Meng Jia

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EDUCATION

- **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

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

RESEARCH EXPERIENCE

- **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.
  - 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
  - Developed a data-driven framework for methane sensor placement on oil and gas facilities using genetic algorithm under the framework of Pareto optimization, significantly increasing the accuracy and scalability compared to traditional methods.
  - Designed and implemented a fast Gaussian puff model to simulate atmospheric transport of methane, achieving a two-order-of-magnitude speedup over a naive implementation.
- **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

- **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

Published

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 January 2024; 12 (1): 00110.
2. **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**, Troy Sorensen, and Dorit Hammerling. Optimizing continuous monitoring sensor placement on oil and gas sites. Submitted (2024).
2. **Meng Jia**, Ryker Fish, William Daniels, Brennan Sprinkle, Dorit Hammerling. Filling a critical need: a lightweight and fast Gaussian puff model implementation. Submitted (2024)
3. William Daniels, **Meng Jia**, and Dorit Hammerling. Estimating methane emission durations using continuous monitoring systems. 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

- **Physics-Informed Neural Networks for Emission Localization and Quantification**
  - Poster at Energy Emissions Modeling and Data Lab (EEMDL) Annual Conference. October 2024.
  - Oral presentation/poster at American Geophysical Union (AGU) Fall Meeting. December 2024.
- **Sensor Placement Optimization for Emission Detection**
  - 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

- **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
  - 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
- **Grader**
  - CSCI 406: Algorithms, Colorado School of Mines. Spring 2020
  - CSCI 448: Mobile Application Development, Colorado School of Mines. Spring 2020

PROFESSIONAL SERVICE

- **Reviewer**
  - Journal of the American Statistical Association
  - Environmetrics
- **Volunteer**
  - AGU Outstanding Student Presentation Awards (OSPA) Reviewer. December 2023
  - 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

- **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, Transformers, Reinforcement Learning), 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