

William S. Daniels

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<https://wsdaniels.github.io/>

Education

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|---------------------------------------------------------------|-----------------|
| Ph.D., Statistics , Colorado School of Mines | 2024 (expected) |
| Thesis: Characterizing Methane Emissions on Oil and Gas Sites | |
| Advisor: Dorit Hammerling | |
| M.S., Statistics , Colorado School of Mines | 2021 |
| Advisor: Dorit Hammerling | |
| B.S., Physics , Colorado School of Mines | 2019 |
| Summa cum laude | |
| Advisor: Lawrence Wiencke | |

Professional Experience

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| 2023 - present | Student Researcher | Energy Emissions Modeling and Data Lab |
| 2022 - present | Core Team Member | Methane Emissions Technology Alliance |
| 2020 - present | Student Researcher | Payne Institute for Public Policy |
| 2019 - present | Graduate Research Assistant | Colorado School of Mines |
| 2018 - 2019 | Systems Engineering Intern | Northrop Grumman |
| 2016 - 2019 | Undergraduate Research Assistant | Colorado School of Mines |
| 2016 | Research Assistant | Northwest Advanced Renewables Alliance |

Publications

Submitted Papers

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*, (2023).

Refereed Papers

1. **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).
2. **William S. Daniels**, Jiayang (Lyra) Wang, Arvind Ravikumar, Matthew Harrison, Selina Roman-White, Fiji 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).
3. 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).
4. **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 and Articles

1. **William S. Daniels**, Dorit M. Hammerling, Morgan D. Bazilian. [New method for tracking down methane emissions on oil and gas sites](#). *Payne Institute for Public Policy - Commentary Series*, (2024).
2. 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 for Public Policy - Commentary Series*, (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 for Public Policy - Commentary Series*, (2021).
4. 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).
5. **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).

Theses

1. **William S. Daniels**. [Statistical methods for the interpretation, prediction, and localization of remotely sensed atmospheric pollutants](#). *ProQuest Dissertations & Theses Global* (No. 28497887), Master's Thesis, (2021).

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

Invited Talks

1. 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.
2. 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.
3. Quantitative Exploration and Discussion (QED) Supergroup, CU Boulder. *Building intuition around common statistical learning techniques*. February 2022.
4. 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 Presentations

1. 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.
2. 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.
3. **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.
4. **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. *AGU Fall Meeting*. December 2023.
5. 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. *AGU Fall Meeting*. December 2023.
6. **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.
8. **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. *AGU Fall Meeting*. December 2021.
9. **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.
10. **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.
11. 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.
12. **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.
13. **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.

Posters

1. Olga Khaliukova, **William S. Daniels**, Dorit M. Hammerling. [Sampling frequency strategies for methane emissions from oil and gas](#). *Mines Graduate Research and Discovery Symposium (GRADS)*. April 2024.
2. **William S. Daniels**, Spencer Kidd, Michael Basanese, Dorit M. Hammerling. [Estimating methane emission durations using continuous monitoring systems](#). *Responsible Gas Symposium*. March 2024.
3. **William S. Daniels**, Dorit M. Hammerling. [Using continuous monitoring systems for measurement-informed inventories on oil and gas production sites](#). *Responsible Gas Symposium*. March 2024.
4. Meng Jia, **William S. Daniels**, 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](#). *Responsible Gas Symposium*. March 2024.
5. **William S. Daniels**. [Using continuous monitoring systems for measurement-informed inventories on oil and gas production sites](#). *Energy Emissions Modeling and Data Lab (EEMDL) Annual Conference*. October 2023.
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.**
7. 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.**
8. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. [Using continuous monitoring systems for data-driven methane emissions inventories for oil and gas facilities](#). *Mines Applied Mathematics and Statistics (AMS) Open House*. March 2023.
9. Meng Jia, **William S. Daniels**, Dorit M. Hammerling. [Methane emission detection, localization, and quantification using continuous point-sensors on oil and gas facilities](#). *Mines Applied Mathematics and Statistics (AMS) Open House*. March 2023.
10. 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.
11. Meng Jia, **William S. Daniels**, Amber Rexwinkle, Dorit M. Hammerling. [Data-driven detection of methane leaks from oil and gas](#). *Mines Applied Mathematics and Statistics (AMS) Open House*. March 2022.
12. **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.**
13. Dorit M. Hammerling, Lewis Blake, **William S. Daniels**, Aidan Dykstal, Sean Crowell. [Student-led investigation of TROPOMI data for the US](#). *EGU General Assembly*. May 2020.

14. Meera Duggal, **William S. Daniels**, Dorit M. Hammerling. Genetic algorithm optimization study for atmospheric carbon monoxide models. *Mines Undergraduate Research Symposium*. April 2020.
15. **William S. Daniels**, Rebecca R. Buchholz, Dorit M. Hammerling. Improving atmospheric carbon monoxide models. *Mines Applied Mathematics and Statistics (AMS) Open House*. March 2019.
16. **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.**
17. **William S. Daniels**, Ruoshui Ma, Xiao Zhang. Characterization of molecular structure and interlinkage network for seven representative biorefinery lignin. *NARA SURE Research Symposium*. August 2016.

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

Funding, Honors, Awards

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| Funding | Colorado Environmental Management Society Scholarship | 2024 |
| | Harvey Graduate Fellowship | 2019 - 2021 |
| | Harvey Undergraduate Scholarship | 2015 - 2019 |
| | Mines Undergraduate Research Fellowship | 2017 - 2018 |
| Honors | Distinguished Graduate, <i>Mines Physics Department</i> | 2019 |
| | Chemistry Student of the Year, <i>Mines Chemistry Department</i> | 2016 |
| Awards | Best talk in Energy session, <i>Mines GRADS</i> | 2024 |
| | Poster competition finalist, <i>IISA Conference</i> | 2023 |
| | Highly commended poster, <i>IGAC Conference</i> | 2021 |
| | Best talk in Environmental Science session, <i>Mines GRADS</i> | 2020 |
| | Outstanding oral presentation award, <i>APS April Meeting</i> | 2019 |
| | Poster competition winner, <i>Mines Physics Research Symposium</i> | 2019 |

Professional Service

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| Reviewer | Elementa: Science of the Anthropocene Remote Sensing of Environment Journal of Undergraduate Reports in Physics | |
| Volunteer | 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 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 |

Media

1. Energy Transition Talk, a USC podcast. *How Can Capturing Carbon and Monitoring Methane Play a Role in the Energy Transition?* February 2024.
2. Bloomberg. *Ukraine War Gives U.S. LNG Chance to Shed Fracked-Gas Stigma.* April 2022.