

Jay Rothenberger

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Education

University of Oklahoma

Norman, OK

Ph.D., Computer Science. GPA 4.0

Expected Graduation Date 05/2026

Relevant Coursework: Advanced Machine Learning, Cryptography, Data Mining, Computer Security, Artificial Intelligence, Parallel Distributed and Network Programming

University of Virginia

Charlottesville, VA

B.S., Computer Science. Major GPA 3.66

Graduation Date 05/2021

Relevant Coursework: Computational Learning Theory, Machine Learning, Algorithms, Advanced Software Design, Advanced Linear Algebra, Real Analysis, Number Theory, Numerical Analysis, Abstract Algebra, Probability Theory

Working Experience

University of Oklahoma

Norman, OK

Graduate Researcher

08/2021 - Current

- Designed and developed a deep convolutional neural network model for image classification capable of producing its own class activation maps as an explanation for each prediction. Approach is several hundred times faster than comparable post hoc methods
- Implemented parallel training strategies for the University of Oklahoma OSCER supercomputer to accelerate model training and enable model scaling for institutional members
- Actively performing research in the areas of Semi-Supervised Learning, Representation Learning, and Explainable Artificial Intelligence (XAI) for Computer Vision

LumenUs Scientific

Oklahoma City, OK

Machine Learning Engineer Intern

05/2024 - 08/2024

- Developed efficient data pipelines for data integration, compression, and AI-ready processing
- Evaluated data storage and compression and storage formats for large datasets used during model training
- Developed and trained a foundation model for the The Earth Surface Mineral Dust Source Investigation (EMIT) Imaging Spectrometer

Vaisala

Louisville, CO

Machine Learning Intern

05/2023 - 08/2023

- Developed and trained a new Deep Learning model for hail prediction that achieves state-of-the-art nowcasting performance improving upon prior work by 32% CSI
- Model was operationalized and deployed as a hail now-casting product
- Designed, implemented, and applied standard explainable artificial intelligence (XAI) techniques including SHAP, PFI, and Integrated Gradients for higher dimensional observations in an HPC setting

Grant Awards

National AI Readiness Resource Pilot <i>Training a Foundation Model for the EMIT Instrument</i> 12,000 GPU Hours	10/2024
Oklahoma Center for Advancement of Science & Technology <i>Machine Learning Algorithms for Oil and Gas Leak Detection and Operator Notification</i> \$30,000	05/2024
NSF Travel Grant \$1,500	11/2023

Publications

2024

- *A Review of Pseudo-Labeling for Computer Vision*
Jay Rothenberger, Patrick Kage, Pavlos Andreadis, Dimitris I. Diochnos

2023

- *Two Views are Better than One: Meta Co-Training*
Jay Rothenberger, Dimitris I. Diochnos

Conference Presentations

2025

- *Improving Road Surface Classification with Co-Training Algorithms - American Meteorological Society (AMS)*
Jay C. Rothenberger, Tiffany Le, Carly Sutter, Kara J. Sulia, Dimitrios I. Diochnos
Best Student Presentation - Honorable Mention
- *Predicting Forecast Error of Numerical Weather Prediction Models using an LSTM - American Meteorological Society (AMS)*
David Aaron Evans, Kara J. Sulia, Nick P. Bassill, Christopher D. Thorncroft, Lauriana Gaudet, Jay C. Rothenberger

2024

- *Two Views are Better than One: Meta Co-Training - International Symposium on Artificial Intelligence and Mathematics (ISAIM)*
Jay C. Rothenberger, Dimitrios I. Diochnos
- *Explaining The Role of Lightning Data in Hail Nowcasting - American Meteorological Society (AMS)*
Jay C. Rothenberger, Eric P. Gritmit, Martin J. Murphy, Robinson Wallace
- *The Promise of Foundation Models for Improving Automated Detection of Methane Sources in Hyperspectral Imagers: A Case Study for the EMIT Instrument - American Geophysical Union (AGU)*
Jay C. Rothenberger, Sean Crowell, William Keely, Dan Cusworth, Kate Howell

2023

- *Classifying Road Surface Conditions with Self-Trained Artificial Intelligence - American Meteorological Society (AMS)*
Vincent Ferrera, Jay C. Rothenberger, Melissa Wilson Reyes, Carly Sutter, Andrew H. Fagg, Dimitrios I. Diochnos

2022

- *Classifying Road Surface Conditions with Self-Trained Artificial Intelligence - New York State Mesonet AI Symposium*
Vincent Ferrera, Jay C. Rothenberger, Melissa Wilson Reyes, Carly Sutter, Andrew H. Fagg, Dimitrios I. Diachnos

Invited Talks

2024

- *Best Practices for Effective and Visible Documentation* - AI2ES
- *Tuning Deep Learning Training & Evaluation Performance on the OU Supercomputer* - AI2ES

2023

- *Introduction to Utilizing HPC resources for AI* - OU AI Club
- *Two Views are Better than One: Meta Co-Training* - Apple Computer Vision Team
- *Explaining Machine Learning Predictions on Higher Dimensional Data* - AI2ES

Academic Service

2024

- *Special Interest Group on Knowledge Discovery and Data Mining (KDD)* - Program Committee Member
- *International Conference on Machine Learning (ICML)* - Sub-Reviewer
- *American Meteorological Society - Artificial Intelligence for Earth Systems (AIES)* - Reviewer

2023

- *American Meteorological Society - Artificial Intelligence for Earth Systems (AIES)* - Reviewer
- *Neural Information Processing Systems (NeurIPS)* - Sub-Reviewer

2022

- *IEEE Conference on Artificial Intelligence (CAI)* - Sub-Reviewer

Mentorship

Luke Terry

08/2024 – Current

Undergraduate Research Mentee

- Guiding a year-long research experience in semi-supervised learning.

Tiffany Le

08/2023 – 05/2024

Undergraduate Research Mentee

- Guided a year-long research experience in semi-supervised learning focusing on co-training methods.
- Work performed as part of this experience will appear in the proceedings of the Annual Meeting of the American Meteorological Society 2025

Alberto Liu

08/2022 – 05/2023

Undergraduate Research Mentee

- Guided a year-long research experience in semi-supervised learning focusing on co-training methods.

Vincent Ferrera

05/2022 – 08/2022

AI2ES Undergraduate Research Experience Mentee

- Guided a three month research experience in semi-supervised learning focusing on self-training methods.
- Work performed as part of this experience will appear in the proceedings of the Annual Meeting of the American Meteorological Society 2023

Leadership & Activities

**Computer Science Graduate Student Association
President**

Norman, OK
01/2023 – Current

- Organized and hosted weekly club events including student research presentations, technical demonstrations, skill-building sessions, and tea time.
- Conducted invited presentations to other student organizations about utilizing university HPC resources
- Served as the graduate student representative to the faculty by attending monthly faculty meetings and representing graduate peers

Skills & Interests

Technical: Python, PyTorch, TensorFlow, NumPy, Pandas, SciPy, SkLearn, Transformers, Graph Neural Networks, Convolutional Neural Networks, Big Data, Peta-Scale Compute

Interests: Deep Learning, Semi-Supervised Learning, Parallel Distributed and Networked Programming, Model Compression