

Contact

www.linkedin.com/in/h-christopher-f-3654aa4b (LinkedIn)

Top Skills

Measurement and modeling of the activity, energy use, and emissions of vehicles.

Quantitative analysis of variability and uncertainty

Process simulation modeling of combustion and gasification based power plants

Honors-Awards

Frank A. Chambers Excellence in Air Pollution Control Award

Alcoa Foundation Distinguished Engineering Research Award

Member, Research Leadership Academy

Invited speaker, 48th Annual A&WMA Critical Review

TRB Transportation and Air Quality Spotlight Paper - 2016

Publications

Incorporating Vehicle Portable Emissions Measurement Systems Into the Classroom

Modeling of Human Exposure to In-Vehicle PM_{2.5} from Environmental Tobacco Smoke

Evaluation of Representativeness of Site-Specific Fuel-based Vehicle Emission Factors for Area-wide Average Emissions

Trends in Onroad Transportation Energy and Emissions

A review of factors impacting exposure to PM_{2.5}, ultrafine particles and black carbon in Asian transport microenvironments

H. Christopher F.

Associate Dean for Research and Infrastructure, College of Engineering, North Carolina State University
Raleigh, North Carolina, United States

Summary

My interests are broadly in energy and environmental systems, including: modeling and evaluation of advanced energy conversion (e.g., combustion, gasification) and environmental control systems; measurement and modeling of real-world fuel use and emissions of onroad and nonroad vehicles; development and application of methods for quantification of variability and uncertainty and for sensitivity analysis in systems models; and exposure and risk analysis.

In my current role as an appointee at the U.S. Environmental Protection Agency, I am a champion of scientific integrity and the role of science to inform decision-making. I am leading scientific and technical research on Administration priorities, including (but not limited to) climate change, environmental justice, per- and polyfluoroalkyl substances (PFAS), and lead; I am also promoting the advancement of innovative scientific methods and approaches.

Experience

North Carolina State University

30 years 11 months

Associate Dean for Research and Infrastructure, College of Engineering
October 2024 - Present (2 months)

Raleigh, North Carolina, United States

Dr. H. Christopher Frey is Associate Dean of Research and Infrastructure in the College of Engineering at North Carolina State University. This role includes strategic and administrative aspects related to the College's research programs, including guiding faculty-driven, cutting-edge research, establishing national and international partnerships with both public and private sectors, and exploring opportunities to enhance our College's research and training programs. Additionally, this role includes overseeing management of our College's physical infrastructure, including shared facilities and faculty labs.

Glenn E. Futrell Distinguished Univ. Prof. of Civil, Construction, and
Envir. Engr

August 2015 - Present (9 years 4 months)

Raleigh, North Carolina, United States

H. Christopher Frey is the Futrell Distinguished University Professor of Civil, Construction, and Environmental Engineering at NC State. His research includes measurement and modeling of human exposure to air pollution, measurement and modeling of vehicle emissions, and applications of probabilistic and sensitivity analysis methods to emissions estimation, risk assessment, and technology assessment. In 2021, he was appointed by the President as Deputy Assistant Administrator for Science Policy at the U.S. Environmental Protection Agency, in 2022, he was nominated by the President and confirmed by the U.S. Senate as Assistant Administrator for Research and Development at the U.S. EPA, where he headed the Office of Research and Development until 2024. He also served as the Agency's Science Advisory. He was a member of the EPA FIFRA Scientific Advisory Panel (2004 to 2006), a member of the EPA Clean Air Scientific Advisory Committee (CASAC) (2008 to 2012), chair of CASAC (2012 to 2015), and a member of the EPA Science Advisory Board (2012 to 2018). He served on National Academy committees and its Board of Environmental Studies and Toxicology, NARSTO assessments of emission inventories and multipollutant air quality management, and a World Health Organization working group on uncertainty in exposure assessment. He was a lead author for 2006 guidance by the Intergovernmental Panel on Climate Change (IPCC) regarding uncertainty in greenhouse gas emission inventories. He is a Fellow and Past President of the Society for Risk Analysis and a Fellow of the Air & Waste Management Association. He received the 2019 A&WMA Frank Chambers Award, the 2012 AWMA Ripperton Environmental Educator Award, the 2008 NCSU Alumni Association Outstanding Research Award, and the 1999 Chauncey Starr Award of the Society for Risk Analysis.

Distinguished University Professor

September 2012 - July 2015 (2 years 11 months)

Raleigh, North Carolina, United States

Professor

August 2004 - August 2012 (8 years 1 month)

Raleigh, North Carolina, United States

Associate Professor

July 1999 - July 2004 (5 years 1 month)

Raleigh, North Carolina, United States

Assistant Professor

January 1994 - June 1999 (5 years 6 months)

US Environmental Protection Agency (EPA)

3 years 8 months

Assistant Administrator

May 2022 - September 2024 (2 years 5 months)

Washington, District of Columbia, United States

Chris Frey served as the Assistant Administrator for Research and Development at the U.S. Environmental Protection Agency. He was nominated for this position by President Biden on January 4, 2022. His nomination was forwarded to the full Senate by the Senate Environment and Public Works committee on January 12, 2022. He was confirmed on May 25, 2022. He also served as the Agency Science Advisor.

Deputy Assistant Administrator, Office of Research and Development

February 2021 - May 2022 (1 year 4 months)

Dr. H. Christopher Frey is the Deputy Assistant Administrator for Science Policy in the Office of Research and Development as an appointee of the Biden/Harris administration. At EPA, Dr. Frey is a champion of scientific integrity and the role of science to inform decision-making. He is leading scientific and technical research on Administration priorities, including (but not limited to) climate change, environmental justice, per- and polyfluoroalkyl substances (PFAS), and lead; he is also promoting the advancement of innovative scientific methods and approaches.

Dr. Frey is on leave from North Carolina State University, where he served on the faculty since 1994, most recently as the Glenn E. and Phyllis J. Futrell Distinguished University Professor. His research includes measurement and modeling of human exposure to air pollution, measurement and modeling of vehicle emissions, and applications of probabilistic and sensitivity analysis methods to emissions estimation, risk assessment, and technology assessment.

He has extensive prior service with the EPA. Dr. Frey was an AAAS/EPA Environmental Science and Engineering Fellow in 1992. He served as exposure modeling advisor in ORD's National Exposure Research Laboratory from 2006 to 2007. He was a member of the EPA FIFRA Scientific Advisory Panel (2004 to 2006), a member of the EPA Clean Air Scientific Advisory Committee (CASAC) (2008 to 2012), chair of CASAC (2012 to 2015), and

a member of the EPA Science Advisory Board (2012 to 2018). He was a member of the CASAC Particulate Matter Review Panel that was dismissed in 2018; under his leadership, the panel reconvened as the Independent Particulate Matter Review Panel.

Dr. Frey is a prominent scholar and leader in environmental science and engineering. Dr. Frey has a B.S. in mechanical engineering from the University of Virginia, and from Carnegie Mellon University a master of engineering in mechanical engineering and Ph.D. in engineering and public policy.

The Hong Kong University of Science and Technology

4 years 8 months

Adjunct Professor, Division of Environment and Sustainability
June 2016 - January 2021 (4 years 8 months)

Hong Kong

Adjunct Professor is an unpaid honorary position. On leave.

Visiting Professor

July 2018 - July 2018 (1 month)

Kowloon, Hong Kong SAR

Taught ENVR 2020 Urban Air Quality. Collaborative research on measurement and modeling of human exposure to air pollution.

Visiting Professor

June 2016 - August 2016 (3 months)

Kowloon, Hong Kong SAR

Taught ENVR 2020 Urban Air Quality. Collaborative research on measurement and modeling of human exposure to air pollution.

Air & Waste Management Association

Director, Board of Directors

January 2016 - December 2018 (3 years)

An elected member of the Board of Directors of the Air & Waste Management Association.

US Environmental Protection Agency (EPA)

10 years 1 month

Member, EPA CASAC Particulate Matter Review Panel
November 2015 - October 2018 (3 years)

Washington D.C. Metro Area

The Particulate Matter Review Panel of the U.S. Environmental Protection Agency Clean Air Scientific Advisory Committee reviews and provides independent advice to the EPA Administrator on EPA's technical and policy assessments that support the Agency's review of the National Ambient Air Quality Standard (NAAQS) for PM. The panel held teleconference meetings on May 23, 2016, and August 9, 2016, to peer review the EPA's Integrated Review Plan (IRP) for the National Ambient Air Quality Standards for Particulate Matter (External Review Draft – April 2016), and conveyed its review of the IRP to the Administrator on August 31, 2016.

Member, U.S. EPA Science Advisory Board
October 2012 - September 2018 (6 years)
Washington, DC

Dr. H. Christopher Frey was appointed by the EPA Administrator to a three year term on the EPA Science Advisory Board, beginning in October 2012 and was reappointed to a second three year term in 2015. Congress established the EPA Science Advisory Board (SAB) in 1978 and gave it a broad mandate to advise the Agency on technical matters. The SAB's principal mission includes: reviewing the quality and relevance of the scientific and technical information being used or proposed as the basis for Agency regulations; reviewing research programs and the technical basis of applied programs; reviewing generic approaches to regulatory science, including guidelines governing the use of scientific and technical information in regulatory decisions, and critiquing such analytic methods as mathematical modelling; advising the Agency on broad scientific matters in science, technology, social and economic issues; and advising the Agency on emergency and other short-notice programs.

Chair, Clean Air Scientific Advisory Committee
October 2012 - June 2015 (2 years 9 months)
Research Triangle Park, NC

Dr. H. Christopher Frey was appointed by U.S. Environmental Protection Agency Administrator Lisa Jackson to serve as Chair of EPA's Clean Air Scientific Advisory Committee (CASAC) beginning in October 2012 through June 2015. CASAC provides independent advice to the EPA Administrator on the technical bases for EPA's national ambient air quality standards. Established in 1977 under the Clean Air Act (CAA) Amendments of 1977 (see 42 U.S.C. § 7409(d)(2)), CASAC also addresses research related to air quality, sources of air pollution, and the strategies to attain and maintain air quality standards and to prevent significant deterioration of air quality. The Chair of the CASAC also serves as a member of the chartered Science Advisory

Board. Dr. Frey chaired the Ozone Review Panel, and the Nitrogen Oxides Review Panel. Prior to becoming chair of CASAC, Dr. Frey chaired the Lead Review Panel.

Member, Clean Air Scientific Advisory Committee

October 2008 - September 2012 (4 years)

Washington, District of Columbia, United States

While a member of the U.S. EPA Clean Air Scientific Advisory Committee, also served on CASAC Review Panels for Particulate Matter, Carbon Monoxide, Lead, Ozone, and Sulfur Oxides.

The Hong Kong University of Science and Technology

Visiting Professor

January 2014 - June 2014 (6 months)

Kowloon, Hong Kong SAR

During Spring 2014, Dr. Frey was a visiting professor of Civil and Environmental Engineering at the Hong Kong University of Science and Technology, and an adjunct professor of the Division of Environment at HKUST. Dr. Frey worked on assessment of human exposure to air pollution in Hong Kong, and related topics in transportation emissions, air quality, and health risk assessment. He taught ENVR 6040B Environmental Exposure and Risk Assessment.

The National Academies of Sciences, Engineering, and Medicine

Member, Board of Environmental Studies and Toxicology

October 2009 - September 2012 (3 years)

Washington, District of Columbia, United States

World Health Organization

Member, Working Group on Uncertainty in Exposure Assessment

April 2005 - November 2007 (2 years 8 months)

Geneva, Switzerland

Contributed to the concepts and content of Uncertainty and data quality in exposure assessment, Part 1: guidance document on characterizing and communicating uncertainty in exposure assessment.

US Environmental Protection Agency (EPA)

3 years 5 months

Exposure Modeling Advisor

August 2006 - August 2007 (1 year 1 month)

Research Triangle Park, NC

Dr. Frey served as Exposure Modeling Advisor to the National Exposure Research Laboratory of the U.S. Environmental Protection Agency. Major activities included co-lead of Working Group 1 of the Probabilistic Risk Analysis task force, development of a conceptual framework for dealing with uncertainty in environmental models, analysis of field data pertaining to near roadside air quality, and advising of NERL's senior scientist and laboratory director on matters of quantitative approaches to dealing with uncertainty.

Member, FIFRA Scientific Advisory Panel

April 2004 - August 2006 (2 years 5 months)

Washington, District of Columbia, United States

Performed statutorily mandated function of reviewing the scientific basis for risk assessments developed by pesticide registrant applicants.

Society for Risk Analysis

President

December 2005 - December 2006 (1 year 1 month)

McLean, VA

President of the Society for Risk Analysis from December 2005 to December 2006. Also served as President-Elect in the prior year and Past-President in the subsequent year. During this time, from December 2004 to December 2007, was a voting member of the SRA Council (board of directors). Other positions at SRA include: 1995-1997 President-Elect, President, and Past-President of the Research Triangle Chapter of SRA; 1996-1999; elected member of the SRA council; 2006-2007; Chair of the SRA Publications Committee; 2007-2008; Chair of the SRA Nominations Committee; and 2008-2009 Chair of the SRA Awards Committee.

The National Academies of Sciences, Engineering, and Medicine Member, Committee on New Source Review Programs for Stationary Sources of Air Pollutants

March 2004 - July 2006 (2 years 5 months)

Washington, District of Columbia, United States

Detailed review and assessment of the need for and effectiveness of New Source Review, particularly with regard to modification of existing sources.

IPCC

Expert and Lead Author, 2006 Guidelines on National Greenhouse Gas Emission Inventories

May 2004 - June 2006 (2 years 2 months)

Kyoto, Japan

Lead Author of chapter on Uncertainties of 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 1, General Guidance and Reporting. Prepared as part of the Task Force on National Greenhouse Gas Inventories of the Intergovernmental Panel on Climate Change.

Carnegie Mellon University's College of Engineering

5 years 6 months

Research Associate (Research Assistant Professor)

June 1991 - December 1993 (2 years 7 months)

Pittsburgh, Pennsylvania, United States

Developed tools to evaluate energy systems and address complex problems of energy and environmental management of the development of new technology. Developed a guideline document describing methods for identifying and characterizing key technical and economic uncertainties which are required as inputs for stochastic modeling of energy technologies. Developed new computer simulation models to predict the performance, emissions, and cost of advanced fossil fuel power generation and pollution control technologies, with objectives of identifying strategies for reducing energy use and emissions. Developed probabilistic process simulation models of several Integrated Gasification Combined Cycle (IGCC) systems based on different types of gasifiers, gas cleanup systems, and byproduct recovery systems. Developed models of air pollution control technologies and conventional power plant components that were incorporated into the Integrated Environmental Control Model (IECM).

Research Assistant, Engineering and Public Policy

July 1988 - May 1991 (2 years 11 months)

Pittsburgh, Pennsylvania, United States

Research assistant during PhD program. Research focus and PhD dissertation was Probabilistic Modeling of Innovative Clean Coal Technologies.

US Environmental Protection Agency (EPA)

AAAS/EPA Environmental Science and Engineering Fellow

June 1992 - August 1992 (3 months)

Washington, DC

Worked in the Exposure Assessment Group on methods for quantification of variability and uncertainty in exposure assessment. Authored a report with related methods and findings: Frey, H.C., Quantitative Analysis of Uncertainty and Variability in Environmental Policy Making, Environmental Science and

Engineering Fellows Program, American Association for the Advancement of Science, Washington, DC, September 1992.

Radian Corporation (now Eastern Research Group)
Engineer, Chemical and Combustion Engineering Department
June 1987 - July 1988 (1 year 2 months)
Research Triangle Park, NC

Conducted technical analyses in support of development of air pollution standards by the U.S. Environmental Protection, including: New Source Performance Standards ; National Emission Standards for Hazardous Air Pollutants; and Prevention of Significant Deterioration. Conducted a review and identification of greenhouse gas emissions from stationary and mobile sources. Developed performance and cost models of air pollution control technologies, including carbon adsorption and selective catalytic reduction.

Carnegie Mellon University's College of Engineering
Research Assistant, Mechanical Engineering
August 1985 - May 1987 (1 year 10 months)
Pittsburgh, Pennsylvania, United States

Research assistant while a graduate student. Research and master's thesis was Performance and Economic Model of the Fluidized Bed Copper Oxide Process.

GE
Mechanical Engineer
May 1986 - August 1986 (4 months)
King of Prussia, Pennsylvania, United States

Summer Hire at the General Electric Valley Forge Space Center. Worked on recoding a FORTRAN program that simulated the thermodynamic performance of heat pipes.

Voice of America
Mechanical Engineer
May 1985 - August 1985 (4 months)
Washington, District of Columbia, United States

GS-7 Summer Hire. Assisted with planning of maintenance, repair, and installation projects at overseas short wave radio relay stations, and performed technical editing.

U.S. Naval Research Laboratory
Engineering Aide

May 1984 - August 1984 (4 months)

Washington, District of Columbia, United States

GS-5 Summer Hire in Chemistry division. Material strength testing. Testing of submarine CO2 adsorbant capacity.

US Army

Engineering Technician

June 1983 - August 1983 (3 months)

Fort Belvoir, Virginia, United States

GS-4 Summer Hire. Quality assurance testing of selected materials used by the U.S. Army, according to ASTM and MIL specifications.

US Army

Engineering Technician

June 1982 - August 1982 (3 months)

Fort Belvoir, Virginia, United States

GS-3 Summer Hire. Quality assurance testing of selected materials used by the U.S. Army, according to ASTM and MIL specifications.

U.S. Naval Research Laboratory

Research Apprentice

June 1981 - August 1981 (3 months)

Washington, District of Columbia, United States

Summer Hire in Chemistry division as part of a summer program via American University. Apprentice in physical chemistry lab where high vacuum experiments were conducted. Built a test apparatus to assess carbon fiber emissions.

Education

Carnegie Mellon University

Doctor of Philosophy (Ph.D.), Engineering and Public Policy · (1988 - 1991)

Carnegie Mellon University

Master of Engineering, Mechanical Engineering · (1985 - 1987)

University of Virginia

Bachelor of Science (B.S.), Mechanical Engineering · (1981 - 1985)