Daniel Smolyak | Curriculum Vitae

5002 Cree Lane – College Park, MD – 20740

443-838-4075 • dsmolyak@umd.edu • dsmolyak.github.io

Education

Ph.D. in Computer Science (In progress)   **University of Maryland, College Park**
With focus on Machine Learning   *August 2020 - Present*

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

Research Experience

Graduate Research Assistant   **University of Maryland, College Park**
Advisor: Dr. Margrét Bjarnadóttir   *August 2020 – Present*

- Studying machine learning approaches to treatment of Neonatal Opioid Withdrawal Syndrome.
- Collaborating with physicians and geneticists from the University of Maryland Medical School.
- Researching methods for minority subgroup fairness in modelling in the healthcare setting.

Gemstone Honors Program   **University of Maryland, College Park**
Advisors: Dr. Margrét Bjarnadóttir and Dr. Sean Barnes   *May 2017 – May 2020*

- As a member of a student-led multi-year research team, investigated team success in the NBA.
- Used k-means clustering of NBA team performance metrics to categorize team play-styles.
- Conducted regression analysis to assess draft pick value and potential draft pick overvaluation by teams.
- Completed a thesis in May 2020, in addition to poster and slide presentations of progress at earlier venues.

Data Science REU   **Indiana University - Purdue University Indianapolis**
Advisor: Dr. George Mohler   *June 2018 – August 2018*

- Adapted generative adversarial networks (GANs) to synthesize taxi driver GPS trajectories.
- Improved upon current benchmarks in GAN-based anomaly detection by using Gaussian Mixture Models.
- Presented at the *5th National Symposium for NSF REU Research in Data Science, Systems, and Security*.

Human Computer Interaction Laboratory   **University of Maryland, College Park**
Advisor: Dr. Eun Kyoung Choe   *September 2017 – May 2018*

- Designed a study to examine individuals' interactions with voice/audio devices in an exercise context.
- Developed an Android mobile application and an Amazon Alexa skill for the above study.
- Published an extended abstract to the *2018 ACM CHI Conference on Human Factors in Computer Systems*.

Computer Science Dept. Independent Study   **University of Maryland, College Park**
Advisor: Dr. William Gasarch   *September 2017 – February 2019*

- Focused on "The Muffin Problem", which involves optimal, constrained allocation of resources (muffins).
- Coded mixed-integer programs and algorithms in Python to find and verify allocation solutions.
- Wrote and proofread mathematical theorems and proofs for solutions to various sub-problems.
- Co-author on a full length book on the topic, *Mathematical Muffin Morsels: Nobody Wants a Small Piece*.

REU: Combinatorial Algorithms Applied Research   **University of Maryland, College Park**
Advisor: Dr. William Gasarch   *June 2015 – August 2015*

- Developed and coded (in C++) algorithms for using Satisfiability (SAT) solvers for Ramsey Theory topics.
- Submitted resulting research to the Siemens competition, where the paper was chosen as a semi-finalist.

Work Experience

Microsoft, Research and AI Group   **Bellevue, WA**
Software Engineering Intern   *June 2019 – August 2019*

- 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.

Johns Hopkins University, Applied Physics Laboratory   **Laurel, MD**
Software Development Intern   *September 2014 – August 2017*

- Implemented an interface for depth perception with two stereo-cameras using the OpenCV library.
- Enhanced functionality of an image annotator for creating training data for a boat-identifying ML system.
- Developed a webcam image recognition program for identifying hand-written numbers.

Publications

Technical

- **Smolyak, D.**, Gray, K., Badirli, S., & Mohler, G (2020, June). Coupled IGMM-GANs with Applications to Anomaly Detection in Human Mobility Data. *ACM Transactions on Spatial Algorithms and Systems*.
- **Smolyak, D.**, Valcarcel, B., & Bjarnadottir, M. (2021, November). Data-Driven Approaches to Evaluating NBA Draft Pick Value. (Under submission) *Journal of Quantitative Analysis in Sports*.
- **Smolyak, D.**, Lee, B., & Choe, E. K. (2018, April). TandemTrack: Promoting Consistent Exercise Leveraging Multimodal Training and Tracking. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*.
- Gasarch, W., Metz, E., Prinz, J., & **Smolyak, D.** (2020, June). Mathematical Muffin Morsels: Nobody Wants A Small Piece. *World Scientific*.
- Cui, G., Dickerson, J., Durvasula, N., Gasarch, W., Metz, E., Prinz, J., Raman, N., **Smolyak, D.** & Yoo, S. H. (2018). A Muffin-Theorem Generator. *International Conference on Fun with Algorithms (FUN)*.
- Canakci, B., Christenson, H., Fleischman, R., McNabb, N., & **Smolyak, D.** (2015). On SAT Solvers and Ramsey-type Numbers. Presented at *American Mathematical Society Fall Eastern Sectional Meeting*.

Applied

- Humphries, E., **Smolyak, D.**, Parikh, A., Agarwal, R., Bjarnadottir, M., et al. (2021, October). Polygenic Prediction of Response to Pharmacotherapy in Infants With Neonatal Opioid Withdrawal Syndrome. *European Neuropsychopharmacology*.
- Kadakia, S.*, **Smolyak, D.***, Bjarnadottir, M., & El-Metwally, D. (2021, October). Variation in Pulse-Oximetry of Infants with Neonatal Opioid Withdrawal Syndrome. (Submitted) *Pediatric Research*.

Skills

- **Programming Languages:** Python, Java, C, C++, C#, R, Javascript, SQL, Kotlin, LaTeX.

Teaching Experience

CMSC 434: Introduction to Human-Computer Interaction

Teaching Assistant   *Fall 2018 & Spring 2019*

- Managing multiple class teams for the semester-long project to prototype and develop a software application.
- Grading and proofreading projects, homeworks, and exams throughout the course.

GEMS 104: Topics in Science, Technology and Society

Teaching Assistant   *Spring 2019*

- Individually taught a 13-person class of second-semester freshman in Gemstone.
- Guided lessons and activities on topics including "Ethics in Research" and "Writing a Literature Review".

Leadership and Service

Graduate Student Government   University of Maryland, College Park

Representative, Computer Science   *September 2020 – Present*

- Policy-making to promote the welfare of graduate students in the CS department and across the university.
- Chair of Polis Committee, working to deploy Polis, an ML-driven group-clustering Wikisurvey software.

Technica Hackathon   University of Maryland, College Park

Organizer, Technology Team   *May 2019 – November 2019*

- Member of the student-lead group organizing UMD's hackathon for underrepresented genders.
- As part of the tech team, helped implement the Technica website (2019.gotechnica.org) and mobile app.

Girls Who Code   University of Maryland, College Park

Tutor   *September 2018 – April 2019*

- Instructed middle and high school students in programming fundamentals in Javascript.

Honors and Awards

- **University of Maryland, College Park, Computer Science Summer Research Fellowship**
- **University of Maryland, College Park, Omicron Delta Kappa National Leadership Honors Society**
  - Well-recognized award of campus involvement.
- **University of Maryland, College Park, College of Behavioral and Social Sciences Undergraduate Experience Funds Recipient** - Funding for IEEE BigData conference attendance.
- **Banneker/Key Scholar** - Full scholarship for attendance at University of Maryland, College Park.

Selected Coursework

CMSC 828U: Justice in Machine Learning	Fall 2021
BMGT 830: Operations Research: Linear Programming	Fall 2021
CMSC 764: Advanced Numerical Optimization	Spring 2021
CMSC 828: Algorithms in Machine Learning: Guarantees and Analyses	Fall 2020