

# HEI Virtual Workshop on Health Applications for Satellite-Derived Air Quality: Opportunities and Potential Pitfalls

## Chair and Speaker Biographies

April and May, 2022

### **Kalpana Balakrishnan**

Dr. Kalpana Balakrishnan serves as Dean of Research and Director of the ICMR Center for Advanced Research on Air Quality, Climate and Health at the Sri Ramachandra Institute for Higher Education and Research. She obtained her undergraduate degree from the All India Institute of Medical Sciences, New Delhi, and subsequently her doctoral and post-doctoral training at the Johns Hopkins University, USA. Dr. Balakrishnan is a leading global environmental health scientist in India, spearheading research and academic efforts in the areas of health effects of air pollution and chemical risk assessment. She has contributed to several national and international technical assessments concerned with air quality including the Global Burden of Disease and Comparative Risk Assessments, IARC Monographs, Global Energy Assessments, World Health Organisation Air Quality Guidelines and India State level Burden of Disease Initiative.

### **Jeff Brook**

Dr. Jeff Brook is an Assistant Professor in the Dalla Lana School of Public Health and Chemical Engineering at the University of Toronto. For over 25 years he was a research scientist at Environment and Climate Change Canada. He has wide ranging expertise related to air quality, contributing to the development of Canadian policy through his research, participation on national committees and leadership on science assessments. Dr. Brook started and serves as the scientific director of the Canadian Urban Environmental Health Research Consortium (CANUE.ca), which represents an open data resource for Canadian research. He leads the environmental component of Canada's largest birth cohort, known as CHILD, and currently sits on the HEI Research Committee.

### **Heesung Chong**

Dr. Heesung Chong received his Ph.D. at Yonsei University in February 2021 and is currently a postdoc at the Center for Astrophysics | Harvard & Smithsonian. His coauthor of this presentation is Dr. Jhoon Kim, a Professor at Yonsei University, Seoul, Korea and the PI of GEMS. Drs. Chong and Kim work on remote sensing of aerosol and trace gases onboard satellite and other platforms.

### **Sagnik Dey**

Dr. Sagnik Dey is Institute Chair Professor at the Centre for Atmospheric Sciences, coordinator of the Centre of Excellence for Research on Clean Air and Associate Faculty of the School of Public Policy, IIT Delhi, India. His research interest is to understand the air pollution impacts on climate change and human health. He was awarded Fulbright-Nehru Professional and Academic Excellence Fellowship in

2017-18. He led various international and national collaborations and is a consultant for the UN Environment Programme and World Bank on air quality management programs in India.

## **Qian Di**

Dr. Qian Di is an associate professor at Vanke School of Public Health, Tsinghua University. Dr. Qian Di has been committed to using interdisciplinary methods to establish a big data platform for environmental health, (1) to study the impact of environmental factors on human health, and (2) to provide support for environmental policy enactment. Dr. Di has paid special attention on the health effects of air pollution and climate change. His previous work has used follow-up data on 67 million people to demonstrate health effects of ambient PM<sub>2.5</sub> below the National Ambient Air Quality Standards; this work was also used by WHO to revise their Air quality guidelines for PM<sub>2.5</sub> in 2021.

## **Rebecca Garland**

Dr. Rebecca Garland is an Associate Professor in the Department of Geography, Geoinformatics and Meteorology at the University of Pretoria, South Africa. She has a background in atmospheric chemistry, with a focus on air quality and climate change, and science-policy linkages. Her research focus is on improving the understanding of air quality and atmospheric science in southern Africa using multiple data streams. This includes emissions inventory development, air quality modelling, using ground-based and remote sensing measurements, evidence-based air quality management planning, and the linkages between air quality and climate change in a regional to urban scale. She is a founding member of the African Group on Atmospheric Sciences (ANGA) under International Global Atmospheric Chemistry and a Coordinating Leader Author on the on-going Climate and Clean Air Coalition/UN Environment Programme in Africa integrated assessment on air pollution and climate change. She was a Principal Researcher in the Climate and Air Quality Modelling Group at the Council for Scientific and Industrial Research (CSIR), South Africa.

## **Dan Goldberg**

Dr. Dan Goldberg is an Assistant Research Professor at the George Washington University Milken Institute School of Public Health. He graduated with his Ph.D. in Atmospheric Science from the University of Maryland, and completed a B.S. in chemical engineering from Lafayette College. Dr. Goldberg combines satellite data with model output and measurement data to quantify the emissions of and human exposures to air pollution. He holds a “Tiger Team” leadership position on the NASA Health and Air Quality Applied Science Team (HAQAST), and actively collaborates with scientists and policymakers at NASA, NOAA, EPA, IHME, CDC, state agencies, non-profit organizations, and other academic institutions.

## **Yuming Guo**

Dr Yuming Guo is Professor of Global Environmental Health and Biostatistics and Head of Climate, Air Quality Research Unit at Monash University in Melbourne, Australia. His research interests focus on environmental epidemiology, biostatistics, air pollution, climate change, urban design, residential environment, environmental exposure assessment, and infectious disease modelling. He has developed/participated in several large international collaborations to assess the impacts of

environmental factors on human health. He was awarded the Leader Fellowship and Career Development Fellowship by the Australian National Health and Medical Research Council, the Reuters Hot List of The World's Top Climate Scientists, Tony McMichael Award by International Society for Environmental Epidemiology, Young Tall Poppy Award by Australian Institute of Policy and Sciences, and Research Excellence Award by Australian National Health and Medical Research Council. He is an associate editor for Environmental Health Perspectives, Environment International, and PLOS Medicine.

## **Colette L. Heald**

Dr. Colette L. Heald is the Germeshausen Professor of Civil and Environment Engineering & Earth, Atmospheric, and Planetary Sciences at MIT. She received her undergraduate degree in Engineering Physics from Queen's University in Canada in 2000, and her PhD in Earth and Planetary Science from Harvard University in 2005. She held the NOAA Climate and Global Change postdoctoral fellowship at the University of California Berkeley from 2006-2007. She was an Assistant Professor in the Department of Atmospheric Science at Colorado State University from 2008-2011. She has been a member of the MIT faculty since 2012. Colette is currently a member of the Advisory Committee on Geosciences for the National Science Foundation, the Department of Energy Aerosol Measurement and Science Advisory Group, and an elected representative of the Atmospheric & Hydrospheric Sciences Section of AAAS. In 2015, she was awarded the James B. Macelwane Medal for early career contributions to the geosciences. She is a Fellow of the American Geophysical Union.

## **Tracey Holloway**

Dr. Tracey Holloway is a Professor in the Nelson Institute for Environmental Studies and the Department of Atmospheric and Oceanic Sciences (AOS) at the University of Wisconsin—Madison, where her research group uses computer models and satellite data to understand links between regional air quality, energy, climate, and health. Dr. Holloway serves as two-time director of the NASA Health and Air Quality Applied Sciences Team (2016-2020 and 2021-2025), and Chair of the Energy Analysis and Policy graduate certificate program at UW-Madison. She completed her undergraduate degree (Sc.B.) from Brown University in Applied Mathematics; Ph.D. in Atmospheric & Ocean Sciences from Princeton University in 2001; and post-doctoral work at Columbia University's Earth Institute in collaboration with the Mailman School of Public Health. For more information: [HAQAST.org](http://HAQAST.org), [hollowaygroup.org](http://hollowaygroup.org)

## **Heather Holmes**

Dr. Heather Holmes is an Associate Professor in the Department of Chemical Engineering at the University of Utah and a member of HEI's Research Committee. She has an interdisciplinary background that also includes mechanical engineering, environmental engineering, and atmospheric science. Her research group uses ground-based sensors, atmospheric models, and satellite remote sensing to investigate atmospheric physics, air pollution sources, transport and dispersion, and provide data for human health and public policy assessments. She has a history of collaborative research with the objectives of improving the understanding of air pollution exposure and understanding regulatory impacts on ambient air pollution concentrations.

## **Laura Judd**

Dr. Laura Judd balances her time as a research scientist at NASA Langley Research Center and an associate program manager for NASA's Health and Air Quality Applied Sciences Program — which promotes the use of NASA data in air quality applications by public and private sectors. Driving new research, she leads airborne air quality field studies revealing unseen spatial resolutions of ozone and its precursors in preparation for the upcoming TEMPO satellite mission. Her research focuses on the interpretation between multi-perspective views of air quality from ground-, aircraft-, satellites-based observations as well as contributing to multiple satellite product validation teams. Dr. Judd has a Bachelors degree in meteorology from the University of Nebraska and PhD in Atmospheric Sciences from the University of Houston.

## **Yang Liu**

Dr. Yang Liu is the Gangarosa Distinguished Professor and Chair of the Gangarosa Department of Environmental Health at the Rollins School of Public Health of Emory University. His research interests include satellite aerosol retrieval and product design, applications of satellite remote sensing in public health research, potential impacts of global climate change on public health, machine learning and spatial statistics. He is a science team member of the NASA EVI-3 MAIA investigation and the Terra MISR mission, and has been a PI member of the NASA Health and Air Quality Applied Science Team since 2011.

## **Eloise Marais**

Dr. Eloise Marais is an Associate Professor in Physical Geography at University College London, UK. Her research group uses and contributes to the development of the widely used atmospheric chemistry transport model GEOS-Chem. The group also develops new inventories of emerging and prolific global and regional emissions, derives new data products of air pollution abundances from a range of data platforms (satellites, aircraft, ground-based networks), and obtains vital information on the sources and characteristics of local and regional air quality for developing prudent environmental policies. She has a PhD from Harvard University and has worked at Harvard University, University of Birmingham and University of Leicester.

## **Ana Prados**

Dr. Ana Prados has 20 years' experience in air quality monitoring, modeling, and research applications of satellite remote sensing. She developed the internationally recognized Applied Remote Sensing Training Program ([ARSET](#)) for NASA, enabling stakeholders worldwide to integrate satellite data into environmental monitoring, planning, and risk assessment. She has a unique ability to translate scientific information for diverse audiences, and 15 years' experience working with local and state government to develop air quality and climate change policies.

## **Sally Pusede**

Dr. Sally Pusede is an Assistant Professor in the Department of Environmental Sciences at the University of Virginia. Her atmospheric chemistry group studies factors controlling air quality variability within cities and interactions between air pollution and the biosphere. Sally is a Co-Director of the Repair Lab,

an interdisciplinary research laboratory at the University of Virginia focused on environmental and climate justice issues. She is a recent recipient of the National Science Foundation CAREER Award and the NASA New Investigator Program Award. Sally received her B.F.A in Sculpture from Pratt Institute, her Ph.D. in Chemistry from the University of California Berkeley, and she was a NASA Postdoctoral Fellow at the NASA Langley Research Center in Hampton, Virginia.

## **Laura Rodriguez**

Dr. Laura Rodriguez is an Associate Professor in the Department of Public Health -School of Medicine at the Universidad Industrial de Santander (UIS) in Bucaramanga, Colombia. She earned her Physician and PhD in Epidemiology credential at the University of Alberta, Canada. Her main research topic is environmental health, conducting epidemiologic studies of the role of environmental exposures, mainly air pollution and heavy metal toxicity, on respiratory, cardiovascular, reproductive health, and cancer. Dr. Rodríguez leads the Global Environmental and Occupational GEO Health Hub in Colombia. Currently she is part of the leading team of the "Research program for environmental health in Colombia" funded by the Ministry of Science and Technology.

## **Aaron van Donkelaar**

Dr. Aaron van Donkelaar is a Research Associate with the Atmospheric Composition Analysis Group at Washington University in St. Louis, Missouri, US. His work brings together satellite retrievals, ground-based observations, and chemical transport modelling to provide global insight into fine aerosol concentrations and its impact on human health. The data sets he will discuss can be found at: <https://sites.wustl.edu/acag/datasets/surface-pm2-5/>.