PACE Air Quality & Applied Atmospheric Sciences Focus Session
May 11th, 2022

Host/Moderator/Speaker/Panelist Bios

Host: Natasha Sadoff: *PACE Mission Applications Deputy Coordinator*, *NASA Goddard Space Flight Center/Science Systems and Applications Inc*

Ms. Natasha Sadoff is the Applications Deputy Coordinator for the NASA PACE mission. Natasha is a geographer who works at the nexus of environmental management, governance, and earth science. She has twelve years of experience connecting data users and stakeholders to resources to improve decision-making and governance in areas such as climate change adaptation and resilience; energy management; air quality; solid waste management; and other areas. She facilitates stakeholder needs assessments, user engagement, training and outreach, and capacity building/development, particularly in the usage of Earth observations for societal benefit. Before coming to NASA, she was a senior scientist at Battelle, where she managed domestic and international environmental governance and capacity building programs for Federal government clients like US EPA and NASA.

Host: Erin Urquhart, PhD: *PACE Mission Applications Coordinator*, *NASA Goddard Space Flight Center/Science Systems and Applications Inc*

Dr. Erin Urquhart, Applications Coordinator for the NASA Plankton, Aerosol, Cloud, and ocean Ecosystem (PACE) mission, works at the transdisciplinary boundary of earth science, social science, and public health. Erin engages end-user/stakeholder communities to identify their needs and science objectives while exploring innovative and practical uses of PACE data products. She has a proven track record in coastal and inland water quality research and satellite remote sensing with a MHS in Environmental Public Health and a MA/PhD in Earth & Planetary Sciences from Johns Hopkins University. Before coming to NASA, she worked on model development and detection of inland cyanobacteria harmful algal blooms at the US Environmental Protection Agency (EPA).

Session 1: NASA Applied Sciences & the PACE Mission

Speaker: Brian Cairns, PhD: *PACE Deputy Project Scientist (Atmospheres), NASA GISS*

Dr. Cairns was educated in the United Kingdom at Chesterfield School and received an engineering degree from the University of Cambridge before completing a Ph. D. in physics at the Institute of Optics of the University of Rochester. He has worked at NASA Goddard Institute for Space Studies since 1992. His initial work was focused on developing parameterizations of three-dimensional radiation transport through clouds for use in general circulation models (GCMs) and that parameterization continues to be used in the GISS GCM. Since 1996 he has worked on the use of polarimetric remote sensing of the Earth to determine aerosol and cloud properties using ground based and airborne observations and was one of the developers of the airborne Research Scanning Polarimeter (RSP) instrument. The development of the RSP instrument was completed in 1999 and it made its first airborne measurements on a small Cessna survey plane. This sensor has obtained the most accurate polarization measurements of the atmosphere of the Earth ever made and over a broader spectral and angular range than any other polarimeter. The capability of these measurements to accurately retrieve aerosol and cloud properties has been widely recognized and has led to the development and planning of new instruments that attempt to provide similar capabilities. Since 2000 Dr. Cairns has led the integration of the RSP instrument onto five different platforms and supervised seventeen different field deployments from Mexico to the Canadian Arctic. During that time the RSP instrument performed impeccably acquiring more than 2000 hours of remote sensing observations. Dr. Cairns was instrument scientist for the Aerosol Polarimetry Sensor, which was on the NASA Glory mission that failed to reach orbit on 4th March 2011 and crashed into the South Pacific. He was also a member of the science-working groups appointed by NASA Headquarters to define the ACE and PACE missions that were recommended by the Decadal Survey of the National Academy of Sciences.

Speaker: Kirk Knoblespiesse, PhD: *Project Science Discipline Lead (Polarimetry), NASA Goddard*

Dr. Kirk Knobelspiesse develops optical satellite remote sensing methods for understanding of the Earth's climate. This includes expertise in radiative transfer computations, information content assessment, algorithm development, and validation with ground and airborne observations. Specific interests include polarimetric remote sensing of aerosols and clouds, atmospheric correction required for ocean color observations, and the statistical and AI tools useful for both. He received an undergraduate degree in Photography from the Rochester Institute of Technology in 1998, then a Master's degree in Imaging Science from the same university in 2000. For the next four years, he worked as a contractor at NASA GSFC on the SeaWiFS and SIMBIOS projects, then returned to graduate school at Columbia University in 2004. His PhD, in Applied Mathematics, dealt with remote sensing retrievals of atmospheric aerosols from multi-angle polarimeters. During his studies, he spent his time at NASA GISS, and remained at that institution for a postdoctoral fellowship following graduation. He took a position at NASA Ames in 2012 and returned to NASA GSFC in 2016.

Speaker: Lorraine Remer, PhD: *Research Professor, Joint Center for Earth Systems Technology, University of Maryland Baltimore County*

Lorraine Remer spent 21 years at the NASA Goddard Space Flight Center involved in the remote sensing of aerosol and the use of remote sensing data for the study of aerosols in climate processes, how aerosol particles affect clouds, aerosol transport and particulate air pollution. Her first position at Goddard in 1991 was in the role of a support scientist, employed by Science Systems and Applications, Inc. (SSAI), where she contributed to the development of the MODIS aerosol algorithms. In 1998 Dr, Remer joined the Federal civil service, and in 2012 she left NASA to become a part of JCET. Dr. Remer has been a member of NASA's MODIS, CloudSat/CALIPSO, NPP, Glory and Global Aerosol Climatology Project Science Teams. She has contributed to the U.S. Climate Change Science Change Program (US CCSCP) and to the WMO International Task Force on Hemispheric Transport of Air Pollution (HTAP). She has contributed leadership to more than 12 major field experiments and has over 120 publications in the refereed literature. Her Ph.D. is from the University of California, Davis (U.C. Davis) in Atmospheric Science (1991). Dr. Remer also has a M.S. in Oceanography from the Scripps Institution of Oceanography, University of California, San Diego, and a B.S. in Atmospheric Science from U.C. Davis.

Speaker: John Haynes: *Program Manager for Health and Air Quality Applications, NASA Headquarters*

John Haynes serves as Program Manager for Health and Air Quality Applications in the Applied Sciences Program of the NASA Earth Science Division at Headquarters in Washington, DC. The Program promotes the use of Earth observations in air quality management and public health, particularly involving environmental health and infectious diseases. Among his responsibilities, John is Co-Chair of the Group on Earth Observations (GEO) Health Community of Practice and Earth Observations for Health. He serves as the NASA Mission Applications Lead on Suomi National Polar-orbiting Partnership (NPP), Global Precipitation Measurement (GPM), Tropospheric Emissions: Monitoring Pollution (TEMPO) and Multi-Angle Imager for Aerosols (MAIA) satellite missions. John entered NASA Headquarters in 2002 through the Presidential Management Fellowship (PMF) program. As required by the PMF program, John completed two detail assignments during his fellowship (NOAA and the US House of Representatives). John converted to a civil service position at NASA Headquarters in August 2004 upon graduation from the PMF program. John received his master's degree in Meteorology from the University of Oklahoma and bachelor's degree in Meteorology from the University of South Alabama.

Session 2: PACE Science & Applications Spotlight

Speaker: Susanne Bauer, PhD: *Physical scientist/Senior research scientist, Columbia University*

Susanne Bauer is a NASA physical scientist and an adjunct senior research scientist at Columbia University. Her group is responsible for the aerosol research and modeling at the Goddard Institute for Space Studies. Her work involves the development of process-level aerosol physics and chemistry-resolving numerical tools, with the goal of building fast but physically realistic Earth system models that can be applied to technology and society relevant research questions as well as century-long climate simulations.

Speaker: Andy Sayer, PhD: *PACE Project Science Lead for Atmospheres, NASA Goddard Space Flight Center/Universities Space Research Association*

Dr. Andrew Sayer is the PACE Project Science Lead for Atmospheres, with a focus on aerosols and clouds from OCI. He has been involved with the development and application of satellite aerosol and cloud data sets from a number of sensors, including in the NASA Deep Blue and European ORAC algorithm families. He is also very interested in the evaluation of data sets and how uncertainty, sampling, and representativeness influence analyses and the conclusions drawn. Andrew Sayer earned his degrees in the United Kingdom: a master's in chemistry from the University of York (2005), and a doctorate in physics from the University of Oxford (2010). Following his doctoral thesis, "Aerosol remote sensing using AATSR", he worked as a postdoc in aerosol and cloud remote sensing jointly at Oxford and the Rutherford Appleton Laboratory. In September 2010, Dr. Sayer joined Christina Hsu's group in the Climate and Radiation Laboratory at GSFC to work on aerosol remote sensing as part of the Deep Blue aerosol project. He joined GESTAR in May 2011 and has been in Dr. Jeremy Werdell's group in the Ocean Ecology Laboratory, since summer 2018.

Speaker: Odele Coddington, PhD: *Research Scientist, Laboratory for Atmospheric and Space Sciences, UCBoulder*

Odele Coddington is a Research Scientist at the Laboratory for Atmospheric and Space Sciences (LASP), which is a research institution affiliated with the University of Colorado Boulder. She began her career at LASP in 2009, upon completion of her Ph.D. from the Department of Atmospheric and Oceanic Sciences (ATOC) at CU Boulder. Many of the scientific problems she has worked on are connected by the emission of radiation by the Sun and the interpretation of how that radiation is spectrally dispersed due to clouds, aerosols, and the terrestrial surface. Towards that pursuit, she has applied quantitative approaches to determine the formal information gain in obtaining measurements at different wavelengths. More recently, her research has expanded to new, small, satellite instrument development to better attribute the variability in Earth-leaving broadband

radiation to underlying sources while also enabling flexible observing and on-orbit implementation strategies.

Speaker: Alexei Lyapustin, PhD: *Research Scientist, Climate & Radiation Lab. NASA Goddard Space Flight Center*
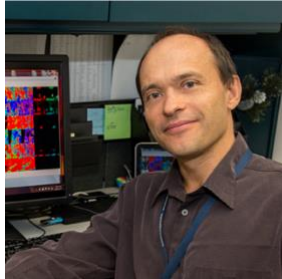
Dr. Alexei Lyapustin is a Physical Research Scientist at the Climate and Radiation Laboratory. He has been at GSFC since 1997, initially with USRA (1997-1999), then with JCET and GEST UMBC (1999-2011), and as a civil servant since 2011. Alexei 's research interests focus on remote sensing of atmospheric aerosol and land surface environmental parameters (bidirectional reflectance and albedo; snow properties including grain size, albedo and sub-pixel snow fraction) from polar-orbiting and geostationary sensors, analysis of field campaign data, and 1D and 3D radiative transfer theory with gaseous absorption and polarization. Alexei is a member of MODIS and JPSS VIIRS Science Teams, as well as a member of GeoCAPE aerosol working group. Dr. Lyapustin holds a M. Sc. in Physics from the Moscow State University, Russia, and Ph. D. degree in Aerospace Remote Sensing from Space Research Institute, Moscow, Russia.

Session 4: Panel Discussion on NASA Mission Synergies

Panelist: Ali Omar, PhD: *PACE Deputy Applications Lead- Atmospheres, NASA Langley*

Dr. Ali Omar, Head of the Lidar Science Branch at Langley Research Center, received his Ph.D. from the University of Illinois at Urbana-Champaign (UIUC) in 1997. Upon graduation, Ali spent one year at the UIUC Electro-Optics System Laboratory as a post-doctoral fellow working on the retrieval of temperature and aerosol profiles from data of NASA's Lidar In-space Technology Experiment (LITE) conducted on board the space shuttle Discovery in September 1994. Ali is a science team member of CALIPSO mission, the AOS Applications Impact Team and PACE Deputy Project Applications (DPA) lead. He led the CALIPSO aerosol classification algorithm development effort which pioneered efforts to estimate aerosol types from space-based lidar measurements. Between 2012-19, Ali served an Associate Program Manager of Air Quality at the Applied Sciences Program at NASA HQ. Ali did his undergraduate studies at Saint Louis University, St. Louis MO, in Aerospace Engineering.

Panelist: Melanie Follette-Cook, PhD: *AOS Applications Coordinator, Morgan State University*

Melanie Follette-Cook is an Associate Research Scientist with Goddard Earth Sciences Technology and Research II (GESTAR II) at Morgan State University focusing on research, external stakeholder engagement and capacity building activities. Her research explores the coupling between the biosphere and atmospheric chemistry/climate with respect to fire activity, and the evolution and variability of trace gases and aerosols across a variety of temporal and spatial scales. She is a Health and Air Quality Trainer with the NASA Applied Remote

Sensing Training (ARSET) program, and additionally serves on the Applications Impact team for the Atmosphere Observing System (AOS) mission.

Panelist: Aaron Naeger, PhD: *TEMPO Deputy Program Applications Lead, NASA Marshall*

Aaron Naeger is a Research Scientist at the University of Alabama in Huntsville and NASA Marshall Space Flight Center and serves as the Deputy Program Applications (DPA) Lead for the NASA Tropospheric Emissions: Monitoring of POllution (TEMPO) Mission. As DPA Lead, he manages the TEMPO Early Adopters Program with the overarching goal of maximizing the applications value of TEMPO data for societal benefit. His primary research activities focus on the development of near-real-time and value-added air quality products derived from multi-sensor satellite data and assimilation of satellite data in chemical transport models. He has a particular interest in the use of trace gas and aerosol products from geostationary satellite measurements for advancing air quality and public health applications.

Panelist: Abbey Nastan: *MAIA Deputy Program Applications Lead, NASA Jet Propulsion Laboratory*

Abbey Nastan is MAIA's Deputy Program Applications Lead, working to maximize the project's societal benefit. She is a systems software engineer at JPL, specializing in applications development, science communications, and public outreach. She received her MS degree in planetary science from California Institute of Technology and her BS degree in international field geosciences from the University of Montana.