JENNIFER MICKEL

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EDUCATION

The University of Texas at Austin Bachelor of Science, **Computer Science Honors** (**Turing Scholars**) May 2024
Bachelor of Science and Arts, **Mathematics Honors** (**Polymathic Scholars**)
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, Complaritarity, 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^3 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^3 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 Teaching 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