



NEWSLETTER Volume 6, Issue 2

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The ***Climate and Health Program***, launched in 2008, has a mission to foster innovative scholarship on the human health dimensions of climate change impacts and vulnerabilities, and to provide information of direct value in climate adaptation and mitigation planning. We train PhD and DrPH students, and postdoctoral scientists in the design and conduct of cutting edge research on mechanisms linking climate to ill-health as well as on methods for assessing health impacts and benefits of future climate policy scenarios. We also offer the first ever MPH certificate in climate and health.

TABLE OF CONTENTS

PROGRAM NEWS.....	2	PAST EVENTS.....	8
<ul style="list-style-type: none"> • Dr. Jeffrey Shaman on Scientific America • Dr. Darby Jack on PBS NewsHour • New doctoral students • New staff as of fall 2016 • Staff transitions 		<ul style="list-style-type: none"> • Taste of Science: Flu • Cyclones and Storm Surges • Ashoka Trust for Research in Ecology and the Environment (ATREE) • Earth Institute Fellows Symposium • American Geophysical Union • Meteorology and Atmospheric Science Colloquium • International Meeting on Emerging Diseases and Surveillance • Measuring Separation in Emergencies Projection Workshop • The Kiosk 	
CERTIFICATE NEWS.....	4		
<ul style="list-style-type: none"> • Meet our new master's students 			
RESEARCH.....	6		
<ul style="list-style-type: none"> • Recent findings • Other recent publications • Proposals 			

PROGRAM NEWS

Dr. Jeffrey Shaman on Scientific America



Dr. Jeffrey Shaman was featured in a Scientific America podcast to discuss a recently published work led by Dr. Wan Yang on granular flu predictions in NYC. They generated neighborhood and borough level forecasts using a model built in with “network connectivity,” or commuter data. This model improved the predictions at the borough level.

Listen to the podcast [here](#).

Dr. Darby Jack on PBS NewsHour



Dr. Darby Jack was featured on PBS NewsHour along with his colleague, Dr. Kwaku Poku Asante, from the Kintampo Health Research Center. They describe their project, Ghana randomized air pollution and health study (GRAPHS), through which they recruit pregnant mothers and provide cleaner-burning cookstoves to reduce exposures of mothers and infants to harmful smoke. Two hypotheses being tested are 1) will reduced exposure to household air pollution increase birth weight, and 2) will reduced exposure reduce the rate of pneumonia in the first year of life.

Watch the podcast [here](#).

New doctoral students



Carlos Gould grew up in Bloomington, Indiana, and received a BA in Environmental Studies from Yale University in 2015. At Yale, he studied household energy, the adoption and impact of improved cookstoves, and patterns of woodfuel collection. After graduating, he spent a year working on two projects: 1) evaluation of the field performance and impacts of two improved cookstove programs in Honduras and Peru and 2) further establishment of non-renewable biomass and woodfuel-deforestation linkages by ground-truthing the estimated impacts of woodfuel demand on forest resources in Honduras. At Columbia, Carlos is eager to expand his research on health impacts of climate change and environmental health risks in developing countries, as well as the impact that energy use has on human health and socioeconomic well-being.



Israel Uwakuba received his Bachelors degree in Biology from Oberlin College and an MPH degree Columbia. He is interested in studying infectious disease modeling; in particular, vector-borne infectious disease modeling. Previously, he worked on using climatologically-driven vectorial capacity to describe and examine malaria transmission in sub-Saharan Africa. Currently, he plans to study the effects of local meteorology and hydrology on population density, survival, and transmission of vector-borne pathogens.

New staff as of fall 2016



Dr. Ruthie Birger

Earth Institute
Postdoctoral Fellow

Ruthie conducted her PhD research in the Department of Ecology and Evolutionary Biology at Princeton University. She focused on HIV-Hepatitis C coinfection dynamics, using mathematical models to describe within-patient biological processes as well as epidemiological impacts of public health interventions. At Columbia, Ruthie will be building on these modeling methods and applying them in an effort to understand the interplay between coinfection with various pathogens and the emergence and evolution of drug resistance in populations and individuals. One of the main goals of this research will be to improve estimates of the scale of the growing problem of drug resistance, in particular in the context of global urbanization.



Dr. Zachary Burt

Postdoctoral Research
Fellow

Zachary earned his PhD at the Energy and Resources Group at UC Berkeley in 2015. He is interested in the techno-social systems which manufacture and allocate risk, and how these play out in the water and sanitation systems of low, middle, and high income countries. He has researched the costs and benefits of urban water service improvements, willingness to pay for household water treatment, and gender inequities in sanitation access. He has conducted field research in India, Tanzania, and Kenya, and assessed urban water policies in India, California, and Kenya. At Columbia, Zach is researching efficient, effective, and equitable ways of incorporating climate risk into urban water management policy in low income countries, especially focusing on water and sanitation access for marginalized groups.



Dr. Maryam Karimi

Postdoctoral Research
Fellow

Maryam completed her PhD at the Graduate Center of CUNY in the Department of Earth and Environmental Science in 2016 and worked on a NOAA funded project on urban heat island effect on human health. While at CUNY, she received funding for her proposal on quantification of near surface temperature fluctuations from NASA Develop. Her research has focused on understanding the structure of cities and temperature variations caused by surface changes in urban areas. At Columbia, she will be developing a social and environmental vulnerability index for air quality to help identify population and neighborhoods that are at higher risk based on their socioeconomic status, living condition, and neighborhood.

Staff transitions



Dr. Jennifer Nguyen
Postdoctoral Research
Fellow

Jennifer received her ScD in Environmental Health and Epidemiology at the Harvard School of Public Health, where she studied the correlation between indoor and outdoor temperature and humidity exposure, and weather as a trigger of arrhythmias. At Columbia, she expanded on her research to consider influenza. She investigated the inter-relationship between weather, influenza, and cardiac outcomes in NYC. Jennifer continues to explore the link between the environment and health as a data scientist at Delos.



Dr. Zheng Zhou
Postdoctoral Research
Scientist

Zheng received his ScD in Global Health and Population from Harvard University. At Columbia, he worked on the Ghana Randomized Air Pollution and Health Study (GRAPHHS) under Dr. Darby Jack. He assessed personal exposure to household air pollution from burning biomass fuels, specifically examining the relationship between PM2.5 and carbon monoxide exposure. He has taken on a new role as a data scientist at Capital One.

CERTIFICATE NEWS

Meet our new master's students



Sonia Dattaray is in the Department of Scoliomedical Sciences. She is from San Diego, CA and received her undergraduate degree in Environmental Science from Emory University in 2016. While attending Emory, she worked with SE@G, where she coordinated an initiative to support coffee growers in Nicaragua. Through the Climate and Health Certificate, she hopes to develop a deeper understanding of the impacts of climate change and how to effectively translate research into action and policy.



Immaculate De Silva is from Bakersfield, CA. She received her undergraduate degree in chemistry from the California State University, Bakersfield, where she was an Instructional Student Assistant in the chemistry department. At Columbia, she looks forward to learning more about climate change and their impacts on human health. She is planning to pursue a degree as a physician assistant after Columbia, and in her future career, hopes to be able to better inform patients on proactive measures to reduce health risks.

Meet our new master's students



Adriana Garcia grew up in the suburbs of Philadelphia, PA. She received her BA in Earth Science at the University of Pennsylvania, where she studied the effects of the oil and gas industry on water quality. She has also previously conducted several community-based environmental health projects, as well as research in geology and tropical ecology. Through the Climate and Health program, she hopes to gain further knowledge about the interdisciplinary field of environmental health in addition to the skills needed to address climate-related health problems in the world.



Marguerite Lally is from NYC and received her undergraduate degree from Boston College in History and a minor in Environmental Studies. She worked at the Village of Saltaire's Waterfront Manager for the past two summers and also interned at Mount Sinai and a clinic in the Cape Town township of Khayelitsha. Marguerite is interested in disaster management and preparation, and how climate change and environmental issues are intertwined. She is excited to join the Climate and Health certificate and to see where it will take her.



Claire Wang is in the department of Population and Family Health. She is from Tokyo, Japan, and received her undergraduate degree in civil engineering from Columbia in 2011. Since then, she volunteered with Engineers Without Borders, leading the design and construction of water projects in Ghana and Kenya. She also worked in the engineering and construction industries in NYC, and more recently completed a four-month mission for MSF as a construction logistician in Ethiopia. She is excited to combine her engineering background with her interest in climate and public health, and looks forward to working in the water, Sanitation, and health sector.



Tiffany Zau was born and raised in Hong Kong. She completed her undergraduate studies at New York University with a major in Environmental Science and minors in Environmental Biology and Urban Design & Architecture. With the Climate & Health program, she hopes to deepen her knowledge of the effects of climate change on the urban environment. She is most interested in climate change resiliency of cities, how mitigation and adaptation through sustainable architecture can lessen the impact of climate change, as well as building healthy communities and therefore healthy people.

Recent findings**Forecasting influenza outbreaks in boroughs and neighborhoods of New York***Affiliated Investigators: Wan Yang and Jeffrey Shaman**Journal: PLoS Computational Biology*

Recently developed influenza forecast systems have potential to aid public health planning for and mitigation of the burden of disease. However, current forecasts are generated at geographic scales (national and regional) that are coarser than the scales at which public health measure and interventions are implemented (community level). Dr. Yang and colleagues developed and tested network models at borough and neighborhood levels for NYC, and found that the inclusion of spatial network connectivity in the forecast model improves forecast accuracy at the borough scale but degrades accuracy at the neighborhood scale.

Spatial and temporal trends in the mortality burden of air pollution in China: 2004–2012*Affiliated Investigators: Miaomiao Liu**Journal: Environment International*

The burden of air pollution has been quantified at the national scale in recent assessments. However, air quality managers would benefit from assessments that disaggregate the health impacts over small geographic scales and over time. This study used the new 10x10km satellite-based PM2.5 dataset to analyze spatial and temporal trends of air pollution-associated mortality in China. Nationally, cardiopulmonary deaths due to PM2.5 increased during the study period. However, there is strong spatial variation with higher burden in regions that have heavy air pollution, high population density, or both, including Beijing–Tianjin Metropolitan Region, Yangtze River Delta, Pearl River Delta, Sichuan Basin, Shandong, Wuhan Metropolitan Region, Changsha–Zhuzhou–Xiangtan, Henan, and Anhui. Liu et al. recommend that priority areas for future national air pollution control policies be adjusted to better reflect the spatial hotspots of health burdens.

Retrospective parameter estimation and forecast of respiratory syncytial virus in the US*Affiliated Investigators: Julia Reis and Jeffrey Shaman**Journal: PLoS Computational Biology*

Respiratory syncytial virus (RSV) is the most common cause of acute lower respiratory infection and bronchiolitis, and early warning of the RSV epidemic timing and volume of patient surge has the potential to reduce well-documented delays of treatment in emergency departments. Reis et al. adapted a model-filter system to simulate and forecast RSV epidemics in the US, using ten years of regional US specimen data. They generated forecasts that predict peak magnitude of outbreaks with nearly 70% accuracy, four weeks before the predicted peak. This is a first step in the development of a real-time RSV prediction system.

Other recent publications

Liu W, **He MZ**, Wang Y, Wang Y, Zhou Y, Wu M, Tang Z, Dai Y, Yuan B, Zhen S, Cheskin LJ. (2017). Differences in health-related behaviors between middle school, high school, and college students in Jiangsu province, China. *Asia Pacific Journal of Clinical Nutrition*, 26(4).

Yamana TK, Kandula S, Shaman J. (2016). Superensemble forecasts of dengue outbreaks. *Journal of The Royal Society Interface*, 13(123), 20160410.

Ban J, Huang L, Chen C, Guo Y, **He MZ**, Li T. (2017). Integrating new indicators of predictors that shape the public's perception of local extreme temperature in China. *Science of The Total Environment*, 579, 529-536.

Liu M, Huang Y, Jin Z, Liu X, Bi J, Jantunen MJ. (2017). Estimating health co-benefits of greenhouse gas reduction strategies with a simplified energy balance based model: The Suzhou City case. *Journal of Cleaner Production*, 142, 3332-3342.

Becker AD, **Birger RB**, Teillant A, Gastanaduy PA, Wallace GS, Grenfell BT. (2016). Estimating enhanced prevaccination measles transmission hotspots in the context of cross-scale dynamics. *Proceedings of the National Academy of Sciences*, 113(51), 14595-14600.

Yamana TK, Qiu X, Eltahir EA. (2016). Hysteresis in simulations of malaria transmission. *Advances in Water Resources*.

Burkart K, Kinney PL. (2016). What drives cold-related excess mortality in a south Asian tropical monsoon climate—season vs. temperatures and diurnal temperature changes. *International journal of biometeorology*, 1-8.

Proposals

Submitted:

- **Drs. Wan Yang** and **Jeffrey Shaman** applied for an NIH R01 proposal titled “Disease persistence and population dynamics: modeling measles in China.”

Awarded:

- With funding from The Rockefeller Foundation, **Dr. Jeffrey Shaman** will lead and oversee a Global Consortium on Climate and Health Education. The purpose of the Consortium is to share best scientific and educational practices and design model curricula on the health impacts of climate change for academic and non-academic audiences, and builds on a pledge by 115 medical, nursing, and public health schools from all over the world to add climate and health to their curricula.
- **Dr. Zachary Burt**, postdoctoral research fellow, received a Fulbright scholarship for his project entitled "Addressing Climate Risks and Water Availability in Urban India". The goal of the project is to forecast both water demand and water supply at the local level, and evaluate different strategies to improve the sustainability of urban water systems in large towns and mid-size cities. He will be based in Hubli-Dharwad and Mysore, mid-size cities in the state of Karnataka, India.

PAST EVENTS

Taste of Science: Flu

Dr. Jeffrey Shaman gave a talk at Ryan's Daughter, a bar in the Upper East Side, on January 24th for a Taste of Science event. He discussed the uses of statistical models and environmental data in forecasting infectious diseases. He was joined by Dr. Nicole Bouvier from Mount Sinai, who discussed the biology of the flu virus.



Cyclones and Storm Surges

Columbia Global Centers Mumbai organized a workshop on 'Cyclones and Storm Surges: Building a Framework for Evaluating the Climate Risk to Mumbai' on January 12th. The workshop was focused on the risk of a catastrophic flood in Mumbai due to a tropical cyclone-driven storm surge. Dr. Zachary Burt, postdoctoral research fellow, attended the workshop.



ATREE

Dr. Zachary Burt, postdoctoral research fellow, was invited to give a talk in January at the Ashoka Trust for Research in Ecology and the Environment (ATREE), located in Bangalore. He spoke on "Economic impacts, equity and sustainability for a drinking water services improvement: The case of Hubli-Dharwad."



Earth Institute Fellows Symposium

The Earth Institute Fellows Symposium: Meeting the Challenges of Sustainable Development in a Changing World was held on December 8th. Postdoctoral research fellow, Dr. Ruthie Birger, gave a talk on 'Modeling public health interventions for HIV and HCV among people who inject drugs in Ho Chi Minh City, Vietnam.'



American Geophysical Union

Dr. Melissa Gervais, postdoctoral research scientist, attended the American Geophysical Union in San Francisco in December. She gave a poster presentation titled 'Impacts of the North Atlantic warming hole on atmospheric circulation.'



Meteorology and Atmospheric Science Colloquium

Dr. Melissa Gervais, postdoctoral research scientist, was invited to speak at the weekly Meteorology and Atmospheric Science Colloquium at Pennsylvania State University on November 2nd. Her talk was entitled 'Arctic Air Masses in a Warming World.'



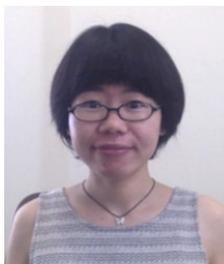
International Meeting on Emerging Diseases and Surveillance

The International Meeting on Emerging Diseases and Surveillance (IMEDS) took place in Vienna, Austria, last November. Eliza Little, PhD candidate, attended the meeting and gave a poster presentation entitled 'Socioecological mechanisms of *Ae. albopictus* spatial and temporal patterns and associated public health risks in NYC.'



Measuring Separation in Emergencies Projection Workshop

Dr. Wan Yang, associate research scientist, attended the Measuring Separation in Emergencies (MSiE) Projection Workshop in New York on November 4th. She gave a talk on 'MSiE projection ideas.' This project is funded by the USAID Office of Foreign Disaster Assistance and implemented by Save the Children, Columbia University, and Johns Hopkins University.



The Kiosk

Daniel Carrión, PhD candidate, was invited to be a panelist for a discussion hosted by WE ACT for Environmental Justice & City as a Living Laboratory on emergency preparedness and climate resiliency in Northern Manhattan last November. The focus of the discussion was on a concept called The Kiosk, a public space installation, which will serve as an interactive and informational community center on climate change as well as a resource for actions during climate-related emergency events,



FEEDBACK

Please email the Program Coordinator, Haruka Morita, at hm2487@cumc.columbia.edu with questions or suggestions for future newsletter content. For more information about the Program, please visit our [website](#).