William S. Daniels

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Education

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

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. **William S. Daniels**, Meng Jia, Dorit M. Hammerling. Estimating methane emission durations using continuous monitoring systems. *Submitted*, (2024).

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

2. 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.

3. 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.

4. **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.**

5. **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.

6. 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.

7. **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.

8. **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.

9. **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.

10. **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.

11. **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.

12. 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.

13. **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.**

14. **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

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, *Mines Physics Department*	2019
	Chemistry Student of the Year, *Mines Chemistry Department*	2016

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

Professional Service

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 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

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.