# William S. Daniels

wdaniels@mines.edu
https://wsdaniels.github.io/

## Education

**Ph.D., Statistics**, Colorado School of Mines (in progress)
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).

2. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Methane emission detection, localization, and quantification using continuous point-sensors on oil and gas facilities. *Submitted*, (2022).

### Refereed Papers

1. **William S. Daniels**, Jiayang (Lyra) Wang, Arvind Ravikumar, Matthew Harrison, Selina Roman-White, Fiji George, Dorit M. Hammerling. Towards 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).

3. **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. 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).

2. **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).

3. 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).

4. **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. **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.

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. *AGU Fall Meeting*. December 2023.

3. **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.

4. **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.

5. **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.

6. **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.

7. **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.

8. 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.

9. **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.**

10. **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. **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.

2. **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**.

3. 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. **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.

5. 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.

6. 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.

7. 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.

8. **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**.

9. 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.

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

11. **William S. Daniels**, Rebecca R. Buchholz, Dorit M. Hammerling. Improving atmospheric carbon monoxide models. *Mines Applied Mathematics and Statistics (AMS) Open House*. March 2019.

12. **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**.

13. **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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| **Fellowships** | Harvey Graduate Fellowship | 2019 - 2021 |
| | Mines Undergraduate Research Fellowship | 2017 - 2018 |
| | Harvey Undergraduate Scholarship | 2015 - 2019 |
| **Awards** | Student poster competition finalist, IISA Conference | 2023 |
| | Highly commended poster, IGAC Conference | 2021 |
| | Best talk in Environmental Science session, Mines GRADS | 2020 |
| | Mines Physics Department distinguished graduate | 2019 |
| | Outstanding presentation award, APS April Meeting | 2019 |
| | Student poster competition winner, Mines Physics Research Symposium | 2019 |
| | General chemistry student of the year | 2016 |

## Professional Service

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| **Reviewer** | Remote Sensing of Environment | |
| | Journal of Undergraduate Reports in Physics | |
| **Affiliations** | American Geophysical Union (AGU) | 2019 - present |
| | Society for Industrial and Applied Mathematics (SIAM) | 2019 - present |
| | American Physical Society (APS) | 2018 - 2019 |
| | Tau Beta Pi Engineering Honor Society | 2018 - 2019 |
| **Other** | AGU Outstanding Student Presentation Awards (OSPA) Reviewer | 2023 |
| | International Indian Statistical Association (IISA) Conference Volunteer | 2023 |
| | Mines Undergraduate Research Symposium Judge | 2022 |