

NEWSLETTER Volume 9, Issue 1

Fall 2019

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.

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PROGRAM NEWS

Successful thesis defense by PhD candidate, Daniel Carrión



Daniel Carrión completed his PhD in Environmental Health Sciences in the Climate and Health Program in July 2019. His doctoral thesis titled 'Examining Infant Nasal Microbial Carriage and Socio-Ecological Determinants of Exposure' examined the impact of household air pollution on upper respiratory microbial carriage of infants, as well the socioecological determinants of biomass combustion amongst families in rural Ghana.

Daniel has also worked with the Columbia Children's Center for Environmental Health to understand differences in air pollution exposures based on compliance with the Clean Heat policies in NYC. Outside these research interests, he serves as an appointed member to the New York State Minority Health Council, is a student member of the New York Academy of Medicine, and helped to start an ongoing public health service-learning project in Puerto Rico.

He is now a Postdoctoral Fellow in the Department of Environmental Medicine and Public Health at the Icahn School of Medicine at Mount Sinai. He is working in Dr. Allan Just's research group to refine large-scale exposure models of temperature and air pollution using remotely sensed data, and conducting epidemiological analyses with those exposure datasets. He received a BA from Ithaca College and an MPH from New York Medical College.

Successful thesis defense by PhD candidate, Alex Heaney



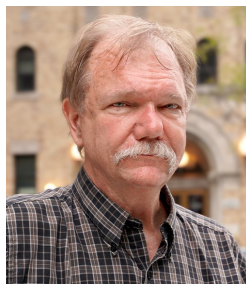
Alexandra Heaney completed her PhD in Environmental Health Sciences in the Climate and Health Program in April 2019. For her dissertation, entitled 'Predicting under-5 diarrhea outbreaks in Botswana: Understanding the relationships between environmental variability and diarrhea transmission,' she developed a forecasting system for diarrhea in the Chobe region of Botswana. Specifically, she first characterized the hydrometeorological determinants of water quality in the Chobe River and under-5 diarrheal disease in the broader flood pulse region around the river. She then showed how the intensity of seasonal river flooding and under-5 diarrhea in the Chobe region are associated with El Niño-Southern Oscillation variability, which modulates rainfall in the upstream highlands and enables prediction of diarrhea outbreak severity with 7-month lead times. In the final chapter, Alex developed and validated a dynamic model-Bayesian inference system for forecasting numbers of under-5 diarrhea cases in the Chobe region.

In addition, she has submitted a paper focusing on the effects of temperature and climate change on bikeshare usage in New York City. Lastly she worked on a project exploring the relationship between wildfire emissions and respiratory and cardiovascular health in California.

Alex recently began postdoctoral training at UC Berkeley School of Public Health.

PROGRAM NEWS

New faculty member—Associate Professor Lewis Ziska



Dr. Lewis Ziska, Associate Professor of Environmental Health Sciences, joined the Climate and Health Program this September after serving for nearly 25 years as a scientist at the United States Department of Agriculture (USDA). Dr. Ziska is a leading expert on the effects of climate change on plants and agriculture. His research has found that a warmer climate could produce pollen with higher allergenicity, exacerbating the allergy season. It has also led to increases in use of herbicides among farmers to fight growth of invasive plant species, which in turn increases the potential for evolving herbicide resistance. He also found that an increase in carbon dioxide has led to reductions in rice protein and nutritional value, threatening global food security.

Dr. Ziska has contributed to several United Nations Intergovernmental Panel on Climate Change (IPCC) reports, and authored numerous climate change publications and books, including *Climate Change and Food Security in the 21st Century: Our Daily Bread* and *Invasive species and Climate Change*.

New doctoral students



Misbath Daouda

Misbath started her PhD in Fall 2019. Before joining Mailman, she received her MPH in Environmental Health from the Harvard School of Public Health. During her time at Harvard, she worked with UNICEF in Mongolia on a study of the association between air pollution exposure and children's respiratory health outcomes in Ulaanbaatar. Prior to that, she assessed the impact of unsustainable tourism activities on the health and well-being of local populations in Tunisia. She plans to conduct research at the intersection of air pollution-related health outcomes, energy use, and environmental policy in the context of climate change.



Maggie Li

Maggie completed her BA in Geography and BS in Conservation and Resource Studies at UC Berkeley, where she focused on studying geospatial methods of quantifying environmental exposures. She has previously conducted research at Penn State University to spatially visualize particulate matter exposure from seasonal dust loading and its effects on respiratory health across Senegal. At Mailman, she hopes to study the differential health impacts of anthropogenic climate change on socially disadvantaged communities, and community-based intervention strategies to bridge these health outcome disparities.

New staff as of spring 2019



**Georgette
Owusu-
Amankwah**

Postdoctoral
Research
Scientist

Georgette holds a doctoral degree in Agricultural Economics from the University of Kentucky. Her research interest is primarily in Development and Health Economics. Her doctoral research examined constraints that have hindered the 'buy-local' policy mandate of the Ghana School Lunch program, and explored gendered agricultural technology adoption and contract participation strategies that could facilitate the policy mandate. Georgette's current research with Drs. Darby and Kelsey Jack examines viable clean energy sources, household adoption and use decisions, and the health impacts of cleaner fuels in Ghana, with interventions to support community-level adoption and sustained use of clean household energy technologies.

Staff transitions



Zachary Burt
Postdoctoral
Research
Fellow

Zachary Burt earned his PhD at the Energy and Resources Group at the University of California, Berkeley in 2015. At Columbia, he worked on four research projects: (1) in Rwanda, in collaboration with Pivot Works Ltd, he designed and implemented a willingness-to-pay study for improved fecal sludge collection services, (2) in Morocco, in collaboration with Harvard University, he designed and implemented a project aiming to encourage conservation of water resources by creating a 'water savings credit' (WSC) program, (3) in India, during a 9-month Fulbright Fellowship, he collected ward level health data in order to build a model of health risk due to flooding across the socio-economic spectrum, and (4) in India, he developed a tool for tracking equity in sanitation systems. Zach joined Athena Infonomics as a Senior Economist, working on projects in water and sanitation, incorporating aspects of gender, social inequity, climate impacts and affordability.

Faculty in the news



Darby Jack in Mailman News
A Global Manual to Clean Urban Air

Professor Jack was featured for his contribution to the USAID report: LMIC (low and middle income countries) Urban Air Pollution Solutions. The report, developed at an April workshop hosted by the Columbia Mailman School and the public health nonprofit Vital Strategies, provides practical steps for low and middle-income countries like India to address air pollution in their cities.

Read the article [here](#).

CERTIFICATE NEWS

Second years' summer practicum experiences



Kaitlyn Coomes worked at the CU Earth Institute (EI) as an Intern for the Office of the Director. Her main project was on the Research Database that EI is launching soon. This will be an online site that contains profiles depicting all of the current and past research projects within EI. She also worked on two smaller projects: compiling case studies of interdisciplinary research projects that have taken place within EI and gathering information to help form the Climate Communications initiative.



Katherine Koziel worked at the Federal Emergency Management Agency with the preparedness team to design and implement green initiatives to improve disaster preparedness, including initiatives to address and prepare for climate-related disasters and the impact climate change will have on safety systems already in place.



Natalia Quiroz participated in Greater New York Hospital Association's (GNYHA) Summer Enrichment Program. She was placed at Mount Sinai Brooklyn in the Patient Care Services Department. Her project focused on mitigating clinical communication barriers within the hospital by developing medical unit huddle boards, and formatting medical messaging for secure messaging platforms. As part of this program, Natalia attended GNYHA sponsored informational sessions with the offices of NY Senator Kirsten Gillibrand and Rep. Hakeem Jeffries; as well as other notable leaders in healthcare advocacy, medical associations, and hospital association in Washington DC and NYC.



Victoria Sanders interned at the NYC Department of Health and Mental Hygiene through the Health Research Training Program. In the Zoonotic, Influenza, and Vector-Borne Disease Unit, she analyzed data from the 2018 tick season in order to create both internal and public reports for diseases like Babesiosis and Anaplasmosis. She also assisted with the community outreach/education program, 2019 tick-borne disease surveillance and investigations, and attended and participated in many meetings, workshops, and field activities.

RESEARCH

Awards

Professor Micaela Martinez was awarded the CUIMC Award for Junior Faculty Who Contribute to the Diversity Goals of the University to study ‘Maternal Gifts: Understanding how Maternal Immunity Shapes the Development of the Infant Immune System.’

Sarah Kramer, PhD candidate, was awarded an NIH F31 titled ‘Forecasting International Transmission of Influenza: Development and Validation of a Global Model.’

Professor Jeffrey Shaman was awarded a grant by the Centers for Disease Control and Prevention on ‘Informing Pandemic Influenza Intervention Practice: Coordinated Modeling’ to systematically test pandemic response and intervention practice.

Recent findings

Development and validation of a method to quantify benefits of clean-air taxi legislation

Affiliated Investigators: Marianthi-Anna Kioumourtzoglou, Daniel Carrión, and Frederica Perera

Journal of Exposure Science & Environmental Epidemiology

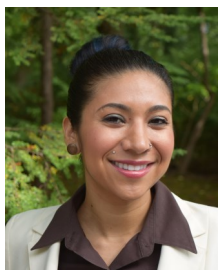


The authors evaluated how changes in NYC’s taxi fleet exhaust emissions were associated with overall spatial and temporal trends in air pollution in NY following the Clean Air Taxi legislation, enacted in 2005–2006. Exhaust emissions of nitric oxide (NO) and total particulate matter were estimated and apportioned over NYC for each year between 2004–2015, which were used to predict reductions in NO and fine particulate matter (PM2.5) concentrations estimates using 2009-2015 New York City Community Air Survey (NYCCAS) data. Efficiency trends among other for-hire vehicles and spatial variation in traffic intensity were also considered. They found that these emissions reductions were associated with changes in NYCCAS-modeled NO and PM2.5 concentrations. NY’s clean air taxi legislation was effective at increasing fuel efficiency of the medallion taxi fleet, and reductions in estimated taxi emissions were associated with decreases in NO and PM2.5 concentrations.

Rescuing troves of hidden ecological data to tackle emerging mosquito-borne diseases

Affiliated Investigators: Micaela Martinez

Journal of American Mosquito Control Association



Despite the major impact of mosquitoes on human health, knowledge gaps exist regarding their natural population dynamics. In the USA, municipalities have created agencies for mosquito control and monitoring, yet no national open-access repository for mosquito surveillance data exists. The authors identified 1,000 mosquito control agencies and those which make their population abundance surveillance data publicly available. They also surveyed Floridian mosquito districts to estimate, from one state alone, the potential amount of hidden data. They generated a large, standardized data set from publicly available online data and demonstrated that spatiotemporal population abundance can be reconstructed and analyzed across data generators.

Recent publications

- Yamana TK, Shaman J.** A framework for evaluating the effects of observational type and quality on vector-borne disease forecast. *Epidemics*. 2019 Aug 5:100359.
- Westervelt DM, Ma CT, **He MZ**, Fiore AM, Kinney PL, **Kiourmourtzoglou MA**, Wang S, Xing J, Ding D, Correa G. Mid-21st century ozone air quality and health burden in China under emissions scenarios and climate change. *Environmental Research Letters*. 2019 Jul 16;14(7):074030.
- Jin X, Fiore AM, Civerolo K, Bi J, Liu Y, van Donkelaar A, Martin RV, Al-Hamdan M, Zhang Y, Insaf TZ, **Kiourmourtzoglou MA**, **He MZ**, Kinney PL. Comparison of multiple PM_{2.5} exposure products for estimating health benefits of emission controls over New York State, USA. *Environmental Research Letters*. 2019 Jul 31;14(8):084023.
- Kandula S, Pei S, Shaman J.** Improved forecasts of influenza-associated hospitalization rates with Google Search Trends. *Journal of the Royal Society Interface*. 2019 Jun 12;16(155):20190080.
- Salas RN, Jacobs W, **Perera F.** The Case of Juliana v. US—Children and the Health Burdens of Climate Change. *New England Journal of Medicine*. 2019 May 30;380(22):2085-7.
- Kandula S, Shaman J.** Near-term forecasts of influenza-like illness: An evaluation of autoregressive time series approaches. *Epidemics*. 2019 Jun 1;27:41-51.
- DeFelice NB, **Birger R**, DeFelice N, Gagner A, Campbell SR, Romano C, Santoriello M, Henke J, Wittie J, Cole B, Kaiser C, **Shaman, J.** Modeling and Surveillance of Reporting Delays of Mosquitoes and Humans Infected With West Nile Virus and Associations With Accuracy of West Nile Virus Forecasts. *JAMA network open*. 2019 Apr 5;2(4):e193175-.
- Heaney AK, Carrión D, Burkart K**, Lesk C, **Jack D.** Climate Change and Physical Activity: Estimated Impacts of Ambient Temperatures on Bikeshare Usage in New York City. *Environmental health perspectives*. 2019 Mar 5;127(3):037002.
- Van Vliet ED, Kinney PL, Owusu-Agyei S, Schluger NW, Whyatt RM, **Jack DW**, Agyei O, Chillrud SN, Boamah EA, Mujtaba M, Asante KP. Current respiratory symptoms and risk factors in pregnant women cooking with biomass fuels in rural Ghana. *Environment international*. 2019 Mar 1;124:533-40.
- Papadogeorgou G, **Kiourmourtzoglou MA**, Braun D, Zanobetti A. Low Levels of Air Pollution and Health: Effect Estimates, Methodological Challenges, and Future Directions. *Current environmental health reports*. 2019 May 14:1-1.
- Gao X, Colicino E, Shen J, **Kiourmourtzoglou MA**, Just AC, Nwanaji-Enwerem JC, Coull B, Lin X, Vokonas P, Zheng Y, Hou L. Impacts of air pollution, temperature, and relative humidity on leukocyte distribution: An epigenetic perspective. *Environment international*. 2019 May 1;126:395-405.
- Payne-Sturges DC, Marty MA, **Perera F**, Miller MD, Swanson M, Ellickson K, Cory-Slechta DA, Ritz B, Balmes J, Anderko L, Talbott EO. Healthy Air, Healthy Brains: Advancing Air Pollution Policy to Protect Children's Health. *American journal of public health*. 2019 Apr;109(4):550-4.
- Wu X, Braun D, **Kiourmourtzoglou MA**, Choirat C, Di Q, Dominici F. Causal inference in the context of an error prone exposure: air pollution and mortality. *The Annals of Applied Statistics*. 2019;13(1):520-47.
- Hilpert M, Johnson M, **Kiourmourtzoglou MA**, Domingo-Relloso A, Peters A, Adria-Mora B, Hernández D, Ross J, Chillrud SN. A new approach for inferring traffic-related air pollution: Use of radar-calibrated crowd-sourced traffic data. *Environment international*. 2019 Jun 1;127:142-59.

PAST EVENTS

ISEE Annual Meeting

Several Climate and Health Program members attended and presented at the ISEE 2019 annual meeting in Utrecht, The Netherlands in August.

Symposium

Climate Change and Child Health: Current Research, Future Opportunities, and Gaps in Knowledge Benefits and Co-benefits to Children's Health of Mitigating

Professor Frederica Perera

Oral presentations

Climate change and physical activity: Estimated impacts of ambient temperatures on bikeshare usage in New York City

Daniel Carrión

Short-term PM_{2.5} and cardiovascular admissions in NY State: assessing sensitivity of exposure model choice

Mike He

Air Pollution and Risk of Chronic Placental Abruption: A Study of Births in New York City, 2008-2014

Professor Marianthi Kioumourtzoglou

Poster presentations

Enhancing LPG Adoption in Ghana: A Factorial Cluster-Randomized Trial

Daniel Carrión

Continued firewood use after decades of access to low-cost LPG: Implications for clean cooking fuel policies and air pollution exposure in Ecuador

Carlos Gould

The effect of clean cooking interventions on maternal personal exposure to air pollution: Results from the Ghana Randomized Air Pollution and Health Study (GRAPHHS)

Carlos Gould

The Role of Hourly Temperature in Risk of Myocardial Infarction

Sebastian Rowland



Presidential Advisory Council

Professor Jeffrey Shaman and Sen Pei, Associate Research Scientist, attended the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB) Public Meeting held in McLean, VA in July 2019. They presented their work on Methicillin-resistant Staphylococcus aureus (MRSA) modeling entitled 'Utilizing big data to track outbreaks of antimicrobial resistant pathogens' to the council committee.



PAST EVENTS

Faculty Panel: Climate Crisis Is Both a Threat and an Opportunity

Professors Micaela Martinez and Jeffrey Shaman were part of a panel on 'Climate Change and Human Health' at the 2019 Columbia Mailman Alumni Summit panel. They discussed the ongoing crisis, including how taking action presents an unprecedented opportunity to advance human health and well-being.

The full video of the event can be viewed [here](#).



Sustainable Energy Transitions Initiative

PhD candidate, Carlos Gould, attended the Sustainable Energy Transitions Initiative Annual Meeting in May 2019 in Santiago, Chile. He gave a talk on 'Continued firewood use after decades of access to low cost LPG: Implications for clean cooking fuel policies and air pollution exposure in Ecuador.'



Medical Society Consortium

Brittany Shea, Project Director of the Global Consortium on Climate and Health Education (GCCHE), presented on GCCHE during The Medical Society Consortium on Climate and Health annual meeting 'Good Climate Policy Starts with Health,' in Arlington, Virginia, in April 2019.



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](#).