

HEI Annual Conference Program

April 30–May 2, 2017

Alexandria, Virginia

Sunday, April 30, 2017

11:30 AM Lunch

1:00 PM **Where Are Vehicles and Fuels Headed in the 21st Century?**

Chairs: *David Foster*, University of Wisconsin and HEI Research Committee; and *Dan Greenbaum*, Health Effects Institute

Transformations are under way in vehicles and fuels in the United States and around the world, prompted in part by current regulatory mandates to reduce greenhouse gas emissions. In the near term — through 2025–2030 — this will mean much greater use of fuel-efficient gasoline direct injection (GDI) engines, “lower carbon” fuels, and many other approaches. Over the longer term — 2025 and beyond — increasingly wider use of electric-drive vehicles has the potential for broad shifts in vehicles and mobility. This session will explore what we know about advantages and challenges of the main technology and fuel options, and potential implications for air quality and public health.

1:00 The Context: A Changing World of Transportation Mobility and Technology
Dan Greenbaum

1:30 The GDI Engine: Features, Emissions, and Effect of Fuel Composition
Allen Robinson, Carnegie Mellon University

2:00 PM Break

2:30 Looking Ahead: Electric Drive
Nic Lutsey, International Council on Clean Transportation

3:00 The Future of Mobility in the Urban Context
Susan Zielinski, Consultant (former head of the Sustainable Mobility and Accessibility Research and Transformation initiative, University of Michigan)

3:30 Wrap-Up: The Way Forward

4:00 PM Break

4:15 PM **Poster Session 1**

6:00 PM **Reception**

7:00 PM **Dinner**

Monday, May 1

7:00 AM Breakfast

8:30 AM **Making Sense of Sensor Data: Promises and Pitfalls**

Chairs: *Jeff Brook*, Environment Canada, University of Toronto, and HEI Research Committee; and *Lianne Sheppard*, University of Washington–Seattle and HEI Review Committee

Air pollution sensors and smartphone apps are revolutionizing the way we can monitor environmental exposures and health outcomes in community studies. These novel technologies are inexpensive, easy to use, and portable, and can provide high temporal and spatial resolution; on the other hand, there are questions on data quality, analysis, interpretation, and communication. This session will discuss the current state of the art of sensor technologies, the challenges of their wider use (such as their application in “citizen science”), and how they may advance exposure assessment for health studies.

8:30 The State of the Science of Sensor Technologies
Ronald Williams, U.S. Environmental Protection Agency

9:00 The CITI-SENSE Study: Lessons Learned from a “Citizen Science” Study
Alena Bartonova, Norwegian Institute for Air Research

9:25 Filling the Gaps in Urban Air Pollution Monitoring with Google Street View Cars
Joshua Apte, University of Texas–Austin

9:50 Harnessing Novel Technologies for Exposure Assessment in Epidemiologic Studies
Michael Jerrett, University of California–Los Angeles

10:15 General Discussion

10:30 AM Break

11 AM **HEI Update**

Chairs: *David Eaton*, University of Washington–Seattle and chair, HEI Research Committee; and *James Merchant*, University of Iowa and chair, HEI Review Committee

HEI will present progress of its research programs and publications. Highlights include a presentation of a recently completed exposure assessment study in Hong Kong and plans for new research on the effects of traffic-related air pollution and unconventional oil and natural gas development. The recipient of the 2016 Walter A. Rosenblith New Investigator Award will also be introduced.

11:00 Introduction of the Committees
David Eaton and *James Merchant*

11:10 Presentation of the 2016 Walter A. Rosenblith New Investigator Award
David Eaton

11:15 Scientific Activities at HEI
Rashid Shaikh, Health Effects Institute

11:30 Global Health Program
Katherine Walker, Health Effects Institute

11:40 Energy Research Program
Donna Vorhees, Health Effects Institute

- 11:50 Featured HEI Study
 A Dynamic Three-Dimensional Exposure Model for Hong Kong
Benjamin Barratt, King's College London, United Kingdom
 Comments
Jennifer Peel, Colorado State University and HEI Review Committee
- 12:20 Discussion
- 12:30 PM Lunch
- 1:30 PM Poster Session 2**
- 3:15 PM A New Vision for Accountability Research?**
 Chairs: *Francesca Dominici*, Harvard T.H. Chan School of Public Health and HEI Research Committee; and *Jennifer Peel*, Colorado State University and HEI Review Committee

There is a long-standing interest in evaluating the effectiveness of air quality interventions in reducing air pollution and improving public health. To date, "accountability" studies have had varying degrees of success in relating regulatory actions to outcomes. To encourage potential new research in this area, this session hopes to bring fresh insights for methods and approaches in accountability research, taking into account the challenges encountered.

- 3:15 Accountability and Attribution: Origin and Applications
Jonathan Samet, University of Southern California
- 3:30 Accountability Studies: Lessons Learned and Recommendations for Future Opportunities
Michael Brauer, University of British Columbia, Canada
- 3:55 An Economics Perspective on Accountability Research
Matthew Neidell, Columbia University
- 4:20 Panel Discussion
 Moderator: *Jennifer Peel*
 Discussants: *Erika Sasser*, U.S. Environmental Protection Agency; and *Clint Woods*, Association of Air Pollution Control Agencies
 Closing Comments: *Francesca Dominici*
- 5:00 PM Free Evening**

Tuesday, May 2

- 7:00 AM Breakfast
- 8:30 AM The Double Life of NO₂: Ozone Precursor and Ambient Pollutant**
 Chairs: *Jana Milford*, University of Colorado–Boulder and HEI Review Committee; and *Bert Brunekreef*, University of Utrecht, the Netherlands

The oxidant gas nitrogen dioxide (NO₂), a regulated criteria pollutant, is the indicator for the larger group of oxides of nitrogen (NO_x) emitted from combustion sources. NO_x react with volatile organic compounds in sunlight to form ozone (O₃). This session will examine two separate scientific debates that have implications for future regulations of NO_x and NO₂: one related to the accuracy of NO_x emission inventories and the challenge in modeling the

formation of O₃ in the troposphere, and the other related to the question of whether NO₂ has independent health effects or is more likely an indicator of the broader traffic mixture.

PART I. The Role of NO_x in Ozone Formation

- 8:30 Introduction and Background
Armistead Russell, Georgia Institute of Technology
- 8:45 NO_x Emission Inventories Uncertainties and Approaches to Evaluate Them
Russell Dickerson, University of Maryland
- 9:10 The Challenge of Modeling the Chemistry of Ozone
Gregory Yarwood, Ramboll Environ
- 9:35 General Discussion on “What Additional Experimental or Other Evidence Do We Need to Resolve These Challenges?”
Moderator: *Jana Milford*
- 10:00 AM Break

PART II. Health Assessment of NO₂

- 10:20 Introduction
Bert Brunekreef
- 10:30 Evaluations of the Health Effects of Long-Term Exposure to NO₂: A European Perspective
Heather Walton, King’s College London, United Kingdom
- 10:50 EPA Integrated Science Assessment of NO₂: Clean Air Scientific Advisory Committee Review and Recommendations
Christopher Frey, North Carolina State University
- 11:10 General Discussion

11:30 AM Lunch

12:30 PM PM Matters: What More Do We Need to Know?

Chairs: *Barbara Hoffmann, University of Düsseldorf, Germany, and HEI Research Committee; and Mark Frampton, University of Rochester Medical Center and HEI Review Committee*

The United States and other countries have made progress in reducing levels of ambient particulate matter (PM), thanks to regulation and technological innovation in the automotive and other industries. Further progress is expected when additional rules are fully implemented by 2030. In this session, experts from the United States and Europe will share perspectives on where PM science is, and identify potential key knowledge gaps where research may provide further insight and leverage for future decisions about the regulation of PM.

- 12:30 PM Progress: Looking Back and Looking to the Future at EPA
Daniel Costa, U.S. Environmental Protection Agency
- 12:55 Air Pollution and Regulatory Challenges Ahead in the EU: Research That Can Make a Difference
Michal Krzyzanowski, King’s College London, United Kingdom
- 1:20 The Future of Environmental Science in Improving Public Health: A View from the Front Lines
Thomas Burke, Johns Hopkins University
- 1:45 Concluding Comments and General Discussion
- 2:30 PM Conference Adjourns**