Qian Zhang

Contacts

Email: zhangqian.rach@gmail.com
Address: 360 Huntington Ave. 1010-177, Boston, MA, 02115, USA
Web: www.zhangqianrach.org

Education

PhD Computer Science   May 2014
Northeastern University, Boston, MA, USA
Doctoral student, Informatics   January 2009 – August 2011
Indiana University, Bloomington, IN, USA
  Dissertation: "Contagion and ranking processes in complex networks: the role of geography and interaction strength" [Full Text]

  Advisor: Prof. Alessandro Vespignani

MSc. Computer Science   December 2008
University of Saskatchewan, Saskatoon, SK, Canada
  Thesis: "Application and Evaluation of Local and Global Analysis for Dynamic Models of Infectious Disease Spread" [Full Text]

  Advisor: Prof. Nathaniel D. Osgood

Doctoral student, Pattern Recognition & Intelligent Systems   Sep. 2004 – Dec. 2006
Beihang University, Beijing, China

BEng. Computer Science and Technology   July 2004
Taiyuan University of Technology, Shanxi, China

Research Interests

My long-term interest is to understand, model and predict the dynamics and emerging global properties of human behaviors on social and biological systems. More specifically, my research focuses on data mining of language and conversations on online social platforms, (mis)information spreading on online social networks, knowledge diffusion and scientific collaborations, contagion models and adaptive behavior, modeling and predicting communicable infectious disease epidemics/pandemics.

Professional Experiences

Associate Research Scientist   01/01/2017 - present
Part-time Faculty   01/01/2016 - present
Postdoctoral Research Associate   05/03/2014 - 12/31/2016
Network Science Institute, College of Science, Northeastern University

Software Development Intern   May 2009 - July 2009
SinoSoft Technology Company Ltd. Beijing, China

Computer Skills

Programming/Scripting Languages:
    Extensive use of C/C++ for scientific computation and simulation
    Extensive use of Python for data analysis, visualization, data mining
    Experiences with Julia, Java, Scheme, Visual Basic, Perl, PHP and Lua

Web: Python full-stack web development; Interactive web development with JavaScript, HTML, XML
Database: Experiences with MySQL, Oracle 9i, MongoDB
Math/Stats Languages: R, MATLAB, Mathematica, Maple; Some use of Scilab, SPSS

Cloud Computing: AWS EC2, S3; GCP Compute Engine, Storage, BigQuery
Modeling: AnyLogic, Vensim
Big Data: MapReduce, Apache Hadoop and Pig
Operating Systems: Advanced Linux user

Publications

Book Chapter

1. A. Pastore-Piontti, **Q. Zhang**, M. FC Gomes, L. Rossi, C. Poletto, V. Colizza, D. L. Chao, I. M. Longini, M. E. Halloran, A. Vespignani. *Real-Time Assessment of the International Spreading Risk Associated with the 2014 West African Ebola Outbreak.* In Mathematical and Statistical Modeling for Emerging and Re-emerging Infectious Diseases, G. Chowell, J. M. Hyman (editors), pp39-56, 2016, Springer

Journal Articles

1. Q-H. Liu, F-M Lü, **Q. Zhang**, M. Tang, T. Zhou. *Impacts of opinion leaders on social contagions.* Chaos. 28, 053103 (2018). [LINK]

2. M. Biggerstaff, M. Johansson, D. Alper, L.C. Brooks, P. Chakraborty, D.C. Farrow, S. Hyun, S. Kandula, C. McGowan, N. Ramakrishnan, R. Rosenfeld, J. Shaman, R. Tibshirani, R. J. Tibshirani, A. Vespignani, W. Yang, **Q. Zhang**, C. Reed. Results from the second year of a collaborative effort to forecast influenza seasons in the United States. Epidemics (2018). In press. [LINK]

3. J.S., Brownstein, S. Chu, A. Marathe, M.V. Marathe, A.T. Nguyen, D. Paolotti, N. Perra, D. Perrotta, M. Santillana, S. Swarup, M. Tizzoni, A. Vespignani, A.K.S. Vullikanti, M.L. Wilson, **Q. Zhang**. *Combining Participatory Influenza Surveillance with Modeling and Forecasting*, JMIR Public Health Surveillance, 2017;3(4):e83 [LINK] (Authors ordered alphabetically)

4. M. Ajelli, **Q. Zhang**, K. Sun, S. Merler, L. Fumanelli, G. Chowell, L. Simonsen, C. Viboud, A. Vespignani. *The RAPIDD Ebola forecasting challenge: Model description and synthetic data generation.* Epidemics. Volume 22, March 2018, Pages 3-12. (2017) [LINK]

5. C. Viboud, K. Sun, R. Gaffey, M. Ajelli, L. Fumanelli, S. Merler, **Q. Zhang**, G. Chowell, L. Simonsen, A. Vespignani. *The RAPIDD Ebola Forecasting Challenge: Synthesis and Lessons Learnt.* Epidemics, Volume 22, March 2018, Pages 13-21. (2017). [LINK]

6. **Q. Zhang**, K. Sun, M. Chinazzi, A. Pastore-Piontti, N. E. Dean, D. P. Rojas, S. Merler, D. Mistry, P. Poletti, L. Rossi, M. Bray, M. E. Halloran, I. M. Longini, A. Vespignani. *Spreading of Zika virus in the Americas.* Proceedings of the National Academy of Sciences (2017), 114(22) E4334-E4343. [LINK]

7. D. Mistry, **Q. Zhang**, N. Perra, A. Baronchelli, *Committed activists and the reshaping of status-quo social consensus*, Phys. Rev. E. 92, 042805, 2015. [LINK]

8. P. Schumm, C. Scoglio, **Q. Zhang**, D. Balcan. *Global epidemic invasion thresholds in directed subpopulation networks having source, sink, and transit nodes*, Journal of Theoretical Biology 367, 203-221, 2015

9. A. Bessi, A. Scala, L. Rossi, **Q. Zhang**, W. Quattrociocchi, *The economy of attention in the age of (mis)information.* Journal of Trust Management 2014, 1:12. [LINK]

10. D. Mocanu, L. Rossi, **Q. Zhang**, M. Karsai, W. Quattrociocchi, *Collective attention in the age of (mis)information*, Computer and Human Behavior, 51 Part B, 1198-1204, 2015 [arXiv]

11. D. Mocanu, A. Baronchelli, N. Perra, B. Goncalves, **Q. Zhang**, A. Vespignani, *The Twitter of Babel: Mapping World Languages through Microblogging Platforms*, PLoS ONE 8, e61981 April 2013 [LINK]

12. **Q. Zhang**, N. Perra, B. Goncalves, F. Ciulla, A. Vespignani, *Characterizing scientific production and consumption in Physics*, Nature Scientific Reports 3, 1640 April 2013 [LINK]

13. D. Vickers, **Q. Zhang** and N. Osgood, *Immunobiological Outcomes of Repeated Chlamydial Infection from Two Models of Within-Host Population Dynamics*. PLoS ONE 4(9): e6886. September 2009. [LINK]

14. **Q. Zhang**, Y. Zhang and S. Qin, *Modeling and Analysis for Obstacle Avoidance of a Behavior-Based Robot with Objected Oriented Methods*. Journal of Computers. Volume 4 (4), April 2009 [PDF]

Peer-reviewed Conference Proceedings

1. **Q. Zhang**, N. Perra, D. Perrotta, D. Paolotti, M. Tizzoni, A. Vespignani, *Forecasting seasonal influenza fusing digital indicators and mechanistic disease models*, The Proceedings of the 26th International Conference on World Wide Web (WWW 2017), April 2017, Perth, Australia [PDF][**Best Paper Honorable Mention**]

2. M. Del Vicario, **Q. Zhang**, A. Bessi, F. Zollo, A. Scala, G. Caldarelli, W. Quattrociocchi, *Interaction Patterns of Occupy Movement on Facebook*, The Proceedings of the 5th International Workshop on Complex Networks and their Applications, Milan, December 2016. [LINK]

3. **Q. Zhang**, B. Goncalves, *Topical differences between Chinese language Twitter and Sina Weibo*, The Proceedings of the 25th International Conference Companion on World Wide Web, Montreal, April 2016.

4. **Q. Zhang**, C. Gioannini, D. Paolotti, N. Perra, D. Perrotta, M. Quaggiotto, M. Tizzoni, A. Vespignani, *Social data mining and seasonal influenza forecasts: the FluOutlook platform*. The Proceedings of European Conference on Machine Learning and Principles and Practices of Knowledge Discovery in Databases (ECML-PKDD 2015), LNCS, Porto, Portugal, September 2015.

5. **Q. Zhang** and N. Osgood, *Summary Function Elasticity Analysis for an Individual-based System Dynamics Model*, The Proceedings of 2010 Winter Simulation Conference. December 2010, Baltimore, MD

6. **Q. Zhang** and N. Osgood, *Local Analysis of Individual-based Dynamic Models with Eigenvalue Elasticity*, The Proceedings of the 27th International Conference of the System Dynamics Society, 2009, Albuquerque [PDF]

7. **Q. Zhang**, Y. Zhang and S. Qin: *The Object Oriented Analysis and Modeling for Obstacle Avoidance of a Behavior-Based Robot*. The Proceedings of IEEE Conference on System, Man and Cybernetics. October 2007, Montreal

8. T. Gong, **Q. Zhang** and H. Wu, *Music Evolution in a Complex System of Interacting Agents*. The Proceedings of IEEE Congress on Evolutionary Computation 2005. September, 2005 Edinburgh

Working papers & Preprints

1. Q-H Liu, X. Xiong, **Q. Zhang**, N. Perra. *Epidemic spreading on time-varying multiplex networks* arXiv:1808.03782 August 11, 2018

2. K. Sun, **Q. Zhang**, A. Pastore-Piontti, M. Chinazzi, D. Mistry, N. E. Dean, D. P. Rojas, S. Merler, P. Poletti, L. Rossi, M. E. Halloran, I. M. Longini, A. Vespignani. *Quantifying the risk of local Zika virus transmission in the continental US during the 2015-2016 ZIKV epidemic*. bioRxiv 298315 April 11, 2018

3. **Q. Zhang**, M. Karsai, A. Vespignani. *Link transmission centrality in large-scale social networks*, under review. arXiv:1802.05337 Feb. 14, 2018

4. J. Asher, C., G. Chen, D. Cummings, M. Chinazzi, S. Daniel-Wayman, M. Fischer, N. Ferguson, D. Follman, M E. Halloran, M. Johansson, K. Kugeler, J. Kwan, J. Lessler, I. M Longini, S. Merler, A. Monaghan, A. Pastore y Piontti, A. Perkins, D R. Prevots, R. Reiner, L. Rossi, I. Rodriguez-Barraquer, A. S Siraj, K. Sun, A. Vespignani, **Q. Zhang**. *Preliminary results of models to predict areas in the Americas with increased likelihood of Zika virus transmission in 2017*. Sep. 18, 2017 [bioRxiv 187591] (Authors ordered alphabetically)

5. **Q. Zhang**, D. Balcan, A. Vespignani, *Phase transition in rumor spread on complex contact networks*, under final internal revision.

Media Coverage	*Seasonal Influenza Forecasting with Twitter*: CNN, NBC News, Northeastern University News, Digital Trends *Projecting spread of Zika virus*: The Altantic, New Scientist, Homeland Security News Wire, Boston NPR News Station, The Conversation, Health Data Management, Biomedical Computation Review *Fluoutlook:* La Stampa, Panorama, ildenaro.it, The Boston Globe *Characterizing scientific production and consumption in Physics:* Wired, The Atlantic, El Definido *Collective attention in the age of (mis)information:* MIT tech. review, Slate, The Daily Dot, Liberty Voice, The Atlantic, Wired IT, Wired UK, La Stampa, PBS *Seasonal influenza forecasting in Italy:* Wired IT

Teaching & Mentor Experiences	*Lecturer* *PHYS 7332: Network Science Data II* Network Science PhD Program, Northeastern University	Spring 2018
	Lecturer *PHYS 7331: Network Science Data* Network Science PhD Program, Northeastern University	Spring 2016, 2017, Fall 2017, Fall 2018
	Guest Lecturer *PHYS 7335: Dynamical Processes in Complex Networks* (Teaching Network Science Boot camp)	September 2016
	Guest Lecturer *PHYS 7331: Network Science Data* (Teaching web data mining) Network Science PhD Program, Northeastern University	March 2015
	Guest Lecturer *PHYS 1125: Introduction to Network Science* (Teaching network visualization) Department of Physics, Northeastern University	March 2015
	Mentor Mentoring an undergraduate thesis (Xinzi Sun, MSc 2016 in UMass Lowell) in Beijing Information Science & Technology University. Thesis title "Spatial and temporal analysis of user behaviors in Weibo Microblogging platform".	February 2014 - June 2014
	Mentor *I399 Research Methods for Informatics and Computing* (Mentored students won the first prize in Undergrads Research of Computing Poster Competition) School of Informatics and Computing, Indiana University Bloomington	January 2011 - May 2011
	Associate Instructor *I201 Mathematical Foundations of Informatics (Discrete Mathematics)* School of Informatics and Computing, Indiana University Bloomington	January 2009 - May 2010

Tutorial Leader		September 2007 - April 2008
CMPT 116 Computing I & II (for Engineers) (C++ in Linux)		
Department of Computer Science, University of Saskatchewan		

Tutorial Assistant   January 2007 - April 2007
CMPT 111 Introduction to Computer Science and Programming (C++ in Linux)
Department of Computer Science, University of Saskatchewan

Scientific visits	ISI Foundation, Torino, Italy	May - June 2015
	HRL Lab, Malibu, CA	May 2013
	ISI Foundation, Torino, Italy	June - July 2012
	Summer Institute in Statistics and Modeling in Infectious Diseases (SISMID), University of Washington, Seattle, WA	June 2011
	ISI Foundation, Torino, Italy	July 2010
	Santa Fe Complex Systems Summer School, Qingdao University, China	July 2004

Academic Service   **Reviewer**

Multidisciplinary journals: PNAS, Nature Scientific Reports, PLOS ONE, Royal Society Open Science, Nature Scientific Data

Physics: Applied Physics Letter, Chaos, EPJ B, International Journal of Modern Physics

Computer science and data science: Neurocomputing, EPJ Data Science, International Journal of Data Science and Analytics , ACM SIGCHI 2016, 2018, WWW 2018

Complex and social network: Applied Network Science, IEEE Transactions on Network Science and Engineering, Network Science, Social Networks

Public health and computational biology: American Journal of Epidemiology, BMC Infectious Disease, BMC Medicine, Environment Systems and Decisions, Epidemics, Frontier Public Health, PeerJ, PLOS Computational Biology, PLOS Neglected Tropical Diseases, Theoretical Biology and Medical Modelling

Program Committee
IEEE Conference on Big Data Computing Service and Applications (BigData Service) 2015, 2016, 2017, 2018
4th Workshop on Computational Approaches to Social Modeling (ChASM), 2016
International Conference on Complex Networks (CompleNet), 2017, 2018
ACM Digital Health 2017, 2018
WWW 2018
NetSciX 2018

Honors & Awards
- Best Paper Honorable Mention. WWW 2017, April 5, 2017

- Fellowship for graduate students, University of Saskatchewan, 2007/2008

- Xi-Fei Fellowship for outstanding graduate students, Beihang University, 2005

- 2005 Scientific Computation Software SCILAB Contest, the third prize, 2005

- Foxconn Fellowship for outstanding students at Taiyuan University of Technology, 2003

- Outstanding Undergraduate of Taiyuan University of Technology, 2004

- The First Grade Scholarship & Merit Award, Taiyuan University of Technology, 2000-2003

- The First Prize, China National College Mathematical Contest in Modeling, 2002

Talks

- *The Geography of Scientific Collaborations*, NetSci2017, Indianapolis, IN, June 2017

- *Modeling and Predicting the Spread of Diseases in the Big-Data Era*, Department of Mathematics and Computer Science, Clarkson University, Potsdam, NY, Nov. 30, 2016 (Invited talk)

- *Modeling and Predicting the Spread of Diseases in the Big-Data Era*, IEEE International Workshop on Complex Systems and Networks, Atlanta, GA, Nov. 14, 2016 (Invited talk)

- *Forecasting seasonal influenza with dynamical models assimilating digital social data*, Seasonal Influenza Forecasting Workshop, CDC, Atlanta, GA, August 31, 2016 (Invited talk)

- *Forecasting seasonal influenza with dynamical models assimilating digital social data*, Epidemics 5, Clearwater Beach, FL, December 2015

- *Social data mining and seasonal influenza forecasts: the FluOutlook platform*, ECML-PKDD 2015, Porto, Portugal, September 2015

- *Forecasting seasonal influenza with dynamical models assimilating digital social data*, Conference on Complex Systems (CCS) 2015, Tempe, AZ, September 2015

- *Forecasting seasonal influenza with dynamical models assimilating digital social data*, NetSci2015, Zaragoza, Spain, June 2015

- *Forecasting seasonal influenza with dynamical models assimilating digital social data*, The 3rd International Conference on Digital Disease Detection (DDD3), Florence, Italy, May 2015

- *The Global Epidemics and Mobility Model*, Links 2013, MIT Media Lab, July 2013 (Invited talk)

- *Characterizing scientific production and consumption in Physics*, APS March Meeting, Baltimore, MD, April 2013

- *Characterizing scientific production and consumption in Physics*, Connect1ons 2012, MIT Media Lab, December 2012

- *Summary Function Elasticity Analysis for an Individual-based System Dynamics Model*, 2010 Winter Simulation Conference, Baltimore, MD, December 2010 (Invited talk)

- *Local Analysis of Individual-based Viral Dynamic Models with Eigenvalue Elasticity*, The 27th International Conference of the System Dynamics Society. July 2009, Albuquerque, NM

- *Discovering Hidden Patterns of Canadian Community Health Survey Data*, Graduate Students Symposium, Department of Computer Science, University of Saskatchewan, April 2008

- *The object oriented analysis and modeling for obstacle avoidance of a behavior-based robot*, 2007 IEEE International Conference on System, Man and Cybernetics, October 2007, Montreal, Canada

- *A Fuzzy Control Based Obstacles Avoidance Strategy with SCILAB for a Mobile Robot*. 2005 International Workshop on SCILAB and Open Source Software Engineering. October 2005. Wuhan, China