Millicent Li

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EDUCATION

Northeastern University, Boston, MA — Sep. 2022 - Present
Ph.D. in Computer Science
NSF GRFP, Northeastern Ph.D. Fellowship
Advised by Byron Wallace

University of Washington, Seattle, WA — 2017 - 2021
B.Sc. in Computer Science
Advised by Noah Smith, Shwetak Patel

PUBLICATIONS AND TALKS

Peer Reviewed Publications and Preprints

[1] **Li, M.**, Chen, T., Van Durme, B., Xia, P. Multi-Field Adaptive Retrieval. In submission to ICLR 2025.

[2] Mueller, A., Brinkmann, J., ..., **Li, M.**, ... Belinkov Y. (2024). The quest for the right mediator: A history, survey, and theoretical grounding of causal interpretability. In submission to TMLR.

[3] Todd, E., **Li, M.**, Sen Sharma, A., Mueller, A., Wallace, B., Bau, D. LLMs Represent Contextual Tasks as Compact Function Vectors. ICLR 2024.

[4] Shaib, C., **Li, M.**, Sebastian, J., Marshall, I., Li, J., Wallace, B. Summarizing, Simplifying, and Synthesizing Medical Evidence using GPT-3 (with Varying Success). ACL 2023.

[5] AlKhamissi, B.*, **Li, M.***, Celikyilmaz, A.ˆ, Diab, M.ˆ, and Ghazvininejad, M. A Review on Language Models as Knowledge Bases. ArXiv 2022. ** denotes equal contribution, ˆdenotes equal supervision*

[6] P. S. Ruth, J. Cao, **M. Li**, J. Sunshine, E. Wang, S. Patel, "Multi-Channel Facial Photoplethysmography Sensing," EMBC 2020.

Talks

[A] "Continuous Arterial Blood Pressure Prediction with Deep Learning Algorithms," in the *UW Undergraduate Research Symposium*, May 2020.

RESEARCH EXPERIENCE

Microsoft Research — June 2024 - September 2024
Research Intern
Advised by Patrick Xia, Tongfei Chen

- Developed a new framework with multiple fields, for document retrieval over structured datasets [1].

Microsoft Research — May 2021 - July 2021
Research Intern
Advised by Tristan Naumann

- Developed benchmarks for biomedical and clinical natural language processing tools, such as SciSpaCy and Stanza

Facebook AI Research — August 2021 - September 2022
AI Resident
Advised by Marjan Ghazvininejad and Mike Lewis

- Empirical natural language processing research, with a focus on pretrained language modeling, knowledge graphs, and prompting.
- Work on evaluating language model capabilities to improve upon its own outputs using prompting
- Preprint on "A Review on Language Models as Knowledge Bases" [5].

Noah's ARK March 2020 - July 2021

Bias in Medical Summarizations

Co-advised by Ana Marasovic and Noah Smith

- Led the development of debiasing methods for state-of-the-art clinical and healthcare summarization models like BART using Huggingface
- Quantified and experimented with existing bias in BART through language modeling tasks

Probing T5

Co-advised by Ana Marasovic and Noah Smith

- Experimented with developing methods to probe the text-to-text transfer transformer (T5) with multiple probing tasks using only a single model
- Created tests to analyze the proficiency of T5 and existing Seq2Seq models to learn both control and non-control tasks

Ubiquitous Computing Lab June 2016 - March 2021

Co-advised by Richard Li, Matt Whitehill, Shwetak Patel

- Led the development of brain-computer interaction methods to understand human speech by examining areas of the motor cortex
- Prototyping with EEG and fNIRS hardware with small user studies to validate feasibility
- Awarded the Washington Research Foundation Fellowship for accomplishments

Multi-Channel Facial Photoplethysmography

Co-advised by Parker Ruth and Shwetak Patel

- Developed deep learning and algorithmic methods for non-invasive and consistent blood pressure (BP) prediction from noisy vital signs PPG sensor data
- Fabricated a pressure sensor system to potentially infer BP from pressure changes
- Created several techniques gleaned from audio-based approaches to utilize neural networks and Fourier transforms for signal filtering and prediction
- Awarded the Mary Gates Research Scholarship for accomplishments
- Presented at UW Ugrad Research Symposium [A] and published at EMBC [1]

HemaApp: Noninvasive Blood Screening of Hemoglobin Using Smartphone Cameras

Co-advised by Edward Wang and Shwetak Patel

- Spearheaded the design of data collection and analysis tools for HemaApp, a smartphone application that detects hemoglobin levels
- Created a module to quickly collect data while preserving user anonymity, intended to be used by users without technical experience

MedicPedsOne: Quick Medical Reference

Co-advised by Lilian de Greef and Shwetak Patel

- Created a user interface through an iterative process for an application to help first responders react to emergency situations as quickly as possible

- Developed a wireframe for the potential application interfaces and user tested the model on several individuals through user studies

Anomaly Detection in Electronic Systems
Co-advised by Manoj Gulati and Shwetak Patel

- Developed and fabricated a novel tool for anomaly detection in electronic devices using PCB designs and several sensors, including accelerometers and gyroscopes
- Created scripts for Bluetooth data collection on the LightBlue Bean that outperformed the speed of collection for the standard Arduino
- Designed multichannel data visualizations in Python to visualize minute changes

Integrated Brain Imaging Center Aug. 2018 - Dec. 2018
Autism Prediction with Fast.ai
Advised by Tara Madhyastha

- Implemented a logistic regression algorithm to classify whether a baby before being born might have autism using fMRI data
- Learned how to use neural networks through the fast.ai library to simplify deep learning for discerning features in fMRI data

INDUSTRY EXPERIENCE

Google June 2020 - Sep. 2020
Software Engineering Intern

- Worked with the ACE Ranking team to build a more robust machine learning ranking model that incorporates user feedback to rank queries on Assistant.

Google June 2019 - Sep. 2019
Engineering Practicum Intern

- Worked with the Android Auto team on Assistant, adding non-intrusive permission messages and fan direction capabilities in Android Auto vehicles.

HONORS

NSF Graduate Research Fellowship 2022
NSF Graduate Research Fellowship Honorable Mention 2021
Washington Research Foundation Fellowship 2020

- Competitive fellowship for academic merit for students undertaking and leading independent research at the University of Washington

Mary Gates Research Scholarship 2020

- Competitive award for academic merit for students undertaking advanced research at the University of Washington

Google Grace Hopper Travel Scholarship 2019
Paul G. Allen School Grace Hopper Travel Scholarship 2018
Washington NASA Space Grant Finalist 2017
Washington State Opportunity Scholarship 2017
Denice Dee Denton Endowment Scholarship 2017
Anderson Family Endowed Scholarship 2017
Google Endowed Scholarship 2017
NCWIT Seattle and West Affiliate Award Winner 2017
Direct Admit to the Paul G. Allen School of Computer Science 2017

LEADERSHIP

UW CSE Student Advisory Council June 2019 - Present
At-Large Representative

- Advocate for undergraduate students in the computer science department over ethics, diversity, and outreach through events and action
- Chaired the Undergraduate Research Panel to encourage 30+ undergraduates to pursue research in computing
- Adapted undergrads to online courses through COVID-19 initiatives

UW Undergraduate Research Program Aug. 2020 - Present
Undergraduate Research Leader
- Provide outreach to First-Year Interest Groups (FIGs) about undergraduate research through presentations and answering questions.

TEACHING EXPERIENCE

Instructor

CSE 590U, Graduate Ubiquitous Computing Seminar	Fall 2020, Winter 2021

Teaching Assistantships

CSE 351, Hardware/Software Interface	Fall 2019, Spring 2020
CSE 332, Data Structures and Algorithms	Winter 2020
CSE 142, Introduction to Programming	Fall 2018, Winter 2018

Curriculum Development

Microsoft edX: Introduction to Device Programming	Winter 2018

Other Teaching

AID Taiwan Volunteer English Teacher	Summer 2018