Mike A. Merrill

PHD CANDIDATE · PAUL G. ALLEN SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

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Research

My work focuses on methods, datasets, and benchmarks for training and evaluating large models (including language models). I'm typically (though not exclusively!) interested in health applications. Recently I've been teaching multimodal language models to reason about time series, and building LLM agents that can make decisions and take actions based off of these inputs.

Education

University of Washington   *Seattle, WA*
PHD COMPUTER SCIENCE   *September 2019 - present*
- Advisor: Tim Althoff
- MS in Computer Science 2022

Cornell University   *Ithaca, NY*
BS INFORMATION SCIENCE   *August 2013 - May 2017*
- Magna Cum Laude
- Undergrad Research Advisor: Tanzeem Choudhury

Other Research Experience

2023 - 2024 **Google Research**, Student Researcher, Consumer Health Research - Agents for Tabular Data
2022 **Apple**, PhD ML Research Intern, Health AI - Large Scale Pretraining with Sensor Data
2016-2019 **HealthRhythms**, Data Scientist (Second Full Time Employee, now $40m+ raised)
2015-2017 **Cornell University**, Undergraduate Research Assistant, Advised by Tanzeem Choudhury
2016 **Carnegie Mellon University**, Undergraduate Research Assistant, Advised by Anind Dey

Publications

CONFERENCE AND JOURNAL PAPERS

- **Mike A. Merrill**, Mingtian Tan, Vinayak Gupta, Tom Hartvigsen, and Tim Althoff. Language Models Still Struggle to Zero-shot Reason about Time Series. EMNLP, 2024

- **Mike A. Merrill**, Akshay Paruchuri, Naghmeh Rezaei, Geza Kovacs, Javier Perez, Yun Liu, Erik Schenck, Nova Hammerquist, Jake Sunshine, Shyam Tailor, Kumar Ayush, Hao-Wei Su, Qian He, Cory Y. McLean, Mark Malhotra, Shwetak Patel, Jiening Zhan, Tim Althoff, Daniel McDuff, and Xin Liu. Transforming Wearable Data into Health Insights using Large Language Model Agents. Under Review at Nature Communications, 2024

- Mingtian Tan, **Mike A. Merrill**, Vinayak Gupta, Tim Althoff, and Thomas Hartvigsen. Are Language Models Actually Useful for Time Series Forecasting? NeurIPS (Spotlight, Top 3%), 2024

- Ken Gu, Ruoxi Shang, Ruien Jiang, Keying Kuang, Richard-John Lin, Donghe Lyu, Yue Mao, Youran Pan, Teng Wu, Jiaqian Yu, Yikun Zhang, Tianmai M. Zhang, Lanyi Zhu, **Mike A. Merrill**, Jeffrey Heer, and Tim Althoff. BLADE: Benchmarking Language Model Agents for Data-Driven Science. EMNLP, 2024

- **Mike A. Merrill**, Esteban Safranchik, Arinbjorn Kolbeinsson, Piyusha Gade, Ernesto Ramirez, Ludwig Schmidt, Luca Foschini, and Tim Althoff. Homekit2020: A Benchmark for Time Series Classification on a Large Mobile Sensing Dataset with Laboratory Tested Ground Truth of Influenza Infections. CHIL (Published in PMLR), 2023

- **Mike A. Merrill** and Tim Althoff. Self-supervised Pretraining and Transfer Learning Enable Flu and COVID-19 Predictions in Small Mobile Sensing Datasets. CHIL (Published in PMLR), 2023

- Xuhai Xu, Han Zhang, Yasaman Sefidgar, Yiyi Ren, Xin Liu, Woosuk Seo, Jennifer Brown, Kevin Kuehn, **Mike A. Merrill**, Paula Nurius, Shwetak Patel, Tim Althoff, Margaret E. Morris, Eve Riskin, Jennifer Mankoff, and Anind K. Dey. Globem dataset: Multi-year datasets for longitudinal human behavior modeling generalization. NeurIPS, 2022

- Ge Zhang, **Mike A. Merrill***, Yang Liu, Jeffrey Heer, and Tim Althoff. Coral: Code representation learning with weakly-supervised transformers for analyzing data analysis. In EPJ Data Science, 2022

- **Mike A. Merrill**, Ge Zhang, and Tim Althoff. Multiverse: Mining collective data science knowledge from code on the web to suggest alternative analysis approaches. KDD, 2021

- Dror Ben-Zeev, Rachel Brian, Rui Wang, Weichen Wang, Andrew T. Campbell, Min S. H. Aung, **Michael Merrill**, Vincent W. S. Tseng, Tanzeem Choudhury, Marta Hauser, John M. Kane, and Emily A. Scherer. Cross-Check: Integrating self-report, behavioral sensing, and smartphone use to identify digital indicators of psychotic relapse. Psychiatric Rehabilitation Journal, 2017

- Rui Wang, Min S. H. Aung, Saeed Abdullah, Rachel Brian, Andrew T. Campbell, Tanzeem Choudhury, Marta Hauser, John Kane, **Michael Merrill**, Emily A. Scherer, Vincent W. S. Tseng, and Dror Ben-Zeev. CrossCheck: toward passive sensing and detection of mental health changes in people with schizophrenia. In Ubicomp. ACM, September 2016

- Vincent W. S. Tseng, **Michael Merrill**, Franziska Wittleder, Saeed Abdullah, Min Hane Aung, and Tanzeem Choudhury. Assessing mental health issues on college campuses: Preliminary findings from a pilot study. In UbiComp workshop on Mental Health and Well-being: Sensing and Intervention, 2016

* denotes co-first author

Preprints

- Momin M. Malik, Afsaneh Doryab, **Michael Merrill**, Jürgen Pfeffer, and Anind K. Dey. Can Smartphone Co-locations Detect Friendship? It Depends How You Model It. `https://arxiv.org/abs/2008.02919`, 2020

Posters

- Ellen Frank, **Michael Merrill**, Hane Aung, Claudio Soares, Sidney Kennedy, Mark Matthews, David Kupfer, Aleksandra Lalovic, and Tanzeem Choudhury. Sensing depression: Using smartphone sensors to predict changes in depression severity, 2017

- Ellen Frank, **Michael Merrill**, Hane Aung, Claudio Soares, Sidney Kennedy, Mark Matthews, David Kupfer, Aleksandra Lalovic, and Tanzeem Choudhury. Continuous behavioral data as a potential depression biomarker, 2016

Awards, Fellowships, & Grants

2019	**Corin Anderson Endowed Fellowship**, UW CSE	*$ 20,000*
2017	**Excellence in Research**, Cornell University Department of Information Science	
2014	**Big Red Idea**, CU Tonight	*$ 1,000*
	Pitch Festival Finalist Travel Grant, RECESS	*$ 1,000*

Outreach & Professional Development

Service and Outreach

2023	**NeurIPS**, Reviewer, Deep Generative Models for Health Workshop
2023	**ICLR**, Reviewer, Time Series Representation Learning for Health Workshop
2021, 2023	**CSE Graduate Admissions**, Data Science Area Chair
2022	**CHI**, Reviewer
2021, 2022	**KDD**, Reviewer
2020	**Graduate Liaison**, Faculty Recruitment Committee
	UW CSE Pre-Application Review Service, Reader
	CSE Prospective Students Committee, Grad Student Panel Coordinator

Presentations

Fall 2023	**Google Fitbit Leadership** *"Agents for Tabular Data"*, Remote
Summer 2023	**Evidation Health** *"Representation Learning for Wearable Health Sensing"*, Remote
Summer 2021	**KDD 2021** *"MULTIVERSE"*, Remote
	Evidation Health *"Transfer Learning for Behavioral Data"*, Remote
Spring 2018	**MassChallenge HealthTech Finale**, Boston, MA
Fall 2017	**Results International** *"AI and Analytics in Healthcare"* **Panel**, New York, NY

Teaching Experience

Fall 2021	**CSE 481DS: Data Science Capstone**, TA
Fall 2020	**CSE 481DS: Data Science Capstone**, Head TA

Mentorship

2019-2020	**Jacopo Mocellin**, University of Trento, now at University of Zurich
2019-2020	**Ge Zhang**, Peking University, now at UMich iSchool