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: 3.74/4.00

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, L. Liu, & K. Tian. "Shifting Occupational Bias: Ramifications and Persistent Stereotypes." *In Preparation NeuRIPS 2024*

[2] **J. Mickel**, S. Modi, & K. Tian. "Developing Algorithms and Improving Worst Case Performance for Intersectional Groups without Demographics." *In Preparation NeuRIPS 2024*

[3] **J. Mickel**, M. De-Arteaga, & S. Fazelpour. "Diversity Considerations During Dataset Development." *In Preparation Big Data & Society*.

[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" *To Appear* in *The Oxford University Press Handbook on Generative AI*. 2024.

[5] **J. Mickel**. "Racial/Ethnic Categories in AI and Algorithmic Fairness: Why They Matter and What They Represent." *To Appear FAccT 2024*. [pdf]

[6] **J. Mickel**. "Intersectional Insights for Robust Models: Introducing FOG 🌫️ for Improving Worst Case Performance Without Group Information." *Turing Scholars Honors Thesis*. Department of Computer Science, University of Texas at Austin, 2024. [pdf]

[7] **J. Mickel**. "The Importance of Multi-Dimensional Intersectionality in Algorithmic Fairness and AI Model Development." *Polymathic Scholars Honors Thesis*. Department of Computer Science, University of Texas at Austin, 2023. [pdf]

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

ACADEMIC & RESEARCH PROJECTS

Shifting Occupational Bias - Dr. Maria De-Arteaga, Dr. Leqi Liu, Dr. Kevin Tian — April 2024 - present

- Identified, quantified, and visualized persistence of stereotypes associated with demographic groups across occupational contexts

Evaluating Social Impact of Generative AI Evaluations - Irene Solamain, Dr. Zeerak Talat — October 2023 - present

- Synthesized and contextualized existing evaluations by modality for understanding the social impact of generative AI systems
- Identified objectives of generative AI social impact evaluations and discussed limitations with existing evaluations

Intersectional Distributionally Robust Optimization (DRO) Without Group Information - Dr. Kevin Tian — August 2023 - present

- Finetuned a transformer vision model to showcase disparate classification accuracy on faces of intersectional groups
- Improved worst-group performance by 2-15% by developing an algorithm to identify worst-performing structured subgroups in demographic-free settings to account for intersectional groups and performed group DRO using these established subgroups
- Developed model training paradigm to improve model robustness and worst-group performance

- Developed loss function to mimic upsampling data points decreasing training time by 82.5%

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 resulting from choices in example and annotator pool in the development of generative AI evaluation and datasets for machine learning

Undergraduate Thesis - ***The Importance of Multi-Dimensional Intersectionality in AIgorithmic 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

TEACHING EXPERIENCE

University of Texas at Austin - *Natural Language Processing Teaching Assistant* August 2023 - December 2023

- 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 (FFNN), language model, final project)

University of Texas at Austin - *Originality in the Arts and Sciences Teaching Assistant* August 2021 - December 2023

- 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

- Deans Honored Graduate (highest honor awarded to top ≤1% of graduating seniors) — Spring 2024
- College of Natural Sciences Research Distinction Award (awarded to top ≤5% graduating seniors) — Spring 2024
- 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, Node.js, Pandas, and SKLearn
Familiar With: R, Hugging Face transformers, Django, Coq, YAML, C#, PostgreSQL, and MySQL