Brad Weir
Morgan State University
NASA Goddard Space Flight Center

8800 Greenbelt Road
Greenbelt, MD 20771
301.614.6033

Brief Bio

Dr. Brad Weir is a research scientist at NASA Goddard Space Flight Center and Morgan State University through the GESTAR II cooperative agreement. He is the lead developer of NASA's Goddard Earth Observing System (GEOS) Constituent Data Assimilation System (CoDAS) — a state-of-the-art statistical method for estimating atmospheric trace gas abundances based on satellite observations. His research focuses on developing and applying mathematical and statistical methods to address questions about the physics, chemistry, and biology of the Earth's atmosphere, ocean, and land surface. His work has appeared in Science, the New York Times, the websites of National Geographic and the BBC, the NASA COVID-19 Dashboard, and the NASA/ESA/JAXA trilateral Earth Observing Dashboard.

Positions/Employment

10/ 2013 - Present **Scientist (Senior Scientist, 2021-Present)**
Global Modeling and Assimilation Office, NASA Goddard Space Flight Center, Greenbelt, MD
Goddard Earth Sciences Technology and Research (GESTAR) I & II cooperative agreements:
- Universities Space Research Association (2013-2021)
- Morgan State University (2021-Present)

9/ 2010 - 10/ 2013 **Post-doctoral Research Associate**
College of Earth, Ocean, and Atmospheric Sciences (CEOAS), Oregon State University, Corvallis, OR

Education

- Ph.D., Mathematics, University of Arizona (2010)
- B.A., *Cum Laude*, Mathematics, New York University (2003)

Publications

Refereed

Sweeney, C., et al. 2022. "Using atmospheric trace gas vertical profiles to evaluate model fluxes: a case study of Arctic-CAP observations and GEOS simulations for the ABoVE domain." *Atmospheric Chemistry and Physics* **22** (**9**): 6347-6364 [10.5194/acp-22-6347-2022]

Schuh, A. E., et al. 2022. "On the role of atmospheric model transport uncertainty in estimating the Chinese land carbon sink." *Nature* **603** E13-E14 [10.1038/s41586-021-04258-9]

Peiro, H., et al. 2022. "Four years of global carbon cycle observed from the Orbiting Carbon Observatory 2 (OCO-2) version 9 and in situ data and comparison to OCO-2 version 7." *Atmospheric Chemistry and Physics* **22** (**2**): 1097-1130 [10.5194/acp-22-1097-2022]

Zhang, L., et al. 2022. "Multi-Season Evaluation of CO2 Weather in OCO-2 MIP Models." *Journal of Geophysical Research: Atmospheres* **127** (**2**): [10.1029/2021jd035457]

Weir, B., et al. 2021. "Regional impacts of COVID-19 on carbon dioxide detected worldwide from space." *Science Advances* **7** (**45**): [10.1126/sciadv.abf9415]

Davis, K. J., et al. 2021. "The Atmospheric Carbon and Transport (ACT)-America Mission." *Bulletin of the American Meteorological Society* **102** (**9**): E1714-E1734 [10.1175/bams-d-20-0300.1]

Weir, B., et al. 2021. "Bias-correcting carbon fluxes derived from land-surface satellite data for retrospective and near-real-time assimilation systems." *Atmospheric Chemistry and Physics* **21** 9609–9628 [10.5194/acp-21-9609-2021]

Campbell, J. F., et al. 2020. "Field Evaluation of Column CO2 Retrievals from Intensity-Modulated Continuous-Wave Differential Absorption Lidar Measurements during the ACT-America Campaign." *Earth and Space Science* [10.1029/2019ea000847]

Wargan, K., et al. 2020. "The Anomalous 2019 Antarctic Ozone Hole in the GEOS Constituent Data Assimilation System With MLS Observations." *Journal of Geophysical Research: Atmospheres* **125** (**18**): [10.1029/2020jd033335]

Lee, E., et al. 2020. "Impact of a Regional US Drought on Land and Atmospheric Carbon." *Journal of Geophysical Research: Biogeosciences* **125** (**8**): [10.1029/2019jg005599]

Bell, E., et al. 2020. "Evaluation of OCO-2 XCO2 Variability at Local and Synoptic Scales using Lidar and In Situ Observations from the ACT-America Campaigns." *Journal of Geophysical Research: Atmospheres* **125** (**10**): [10.1029/2019jd031400]

Wargan, K., et al. 2020. "Toward a Reanalysis of Stratospheric Ozone for Trend Studies: Assimilation of the Aura Microwave Limb Sounder and Ozone Mapping and Profiler Suite Limb Profiler Data." *Journal of Geophysical Research: Atmospheres* **125** (**4**): [10.1029/2019jd031892]

Schuh, A. E., et al. 2019. "Quantifying the Impact of Atmospheric Transport Uncertainty on CO2 Surface Flux Estimates." *Global Biogeochemical Cycles* **33** 484-500 [10.1029/2018gb006086]

Lee, E., et al. 2018. "The impact of spatiotemporal variability in atmospheric CO_2 concentration on global terrestrial carbon fluxes." *Biogeosciences* **15** 5635-5652 [10.5194/bg-15-5635-2018]

Eldering, A., et al. 2017. "The Orbiting Carbon Observatory-2 early science investigations of regional carbon dioxide fluxes." *Science* **358** (**6360**): eaam5745 [10.1126/science.aam5745]

Weir, B., et al. 2013. "A potential implicit particle method for high-dimensional systems." *Nonlinear Processes in Geophysics* **20** 1047-1060 [10.5194/npg-20-1047-2013]

Weir, B., et al. 2013. "Implicit Estimation of Ecological Model Parameters." *Bulletin of Mathematical Biology* **75** (**2**): 223-257 [10.1007/s11538-012-9801-6]

Weir, B., et al. 2011. "A vortex force analysis of the interaction of rip currents and surface gravity waves." *Journal of Geophysical Research: Oceans* **116** (**C5**): C05001 [10.1029/2010jc006232]

Non-Refereed

Weir, B., and L. E. Ott. 2022. "OCO-2 GEOS Level 3 monthly, 0.5x0.625 assimilated CO2 V10r." *Product User's Guide (Version 1.0) Goddard Earth Sciences Data and Information Services Center (GES DISC)* Greenbelt, MD, USA [10.5067/BGFIODET3HZ8]

Weir, B., and L. E. Ott. 2022. "OCO-2 GEOS Level 3 daily, 0.5x0.625 assimilated CO2 V10r." *Product User's Guide (Version 1.0) Goddard Earth Sciences Data and Information Services Center (GES DISC)* Greenbelt, MD, USA [10.5067/Y9M4NM9MPCGH]

Kuze, A., et al. 2021. "Covid-19 Impact Monitoring for Climate Environment (Greenhouse Gases)." *2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS* [10.1109/igarss47720.2021.9554328]

Invited talks

Data assimilation for carbon monitoring **5/11/2022**
WMO GHG/Carbon Monitoring Workshop
World Meteorological Organization, Geneva, Switzerland

The Orbiting Carbon Observatory-2 project: Monitoring atmospheric carbon dioxide **3/22/2022**
Carbon Tracking and Reporting
Energy Conference Network, Houston, TX, USA

The GEOS-Carb reanalysis of atmospheric carbon dioxide **4/5/2017**
GMAO Seminar Series on Earth System Sceince
Global Modeling and Assimilation Office, Greenbelt, MD, USA

Implicit parameter estimation **2/17/2013**
Probabilistic Approaches to Data Assimilation for Earth Systems
Banff International Research Station, Banff, Alberta, Canada

Implicit sampling: theory and implementation **2/7/2013**
International Workshop on Particle Filters for Data Assimilation
Institute for Statistical Mathematics, Tachikawa, Tokyo, Japan

Implicit assimilation for marine ecological models **12/3/2012**
AGU Fall Meeting 2012, San Francisco, CA, USA
Abstract Id. NG41D-02