

# Meng Jia

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## EDUCATION

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- **Colorado School of Mines, Golden, CO** **May 2025**  
Doctor of Philosophy in Applied Mathematics and Statistics GPA: 4.00/4.00
- **Colorado School of Mines, Golden, CO** **Dec 2020**  
Masters of Science in Data Science GPA: 4.00/4.00
- **University of Florida, Gainesville, FL** **Aug 2018**  
Masters of Science in Geological Sciences GPA: 3.87/4.00
- **Peking University, Beijing, China** **Jul 2015**  
Bachelor and Masters of Science in Geophysics GPA: 3.88/4.00

## RESEARCH INTERESTS

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Deep Learning, Optimization, Bayesian Inversion, Time Series Analysis, Methane Emission Monitoring

## RESEARCH EXPERIENCE

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- **Research Assistant – Colorado School of Mines, Golden, CO** **May 2023 – Present**  
Methane emission localization and quantification using machine learning
  - Introduce physics-informed neural networks (PINN) in methane emission localization and quantification using continuous monitoring systems (CMS), significantly improving accuracy over traditional methods.
  - Integrated the Iterative Soft Thresholding Algorithm (ISTA) into neural network training to enhance sparsity in the inverted emission source term.
  - Design and implement the entire pipeline from data collection, preprocessing, model development, and evaluation using PyTorch on HPC with PBS for efficient resource management and scalability.
- **Research Assistant – Colorado School of Mines, Golden, CO** **May 2022 – Dec 2023**  
Methane sensor placement optimization using genetic algorithms
  - Designed a data-driven framework for ground-based methane sensor placement on oil and gas facilities, gaining industrial recognition and successfully applied to operating oil and gas sites.
  - Implemented genetic algorithms (GAs) within a Pareto optimization framework, achieving notable improvements in accuracy and scalability over traditional methods.
- **Research Assistant – Colorado School of Mines, Golden, CO** **Jan 2021 – Sep 2023**  
Fast Gaussian puff model implementation
  - Developed a lightweight, fast, and scalable Gaussian puff model, significantly improving computational efficiency for near real-time methane emission detection on oil and gas sites.
  - Conducted the first direct comparison between Gaussian plume and puff models using 343 controlled emission events, demonstrating the puff model's superior performance in practical applications.
- **Research Assistant – Colorado School of Mines, Golden, CO** **Jan 2021 – Aug 2023**  
Methane emission detection, localization, and quantification
  - Developed an open-source, practical framework for methane emission detection, localization, and quantification using point-in-space continuous monitoring systems for oil and gas sites.
  - Demonstrated the framework's effectiveness by evaluating it on controlled release data from METEC, achieving superior localization and quantification performance compared to proprietary solutions.

**Research Assistant – University of Florida, Gainesville, FL**

**Aug 2015 – Jun 2018**

- Bayesian inversion of Mars interior structure
  - Applied a reversible jump Markov chain Monte Carlo (MCMC) algorithm in the trans-dimensional hierarchical Bayesian framework to invert Mars interior structures from surface seismic observations.
  - Participated as a researcher in the NASA InSight project - the first Mars seismology study in human history.

## **WORK EXPERIENCE**

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**Data Science Intern – Schlumberger, Houston, TX**

**May - Aug 2021**

- Well logs interpolation and uncertainty quantification using deep learning
  - Pioneered the application of attentive neural processes for well log interpolation and uncertainty quantification, delivering the first reliable prediction uncertainty quantification in the field.
  - Independently developed and deployed a full project using TensorFlow in a GPU-accelerated Google Cloud Platform environment.
  - Received a return offer for a second internship based on strong performance and contributions in machine learning model development.

## **PUBLICATIONS**

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### **Published**.....

1. **Meng Jia**, Troy Sorensen, and Dorit Hammerling. Optimizing Point-in-Space Continuous Monitoring System Sensor Placement on Oil and Gas Sites. *ACS Sustainable Resource Management*, 18 December 2024.
2. William Daniels, **Meng Jia**, and Dorit Hammerling. Estimating Methane Emission Durations Using Continuous Monitoring Systems. *Environmental Science & Technology Letters*, 11 November 2024
3. 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 January 2024
4. **Meng Jia**, Xianguang Wang, Shilin Li, Yongshun Chen. Crustal structures of Ordos block and surrounding regions from receiver functions. *Progress in Geophysics*, 2015, 30(6): 2474-2481

### **Preprints/Submitted**.....

1. **Meng Jia**, Ryker Fish, William Daniels, Brennan Sprinkle, Dorit Hammerling. Filling a critical need: a lightweight and fast Gaussian puff model implementation. Submitted (2024)

### **Theses**.....

1. **Meng Jia**. Determining crust and upper mantle structure by bayesian joint inversion of receiver function, surface wave dispersion and rayleigh wave ellipticity at a single station. Masters' Thesis (2018)

## **CONFERENCE PRESENTATIONS**

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- **Physics-Informed Neural Networks for Emission Localization and Quantification**
  - Poster at American Geophysical Union (AGU) Fall Meeting. December 2024.
- **Sensor Placement Optimization for Emission Detection**
  - Poster at American Geophysical Union (AGU) Fall Meeting. December 2024.
  - Oral presentation at American Chemical Society (ACS) Fall Meeting. August 2024.
  - Oral presentation at AGU Fall Meeting. December 2023.
  - Oral presentation at Air Quality Measurement Methods and Technology. November 2023.
- **Emission Detection, Localization and Quantification**

- Poster at Responsible Gas Symposium. March 2024.
- Poster at EEMDL Annual Conference. October 2023.
- Poster at International Indian Statistical Association Annual Conference. June 2023. **Best Poster Award.**
- Oral presentation at Colorado Wyoming Chapter of the American Statistical Association's Spring Meeting. April 2022.
- **Fast Gaussian Puff Model Implementation**
  - Poster at Responsible Gas Symposium. March 2024.
  - Poster at EEMDL Annual Conference. October 2023.
- **Bayesian Inversion for Martian Interior Structure**
  - Poster at AGU Fall Meeting. December 2017.

## TEACHING

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- **Course Developer**
  - MATH/DSCI 530: Statistical Methods I, Colorado School of Mines. Summer 2020
  - MATH/DSCI 560: Statistical Learning I, Colorado School of Mines. Summer 2020
- **Teaching Assistant**
  - MATH 482: Statistics Practicum, Colorado School of Mines. Spring 2021
  - CSCI 406: Algorithms, Colorado School of Mines. Spring 2020
  - GPGN 455/555: Earthquake Seismology, Colorado School of Mines. Fall 2018
  - GLY 1880: Natural Disasters, University of Florida. Fall 2016
  - GLY 5455: Introduction to Geophysics/Geodynamics, University of Florida. Fall 2015

## PROFESSIONAL SERVICE

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- **Reviewer**
  - Journal of the American Statistical Association
  - Environmental Science & Technology (ES&T) Air
- **Volunteer**
  - AGU Outstanding Student Presentation Awards (OSPA) Reviewer. December 2024
  - International Indian Statistical Association (IISA) Conference Volunteer. June 2023
- **Member**
  - American Geophysical Union (AGU), 2014 – Present
  - Society for Industrial and Applied Mathematics (SIAM), 2021 – Present
  - Air & Waste Management Association (AWMA). 2023 – Present
  - American Statistical Association (ASA). 2022 – Present
  - American Chemical Society (ACS). 2024 – Present

## SKILLS

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- **Programming & Software:** Python, R, Matlab, C/C++, Linux Shell script, SQL, high-performance computing (HPC), Google Cloud Computing, Github, Latex
- **Data Science & Machine Learning:** Deep Learning (Tensorflow, PyTorch, Physics-Informed Neural Networks, Large Language Models, Reinforcement Learning), Optimization (Evolutionary Algorithms, Convex Optimization Algorithms), Data Analytics (Numpy, Scikit-learn, SciPy), Data Management (Pandas, MySQL), Data Visualization (Matplotlib)
- **Professional:** Quick Learning, Multitasking, Creative Problem Solving, Interdisciplinary Collaboration, Oral Presentations, Technical Writing