Wan Yang, Ph.D.

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CAREER

2018-present   Assistant Professor, Department of Epidemiology, Columbia University, New York, NY

2014-2018   Associate Research Scientist, Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University, New York, NY

2012-2014   Post-doctoral fellow, Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University, New York, NY

2009-2012   Graduate Research Assistant, Department of Civil and Environmental Engineering, Virginia Tech, Blacksburg, VA

Jan-May 2012   Graduate Teaching Assistant, Virginia Tech, Blacksburg, VA

Feb-July 2009   Research Assistant, Tsinghua University, Beijing, China

EDUCATION AND TRAINING

2012-2014   **Post-doc training in Infectious Disease Modeling and Forecasting, Columbia University**, New York, NY
Mentor: Dr. Jeffrey Shaman

2009-2012   **Ph.D. in Civil Engineering, Virginia Tech**, Blacksburg, VA
Thesis: Airborne transmission of influenza A virus in indoor environments
Advisor: Dr. Linsey Marr

2006-2009   **M.S. in Environmental Engineering, Tsinghua University**, Beijing, China
Thesis: Detection of rotavirus in environmental waters
Advisor: Dr. Miao He

2002-2006   **B.S. in Environmental Engineering & Computer Science (minor)
South China University of Technology**, Guangzhou, China

GRANTS, AWARDS, AND HONORS

2018   Career Development Award, The NIEHS Center for Environmental Health in Northern Manhattan, Mailman School of Public Health, Columbia University

2015   Dean's Initiative R01 Pilot Awards, Mailman School of Public Health, Columbia University (*Role: PI; total cost: $25,000; funding period: Nov 2015-Oct 2016*)

2014   Winner, Centers for Disease Control and Prevention Inaugural "Predict the Influenza Season Challenge" (Team Member)

2012   Tuition and Travel Scholarship: Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington

2009   PRATT Fellowship, Virginia Tech

2009   Excellent Thesis, Tsinghua University

2002-2005   Scholarship for Excellent Students, South China Univ. of Tech. (awarded three times)

TEACHING EXPERIENCE

Department of Epidemiology, Columbia University, New York, NY

- *Instructor.* P8477 Epi Modeling for Infectious Diseases, Spring 2016, 2017, 2018
- Introductory to intermediate level mathematical modeling methodologies for infectious diseases, with computer simulation exercises
- Graduate level, 3 credit course

Department of Environmental Health Sciences, Columbia University, New York, NY

- *Guest Lecturer.* P8301 Atmospheric and Climate Science for Public Health, Jeffrey Shaman instructor, Fall 2014 and Fall 2015
- Graduate level, 3 credit course offered to master's and doctoral students

Pasteur Institute-Ho Chi Minh City Training Center, Ho Chi Minh City, Vietnam

- *Faculty Member.* Epidemiology Course Series: Surveillance of Influenza-like Illness, November 2014
- Taught 25 trainees from government agencies, research institutes, universities in 10 Asian countries, the UK, and Italy.

Virginia Tech, Blacksburg, VA

- *Teaching Assistant.* CEE 4144 Air Resources Engineering, Spring 2012
- Graded homework and exams; held office hours

RESEARCH INTERESTS

Infectious disease modeling and forecasting; Infectious disease spatiotemporal transmission dynamics; Bayesian inference methodologies; Climate and environmental influences on disease transmission and underlying mechanisms

PUBLICATIONS

Peer-Reviewed Journal Articles:
*articles reported by the media (815 Google Scholar citations as of 3/1/18; h-index: 16; i10-index: 18. https://scholar.google.com/citations?user=xVRKg-8AAAAJ&hl=en)

1. Yang W, Cummings MJ, Bakamutumaho B, Kayiwa J, Owor N, Namagambo B, Byaruhanga T, Lutwama JJ, O'Donnell MR, and Shaman J. Dynamics of influenza in Tropical Africa: temperature, humidity, and co-circulating (sub)types. ***Influenza and Other Respiratory Viruses.*** 2018 Mar 23. doi: 10.1111/irv.12556. [Epub ahead of print]

2. *Yang W*, Cummings MJ, Bakamutumaho B, Kayiwa J, Owor N, Namagambo B, Byaruhanga T, Lutwama JJ, O'Donnell MR, and Shaman J. Transmission Dynamics of Influenza in Two Major Cities of Uganda. *Epidemics.* 2018. *https://doi.org/10.1016/j.epidem.2018.03.002*

3. Biggerstaff M, Johansson M, Alper D, Brooks L, Chakraborty P, Farrow D, Hyun S, Kandula S, McGowan C, Ramakrishnan N, Rosenfeld R, Shaman J, Tibshirani R, Tibshirani RJ, Vespignani A, Yang W, Zhang Q, Reed C. Results from the second year of a collaborative effort to forecast influenza seasons in the United States. *Epidemics.* 2018; Available online 24 February 2018. https://doi.org/10.1016/j.epidem.2018.02.003

4. 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.* 2018; published ahead of print February 26, 2018, https://doi.org/10.1073/pnas.1708856115

5. Cummings MJ, Bakamutumaho B, Yang W, Wamala JF, Kayiwa J, Owor N, Namagambo B, Byaruhanga T, Wolf A, Lutwama JJ, Shaman J, O'Donnell MR. Emergence, epidemiology, and transmission dynamics of 2009 pandemic A/H1N1 influenza in Kampala, Uganda, 2009-2015. *The American Journal of Tropical Medicine and Hygiene*. 2018;98(1):203-6.

6. Shaman J, Kandula S, Yang W, Karspeck A. The use of ambient humidity conditions to improve influenza forecast. *PLOS Computational Biology*. 2017;13(11):e1005844.

7. *Yang W, Wen L, Li S, Chen K, Zhang W, Shaman, J. Geospatial characteristics of measles transmission in China during 2005-2014. *PLoS Computational Biology* 2017;13(4): e1005474.

8. Kandula S, Yang W, Shaman J. Type- and subtype-specific influenza forecast. *American Journal of Epidemiology.* 2017; 185(5): 395-402.

9. *Yang W, Olson DR, Shaman J. Forecasting influenza outbreaks in boroughs and neighborhoods of New York City. *PLoS Computational Biology.* 2016;12(11): e1005201.

10. Nguyen J, Yang W, Ito K, Matte T, Shaman J, Kinney P. Seasonal influenza infections and cardiovascular disease mortality. *JAMA Cardiology*. 2016; 1(3): 274-281.

11. *Yang W, Zhang W, Kargbo D, Yang R, Chen Y, Chen Z, Kamara A, Kargbo B, Kandula S, Karspeck A, Liu C, Shaman J. Transmission network of the 2014-2015 Ebola epidemic in Sierra Leone. *Journal of the Royal Society Interface*. Published 11 November 2015. DOI: 10.1098/rsif.2015.0536.

12. *Yang W, Cowling BJ, Lau EHY, Shaman J. Forecasting influenza epidemics in Hong Kong. *PLoS Computational Biology* 2015; 11: e1004383.

13. *Yang W, Lipsitch M, Shaman J. Inference of seasonal and pandemic influenza transmission dynamics. *Proceedings of the National Academy of Sciences* 2015; 112: 2723 -2728.

14. Hong A, Schweitzer L, Yang W, Marr LC. The impact of temporary freeway closure on regional air quality: A lesson from Carmageddon in Los Angeles, United States. *Environmental Science & Technology* 2015; 49: 3211-3211.

15. Lofgren E, Halloran ME, Rivers CM, Drake JM, Porco TC, Lewis B, <u>Yang W</u>, Vespignani A, Shaman J, Eisenberg JNS, Eisenberg MC, Marathe M, Scarpino SV, Alexander KA, Meza R, Ferrari MJ, Hyman JM, Meyers LA, Eubank S. Opinion: Mathematical models: A key tool for outbreak response. ***Proceedings of the National Academy of Sciences*** 2014; 111: 18095-18096.

16. Shaman J, <u>Yang W</u>, Kandula S. Inference and forecast of the current West African Ebola outbreak in Guinea, Sierra Leone and Liberia. ***PLoS Currents Outbreaks***. 2014; DOI: 10.1371/currents.outbreaks.3408774290b1a0f2dd7cae877c8b8ff6.

17. ***<u>Yang W</u>, Shaman J. Does exposure to poultry and wild fowl confer immunity to H5N1? ***Chinese Medical Journal*** 2014; 127: 3335-3343.

18. ***<u>Yang W</u>,** Karspeck A, Shaman J. Comparison of filtering methods for the modeling and retrospective forecasting of influenza epidemics. ***PLoS Computational Biology*** 2014; 10: e1003583

19. ***<u>Yang W</u>, Petkova E, Shaman J. The 1918 influenza pandemic in New York City: age-specific timing, mortality, and transmission dynamics***. Influenza and Other Respiratory Viruses*** 2014; 8: 177-188.

20. Shaman J, Karspeck A, <u>Yang W</u>**,** Tamerius J, Lipsitch M. Real-time influenza forecasts during the 2012-2013 season. ***Nature Communications*** 2013; 4: 2837.

21. *<u>Yang W</u>**,** Elankumaran S, Marr LC. Relationship between humidity and influenza A viability in droplets and implications for influenza's seasonality. ***PloS ONE*** 2012; 7: e46789.

22. ***<u>Yang W</u>,** Marr LC. Mechanisms by which ambient humidity may affect viruses in aerosols. ***Applied and Environmental Microbiology*** 2012; 78: 6781-6788.

23. ***<u>Yang W</u>, Marr LC. Dynamics of airborne influenza A viruses indoors and dependence on humidity. ***PloS ONE*** 2011; 6: e21481.

24. *<u>Yang W</u>, Elankumaran S, Marr LC. Concentrations and size distributions of airborne influenza A viruses measured indoors at a health centre, a day-care centre, and on aeroplanes. ***Journal of The Royal Society Interface*** 2011; 8: 1176.

25. ***<u>Yang W</u>, Gu AZ, Zeng SY, Li D, He M, Shi HC. Development of a combined immunomagnetic separation and quantitative reverse transcription-PCR assay for sensitive detection of infectious rotavirus in water samples. ***Journal of Microbiological Methods*** *2011;* 84: 447-453.

26. Li D, Gu AZ, Zeng S, <u>Yang W</u>, He M, Shi HC. Monitoring and evaluation of infectious rotaviruses in various wastewater effluents and receiving waters revealed correlation and seasonal pattern of occurrences. ***Journal of Applied Microbiology*** 2011; 110:1129-1137.

27. Li D, Gu AZ, Zeng S, <u>Yang W</u>, He M, Shi HC. Evaluation of the infectivity, gene and antigenicity persistence of rotaviruses by free chlorine disinfection. ***Journal of Environmental Sciences*** 2011; 23: 1691-1698.

28. Li D, Gu AZ, <u>Yang W</u>, He M, Hu XH, Shi HC. An integrated cell culture and reverse transcription quantitative PCR assay for detection of infectious rotaviruses in environmental waters. ***Journal of Microbiological Methods*** *2010;* 82: 59-63.

29. Yang L, Zeng S, Chen J, He M, <u>Yang W</u>. Operational energy performance assessment system of municipal wastewater treatment plants. ***Water Science & Technology*** 2010; 62:1361-1370.

30. Li D, Gu AZ, He M, Shi HC, <u>Yang W</u>. UV inactivation and resistance of rotavirus evaluated by integrated cell culture and real-time RT-PCR assay. ***Water Research*** *2009;* 43: 3261-3269.

<u>*arXiv Posting:*</u>

    *<u>Yang W</u>, Shaman J. 2014. A simple modification to improving inference for non-linear dynamical systems. ***arXiv***: 1403.6804

CONFERENCE PRESENTATIONS

1. 2018. Modeling measles transmission in Beijing during 1951-2015. MIDAS Network Meeting, Washington, DC (Poster)

2. 2017. Modeling measles transmission in Beijing. Academy of Military Medical Sciences, Beijing, China (Invited talk)

3. 2017. Geospatial characteristics of measles transmission in China during 2005-2014. Epidemics[6]: Sixth International Conference on Infectious Disease Dynamics, Sitges, Spain (Talk)

4. 2017. Geospatial characteristics of measles transmission in China during 2005-2014. MIDAS Network Meeting, Atlanta, GA (Poster)

5. 2017. Inference and forecast of infectious disease spatial temporal dynamics. CUNY Graduate School of Public Health & Health Policy. New York, NY (Invited talk)

6. 2016. Measuring Separation in Emergencies (MSiE): Projection ideas. Measuring Separation in Emergencies Projection Workshop, New York, NY (Invited Talk)

7. 2016. CDC flu forecast challenge: 2015-2016 season. Seasonal Influenza Forecasting Workshop, CDC Roybal (Clifton) Campus, Atlanta, GA (Invited Talk)

8. 2016. Shaman J. Forecasting influenza outbreaks in boroughs of New York City. MIDAS Network Meeting, Reston, VA (Poster)

9. 2015. Inference of seasonal and pandemic influenza transmission dynamics. Epidemics[5]: Fifth International Conference on Infectious Disease Dynamics, Clearwater Beach, FL (Talk)

10. 2015. Forecasting influenza epidemics in Hong Kong. Epidemics[5]: Fifth International Conference on Infectious Disease Dynamics, Clearwater Beach, FL (Poster)

11. 2015. A simple modification for improving inference of non-linear dynamical systems. Epidemics[5]: Fifth International Conference on Infectious Disease Dynamics, Clearwater Beach, FL (Poster)

12. 2015. Transmission network of 2014-2015 Ebola epidemic in Sierra Leone. MIDAS Network Meeting, Atlanta, GA (Talk)

13. 2015. Comparison of non-ordinary-differential-equation (NODE) and ODE model for forecast of Ebola epidemic. RAPIDD Workshop on Ebola Forecasting Approaches, Fogarty International Center, NIH, Bethesda, MD (Invited Talk)

14. 2014. Real time forecast of influenza using Google Flu Trends data. JSMB/SMB 2014, Osaka, Japan (Talk)

15. 2014. Towards better influenza forecast systems. Workshop: Preparing for and Responding to Influenza Outbreaks: Public Health Decision Making and a Role for Influenza Forecast, New York, NY (Talk)

16. 2013. Comparison of filtering methods for the modeling and retrospective forecasting of influenza epidemics. Fourth International Conference on Infectious Disease Dynamics, Amsterdam, The Netherlands (Poster)

17. 2013. The 1918 influenza pandemic in New York City: age-specific timing, mortality, and transmission dynamics. Fourth International Conference on Infectious Disease Dynamics, Amsterdam, The Netherlands (Poster)

18. 2013. Does exposure to poultry and wild fowl confer immunity to H5N1? Fourth International Conference on Infectious Disease Dynamics, Amsterdam, The Netherlands (Poster)

19. 2013. How ambient humidity may affect the transmission of viral infectious diseases. European Geosciences Union General Assembly, Vienna, Austria (Talk)

20. 2012. The effect of relative humidity on the transmission of influenza A virus. Asia Oceania Geosciences Society – American Geophysical Unit Joint Assembly, Singapore (Talk)

ACADEMIC SERVICE

Manuscripts reviewed for: *Applied and Environmental Microbiology; American Journal of Epidemiology; BMC Infectious Disease; BMC Medicine; Environmental Health; Epidemics; Eurosurveillance; Influenza and Other Respiratory Viruses; Journal of Biological Dynamics; Journal of the Royal Society Interface; Mathematical Biosciences; Nature Communications; PLoS Computational Biology; PLoS Neglected Tropical Diseases; PLoS One; PNAS; Signal Processing; Statistical Methods in Medical Research*