

# Eric W. Todd

 [github.com/ericwtodd](https://github.com/ericwtodd) |  [ericwtodd.github.io](https://ericwtodd.github.io) |  [todd.er@northeastern.edu](mailto:todd.er@northeastern.edu)

## EDUCATION

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### 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

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### 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].

## PUBLICATIONS

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### Conference Papers

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)

## Preprints

1. Jaden Fiotto-Kaufman, Alexander R Loftus, **Eric Todd**, Jannik Brinkmann, Caden Juang, Koyena Pal, Can Rager, Aaron Mueller, Samuel Marks, Arnab Sen Sharma, Francesca Lucchetti, Michael Ripa, Adam Belfki, Nikhil Prakash, Sumeet Multani, Carla Brodley, Arjun Guha, Jonathan Bell, Byron Wallace, David Bau. “[NNsight and NDIF: Democratizing Access to Foundation Model Internals](#)”. [arxiv.org/abs/2407.14561](https://arxiv.org/abs/2407.14561) (2024)

## AWARDS

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<b>Northeastern Graduate Assistantship</b> , <i>Northeastern University</i>	2022–Present
<b>Khoury College Start-Up Fund</b> , <i>Northeastern University</i> (\$5,000)	2022
<b>President’s Leadership Council Presentation</b> , <i>Brigham Young University</i>	2020
– Selected by faculty to represent my college’s 3000+ students by presenting my internship work on <a href="#">Early Alert</a> to BYU’s \$1M+ donors and top university administration.	
<b>Outstanding Performance in Mathematics Award</b> , <i>Brigham Young University</i>	2020
– Awarded to the top performing mathematics majors of my graduating class as voted by faculty	
<b>Warren Rollins and Murdell Hull Scholarship</b> , <i>Brigham Young University</i> (\$1,000)	2020
<b>Brigham Young Scholarship (Full Tuition)</b> , <i>Brigham Young University</i> (\$34,175)	2014–2020
<b>CPMS Dean’s List (Top 5% of College)</b> , <i>Brigham Young University</i>	2017–2020
<b>New Century/Regents Scholarship</b> , <i>Utah System of Higher Education</i> (\$6,000)	2014–2018

## TEACHING

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### 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

## INVITED TALKS

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- *Function Vectors in Large Language Models*. Invited talk at the Princeton Neuroscience Institute. Princeton, NJ. May 2024
- *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, CA. December 2019. (Presenter: Mylan R. Cook)
- *Feature reduction of crowd noise used for machine learning classification*, Acoustical Society of America Meeting. San Diego, CA. December 2019. (Presenter: Brooks Butler)
- *Improved automated classification of basketball crowd noise*, Acoustical Society of America Meeting. Louisville, KY. May 2019. (Presenter: Mylan R. Cook)
- *Unsupervised classification of crowd noise at BYU basketball games*. BYU CPMS Student Research Conference. Provo, UT. March 2019. (Co-Presenter: Brooks Butler)
- *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. Provo, UT. March 2018.

## SERVICE

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| – Reviewer for Conference on Neural Information Processing Systems (NeurIPS) | 2024       |
| – 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 |