

EDUCATION

UNIVERSITY OF MICHIGAN ANN ARBOR, College of Engineering
BSE in Computer Science with minor in Mathematics

Ann Arbor, MI
January 2025

RESEARCH PUBLICATIONS

Lee, Bai, **Pres**, et al.(2024) A Mechanistic Understanding of Alignment Algorithms: A Case Study on DPO and Toxicity
The Forty-first International Conference on Machine Learning (Oral: top 1.5 % of submissions)

- Discovered how toxicity is represented in pre-trained language models (GPT2, Llama2-7b)
- Studied the internal mechanisms of a popular alignment algorithm (Direct Preference Optimization)
- Discovered that DPO does not remove toxicity representations but rather suppresses them
- Uncovered why “aligned” models can be jailbroken

Pres, et al.(2024) Towards Reliable Evaluation of Behavior Steering Interventions in LLMs *The 38th Conference on Neural Information Processing Systems - Workshop on Foundation Model Interventions (Oral: Top 6 of total submissions)*

- Established four criteria for effective behavioral steering metrics and highlighted current metric shortcomings
- Developed new steering metric showing over-reported success of control method Contrastive Activation Steering

Park*, Lubana*, **Pres**, et al.(2024) Competition Dynamics Shape Algorithmic Phases of In-Context Learning - *Under Review at The 13th International Conference on Learning Representations*

- Provided mechanistic analysis showing Transformers solve in-context learning with multiple competing algorithms
- Developed quantifiable techniques to measure neuron memorization of training data in transformers

RESEARCH EXPERIENCE

Krueger AI Safety Lab Internship (University of Cambridge)
*Mentored By **David Krueger***

May 2024 - Dec 2024

- Developed framework for multiple constraint satisfaction of Large Language Model generations at inference-time
- Explored generalizability of inference-time interventions such as Contrastive-Activation-Steering
- Developed novel benchmark to measure the success of behavioral steering interventions

Physics of Intelligence at the Center for Brain Science (Harvard University)
*Mentored By **Hidenori Tanaka, Ekdeep Singh Lubana***

Sept 2024 - Present

- Rigorously studying Transformer model behaviors in thoughtfully constructed toy-settings
- Trained Transformers of different architectures to perform in-context learning (ICL)
- Researching the mechanisms these Transformers use to solve ICL tasks and handle underspecified queries
- Published findings at ICLR

University of Michigan Language and Information Technologies Lab
*Supervised by **Rada Mihalcea***

October 2023 - Present

- Conducted research in mechanistic interpretability, with a focus on safety alignment algorithms
- Published research findings at ICML
- Researched Vision Language Model interpretability as well as In Context Learning mechanisms

Mechanistic Interpretability Research (SERI MATS)
*Mentored by **Neel Nanda***

June 2023 – Aug 2023

- Analyzed and visualized high-dimensional LLM operations to generate hypothesis of LLM internal mechanisms
- Tested hypotheses of attention head superposition phenomenon in GPT2-XL
- Devised precise casual interventions to validate hypotheses under fact extraction contexts

Machine Learning Safety Scholars

June 2022 – August 2022

- Completed coding, written, and discussion assignments from MIT’s Intro to Machine Learning, UM’s Deep Learning for Computer Vision, and NYU’s Deep Learning courses
- Distilled foundational machine learning papers into readable summaries
- Implemented safety techniques including adversarial and black swan robustness as well as interpretability

GRANTS

Effective Altruism Infrastructure Grant, Full stack Development

June 2022 – September 2022

- * Developed prototype for web-app that increases transparency of unlikely global risk assessments
- * Designed NoSQL MongoDB database structure for back-end
- * Created interactive front-end using React.js
- * Developed API connecting database to front-end using Node.js and Express.js