Daniel Smolyak

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EDUCATION

Ph.D. in Computer Science 2020-2025
University of Maryland, College Park
Thesis title: Identifying and Mitigating Bias in Machine Learning for Healthcare
Thesis Committee:
Prof. Margrt V. Bjarnadttir (co-chair), Prof. Vanessa Fras-Martnez (co-chair), Prof. Hal Daum III, Prof. Thu Nguyen, Prof. Rob Patro, Prof. Tianyi Zhou

M.S. in Computer Science 2020-2023
University of Maryland, College Park

B.S. in Computer Science and Economics 2016-2020
University of Maryland, College Park
Summa Cum Laude
Gemstone Honors College

RESEARCH APPOINTMENTS

Graduate Student Researcher 2020-
Department of Computer Science, University of Maryland, College Park

Graduate Student Researcher 2023-
Accenture Federal Services, Health Analytics

Undergraduate Student Researcher 2017-2020
Gemstone Honors Program

Undergraduate Student Researcher 2018
Data Science REU, Indiana University - Purdue University Indianapolis

Undergraduate Student Researcher 2017-2018
Human Computer Interaction Laboratory

AWARDS

Best Paper Award Nominee, Netmob 2024 2024

Outstanding UMD Graduate Student Government Representative 2023

University of Maryland, Computer Science Summer Research Fellowship 2021

Banneker/Key Scholar (Full Undergraduate Scholarship) 2016-2020

PROFESSIONAL SERVICE

Chair, Computer Science Graduate Council Governance Committee 2023-

Student Representative, Computer Science Dept Chair Selection Committee 2024

Chair of Legislative Affairs, UMD Graduate Labor Union 2022-2023

Panelist, Computer Science Graduate Orientation Panel 2022-2024

Chair of Elections Committee, Graduate Student Government 2021-2022

Computer Science Representative, Graduate Student Government 2020-2022

Organizer, Technical Team, Technica Hackathon 2019

PUBLICATIONS

Peer Reviewed

- **Smolyak, D.**, Bjarnadttir, M., Crowley, K. & Agarwal, R. "Large Language Models and Synthetic Health Data: Progress and Prospects" *JAMIA Open*, 2024.
- Anderson C., Willner, M., Patsolic, H., Brem, L., Aboye, G., **Smolyak, D.** & Crowley, K. "A Comparison of LLMs for Use in Generating Synthetic Test Data for Automated Testing of a Patient-Focused, Survey-Based System" *AMIA 2024 Annual Symposium*, 2024.
- Abrar, S.M.*, Awasthi, N.*, **Smolyak, D.*** & Frias-Martinez, V. "Analysis of Performance Improvements and Bias Associated with the Use of Human Mobility Data in COVID-19 Case Prediction Models" *ACM Journal on Computing and Sustainable Societies*, 2023.
- **Smolyak, D.**, Humphries, E.M., Parikh, A., Gopalakrishnan, M., Aycan, F., Bjarnadttir, M., Ament, S.A., ElMetwally, D., Beitelshees, A. & Agarwal, R. "Predicting Heterogeneity in Patient Response to Morphine Treatment for Neonatal Opioid Withdrawal Syndrome". *Clinical Pharmacology & Therapeutics*, 2023.
- **Smolyak, D.**, Gray, K., Badirli, S., & Mohler, G. Coupled IGMM-GANs with Applications to Anomaly Detection in Human Mobility Data. *ACM Transactions on Spatial Algorithms and Systems*, 2020.
- Gasarch, W., Metz, E., Prinz, J., & **Smolyak, D.** Mathematical Muffin Morsels: Nobody Wants A Small Piece. *World Scientific*, 2020.
- **Smolyak, D.**, Lee, B., & Choe, E. K. TandemTrack: Promoting Consistent Exercise Leveraging Multimodal Training and Tracking. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*, 2018.

Working Papers/Under Submission

- **Smolyak, D.**, Paulson, C. & Bjarnadttir, M. "Maximizing Predictive Performance for Small Subgroups: Functionally Adaptive Interaction Regularization (FAIR)" *Target: Machine Learning for Health Symposium*, 2024.
- **Smolyak, D.**, Welivita, A., Bjarnadttir, M. & Agarwal, A. "Improving Equity in Health Modeling with GPT4-Turbo Generated Synthetic Data: A Comparative Study" *Target: Journal of Biomedical Informatics*, 2024.
- **Smolyak, D.**, Abrar, S.M., Awasthi, N., & Frias-Martinez, V. "Assessing the Impact of Case Correction Methods on the Fairness of COVID-19 Predictive Models" *Target: EPJ Data Science*, 2024.

Undergraduate Team Thesis: Gemstone Honors Program

- Chun, H., Creegan, D., Majedi, O., **Smolyak, D.**, Valcarcel, B., & Bjarnadottir, M. Data-Driven Approaches to NBA Team Evaluation and Building. 2020.

POSTERS & TALKS

- [Poster] "Assessing the Impact of Case Correction Methods on the Fairness of COVID-19 Predictive Models," NetMob 2024, October 7, 2024
- [Speed Presentation] "Advancing Hypertension Disparity Research using the All of Us Research Program Data," Conference on Health IT & Analytics (CHITA 2024), May 3, 2024
- [Invited Talk] "Advancing Health Disparity Research with the All of Us Research Program: A Hypertension Case Study," UMBC All of Us Research Program Showcase, April 18, 2024
- [Poster] "Modeling Disparities in Cost of Care Based on CMS Coverage Options and Social Determinants of Health," CMS Health Equity Conference, June 7, 2023
- [Poster] Back to Basics: Variation in Pulse-Oximetry in Infants with NOWS. *Pediatric Academic Societies Meeting*, April 2022.
- [Speed Presentation] "Maximizing Machine Learning Model Performance: Revisiting Resource Allocation in Health Care from a Fairness Perspective," Conference on Health IT & Analytics (CHITA 2022), March 5, 2022
- [Poster] Polygenic Prediction of Response to Pharmacotherapy in Infants With Neonatal Opioid Withdrawal Syndrome. *European Neuropsychopharmacology*, October 2021.

TEACHING

CMSC 132: Object-Oriented Programming II — Fall 2024
Leading a 30-student twice-a-week lab section, reviewing and teaching OOP in Java.

CMSC 434: Introduction to Human-Computer Interaction — 2018 - 2019
Managing students teams for the semester-long project to prototype/develop an app.

MENTORING

Co-advised Undergraduate Student — 2023-
Arshana Welivita (Johns Hopkins University)

Mentor, Computer Science Peer-Mentoring Program — 2022-2024

INDUSTRY EXPERIENCE

Data Science Intern — Summer 2019
Microsoft, Research and AI Group, Bellevue, WA

- As a member of the Bing Conversational Search Team, worked on a feature for query reformulation.
- Extended the scope of the feature by allowing for faceted search, using word ontologies and classifiers.

Software Development Intern — 2014 - 2017
Johns Hopkins University, Applied Physics Laboratory, Laurel, MD

- Implemented an interface for depth perception with two stereo-cameras.
- Enhanced functionality of an image annotator for creating training data for a boat-identifying ML system.

SELECTED COURSEWORK

EPIB 637: Social Epidemiologic Methods in Health Equity Research — Spring 2023

CMSC 828U: Justice in Machine Learning — Fall 2021

CMSC 764: Advanced Numerical Optimization — Spring 2021

CMSC 828: Algorithms in Machine Learning: Guarantees and Analyses — Fall 2020