NC BREATHE CONFERENCE
2017

Bridging Research on Economics and Air Quality For the Health of Everyone

Tuesday, March 28, 2017
NC Museum of Natural Sciences
Raleigh, NC

Join the Conversation #NCBREATHE @cleanaircarolina @cleanairNC

Clean Air Carolina

Environmental Health Scholars Program
MAHA Medical Advocates for Healthy Air
Fred and Alice Stanback
Your advocates for healthy air
MISSION STATEMENT
To provide an interactive forum for North Carolinians to share the latest research related to the impacts air pollution has on human health, the environment, and the economy and to discuss the critical role policymaking plays.

March 28, 2017
NC Museum of Natural Sciences
Nature Research Center
www.ncbreatheconference.org

WiFi Network: DNCR – Guest (** no password necessary)
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Twitter: @cleanairNC #NCBREATHE

** There is no password to access the WiFi network. Guests will need to open a browser after selecting the network to accept the terms of use.
Clean Air Carolina is a nonprofit organization based in Charlotte with a satellite office in the Triangle. Its mission is to ensure cleaner air quality for all North Carolinians through education and advocacy and by working with partners to reduce sources of pollution. Current programs include Medical Advocates for Healthy Air, Clear the Air for Kids!, Climate and Energy, and Diesel and Transportation. www.cleanaircarolina.org

Medical Advocates for Healthy Air (MAHA), an initiative of Clean Air Carolina, is a statewide network of medical and health professionals leading the call for cleaner, healthier air. MAHA members educate colleagues, patients and policymakers about the health impacts of air pollution. MAHA also offers a clean air advocacy training to pediatric residents at medical schools across the state. www.medicaladvocatesforhealthyair.org

The Environmental Health Scholars Program supports faculty investigators and students to become involved in basic, translational and population research arenas to better understand the health impact of environmental changes in North Carolina. The Program is headed by Dr. H. Kim Lyerly, George Barth Geller Professor in Cancer Research and Professor of Surgery at Duke University.

Special Thanks to

Fred and Alice Stanback
Conference Agenda

Morning Session

8:00 AM  Registration & Breakfast - Student Research Posters & Exhibitors
8:30 AM  Welcome & Opening Remarks
8:45 AM  Plenary - Perspectives on 21st Century Air Pollution Health Research Priorities
          Sri Nadadur, Ph.D.
          National Institute of Environmental Health Sciences (NIEHS)
9:45 AM  Plenary - Economic Consequences of Air Pollution from Electric Car Adoption
          Andrew Yates, Ph.D.
          UNC Chapel Hill
10:40 AM Break
10:55 AM Plenary - Energy and Our Environment: A Systems and Life Cycle Perspective
          Rebecca Dodder, Ph.D.
          U.S. Environmental Protection Agency

Luncheon

12:00 PM  Policymaker Perspectives
          Robin Smith, J.D.
          Former Assistant Secretary for Environment, NC DENR
          Airkeeper Awards
          Sen. Angela R. Bryant
          Rep. Chuck McGrady
          Local Perspectives
          Sig Hutchison, M.Ed.
          Chair, Wake County Board of Commissioners
1:15 PM  Break - Student Research Posters & Exhibitors

Afternoon Session

1:45 PM  Participant Discussion Breakout Sessions - Health, Economy, and Environment
3:05 PM  Break - Student Research Posters and Exhibitors
3:35 PM  Poster Award
3:50 PM  Participant Discussion Breakout Reports
4:30 PM  Advocacy Practices & Opportunities
4:50 PM  Closing Remarks
5:00 PM  Conference Adjourns
Program Committee

Viney Aneja, Ph.D.
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Sri Nadadur, Ph.D.
Dr. Nadadur is a Program Director and oversees three research portfolios - Nanotechnology Environmental Health and Safety (Nano-EHS), air pollution environmental cardiopulmonary health, and Countermeasures against Chemical Threat agents (pulmonary) extramural research programs at the National Institute of Environmental Health Sciences (NIEHS).

Nadadur has more than 30 years of research experience in molecular biology and toxicology. While working as a bench scientist he focused on integrating emerging state of the art technologies to address fundamental biological questions. Nadadur served as Embassy Science Fellow at the U.S. Embassy, New Delhi, India in 2015 to facilitate scientist to scientist interactions in implementing the goals of Memorandum of understanding signed between the two countries on cooperation in the areas of ‘air quality and health’ announced in the joint statement “Shared Effort; Progress for All.” During his sabbatical as Embassy Science Fellow Nadadur formed three Communities of Researchers in the areas of air pollution health research, exposure assessment and training to facilitate collaboration and exchange of technical expertise.

Prior to joining NIEHS, Nadadur worked as a Principal Investigator at the National Center for Environmental Assessment (NCEA), National Health and Environmental Effects Research Laboratories (NHEERL), Office of Research and Development, U.S. Environmental Protection Agency. At NCEA his research efforts were focused on developing ambient air quality criteria documents for the health effects of ozone and lead in support of the national ambient air quality standard setting process. At NHEERL, Nadadur’s research efforts were to integrate genomics and systems biology approaches to understand air pollution-induced molecular alterations in the cardiopulmonary system.
Economic Consequences of Air Pollution from Electric Car Adoption

There are three implications of a change from gasoline to electric cars. First, electric cars may increase or decrease the damages from air pollution, depending on where they are charged. Second, electric cars tend to export pollution from one state to other nearby states. Third, households with higher incomes tend to obtain decreased damages from electric cars; this is reversed for households with lower incomes.

Andrew Yates, Ph.D.
Professor Andrew Yates’ research expertise is in the area of environmental economics, with a particular focus on the design of pollution permit markets. One of his recent projects analyzes the optimal scale of nitrogen emission trading in North Carolina’s Neuse River System.

He has published articles in a variety of economic journals including the Journal of Economic Theory, the Review of Economics and Statistics, the Journal of Environmental Economics and Management, and Economic Theory. He is currently the co-editor of the Journal of the Association of Environmental and Resource Economists.

Energy and Our Environment: A Systems and Life Cycle Perspective

The production and use of energy touches on multiple aspects of our economy and our lives and has a diverse and complex set of impacts on our environment. There is also deep uncertainty regarding how our energy system will unfold over time. A long-range energy systems modeling approach can address some of this complexity, by modeling interactions among sectors (e.g., electric sector and transportation) and impacts across media (e.g., air versus water). Innovative approaches to modeling our energy system will be discussed, drawing from examples such as biofuel production, scenario planning, and the water-energy nexus.

Rebecca Dodder, Ph.D.
Dr. Rebecca Dodder is a Physical Scientist with the US EPA Office of Research and Development’s National Risk Management Research Laboratory. She specializes in the use of energy system modeling tools to assess issues related to biomass and biofuels, agriculture-energy linkages, the water-energy nexus, and the broader life cycle impacts of energy choices. Although originally trained in physics, Dr. Dodder moved deeper into the interdisciplinary area of energy and the environment while working as a graduate student researcher on air quality and transportation in Mexico City.

Rebecca holds a Ph.D. in Technology, Management and Policy from Massachusetts Institute of Technology, an M.S. in Science, Technology, and Public Policy from George Washington University, and undergraduate degrees in Physics and Spanish from Vanderbilt University. In 2016, Dr. Dodder received the prestigious Presidential Early Career Award for Scientists and Engineers (PECASE), the highest honor bestowed by the U.S. government on outstanding science and engineering professionals in the early stages of their research careers.
Conference Faculty

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Chris Weaver, Ph.D.
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Andrew Yates, Ph.D.
Associate Professor, Economics
UNC Chapel Hill
Exhibitors

Go Triangle
Learn about current and future transit services across the Triangle region.

City of Raleigh Office of Sustainability
The Office of Sustainability for the City of Raleigh will have information available about the most recent Greenhouse Gas Inventory, including community-wide results. Come learn about actions you can take in your daily life to help reduce GHG emissions that improve our air quality.

This exhibit will highlight rural North Carolinians’ thoughts about climate change in their state. It will address related health concerns (e.g., air quality, respiratory illnesses, water quality, bacteria), as well as issues of Climate Justice of vulnerable populations in NC and in the Southeastern U.S. Exhibitors: Kristie Gutierrez, Ph.D. and Louie Rivers III, Ph.D., NC State University.

U.S. EPA, Air, Climate, and Energy Research Program
The U.S. Environmental Protection Agency’s Air, Climate, and Energy Research Program provides critical air quality science and technology to protect public health as we face an evolving energy landscape and changing environment. The research is improving understanding of the impacts of air pollution on the lungs, cardiovascular system, brain and other biological systems, while providing solutions and new approaches to minimize adverse public health impacts.

Advanced Self-Powered Systems of Integrated Sensors and Technologies
As an NSF Nanosystems Engineering Research Center, ASSIST is part of the National Nanotechnology Initiative—a government-wide activity designed to develop wearable sensors that perform analytic processing of health/environmental collected sensor data. These devices developed at the center are transforming health care by improving the way doctors, patients, communities, and researchers gather and interpret important data together.

Clean Air Carolina/Medical Advocates for Healthy Air
Learn how you and other North Carolinians can ensure healthy air through education, citizen science and advocacy.
Health

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Support NC BREATHE
For the past three years, Clean Air Carolina and partners have created a safe space for advocates, scientists, medical researchers, health professionals, economists, students, and government officials to come together and discuss the linkages between air pollution, climate change, public health, and the economy.

While the conference is free, we are grateful for your support to help offset expenses. Please consider making a donation to Clean Air Carolina today by visiting [www.CleanAirCarolina.org/donate](http://www.CleanAirCarolina.org/donate) or sending a check to Clean Air Carolina, PO Box 5311, Charlotte, NC 28299.

Join our GivingCircle and you will become part of a special group of people who provide a dependable base of support to Clean Air Carolina through monthly donations. We’re offering a free Clean Air Carolina t-shirt to supporters who join our GivingCircle at the $15 a month level by April 30, 2017.
**Poster Abstracts**

**Sara Duncan (1,2) and Barbara Turpin (1)**  
1=University of North Carolina, Chapel Hill, 2=Rutgers University, New Brunswick  
**Identification of Water-soluble Organic Gases in 13 Real Homes in New Jersey and North Carolina**  
>This research aims to identify water-soluble organic gases in real homes. These gases are likely to play an important roll in indoor air chemical makeup in humid and damp homes such as those often found in the southeast.

**Calvin Arter** and Saravanan Arunachalam, Ph.D.  
Institute for the Environment, University of North Carolina, Chapel Hill  
**Calculating Second Order Sensitivity Coefficients For Airport Emissions In The Continental U.S. Using CMAQ-HDDM**  
>This work shows higher order sensitivity coefficient calculations for O3 and PM2.5 formation with respect to aircraft emissions in the continental United States. CMAQ HDDM sensitivity coefficient calculations were then used to construct an analysis estimating the emission reduction needed in five airport grid cells to bring hypothetical regions in PM2.5 nonattainment into attainment.

**Yuqiang Zhang**  
U.S. Environmental Protection Agency and University of North Carolina, Chapel Hill  
**Significantly Reduced Health Burdens from Ambient Air Pollution in the U.S. Under Emission Reductions from 1990 to 2010**  
>For this study, we are trying to quantify the health burden from ambient air pollution, including both O3 and PM2.5 in U.S. from 1990 to 2010 by using long-term air quality model simulations, and quantify the health benefits from the emission reductions for the past 2 decades.

**Mohammad Maksimul Islam** and Dr. Andrew P Grieshop  
Department of Civil, Construction & Environmental Engineering, North Carolina State University  
**Comparative Analysis of Cookstove Activity and Air Pollutant Emission Factors and Properties Measured in the Field and Laboratory**  
>We compare emission data from five different cookstoves measured during two previous field campaigns in Malawi and India and in laboratory tests at NC State University. We also explore whether emission factor (EF) calculation approaches do bias the results or not.

**Weichang Yuan** and H. Christopher Frey  
Department of Civil, Construction, Environmental Engineering, North Carolina State University  
**Quantification of Transit Train Activity Data for Energy Consumption Estimation**  
>A procedure is demonstrated for quantifying transit train activity based on open-access data and real-time transit tracking. As an example, for the Washington Metropolitan Area Transit Authority (WMATA) Metrorail system, the daily number of trips, travel time of each trip, stop-by-stop travel distance of each route, dwell time at each stop, and speed profiles for each train service were quantified.
Pornpan Uttamang (1), Viney P. Aneja (1), and Adel Hanna (2)
1-Department of Marine, Earth and Atmospheric Sciences, North Carolina State University, 2-Institute for the Environment, University of North Carolina, Chapel Hill

**Measurements and Analysis of Air Quality in Bangkok Metropolitan Region, Thailand**
This research investigates characteristics of air pollution in Bangkok Metropolitan Region, Thailand based on 5-year observation data during 2010-2014.

Aditya Sinha and Andrew Grieshop
North Carolina State University

**Measurement of atmospherically relevant secondary organic aerosol from cook-stove emissions**
Emissions from cookstoves contribute to the formation of secondary organic aerosol (SOA) which have implications on health and climate effects. This poster looks at accurately modeling this SOA in the laboratory, the experimental parameters used and some characteristics observed from preliminary results.

Zhiyuan Li (1,3), Zibing Yuan (1), Ying Li (1), Alexis K.H. Lau (1), and Peter K.K. Louie (2)
1-Division of Environment, The Hong Kong University of Science and Technology, 2-Hong Kong Environmental Protection Department, 3-Department of Civil, Construction and Environmental Engineering, North Carolina State University

**A Method for Source Apportionment of Health Risk from Ambient Particulate Matter (PM): Development and Validation**
In this study, one health risk-based source apportionment method was proposed to identify source contributions to health risk from ambient particulate matter (PM).

Casey D. Bray (1), William Battye (1), Viney P. Aneja (1), Daniel Tong (2,3,4), Pius Lee (2), and Youhua Tang (2,3)
1-North Carolina State University, 2-NOAA Air Resources Laboratory, 3-Cooperative Institute for Climate and Satellites, University of Maryland, College Park 4-Center for Spatial Information Science and Systems, George Mason University

**Evaluating the Impact of Wildfires on Atmospheric Ammonia Concentrations in the U.S. Using Satellite Measurements**
Comparing calculated emissions for ammonia from biomass burning for each EPA region with the National Emissions Inventory emissions and identifying trends in these emissions from 2010 to 2014.

Jordan Baker, Dr. Viney Aneja, and Dr. Pal Arya
North Carolina State University

**Agricultural Ammonia Emissions on the Delmarva Peninsula: Transport and Deposition from a Broiler Concentrated Animal Feeding Operation**
This project looks at a numerical simulation of a broiler CAFO over the course of 1 year. Deposition and concentrations are calculated via AERMOD which will provide information about Ammonia behavior and transport from a single broiler CAFO.
Rachel N. Long, Prof. Ilona Jaspers, Phillip Clapp, Prof. Barbara Turpin, and Prof. Jason D. Surratt
University of North Carolina, Chapel Hill

Chemical Characterization of Fine Particulate Matter Derived from E-Cigarette Usage
This study aims to understand the chemical composition of e-cigarette aerosols to determine whether e-cigarette device wattage affects the emission of potentially toxic compounds.

Ashley Bittner, Joseph Pedit, Ipsita Das, Zoey Frolking, Sudhanshu Handa, Leena Nylander-French, Karin Yeatts, and Pamela Jagger
University of North Carolina, Chapel Hill

Quantifying Household Air Pollution in Charcoal-burning Households in Peri-urban Rwanda
The objective of our study is to characterize the effect that improved cookstoves have on social welfare, health outcomes, regional forest use, and household energy. As a first step, we analyze the exposure monitoring data collected during the baseline phase of our study.

Tongchuan Wei, Tanzila Khan, and H. Christopher Frey
North Carolina State University

Modeling CNG, Diesel, and Hybrid Transit Bus Energy Use Rates
This study focuses on quantifying and comparing transit bus fuel economy on fuel, power train, and lengths, thus developing an energy use rate model for transit buses.