DANIEL S. COHAN

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Dept. of Civil & Environmental Engineering
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EDUCATION

2004 Ph.D., Atmospheric Sciences
Georgia Institute of Technology, Atlanta, GA
Thesis: "Photochemical formation and cost-efficient abatement of ozone: High-order sensitivity analysis"
Minor: Transportation Policy and Economics

1998 B.A., Applied Mathematics
Harvard University, Cambridge, MA

EMPLOYMENT

2013 – Associate Professor, Civil & Environmental Engineering, Rice University
2006 – 2013 Assistant Professor, Civil & Environmental Engineering, Rice University
2004 – 2006 Environmental Specialist, Georgia Environmental Protection Division
1999 – 2004 Graduate Research Assistant, Georgia Institute of Technology
1998 – 1999 Fulbright Scholar to Australia, CRC - Southern Hemisphere Meteorology
1997 – 1997 Research Intern, Northeast States for Coordinated Air Use Management
1995 – 1998 Teaching Fellow and Research Assistant, Harvard University

BOOK

Cohan, D.S. (2022). *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*. Yale University Press.

PEER-REVIEWED PUBLICATIONS

(54 total; h-index = 28 per Google Scholar)

Luo, L., L. Ran, Q.Z. Rasool, and D.S. Cohan (2022). Integrated modeling of U.S. agricultural soil emissions of reactive nitrogen and associated impacts on air pollution, health, and climate. *Environmental Science & Technology*. https://doi-org.ezproxy.rice.edu/10.1021/acs.est.1c08660

Morse, R., S. Salvatore, J.H. Slusarewicz, and D.S. Cohan (2022). Can wind and solar replace coal in Texas? *Renewables: Wind, Water, and Solar*, 9(1). https://doi.org/10.1186/s40807-022-00069-2

Chen, C., D.C. McCabe, L.E. Fleischman, and D.S. Cohan (2022). Black carbon emissions and associated health impacts of gas flaring in the United States. *Atmosphere*, 13(3), 385. doi:10.3390/atmos13030385 GitHub for data and code

Xu, A., T. Loch-Temzelides, C. Adiole, N. Botton, S.G. Dee, C.A. Masiello, M. Osborn, M.A. Torres, and D.S. Cohan (2022). Race, Local Pollution, and COVID-19 Deaths in Texas. *Scientific Reports* 12, 1022, https://doi.org/10.1038/s41598-021-04507-x.

Goldman, G., A. Desikan, R. Morse, C. Kalman, T. MacKinney, D.S. Cohan, G. Reed, and J. Parras (2021). Assessment of Air Pollution Impacts and Monitoring Data Limitations of a Spring 2019 Chemical Facility Fire. *Environmental Justice*. doi:10.1089/env.2021.0030.

Wang, J., Xu, H., and D.S. Cohan (2020). Spatiotemporal ozone pollution LUR models: Suitable statistical algorithms and time scales for a megacity scale. *Atmospheric Environment*, 237, 117671. doi:10.1016/j.atmosenv.2020.117671.

Rasool, Q.Z., J.O. Bash, and D.S. Cohan (2019). Mechanistic representation of soil nitrogen emissions in the Community Multiscale Air Quality (CMAQ) model v 5.1. *Geoscientific Model Development*, 12, 849-878. doi:10.5194/gmd-2018-276.

Slusarewicz, J.H., and D.S. Cohan (2018). Assessing solar and wind complementarity in Texas. *Renewables: Wind, Water, and Solar*, 5(7), doi:10.1186/s40807-018-0054-3.

Strasert, B., S.C. Teh, and D.S. Cohan (2018). Air quality and health benefits from potential coal power plant closures in Texas. *Journal of the Air and Waste Management Association*, 69(3), 333-350. doi:10.1080/10962247.2018.1537984

Zhang, R., A.T. White, A. Pour Biazar, R.T. McNider, D.S. Cohan (2018). Incorporating GOES satellite photosynthetically active radiation (PAR) retrievals to improve biogenic emission estimates in Texas. *Journal of Geophysical Research*, 123(2), doi:10.1002/2017JD026792.

Sanchez, N.P., C. Zheng, W. Ye, B. Czader, D.S. Cohan, F.K. Tittel, R.J. Griffin (2018). Exploratory study of atmospheric methane enhancements derived from natural gas use in the Houston urban area. *Atmospheric Environment*, 176, 261-272. doi:10.1016/j.atmosenv.2018.01.001.

Pourhashem, G., Q.Z. Rasool, R. Zhang, K.B. Medlock, D.S. Cohan, and C.A. Masiello (2017). Valuing the air quality effects of biochar reductions on soil NO emissions. *Environmental Science and Technology*, 51, 9856-9863. doi:10.1021/acs.est.7b00748.

Krakauer, N.Y., and D.S. Cohan (2017). Interannual variability and seasonal predictability of wind and solar resources. *Resources*, 6(3). doi:10.3390/resources6030029.

Zhang, R., A. Cohan, A. Pour-Biazar, and D.S. Cohan (2017). Source apportionment of biogenic contributions to ozone formation over the United States. *Atmospheric Environment*, 164, 8-19. doi:10.106/j.atmosenv.2017.05.044

Sengupta, S., and D.S. Cohan (2017). Fuel Cycle Emissions and Life Cycle Costs of Alternative Fuel Vehicle Policy Options for the City of Houston Municipal Fleet. *Transportation Research D*, 54, 160-171. doi:10.106/j.trd.2017.04.039

Rasool, Q.Z., R. Zhang, B. Lash, D.S. Cohan, E. Cooter, J. Bash, L.N. Lamsal (2016). Enhanced representation of soil NO emissions in the Community Multi-scale Air Quality (CMAQ) model version 5.0.2. *Geoscientific Model Development*, 9, 3177-3197. doi:10.5194/gmd-9-3177-2016

Tao, Z., A. Kokas, R. Zhang, D.S. Cohan, and D. Wallach (2016). Inferring atmospheric particulate matter concentrations from Chinese social media data. *PLOS ONE*. doi:10.1371/journal.pone.0161389

Cohan, D.S., N.Y. Krakauer, J.J. Corbett, D. Rife, R. Zhang, A.R. Halberstadt, and L.Y. Parks (2016). Could cuts in sulfur from coal and ships help explain the 2015 spurt in Northern Hemisphere temperatures. *Earthzine*.

Rife, D., N.Y. Krakauer, D.S. Cohan, J.C. Collier (2016). A new kind of drought: U.S. record low windiness in 2015. *Earthzine*.

Cohan, D.S., and S. Sengupta (2016). Net Greenhouse Gas Emissions Savings from Natural Gas Substitutions in Vehicles, Furnaces, and Power Plants. *International Journal of Global Warming*, 9(2), 254-273, doi:10.1504/IJGW.2016.074960.

Tang, W., D.S. Cohan, A. Pour-Biazar, L.N. Lamsal, A. White, X. Xiao, W. Zhou, B.H. Henderson, and B. Lash (2015). Influence of satellite-derived photolysis rates and NOx emissions on Texas ozone modeling. *Atmospheric Chemistry and Physics*, 15, 1601-1619, doi :10.5194/acp-15-1601-2015.

Cohan, D.S., and R. Chen. (2014). Modeled and observed fine particulate matter reductions from state attainment demonstrations. *Journal of the Air & Waste Management Association*, 64(9), 995-1002, doi: 10.1080/10962247.2014.905509.

Zhu, L., D.J. Jacob, L.J. Mickley, E.A. Marais, D.S. Cohan, Y. Yoshida, B.N. Duncan, G.G. Abad, and K.V. Chance (2014). Anthropogenic emissions of highly reactive volatile organic compounds in eastern Texas inferred from oversampling of satellite (OMI) measurements of HCHO columns. *Environmental Research Letters* 9(11), doi:10.1088/1748-9326/9/11/114004.

Zhou, W., D.S. Cohan, and B.H. Henderson (2014). Slower ozone production in Houston, Texas, following emission reductions: evidence from Texas Air Quality Studies in 2000 and 2006. *Atmospheric Chemistry and Physics*, 14, 2777-2788, doi:10.5194/acp-14-2777-2014.

Tang, W., D.S. Cohan, L.N. Lamsal, X. Xiao, and W. Zhou (2013). Inverse modeling of Texas NOx emissions using space-based and ground-based NO2 observations. *Atmospheric Chemistry and Physics*, 13, 11005-11018. doi:10.5194/acp-13-11005-2013.

Zhou, W., D.S. Cohan, and S.L. Napelenok (2013). Factors affecting CMAQ predictions of ozone improvements following the NO_x SIP Call. *Atmospheric Environment*, 70, 236-244. doi: 10.1016/j.atmosenv.2012.12.038.

Digar, A., D.S. Cohan, X. Xiao, K.M. Foley, B. Koo, and G. Yarwood (2013). Constraining ozone-precursor responsiveness using ambient measurements. *Journal of Geophysical Research*, 118(2), 1005-1019, doi:10.1029/2012JD018100.

Zhou, W., D.S. Cohan, R.W. Pinder, J.A. Neuman, J.S. Holloway, J. Peischl, T.B. Ryerson, J.B. Nowak, F. Flocke, and W.G. Zheng (2012). Observation and modeling of the evolution of Texas power plant plumes. *Atmospheric Chemistry and Physics*, 12, 455-468. doi: 10.5194/acp-12-455-2012.

Pegues, A.H., D.S. Cohan, A. Digar, C. Douglass, and R.S. Wilson (2012). Efficacy of recent state implementation plans for 8-hour ozone. *Journal of the Air & Waste Management Association*, 62(2), 252-261. doi: 10.1080/10473289.2011.646049.

Cohan, D.S., and S.L. Napelenok (2011). Atmospheric response modeling for decision support. *Atmosphere*, 2(3), 407-425. doi:10.3390/atmos2030407.

Digar, A., D.S. Cohan, M.L. Bell, and W. Tang (2011). Uncertainties influencing health-based prioritization of ozone abatement strategies. *Environmental Science & Technology* , 45(1), 189-196. doi: 10.1021/es102581e.

Ji, M., D.S. Cohan, and M.L. Bell (2011). Meta-analysis of the association between short-term exposure to ambient ozone and respiratory hospital admissions. *Environmental Research Letters*, 6, 11 pp., doi: 10.1088/1748-9326/6/2/024006.

Cohan, D.S., and C. Douglass (2011). Potential emissions reductions from grandfathered coal power plants in the United States. *Energy Policy*, 39(9), 4816-4822, doi: 10.1016/j.enpol.2011.06.039.

Tang, W., D.S. Cohan, G.A. Morris, D.W. Byun, W.T. Luke (2011). Influence of vertical mixing uncertainties on ozone simulation in CMAQ. *Atmospheric Environment*, 45(17), 2898-2909. doi: 10.1016/j.atmosenv.2011.01.057.

Digar, A., D.S. Cohan, D.D. Cox, B.-Y. Kim, and J.W. Boylan (2011). Likelihood of achieving air quality targets under model uncertainties. *Environmental Science & Technology*, 45, 189-196, doi: 10.1021/es102581e.

Wang, X., Y. Zhang, Y. Hu, W. Zhou, L. Zeng, M. Hu, D.S. Cohan, A.G. Russell (2011). Decoupled direct sensitivity analysis of regional ozone pollution over the Pearl River Delta during the PRIDE-PRD2004 campaign. *Atmospheric Environment*, 45(28), 4941-4949, doi:10.1016/j.atmosenv.2011.06.006.

Cohan, D.S. (2011). An energy and environment undergraduate course emphasizing comparative metrics. *ASCE Journal of Professional Issues in Engineering Education & Practice*, 137(2), 64-68, doi:10.1061/(ASCE)EI.1943-5541.0000045.

Xiao, X., D.S. Cohan, D.W. Byun, and F. Ngan. (2010). Highly nonlinear ozone formation in the Houston region and implications for emission controls. *Journal of Geophysical Research*, 115, D23309, doi:10.1029/2010JD014435.

Digar, A., and D.S. Cohan (2010). Efficient characterization of pollutant-emission response under parametric uncertainty. *Environmental Science & Technology*, 44(17), 6724-6730, doi:10.1021/es903743t.

Cohan, D.S., B. Koo, and G. Yarwood (2010). Influence of uncertain reaction rates on ozone sensitivity to emissions in Houston. *Atmospheric Environment*, 44, 3101-3109.

Tian, D., M.S. Bergin, D.S. Cohan, S. Napelenok, Y. Hu, M. Chang, A.G. Russell (2010). Uncertainty analysis of ozone formation and response to emission controls using high-order sensitivities. *Journal of the Air & Waste Management Association*, 60, 797-804.

Kim, S., D.W. Byun, and D. Cohan (2009). Contributions of inter- and intra-state emissions to ozone over Dallas-Fort Worth, Texas. *Civil Engineering and Environmental Systems*, 26, 103-116.

Jin, L., S. Tonse, D.S. Cohan, X. Mao, R.A. Harley, and N.J. Brown (2008). Direct sensitivity analysis of ozone formation in California's San Joaquin Valley. *Environmental Science & Technology*, 42, 3683-3689.

Bergin, M.S., A.G. Russell, M.T. Odman, D.S. Cohan, and W.L. Chameides (2008). Single-source impact analysis using 3D air quality models. *Journal of the Air & Waste Management Association*, 58, 1351-1359.

Napelenok, S.L., D.S. Cohan, M.T. Odman, and S. Tonse (2008). Extension and evaluation of sensitivity analysis capabilities in a photochemical model. *Environmental Modelling & Software*, 23, 994-999.

Cohan, D.S., J.W. Boylan, A. Marmur, and M.N. Khan (2007). An integrated framework for multi-pollutant air quality management and its application in Georgia. *Environmental Management*, 40, 545-554.

Cohan, D.S., D. Tian, Y. Hu, and A.G. Russell (2006). Control strategy optimization for attainment and exposure mitigation: Case study for ozone in Macon, Georgia. *Environmental Management*, 38, 451-462.

Cohan, D.S., Y. Hu, and A.G. Russell (2006). Dependence of ozone sensitivity analysis on grid resolution. *Atmospheric Environment*, 40, 126-135.

Chestnut, L.G., D.S. Cohan, and D.M. Mills (2006). Cost-benefit analysis in the selection of efficient multipollutant strategies. *Journal of the Air & Waste Management Association*, 56, 530-536.

Greenwald, R., M.H. Bergin, J. Xu, D. Cohan, G. Hoogenboom, and W.L. Chameides (2006). The influence of aerosols on crop production: A study using the CERES crop model. *Agricultural Systems*, 89, 390-413.

Napelenok, S.L., D.S. Cohan, Y. Hu, and A.G. Russell (2006). Decoupled direct 3D sensitivity analysis for particulate matter. *Atmospheric Environment*, 40, 6112-6121.

Cohan, D.S., A. Hakami, Y. Hu, and A.G. Russell (2005). Nonlinear response of ozone to emissions: Source apportionment and sensitivity analysis. *Environmental Science & Technology*, 39, 6739-6748.

Cohan, D.S., G.A. Sturrock, A.P. Biazar, and P.J. Fraser (2003). Atmospheric methyl iodide at Cape Grim, Tasmania, from AGAGE observations. *Journal of Atmospheric Chemistry*, 44, 131-150.

Cohan, D.S., J. Xu, R. Greenwald, M.H. Bergin, and W.L. Chameides (2002). Impact of atmospheric aerosol light scattering and absorption on C-uptake by terrestrial plants. *Global Biogeochemical Cycles*, doi:10.1029/2001GB001441.

Cohan, D.S., M.G. Shultz, D.J. Jacob, B.G. Heikes, D.R. Blake (1999). Convective injection and photochemical decay of peroxides in the tropical upper troposphere: Methyl iodide as a tracer of marine convection. *Journal of Geophysical Research*, 104, 5717-5724.

BOOK CHAPTERS

Zhou, W., D.S. Cohan (2010). Nonlinear formation of ozone in power plant plumes in Texas. *Air Pollution Modeling and Its Application XX*, Eds. D.G. Steyn and S.T. Rao, Springer Publishing, pp. 125-129.

Cohan, D.S., A. Digar, M.L. Bell (2010). Influence of concentration-response temporal metrics on control strategy optimization. *Air Pollution Modeling and Its Application XX*, Eds. D.G. Steyn and S.T. Rao, Springer Publishing, pp. 421-425.

Cohan, D., A. Russell (2007). Cost-optimized air pollution control using high-order sensitivity analysis. *Air Pollution Modeling and Its Application XVII*, Eds. C. Borrego and A.-L. Norman, Springer Publishing, pp. 48-58.

Cohan, D., Y. Hu, A. Russell (2007). Alternative approaches to diagnosing ozone production regime. *Air Pollution Modeling and Its Application XVII*, Eds. C. Borrego and A.-L. Norman, Springer Publishing, pp. 140-148.

ARTICLES IN POPULAR MEDIA

(*Compiled at https://cohan.rice.edu/columns*)

Op-eds and articles in The Hill (48), Houston Chronicle (17), The Conversation (9), Austin American Statesman (1), Talking Points Memo (1), Bloomberg Government (3), and Chemistry and Industry (1)

HONORS AND AWARDS

Monetary Awards:

National Science Foundation CAREER Award (2009-2014)
NASA Air Quality Applied Sciences Team (2011-2016)
Outstanding Faculty Associate Award, Will Rice College (2007, 2011)
National Science Foundation Graduate Research Fellow (1999-2002)
Georgia Tech Presidential Scholar (1999-2003)
Georgia Air & Waste Management Association Scholarship (2003)
Best Scientific Publication Award, Georgia Tech Earth & Atmospheric Sciences (2003)
Best Speaker, Georgia Tech EAS Graduate Student Symposium (2003)
American Meteorological Society Paul H. Kutschenreuter Scholar (1998)

Non-monetary Honors:

Financial Times, Best New Books on Climate and the Environment (2022)
Distinguished Lecturer, West Texas A&M University (2022)
TEDx speaker (2022)
SustMeme Top 500 Climate and Energy Influencers (ranked #349 as of May 2022)
Career Champion Award, Rice Center for Career Development (2022)
Second-most media mentions among Rice faculty (2021)
ASCE Faculty Member of the Year (2015)
Excellence in Review Award, Environmental Science and Technology (2015)
Baker Institute Faculty Scholar for Energy Studies (2013-2015)
Distinguished Faculty Associate Award, Will Rice College (2009, 2010, 2014, 2018)
Doughtie Outstanding Associate Award, Will Rice College (2008)
Community Modeling & Analysis System Award of Appreciation (2004)
Chronicle of Higher Education Rising Star Nominee (2004)
Phi Beta Kappa (1998)

SPONSORED RESEARCH

Grants funded as Principal Investigator:

"Modeling the potential role of geothermal energy in U.S. power systems." Project Innerspace. 9/2022 – 9/2023.

"Synthesis of Texas Electricity Research from Rice University." Energy Foundation. 11/2022 – 4/2023. Co-Investigator: James Doss-Gollin.

"Air, climate, and agricultural impacts of applying methane-derived carbon solids to soils: Assessing potential impacts to the N cycle." Carbon Hub. 1/2022 – 12/2022.

"Modeling the Impacts of Emissions from Flaring in Texas." Clean Air Task Force. 08/2021 – 4/2022.

"Estimating Ecosystem Services from CH_4-derived Solid Carbon." Carbon Hub. 1/2021 – 12/2021. Co-PI with Carrie Masiello.

"Carbon Accounting for Hydrogen Production by Syzygy Plasmonics." Syzygy Plasmonics. 1/2021 – 8/2021.

"Can Wind and Solar Replace Coal in Texas." Energy Foundation. 05/2020 – 02/2021.

"Air Quality Impacts of COVID Response Policies." Rice University. 4/2020 – 12/2020. Co-Investigator: Daniel Kowal

"Air Quality Impacts of Houston Fires in 2019." Union of Concerned Scientists. 07/2019 – 12/2019.

"A roadmap toward a sustainable vehicle fleet in Houston." Houston Solutions Lab. 08/2018 – 12/2019. Co-Investigator: Laura Schaefer.

"NASA Air Quality Applied Sciences Team." National Aeronautics and Space Administration. 10/2011 – 9/2016.

"Application of Satellite Observations to Ozone Attainment Planning in Texas." National Aeronautics and Space Administration. Co-Investigator: A. Pour-Biazar. 8/2010 – 7/2013.

"CAREER: Ground-truthing Ozone and Particulate Matter Sensitivities to Emissions Trends." National Science Foundation. 7/2009 – 6/2014.

"Factors Influencing Ozone-Precursor Response in Texas Attainment Modeling." Texas Air Quality Research Program. Co-Investigators: B. Koo, G. Yarwood, and X. Xiao. 10/2010 – 8/2011.

"Incorporating Uncertainty Analysis into Integrated Air Quality Planning." U.S. Environmental Protection Agency STAR Grant. Co-Investigators: D. Cox, M. Bell, J. Boylan, A. Marmur, M. Bergin. 10/2007 – 4/2010.

"Integrated Economic, Environmental, and Reliability Modeling of Power System Growth." Shell Center for Sustainability. Co-Investigators: L. Duenas-Osorio, P. Hartley, and K. Medlock. 1/2008 – 1/2009.

"Sustainable Production and Deployment of Biodiesel in Texas." Shell Center for Sustainability. Co-Investigators: K. Zygourakis and R. Gonzalez. 1/2008 – 1/2009.

"A Roadmap to Clean Air and Sustainable Energy in Texas." Texas Business for Clean Air. Co-Investigator: B. Buzcu-Guven. 6/2008 – 8/2008.

"Exploratory Study of Power Systems Options in Texas." Rice University Energy and Environmental Systems Institute. 7/2007 – 8/2008.

Grants funded as Co-I.:

"Effect of Climate Change on Future Harvey-like Hurricanes and the Implications for Houston." Rice University Houston Engagement and Recovery Effort. P.I.: P. Hassanzadeh.

"Incorporation of Space-borne Observations to Improve Biogenic Emissions Estimates in Texas." Texas Air Quality Research Program. P.I.: A. Pour-Biazar (U. Alabama-Huntsville). 4/2014 – 8/2015.

Camille and Henry Dreyfus Foundation, funding to support Dreyfus Postdoctoral Fellow in Environmental Chemistry. P.I.: R. Griffin. 11/2009 – 10/2011.

Subawards:

"Improving the Representation of Physical Atmosphere in Air Quality Decision Support Systems Used for Emissions Control Strategy Development." NASA. 8/2015 – 5/2018. (Subaward from University of Alabama – Huntsville).

"Clean Air Benefits Estimation Project." Houston Endowment. 8/2008 – 8/2009. (Subcontract from University of Texas School of Public Health).

"Air Quality Modeling of TexAQS-II Episode with Data Assimilation." Texas Environmental Research Consortium. 4/2008 – 8/2009. (Subcontract from University of Houston).

"Incorporation of High-Order Decoupled Direct Method (HDDM) Sensitivity Analysis into CAMx." Texas Commission on Environmental Quality. 6/2007 – 8/2007. (Subcontract from ENVIRON International Corp.).

"A Seasonal Perspective on Regional Air Quality in Central California." U.S. Department of Energy. 7/2006 – 6/2007. (Subcontract from Lawrence Berkeley National Laboratory).

"Regional Transport Modeling for East Texas." Houston Advanced Research Center. 1/2006 – 6/2006. (Subcontract from University of Houston).

SCIENTIFIC PRESENTATIONS

Invited:

"Agricultural Soil Emissions of Reactive Nitrogen and their impacts on Air Quality, Health, and Climate." U.S. EPA New Insights in Atmospheric Science monthly seminar, 2022.

"How Better Buildings Can Help Confront Climate Gridlock." Humid Climate Conference, 2022.

"Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future." Center for Houston's Future Energy and Climate Thought Leadership Webcast Series, 2022.

"Confronting Climate Gridlock." University of Texas Energy Symposium, 2022.

"Replacing the Highest Polluting Power Plants with Cleaner, More Reliable Sources." Texas Energy Summit, 2022.

"Book Authors Panel." Society of Environmental Journalists Annual Conference, 2022.

"Opportunities to Replace Coal with Wind and Solar Power." North Carolina State University, 2021.
"The Energy Transition in Texas and Beyond." Environmental Sustainability Board learning academy, 2021.
"Climate Change: Trends, Causes, and Impacts." Rotary Club, Houston, 2021.
"Electricity in a Time of Transition." Planet Now and Rice Design Alliance, 2021.
"Balancing Wind and Solar Power for a Cleaner Grid." Offshore Technology Conference, Houston, 2019.
"Opportunities for Wind and Solar Power in Texas." Gulf Coast Power Association, Houston, 2019.
"State of the Air: Causes and trends of air pollution in Houston and beyond." Toshiba Technical Society, Houston, 2019.
"Climate Change and the Future of Hurricanes." SSPEED Center Conference, Houston, 2019.
"Opportunities for Wind and Solar Power to Replace Coal in Texas." Houston Renewable Energy Network, Houston, 2018.
"The Economic Development and Political Potential of Clean Energy." Texas Energy Summit, Houston, 2018.
"Air Quality and Health Benefits of Clean Energy." Rocky Mountain Institute. Boulder, CO, 2018.
"Influence of Climate Change on Hurricane Harvey & Future Storms." SSPEED Center Conference, Houston, 2018.
"Solving the Climate Challenge." Houston Philosophical Society, Houston, 2018.
"Renewable Energy's Role in Addressing Air Pollution and Climate Change", NASA Johnson Space Flight Center, Houston, TX, 2017.
"Texas' Evolving Electricity Market and Its Impact on Air Quality", Air & Waste Management Association Gulf Coast Chapter, Houston, TX, 2017.
"Current Scientific Understanding of Climate Change." AIAA Houston Chapter Annual Meeting, Houston, TX, 2015.
"Linking Air Quality Models and Epidemiology to Assess Health Impacts." University of Texas School of Public Health seminar, Houston, TX, 2013.
"Air Quality Responses to Emissions Trends." University of Houston departmental seminar, Houston, TX, 2013.
"Uncertainties Influencing Health-Based Prioritization of Ozone Abatement Options." AAAS Annual Conference, Boston, MA, 2013.
"Characterizing ozone response to emissions and its uncertainty." Harvard University seminar, Cambridge, MA, 2012.
"State of the Air: Air Quality and Climate Change in Texas and Beyond." American Meteorological Society Houston Chapter, Houston, TX, 2012.
"Characterizing uncertainty in atmospheric response modeling." Texas A&M University departmental seminar, College Station, TX, 2011.
"Assessing the Uncertainties of SIP Strategy Modeling." Invited presentation to California Air Resources Board, Sacramento, CA, 2010.

"Uncertainty in pollutant-emission sensitivity modeling." University of North Carolina air group seminar, Chapel, NC, 2010.
"Uncertainty in integrated air quality planning." Georgia Air Policy Symposium, Atlanta, GA, 2009.
"Reaction rate uncertainty in the development of control strategies." International Conference on Atmospheric Chemical Mechanisms, Davis, CA, 2008.
"Air quality modeling to inform health impact analyses." University of Texas School of Public Health departmental seminar, Houston, TX, 2008.
"Photochemical sensitivity analysis and its application to policy." University of Houston Department of Civil & Environmental Engineering, Houston, TX, 2008.
"High-order sensitivity analysis of photochemical models." Nankai University College of Environmental Science and Engineering, Tianjin, China, 2008.
"Electric power generation and air quality." Carnegie Mellon University Electricity Center, Pittsburgh, PA, 2008.
"Photochemical sensitivity analysis and its application to policy." Texas A&M Department of Atmospheric Sciences seminar, College Station, TX, 2007.
"High order sensitivity analysis in an air quality model: Methods and applications." Air & Waste Management Association North Carolina Chapter, RTP, NC, 2006.
"An integrated approach to air quality management." Canadian Council of Ministers of the Environment Strategic Planning Workshop: Future Directions for Air Management, Toronto, Canada, 2005.
"Modeling the air quality impacts and health benefits of emissions reductions." EPA Air Innovations Conference, Chicago, IL, 2005.
"Decoupled direct method for atmospheric sensitivity analysis." EPA Regulatory Modeling Workshop, New Orleans, LA, 2005.
"CMAQ-DDM: Method, performance, and application." University of Houston Department of Geosciences seminar, Houston, TX, 2005.

Other:

"Responses of human activity and in-situ and satellite-observed air quality in U.S. cities to the COVID pandemic." American Geophysical Union Fall Meeting, 2020.
"Air quality benefits of replacing coal with wind and solar in Texas." CMAS Conference, 2020.
"Solving the Climate Challenge." National Youth Science Camp, Bartow, WV, 2019.
"Opportunities for wind and solar to displace coal and associated health impacts in Texas," American Geophysical Union Fall Meeting, New Orleans, LA, 2017.
"Source apportionment of biogenic contributions to ozone formation over the United States", CMAS Conference, Chapel Hill, NC, 2016.
"Greenhouse gas impacts of natural gas substitutions." American Geophysical Union Fall Meeting, San Francisco, CA, 2015.
"Emission reductions needed to meet proposed ozone standard and their effect on particulate matter." CMAS Conference, Chapel Hill, NC, 2015.
"Evaluation of Attainment Modeling Methods for Ozone and Particulate Matter." EPRI ENVISION Meeting, Crystal City, VA, 2015.

"Toward the integration of air quality and climate strategies at the state level." CMAS Conference, Chapel Hill, NC, 2014.
"Retrospective evaluation of recent state implementation plans for ozone." American Meteorological Society Annual Meeting, Austin, TX, 2013.
"Interannual variability in biogenic emissions." NASA Air Quality Applied Sciences Team meeting, Sacramento, CA, 2012.
"Interannual variability in biogenic emissions driven by dynamic vegetation conditions." NASA Air Quality Applied Sciences Team meeting, Madison, WI, 2012.
"Kalman Filter Inversion of Regional NOx Emissions based on OMI NO_2 Observations." American Geophysical Union Annual Meeting, San Francisco, CA, 2012.
"State of the Air: Air Quality and Climate Change in Texas and Beyond." American Meteorological Society Houston Chapter meeting, Houston, TX, 2012.
"NASA Air Quality Applied Sciences Team." CenSARA Annual Meeting, Dallas, 2012.
"Observation-constrained probabilistic evaluation of modeled concentrations and sensitivities." CMAS Conference, Chapel Hill, NC, 2012.
"Inverse modeling of Texas NO_x emissions using OMI NO_2 observations." American Geophysical Union Fall Meeting, San Francisco, CA, 2011.
"Inquiry-based atmospheric science lessons for K-12 students." American Geophysical Union Fall Meeting, San Francisco, CA, 2011.
"Characterizing uncertainty in atmospheric response modeling." AEESP Research and Education Conference, Tampa, FL, 2011.
"An energy and environment course at Rice University." American Society for Engineering Education Gulf Southwest Conference, Houston, TX, 2011.
"Influence of reaction rate uncertainties on pollutant-emission sensitivities." Atmospheric Chemical Mechanisms Conference, Davis, CA, 2010.
"Uncertainties influencing health-based prioritization of ozone abatement options." CMAS Conference, Chapel Hill, NC, 2010.
"Accuracy of multi-parameter response surfaces generated from sensitivity coefficients." CMAS Conference, Chapel Hill, NC, 2009.
"Photochemical modeling to inform environmental policy." Dissertations Initiative for the Advancement of Climate Change Research, Hilo, HI, 2007.
"High order sensitivity analysis to inform control strategy development." A&WMA Specialty Conference on Integrated Control Strategies, Durham, NC, 2006.
"Integrating atmospheric science into air quality planning: Challenges and opportunities." American Meteorological Society Annual Meeting, Atlanta, GA, 2006.
"Air quality modeling for control strategy development." NOAA/EPA Golden Jubilee Symposium, Durham, NC, 2005.
"Atmospheric modeling for abatement strategy formulation." Gordon Research Conference on Atmospheric Chemistry, Big Sky, MT, 2005.
"Atmospheric science in the public realm." Atmospheric Chemistry Colloquium for Emerging Senior Scientists, Yellowstone National Park, WY, 2005.
"An integrated approach to air quality attainment." American Association of Aerosol Research International Specialty Conference, Atlanta, GA, 2005.

"Heterogeneity of ozone yield with location of NO_x emission origin." American Geophysical Union Fall Conference, San Francisco, CA, 2004.
"Applicability of CMAQ-DDM to source apportionment and control strategy development." Models-3 Users Workshop, Durham, NC, 2004.
"Impact of atmospheric particulate matter on plants." Southeast Ecology & Evolution Conference, Atlanta, GA, 2004.
"Sensitivity analysis of O_3 in the Southeast." Models-3 Workshop, Durham, NC, 2003.
"Implementation of a direct sensitivity analysis method into CMAQ." Models-3 Users Workshop, Durham, NC, 2002.
"Impact of aerosol light attenuation on plant growth." American Geophysical Union Fall Conference, San Francisco, CA, 2000.
"Emission of methyl iodide from the Southern Ocean." International Conference on Southern Hemisphere Meteorology and Oceanography, Santiago, Chile, 2000.
"Low ozone episodes over southern Australia in summer 1999." American Geophysical Union Fall Conference, San Francisco, CA, 1999.
"Methyl iodide at Cape Grim, Tasmania." SOAPEX II post-campaign meeting, Melbourne, Australia, 1999.
"Methyl iodide as a tracer of marine convection." Cape Grim Annual Scientific Meeting, Melbourne, Australia, 1998.

PROFESSIONAL SERVICE

EXTERNAL

Board of Scientific Counselors, Climate Change Sub-committee: U.S. Environmental Protection Agency (2022-)
Texas Tribune Festival invited speaker (2022)
Advisory Council, Houston Advanced Research Center (2019-)
Editorial Review Board, Journal of the Air & Waste Management Association (2016-2019)
Conference host and session chair, NASA Air Quality Applied Sciences Team (2014)
Independent Technical Advisory Committee, Texas Air Quality Research Program (2010-2012)
Session Co-Chair: CMAS atmospheric modeling conference (2012)
Session Co-Chair: American Society for Engineering Education regional conference (2011)
Program Technical Committee and Session Co-Chair: Association of Environmental Engineering and Science Professors Education and Research Conference (2011)
Session Co-Chair: American Meteorological Society Annual Meeting (2010)
CMAQ Model Review Committee (2007)
Georgia Air Policy Symposium: Founding chair (2006)
Session Chair: A&WMA Specialty Conference on Integrated Control Strategies (2006)

Professional Memberships: American Geophysical Union; American Meteorological Society; Air & Waste Management Association

Journal Peer Reviewer: Environmental Science & Technology; Atmospheric Chemistry and Physics; Atmospheric Environment; Journal of Geophysical Research; Bulletin of the American Meteorological Society; Environmental Management; Geophysical Research Letters; Journal of Applied Meteorology; Journal of Environmental Management; Geoscientific Model Development; Environmental Modeling and Software; Environmental Chemistry; Environment International; International Journal of Environmental Technology and Management; Energy Policy; American Journal of Public Health; PNAS; Environmental Research Letters; Environmental Research Communications; Atmosphere; Air Quality Atmosphere and Health; Energy Strategy Reviews; IEEE Transactions on Education; Proceedings of the National Academy of Sciences; IEEE Transactions on Power Systems; IEEE Vehicular Technology; Transportation Research D; Environmental Research Infrastructure and Sustainability; Science of the Total Environment

Grant Peer Reviewer: National Science Foundation; Texas Air Quality Research Program; National Oceanic and Atmospheric Administration; NASA

Book Proposal Reviewer: University of Chicago Press, Elsevier

UNIVERSITY

Faculty Senate (2021-)
Steering Committee, Environmental Analysis Professional M.S. program (2007-)
Faculty Advisory Board, Program in Writing and Communication (2013-2016, 2022-)
Engineering Divisional Advisor: Will Rice College (2008-2015, 2022-)
Faculty Associate: Will Rice College (2006-)
Steering Committee, Center for Environmental Studies (2020-2021)
Task force on the creation of an institute for the environment (2019-2020)
Fellow, Rice University Center for Teaching Excellence (2014-2017)
Treybig Teaching Colloquy (2017)
Rice Civic Scientist presentations to high schools (2013-2016)
University Committee on Teaching (2012-2014)
Faculty Search Committees: Engineering-wide search in Energy and Materials (2012); Earth Sciences (2009); Statistics (2008)

DEPARTMENTAL COMMITTEES

Accreditation (2013-); Awards (2012-2015); Curriculum (2015-); Faculty Search (2007-2008, 2022-2023); Seminar (2006-2011); Graduate Studies (2011-2013)

COURSES TAUGHT

CEVE/ESCI/ENST 307, "Energy and the Environment" (Spring 2007-2022)
CEVE 411/511, "Atmospheric Chemistry and Climate" (Fall 2008, 2009, 2011-2017, 2019-2022)
MLSC 553, "Solving the Climate Challenge" (Fall 2017, Spring 2021)

RESEARCH ADVISING

Graduate Students: Antara Digar, Ph.D., 2007-2012
Wei Zhou, Ph.D., 2007-2013
Wei Tang, Ph.D., 2008-2014
Benjamin Lash, M.S., 2011-2014
Erin Chavez-Figueroa, M.S., 2011-2015
Quazi Rasool, Ph.D., 2014-2018
Brian Strasert, M.S., 2016-2017
Amy Jiang, M.C.E.E., 2021
Hannah Vincent, M.C.E.E., 2022
Lina Luo, Ph.D. Student, 2018-
Chen Chen, Ph.D. Student, 2021-
Chun-Ying Chao, Ph.D. Student, 2020-

Post-doctoral Fellows: Dr. Xue Xiao, 2008-2011; Dr. Adetutu Aghedo, 2012-2013
Dr. Rui Zhang, 2014-2016

Research Scientist: Dr. Beata Czader, 2014-2016

Undergraduate Research: Raleigh Ricart, Carlos Rojo, Kirti Datla, Kyle Saari, Daniel Hodges-Copple, Oviea Akpotaire, Seoyeon Hong, Andrew Pegues, Catherine Douglass, Willie Xu, Lance Le, Kavita Venkateswar, Chris Chan, Rebecca Hyde, Komal Bansal, Shayak Sengupta, Ran Chen, Lun (Allen) Li, Elizabeth Piña, Amanda MacDonald, Fariha Rashid, Nicole Moes, Joanna Slusarewicz, Katherine Zoellmer, Su Chen Teh, Tim Thomas II, Vincent Gonzales, Zack Muhia, Ricky Morse, Sarah Salvatore, Winnie Louh, Yunseo Choi, Zach Rewolinski, James Li, Andrew Nguyen, Robin MacDonald, Diego De La Fuente, Gabriel Meriano, Lynn Niu, Xander Abbott, Andrea Dayan, Amy Jiang, Tona Akerele, George Lyu, Leticia Souto

Thesis Committees: Shagun Bhat, Ph.D., 2007; Andrea Zimmer, M.S., 2007; Vinitha Chinnakani, M.S., 2007; Hilary Robinson, M.S., 2009; Yuling Jia, Ph.D., 2009; Wei Tang, M.S., 2009; Roque Sanchez, M.S., 2010; Marco Enriquez, Ph.D., 2010; Kabindra Shakya, Ph.D., 2011; Andrew Juan, M.S., 2011; Brandon Duncan, M.S., 2011; Merritt McKinney, Ph.D., 2011; Antara Digar, Ph.D., 2012; Carol Liu, M.S., 2012; Andrea Clements, Ph.D., 2012; Basak Cevik, M.S., 2012; Wei Zhou, Ph.D., 2013; Longwen Gong, Ph.D., 2013; Wei Tang, Ph.D., 2014; Jialu Xu, M.S., 2014; Tatyana Boland, M.S. (Harvard Extension School), 2015; Yu Jun Leong, 2015; Erin Chavez-Figueroa, M.S., 2015; Brian Strasert, M.S., 2017; Kishore Babu Ragi, Ph.D., 2017 (National Institute of Technology Rourkela); Ben Schulze, M.S. 2018; Loredana Suciu, Ph.D., 2020; Fangzhou Guo, Ph.D., 2021; Robert Idel, Ph.D., 2022; Blake Atkinson, Ph.D., 2022