Julian Baldwin

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EDUCATION

Northwestern University, McCormick School of Engineering — Evanston, IL
Master of Science in Computer Science, GPA: 4.0 — *June 2024*
Bachelor of Science in Computer Science, GPA: 4.0 — *June 2024*

- Relevant Coursework:
  - **Machine Learning:** Applied Linear Algebra, Machine Learning, Deep Learning, DL for NLP, Robustness in ML
  - **Software Engineering:** Foundations of Security, Web Dev, Agile Dev, Operating Systems, Distributed Systems
- Named 'CS Outstanding Senior' in 2024, recognizing exceptional research contribution (one of six recognized)

WORK EXPERIENCE

Northwestern Security & AI Lab, *Research Assistant* — *May 2022 - Present*

- Worked with Prof. V.S. Subrahmanian in multi-university team to create a game-playing AI capable of strategic planning, negotiation, and deception in simulated environment of Diplomacy
- Refactored existing Python codebase to run in parallel on TACC cluster, resulting in 200x throughput
- Built and deployed React UI to facilitate collection of data labels from expert-level Diplomacy players
- Containerized project code using both Docker and Singularity to run across different university environments

UChicago Existential Risks Lab, *Research Fellow* — *Jun 2023 - Aug 2023*

- Designed and executed independent 10-week research project under mentorship of Prof. Victor Veitch and David Reber, expanding on earlier work by Li et al and Neel Nanda that used the toy problem of predicting legal moves in the board game Othello to study world representations in transformer models
- Developed a novel "global" intervention—replacing the residual stream with activations generated from linear probes—that enables precise manipulation of model behavior, successfully steering outputs to reflect arbitrarily edited board states.

Knight Lab, *Development Intern* — *March 2023 - June 2023*

- Prototyped React front-end to dynamically adjust linguistic complexity of news articles for wider accessibility
- Utilized OpenAI API to adjust language, provide breakdown of complex concepts, and provide QA capability with context

Poatek IT, *Software Engineering Intern* — *May 2023 - June 2023*

- Created internal React app to plan meetings for hybrid work model, fetching from company API for workstation check-in

PROJECTS

Feed-Forward Assisted Transformer

- Placed 3rd in international undergrad research competition focused on 'Efficient AI' with FAST: a novel fine-tuning method for NLP tasks where pre-trained transformers are frozen and fitted with small FFNs for downstream tasks
- FAST method achieves 85.0% accuracy of full fine-tuning with 124x faster training times

The Gift Whisperer

- Web app using OpenAI's GPT3 (pre-ChatGPT) to generate personalized gift ideas. Built using React frontend and Flask backend, processing text then scraping relevant product information from Amazon and Etsy
- Won grand prize and voted community favorite at Wildhacks 2022

Redex Model of WebAssembly

- Developed comprehensive model of WebAssembly in PLT Redex, specifying syntax and operational semantics
- Final model is tested extensively with over 50 WebAssembly programs that reduce according to formal specifications

Advent of Code

- Competed in popular yearly series of algorithmic coding challenges, primarily using Python and Java
- Placed top 100 multiple times out of >200,000 yearly participants (50* in 2022 and 2023)

TECHNICAL SKILLS & INTERESTS

Programming: Python (NumPy, PyTorch, Pandas), Javascript (React, d3.js), SQL, Racket, Java, C# (Unity Engine), Go
Tools: Git, Docker, Singularity, Slurm, Linux, WireShark, HuggingFace
Interests: Ultimate frisbee, bouldering, effective altruism, pro cycling