Sen **Pei**

Assistant Professor
Department of Environmental Health Sciences
Mailman School of Public Health
Columbia University
New York, NY 10032 USA

sp3449@cumc.columbia.edu www.columbia.edu/~sp3449/

Research Interest

I study transmission dynamics of infectious diseases. Within this broad topic, I develop mathematical models and computational tools to advance surveillance, forecasting, and control of both seasonal and emerging infectious agents. Using dynamical and statistical modeling techniques, I work to better understand the environmental, social, and ecological drivers of disease transmission. My recent studies focus on the spatial spread of influenza, dengue, and COVID-19, as well as the transmission of antimicrobial-resistant pathogens in healthcare systems.

Academic Appointments

Assistant Professor *New York City, USA*
Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University *Aug 2021 – present*

Associate Research Scientist *New York City, USA*
Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University *Dec 2018 – Jul 2021*
- Research: Data-driven statistical inference and forecast of infectious disease outbreaks

Post-doctoral Research Scientist *New York City, USA*
Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University *Dec 2015 – Nov 2018*
- Research: Mathematical modeling and real-time forecast of infectious disease spread
- Advisor: Prof. Jeffrey Shaman

Education

Ph.D. in Mathematics *Beijing, China*
School of Mathematics and Systems Science, Beihang University *Sep 2010 - July 2015*
- Research: Dynamical modeling and empirical study of spreading processes in networks
- Advisor: Prof. Zhiming Zheng

Visiting Ph.D. Student *New York City, USA*
Levich Institute and Physics Department, City College of New York *Sep 2012 - Dec 2013*
- Research: Searching for superspreaders in spreading dynamics
- Advisor: Prof. Hernán A Makse

B.S. in Mathematics *Beijing, China*
School of Mathematics and Systems Science, Beihang University *Sep 2006 - Jun 2010*
- Research: One-dimensional chaotic dynamical systems

Publication

Peer Reviewed Journal

2021

Pei, S., Yamana, T., Kandula, S., Galanti, M. & Shaman, J. "Burden and characteristics of COVID-19 in the United States during 2020". *Nature* In Press (2021).

Pei, S., Liljeros, F. & Shaman, J. "Identifying asymptomatic spreaders of antimicrobial resistant pathogens in hospital settings". *Proceedings of the National Academy of Sciences of the United States of America* In Press (2021).

Ma, Y., **Pei, S.**, Shaman, J., Dubrow, R. & Chen, K. "Role of meteorological factors in the transmission of SARS-CoV-2 in the United States". *Nature Communications* 12, 3602 (2021).

Zebrowski, A., Rundle, A., **Pei, S.**, Yaman, T., Yang, W., Carr, B.G., Sims, S., Doorley, R., Schluger, N., Shaman, J. & Branas, C. "A spatiotemporal tool to project hospital critical care capacity and mortality from COVID-19 in US counties". *American Journal of Public Health* 111, 1113-1122 (2021).

Teng, X., **Pei, S.** & Lin, Y. "StoCast: Stochastic Disease Forecasting with Progression Uncertainty". *IEEE Journal of Biomedical and Health Informatics* 25, 850-861 (2021).

Galanti, M., **Pei, S.**, Yamana, T.K., Angulo, F.J., Charos, A., Swerdlow, D.L. & Shaman, J. "Social distancing remains key during vaccinations". *Science* 371, 473-474 (2021).

Pei, S., Teng, X., Lewis, P. & Shaman, J. "Optimizing respiratory virus surveillance networks using uncertainty propagation". *Nature Communications* 12, 222 (2021).

Xu, X.-K.*, Wang, L.*, & **Pei, S.*** "Multiscale mobility explains differential associations between the gross domestic product and COVID-19 transmission in Chinese cities". *Journal of Travel Medicine* 28, taaa236 (2021). (* Equal contribution)

2020

Pei, S.*, Dahl, K.A.*, Yamana, T., Licker, R. & Shaman, J. "Compound risks of hurricane evacuation amid the COVID-19 pandemic in the United States". *GeoHealth* 4, e2020GH000319 (2020). (* Equal contribution)

Pei, S., Kandula, S. & Shaman, J. "Differential effects of intervention timing on COVID-19 spread in the United States". *Science Advances* 6, eabd6370 (2020).

Bomfim, R, **Pei, S.**, Shaman, J., Yamana, T., Makse, H.A., Andrade Jr., J.S., Lima Neto, A.S. & Furtado, V. "Predicting dengue outbreaks at neighborhood level using human mobility in urban areas". *Journal of the Royal Society Interface* 17, 20200691 (2020).

Pei, S. & Shaman, J. "Aggregating forecasts of multiple respiratory pathogens supports more accurate forecasting of influenza-like illness". *PLoS Computational Biology* 16, e1008301 (2020).

Kramer, S.C., **Pei, S.** & Shaman, J. "Forecasting influenza in Europe using a meta population model incorporating cross-border commuting and air travel". *PLoS Computational Biology* 16, e1008233 (2020).

Zhou, B.*, **Pei, S.***, Muchnik, L., Meng, X., Xu, X., Sela, A., Havlin, S. & Stanley, H.E. "Realistic modelling of information spread using peer-to-peer diffusion patterns". *Nature Human Behaviour* 4, 1198–1207 (2020). (* Equal contribution)

Pei, S.*, Wang, J.*, Morone, F. & Makse, H. A. "Influencer identification in dynamical complex systems". *Journal of Complex Networks* 8, cnz029 (2020). (* Equal contribution)

Li, R.*, **Pei, S.***, Chen, B.*, Song, Y., Zhang, T., Yang, W. & Shaman, J. "Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV2)". *Science* 368, 489-493 (2020). (* Equal contribution).

Zhang, R., Quan, G., Wang, J. & **Pei, S.** "Backtracking activation impacts the criticality of excitable networks". *New Journal of Physics* 22, 013038 (2020).

2019

Sy, K. T., Shaman, J., Kandula, S., **Pei, S.**, Gould, M. & Keyes, K. M. "Spatiotemporal Clustering of Suicide Deaths from 1999 to 2016: A Spatial Epidemiological Approach". *Social Psychiatry and Psychiatric Epidemiology* 54, 1471–1482 (2019).

Kandula, S., **Pei, S.** & Shaman, J. "Improved forecasts of influenza hospitalization rates with Google search trends". *Journal of the Royal Society Interface* 16, 20190080 (2019).

Pei, S., Cane, M. A. & Shaman, J. "Predictability in process-based ensemble forecast of influenza". *PLoS Computational Biology* 15, e1006783 (2019).

Wang, J., Zhang, R., Wei, W., **Pei, S.** & Zheng, Z. "On the stability of multilayer Boolean networks under targeted immunization". *Chaos: An Interdisciplinary Journal of Nonlinear Science* 29, 013133 (2019).

2018

Pei, S., Morone, F., Liljeros, F., Makse, H. A. & Shaman, J. "Inference and control of the nosocomial transmission of Methicillin-resistant Staphylococcus aureus". *eLife* 7, e40977 (2018).

Pei, S., Kandula, S., Yang, W. & Shaman, J. "Forecasting the spatial transmission of influenza in the United States". *Proceedings of the National Academy of Sciences of the United States of America* 115, 2752-2757 (2018).

Fu, C., Dong, Z., Shen, J., Yang, Z., Liao, Y., Hu, W., **Pei, S.** & Shaman, J. "Rotavirus gastroenteritis infection among children vaccinated and unvaccinated with rotavirus vaccine in southern China: A population-based assessment". *JAMA Network Open* 1, e181382 (2018).

Kandula, S., Yamana, T., **Pei, S.**, Yang, W., Morita, H. & Shaman, J. "Evaluation of mechanistic and statistical methods in forecasting influenza-like illness". *Journal of the Royal Society Interface* 15, 20180174 (2018).

Wang, J., **Pei, S.**, Wei, W., Feng, X. & Zheng, Z. "Optimal stabilization of Boolean networks through collective influence". *Physical Review E: Statistical, Nonlinear, Biological, and Soft Matter Physics* 97, 032305 (2018).

Zhang, R. & **Pei, S.** "Dynamic range maximization in excitable networks". *Chaos: An Interdisciplinary Journal of Nonlinear Science* 28, 013103 (2018).

2017

Pei, S. & Shaman, J. "Counteracting structural errors in ensemble forecast of influenza outbreaks". *Nature Communications* 8, 925 (2017).

Wang, X., Li, W., Liu, L., **Pei, S.**, Tang, S. & Zheng, Z. "Promoting information diffusion through interlayer recovery processes in multiplex networks". *Physical Review E: Statistical, Nonlinear, Biological, and Soft Matter Physics* 96, 032304 (2017).

Fu, C., Shen, J., Lu, L., Li, Y., Cao, Y., Wang, M., **Pei, S.**, Yang, Z., Guo, Q. & Shaman, J. "Pre-Vaccination Evolution of Antibodies among Infants 0, 3 and 6 Months of Age: a Longitudinal Analysis of Measles, Enterovirus 71 and Coxsackievirus 16". *Vaccine* 35(31), 3817-3822 (2017).

Pei, S., Teng, X., Shaman, J., Morone, F. & Makse, H. A. "Efficient collective influence maximization in cascading processes with first-order transitions". *Scientific Reports* 7, 45240 (2017).

2016

Teng, X., **Pei, S.**, Morone, F. & Makse, H. A. "Collective influence of multiple spreaders evaluated by tracing real information flow in large-scale social networks". *Scientific Reports* 6, 36043 (2016).

2015

Jiang, S., Tang, S., **Pei, S.**, Fang, W. & Zheng, Z. "Low dimensional behavior of explosive synchronization on star graph". *Journal of Statistical Mechanics: Theory and Experiment* 2015(10), P10007 (2015).

Yan, S., Tang, S., Fang, W., **Pei, S.** & Zheng, Z. "Global and local targeted immunization in networks with community structure". *Journal of Statistical Mechanics: Theory and Experiment* 015(8), P08010 (2015).

Pei, S., Muchnik, L., Tang, S., Zheng, Z. & Makse, H. A. "Exploring the complex pattern of information spreading in online blog communities". *PLoS ONE* 10, e0126894 (2015).

Pei, S., Tang, S. & Zheng, Z. "Detecting the influence of spreading in social networks with excitable sensor networks". *PLoS ONE* 10, e0124848 (2015).

Tang, S., Teng, X., **Pei, S.**, Yan, S. & Zheng, Z. "Identification of highly susceptible individuals in complex networks". *Physica A: Statistical Mechanics and its Applications* 432, 363-372 (2015).

Zhang, Y., Tang, S., **Pei, S.**, Yan, S., Jiang, S. & Zheng, Z. "Health behavior spreading with similar diminishing returns effect". *Physica A: Statistical Mechanics and its Applications* 425, 18-26 (2015).

2014

Zhang, R., **Pei, S.**, Wei, W. & Zheng, Z. "Evolution of autocatalytic sets in a competitive percolation model". *Journal of Statistical Mechanics: Theory and Experiment* 2014(11), P11018 (2014).

Yan, S., Tang, S., **Pei, S.**, Jiang, S. & Zheng, Z. "Dynamical immunization strategy for seasonal epidemics". *Physical Review E: Statistical, Nonlinear, Biological, and Soft Matter Physics* 90, 022808 (2014).

Pei, S., Muchnik, L., Andrade Jr, J. S., Zheng, Z. & Makse, H. A. "Searching for superspreaders of information in real-world social media". *Scientific Reports* 4, 5547 (2014).

Teng, X., Yan, S., Tang, S., **Pei, S.**, Li, W. & Zheng, Z. "Individual behavior and social wealth in the spatial public goods game". *Physica A: Statistical Mechanics and its Applications* 402, 141-149 (2014).

Li, W., Tang, S., **Pei, S.**, Yan, S., Jiang, S., Teng, X. & Zheng, Z. "The rumor diffusion process with emerging independent spreaders in complex networks". *Physica A: Statistical Mechanics and its Applications* 397, 121-128 (2014).

2013

Pei, S. & Makse, H. A. "Spreading dynamics in complex networks". *Journal of Statistical Mechanics: Theory and Experiment* 2013(12), P12002 (2013).

Muchnik, L.*, **Pei, S.***, Parra, L. C.*, Reis, S. D., Andrade Jr, J. S., Havlin, S. & Makse, H. A. "Origins of power-law degree distribution in the heterogeneity of human activity in social networks". *Scientific Reports* 3, 1783 (2013). (* Equal contribution)

Yan, S., Tang, S., **Pei, S.**, Jiang, S., Zhang, X., Ding, W. & Zheng, Z. "The spreading of opposite opinions on online social networks with authoritative nodes". *Physica A: Statistical Mechanics and its Applications* 392, 3846-3855 (2013).

2012

Pei, S., Tang, S., Yan, S., Jiang, S., Zhang, X. & Zheng, Z. "How to enhance the dynamic range of excitatory-inhibitory excitable networks". *Physical Review E: Statistical, Nonlinear, Biological, and Soft Matter Physics* 86, 021909 (2012).

Pei, S., Tang, S., Zhang, X., Liu, Z. & Zheng, Z. "Effects of consumption strategy on wealth distribution on scale-free networks". *Physica A: Statistical Mechanics and its Applications* 391, 2023-2031 (2012).

2009

Pei, S., Sun, Y., Zhao, Z., Wang, H. & She, Z. "Topological Conditions on a Class of One-dimensional Chaotic Maps". *Mathematics in Practice and Theory* 19, 033 (2009). (In Chinese)

Report

Yamana, T., **Pei, S.**, Kandula, S. & Shaman, J. "Projection of COVID-19 Cases and Deaths in the US as Individual States Re-open May 4,2020". *medRxiv* doi:10.1101/2020.05.04.20090670 (2020).

Pei, S., Galanti, M., Yamana, T. & Shaman, J. "Reconciling Diverse Estimates of COVID-19 Infection Rates". (2020).

Pei, S. & Shaman, J. "Simulation of SARS-CoV2 Spread and Intervention Effects in the Continental US with Variable Contact Rates, March 24, 2020". (2020).

Pei, S. & Shaman, J. "Initial Simulation of SARS-CoV2 Spread and Intervention Effects in the Continental US". *medRxiv* doi:10.1101/2020.03.21.20040303 (2020).

Conference

Pei, S. & Zheng, Z. "The dynamics of a class of one-dimensional chaotic maps". *Proceedings of 15th WSEAS International Conference on Applied Mathematics, Athens, Greece* 122-127 (2010).

Book Chapter

Pei, S., Morone, F. & Makse, H. A. "Theories for influencer identification in complex networks". In *Complex Spreading Phenomena in Social Systems*, p.p. 125-148, edited by Sune Lehmann and Yong-Yeol Ahn (Springer Nature, 2018).

Book Review

Pei, S. "Review of Vaccines and Immunization by Chuanxi Fu (editor-in-chief)". *Human Vaccines & Immunotherapeutics* (2020). DOI: 10.1080/21645515.2020.1835337.

Grants

2020	U01 Supplement, Analysis and simulation of bacterial infections and resource strain in hospitals during the COVID-19 pandemic. MPI, 2020-2021	*Centers for Disease Control and Prevention*
2020	U01, Inference, forecasting and optimal control of healthcare-associated infections. MPI, 2020-2025	*Centers for Disease Control and Prevention*
2020	Calderone Junior Faculty Award, Identifying asymptomatic colonization with antibiotic-resistant pathogens in hospital settings, PI, 2019-2020	*Mailman School of Public Health*
2020	Columbia Public Health Innovation Fund, Integrating healthcare data and mathematical models to track antimicrobial resistant pathogens in hospitals, MPI, 2019-2020	*Mailman School of Public Health*
2014	Innovation Fund for Ph.D. Graduate, Spreading dynamics in complex networks, PI, 2014-2015	*Beihang University*

Awards

2021	Finalist of 2020 AAAS Newcomb Cleveland Prize (7 finalists from all disciplines)	*AAAS*
2020	Calderone Junior Faculty Award	*Mailman School of Public Health*
2019	First Prize in Scientific Achievement Category, Awards for Outstanding Research Articles in Biosurveillance	*International Society for Disease Surveillance*
2016	Outstanding Doctoral Thesis Award	*Beihang University*
2015	Ph.D. Graduate Excellence Awards (10 winners university-wide)	*Beihang University*
2014	National Ph.D. Scholarship	*Ministry of Education*
2009	Gold Medal Award for Undergraduate (10 winners university-wide)	*Beihang University*
2009	First Prize in “Challenge Cup” National Undergraduate Academic Competition	*Ministry of Education*

Academic Services

Editorial Activities

- Associate Editor: BMC Infectious Diseases, September 2019 – present
- Review Editor: Frontiers in Physics, June 2018 – present
- Guest Associate Editor: Frontiers, Research Topic: Mathematical modelling of the pandemic of 2019 novel coronavirus (COVID-19): Patterns, Dynamics, Prediction, and Control, 2020

Professional Membership

- Modeling Infectious Diseases in Healthcare Network (MInD - Healthcare), 2020 – present
- Models of Infectious Disease Agent Study (MIDAS), 2019 – present
- National Syndromic Surveillance Program Community of Practice (NSSP CoP), 2019 – present
- International Society for Disease Surveillance (ISDS), 2018 – 2019

Professional Activities

- FluSight real-time influenza forecasting challenges, CDC, 2016 – 2017, 2017 – 2018, 2018 – 2019, 2019 – 2020
- FluCode, Informing Pandemic Influenza Intervention Practice: Coordinated Modeling, CDC, 2019 – 2020
- Columbia projection of COVID-19 spread in the United States, 2020

Peer Review

Science, PNAS, Nature Communications, Nature Human Behaviour, PLoS Computational Biology, The Lancet Planetary Health, Nature Computational Science, Global Environmental Change, American Journal of Epidemiology, American Journal of Public Health, ACM Transactions on Computing for Healthcare, BMC Bioinformatics, BMC Infectious Diseases, BMJ Open, Chaos: An Interdisciplinary Journal of Nonlinear Science, Disaster Medicine and Public Health Preparedness, Entropy, Epidemics, Europhysics Letters, Frontiers in Physics, Health Affairs, Human Vaccines & Immunotherapeutics, Infectious Diseases of Poverty, International Journal for Uncertainty Quantification, International Journal of Environmental Research and Public Health, IEEE Access, IEEE Transactions on Cybernetics, IEEE Transactions on Control Systems Technology, IEEE Transactions on Network Science and Engineering, JAMA Network Open, Journal of Computational Science, Journal of Mathematical Biology, Journal of Statistical Mechanics: Theory and Experiments, Meteorological Applications, Mathematical Biosciences and Engineering, Physica A: Statistical Mechanics and its Applications, Physica D: Nonlinear Phenomena, Physics Letters A, PLoS ONE, Scientific Reports, Wellcome Open Research

Program Committee

- Program Committee Co-Chair, The 4th International workshop on Epidemiology meets Data Mining and Knowledge discovery (epiDAMIK 4.0), in conjunction with the 2021 ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (ACM SIGKDD 2021).
- The SI 2021 Workshop on Social Influence, The Hague, Netherlands, 8th November 2021, in conjunction with the 2021 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2021).
- The SI 2019 Workshop on Social Influence, Vancouver, Canada, 27th August 2019, in conjunction with the 2019 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2019).
- The SI 2018 Workshop on Social Influence, Barcelona, Spain, 28th August 2018, in conjunction with the 2018 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2018).
- The 3rd Workshop on Social Influence, Sydney, Australia, July 2017, in conjunction with the 2017 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2017).

Grant Review

- Secondary Data Analysis Projects, Health Research Board, Republic of Ireland, 2021
- Review Panel, MIDAS COVID-19 Modeling Urgent Grant Program – New Initiatives, 2020

Panels

- Core participant, NSF PRedicting Emergence Of Virulent Entities By Novel Technologies (PREVENT) Seminar, February 22-23, 2021 (online)

Public Outreach

Press inquiry and interview

- The New York Times, Wall Street Journal, NPR, Bloomberg News, BuzzFeed News, Chicago Tribune, WIRED, POLITICO, Slate, MIT Technology Review, ABC News, Scientific American, National Geographic, USA TODAY Network, Communications of the ACM, WebMD, FiveThirtyEigtht, ProPublica, Live Science, Milwaukee Journal Sentinel, Tufts Daily, The Times-Picayune, Breathe at Berkeley

Featured Media Coverage

- The New York Times, Lockdown Delays Cost at Least 36,000 Lives, Data Show. May 22, 2020.
- The New York Times, Coronavirus Could Overwhelm U.S. Without Urgent Action, Estimates Say. March 20, 2020.
- MIT Technology Review, The Emerging Science of Superspreaders (And How to Tell If You're One Of Them). May 13, 2014.

Invited Talks

2021 *Parameter inference and identification of asymptomatic carriers of antimicrobial-resistant pathogens in hospital settings.* University of California San Francisco MInD group meeting, July 8th 2021. (Online)

2021 *Parameter inference and identification of asymptomatic carriers of antimicrobial-resistant pathogens in hospital settings.* Transatlantic Taskforce on Antimicrobial Resistance (TATFAR) meeting, May 26th 2021. (Online)

2021 *Forecasting infectious disease spread.* School of Public Health, Zhejiang Chinese Medical University, China, April 22nd 2021. (Online)

2021 *Transmission dynamics of COVID-19 in China and the United States.* The Pathogen Dynamics Group Seminar Series, University of Cambridge, UK, March 12th 2021. (Online)

2021 *Advancing forecast, surveillance and control of infectious disease.* Department of Biology, University of Notre Dame, Indiana, USA, February 4th 2021. (Online)

2021 *Identifying asymptomatic spreaders of MRSA in hospital settings.* Modeling Infectious Diseases in Healthcare (MInD - Healthcare) Network meeting, January 25th 2021. (Online)

2020 *Advancing forecast, surveillance and control of infectious disease.* EHS Department Seminar, Columbia University, New York, USA, November 2nd 2020. (Online)

2020 *Forecasting COVID-19 spread in the US.* The CDC COVID-19 forecasting meeting, June 9th 2020. (Online)

2020 *Modeling and projecting COVID-19 transmission using geolocation data.* Geolocation Economics, Columbia University, New York, USA, May 4th 2020. (Online)

2020 *Modeling the transmission dynamics of COVID-19 in China and US.* Dalian University of Technology, Dalian, China, April 21st 2020. (Online)

2020 *Modeling the transmission dynamics of COVID-19 in China and US.* Renmin University of China, Beijing, China, March 30th 2020. (Online)

2019 *Utilizing big data to track outbreaks of antimicrobial resistant pathogens.* Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB) Public Meeting, McLean, Virginia, USA, July 10th 2019.

2019 *Inference and control of the nosocomial transmission of Methicillin-resistant Staphylococcus aureus.* SPHINx19: Spread of Pathogens in Healthcare Institutions and Networks: a modeling conference, Paris, France, June 24th 2019.

2019 *Forecasting the spatial transmission of influenza in the United States.* ISDS (International Society for Disease Surveillance) 2019 Annual Conference, presentation as the First Prize in Scientific Achievement Category, Awards for Outstanding Research Articles in Biosurveillance, San Diego, California, USA, January 31st 2019.

2017 *Forecast and inference of infectious disease spread using network models.* EHS Department Seminar, Columbia University, New York, USA, November 20th 2017.

2017 *Finding influential spreaders in cascading processes in complex networks.* Dalian University of Technology, Dalian, China, June 16th 2017.

2015 *Empirical studies on information spreading in online social networks.* Hangzhou Normal University, Hangzhou, China, July 6th 2015.

Conferences

2021 *Identifying asymptomatic spreaders of antimicrobial-resistant pathogens in hospital settings.* Networks 2021: A Joint Sunbelt and NetSci Conference, July 8th 2021. (Online)

2021 *Optimizing respiratory virus surveillance networks using uncertainty propagation.* SIAM Conference on Applied Linear Algebra (LA21), Latest Advances in Spectral Linear Algebra in Network Science, May 20th 2021. (Online)

2021 *Identifying asymptomatic carriers of antimicrobial-resistant pathogens in hospital settings.* 2021 MIDAS Network Annual Meeting, May 10th 2021. (Online)

2020 *Real-time projection of COVID-19 in the United States.* COVID-19 Dynamics & Evolution Conference, October 19th 2020. (Online)

2020 *Identifying asymptomatic colonization with antimicrobial-resistant pathogens in hospital settings.* New York City Epidemiology Forum, New York, NY, USA, February 28th 2020. (Poster Session)

2019 *Optimizing respiratory virus surveillance networks using uncertainty propagation.* Epidemics7 the seventh International Conference on Infectious Disease Dynamics, Charleston, SC, USA, December 5th 2019.

2019 *Forecasting influenza-like-illness by aggregating predictions for multiple respiratory pathogens.* Epidemics7 the seventh International Conference on Infectious Disease Dynamics, Charleston, SC, USA, December 5th 2019. (Poster Session)

2019 *Stochastic Progression Forecasting for Alzheimer's and Parkinson's Diseases.*, Modeling the World's Systems 2019, Washington DC, USA, May 12th 2019. (Poster Session)

2018 *Inference of the nosocomial transmission dynamics of Methicillin-resistant Staphylococcus aureus.* NIH-MIDAS (Models of Infectious Disease Agent Study) 2018 Annual Meeting, Washington DC, USA, April 4th 2018.

2017 *Forecasting the spatial spread of influenza in the United States.* Epidemics6 the sixth International Conference on Infectious Disease Dynamics, Sitges, Spain, November 29th 2017.

2017 *Forecasting the spatial transmission of influenza.* NIH-MIDAS (Models of Infectious Disease Agent Study) 2017 Annual Meeting, Atlanta, Georgia, USA, May 23rd 2017.

2016 *Improving influenza forecast by counteracting structural errors.* Joint Statistical Meeting 2016, Chicago, Illinois, USA, August 4th 2016.

2016 *Improving influenza forecast by counteracting structural errors.* NIH-MIDAS (Models of Infectious Disease Agent Study) 2016 Annual Meeting, Reston, Virginia, USA, May 23rd 2016. (Poster Session)

2014 *Searching for superspreaders of information in real-world social media.* 2014 International Conference of Mathematics, Information and Computational Science, Beijing, China, October 21st 2014.

2013 *Heterogeneity of human activity levels gives rise to power-law distribution in online social networks.* American Physical Society (APS) March Meeting, Baltimore, Maryland, USA, March 19th 2013.

2010 *The dynamics of a class of one-dimensional chaotic maps.* The 15th WSEAS International Conference on Applied Mathematics, Athens, Greece, December 31st 2010.

Teaching

2020 Lecturer – Modeling COVID-19: Fighting the COVID-19 Pandemic Using Mathematical Models (September 23rd 2020, online) — *Icahn School of Medicine at Mount Sinai*

2020 Instructor – Summer course: COVID-19 from Virus to Vaccine: Biological, Clinical, and Public Health Dimensions; Virtual Lab: tutorials on mathematical models. (August 25th 2020, online) — *Mailman School of Public Health*

2017 Lecturer – Inference of the nosocomial transmission of Methicillin-resistant Staphylococcus aureus (December 11th 2017) — *School of International and Public Affairs, Columbia University*

Mentoring

2020 Helen Zhang, MPH, Department of Epidemiology, Mailman School of Public Health. *Thesis project*.

2020 Yuchen Qi, MS, Department of Biostatistics, Mailman School of Public Health. *Control measures against COVID-19 reduce transmission of seasonal influenza in the United States*.

2018 Rafael Bomfim, PhD Candidate, Graduate Program in Applied Computing, University of Fortaleza, Brazil. *Predicting dengue outbreaks at neighborhood level using human mobility in urban areas*.