC, IEEE TIT, Elsevier TCS, PLOS Currents: Outbreaks, Springer Artificial Intelligence Review, Epidemiology and Infection, Health Security, Elsevier Ecological Modeling, Simulation Modeling Practice & Theory
- Local Organizing Committee, ICTS School and Workshop on Network Science in EECS, IISc. Bangalore, 2012

## Mentoring

### Graduate students

- Akhil Peddireddy (Fall 2019) - Real-time database for multi-modal spatiotemporal influenza surveillance

### Undergrad interns

- Andrew Murphy (Summer 2019) - Hierarchical seasonal autoregressive models for influenza forecasting
- Ethan Ludwick (Summer 2018) - Machine learning and satellite imagery to map *C. odorata* in Nepal
- Kingsley Nwosu Jr. (Summer 2017) - Computational Methods for Stockpile Allocation during Epidemics
- Asia Taylor (Summer 2017) - Assessing the resolution of Influenza surveillance datasets in the US

## Miscellaneous Achievements

- Best Poster Award at the UNC Going Viral Symposium, Chapel Hill, NC, Apr 2018
- Runner up - BDMM2017 Hackathon, co-held with IEEE BigData 2017, Boston, MA, Dec 2017
- Among top three teams in NIH/NSF RAPIDD Ebola Forecasting Challenge, Sep-Dec 2015
- Best Presentation Award at the SCINSE’14 workshop co-held with COMSNETS 2014
- 6th out of 225 teams - Event Recommendation Challenge organized by Kaggle.com, Feb 2013
- 4th place NTL Robot Challenge, organized by NASA Tournament Lab and Topcoder, Jun 2012