

# R. BRADLEY PIERCE

## Academic Program Director, Space Science and Engineering Center, UW-Madison

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Scientific leader with 20+ years of experience leading large-scale research efforts with multidisciplinary teams. Extensive experience with observation, analysis, and prediction of the chemistry and dynamics of the Earth's atmosphere using a broad range of observational systems and theoretical approaches. Skilled at leading geographically diverse scientific and technical teams while managing research activities and programs to meet national goals and uncovering new research and funding opportunities.

### EDUCATION

**Doctor of Philosophy (PhD) in Meteorology** — University of Wisconsin-Madison, WI, 1988

**Master of Science (MS) in Meteorology** — University of Wisconsin-Madison, WI, 1986

**Bachelor of Science (BS) in Physics** — University of Wisconsin-River Falls, WI, 1982

**Bachelor of Science (BS) in Mathematics** — University of Wisconsin-River Falls, WI, 1982

### PROFESSIONAL EXPERIENCE

<b>Faculty</b> , Energy Analysis and Policy Graduate Certificate Program, UW-Madison	January 2022-Present
<b>Professor</b> , Atmospheric and Oceanic Sciences Department, UW-Madison	September 2019-Present
<b>Academic Program Director</b> , Space Science and Engineering Center, UW-Madison	October 2018-Present
<b>Physical Scientist</b> , National Ocean and Atmospheric Administration, Madison, WI	May 2007-September 2018
<b>Senior Research Scientist</b> , National Aeronautics and Space Administration, Hampton, VA	August 2000-May 2007
<b>Research Scientist</b> , National Aeronautics and Space Administration, Hampton, VA	January 1990-August 2000
<b>Research Associate</b> , Space Science and Engineering Center, UW-Madison	June 1988-December 1989

### AWARDS AND HONORS

- NASA Group Achievement Award: FIREX-AQ, 2020.
- NOAA Administrator's Award for providing robust, real-time, simulated data of the next generation geostationary satellite imagers, reducing risk in post-launch operations, 2016.
- NASA Exceptional Achievement Medal for outstanding contributions to the development of innovative techniques which enhance the scientific interpretation of airborne measurements of atmospheric constituents, 2003.
- NASA Group Achievement Award for the INTEX-NA Science Team, 2005
- NASA Group Achievement Award in recognition of exceptional achievement in developing the highly successful air quality, aviation weather, and energy management applications for the earth science enterprise, 2005
- NASA Group Achievement Award for the SOLVE Science Team, 2001
- NASA Group Achievement Award for the POLARIS Project Team, 1998
- NASA Group Achievement Award for the ASHOE/MAESA Experiment Team, 1996

### SCIENCE TEAM MEMBERSHIPS

- Member of the NOAA Geostationary Extended Orbits Mission (GeoXO) Atmospheric Composition Instrument (ACX) Science Team (2022-present)
- Member of the NOAA Stratospheric Aerosol processes, Budget and Radiative Effects (SABRE) Science Team (2022-present)
- Member of the NOAA Atmospheric Emissions and Reactions Observed from Megacities to Marine Areas (AEROMMA) and NASA Synergistic TEMPO Air Quality Science (STAQS) Science Teams (2022-Present)
- Member of the NASA/NOAA Fire Influence on Regional to Global Environments and Air Quality (FIREX-AQ) Science Team (2017-Present)

- Member of the NASA Health and Air Quality Applied Science Team (HAQAST) (2017-Present)
- Member of the NOAA Joint Polar Satellite System (JPSS) Proving Ground (2014-Present)
- Member of the NASA Tropospheric Emissions: Monitoring of Pollution (TEMPO) Science Team (2013-Present)
- Member of the NOAA GOES-R Algorithm Working Group (AWG) (2008-September 2018)
- Member of the NASA Air Quality Applied Science Team (AQAAT) (2012-2016)
- Member of the NASA Aura Science Team (2014-2016)
- Member of the NSF Tropical Ocean Troposphere Exchange of Reactive halogen species and Oxygenated VOC (TORERO) Science Team (2012)
- Member of the NOAA Research at the Nexus of Air Quality and Climate Change (CalNex) Science Team (2010)
- Member of the NOAA Volcanic Ash Working Group (VAWG) Science Team (2009)
- Member of the NOAA Aerosol, Radiation, and Cloud Processes affecting Arctic Climate (ARCPAC) Science Team (2008)
- Member of the NOAA Texas Air Quality Study (TEXAQS) Science Team (2006)
- Member of the NASA Intercontinental Chemical Transport Experiment (INTEX-NA) Science Team (2004-2006)
- Member of the NASA Transport and Chemical Evolution over the Pacific (TRACE-P) Science Team (2001)
- Member of the NASA Stratospheric Aerosol and Gas Experiment (SAGE) III Ozone Loss and Validation Experiment (SOLVE) Science Team (2001)
- Member of the NASA Photochemistry of Ozone Loss in the Arctic Region In Summer (POLARIS) Project Team (1997)
- Member of the NASA Airborne Southern Hemisphere Ozone Experiment (ASHOE) and Measurements for Assessing the Effects of Stratospheric Aircraft (MAESA) Experiment Team (1994)

## LEADERSHIP

- Responsible for the overall success of SSEC through leadership of the administrative staff that runs the Center's day-to-day activities. Communicate to SSEC staff on a regular basis the state of the Center, its progress, and its upcoming tasks and opportunities.
- Provide vision and leadership for a research environment that accommodates a diverse range of activities involving world class research in the physical sciences, matching SSEC goals to appropriate national research initiatives.
- Establish policies for short- and long-term research and outreach goals and objectives, address the diverse funding needs of SSEC, and interact with the Center's Principal Investigators and staff in development and review of programs and personnel to ensure clearly defined progress and fulfillment of the SSEC mission and obligations.
- Lead large-scale research programs involving instrument development, data analysis technique development, participation in field campaigns, and new technology definition and implementation.
- Participate in national and international research programs and in professional society affairs. Serve on various committees and advisory boards, and participate in other public activities within the University of Wisconsin and State of Wisconsin.
- Mission Scientist: 2017 Lake Michigan Ozone Study (LMOS 2017). Led a team of 40+ scientists in planning and execution of LMOS 2017 field campaign designed to collect field measurements to improve understanding of persistent violations of the ozone National Ambient Air Quality Standard in the coastal communities around Lake Michigan.
- Lead: NOAA GOES-R Advanced Baseline Imager (ABI) Algorithm Working Group Proxy Data Team. Oversaw development and delivery of real-time simulated ABI geostationary satellite observations for use

in end-to-end testing of the NOAA GOES-R Ground System and National Weather Service Advanced Weather Interactive Processing System (AWIPS) prior to launch of the NOAA GOES-16 satellite.

- Co-Lead: NASA GEOstationary Coastal and Air Pollution Events (GEO-CAPE) Mission Studies Regional OSSE Group. Co-led team of NASA, NOAA, NSF, and University scientists in conducting chemical Observation System Simulation Experiments (OSSEs) to demonstrate impact of assimilation of hyper-spectral geostationary ozone retrievals on regional air quality predictions in support of –one of the earth observation missions recommended by Nat'l Research Council 2007 Decadal Survey.
- Principal Investigator: Real-time Air Quality Modeling System (RAQMS). Led design, development, and utilization of RAQMS, a global meteorological and chemical modeling system developed for assimilating satellite observations of atmospheric chemical and aerosol composition and predicting global air quality.
- Principal Investigator: NOAA Unified Forecast System (UFS) Atmospheric Composition Forecasting and Data Assimilation Development. Lead design, development, and demonstration of UFS-RAQMS global atmospheric composition forecasting and assimilation system.
- Principal Investigator: NASA Aura Chemical Reanalysis in support Air Quality Applications. Designed, developed, and executed first satellite-based, global chemical and aerosol reanalysis attempted within US; reanalysis provides comprehensive dataset describing global distribution of trace gases and aerosols for assessing global air quality.
- Principle Investigator: NASA Air Quality Applied Science Team (AQAAT). Served as NOAA/NESDIS Liaison on AQAAT and focused on engaging the NOAA Air Quality Research Program and State and Local Air Quality Agencies in the use of NASA satellite trace gas and aerosol measurements in air quality forecasting and assessment activities.
- Principle Investigator: NOAA Stratospheric Aerosol processes, Budget and Radiative Effects (SABRE) NOAA Earth's Radiation Budget (SABRE) Initiative Project. Provided flight planning and chemical forecasting support for SABRE using RAQMS global assimilation and forecasting model.
- Principle Investigator: NOAA Research in California at the Nexus of Air Quality and Climate Change (CalNex) field campaign. Collaboration with scientists from the California Air Resources Board (ARB) and NOAA Earth System Research Laboratory (ESRL) Chemical Sciences Division (CSD) on utilization and validation of real-time satellite trace gas and aerosol retrievals during the field phase of the 2010 CalNex field mission.
- Principle Investigator: NOAA Aerosol, Radiation, and Cloud Processes affecting Arctic Climate (ARCPAC) field campaign. RAQMS forecasting support for ARPAC flight planning and post mission analysis.
- Principle Investigator: NASA Intercontinental Chemical Transport Experiment – North America (INTEX-NA). Used RAQMS real-time forecasts and post mission data assimilation studies to link aircraft and satellite observations during NASA the NASA INTEX-NA AURA validation missions (INTEX-A and INTEX-B)
- Principle Investigator: NASA Airborne Southern Hemisphere Ozone Experiment (ASHOE) airborne mission theory team. Developed real-time ensemble trajectory forecasting system using stratospheric solar occultation trace gas measurements to assist in flight planning and post mission analysis of airborne and satellite data.
- Principle Investigator: NASA Photochemistry of Ozone Loss in the Arctic in Summer (POLARIS) airborne mission theory team. Developed real-time ensemble trajectory chemical forecasting system using stratospheric solar occultation trace gas measurements to assist in flight planning and post mission analysis of airborne and satellite data
- Principle Investigator: NASA SAGE III Ozone Loss and Validation Experiment (SOLVE) airborne mission theory team. Utilized real-time ensemble trajectory chemical forecasting system to assist in flight planning and post mission analysis of airborne and satellite data

## RESEARCH

- Designed, developed and executed the Lake Michigan Ozone Study (LMOS 2017); a ground based and airborne field campaign to collect field measurements to improve Lake Michigan Air Directors Consortium (LADCO) Wisconsin Department of Natural Resources (WDNR) modeling in support of State Implementation Planning and addressed persistent violations of the ozone National Ambient Air Quality Standard in the coastal communities around Lake Michigan.
- Developed the Real-time Air Quality Modeling System (RAQMS); the first global to regional meteorological and chemical modeling system developed for assimilating satellite observations of atmospheric chemical and aerosol composition and predicting global air quality.
- Designed, developed, and executed first satellite-based, global chemical and aerosol reanalysis attempted within US; reanalysis provided comprehensive dataset describing global distribution of trace gases and aerosols for assessing global air quality.
- Conducted the first regional chemical Observation System Simulation Experiments (OSSEs); demonstrated impact of assimilation of hyper-spectral geostationary ozone retrievals on regional air quality predictions in support of NASA's GEOstationary Coastal and Air Pollution Events (GEO-CAPE) Mission Studies –one of the earth observation missions recommended by Nat'l Research Council 2007 Decadal Survey.
- Coordinated the development of the LaRC Interactive Modeling Project for Atmospheric Chemistry and Transport (IMPACT) model. The LaRC IMPACT model is a global, three-dimensional general circulation model (GCM) of the troposphere, stratosphere and mesosphere with coupled dynamics, chemistry and radiation, and was developed as a tool for assessing the effects of stratospheric chemical, dynamical, and radiative coupling on the Earth's climate.

## CURRENT FUNDING: UW-MADISON SPACE SCIENCE AND ENGINEERING CENTER (SSEC)

Title: Assimilation of JPSS Atmospheric Composition and Aerosol products within NGGPS

Agency: NOAA

Role: Principal Investigator

Total Award Amount: \$443,976

Period of Performance: 08/1/21– 07/31/24

Title: Using Geostationary Satellite Observations to constrain Global and Western US Wildfire

Source/Receptor predictions during FIREX-AQ

Agency: NASA

Role: Principal Investigator

Total Award Amount: \$459,124.00

Period of Performance: 4/1/21 - 3/31/24

Title: NASA Health and Air Quality Applied Science Team, Member and Team Lead

Agency: NASA

Role: Co-Investigator

Total Award Amount: \$1,000,000

Period of Performance: 2/1/21-2/1/25

Title: Refining Planetary Boundary Layer Remote Sensing Requirements Using Merged Orbital And Sub-Orbital And Merged Active And Passive Observations From The Program Of Record

Agency: NASA

Role: Co-Investigator

Total Award Amount: \$595,567

Period of Performance: 04/14/2022- 03/13/2025

Title: CIMSS Research for AEROMMA Field Campaign Forecasting Support FY23

Agency: NOAA

Role: Principal Investigator

Total Award Amount: \$30,000

Period of Performance: 7/1/2023-6/30/2024

Title: RAQMS Forecast Support and Post Mission Analysis for the 2023 SABRE Campaign

Agency: NOAA

Role: Principal Investigator

Total Award Amount: \$107,206.00

Period of Performance: 1/1/23-12/31/23

Title: CIMSS Support for the Infrastructure Investment & Jobs Act: New and Improved Satellite Products in Support of Wildland Fire Monitoring and Forecasting

Agency: NOAA

Role: Principal Investigator

Total Award Amount: \$1,491,000

Period of Performance: 10/1/22 – 6/30/25

Title: CIMSS Support for the Disaster Relief Supplemental Appropriations Act (2022): Development of Advanced Satellite Detection and Monitoring for an Integrated Fire Information System

Agency: NOAA

Role: Principal Investigator

Total Award Amount: \$1,498,336

Period of Performance: 10/01/2022 – 9/30//2024

## PUBLICATIONS (H-INDEX=35)

- 1 Pierce, R.B., Harkey, M., Lenzen, A., Cronce, L.M., Otkin, J.A., Case, J.L., Henderson, D.S., Adelman, Z., Nergui, T. and Hain, C.R., 2023. High-resolution air quality simulations of ozone exceedance events during the Lake Michigan Ozone Study. *Atmospheric Chemistry and Physics*, 23(16), pp.9613-9635.
- 2 Acdan, J.J.M.s, Pierce, R.B., Dickens, A.F., Adelman, Z. and Nergui, T., 2023. Examining TROPOMI formaldehyde to nitrogen dioxide ratios in the Lake Michigan region: implications for ozone exceedances. *Atmospheric Chemistry and Physics*, 23(14), pp.7867-7885.
- 3 Otkin, J.A., Cronce, L.M., Case, J.L., Pierce, R.B., Harkey, M., Lenzen, A., Henderson, D.S., Adelman, Z., Nergui, T. and Hain, C.R., 2023. Meteorological modeling sensitivity to parameterizations and satellite-derived surface datasets during the 2017 Lake Michigan Ozone Study. *Atmospheric Chemistry and Physics*, 23(14), pp.7935-7954.
- 4 Warneke, C., Joshua P. Schwarz, Jack Dibb, Olga Kalashnikova, Gregory Frost, Jassim Al-Saad, Steven S. Brown, Wm. Alan Brewer, Amber Soja, Felix C. Seidel, Rebecca A. Washenfelder, Elizabeth B. Wiggins, Richard H. Moore, Bruce E. Anderson, Carolyn Jordan, Tara I. Yacovitch, Scott C. Herndon, Shang Liu, Toshihiro Kuwayama, Daniel Jaffe, Nancy Johnston, Vanessa Selimovic, Robert Yokelson, David M. Giles, Brent N. Holben, Philippe Goloub, Ioana Popovici, Michael Trainer, Aditya Kumar, R. Bradley Pierce, David Fahey, James Roberts, Emily M. Gargulinski, David A. Peterson, Xinxin Ye, Laura H. Thapa, Pablo E. Saide, Charles H. Fite, Christopher D. Holmes, Siyuan Wang, Matthew M. Coggon, Zachary C. J. Decker, Chelsea E. Stockwell, Lu Xu, Georgios Gkatzelis, Kenneth Aikin, Barry Lefer, Jackson Kaspari, Debora Griffin, Linghan Zeng, Rodney Weber, Meredith Hastings, Jiajue Chai, Glenn M. Wolfe, Thomas F. Hanisco, Jin Liao, Pedro Campuzano Jost, Hongyu Guo, Jose L. Jimenez, James Crawford 2023. Fire influence on regional to global Environments and air quality (FIREX-AQ). *Journal of Geophysical Research: Atmospheres*, 128(2), p.e2022JD037758.

- 5 Tirado, J., Torti, A.O., Butterworth, B.J., Wangen, K., Voon, A., Kies, B., Hupy, J.P., de Boer, G., Pierce, R.B., Wagner, T.J. and Cleary, P.A., 2023. Observations of coastal dynamics during lake breeze at a shoreline impacted by high ozone. *Environmental Science: Atmospheres*, 3(3), pp.494-505.
- 6 Loveless, D.M., Knuteson, R.O., Wagner, T.J., Loveless, M.L., Pierce, R.B. and Gero, P.J., 2023, July. Developing Synergies with Space-based Infrared Sounders to Improve Thermodynamic Sounding of the Planetary Boundary Layer. In *IGARSS 2023-2023 IEEE International Geoscience and Remote Sensing Symposium* (pp. 1317-1320). IEEE.
- 7 Chen, S.P., Lu, C.H.S., Davies, J.E., Ou-Yang, C.F., Lin, N.H., Huff, A.K., Pierce, B.R., Kondragunta, S. and Wang, J.L., 2023. Infusing satellite data into aerosol forecast for near real-time episode detection and diagnosis in East Asia. *Science of The Total Environment*, 856, p.158797.
- 8 Bela, M.M., Kille, N., McKeen, S.A., Romero-Alvarez, J., Ahmadov, R., James, E., Pereira, G., Schmidt, C., Pierce, R.B., O'Neill, S.M. and Zhang, X., 2022. Quantifying carbon monoxide emissions on the scale of large wildfires. *Geophysical Research Letters*, 49(3), p.e2021GL095831.
- 9 Washenfelder, R. A., L. Azzarello, K. Ball, S. S. Brown, Z. C. J. Decker, A. Franchin<sup>1,6,7</sup>, C. D. Fredrickson, K. Hayden, C. D. Holmes, A. M. Middlebrook<sup>1</sup> B. B. Palm, R. B. Pierce, D. J. Price, J. M. Roberts, M. A. Robinson, J. A. Thornton, C. C. Womack, and C. J. Young (2022). Complexity in the evolution, composition, and spectroscopy of brown carbon in aircraft measurements of wildfire plumes. *Geophysical Research Letters*, 49, e2022GL098951
- 10 East, J.D., Henderson, B.H., Napelenok, S.L., Koplitz, S.N., Sarwar, G., Gilliam, R., Lenzen, A., Tong, D.Q., Pierce, R.B. and Garcia-Menendez, F., 2022. Inferring and evaluating satellite-based constraints on NO<sub>x</sub> emissions estimates in air quality simulations. *Atmospheric Chemistry and Physics*, 22(24), pp.15981-16001.
- 11 Kumar, A.s, Pierce, R.B., Ahmadov, R., Pereira, G., Freitas, S., Grell, G., Schmidt, C., Lenzen, A., Schwarz, J.P., Perring, A.E. and Katich, J.M., 2022. Simulating wildfire emissions and plume rise using geostationary satellite fire radiative power measurements: a case study of the 2019 Williams Flats fire. *Atmospheric Chemistry and Physics*, 22(15), pp.10195-10219.
- 12 Edwards, M.R., Holloway, T., Pierce, R.B., Blank, L., Broddle, M., Choi, E., Duncan, B.N., Esparza, Á., Falchetta, G., Fritz, M. and Gibbs, H.K., 2022. Satellite Data Applications for Sustainable Energy Transitions. *Frontiers in Sustainability*, 3, p.910924.
- 13 Langford, A.O., Senff, C. J., Alvarez II, R. J., Aikin, K. C., Baidar, S., Bonin, T. A., Brewer, W. A., Brioude, J., Brown, S. S., Burley, J. D., Caputi, D. J., Conley, S. A., Cullis, P. D., Decker, Z. C. J., Evan, S., Kirgis, G., Lin, M., Pagowski, M., Peischl, J., Petropavlovskikh, I., Pierce, R. B., Ryerson, T. B., Sandberg, S. P., Sterling, C. W., Weickmann, A. M., and Zhang, L.: 2022. The Fires, Asian, and Stratospheric Transport–Las Vegas Ozone Study (FAST-LVOS). *Atmospheric Chemistry and Physics*, 22(3), pp.1707-1737.
- 14 Cleary, P.A., Dickens, A., McIlquham, M., Sanchez, M., Geib, K., Hedberg, C., Hupy, J., Watson, M.W., Fuoco, M., Olson, E.R. and Pierce, R.B., 2022. Impacts of lake breeze meteorology on ozone gradient observations along Lake Michigan shorelines in Wisconsin. *Atmospheric Environment*, 269, p.118834.
- 15 Wagner, T.J., Czarnetzki, A.C., Christiansen, M., Pierce, R.B., Stanier, C.O., Dickens, A.F. and Eloranta, E.W., 2022. Observations of the Development and Vertical Structure of the Lake-Breeze Circulation during the 2017 Lake Michigan Ozone Study. *Journal of the Atmospheric Sciences*, 79(4), pp.1005-1020.
- 16 Abdi-Oskouei, M., Roozitalab, B., Stanier, C.O., Christiansen, M., Pfister, G., Pierce, R.B., McDonald, B.C., Adelman, Z., Janseen, M., Dickens, A.F. and Carmichael, G.R., 2022. The Impact of Volatile Chemical Products, Other VOCs, and NO<sub>x</sub> on Peak Ozone in the Lake Michigan Region. *Journal of Geophysical Research: Atmospheres*, 127(22), p.e2022JD037042.
- 17 Holloway, T., Miller, S. Anenberg, M. Diao, B. Duncan, A. M. Fiore, D. K. Henze, J. Hess, P. L. Kinney, Y. Liu, J. L. Neu, S. M. O'Neill, M. T. Odman, R. B. Pierce, A. G. Russell, D. Tong, J. J. West, M. A. Zondlo, 2021. Satellite monitoring for air quality and health. *Annual review of biomedical data science*, 4, pp.417-447.
- 18 Hughes, D.D., Christiansen, M.B., Milani, A., Vermeuel, M.P., Novak, G.A., Alwe, H.D., Dickens, A.F., Pierce, R.B., Millet, D.B., Bertram, T.H. and Stanier, C.O., 2021. PM<sub>2.5</sub> chemistry, organosulfates, and secondary organic aerosol during the 2017 Lake Michigan Ozone Study. *Atmospheric Environment*, 244, p.117939.

- 19 Koenig, T.K., Volkamer, R., Apel, E.C., Bresch, J.F., Cuevas, C.A., Dix, B., Eloranta, E.W., Fernandez, R.P., Hall, S.R., Hornbrook, R.S. and Pierce, R.B., 2021. Ozone depletion due to dust release of iodine in the free troposphere. *Science advances*, 7(52), p.eabj6544.
- 20 Stanier, C.O., Pierce, R.B., Abdi-Oskouei, M., Adelman, Z.E., Al-Saadi, J., Alwe, H.D., Bertram, T.H., Carmichael, G.R., Christiansen, M.B., Cleary, P.A. and Czarnetzki, A.C., 2021. Overview of the Lake Michigan ozone study 2017. *Bulletin of the American Meteorological Society*, 102(12), pp.E2207-E2225.
- 21 Cleary, P.A., de Boer, G., Hupy, J.P., Borenstein, S., Hamilton, J., Kies, B., Lawrence, D., Pierce, R.B., Tirado, J., Voon, A. and Wagner, T.J., 2021. Observations of the lower atmosphere from the 2021 WiscoDISCO campaign. *Earth System Science Data Discussions*, 2021, pp.1-32.
- 22 Taylor, J.K., Tobin, D.C., Revercomb, H.E., Best, F.A., Garcia, R.K., Smith, W., Weisz, E., Pierce, R.B., Kalashnikova, O., Frost, G. and Goldberg, M., 2021, July. A Summary of Scanning High-resolution Interferometer Sounder (S-HIS) Observations During the FIREX-AQ ER-2 Campaign. In *Fourier Transform Spectroscopy* (pp. FTh2G-2). Optica Publishing Group.
- 23 Robinson MA, Decker ZCJ, Barsanti KC, Coggon MM, Flocke FM, Franchin A, Fredrickson CD, Gilman JB, Gkatzelis GI, Holmes CD, Lamplugh A, Lavi A, Middlebrook AM, Montzka DM, Palm BB, Peischl J, Pierce B, Schwantes RH, Sekimoto K, Selimovic V, Tyndall GS, Thornton JA, Van Rooy P, Warneke C, Weinheimer AJ, Brown SS. 2021. Variability and Time of Day Dependence of Ozone Photochemistry in Western Wildfire Plumes. *Environ Sci Technol*. 2021 Aug 3;55(15):10280-10290. doi: 10.1021/acs.est.1c01963. Epub 2021 Jul 13. PMID: 34255503.
- 24 Ye, X., Arab, P., Ahmadov, R., James, E., Grell, G. A., Pierce, B., Kumar, A., Makar, P., Chen, J., Davignon, D., Carmichael, G. R., Ferrada, G., McQueen, J., Huang, J., Kumar, R., Emmons, L., Herron-Thorpe, F. L., Parrington, M., Engelen, R., Peuch, V.-H., da Silva, A., Soja, A., Gargulinski, Wiggins, E., Hair, J. W., Fenn, M., Shingler, T., Kondragunta, S., Lyapustin, A., Wang, Y., Holben, B., Giles, D. M., and Saide, P. E. 2021. Evaluation and intercomparison of wildfire smoke forecasts from multiple modeling systems for the 2019 Williams Flats fire, *Atmos. Chem. Phys.*, 21, 14427–14469, <https://doi.org/10.5194/acp-21-14427-2021>, 2021.
- 25 Austin G. Doak, Megan B. Christiansen, Hariprasad D. Alwe, Timothy H. Bertram, Gregory Carmichael, Patricia Cleary, Alan C. Czarnetzki, Angela F. Dickens, Mark Janssen, Donna Kenski, Dylan B. Millet, Gordon A. Novak, Bradley R. Pierce, Elizabeth A. Stone, Russell W. Long, Michael P. Vermeuel, Timothy J. Wagner, Lukas Valin & Charles O. Stanier, 2021. Characterization of ground-based atmospheric pollution and meteorology sampling stations during the Lake Michigan Ozone Study 2017, *Journal of the Air & Waste Management Association*, 71:7, 866-889, DOI: 10.1080/10962247.2021.1900000
- 26 Judd, L.M., Al-Saadi, J. A., Szykman, J. J., Valin, L. C., Janz, S. J., Kowalewski, M. G., Eskes, H. J., Veefkind, J. P., Cede, A., Mueller, M., Gebetsberger, M., Swap, R., Pierce, R. B., Nowlan, C. R., Abad, G. G., Nehrir, A., and Williams, D. 2020. Evaluating Sentinel-5P TROPOMI tropospheric NO<sub>2</sub> column densities with airborne and Pandora spectrometers near New York City and Long Island Sound. *Atmospheric measurement techniques*, 13(11), pp.6113-6140.
- 27 Wiggins, E.B., Soja, A.J., Gargulinski, E., Halliday, H.S., Pierce, R.B., Schmidt, C.C., Nowak, J.B., DiGangi, J.P., Diskin, G.S., Katich, J.M. and Perring, A.E., 2020. High temporal resolution satellite observations of fire radiative power reveal link between fire behavior and aerosol and gas emissions. *Geophysical Research Letters*, 47(23), p.e2020GL090707.
- 28 Abdi-Oskouei, M., Carmichael, G., Christiansen, M., Ferrada, G., Roozitalab, B., Sobhani, N., Wade, K., Czarnetzki, A., Pierce, R.B., Wagner, T. and Stanier, C., 2020. Sensitivity of meteorological skill to selection of WRF-Chem physical parameterizations and impact on ozone prediction during the Lake Michigan Ozone Study (LMOS). *Journal of Geophysical Research: Atmospheres*, 125(5), p.e2019JD031971.
- 29 Frost, G.J., Monika Kopacz, Shobha Kondragunta, Ravan Ahmadov, Jassim Al-Saadi, Arlyn Andrews, Christopher Barnet, Victoria Breeze, Julianna Christopoulos, Owen Cooper, Alice Crawford, Lawrence Flynn, Audrey Gaudel, Cory Martin, Brian McDonald, Jeff McQueen, Fabien Paulot, Michael Pavolonis, Irina Petropavlovskikh, R. Bradley Pierce, Karen H. Rosenlof, Rick Saylor, Tim Schmit, Ivanka Stajner, Diane Stanitski, James Szykman 2020. A Value Assessment of an Atmospheric Composition Capability on the

NOAA Next-Generation Geostationary and Extended Orbits (GEO-XO) Missions.

<https://doi.org/10.25923/1s4s-t405>

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## SEMINARS | INVITED LECTURES

- “Overview of UW-Madison SSEC and CIMSS: Strengths, Aspirations, Concerns”, USRA Council of Institutions Region VI Meeting, Iowa State University, September 28, 2023
- “Summer 2023: TEMPO First Light & NASA/NOAA Airborne Field Campaigns”, 2023 Wisconsin Department of Natural Resources Air Monitoring & AQPS Ozone Season Technical Training May 11th and 12th, 2023
- “TEMPO/GeoXO Joint Panel”, Joint Science Meeting for TEMPO, GeoXO ACX, & TOLNet, May 1-5, 2023, Huntsville, AL
- “TEMPO Air Quality Modeling Panel”, Joint Science Meeting for TEMPO, GeoXO ACX, & TOLNet, May 1-5, 2023, Huntsville, AL
- “Data Assimilation of Trace Gases”, JPSS Science Seminar Series, May 19, 2023
- “Satellite Data to Support Emission Control Strategies”, NASA HAQAST Meeting, Wednesday, April 19, 2023
- “Planning and Chemical Forecasting during the 2023 NOAA SABRE Field Campaign”, AOS Seminar, Wednesday, March 29, 2023
- “WDNR Enhanced Ozone Monitoring Program and NASA/NOAA Field Campaigns”, Wisconsin Department of Natural Resources Air Management Advisory Group Meeting, Thursday, June 1, 2023
- “Historical use Satellite Data for Monitoring and Predicting Weather”, EAP 2022 Conference: Satellite Data for Energy Analysis and Policy, October 6-7, 2022
- “Assimilation of JPSS Atmospheric Composition and Aerosol Products within UFS-RAQMS”, AMS 25th Conference on Satellite Meteorology, Oceanography, and Climatology joint with the NOAA Satellite Meeting, August 5-12, 2022 Madison, WI
- “An assessment of the value of IR sounder trace gas retrievals in chemical data assimilation”, NOAA Infrared Sounder Workshop, December 6th, 2021
- “High Resolution WRF/CMAQ Air Quality Simulations During the 2017 Lake Michigan Ozone Study (LMOS): Lessons for LISTOS”, Long Island Sound Tropospheric Ozone Study (LISTOS) Workshop, October 14-15, 2021
- “Aura Chemical Reanalysis”, TOAR-II chemical reanalysis WG 2nd meeting, July 2, 2021
- “User Perspective: Global Chemical and Aerosol Data Assimilation and Forecasting”, 2020 JPSS/GOES PGR Summit, February 24-28, 2020, College Park, MD



- “The Brightest Idea: New Capabilities for Infusing Satellite Data into Environmental Applications-- International (IDEA-I)”, NASA HAQAST Webinar Series, online, February, 25, 2020
- “What 50 Years Of Clean Air Looks Like”, Wild Wisconsin - Off the Record”, Wisconsin Department of Natural Resources Podcast, May 20, 2020
- “Ozone Formation Along Wisconsin’s Lake Michigan Shore”, 2019 DNR Air Program Statewide Meeting, October 29-30, 2019, Sheboygan, WI
- “2017 Lake Michigan Ozone Study (LMOS)”, UW-Madison Physics Department Colloquium, October 04, 2019, Madison, WI
- “2017 Lake Michigan Ozone Study (LMOS)”, Electric Power Research Institute, September 17, 2019, Chicago, Ill
- “LMOS lessons”, at Long Island Sound Tropospheric Ozone Study Meeting, Albany, NY (2019)
- “Overview of the 2017 Lake Michigan Ozone Study” at Fall AGU (2018)
- “Lake Michigan Ozone Study (LMOS) Turning NOAA Science into Information for Societal Benefit”, at NOAA/NESDIS Cooperative Research Program (CoRP), Annual Science Symposium, (2018)
- “Real-time Air Quality Modeling System (RAQMS) Online global chemical and aerosol assimilation/forecasting system” at CIMSS Symposium, (2018)
- “Forecasting Ozone within Stratospheric Intrusions”, Western U.S. TEMPO Early Adopters Workshop (2018)
- “Improved National Emissions Inventory NOx emissions using OMI tropospheric NO2 retrievals and potential impacts on air quality strategy development” NASA HAQAST3 (2017)
- “Intercontinental Pollution and Atmospheric River Transport Processes during the 2016 NOAA El Niño Rapid Response (ENRR) Field Campaign” NOAA Earth Systems Research Laboratory, Chemical Sciences Division, (2017)
- “The 2017 Lake Michigan Ozone Study (LMOS 2017)” Air Quality Research Subcommittee (AQRS), Committee on Environment, Natural Resources, and Sustainability (CENRS), National Science and Technology Council (NSTC) Meeting (2016)
- “High-Resolution IDEA-I VIIRS/NUCAPS trajectory forecasts” at Fall AGU (2016)
- “JPSS Observations of Intercontinental Pollution and Atmospheric River Transport Processes during the 2016 NOAA El Niño Rapid Response (ENRR) Field Campaign” at Fall AGU (2016)
- “Regional O3 OSSEs for the GEO-CAPE Mission” at the Second Atmospheric Composition Observation System Simulation Experiments (OSSE) Workshop hosted by ECMWF (2016)
- “NOAA JPSS and GOES Fire Products” at the WMO International Global Atmospheric Chemistry (IGAC) Interdisciplinary Biomass Burning Initiative (IBBI) workshop (2016)
- “Development of an Aura Chemical Reanalysis in support Air Quality Applications” at the 2015 AGU Fall meeting (2015)
- “AQAQST NOAA/NESDIS liaison highlights and planning for a future Great Lakes airborne mission” at the 2016 Midwest and Central States Air Quality Workshop (2016)
- “Satellite data, modeling, and planned field study for better characterising wildfire impacts (FIREX)” at the 2016 Midwest and Central States Air Quality Workshop (2016)
- “Evaluation of NUCAPS CO Retrieval and High-Resolution Smoke Trajectory Forecasting” at the 2016 NOAA JPSS Annual Meeting (2016)
- “Real-time aerosol data assimilation experiments during the 2014 FRAPPE/DISCOVER-AQ field mission” at the 2014 AGU Fall meeting (2014)

- “Real-time depiction of stratospheric intrusions in RAQMS/WRF-Chem” at the Western Region Air Quality Modeling Conference (2014)
- “Trans-boundary Ozone Pollution: A Global Chemical and Aerosol Data Assimilation Perspective” at the Transboundary Ozone Pollution Conference (2014)
- “Nested Global and Regional Scale Modeling of the Impacts of Intercontinental Pollution Transport and Stratospheric Intrusion on Surface Air Quality in the Western US” at the Meteorology And Climate Modeling for Air Quality (MAC-MAQ) Conference (2014)
- “Aerosol/Chemical Data Assimilation” Joint Center for Satellite Data Assimilation Colloquium (2012)
- “Real-time aerosol data assimilation experiments during the 2014 FRAPPE/DISCOVER-AQ field mission” UW AOS Colloquium (2011)
- “NOAA ARCPAC field campaign” Valparaiso University Physics Colloquium (2010)
- “Constituent and Aerosol Assimilation” during the Joint Center for Satellite Data Assimilation Summer Colloquium (2009)
- “Real-Time Air Quality Modeling (RAQMS) Chemical and Aerosol Assimilation Studies during the 2008 NOAA Aerosol, Radiation and Cloud Processing affecting Arctic Climate (ARCPAC) field mission” at the 6th Annual CoRP Science Symposium (2009)
- “Air quality modeling and aerosol assimilation during the ARCPAC field mission” at the Michigan Technical University Remote Sensing Institute Remote Sensing Seminar Series (2009)
- “Forecast Improvement with Solar Occultation and Limb Scatter Data Assimilation” at the 4th International Atmospheric Limb Conference and Workshop (2007)
- “Global Chemical Data Assimilation Studies During 2006 NASA INTEX-B and NOAA TEXAQS field missions” at NOAA Earth Systems Research Laboratory (2007)
- “Real-time Air Quality Modeling System” at NOAA Atmospheric Chemical Modeling Workshop (2007)

## TEACHING, MENTORING, AND DIVERSITY

### Students Advised:

- **David Kuhl**, Ph.D. Research Advisor (2004-2009), **PhD 2009**, Atmospheric and Oceanic Science, University of Maryland, College Park
- **Andrew Wentland**, MS Research Advisor (2013-2015), **MS 2015**, Atmospheric and Oceanic Sciences, University of Wisconsin-Madison
- **Burcu Kabatas**, Ph.D. Research Advisor (2011-2016), **PhD 2016**, Marine and Climate Sciences, Eurasia Institute of Earth Sciences, Istanbul Technical University, Turkey (Visiting Scholar at UW-Madison CIMSS)
- **Barbara Arvani**, Ph.D. Research Advisor (2013-2016), **PhD 2016**, High Mechanics and Automotive Design and Technology, University of Modena, Italy (Visiting Scholar at UW-Madison CIMSS)
- **Sarah Benish**, Senior Thesis Advisor (2013-2015), **BS 2015**, Nelson Institute Center for Sustainability and the Global Environment, University of Wisconsin-Madison
- **Kyle Hosley**, MS Research Advisor (2013-2016), **MS 2016**, Atmospheric and Oceanic Sciences, University of Wisconsin-Madison
- **Jack Bruno**, Senior Thesis Advisor (2017-2018), **BS 2018**, Department of Physics and Astronomy, Ohio University, Athens, OH
- **Margaret Bruckner**, Ph.D. Research Advisor (2017-2018), Academic Advisor (2019-present), Atmospheric and Oceanic Sciences, University of Wisconsin-Madison
- **Jerrold Acdan**, Ph.D. Academic Advisor (2019-present), Atmospheric and Oceanic Sciences, University of Wisconsin-Madison
- **Shane Visaga**, Ph.D. Academic Advisor (2023-present), Atmospheric and Oceanic Sciences, University of Wisconsin-Madison

**Student Committee Memberships:**

- **Alicia Hoffman** PhD Committee, (2021-present), Atmospheric and Oceanic Sciences, University of Wisconsin-Madison
- **Yun (April) Hang** PhD Committee, (2018-2020), Nelson Institute Center for Sustainability and the Global Environment, University of Wisconsin-Madison
- **Javier J. Martinez** PhD Committee, (2019-2020), Mechanical Engineering, University of Wisconsin-Madison
- **Kevin Wokosin** PhD Committee (2021-present), Chemistry, University of Wisconsin-Madison
- **Elise Penn**, Senior Thesis Committee Member (2018), BS 2018, Geological Engineering and Applied Math, University of Wisconsin-Madison

**Post-Doctoral Research Advisor:**

- **Lynn Harvey**, 1997-1999, University of Wisconsin-Madison
- **Chieko Kittaka**, 2001-2003, University of Wisconsin-Madison
- **Aditya Kumar**, 2019-2021, University of Wisconsin-Madison

**Guest Lectures:**

- “Meteorological Satellite Applications: Atmospheric Composition retrievals and assimilation”, AOS 745, Meteorological Satellite Applications, (2022)
- “2017 Lake Michigan Ozone Study (LMOS)”, Environmental Studies 401: Introduction to Air Quality (2019)
- “Air Quality in Wisconsin and Beyond”, Environmental Studies 401: Introduction to Air Quality (2018)
- “The Lake Michigan Ozone Study 2017”, AOS 405 Senior Capstone Seminar (2017)
- “Development and applications of Air Quality Models: Real-time Air Quality Modeling System” AOS 535 Atmospheric Dispersion and Air Pollution (2016)
- “Development of National Air Quality Forecasting Capabilities: Combining models, satellite, and insitu measurements during airborne field campaigns”, Environmental Studies Introduction to Air Quality (2015)
- “Using VIIRS DNB and OMI NO<sub>2</sub> retrievals for constraining NO<sub>x</sub> Emissions” AOS Senior Capstone Seminar (2015)
- “Development of National Air Quality Forecasting Capabilities: Combining models, satellite, and insitu measurements during Airborne field missions”, Environmental Studies Introduction to Air Quality (2014)
- “Air quality forecasting and data assimilation for NOAA Airborne field missions” Environmental Studies Introduction to Air Quality (2013)
- “NASA and NOAA airborne field campaigns” for UW AOS 405 senior student seminar (2010)
- “Adventures in NASA and NOAA Flight Campaigns” to the UW AOS 405 Senior Capstone Seminar (2009)
- “Chemical data assimilation for air quality forecasting” University of Wisconsin-Madison Department of Atmospheric and Oceanic Science (UW AOS) Graduate Student Seminar (2007)

**Diversity Efforts:**

- Hosted Sun Prairie High School girls for Earth Science Women’s Network (ESWN) Science-a-Thon (October 18, 2018)
- Hosted the first SSEC Equity Tech Camp (August 5-9, 2019)
- UW Unlearning Racism in Geosciences (URGE) Pod Leader (2022)
- Member of the UW Madison AOS DEI committee (2022-2023)
- Chair of the UW Madison AOS DEI Committee (2023)

## SERVICE

### Committee and Working Group Memberships

- Co-chair TEMPO Validation Working Group 2023-present
- UW-Madison representative on the Universities Space Research Association (USRA) Council of Institutions (COI) 2023-present
- Associate Member of the NOAA Systems Performance Assessment Team (SAT) 2020-present
- Member of the International Global Atmospheric Chemistry (IGAC) Tropospheric Ozone Assessment Report, Phase II (TOAR-II) Chemical Reanalysis Working Group 2021-present
- Member of the Independent Technical Advisory Committee (ITAC) for the Texas Air Quality Research Program (AQRP) 2023-present
- Co-chair 2023 EAP/NCAR Conference on Energy, Wildfires, and Satellites
- Co-chair at the 2019 AMS Joint Satellite Conference.
- Member of the NSF NCAR Earth System Predictability Across Timescales (ESPAT) External Advisory Committee (EAC). Member (2023-present)
- Member of the NOAA Next Generation Global Prediction System (NGGPS) Aerosol and Composition Strategic Implementation Plan Team (2016-Present)
- Member of the NOAA Fire Influence on Regional and Global Environments Experiment (FIREX) Steering Committee (2015-Present)
- Member of the Lake Michigan Air Directors Consortium (LADCO) 2017 Lake Michigan Ozone Study (LMOS 2017) Steering Group (2015-Present)
- Member of the NOAA Grid-point Statistical Interpolation (GSI) Review Committee (2012-September 2018)
- Member of the Committee on Earth Observation Satellites (CEOS) Atmospheric Chemistry Constellation (ACC) Global Fire and Aerosol Forecasting Demonstration (2007-2009)
- Member of the Task Force on Hemispheric Transport of Air Pollution Phase 2 (HTAP2) (2012-Present)
- Member US EPA Stratospheric Intrusion Working Group (2012-Present)
- Member of the NASA/NOAA Joint Center for Satellite Data Assimilation (JCSDA) Atmospheric Composition Working Group (2010-Present)
- Member of the NASA Geostationary Coastal Ocean and Air Pollution Events (GEO-CAPE) Science Working Group (2009-September 2018)

### Public Lectures

- “The 2017 Lake Michigan Ozone Study (LMOS)”, Sheboygan County Chamber (2018)
- “Air Quality and Climate Change” Forest County Potawatomi Community Climate Change Adaptation Workshop (2016)
- “Chemical Weather Forecasting” NASA Speaks, CNU Lifelong Learning Society (2004)