Joseph Shenouda

Github: www.github.com/joeshenouda
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Research Interests

Deep Learning, Machine Learning, Signal Processing, Optimization

Education

University of Wisconsin-Madison (In Progress)
Ph.D. Electrical and Computer Engineering
Advisors: Kangwook Lee & Robert D. Nowak

University of Wisconsin-Madison 2023
M.S. Electrical and Computer Engineering
Advisors: Kangwook Lee & Robert D. Nowak

Rutgers University 2021
B.S. Electrical and Computer Engineering
Summa Cum Laude

Preprints

- **Variation Spaces for Multi-Output Neural Networks: Insights on Multi-Task Learning and Network Compression**
  Joseph Shenouda, Rahul Parhi, Kangwook Lee, Robert D. Nowak
  arXiv
- **PathProx: A Proximal Gradient Algorithm for Weight Decay Regularized Deep Neural Networks**
  Liu Yang, Jifan Zhang, **Joseph Shenouda**, Dimitris Papailiopoulos, Kangwook Lee, Robert D. Nowak
  arXiv

Publications

- **A Continuous Transform for Localized Ridgelets**
  Joseph Shenouda, Rahul Parhi, Robert D. Nowak
  Sampling Theory and Applications Conference (SampTA) (2023) paper
- **A Guide to Reproducible Research in Signal Processing and Machine Learning**
  Joseph Shenouda and Waheed U. Bajwa.
  IEEE Signal Processing Magazine (2023) paper.

Workshop Papers

- **A Representer Theorem for Vector-Valued Neural Networks: Insights on Weight Decay Regularization and Widths of DNNs**
  Joseph Shenouda, Rahul Parhi, Kangwook Lee, Robert D. Nowak
  ICML Duality Principles for Modern ML Workshop (2023)
- **A Better Way to Decay: Proximal Gradient Training Algorithms for Neural Nets**
  Liu Yang, Jifan Zhang, **Joseph Shenouda**, Dimitris Papailiopoulos, Kangwook Lee, Robert D. Nowak.
  Neural Information Processing Systems (NeurIPS) OPT-ML Workshop (2022) paper

Selected Talks

- **Vector-Valued Variation Spaces and Width Bounds for DNNs** October 2023
  University of Wisconsin-Madison (MLOPT Idea Seminar)
- **A Representer Theorem for Vector-Valued Neural Networks** July 2023
  ICML Duality Principles for Modern Machine Learning Workshop (Video)
- **A Continuous Transform for Localized Ridgelets** July 2023
  Sampling Theory and Applications Conference (SampTA)

Relevant Coursework

- High Dimensional Statistics
- Randomized Linear Algebra
- Stochastic Signals and Systems
- Convex Optimization
- Error Control Coding
- Linear Algebra
- Analysis
- Mathematical Methods of Machine Learning
- Theory of Large Scale Machine Learning
- Non-linear Optimization

Teaching

University of Wisconsin-Madison

- (Teaching Assistant) **ECE/CS 761: Mathematical Methods in Machine Learning** **Spring 2024**

Experience

MIT Lincoln Laboratory: Summer Research Intern **Summer 2021**

Los Alamos National Laboratory: Electrical Engineer Intern **Summer 2020**

Lockheed Martin: Software Engineering Intern **Summer 2019**

Service

- Reviewer: JMLR, NeurIPS Optimization in Machine Learning Workshop, Asilomar Conference 2021
- Organizer for Systems Information Learning Optimization (SILO) Seminar at University of Wisconsin-Madison
- Organizer for Signal and Information Processing (SIP) Seminar at Rutgers University.

Awards and Memberships

ECE 2021 Wisconsin Distinguished Graduate Fellowship-Richardson
JJ Slade Scholar
Tau Beta Pi
Recipient of the Kuhl Memorial Engineering Scholarship