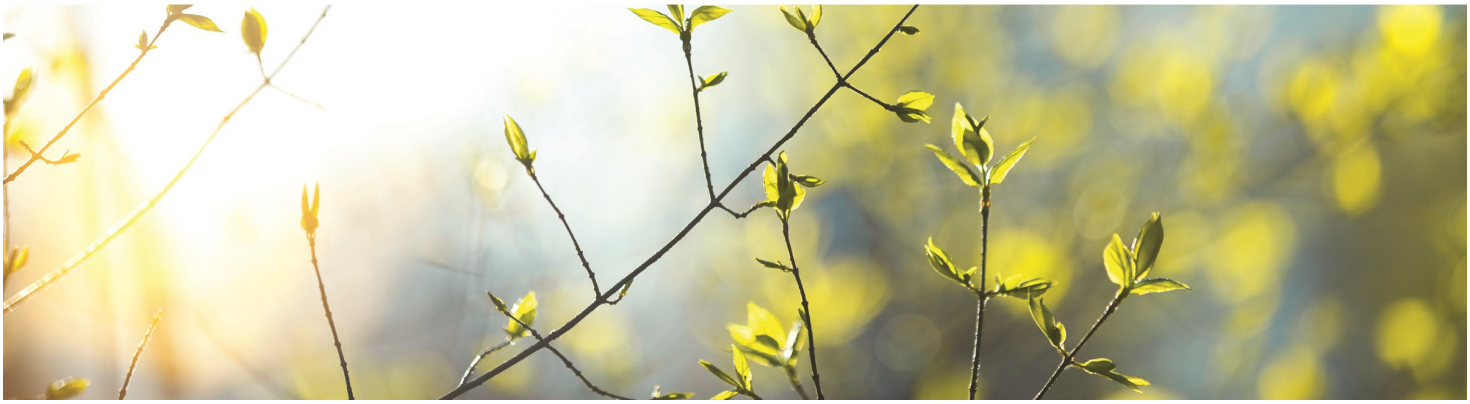
COLUMBIA | MAILMAN SCHOOL OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SCIENCES

Climate & Health



NEWSLETTER Volume 9 Issue 2 *Spring 2020*

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

In Mailman news

Righting the world's wrongs

The Global Health Justice and Governance Program was founded by Professor Terry McGovern to protect the health of vulnerable populations without power, on issues ranging from abortion to fracking to gender-based violence to food insecurity. Professor Jeffrey Shaman is collaborating with McGovern's team on issues such as the interaction between climate change and forced migration.

Climate in crisis

Professors Marianthi Kioumourtzoglou, Jeffrey Shaman, and Darby Jack and project director for the Global Consortium on Climate and Health Education, Brittany Shea, and doctoral graduates, Kate Weinberger and Daniel Carrión are highlighted for their efforts to better understand impacts of climate change on human health.

Study highlights high cost of fossil fuel pollution on children's health

A new study by researchers at the Columbia Center for Children's Environmental Health (CCCEH) is the first to compile the estimated per-case costs of six childhood health conditions linked to air pollution. Study co-author, Professors Frederica Perera, says 'Impacts on children's health are generally under-represented in benefits assessments related to environmental pollution.'

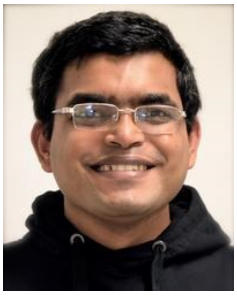
Scientists link La Niña climate cycle to increased diarrhea

Doctoral graduate, Alex Heaney, and Professor Jeffrey Shaman were featured for their study in Botswana that found that spikes in cases of life-threatening diarrhea in young children are associated with La Niña climate conditions. The paper was published in Nature Communications.

Just how bad is this year's flu season going to get?

A flu forecasting system developed by scientists at Columbia University Mailman School of Public Health is providing useful insights into those parts of the country most affected by the flu and when the worst of the season might be over.

Staff transition



Minhaz Ud-Dean

Post-doctoral Research Scientist

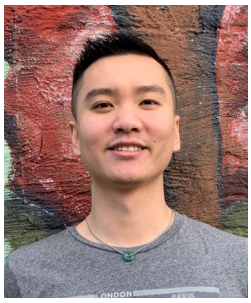
Dr. Minhaz Ud-Dean studied Biotechnology at University of Dhaka. There, he developed a biophysical model for the stability of airborne virus. Later, he completed an Erasmus Mundus joint masters program at University of Jena and Delft University of Technology. His doctorate was in chemical engineering on inferability and inference of gene regulatory networks at ETH Zurich. At Columbia, he was a post-doctoral research scientist under Professor Jeffrey Shaman, working on developing multi-factorial models for transmission of airborne viruses. Currently, he is Research Scientist in Bioinformatics at Helmholtz Zentrum München in Germany.

New staff as of fall 2019

Abishek Kar

Post-doctoral
Research Scientist

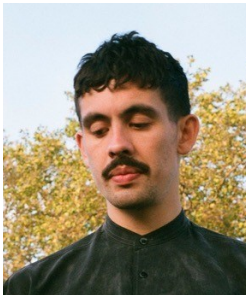
Abhishek obtained his doctorate in Resources, Environment and Sustainability from the University of British Columbia. He received his MBA from Indian Institute of Forest Management. He is currently an ISEP (Initiative for Sustainable Energy Policy) Fellow at Johns Hopkins School of Advanced International Studies. His multi-disciplinary research experience spans aerosols, human behavior, and policy analysis related to household air pollution in specific and energy access in general. At Columbia, Abhishek is working with Professor Darby Jack on a clean cooking intervention project in Ghana.



Michael Lam

Research Coordinator

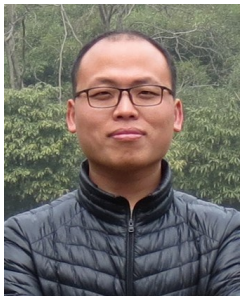
Michael earned his bachelor's degree in Psychology from University at Buffalo in 2017. During the summers of college, he received his certification as an EMT from St. John's University and worked in high risk neighborhoods in Queens and Brooklyn. After college, he became a full time Case Manager in a transitional housing, where he worked with clients battling infectious diseases, mental illness, and domestic abuse, to access proper medical attention and housing. Michael is currently working with Professor Shaman on his research to understand biomarkers that may determine the outcome of an infection.



Robbie Parks

Post-doctoral Research Fellow

Robbie earned his PhD from Imperial College London and an undergraduate degree in physics from the University of Oxford. He is an environmental epidemiologist whose primary interests are in understanding the impact that climate, weather, and air pollution has on mortality, nutrition, and disease outcomes, and how these impacts may differ in sub-groups of a population. He is also interested in developing new statistical methods, relevant to these concerns. In summer 2017, he interned at the World Meteorological Organisation, a constituent part of the United Nations, in Switzerland. While interning, he became a founding member of the Global Heat Health Information Network.



Weilu Wang

Adjunct Associate
Research Scientist

Weilu received his PhD in Ecology at the University of China Academy of Science, Beijing. He is interested in health impacts related to rising carbon dioxide levels, and associated climate change events, including changes in temperature and drought. His previous research evaluated the influences of elevated CO2 and temperature on rice quality in central China. He is currently working with Professor Lewis Ziska on developing a model to appraise the effects of CO2 and climate change on food security in China and the Sahelian region of Africa with a focus on anticipated changes in nutritional quality and health outcomes.

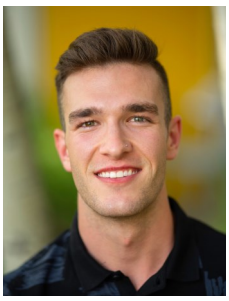
CERTIFICATE NEWS

Meet our new master's students

Haley Campbell is from the San Francisco Bay Area. She received her BS in Environmental Science with a concentration in Natural Science from University of Oregon in 2018. She worked as a project manager in an environmental testing lab for a year, and her interest in soil science and forest biology influenced her decision to pursue her MPH degree in EHS. At Columbia, she hopes to gain a better understanding of the climate crisis in relation to human health, and how cities like NY can mitigate and adapt to the inevitable changes in the urban environment.

Grace Chao is originally from China. She graduated from the University of Washington with a Bachelor's degree in Public Health. Through this program, she hopes to learn more about mitigation and adaptation strategies regarding climate change.

Kunsorya Chhea is from San Diego, CA and majored in Biology at UCLA for her undergrad. Her educational background was concentrated around ecology and evolutionary biology, which eventually introduced her to the impacts of climate change. As an EHS student with a Climate and Health certificate, she hopes to gain a well-rounded perspective on environmental health and develop her skills in research and climate advocacy.



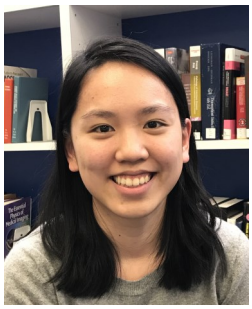
Kidd Duhe Solomon grew up in the mountains of CO and has a passion for social change, politics, and the environment. He began his studies at Tulane University, where he majored in International Relations with minors in International Development and Spanish. Over his professional career, Kidd has worked on a micro-entrepreneurship campaign at the US Dept of State as an HIV counselor for the NO/AIDS Task Force in New Orleans, and with global, socially-minded CEOs at the Aspen Institute. He hopes to combine his love of policy, social justice, and the natural world to improve the lives of those most impacted by climate change across the globe.

Meet our new master's students

Sanjali Mitra is from Kolkata, India, where she completed a Masters in Biotechnology. Before coming to Mailman, she worked at a cancer hospital on clinical trials. There, she realized that her interests are in population health at a macroscopic level and understanding the devastating effects that climate change has on people, which led her to pursue an MPH. She plans to use her time at Columbia to explore this broad area of interest to figure out how to best contribute to mitigating the issue.

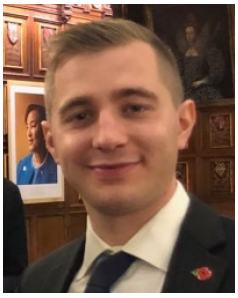
Jamie Ponmattam grew up in Miami, FL. She studied International Relations and Microbiology at the University of Miami. She attended Case Western Reserve University School of Medicine and worked as a resident at the St. Christopher's Hospital for Children in north Philadelphia. Through her MPH and the Climate and Health certificate, she is hoping to gain a better understanding of the health implications of climate change. She plans to eventually use that knowledge to better understand the economic costs associated with the health impacts climate change.

Rachel Sapire is from Los Angeles, CA. She received her Bachelor's degree from Harvard University in Human Evolutionary Biology. Prior to coming to Columbia, she worked for four years at a non-profit in NY called charity: water, where she managed their revenue operations - fundraising analytics and donor reporting. She is interested in the public health impacts of climate change, specifically related to food security and hopes to work in applied research in this area.



Nalyn Siripanichgon is from Bangkok, Thailand. Her undergraduate degree was in Environmental Studies, focusing on natural sciences. Prior to attending Mailman, she worked for a research organization where she worked on projects relating to aerosols and health. At Columbia, she hopes to gain analytical skills that can be applied in future work and research, as well as develop a better understanding of the connection between public health and climate.

Meet our new master's students



Benjamin Steiger is from Hastings-on-Hudson, NY, and received his BS in Biology in 2017 at the University of Wisconsin-Madison, with certificates in Environmental Studies and Global Health. He spent the last two years as Data Manager with the Early Lung and Cardiac Action Program at Mount Sinai Hospital, working on a multi-institutional cohort study investigating treatment outcomes for stage I lung cancer patients. However, he wished to transition to the public sector where he could have a wider population impact, which led him to pursue an MPH. He hopes to gain a wide knowledge of climate change impacts on human health, particularly on zoonotic and infectious diseases as well as air pollution-related mortality, as he pursues his career goals of creating policy solutions for climate change.

RESEARCH

Recent findings

Direct Measurement of Rates of Asymptomatic Infection and Clinical Care-Seeking for Seasonal Coronavirus

Affiliated Investigators: Jeffrey Shaman and Marta Galanti
Journal: medRxiv

Abstract: The pandemic potential of the novel coronavirus (nCoV) that emerged in Wuhan, China, during December 2019 is strongly tied to the number and contagiousness of undocumented human infections. Here we present findings from a proactive longitudinal sampling study of acute viral respiratory infections that documents rates of asymptomatic infection and clinical care seeking for seasonal coronavirus. We find that the majority of infections are asymptomatic by most symptom definitions and that only 4% of individuals experiencing a seasonal coronavirus infection episode sought medical care for their symptoms. These numbers indicate that a very high percentage of seasonal coronavirus infections are undocumented and provide a reference for understanding the spread of the emergent nCoV.

Recent findings

Low Levels of Air Pollution and Health: Effect Estimates, Methodological Challenges, and Future Directions

Affiliated Investigators: Marianthi Kioumourtzoglou
Journal: Current environmental health reports

Abstract: The goal was to assess the current literature to characterize the association between PM2.5 and adverse health at low exposure levels. We reviewed 26 papers that examined the association between short- and long-term exposure to PM2.5 and cardio-respiratory morbidity and mortality. There is evidence suggesting that these associations are stronger at lower levels. However, there are certain methodological and interpretational limitations specific to studies of low PM2.5 levels, and further methodological development is warranted. There is strong agreement across studies that air pollution effects on adverse health are still observable at low concentrations, even well below current US standards. These findings suggest that US standards need to be reevaluated, given that further improving air quality has the potential of benefiting public health.

Awards and recognitions

Sen Pei, Associate Research Scientist, received the Columbia University Calderone Award for Junior Investigators ($25,000) for his work on *Identifying Asymptomatic Colonization with Antibiotic-resistant Pathogens in Hospital Settings.*

Professor Darby Jack and **Carlos Gould**, PhD candidate, were awarded a grant by the NIH Clean Cooking Implementation Science Network for their project on *Clean stacking in Ecuador: Investigating how induction changes energy use and HAP exposures across scales.*

Professor Frederica Perera was awarded a grant by the John Merck Fund for their project on *Estimating the benefits to children's health from the Transportation Climate Initiative*. The goal is to assess the comprehensive benefits to children's health under different policy scenarios of the Transportation Climate Initiative.

Professors Jeffrey Shaman and Katherine Keyes from the Department of Epidemiology were awarded an NIH R01 grant for their project on *Suicide as a contagion: modeling and forecasting emergent outbreaks*. The objective is to use statistical and mathematical modeling approaches to understand the spatial-temporal clustering of suicidal behaviors and develop systems capable of forecasting outbreaks of suicidal attempts.

Professor Marianthi Kioumourtzoglou's paper was selected as a paper of the month by NIEHS Environmental Factor for November 2019. The paper is entitled on *An overview of methods to address distinct research questions on environmental mixtures: an application to persistent organic pollutants and leukocyte telomere length* and published in Environmental Health.

Other recent publications

Heaney AK, Alexander KA, **Shaman J**. Ensemble forecast and parameter inference of childhood diarrhea in Chobe District, Botswana. Epidemics. 2019 Sep 16:100372.

Carrión D, Kaali S, Kinney PL, Owusu-Agyei S, Chillrud S, Yawson AK, **Quinn A**, Wylie B, Ae-Ngibise K, Lee AG, Tokarz R. Examining the relationship between household air pollution and infant microbial nasal carriage in a Ghanaian cohort. Environment international. 2019 Dec 1;133:105150.

Gould CF, Urpelainen J. The Gendered Nature of Liquefied Petroleum Gas Stove Adoption and Use in Rural India. The Journal of Development Studies. 2019 Sep 14:1-21.

Reich NG, McGowan CJ, **Yamana TK**, Tushar A, Ray EL, Osthus D, **Kandula S**, Brooks LC, … **Shaman, J**. Accuracy of real-time multi-model ensemble forecasts for seasonal influenza in the US. PLoS computational biology. 2019 Nov;15(11).

Biggerstaff M, Dahlgren FS, Fitzner J, George D, Hammond A, Hall I, Haw D, Imai N, Johansson MA, **Kramer S,** McCaw JM. Coordinating the real-time use of global influenza activity data for better public health planning. Influenza and Other Respiratory Viruses. 2019 Dec 3.

Gould CF, Schlesinger SB, Molina E, Bejarano ML, Valarezo A, **Jack DW**. Household fuel mixes in peri-urban and rural Ecuador: Explaining the context of LPG, patterns of continued firewood use, and the challenges of induction cooking. Energy Policy. 2020 Jan 1;136:111053.

Gould CF, Urpelainen J. The role of education and attitudes in cooking fuel choice: Evidence from two states in India. Energy for Sustainable Development. 2020 Feb 1;54:36-50.

Shea E, **Perera F**, Mills D. Towards a fuller assessment of the economic benefits of reducing air pollution from fossil fuel combustion: Per-case monetary estimates for children's health outcomes. Environmental Research. 2019 Dec 9:109019.

Johansson MA, Apfeldorf KM, Dobson S, Devita J, Buczak AL, Baugher B, Moniz LJ, Bagley T, Babin SM, Guven E, **Yamana TK, Shaman J**. An open challenge to advance probabilistic forecasting for dengue epidemics. Proceedings of the National Academy of Sciences. 2019 Nov 26;116(48):24268-74.

Wylie BJ, **Quinn A**, Oppong F, **Jack D,** Boamah E, Gyaase S, Lee A, Seyram K, Chillrud S, Kinney P. 284: Prenatal household air pollution exposure associated with lower birth weight and length in rural Ghana. American Journal of Obstetrics & Gynecology. 2020 Jan 1;222(1):S192.

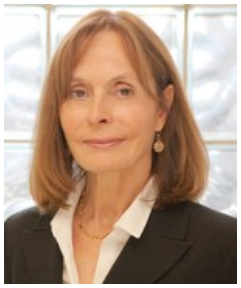
Zhang J, Li D, Xu X, **Ziska LH**, Zhu J, Liu G, Zhu C. The potential role of sucrose transport gene expression in the photosynthetic and yield response of rice cultivars to future CO2 concentration. Physiologia plantarum. 2020 Jan;168(1):218-26.

Sy KT, **Shaman J, Kandula S, Pei S,** Gould M, Keyes KM. Spatiotemporal clustering of suicides in the US from 1999 to 2016: a spatial epidemiological approach. Social psychiatry and psychiatric epidemiology. 2019 Dec 1;54(12):1471-82.

Parks RM, Bennett JE, Tamura-Wicks H, Kontis V, Toumi R, Danaei G, Ezzati M. Anomalously warm temperatures are associated with increased injury deaths. Nature Medicine. 2020 Jan;26(1):65-70.

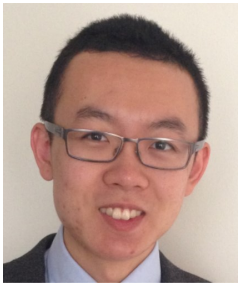
PAST EVENTS

Environmental Mutagenesis and Genomic Society



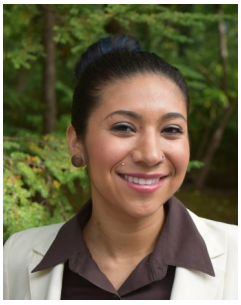
Professor Frederica Perera gave a plenary lecture at the Environmental Mutagenesis and Genomic Society 50th |anniversary meeting in Washington on September 21, 2019 entitled “Translational Research to Prevent Environmental Threats to Children’s Developing Brains” that covered the impacts of climate change and toxic chemicals.

TEMPO Health Applications Conference



Mike He, doctoral candidate, attended a TEMPO conference titled "New Applications in the Use of Satellite Data Monitoring for Population Health" on October 9-11, 2019 at the University of Alabama in Huntsville. He gave an oral presentation, titled "Fine particulate matter and cardiovascular admissions in NY State: an assessment of exposure model choice sensitivity and spatial-temporal effect modification."

UN International Conference on Population Health

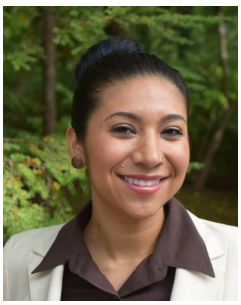


Professor Micaela Martinez recently spoke for a panel at the UN International Conference on Population Health, held in Nairobi, Kenya on November 12-14, 2019. The session, entitled "Environment for Justice: Following the Leadership of Grassroots Women at the Intersection of Reproductive + Climate Justice," was hosted by the Global Fund For Women and Professor Terry McGovern, Chair to the Department of Population and Family Health.

Epidemics 7

Sen Pei, Associate Research Scientist, attended the Epidemics 7 International Conference on Infectious Disease Dynamics from December 3-6, 2019 in Charleston, SC. He gave one oral presentation, entitled “Optimizing respiratory virus surveillance networks using uncertainty propagation,” and a poster presentation on “Forecasting influenza-like-illness by aggregating predictions for multiple respiratory pathogens.”

Santa Fe Institute Working Group



Professor Micaela Martinez attended the Santa Fe Institute Working Group: Aging and Adaptation and Infectious Diseases III in New Mexico on January 14-17, 2020. She gave a talk, entitled “Fast & Slow Immunology: Can we frame predictable temporal trajectories in immunity?”

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.