Eric W. Todd

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Education

PhD Candidate, Computer Science Sep 2022–Present
Northeastern University - Khoury College of Computer Sciences Boston, MA
Advisor: David Bau
Research Area: Interpretable Machine Learning, Natural Language Processing

BS, Applied and Computational Mathematics Apr 2020
Brigham Young University - GPA: 4.00/4.00, *Summa Cum Laude* Provo, UT
Minors: Computer Science, Statistics

Employment

Research Assistant Sep 2022–Present
Northeastern University - Bau Lab (Interpretable Neural Networks) Boston, MA

– Researching the mechanisms large neural networks use to solve different tasks.
– "Function Vectors in Large Language Models" (ICLR 2024) investigates whether LLMs contain function representations through the lens of in-context learning. We found that a small set of attention heads do transport task-representative information that can be extracted and is robust to different contexts.

Research Assistant Sep 2020–Aug 2022
Brigham Young University - Computer Science Department, Advisor: Ryan Farrell Provo, UT

– Researched unsupervised methods for image part segmentation & overcoming occlusion, in the context of fine-grained visual classification.

Research Intern May–Aug 2022
Air Force Research Lab/Wright State University, AFRL Advisor: Oliver Nina Remote

– Investigated self-supervised learning methods for fine-grained image classification and presented my research to other interns and AFRL research advisors.

Machine Learning Intern May–Aug 2019
Brigham Young University - Enrollment Services, Manager: Kristine Manwaring Provo, UT

– Developed Early Alert, a machine learning system that identifies students struggling academically and enables personalized outreach from campus support offices.
– Early Alert is deployed and in active use by most academic advisors and support offices at BYU.

Research Assistant Feb 2018–Aug 2020
Brigham Young University - Physics Department, Advisor: Mark Transtrum Provo, UT

– Researched crowd noise classification using machine learning methods. My work focused on crowd noise data from basketball games and a Mardi Gras parade float, resulting in 2 publications [2, 3].
– Other researchers are creating a crowd engagement detection product that builds on top of our work.

Publications

1. **Eric Todd**, Millicent L. Li, Arnab Sen Sharma, Aaron Mueller, Byron C. Wallace, and David Bau. "Function Vectors in Large Language Models." Proceedings of the 2024 International Conference on Learning Representations (ICLR 2024)

2. **Eric Todd**, Mylan R. Cook, Katrina Pedersen, David S. Woolworth, Brooks A. Butler, Xin Zhao, Colt Liu, Kent L. Gee, Mark K. Transtrum, Sean Warnick. "Automatic detection of instances of focused crowd involvement at recreational events." Proceedings of Meetings on Acoustics 39, 040003 (2019)

3. Brooks A. Butler, Katrina Pedersen, Mylan R. Cook, Spencer G. Wadsworth, **Eric Todd**, Dallen Stark, Kent L. Gee, Mark K. Transtrum, Sean Warnick. "Classifying crowd behavior at collegiate basketball games using acoustic data." Proceedings of Meetings on Acoustics 35, 055006 (2018)

Awards

Northeastern Graduate Assistantship, *Northeastern University* 2022–Present
Khoury College Start-Up Fund, *Northeastern University* ($5000) 2022
President's Leadership Council Presentation, *Brigham Young University* 2020
– Selected by faculty to represent my college's 3000+ students by presenting my internship work on Early Alert to BYU's $1M+ donors and top university administration.
Outstanding Performance in Mathematics Award, *Brigham Young University* 2020
– Awarded to the top performing mathematics majors of my graduating class as voted by faculty
Warren Rollins and Murdell Hull Scholarship, *Brigham Young University* ($1000) 2020
Brigham Young Scholarship (Full Tuition), *Brigham Young University* ($34,175) 2014–2020
CPMS Dean's List (Top 5% of College), *Brigham Young University* 2017-2020
New Century/Regents Scholarship, *Utah System of Higher Education* ($6000) 2014-2018

Teaching

Northeastern University
Khoury College of Computer Sciences
– Practical Neural Networks (DS 4440), Teaching Assistant Spring 2024

Brigham Young University
Department of Computer Science
– Computer Vision (CS 450), Teaching Assistant Winter 2022
– Introduction to Machine Learning (CS 472), Teaching Assistant Winter 2021, Summer 2021
– Deep Learning (CS 474), Teaching Assistant Fall 2021

Department of Mathematics
– Algorithm Design and Optimization 2 Lab (Math 323), Teaching Assistant Winter 2020
– Mathematical Analysis 2 Lab (Math 347), Teaching Assistant Winter 2020
– Algorithm Design and Optimization 1 Lab (Math 321), Teaching Assistant Fall 2019
– Mathematical Analysis 1 Lab (Math 345), Teaching Assistant Fall 2019
– Introduction to Mathematical Python (Math 495R), Teaching Assistant Winter 2019

Talks

Invited Podcasts
– "Opening AI's Black Box with Prof. David Bau, Koyena Pal, and Eric Todd of Northeastern University". The Cognitive Revolution Podcast, Boston, MA, April 2024.

Co-Authored Conference Presentations
– "Detecting instances of focused crowd involvement at recreational events". Acoustical Society of America Meeting, San Diego, California, December 2019, (Presenter: Mylan R. Cook)

– "Feature reduction of crowd noise used for machine learning classification", Acoustical Society of America Meeting, San Diego, California, December 2019, (Presenter: Brooks Butler)
– "Unsupervised classification of crowd noise at BYU basketball games". BYU CPMS Student Research Conference, BYU, Provo, Utah, March 2019, (Co-Presenter: Brooks Butler)
– "Improved automated classification of basketball crowd noise", Acoustical Society of America Meeting, Louisville, Kentucky, May 2019, (Presenter: Mylan R. Cook)
– "Clustering analysis of crowd noise from collegiate basketball games", Acoustical Society of America Meeting, Victoria, BC, Canada, November 2018, (Presenter: Brooks Butler)
– "Modeling Crowd Noise with Machine Learning". BYU CPMS Student Research Conference, BYU, Provo, Utah, March 2018

Service

– Reviewer for 1st ICML Workshop on In-Context Learning (ICML) 2024
– Reviewer for International Conference on Learning Representations (ICLR) 2024
– Northeastern Khoury College PhD Student Admissions Committee Reviewer 2024
– Northeastern Khoury College PhD Student Open House Volunteer 2023 –2024