NIKOLAS ACHATZ

(503) · 826 · 7190 ⋄ achatzn@oregonstate.edu
github.com/nachatz

EDUCATION

Oregon State University, Corvallis *June 2022*
B.S. in Computer Science, Systems (ABET)
Minor in Mathematics - Linear Algebra

EXPERIENCE

The Ensemble Lab June 2021 - Present
Undergraduate AI Researcher *Corvallis, OR*

- **Advisors: Dr.Xiaoli Fern and Dr.Cory Simon**
- Independent NSF funded research utilizing graph neural networks to predict gas adsorptions of covalent organic frameworks.
- Implemented multi-task learning with shared representations to predict multiple gas adsorptions for each crystal structure utilizing message passing.
- Collaboration with chemical engineers to modify the architecture in a way that augments predictions.
- Researched and discovered a form of querying/importing data into an AiiDa database for the group.
- Multitude of presentations given to the group including matrix factorization, recommendation systems, Gaussian processes, multitask learning, and transfer learning.
- Maintain and update a covalent organic framework dataset repository used to train message passing neural networks with fellow researchers.
- **Tools: Python, Julia, PyTorch, PyTorch-Geometric, and AiiDa**

Teach Engineering February 2021 - Present
Full Stack Developer *Corvallis, OR*

- Lead developer for the TeachEngineering visualization project:
`https://www.teachengineering.org/ngss_visualization`
- Visualization tool that takes advantage of powerful graph drawing algorithms like Kamada Kawai to display educational standards for K-12 with a clear visual to assist curriculum developers.
- Developed and maintained nightly routines that update and populate RavenDB databases.
- Extensive work with Azure Cognitive Search allowing a dynamic pathway to a user friendly experience.
- Integrated the visualizer into the main web page through dynamic graph drawing parameterization.
- Set up and maintained the entirety of the visualizers backend VIA RavenDB (NoSQL).
- Routinely adjusted the front end appearance of the page by writing new graph drawing algorithms.
- Substantial research on how to improve the natural language processing recommendation system affecting hundreds of thousands of users.
- **Tools: HTML, JavaScript, C#, .NET CORE, ASP.NET, Python, and Azure**

Artificial Intelligence Club September 2020 - Present
Vice President *Corvallis, OR*

- Develop curriculum for each weekly event.
- Arrange and schedule profound guest speakers of the community including Dr. Stefan Lee, Dr. Cory Simon, and Dr. Alan Fern.
- Coordinate competitions on Kaggle and reinforcement learning for Snake.
- Present academic lectures on specific topics including feed forward neural networks, NLP, and matrix factorization.

Tutor.com January 2021 - August 2022
Computer Science and Mathematics tutor *Remote*

- Certified C++, C, Python, and Linear Algebra tutor for Tutor.com.
- Developed curriculum for 5-10 students daily on certain material ranging from Linear Algebra to complex algorithms in C++.

Physics Department March 2021 - June 2021
Undergraduate Learning Assistant *Corvallis, OR*

- Attend the Physics with Calculus I course to help students working in groups expound robust solutions.

PROJECTS

Intricate Mathematics
Visualization tool

- Visualization tool for path finding algorithms including Breadth-First Search, Depth-First Search, and A-Star with or without barricades. The tool also displays the basics of Linear Algebra and several other mathematical topics. This project is designed to show immediate results to higher mathematics and help understand advanced path-finding algorithms all with relevant source code: `http://web.engr.oregonstate.edu/~achatzn/`
- **Tools: JavaScript, C++, and Python**

Video Game Bot
Computer Vision

- Autonomous software that plays video games by detecting various entities in game utilizing cascade classifiers and hsv filters. Primarily tested and validated on resource collection actions within games like Runescape and Albion Online.
- **Tools: Python, OpenCv**

Learn AI
Jupyter Notebook Tutorials

- Collection of Jupyter Notebooks that walk the reader through the theory of the topic to present them with a comprehensive conceptual understanding. Each notebook also displays how to code the corresponding topic for further user understanding and is actively updated on my GitHub.
- **Tools: Python, PyTorch, NumPy, and Pandas**

Event Planner
Social Media Web Application

- Large scale social media website utilizing modern day web application technologies. Allows users to register and log into the application to create, join, delete, and comment on events.
- **Tools: React, .NET Core, SQL, TypeScript, and MobX**

PHILANTHROPY

Annual March for Black Mental Health
Full Stack Developer and Promoter

- Designed, created, maintained, and hosted the website for the 1st Annual March for Black Mental Health awareness event. Was one of the lead promoters for the philanthropic event to bring awareness to the cause. I worked closely with the International Honors Society in Psychology (Psi Chi) and the NAACP organization at Oregon State University to promote the event to a vast audience.
- Annual event looking to take place again February, 2022.

TECHNICAL SKILLS

Languages	Python, Julia, C++, JavaScript, and C# (.NET Core)
Protocols & APIs	JSON and REST
Databases	RavenDB, MySQL, and Microsoft SQL
Tools	Insomnia/Postman, Azure, Git, Cuda, Conda, and Jupyter Notebooks
Experience with	C, React, TypeScript, Java, R, Axios, and MATLAB.

ADVANCED COURSEWORK

EECS	Machine Learning (CS 434), Algorithms (CS 325), Theory of Computation (CS 321), and Digital Logic Design (ECE 271)
Mathematics	Numerical Linear Algebra (MTH 451), Linear Algebra Series (MTH 34x), Numerical Analysis (MTH 351), and Computational Number Theory (MTH 440)

AWARDS

Dean's List - 2017
Honor Roll - 2018, 2019, 2020
Engineering Dean's List - 2018, 2019, 2020
Expected: Magna Cum Laude