Honoring Air Quality Achievements

HAAGEN-SMIT
CLEAN AIR AWARDS

February 21, 2019

CalEPA Headquarters
Sacramento, California

The Haagen-Smit Clean Air Awards are given annually to scientists, policy makers, community leaders, and educators from California and around the world who have made significant lifetime contributions to the advancement of clean air and climate change science, technology, and policy.

"We should have learned by now that we cannot hope to change the laws of nature, but we can change human institutions. The road is not an easy one, but the reward ... is worth the effort."

– Dr. Arie Haagen-Smit

Dr. Arie Haagen-Smit

Dr. Arie Haagen-Smit, a native of the Netherlands, was a leader in developing air quality standards based on his research efforts. Known by many as the "father of air pollution control," Dr. Haagen-Smit was a graduate of the University of Utrecht and a biochemistry professor at the California Institute of Technology (Caltech) in Pasadena for 16 years before beginning his air pollution research in 1948. At Caltech, Dr. Haagen-Smit studied the physiological aspects of natural products like rubber and pineapples. This work led to studies with his colleagues investigating the flavor components of wine, onions and garlic. His training and expertise in chemistry, along with his natural curiosity, brought him to the forefront of air pollution research when he was asked by the county of Los Angeles to investigate the chemical nature of what we now call smog. Noticeably different from earlier accounts of haze and dust in London, which was caused by coal, the eye-irritating haze in Los Angeles was brown and almost odorless. Dr. Haagen-Smit applied his technique of studying plant chemistry in enclosed clear chambers exposed to sunlight to figure out what caused smog in the Los Angeles air basin.

Through a series of experiments, he concluded that most of California's smog resulted from photochemistry – when substances in the exhaust from motor vehicles and the smokestacks of industrial facilities react with sunlight to create ozone. This breakthrough provided the scientific foundation for the development of both California's, and the nation's, air pollution control programs. In recognition of this contribution, Dr. Haagen-Smit received the National Medal of Science in 1973, the nation's highest scientific honor. He became the California Air Resources Board's first chairman in 1968 after serving eight years as an original board member of Air Resources Board's predecessor, the Motor Vehicle Pollution Control Board. Dr. Haagen-Smit passed away in 1977, but his legacy lives on.

Since 2001, the California Air Resources Board has annually bestowed the distinguished Haagen-Smit Clean Air Awards. The awards are given to 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. Over the years, there have been 59 acclaimed recipients. In light of the global connection between air quality and climate change, the scope of the program has now expanded to include an international focus and a focus on climate change science and mitigation.

Past Winners

Alphabetical Order by Last Name (* indicates Legacy Award)

Janet Arey · 2011
Roger Atkinson · 2004
David Bates · 2004
Timothy Belian · 2005
Leon Billings · 2004
Donald Blake · 2014
James Boyd · 2006
Tom Cackette · 2012
William Carter · 2005
Judith Chow · 2011
Joan Denton · 2010
Bradley Edgar · 2010
Alex Farrell · 2008
Barbara Finlayson-Pitts · 2013
Chet France · 2016
Axel Friedrich · 2006
John Froines · 2010
Daniel Greenbaum · 2016
James Hansen · 2007
Jiming Hao · 2015
David Hawkins · 2017*
John Holmes · 2001
Andrea Hricko · 2012
Timothy Johnson · 2009
James Lents · 2013
Alan Lloyd · 2007
Ron Loveridge · 2012
Gina McCarthy · 2017*
Mario Molina · 2017*
Curtis Moore · 2005
Mary Nichols · 2002
Margo Oge · 2009
Teruyuki Ohno · 2013
Fran Pavley · 2007
Joyce Penner · 2016
John Peters · 2009
James Pitts · 2002
Kimberly Prather · 2015
Michael Prather · 2015
Veerabhadran Ramanathan · 2016
Anumita Roychowdhury · 2016
Robert Sawyer · 2008
Arnold Schwarzenegger · 2017*
John Seinfeld · 2003
Jananne Sharpless · 2011
Byron Sher · 2001
Kirk Smith · 2014
Donald Stedman · 2015
John Wall · 2014
Michael Walsh · 2003
Henry Waxman · 2017*
Henry Wedaa · 2008
V. John White · 2003
Arthur Winer · 2006

2018 Haagen-Smit Clean Air Award Recipients

Paul Crutzen
Max Planck Institute for Chemistry
International Air Pollution Research

Anne Douglass
NASA
Atmospheric Research

Hal Harvey
Energy Innovation
Climate Policy

Barry Wallerstein
University of California, Riverside
Environmental Policy

John Watson
Desert Research Institute
Air Pollution Research

Paul Crutzen, Ph.D.

International Air Pollution Research

For path-breaking research in the atmospheric chemistry of ozone, we recognize Professor Paul Crutzen, who played a fundamental role in establishing the link between human activities and ozone in the atmosphere.

Plants and animals could not exist on Earth's surface without a protective layer of stratospheric ozone filtering out destructive ultraviolet radiation. In the late 1960s and early 1970s, Crutzen exposed the power of nitrogen oxides to destroy ozone. He focused scientific attention on man-made threats to the stratospheric ozone layer, including chlorofluorocarbons (CFCs) and other industrially manufactured gases. In 1995, Crutzen received the Nobel Prize in Chemistry for advancing our understanding of the ozone layer. His work – and that of co-recipients Mario Molina and Sherwood Rowland – was an essential step toward discovering the "hole in the ozone" and identifying its causes. Crutzen's findings helped galvanize a global political response to the threat of ozone depletion, leading, ultimately, to the 1987 signing of the Montreal Protocol for global protection of the stratospheric ozone layer.

Born into a modest family in Amsterdam in 1933, Crutzen's early education overlapped with Germany's military occupation of the Netherlands. Crutzen overcame the hardships of war-time civilian life to complete his elementary education and later became a civil engineer. A passion for long-distance skating on frozen canals and lakes made him intimate with bridges and tunnels, the focus of his first engineering job at Amsterdam's Bridge Construction Bureau. Crutzen was also a chess enthusiast, a deep thinker who longed for an academic career. Crutzen obtained – with no prior experience – a computer programming position at Stockholm University's esteemed meteorological institute. There he helped develop some of the first numerical weather prediction models.

Thus began his second career – as an atmospheric modeler and stratospheric chemist. Taking classes while continuing in his programming post, Crutzen worked toward his doctorate. Assigned in 1965 to work on a computer model of oxygen distribution in the upper atmosphere, Crutzen became fascinated

with the photochemistry of atmospheric ozone. His 1968 dissertation on stratospheric ozone identified nitrogen oxides as a research priority and earned Crutzen a fellowship at the University of Oxford. In 1971, he was among the first to identify the potential danger to the ozone layer of supersonic aircraft, which drew international scientific scrutiny to the potential depletion of the stratospheric ozone layer. By 1974, Crutzen's North American Nobel Prize co-recipients had pinpointed the damaging action of chlorine atoms. That same year, Crutzen modeled the ozone-depleting potential of CFCs used as refrigerants and as propellants in aerosol spray cans.

In 1976, on the strength of their findings, the scientific community called for an immediate ban on CFCs. But it was not until 1985 – when a gaping hole in the polar ozone layer was discovered by a satellite survey of the Antarctic – that a global political response was mobilized, culminating in the 1987 Montreal Protocol. Crutzen's work mapping the chemical mechanisms of high-altitude ozone-decomposition was critical to establishing the science that led to global political action. Today, the recovery of Earth's stratospheric ozone layer is well underway, thanks to the Montreal Protocol's exemplary combination of authoritative science and collaborative political action.

Crutzen's publication record is one of the most prolific within the geosciences. Beyond his contributions on stratospheric ozone depletion, Crutzen also explored the effects of agriculture, biomass burning, and industrial processes on ozone formation in the lower atmosphere, where ozone exposure can damage human health and food production. His deep understanding of the interaction of Earth's upper and lower atmospheric layers led Crutzen to conceive of the theory of nuclear winter, underlining

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the catastrophic environmental consequences of nuclear war. He coined the term Anthropocene to describe our current age: in which the scope and scale of human activities distort or displace natural processes and change the basic properties of the biosphere. More recently, Crutzen's original insights on stratospheric geoengineering and biofuel production have enriched global climate research.

In addition to two decades at the Max Planck Institute for Chemistry in

Germany, Crutzen also has held appointments at Scripps Institution of Oceanography, Georgia Institute of Technology, Stockholm University, Utrecht University in the Netherlands, and Seoul National University in South Korea. Crutzen is a true citizen of the world. His political engagement makes him a tireless ambassador for environmental issues such as climate change.

Crutzen's questions have consistently traced the theoretical arc connecting human activities with their environmental consequences, and his answers revealed the means to mitigate those impacts.

Like the Dutch boy of legend who plugs a leak in the dyke at the critical moment, Crutzen was the right man in the right place at the right time to help find and fix the hole in our planet's ozone layer. But his achievements are more than mere coincidence. "Meteorology is very much an intuitive science," Crutzen says, "and you need intuition to focus on the right questions." Crutzen's questions have consistently traced the theoretical arc connecting human activities with their environmental consequences, and his answers revealed the means to mitigate those impacts. For all of his questions and answers, which helped define and confront a profound existential challenge to our planet, CARB is honored to bestow Professor Paul Crutzen with a 2018 Haagen-Smit Clean Air Award.

Anne Douglass, Ph.D.

Atmospheric Research

We recognize Dr. Anne Douglass for her innovative use of airborne and ground-based observations to advance the modeling of the chemical and climate processes that control ozone in Earth's atmosphere. We also recognize Dr. Douglass for her sustained and extraordinary leadership of NASA's Aura satellite project. Aura's observations are critical to the scientific community's research on ozone trends, air quality changes and their links to climate change.

One of the world's leading scientists in modeling the earth's ozone layer, Douglass worked through one-dimensional observations from solitary balloons to two-, three- and finally, four-dimensional comparisons with daily satellite maps. Her stellar research and influential publications re-set the scientific paradigm on stratosphere-troposphere exchange and its contribution to ozone pollution in the lower troposphere.

As Deputy Project Scientist and later Project Scientist at NASA Goddard Space Flight Center, Douglass led a large and diverse international team of scientists responsible for launching the Aura satellite, one of NASA's principal sentinels for monitoring the chemistry and dynamics of Earth's atmosphere. For more than a decade, Douglass also managed the day-to-day twists and turns of its operation, ensuring the uninterrupted flow of data from Aura's instruments to hundreds of scientists who relied on its observations of Earth's chemistry to develop thousands of publications investigating atmospheric composition associated with air quality and global climate change.

Known for her scientific acuity, objectivity, honesty, and community building, Douglass has shown a remarkable talent for improving atmospheric models by comparing their output to NASA's growing array of observational resources. The effectiveness and credibility of chemistry climate models has benefited substantially from her creative exploration of the interplay among atmospheric observations, conceptual models, and their numerical implementation. In Douglass's own words: "You have no way of knowing if your conceptual model is complete until you have the data. New data challenges the conceptual model and shows us how we need to expand it."

Douglass credits her father, her mother, and Sputnik 1, the first artificial

Earth satellite, as key influences on her decision to embrace her nerdiness and pursue a career in science. Sputnik channeled a surge of patriotic energy into teaching math and science to Douglass's generation of school children so that the United States could catch up with the Russians. Her father, who had no expectations of Douglass beyond marrying and raising a family, nonetheless told her that if she learned to do math she could learn to do anything. Douglass's mother was determined to provide a good education for her daughters and took a full-time job to make that happen. Inspired by her mother, Douglass was the only female graduate student in Iowa State University's Physics Department. She credits Professor John Stanford for his support and mentorship, and for turning her attention to environmental issues. Now a grandmother many times over, Douglass is also a proud member of the first mother-daughter team in the American Geophysical Union.

Today, Douglass continues to develop data-driven strategies for improving the effectiveness of chemistry climate models through parallel analysis of observational data and simulated output. While serving on the leadership team for the Goddard Earth Observing System Chemistry Climate Model, Douglass also supports the incoming Aura Satellite Project Scientist and continues to foster communications among the many groups at NASA with a stake in the Aura program. In short, working just half-time in phased-in retirement, Douglass continues to surpass expectations for a full-time scientist.

A Fellow of both the American Geophysical Union and the American Meteorological Society, Douglass is the recipient of NASA's Exceptional Scientific Achievement Medal (2009); its Outstanding Leadership Medal (2012) and the Goddard Space Flight Center's highest award in the area of

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Earth science, the Nordberg Memorial Award (2013). Today, for her years of leadership of satellite missions studying atmospheric composition, for her pioneering work in using measurements to test models, for her inclusive nurturing of young scientists, and incisive communication of ozone science to policy makers and the broader public, CARB is honored to bestow Dr. Anne Douglass with a 2018 Haagen-Smit Clean Air Award.

Hal Harvey

Climate Policy

We recognize Hal Harvey for elevating the practice of strategic philanthropy in the service of climate change mitigation, and for his unwavering conviction that we can and will find a way to win on global climate change.

Harvey founded climate-focused philanthropic organizations The Energy Foundation and ClimateWorks Foundation, and directed environmental giving for The William and Flora Hewlett Foundation. There he honed a method for transforming philanthropic dollars into large-scale climate policy change. A prolific organizer on a global scale, he co-founded the International Council on Clean Transportation (ICCT) in 2001 to support government action to reduce energy consumption and climate change emissions from the world's fastest growing vehicle fleets. He took the lead in highlighting the links between climate change and air pollution and pushed ICCT to also reduce conventional pollutants such as diesel particulate matter, which includes the potent climate forcer, black carbon. Applying persistent, precise pressure for credible, carefully designed policies, Harvey orchestrated successful campaigns to spur climate action on everything from California building codes to Chinese tailpipe emission standards.

A man with no reverse gear, whose mantra is "speed and scale," Harvey re-wrote the playbook for environmental philanthropy. Through his profound grasp of the obstacles to stabilizing the global climate and the penalties of failing to do so, Harvey inspires with his unfailingly positive outlook: 'Yes we can,' he says, 'and here's how.'

Raised on his family's cattle ranch near Aspen, Colorado, Harvey learned his first lessons in environmental activism at home. His mother, an ardent conservationist, co-founded the Aspen Wilderness Workshop. The Workshop achieved a wilderness designation for half a million acres of Colorado wilderness under the National Wilderness Act, and served as a national model for land preservation. Harvey's formal education includes Bachelors and Master's Degrees from Stanford University in engineering and energy planning. Between engineering degrees, Harvey started a solar house construction business. Though the company didn't last, Harvey's experience as a builder yielded lasting insights into the power of codes and performance

standards to mobilize builders to adopt energy-efficient designs and materials. Harvey's early experiences in philanthropy – with The Rocky Mountain Institute, The Ploughshares Fund, PeaceNet and the New-Land Foundation co-founded by his activist grandmother – addressed issues of world peace and security. By the early 1990s when he created the Energy Foundation, Harvey's compass needle had settled on energy policy and climate change. A global climate change patriot, Harvey has been on a Paul Revere-like ride ever since, raising the alarm and sharing vital information with policymakers about how to win on climate change.

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Since 2011, Harvey has directed the work of San Francisco-based energy and environmental policy firm Energy Innovation LLC which aims to influence the decision-making of the small group of individuals who control the bulk of energy expenditures. He serves as a senior fellow for energy and the environment at the Paulson Institute in Chicago and vice chair of the scientific advisory board at the Mercator Institute in Berlin. The author of "Designing Climate Solutions: A Policy Guide for Low-Carbon Energy" and "Money Well Spent: A Strategic Plan for Smart Philanthropy," Harvey also served as a science and technology advisor to presidents George H.W. Bush and Bill Clinton. Some of his best work is done behind the scenes, marshalling people and resources around strategic policy opportunities. Harvey pushed for emission-cutting Bus Rapid Transit pilots in Mexico and China, for development of the now-ubiquitous McKinsey marginal CO_2 abatement cost curve, and more recently, for the use of dams, water heaters, and electric vehicles to store renewable energy while increasing grid flexibility.

An optimistic and authoritative voice on carbon emissions and energy waste, Harvey works from the premise that the climate change problem can in fact be solved through large-scale use of zero-carbon energy technologies. As the climate change outlook darkens, Harvey's policy-focused philanthropy lights a path for policymakers to follow. In his own words: "This is a moment of opportunity. This is not a narrative of sacrifice. This is a narrative of 'When you do the right things the rewards come back.' They come back in community, they come back in clean air, and they come back in stronger and healthier businesses." For his warm-hearted, cool-headed leadership, for his positive vision and single-minded focus on practical, profitable solutions, CARB is honored to bestow Hal Harvey with a 2018 Haagen-Smit Clean Air Award.

Barry Wallerstein, D.Env.

Environmental Policy

Today we recognize Dr. Barry Wallerstein for over 30 years of service to the people of Southern California. He served as the executive officer of the agency responsible for the respiratory health of 17 million Californians in the most smog-stricken air quality district in the nation. Dr. Wallerstein oversaw policies and programs that achieved dramatic improvements in air quality against a backdrop of strong economic and population growth.

Wallerstein's career in air pollution control placed him at the crossroads of public health and free enterprise: not always a comfortable space, but one that Wallerstein occupied with integrity, skill, and resolve in the face of relentless advocacy from opposing voices. Trained as a scientist and gifted as a communicator, Wallerstein leveraged sound research, transparent process, and vigorous communication to steadily build the South Coast Air Quality Management District's capabilities and credibility as it wrote one of the great success stories in environmental management.

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Wallerstein's path to air quality leadership began with his sixth grade teacher, Mr. Porter, whose year-round science projects kindled the flame of scientific curiosity. Bachelor's and Master's degrees in biological science from the University of Southern California and a doctorate in environmental science and engineering from UCLA added a solid grounding in human health, urban planning, and environmental law and engineering, as well as sophisticated research methods and data analysis.

Soon after completing his doctorate, Wallerstein joined the California Air Resources Board, where he climbed the steep part of the learning curve for

policy design and regulatory processes, appearing before the Board 10 times in 28 months. Assigned to develop tailpipe regulations for motorcycles, Wallerstein once found himself alone in a room with the lead engineer, outside counsel, and nine other executives from a leading motorcycle manufacturer. "I wasn't happy when I left that room," Wallerstein recalled recently, "since I'd only been on staff for a year and a half. But in the end it is that kind of experience that gives you the fortitude to be put in tough situations and improve your ability to think through things quickly and respond."

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A move to the South Coast Air Quality Management District (SCAQMD) in 1984 brought Wallerstein additional exposure to challenging situations as the District worked to address the classification of severe nonattainment with national air quality standards for ozone and fine particle pollution. In 1997 Wallerstein succeeded James Lents as executive officer of the SCAQMD and remained in that position for 19 years, striking a balance between the agency's public health mission and the political, economic, and environmental realities of its four-county, 10,000-square-mile territory. In addition to overseeing the design and implementation of dozens of new regional air quality rules, Wallerstein developed the nation's first local air toxics monitoring and control program. Through its pioneering research into air toxics exposure, SCAQMD identified diesel engine exhaust as the primary source of community cancer risk from air toxics in Southern California. The District developed the nation's first local air toxics control plan which reduced exposure to air toxics by more than 50 percent between 2005 and 2012. Wallerstein also spearheaded implementation of the agency's Clean Fleet Vehicle rules to help clear the air in neighborhoods close to rail yards, ports, freeways and warehouses supporting the region's thriving goods movement industry.

While guiding the agency's strategic air quality research and regulatory agenda, Wallerstein also faced an unpredictable stream of acute air quality crises with courage and patience. These ranged from refinery explosions,

mysterious plumes of noxious gas, massive leaks from natural gas storage facilities, and even the eye-watering aroma of a hot sauce plant. In addition, he faced critical questions, such as: Should the Salton Sea be drained; when should California's largest oil refinery be re-started; and should Aliso Canyon be evacuated? Month-in and month-out, Wallerstein guided his agency's Board toward timely answers to urgent questions with enormous environmental and economic stakes for the communities it serves.

Toward the end of his air district tenure, Wallerstein helped the agency find a way to meet air quality goals from mobile source emissions through innovative facility-based measures. Developing facility-based emission control measures continues to be a priority for the South Coast District today.

In 2016, Wallerstein was appointed Senior Policy Fellow at the UC Riverside School of Public Policy. The recipient of numerous awards for environmental leadership, Wallerstein has held senior policy positions on many advisory boards and committees for the U.S. EPA, the National Research Council, CARB, and CalEPA.

The SCAQMD's record of air quality improvement demonstrates that communities don't have to choose between clean air or a vibrant economy. And Wallerstein's transparent, science-based leadership of the agency demonstrated that it is possible – perhaps even necessary – to support unpopular actions to serve the public interest and maintain the community's trust. For a lifetime of service and commitment to clean, healthful air for all Southern Californians, CARB is honored to bestow Dr. Barry Wallerstein with a 2018 Haagen-Smit Clean Air Award.

John Watson, Ph.D.

Air Pollution Research

We recognize Dr. John Watson for his seminal contributions to the science and technology of air pollution measurement, characterization, and monitoring, which have advanced air quality management programs in California and abroad.

Over the span of more than four decades of engagement as an air quality scientist, Watson spurred many innovations in aerosol measurement, source apportionment, and the assessment of adverse impacts on visibility, ecosystems, and cultural heritage. Watson is the developer of mission-critical technology used by the U.S. EPA and by scientists throughout the world to estimate source contributions to airborne particulates and volatile organic compounds. A prolific researcher, author, and editor, Watson served as principal investigator for more than 120 air quality studies and produced hundreds of peer reviewed journal publications. Critical review papers he organized and led have proven indispensable to the design and adoption of air quality control policies and programs.

Watson has worked tirelessly to guide and support air pollution research and mitigation efforts of scientists and policymakers in China, India, Hong Kong, Mexico, Canada, Brazil, Chile, Thailand, and elsewhere. Chances are – if you are from one of the world's rapidly industrializing nations and looking for answers about air pollution sources and mitigation policies – that your nation's scientists and policymakers have benefited from the work of Watson and his small army of international collaborators.

Watson also is no stranger to the study of air pollution in the state of California. In the 1990s, he guided measurement and modeling for the San Joaquin Valley Air Quality Study. This study helped establish a model for collaborative public-private partnerships to address air quality issues. It confirmed the regional connection between Bay Area emissions and summertime air quality in the San Joaquin Valley. Later, Watson co-led the California Regional Particulate Air Quality Study to determine causes and mitigation measures for Central Valley PM2.5. This decade-long study involved the field work, data analysis, and modeling of more than 100 scientists and bolstered CARB's capacity to estimate emissions reductions from state implementation plans.

Watson's commitment to improving California air quality dates to his childhood in smog-choked Los Angeles' west San Fernando Valley. A precocious clean air activist, he remembers transforming his backyard garbage incinerator – banned in 1957 to reduce smog – into decorative paving stones, and replacing clogged crankcase ventilation valves on his father's pickup truck. After earning Bachelor's and Master's degrees in physics back East, Watson ultimately returned to the western U.S. to pursue a doctorate in the emerging field of air quality science at Oregon Health and Science University. His doctoral research, the first regulatory source apportionment study performed in Portland, Oregon, identified pollutant emissions from un-inventoried sources, including residential wood combustion, and resulted in new Oregon emission standards for wood stove emissions. Later, Watson worked on several CARB projects, developing source apportionment software, directing the California Acid Deposition Monitoring Program and analyzing data from the Southern California Air Quality Study. A research professor at Nevada's Desert Research Institute since 1982, Watson guided development of real-world multi-pollutant measurement technologies and played a key role in advancing methods to measure black carbon and organic carbon.

Two and a half years as a physics instructor for the Peace Corps in Peru opened Watson's eyes to air quality issues abroad and initiated decades of work mentoring students, professors, and regulators from countries throughout Asia, Africa, and Latin America. Watson focused on cultivating relationships in rapidly industrializing nations such as India and China, teaching source measurement and modeling techniques, and helping scientists produce methodologically sound journal articles. An adjunct professor at

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Watson is the developer of mission-critical technology used by the U.S. EPA and by scientists throughout the world to estimate source contributions to airborne particulates and volatile organic compounds.

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the Chinese Academy of Sciences since 2005, Watson has collaborated with Chinese scientists on more than 60 publications on topics ranging from spatial and temporal distribution of pollutants in Chinese cities to adverse impacts on China's cultural heritage. At the Chinese Academy's Institute of Earth Environment, Watson helped establish a world-class aerosol sampling and analysis capacity to better target the causes of urban air pollution in Chinese cities and evaluate the effectiveness of emission controls.

Watson's more recent work ranges from testing real-world emissions from oil sands production operations in Northern Canada, to characterizing engine exhaust in Hong Kong, to commercializing a thermal-optical aerosol carbon analyzer. Currently, Watson's projects include designing air quality measurement networks in developing countries for the World Bank and evaluating micro-sensor interfaces for citizen science smartphone applications.

The recipient in 2018 of the Desert Research Institute Award for 35 Years of Distinguished Service, Watson has received numerous honors for his scientific and editorial achievements, including awards from universities in both Taiwan and the People's Republic of China.

For his extraordinary contributions to the science and technology of air pollution measurement and management, and for sustained leadership of collaborative research that has benefited public health throughout the world, CARB is honored to bestow Dr. John Watson with a 2018 Haagen-Smit Clean Air Award.

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