

# JENNIFER MICKEL

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## EDUCATION

The University of Texas at Austin	Bachelor of Science, <b>Computer Science Honors (Turing Scholars)</b>	May 2024
	Bachelor of Science and Arts, <b>Mathematics Honors (Polymathic Scholars)</b>	
	GPA: 3.72/4.00	

Relevant Coursework: (**Bold denotes Honors**) **Machine Learning**, Natural Language Processing, Safe & Ethical AI, Neural Networks, **Artificial Intelligence, Algorithms, Operating Systems, Linear Algebra, Data Structures, Discrete Math**

## PUBLICATIONS

- [1] **J. Mickel**, M. De-Arteaga, & S. Fazelpour. "Diversity Considerations During Dataset Development." *In Preparation FAccT 2024*
- [2] **J. Mickel**, K. Tian. "Robust Algorithms for Intersectional Groups without Demographics." *In Preparation FAccT 2024*
- [3] **J. Mickel**. "Racial/Ethnic Categorizations in AI and Algorithmic Fairness: Why They Matter and What They Represent." *In Preparation FAccT 2024*
- [4] I. Solaiman\*, Z. Talat\*, A. Williams, A. Lusoli, A. S. Luccioni, A. Leidinger, A. Ovalle, A. Strait, A. Vassilev, C. Chen, D. Baker, E. Evans, F. Friedrich, F. Dechesne, H. Daumé III, I. Duan, **J. Mickel**, J. Dodge, J. Newman, L. Ahmad, L. Sagun, M. Mitchell, M. Png, M. Lin, M. Lopez-Gonzalez, R. Kalluri, S. Hooker, S. Bhat, S. Singh, S. L. Blodgett, U. Gohar, W. Agnew, X. Lin, Y. Jernite. "Assessing the Social Impact of Generative AI Systems in Systems and Society: v2." *In Preparation FAccT 2024*.
- [5] **J. Mickel**. "The Importance of Multi-Dimensional Intersectionality in AI and Algorithmic Fairness." *Polymathic Scholars Honors Thesis*. Department of Computer Science, University of Texas at Austin, 2023. [\[pdf\]](#)

## ACADEMIC & RESEARCH PROJECTS

**Beyond-Worst-Case Distributionally Robust Optimization (DRO)** - Dr. Kevin Tian August 2023 - present

- Finetuned a transformer vision model to showcase disparate classification accuracy on faces of intersectional groups
- Developed algorithm to identify worst performing structured subgroups in demographic-free settings to account for intersectional groups and performed group DRO using these established subgroups
- Evaluated algorithm effectiveness for improving worst group performance on CelebA, WaterBirds, and MultiNLI

**Diversity, Complanarity, and Annotation** - Dr. Maria De-Arteaga, Dr. Sina Fazelpour January 2023 - present

- Innovated framework considering example-to-annotator allocation policy, annotator distribution, and example distribution for examining diversity considerations in the dataset development pipeline with Dr. Maria De-Arteaga and Dr. Sina Fazelpour
- Simulated and quantified performance disparities in label annotation and development for supervised and reinforcement machine learning models and finetuning of LLMs and multimodal models using reinforcement learning with human feedback

**Undergraduate Thesis** - [The Importance of Multi-Dimensional Intersectionality in AI & Algorithmic Fairness](#) May 2023

- Designed the I<sup>3</sup> tool to increase the consideration of people with underrepresented intersectional identities (race, gender, ethnicity, sexual orientation, dis/ability, culture, country) during the development of algorithms and AI systems
- Investigated the impact of I<sup>3</sup> on reducing bias and disparate impact of AI systems and algorithms and justified tool usefulness using existing literature (20+ papers); advised by Dr. Maria De-Arteaga and Dr. Tina Peterson
- Presented thesis findings at the annual Polymathic Scholars honors symposium and to engineers at Cruise

**Natural Language Processing** - *Python, PyTorch, Pandas (Fall 2022 - Spring 2023)*

- Assessed bias between race, gender, and occupation within Cohere's large language model utilizing statistical fairness measures
- Analyzed and evaluated 4 large language models (BERT, RoBERTa, BigBird, Cohere's classification model) using Hugging Face Transformers and Cohere on 4 bias benchmarking datasets (CrowS-Pairs, StereoSet, WinoGender, WinoQueer)
- Visualized results using matplotlib and expanded the scope of the Winogender schemas dataset to include race
- Implemented Transformer (>95% accuracy) and developed and trained a Transformer Language Model on 100,000 characters
- Created neural network using batch processing, consisting of 5 hidden layers and achieved an accuracy of 77%

**AI Fairness in Machine Learning** - *Python, PyTorch, Sklearn, Pandas (Fall 2022)*

- Implemented and trained a neural network on the German Credit Dataset to predict risk of defaulting on a loan (achieved 73% accuracy) and reported network's performance on fairness criteria (independence, separation, and sufficiency) on a model card
- Architected and implemented a convolutional neural network to classify faces based on age across race and gender achieving 64% accuracy and analyzed accuracy across race and gender using matplotlib to find bias within the model
- Trained and evaluated a logistic regression model on the COMPAS Dataset race-blind, replicated results of the ProPublica analysis, and assessed both models by evaluating accuracy, precision, recall, FPR, and TPR

**Systems Programming** - *C, C++ (2021)*

- Implemented networking, syscalls, userspace, virtual memory, Ext2 file system, caching, garbage collection, and preemptive multithreading on a multicore system to build an operating system kernel using C++
- Built interpreter and compiler for language with while loops, functions, if/else and print statements, and variable assignments

## INDUSTRY EXPERIENCE

- Cruise** - *Software Engineering Intern*; San Francisco, CA May 2023 - August 2023
- Increased autonomous vehicle (AV) trip controls by 100% enabling 100+ agents to remotely cancel and end AV trips for 10,000+ ridehail users in 400+ AVs by developing and deploying cancel trip and end ride early functionality using React and Node.js
  - Decreased operational costs by \$300,000/yr by coordinating across eng, product, design, ops, and tested using unit and E2E testing with the react-testing library and in prod with ops using driverless AVs to perform UAT and product functional testing
- Indeed** - *Software Developer Intern*; Austin, TX May 2022 - August 2022
- Engineered Right to Work onboarding process accessed by 180,000+ users yearly using React, Django, Typescript, and Python, which records and saves user information and personal identification to improve user security and maintain sole data ownership
  - Deployed 50+ unit and integration tests using Jest, react-testing-library, Pytest, and Cypress to test application functionality
- Co-Founder and President** - *White Matter LLC*; Dallas, TX July 2020 - May 2022
- Created mobile application using Python to provide users with working memory capacity for professional and individual use
- Plexon Inc** - *Software Development Intern*; Dallas, TX June 2019 - August 2019, June 2020 - August 2020
- Devised proprietary API in Python to read neural spike data and devised example programs to demonstrate API functions
  - Designed and developed neural data visualization applications using Python showcasing the integration of the PyOPXClient API

## TEACHING EXPERIENCE

- University of Texas at Austin** - *Natural Language Processing Teaching Assistant* August 2023 - present
- Held weekly office hours, graded assignments, and assisted students in learning about word embeddings, FFNNs, transformers, LLMs, and building NLP projects (sentiment analysis NN, feed-forward neural network, language model, final project)
- University of Texas at Austin** - *Originality in the Arts and Sciences Teaching Assistant* August 2021 - present
- Mentored 3 cohorts of 6 undergraduate honors students in writing a grant proposal and developing a scientific experiment
  - Clarified and explained how to read research papers, ask research questions, and develop methods for computer science research

## LEADERSHIP & INVOLVEMENT

- Turing Scholars Student Association** - *Co-President*; Austin, TX March 2022 - present
- Led an 8-person team in providing and facilitating research and recruiting opportunities, mentorship, social events, resources, and support to 200+ students by coordinating with faculty, staff, students, and external organizations
  - Organized marketing, entertainment, and catering for events attended by 40+ students and provided resources to 200+ students
  - Coordinated student volunteer outreach and established workshop to improve program culture for underrepresented students
- ACM Conference on Fairness, Accountability, and Transparency 2023** - *Virtual Student Volunteer* June 2023
- Assisted in publicity communications for FAccT 2023
- Association of Computer Machinery For Change (A4C)** - *DEI Initiative Lead*; Austin, TX April 2021 - present
- Established a Cultural Competency workshop for teaching assistants in the Computer Science department
  - Launched a monthly talk series discussing various topics within computer science drawing 45+ attendees per talk
  - Designed curriculum to educate 40+ members on enacting successful initiatives and lead the DEI initiative
- Convergent** - *Build Team Tech Lead*; Austin, TX September 2021 - December 2022
- Taught 50+ students the basics of git, React/React Native, and Flask, created presentations to support product development, and assisted students in developing Reactive Native apps using the Google Cloud API and Google Maps Platform
  - Collaborated with 3-5 students to create 2 applications using React Native, Google Speech API, PyTorch, Flask, Pandas, and the ESG, social sentiment, and Yahoo APIs

## HONORS

- Jean Holloway Award Selection Committee Fall 2023
- Natural Sciences 21st Century Endowed Presidential Scholarship Fall 2023 - Spring 2024
- Natural Sciences Council Endowed Service Scholarship Fall 2022 - Spring 2023
- Bob Williams Endowment for Excellence in Undergraduate Mathematics Fall 2022 - Spring 2023
- Nettle Bush PWS Scholarship Fall 2021 - Spring 2022
- University Honors (4 Semesters) Fall 2020 - Spring 2021, Spring - Fall 2022
- Chuchu Ma Memorial Endowed Presidential Scholarship in Computer Science Fall 2020 - Spring 2021
- College of Natural Sciences Merit Scholarship Fall 2020 - Spring 2021

## TECHNICAL SKILLS

**Proficient In:** Python, PyTorch, Typescript, Javascript, Java, C/C++, React/React Native, and Node.js

**Familiar With:** Hugging Face transformers, SkLearn, Pandas, Django, YAML, C#, PostgreSQL, and MySQL