Emily J. Herron

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EDUCATION

University of Tennessee, Knoxville, Tennessee, USA

- Ph.D. Candidate in Data Science & Engineering, Breseden Center   Aug 2018 – Present
  - Thesis: Generalized Differentiable Neural Architecture Search with Scaling and Stability Improvements
  - Advisor: Dr. Steven R. Young
  - Focus: Machine learning, deep learning, data analytics
  - Cumulative GPA: 3.94 / 4.00

Mercer University, Macon, GA, USA

- B.S. in Computational Science   Aug 2014 – May 2018
  - Graduated Summa Cum Laude
  - Cumulative GPA: 3.94 / 4.00

RESEARCH EXPERIENCE

Computational Data Analytics Group, Oak Ridge National Laboratory

- Graduate Research Assistant   Aug 2018 – Present
  - Proposed and implemented improvements to the CDARTS neural architecture search algorithm.
  - Developed method for creating diverse ensembles of networks produced from neural architecture search.
  - Experimented with improvements to MENNDL, an evolutionary algorithm-based framework for deep learning hyperparameter optimization.
  - Researched and implemented selection algorithms; compared results of runs using different selection methods and scales on Titan and Summit supercomputers

- Intern   Jun 2018 – Aug 2018
  - Carried out text mining project dealing with classification of NIEHS research publications
  - Trained Hierarchical Attention Networks and other models including Naive Bayes and Random Forests to classify publications based on satisfaction of various criteria
  - Leveraged frameworks including Hierarchical Attention Networks and Tf-Idf Based Weighting, and spatial distances between word groupings and criteria descriptions to quantify the relevance of words or word groups to criteria queries and category predictions

Big Data X REU, University of Chicago & Illinois Institute of Technology

- Undergraduate Researcher   May 2017 – Present
  - Contributed to development of automated pipeline for extracting metadata and predicting contextual relationships between files in large scientific repositories
  - Developed collection of modules for extracting metadata from images; functionality included feature-based clustering, text extraction using optical character recognition, and image classification through use of support vector machine models
  - Module tested on over 3,500 images; results published in poster, placed 3rd in ACM's undergraduate Student Poster Competition at Super Computing (SC) 2017 Conference

Mercer Engineering Research Center, Warner Robins, GA

- Intern   May 2016 – May 2018
  - Applied variety of machine learning methods to classification of aircraft flight regime data (Pandas, Scikit-Learn, Tensorflow, Keras, Weka)
  - Presented PowerPoint of classification results and findings to group of engineers on weekly basis
  - Researched and developed augmented reality-based remote collaboration and video streaming application for Microsoft Hololens using C, Unity, Windows 10 UWP, ASP.NET with team

PUBLICATIONS

Journal and Conference Papers

[1] E. J. Herron, S. R. Young, and D. Rose, "Icdarts: Improving the stability of cyclic darts," in *2022 21st IEEE International Conference on Machine Learning and Applications (ICMLA)*, 2022.

[2] J. Duncan, F. Fallas, C. Gropp, E. Herron, M. Mahbub, P. Olaya, E. Ponce, T. K. Samuel, D. Schultz, S. Srinivasan, M. Tang, V. Zenkov, Q. Zhou, and E. Begoli, *The sensitivity of word embeddings-based author detection models to semantic-preserving adversarial perturbations*, 2021. DOI: 10.48550/ ARXIV.2102.11917. [Online]. Available: https://arxiv.org/abs/2102.11917.

[3] E. J. Herron, S. R. Young, and T. E. Potok, "Ensembles of networks produced from neural architecture search," in *International Conference on High Performance Computing*, Springer, 2020, pp. 223–234.

[4] E. Herron, T. J. Skluzacek, I. Foster, and K. Chard, "Applying image feature extraction to cluttered scientific repositories," 2017.

INVITED PRESENTATIONS	▪ Herron, E., Young, S.R., Rose, D. ICDARTS: Improving the Stability of Cyclic DARTS. 2022 21st IEEE International Conference on Machine Learning and Applications, Nassau, The Bahamas. ▪ Herron, E., Young, S.R., Potok, T.E. Ensembles of Neural Networks Produced from Neural Architecture Search, Women in High Performance Computing Workshop, SuperComputing 2020, Virtual. ▪ Herron, E., Young, S.R., Potok, T.E. Ensembles of Neural Networks Produced from Neural Architecture Search, The International Conference on High Performance Computing 2020, Virtual. ▪ Herron, E., Skluzacek, T., Foster I., Chard, K. Applying Image Feature Extraction to Cluttered Scientific Repositories. Student Research Competition Poster Session, SuperComputing 2017, Denver, CO.

AWARDS & SCHOLARSHIPS

University of Tennessee, Knoxville
- Bredesen Center Data Science & Engineering Fellowship — Mar 2018

Super Computing Conference
- ACM Student Poster Competition Undergraduate Semifinalist — Nov 2017

Mercer University
- Outstanding Student in Computational Science — Apr 2016 – Apr 2018
- President's and Dean's Lists — Dec 2014 – May 2018
- Summa Cum Laude — May 2018
- Academic Scholarship — Apr 2014

PROFESSIONAL AFFILIATIONS & ACTIVITIES

Institute of Electrical and Electronics Engineers (IEEE)
- Member — 2022 – Present

Association for Computing Machinery (ACM)
- Member — 2017 – Present

PROFESSIONAL SERVICE

2022 International Conference on Machine Learning (ICML 2022), Baltimore, Maryland, USA
- Reviewer - Top 10% — 2022

Bredesen Center Peer Mentoring Program, Knoxville, TN, USA
- Peer Mentor — 2022

Introduce Your Daughter to AI, Oak Ridge National Laboratory
- Volunteer — 2018 – 2019

Majors in Minutes, Mercer University
- Computational Science Major Representative — 2016 – 2018

3D Modeling Inventors Workshop, Museum of Aviation
- Volunteer — 2017