William S. Daniels

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Professional Experience

Johns Hopkins University Starting Jul 2025
Postdoctoral Fellow, Department of Environmental Health and Engineering
Member, NASA Orbiting Carbon Observatory Science Team
Advisor: Scot Miller

Colorado School of Mines Jan 2025 - Jun 2025
Research Scientist, Department of Applied Mathematics and Statistics
Advisor: Dorit Hammerling

Education

Ph.D., Statistics, Colorado School of Mines Aug 2021 - Dec 2024
Research Associate, Payne Institute for Public Policy
Student Researcher, Energy Emissions Modeling and Data Lab
Advisor: Dorit Hammerling

M.S., Statistics, Colorado School of Mines Aug 2019 - May 2021
Advisor: Dorit Hammerling

B.S., Physics, Colorado School of Mines Aug 2015 - May 2019
Summa cum laude
Advisor: Lawrence Wiencke

Awards and Fellowships

Awards

Rath Award, Colorado School of Mines 2024
Top recognition at Mines for excellence in doctoral research; presented to one graduate per semester whose dissertation demonstrates the greatest potential for societal impact.

Distinguished Graduate, Mines Physics Department 2019
Presented to three graduates per semester who demonstrate exceptionally high academic achievement in physics.

Chemistry Student of the Year, Mines Chemistry Department 2016
Presented to the top general chemistry student each year.

Fellowships

Johns Hopkins Postdoctoral Research Fellowship 2025
Colorado Environmental Management Society Scholarship 2024
Harvey Graduate Fellowship 2019 - 2021
Harvey Undergraduate Scholarship 2015 - 2019
Mines Undergraduate Research Fellowship 2017 - 2018

Presentation Recognition

Best talk in Energy session, *Mines Graduate Research Symposium* 2024
Poster competition finalist, *IISA Conference* 2023
Highly commended poster, *IGAC Conference* 2021
Best talk in Environmental Science session, *Mines Graduate Research Symposium* 2020
Outstanding oral presentation award, *APS April Meeting* 2019
Poster competition winner, *Mines Physics Research Symposium* 2019

Publications (underline: mentored student, †: equal contribution, Google Scholar)

Submitted Papers

3. **William S. Daniels**†, Spencer G. Kidd†, Shuting (Lydia) Yang, Shannon Stokes, Arvind P. Ravikumar, Dorit M. Hammerling. Intercomparison of three continuous monitoring systems on operating oil and gas sites. *Submitted, ACS ES&T Air*, (2024).

2. Olga Khaliukova, Yuanrui Zhu, **William S. Daniels**, Arvind P. Ravikumar, Gregory Ross, Selina Roman-White, Fiji C. George, Dorit M. Hammerling. Investigating aerial data pre-analysis schemes and site-level methane emission aggregation methods at LNG facilities. *Submitted, Environmental Science & Technology*, (2024).

1. Meng Jia, **William S. Daniels**, Dorit M. Hammerling. Comparison of the Gaussian plume and puff atmospheric dispersion models on oil and gas facilities. *Submitted, Scientific Reports*, (2023).

Refereed Papers

5. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Estimating methane emission durations using continuous monitoring systems. *Environmental Science & Technology Letters*, *11*(11), 1187-1192 (2024).

4. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Detection, localization, and quantification of single-source methane emissions on oil and gas production sites using point-in-space continuous monitoring systems. *Elementa: Science of the Anthropocene*, *12*(1), 00110, (2024).

3. **William S. Daniels**, Jiayang (Lyra) Wang, Arvind P. Ravikumar, Matthew Harrison, Selina A. Roman-White, Fiji C. George, Dorit M. Hammerling. Toward multiscale measurement-informed methane inventories: reconciling bottom-up site-level inventories with top-down measurements using continuous monitoring systems. *Environmental Science & Technology*, *57*(32), 11823-11833, (2023).

2. Jiayang (Lyra) Wang, **William S. Daniels**, Dorit M. Hammerling, Matthew Harrison, Kaylyn Burmaster, Fiji C. George, Arvind P. Ravikumar. Multi-scale methane measurements at oil and gas facilities reveal necessary framework for improved emissions accounting. *Environmental Science & Technology*, *56*(20), 14743-14752, (2022).

1. **William S. Daniels**, Rebecca R. Buchholz, Helen M. Worden, Fatimah Ahamad, Dorit M. Hammerling. Interpretable models capture the complex relationship between climate indices and fire season intensity in Maritime Southeast Asia. *Journal of Geophysical Research: Atmospheres*, 127, e2022JD036774, (2022).

Non-Refereed Papers, Articles, and Policy Documents

7. **William S. Daniels**, Philip Waggoner, Dorit M. Hammerling. Comment on EPA Docket No. EPA-HQ-OAR-2024-0350. *Submitted to the United States Environmental Protection Agency*, (2024).

6. Kellis Ward, **William S. Daniels**, Dorit M. Hammerling. Comparison of co-located laser and metal oxide continuous monitoring systems. *Payne Institute Commentary Series: Research*, (2024).

5. **William S. Daniels**, Dorit M. Hammerling, Morgan D. Bazilian. New method for tracking down methane emissions on oil and gas sites. *Payne Institute Commentary Series: Commentary*, (2024).

4. Dorit M. Hammerling, **William S. Daniels**, Morgan D. Bazilian, Brooke Bowser. Improving satellite monitoring of methane emissions: data science is fundamental to better emissions tracking. *Payne Institute Commentary Series: Research*, (2021).

3. **William S. Daniels**, James Crompton, Dorit M. Hammerling, Morgan D. Bazilian. Initial findings from continuous monitoring of oil and gas operations. *Payne Institute Commentary Series: Research*, (2021).

2. Meera Duggal, **William S. Daniels**, Rebecca R. Buchholz, Dorit M. Hammerling. Optimizing genetic algorithm parameters for atmospheric carbon monoxide modeling. *NCAR Technical Notes* (No. NCAR/TN-566+STR), (2021).

1. **William S. Daniels**, Dorit M. Hammerling, Rebecca R. Buchholz. regClimateChem: An R package for data driven variable selection applied to atmospheric carbon monoxide. *NCAR Technical Notes* (No. NCAR/TN-562+STR), (2020).

Software Packages and Data Sets

1. Rebecca R. Buchholz, Helen M. Worden, Fatimah Ahamad, **William S. Daniels**, Dorit M. Hammerling. Weekly carbon monoxide anomalies over Maritime Southeast Asia and weekly climate indices. *NCAR Geoscience Data Exchange*, (2021).

Presentations (underline: mentored student)

Invited Talks

4. Methane Emissions Technology Alliance (META) Seminar Series, Stanford. *Multi-scale methane measurements at oil and gas facilities reveal necessary framework for improved emissions accounting*. September 2022.

3. Applied Mathematics and Statistics (AMS) Student Colloquium, Colorado School of Mines. *Leveraging multiple continuous monitoring sensors for emission identification and localization on oil and gas facilities*. March 2022.

2. Quantitative Exploration and Discussion (QED) Supergroup, CU Boulder. *Building intuition around common statistical learning techniques*. February 2022.

1. International Global Atmospheric Chemistry (IGAC) Scientific Conference - MANGO Session. *Using climate mode indices to forecast carbon monoxide variability in fire-prone Southern Hemisphere regions*. September 2021.

Conference Talks

16. Dorit M. Hammerling, **William S. Daniels**, Spencer G. Kidd. Comparing continuous methane monitoring technologies on operating oil and gas sites. *American Geophysical Union (AGU) Fall Meeting*. December 2024.

15. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Estimating methane emission durations using continuous monitoring systems. *American Chemical Society (ACS) Fall Meeting*. August 2024.

14. **William S. Daniels**, Douglas W. Nychka, Dorit M. Hammerling. Bayesian hierarchical model for methane emission source apportionment. *Joint Statistical Meetings (JSM)*. August 2024.

13. Michael Basanese, **William S. Daniels**, Dorit M. Hammerling. Comparing different sensor types for continuous monitoring of methane emissions at oil and gas sites. *Mines Undergraduate Research Symposium*. April 2024.

12. Meng Jia, Troy Sorensen, **William S. Daniels**, Dorit M. Hammerling. A data-driven algorithm to optimize the placement of continuous monitoring sensors on oil and gas sites. *Mines Graduate Research and Discovery Symposium (GRADS)*. April 2024.

11. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Estimating methane emission durations using continuous monitoring systems. *Mines Graduate Research and Discovery Symposium (GRADS)*. April 2024.
    · **Received best presentation award in Energy session.**

10. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Reconciling bottom-up inventories and top-down measurements on individual oil and gas sites using continuous monitoring systems. *American Geophysical Union (AGU) Fall Meeting*. December 2023.

9. Meng Jia, Troy Sorensen, **William S. Daniels**, Dorit M. Hammerling. A data-driven algorithm to optimize the placement of continuous monitoring sensors on oil and gas sites. *American Geophysical Union (AGU) Fall Meeting*. December 2023.

8. **William S. Daniels**, Lyra Wang, Arvind Ravikumar, Dorit M. Hammerling. Developing methane emissions inventories for oil and gas production sites using point-in-space continuous monitors. *International Emissions Inventory Conference*. September 2023.

7. **William S. Daniels**, Rebecca R. Buchholz, Helen M. Worden, Fatimah Ahamad, Dorit M. Hammerling. Interpretable model captures complex relationship between climate variability and fire season intensity in Maritime Southeast Asia. *International Association of Wildland Fire - Fire and Climate Conference*. May 2022.

6. **William S. Daniels**, Meng Jia, Dorit M. Hammerling, Shyla Kupis, Nasr Alkadi, Anna Scott. Leveraging multiple continuous monitoring sensors for emissions alerting on oil and gas facilities. *American Geophysical Union (AGU) Fall Meeting*. December 2021.

5. **William S. Daniels**, Rebecca R. Buchholz, Helen M. Worden, Fatimah Ahamad, Dorit M. Hammerling. Predicting fire season intensity in Maritime Southeast Asia with interpretable models. *American Statistical Association CO/WY Fall Meeting*. October 2021.

4. **William S. Daniels**, Fatimah Ahamad, Rebecca R. Buchholz, Dorit M. Hammerling, Helen M. Worden. Using atmospheric carbon monoxide models to predict fire season intensity. *Spatial and Temporal Statistics Symposium (STSS)*. February 2021.

3. Meera Duggal, **William S. Daniels**, Dorit M. Hammerling. Optimizing genetic algorithm parameters for atmospheric carbon monoxide modeling. *Electronic Undergraduate Statistics Research Conference (eUSR)*. November 2020.

2. **William S. Daniels**, Rebecca R. Buchholz, Dorit M. Hammerling. Using the climate to model atmospheric carbon monoxide. *Mines Graduate Research and Discovery Symposium (GRADS)*. April 2020.
    · **Received best presentation award in Environmental Science session.**

1. **William S. Daniels**, Kevin-Druis Merenda, Lawrence Wiencke. What can elves tell us about very strong lightning? *APS April Meeting*. April 2019.
    · **Received outstanding presentation award.**

Selected Posters

8. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. A Bayesian hierarchical model for localizing and quantifying multi-source methane emissions on oil and gas sites using continuous monitoring systems. *American Geophysical Union (AGU) Fall Meeting*. December 2024.

7. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Estimating methane emission durations using continuous monitoring systems. *American Chemical Society (ACS) Fall Meeting, Sci-Mix Invited Poster Session*. August 2024.

6. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Using continuous methane measurements for inventory development on oil and gas sites: three case studies. *International Indian Statistical Association (IISA) Conference*. June 2023.
   · **Finalist in student poster competition**.

5. Meng Jia, **William S. Daniels**, Dorit M. Hammerling. Methane emission detection, localization, and quantification using continuous point-sensors on oil and gas facilities. *International Indian Statistical Association (IISA) Conference*. June 2023.
   · **Winner of student poster competition**.

4. Zi Li, **William S. Daniels**, Dorit M. Hammerling. Seasonal and hourly variability of particulate matter 2.5 in Denver. *Mines Undergraduate Research Symposium*. April 2022.

3. **William S. Daniels**, Dorit M. Hammerling, Rebecca R. Buchholz, Helen M. Worden, Fatimah Ahamad. Using climate mode indices to forecast carbon monoxide variability in fire-prone Southern Hemisphere regions. *International Global Atmospheric Chemistry (IGAC) Scientific Conference - Southern Hemispheres Session*. September 2021.
   · **Highly commended by Southern Hemisphere Working Group**.

2. Meera Duggal, **William S. Daniels**, Dorit M. Hammerling. Genetic algorithm optimization study for atmospheric carbon monoxide models. *Mines Undergraduate Research Symposium*. April 2020.

1. **William S. Daniels**, Kevin-Druis Merenda, Lawrence Wiencke. What can elves tell us about very strong lightning? *Mines Physics Undergraduate Research Symposium*. April 2019.
   · **Winner of student poster competition**.

Media Coverage

3. Colorado School of Mines Newsroom. *Mathematics PhD wins Rath Award at Fall 2024 Graduate Commencement*. December 2024.

2. Energy Transition Talk, a USC podcast. *How Can Capturing Carbon and Monitoring Methane Play a Role in the Energy Transition?* February 2024.

1. Bloomberg. *Ukraine War Gives U.S. LNG Chance to Shed Fracked-Gas Stigma*. April 2022.

Teaching Experience

TEAM-UP Teaching Program Fall 2017
Introduction to Field Based Experience

- Worked as a teaching assistant in a high school chemistry class.
- Gave lectures, assisted during labs, and participated in lesson planning.
- Took an accompanying education course on education psychology and modern STEM education.

Teaching Assistant Positions

- Colorado School of Mines, MATH 482: Statistics Practicum — Spring 2022
- Colorado School of Mines, MATH 482: Statistics Practicum — Spring 2021
- Colorado School of Mines, MATH 482: Statistics Practicum — Spring 2020
- Colorado School of Mines, PHGN 300: Modern Physics — Fall 2017
- Arvada West High School, Honors Chemistry — Fall 2017

Professional Service

Reviewer	Nature Communications	
	Environmental Science & Technology	
	Elementa: Science of the Anthropocene	
	Remote Sensing of Environment	
	Journal of Undergraduate Reports in Physics	
Grant Reviewer	Climate Change AI Innovation Grants	2024
	Harvey Undergraduate Scholarship Program	2015 - 2019
Convener	AGU Fall Meeting 2024 (GC51T, GC53L, and GC54D) *New Technologies and Frameworks to Detect and Analyze Methane Emissions from the Oil and Gas Supply Chain: Methods, Data, and Insights*	2024
	Methane Emissions Technology Alliance (META)	2022 - present
Volunteer	AGU Outstanding Student Presentation Awards (OSPA) Liason	2024
	Mines Undergraduate Research Symposium Oral Session Judge	2024
	AGU Outstanding Student Presentation Awards (OSPA) Reviewer	2023
	International Indian Statistical Association (IISA) Conference Volunteer	2023
	Mines Undergraduate Research Symposium Poster Session Judge	2022
Member	American Statistical Association (ASA)	2024 - present
	American Geophysical Union (AGU)	2019 - present
	Society for Industrial and Applied Mathematics (SIAM)	2019 - 2021
	American Physical Society (APS)	2018 - 2019
	Tau Beta Pi Engineering Honor Society	2018 - 2019