

# Shea Durgin

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## EDUCATION

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### University of Southern Maine

*Bachelor of Science in Computer Science*

May, 2024

Portland, ME

- 3.93 GPA
- Summa Cum Laude and Dean's List

## WORK EXPERIENCE

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### VividCloud

*Software Developer Intern*

Sep. 2023 - May 2024

Brunswick, ME

- Extensive use of Java framework, Mockito, for writing unit tests
- Simplified project pipeline through merger of unnecessarily separate processes
- Utilized Docker, Kubernetes, Spring Boot, and Azure during development
- Followed AGILE methodology for collaborative project management

### University of Southern Maine

*Subject-Based Tutor*

Jan. 2022 – May 2023

Gorham, ME

- Helped students understand Java and prepare for exams
- Concepts covered include Object-Oriented Programming, Data Structures, syntax, etc.
- Kept track of past tutees and their previous questions to maintain relationship

## PROJECTS & PUBLICATIONS

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### MathMex Project/Internship

- Launched mathmex.com for mathematical definition and image retrieval from text and LaTeX queries
- Engineered OpenSearch databases for both semantic search and data logging purposes
- Fine-tuned Sentence-BERT AI model in Python for retrieving definitions to mathematical queries
- Assisted in UI design and frontend functionality using JavaScript, HTML, and CSS
- MathMex demo paper accepted and published at the European Conference on Information Retrieval

Durgin, S., Gore J., & Mansouri, B (2024). MathMex: Search Engine for Math Definitions

### Portfolio Website

- Deployed Next.js website to sheadurgin.com using Vercel
- Created React components for an interactive navigation bar and text boxes
- Styled using Tailwind CSS to speed up development
- Utilized the Next.js App Router for contact form and it's api calls

### CLEF 2023 SimpleText

- Developed an information retrieval model for scientific abstracts using Sentence-BERT
- Reciprocal Rank Fusion propagates commonly found documents from re-ranking and initial retrieval
- Presented my teams models and their respective results to an audience in Greece
- Submission paper accepted and published by Conference and Labs of the Evaluation Forum

Mansouri, B., Durgin, S., Franklin, S. J., Fletcher, S., & Campos, R. (2023). AIIR and LIAAD Labs Systems for CLEF 2023 SimpleText.

## PROJECTS & PUBLICATIONS CONT.

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### CLEF 2024 SimpleText

- Significantly improved 2023 submission with a fine-tuned Sentence-BERT cross-encoder for re-ranking
- Optimal fine-tuning hyper-parameters found using k-fold Cross Validation
- Paper for Conference and Labs of the Evaluation Forum in progress

### Recipe Roots

- Worked with Dart, Flutter, and SQL to create a family focused recipe app
- Built a visually appealing and functional UI to host family connections and their recipes
- Released for Android and iOS on their respective marketplaces

### NES Tetris Clone

- Recreated the ever popular 1989 version of Tetris in Python using Pygame
- Fine-tuned a linear regression function using a genetic algorithm for the game to play itself

## RELEVANT COURSEWORK

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### Text Mining

Spring 2024

- Recent advances in Large Language Models such as LLaMA 3, Orca 2, and Mistral AI were taught
- Experimented with prompt engineering and instruction tuning for LLMs
- Presented CLEF SimpleText 2024 submission via public poster presentation

### Generative AI Independent Study

Fall 2023

- Text and Image based generative models were covered and employed
- Successfully generated food recipes and cartoon style faces
- Wrapped recipe generator in a Tkinter GUI, where user can receive a recipe given a dish

### Design & Analysis of Algorithms

Spring 2023

- Analyzed algorithms in regards to their growth rate and space
- Algorithms covered include Dynamic Programming, Depth First Search, Divide and Conquer, etc.

### Natural Language Processing

Spring 2023

- Applied NLP techniques from Naive Bayes to Transformers in assignments/projects
- Created an Information Retrieval pipeline utilizing a Sentence-BERT cross-encoder in Python

### Systems Programming

Spring 2023

- Became proficient with the Unix command line, C programming, and Bash scripting

## RELEVANT SKILLS

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### ▪ Languages, Libraries, and Frameworks

- Java, Python, C, C#, Dart
- JavaScript, TypeScript, HTML, CSS, REST API
- React, Next.js, Express.js, Tailwind CSS

### ▪ Database Experience

- SQL, MongoDB, Neo4J, ElasticSearch, OpenSearch

### ▪ Software Development Tools

- GitHub, GitLab, Jira
- Docker, Kubernetes, Spring Boot, Azure

### ▪ General Abilities

- Problem Solving, Collaboration, and Communication