

# Cullen Anderson

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## EDUCATION

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### University of Massachusetts Amherst

*BS in Computer Science, BS in Pure Math*

*Pursuing Accelerated (3+1) MS in Computer Science*

Amherst, MA

*Graduating: May 2025*

*Expected: May 2026*

- GPA: 3.90
- Graduate Coursework: Ongoing - Advanced Algorithms, Algorithms For Data Science, Advanced Probability Theory, Topological Data Analysis; Completed - Machine Learning, Formal Language Theory, Topology
- Undergraduate Coursework: Software Engineering, Systems, Graphics, Algorithms, Programming Methodology, Data Structures, Theory Of Computation, Programming In C, Object Oriented Programming, Statistics For CS, Real Analysis, Abstract Algebra, Calc 3, Linear Algebra

## EXPERIENCE

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### Researcher

July 2023 – September 2024

*University Of Utah*

*Salt Lake City, UT*

- Leading research on computationally efficient robust statistics on corrupted high dimensional data under low data size, culminating in first-author paper currently under review at TMLR; funded by an NSF grant.
- Performed first wide-scale experimental study of modern robust mean estimation methods; evaluating methods across synthetic, Large Language Model, and deep image model data.
- Extended state of the art algorithm to the low data size regime through a novel theorem, significantly enhancing experimental performance.
- Developed a modular Python library for robust mean estimation, offering a suite of modern algorithms and an extendable experimental infrastructure for researchers and practitioners.

### Researcher

June 2024 – August 2024

*University Of Houston + INAOE*

*Puebla, Mexico*

- Applied a suite of Multi-Task training methods to finetune a deep Multi-Modal model for Comic Mischief Detection.
- Novelty applied curriculum learning based training methods to boost SOTA performance on Comic Mischief Detection.
- Used PyTorch to implement Multi-Modal deep learning models, Multi-Task training methods, and experimental infrastructure.
- Worked in person at INAOE, a Mexican research institution, and attended NAACL 2024, funded by an NSF grant.

### Software Engineering Intern

January 2023 – May 2023

*Initiative For Digital Public Infrastructure*

*Amherst, MA*

- Led the development of a deduplication algorithm for Gobo, a social media aggregator combining Reddit, Twitter, and Mastodon into a unified platform with user-controlled algorithms.
- Utilized Python and social media APIs to create a dataset of social media posts across platforms.
- Designed and implemented complex duplicate detection rules in Python, ensuring accuracy and minimizing redundancy.
- Conducted extensive testing and validation of the algorithm across both real and augmented data using unittest.

## PROJECTS

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### Robust Mean Estimation Library | *Python, NumPy, Matplotlib, PyTorch, Hugging Face, SciPy, Cvxpy*

- Developed a suite of robust mean estimation algorithms; synthetic, LLM, deep image model, and GloVe word embedding data generation and corruption schemes; and experimental infrastructure.
- Designed and well-documented with a focus on modularity, enabling future researchers and practitioners to evaluate new algorithms over different data and experimental conditions.

### Reddit Sentiment Analysis | *Python, Flask, Keras, Reddit API, HTML/CSS*

- Built a ML sentiment analysis model using Keras on a web application with Flask; the website allows users to perform sentiment analysis on Reddit Subreddits based on popular headlines.

### Job Search Website | *Javascript, Node.js, Express, React.js, PostgreSQL*

- Collaborated in a team during a Software Engineering course to develop a full-stack JavaScript job search website, utilizing Agile methodologies.
- As part of backend team, designed and implemented RESTful API endpoints, optimized database interactions with PostgreSQL, and ensured integration between the frontend and backend using Express and Node.js.

### Digit Recognizer Website | *Python, Keras, NumPy, Pillow, Flask, JavaScript, HTML/CSS*

- Implemented a neural network from scratch in NumPy and convolutional neural network using Keras.
- Built image preprocessing pipeline using Pillow, allowing digits drawn on or submitted to the website to be identified.
- Built full-stack web interface using Flask, JavaScript, and HTML/CSS.

## SKILLS

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Python, PyTorch, Hugging Face, JavaScript, TypeScript, Java, C, NumPy, Matplotlib, HTML, CSS, Flask