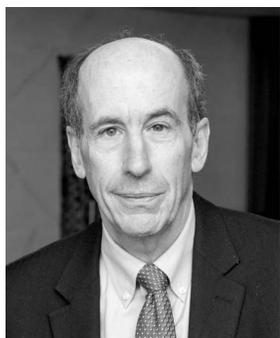




Greenbaum Honored for Many Years of Clean Air Leadership at HEI



Dan Greenbaum.

PHOTO BY JAY MALLIN

H EI President Dan Greenbaum has received a 2016 Haagen-Smit Clean Air Leadership Award from the California Air Resources Board (CARB). This honor, [as explained on CARB's website](#), is conferred annually on "extraordinary individuals to recognize significant career accomplishments in at least one of these air quality categories: research, environmental policy, science and technology, public education and community service."

In selecting Greenbaum as a recipient, CARB commended his having "led HEI's efforts for over two decades to produce and communicate — for decisions first in the U.S., then in Europe, and now worldwide through the Global Burden of Disease and the State of Global Air report and website — high-quality, relevant, and credible science on the health effects of particulate matter, ozone, air toxics, and many other air pollutants."

As part of a June 21 awards ceremony, held at the headquarters of the California Environmental Protection Agency in Sacramento, Greenbaum gave an educational talk to a diverse audience of CARB experts and stakeholders describing HEI's model for producing trusted science, its mission and impact, and its current projects. The awardees were pleased to have Governor Jerry Brown join them at the reception following the ceremony.

The award was named for Arie Haagen-Smit, an atmospheric chemist known by many as the "father" of air pollution control, who first identified what causes smog and served as CARB's first chair when the agency began in 1968. 

Annual Conference Features Dynamic Scientific Program, Productive Workshop

A bout 175 diverse participants from academia, government, industry, and nongovernmental organizations gathered in Alexandria, Virginia, just outside of Washington, D.C., for HEI's [31st Annual Conference](#).

The three-day meeting, held April 30–May 2, featured discussion of the latest research on air pollution and health in the context of current and past policies and provided opportunities for attendees to meet others with similar interests.

The meeting kicked off on Sunday with a series of presentations on the regulatory, economic, and technological context of vehicles and fuels in the 21st century. The presentations were followed by a poster session on air pollution exposure, emissions, epidemiological methods, and epidemiology at low exposure. A guided poster tour highlighted posters by HEI-funded investigators [Stuart Batterman](#) of the University of Michigan, [Christopher Frey](#) of North Carolina State University, and [Jeremy Sarnat](#) of Emory University.

Monday morning began with a vibrant discussion on how air pollution sensors and smartphone apps may revolutionize the way we monitor environmental exposures and health outcomes in community studies, and some of the challenges in developing and applying them.

Next, a general update on HEI's research program included the presentation of the 2016 Walter A. Rosenblith New Investigator Award to [Mònica Guxens](#) from the Barcelona Institute for Global Health (ISGlobal; formerly CREAL) and the introduction of several new HEI initiatives. Plans for an updated review of the scientific literature on the effects of traffic-related air pollution were announced, and the attendees were asked to consider nominations for the research panel. An update on HEI's Global Health Program, now led by Principal Scientist Katy Walker, included a newly released interactive website on the [State of Global Air](#), and new projects on the influence of ports and household air pollution on health. Donna Vorhees introduced HEI's new Energy Research Program, which she directs



Washington, D.C.

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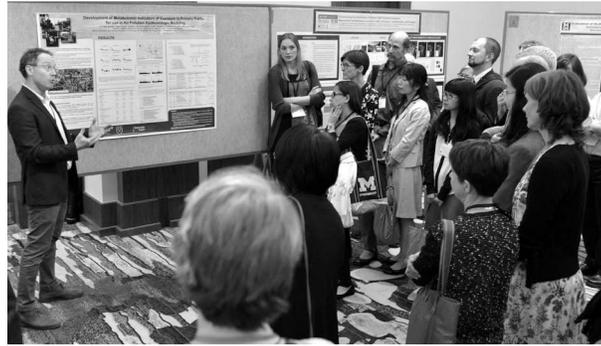
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Qian Di, Harvard T.H. Chan School of Public Health; and Heather Walton, King's College London.



Jeremy Sarnat of Emory University presents his work on assessment of exposure to traffic-related pollution during the poster tour.



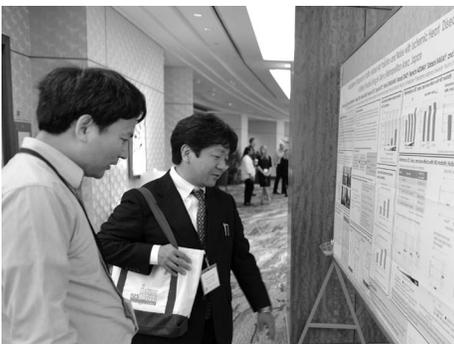
Clint Woods, Association of Air Pollution Control Agencies.



Francesca Dominici, Harvard T.H. Chan School of Public Health, with John Vandenberg (center) and Zachary Pekar, both from the U.S. Environmental Protection Agency.



Walter A. Rosenblith New Investigator Award recipients, from left: Jason Surratt, University of North Carolina–Chapel Hill (2012); Nga Lee (Sally) Ng, Georgia Institute of Technology (2013); Mònica Guxens, Barcelona Institute for Global Health (2016); Kymberly Gowdy, East Carolina University (2015); and Lydia Contreras, University of Texas–Austin (2014).



Xiaoliang Wang, Desert Research Institute (left); and Haruya Sakai, Japan Automobile Research Institute.

HEI ANNUAL CONFERENCE (Continued from page 1)

and which will focus on the effects of **unconventional oil and gas development**. A recently completed study on a three-dimensional exposure model for Hong Kong, led by **Benjamin Barratt** of King's College London, was the featured HEI study, with comments by Jennifer Peel of the HEI Review Committee.

Monday afternoon began with a poster session on emission inventories, accountability, epidemiology, risk communication, and experimental and clinical studies of the

mechanisms by which air pollution impacts health. The day ended with a session on the history and current state of “**accountability**” research to evaluate the effectiveness of air quality interventions in reducing air pollution and improving public health.

Tuesday morning featured a session on nitrogen oxides (NO_x), providing first an overview of the science on the role of NO_x in ozone formation and the issues associated with the development and validation of NO_x emission inventories, and then discussion of the differing health assessments of nitrogen dioxide (NO₂) in the European Union and United States. The conference concluded on Tuesday afternoon with a session on particulate matter (PM) research needs for future decisions about the National Ambient Air Quality Standard for PM as concentrations continue to decrease. The conference was followed by a workshop of the researchers investigating health effects at low levels of air pollution (see separate story). Attendees discussed study designs and approaches to exposure and health assessment with the goal of coordinating the efforts and ensuring the maximum degree of comparability of the results. **HEI**

The conference program and all presentation slides are available at www.healtheffects.org/annual-conference. Next year's Annual Conference is scheduled for April 29–May 1, 2018, at the Drake Hotel in Chicago, Illinois. Registration and program information will be available in early 2018.

CONFERENCE PHOTOS BY JAY MALLIN

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HEI is a nonprofit organization funded jointly by government and industry to research and evaluate the health effects of air pollution. An overview of HEI, information on its current research program, and all published HEI reports are available for downloading, free of charge, from the website.

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HEI Studies of Potential Health Effects at Low Air Pollution Levels Moving Ahead

The three highly qualified teams competitively selected by HEI in 2016 to investigate the health effects of exposure to low levels of ambient air pollution in millions of people in the United States, Canada, and Europe are moving quickly ahead. Using a variety of epidemiological and statistical techniques, the studies are designed to address current major uncertainties in air pollution effects at very low levels, and their results will likely inform important scientific and regulatory questions.

The selected teams are led by [Michael Brauer](#) (University of British Columbia, Canada), [Bert Brunekreef](#) (Utrecht University, the Netherlands) and [Francesca Dominici](#) (Harvard University, Boston). Their studies are relying on information from very large populations (with detailed individual information about potential confounders) and very large administrative databases, such as Medicaid and Medicare and the Canadian Census, giving them great statistical power. They are using state-of-the-art hybrid exposure models that include satellite data, chemical transport models, land use variables, and monitoring data.

To evaluate health outcomes, the studies are including information on all-cause and cause-specific mortality and morbidity. They are also developing and applying new statistical methods — for example, to address errors in measuring exposure — and applying direct and indirect approaches to correct risk estimates for the effects of important potential confounding variables, such as smoking.

HEI has convened a Special Oversight Panel to monitor progress of these studies. An external quality assurance/quality control team will audit the quality and handling of the data used. At its 2017 Annual Conference HEI held a successful workshop with its

sponsors to review study progress and future plans. Many useful suggestions were made and will be implemented in the studies. A similar workshop is being planned as part of next year's Annual Conference in Chicago, Illinois, which will be held on April 29–May 1, 2018.

While final reports published by HEI are always based on detailed peer review of *all* study results by the HEI Review Committee, investigators are also free to publish in peer-reviewed journals as the data and analyses permit. In this vein, Dominici and colleagues recently published results of an initial analysis in the June 29 issue of the *New England Journal of Medicine*. They investigated mortality effects of low levels of air pollution using data from 61 million Medicare patients' records across the United States from 2000 to 2012. This first analysis reported associations of mortality with exposure to PM_{2.5} and ozone at concentrations below the current National Ambient Air Quality Standard. The complete and ongoing analyses in this study will include morbidity outcomes, use of Medicaid data, and rigorous control for confounder variables using various approaches. Moreover, they will develop and apply new causal modeling methods to estimate exposure–response functions, and correct for exposure measurement error.

All three studies will proceed under careful oversight for the next two to three years. HEI's ultimate goal is to draw from across these studies — and large populations — to better understand whether there are associations of health effects with air pollution at lower levels. HEI continues to work actively to coordinate the studies and ensure the maximum degree of comparable epidemiological results at the end of this important research effort. [HEI](#)

NEW INVESTIGATOR AWARDS (Continued from page 4)

“Impact of Exposure to Air Pollution on Asthma: A Multi-Exposure Assessment.”

Pedersen specializes in biomarker-based environmental epidemiology. She received a Ph.D. in molecular epidemiology from the University of Copenhagen. In addition, Pedersen was a postdoc in environmental epidemiology jointly with CREAL (now ISGlobal) in Barcelona, Spain, and the French National Institute of Health and Medical Research in Grenoble. She has received the Rebecca James Baker Award and Best Environmental Epidemiology Paper Award from the International Society of Environmental Epidemiology. She also has an appointment at the Danish Cancer Society Research Center in Copenhagen.

Pedersen's research focuses on the adverse health effects of modifiable early-life environmental exposures. In her Rosenblith Award study, she will evaluate whether early-life exposure to air pollution is

associated with development of asthma in children and adolescents. Unlike studies on asthma exacerbation, the potential role of air pollution on the development of asthma is an understudied question.

Pedersen will investigate this question using an unprecedentedly large data set, collected in Denmark since 1997 and consisting of health data from more than a million children and adolescents. In addition, she will make use of two smaller cohort studies with detailed individual information about potential confounders: the Danish National Birth Cohort, and the Copenhagen Prospective Studies on Asthma in Childhood. She will estimate residential outdoor exposures to several particulate and gaseous air pollutants modeled with the AirGIS human exposure modeling system. She will also look at the mechanistic basis for these effects by studying changes in lung function, inflammation, immunological markers, and airway DNA methylation.

Named for the first chair of the HEI Research Committee, the [Walter A. Rosenblith New Investigator Award](#) supports the work of a promising scientist early in his or her career. In selecting award recipients, the HEI Research Committee considers each applicant's potential for a productive research career in examining air pollution and its effects on health, the support provided by the applicant's institution, and the scientific merit of the research project and its relevance to HEI's mission. Joshua Apte and Marie Pedersen are the 23rd and 24th scientists to receive the Rosenblith Award since the program's inception in 1999. [HEI](#)

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Walter A. Rosenblith New Investigator Awards Announced

HEI is pleased to announce recipients of the 2017 Walter A. Rosenblith New Investigator Awards. Although the HEI Research Committee normally selects one recipient, the large number of quality applications this year led the Committee to select two excellent awardees.



Joshua Apte.

Joshua Apte, assistant professor in the Cockrell School of Engineering at the University of Texas at Austin (UT-Austin), was selected to receive the award for his proposal “Scalable Multipollutant Exposure Assessment Using Routine Mobile Monitoring Platforms.”

Apte specializes in air pollution exposure assessment. He received a Ph.D. in energy and resources from the University of California, Berkeley, and has held a U.S. Environmental Protection Agency STAR graduate

fellowship and a Fulbright-Nehru Fellowship to India. In addition, Apte was a postdoctoral fellow at Lawrence Berkeley National Laboratory. He subsequently joined the faculty at UT-Austin.

Apte’s research builds on his prior novel work to collect large amounts of air pollution data using monitors mounted on

Google Street View cars. In his Rosenblith Award study, he will investigate whether such monitoring could improve exposure assessment for health studies. The study has the potential for a significant impact on the way research related to air pollution and health is conducted.

Apte will measure air pollution concentrations using vehicle-mounted monitors in Oakland, California, and Delhi, India. Next, he will compare these data with other, more traditional exposure assessment approaches, such as fixed-site measurements, land use regression, and satellite estimates. He will also mine data from the multipollutant data set to understand the effects of sources on population exposures. Finally, he will evaluate how scaling up this approach could address data gaps related to air pollution exposure in health studies.

Marie Pedersen, associate professor at the University of Copenhagen in Denmark, received the other 2017 Rosenblith award for her proposal

Continued on page 3



Marie Pedersen.