Profile

Dr. Kelly Graham is a research scientist at Carbon Solutions with a background in atmospheric science and modeling. She is interested in modeling atmospheric chemistry, air quality, and providing decision-makers with robust tools. Prior to joining Carbon Solutions, she was a data scientist, utilizing machine learning and statistical models to improve business outcomes. During her PhD, she was awarded the NASA Earth and Space Science Fellowship to conduct research quantifying sources and sinks of CO_2 over the Arctic Ocean.

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Kelly A. Graham

Research Scientist | **Carbon Solutions LLC**

Education & Training

PhD | **Meteorology**
Florida State University | **2018–2022**
MS | **Meteorology**
Florida State University | **2016–2018**
BS | **Meteorology, Mathematics**
State University of New York at Oneonta | **2012–2016**

Professional Experience

Research Scientist | **Carbon Solutions LLC** | **2024–Present**
Atmospheric modeling | Air quality modeling

Data Scientist, Personalization | **PetSmart Home Office** | **2022–2024**
Worked on the Analytics & Insights team to develop customer-centric personalization business solutions, routinely collaborating with marketing, Loyalty, and CRM partners. Utilized statistical and machine learning methods to develop and productionize code for various applications to meet business needs. Developed an algorithm during first year of employment that was sold to a national brand for exclusive usage within first-party audiences.

Research Assistant | **Florida State University** | **2016–2022**
Recipient of the NASA Earth and Space Science Fellowship to conduct PhD dissertation research. Projects included assessment and modeling of CO_2 sources and sinks at the high-latitudes, specifically the Arctic Ocean.
Dissertation title: *Establishing Constraints on Carbon Dioxide Fluxes and Transport in a Changing Arctic Ocean Climate System*.

Teaching Assistant | **Florida State University** | **2016**
Graduate TA to sophomore-level meteorology course providing an overview of the physics, chemistry, and dynamics of the atmosphere. Responsible for tutoring and various administrative tasks, as well as lecturing on occasion.

NOAA Ernest F. Hollings Scholar | **Aircraft Operations Center** | **2015**
Conducted statistical analysis project of aircraft observational data with the Science Division of the NOAA Hurricane Hunters. Worked cross-functionally with science and engineering teams to synthesize results for standard operational procedure improvements for wind instrument calibration.

Selected Technical Skillset

Programming Experience | Python, R, SQL, bash, Fortran
Python Data Analysis Tools | PySpark, Pandas, NumPy, Scikit-learn, etc.
Atmospheric Modeling | GEOS-Chem, NOAA Hysplit
Software Development | GitHub, MLFlow, Jira
Database & Cloud Platforms | Databricks, Snowflake, GCP
Data Visualization Tools | Matplotlib, Seaborn, Plotly, Microstrategy, Tableau

Publications

1. **Graham, K.A.**, Friedrich, G., Rauschenberg, C. D., Williams, C. R., Bottenheim, J. W., Chavez, F. P., et al. (**2023**). Variability of Atmospheric CO_2 Over the Arctic Ocean: Insights From the O-Buoy Chemical Observing Network. *Journal of Geophysical Research: Atmospheres, 128, e2022JD036437, https://doi.org/10.1029/2022JD036437*.
2. Jacobs, N., Simpson, W. R., **Graham, K. A.**, Holmes, C. D., Hase, F., Blumenstock, T., et al. (**2021**). Spatial distributions of X_{CO2} seasonal cycle amplitude and phase over northern high latitude regions. *Atmospheric Chemistry and Physics, 21, 16661–16687, https://doi.org/10.5194/acp-21-16661-2021*.
3. Swanson, W. F., **Graham, K. A.**, Halfacre, J. W., Holmes, C. D., Shepson, P. B., & Simpson, W. R. (**2020**). Arctic reactive bromine events occur in two distinct sets of environmental conditions: A statistical analysis of 6 years of observations. *Journal of Geophysical Research: Atmospheres, 125, e2019JD032139, https://doi.org/10.1029/2019JD032139*.
4. Holmes, C. D., Bertram, T. H., Confer, K. L., **Graham, K. A.**, Ronan, A. C., Wirks, C. K., & Shah, V. (**2019**). The role of clouds in the tropospheric NO_x cycle: A new modeling approach for cloud chemistry and its global implications. *Geophysical Research Letters, 46, 4980–4990, https://doi.org/10.1029/2019GL081990*.
5. Montero, N., Ceriani S. A., **Graham, K.**, & Fuentes, M. M. P. B. (**2018**). Influences of the Local Climate on Loggerhead Hatchling Production in North Florida: Implications From Climate Change. *Frontiers in Marine Science, 5:262, 1–11, https://doi.org/10.3389/fmars.2018.00262*.

Conference Presentations

1. Modeling Interannual Variations and Spatial Gradients of Atmospheric CO_2 Over the Arctic Ocean. American Geophysical Union Fall Meeting, virtual. Abstract A102-07, 2020.
2. Inverse modeling of CO_2 fluxes using O-Buoys, a multi-year dataset of surface observations from the Arctic Ocean. 9th International GEOS-Chem Meeting, Cambridge, MA. Abstract #C6, 2019.
3. Inverse modeling of CO_2 fluxes using O-Buoys, a multi-year dataset of surface observations from the Arctic Ocean. 21st Conference on Atmospheric Chemistry, American Meteorological Society Annual Meeting, Phoenix, AZ. Abstract #980, 2019.
4. Arctic CO_2 in a changing climate: constraints on fluxes and transport from remote sensing, in situ measurements, and modeling. American Geophysical Union Fall Meeting, New Orleans, LA. Abstract #A11K-2019, 2017.
5. Arctic CO_2 in a changing climate: constraints on fluxes and transport from remote sensing, in situ measurements, and modeling. 8th International GEOS-Chem Meeting, Cambridge, MA. Abstract #A16, 2017.
6. Statistical Validation of Calibrated Wind Data Collected From NOAA's Hurricane Hunter Aircraft. American Meteorological Society Annual Meeting, New Orleans, LA. Abstract #S130, 2016.
7. Statistical Validation of Calibrated Wind Data Collected From NOAA's Hurricane Hunter Aircraft. American Geophysical Union Fall Meeting, San Francisco, CA. Abstract # ED33D-0952, 2015.
8. Statistical Validation of Calibrated Wind Data Collected From NOAA's Hurricane Hunter Aircraft. NOAA Science and Education Symposium, Silver Spring, MD., 2015.
9. North Atlantic Oscillation impacts on air masses in European winters and springs. Student Research Symposium at SUNY Oneonta, Oneonta, NY. 2015.

Selected Achievements

- Outstanding Student Presentation Award, AGU Fall Meeting, 2020.
- Three Minute Thesis Competition, Florida State University. Second Place, 2020.
- NASA Earth and Space Science Fellowship, 2017–2020.
- American Meteorological Society Summer Policy Colloquium, NSF Funding Award, 2019.
- Fellow's Society, Florida State University, 2017.
- Chi Epsilon Pi, Meteorology Honor Society, Florida State University, 2017.