

# Marco Bornstein



Baltimore, MD



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Personal Website

## WORK EXPERIENCE

**Applied Machine Learning Scientist** | Alcority 2022 – PRESENT  
*Large-Scale Training of Neural-Operator Networks*

- Constructing efficient and scalable ML algorithms for physical applications
- Building large-scale distributed training architectures

**Lecturer** | Goucher College Prison Education Partnership 2025 – PRESENT  
*College Math and Statistics Lecturer*

- Teaching math to students in Maryland Correctional Institution – Jessup

**Graduate Assistant** | Huang Research Group 2020 – 2025  
*Mechanism Design, Federated Learning (FL), Asynchrony, & Compression*

- Building mechanisms to regulate AI models, ensure FL agent truthfulness, and incentivize FL participation & performance
- Constructing memory- and computational-efficient distributed algorithms via asynchronous and compression methods

**Doctoral Internship** | Pacific Northwest National Lab 2022 – 2023  
*Distributed Algorithms for Micro-grid Applications*

- Researched edge-computing algorithms with applications to inverter-based micro-grids with high renewable penetration
- Constructed a model-agnostic distributed algorithm so edge devices can collaboratively train irrespective of cost or memory constraints

## TEACHING EXPERIENCE

2025 **Introduction to Statistical Methods**, Goucher College

2025 **Introduction to MATLAB**, University of Maryland

2019-2020 **Calculus I**, University of Maryland

2025-PRESENT **Varsity Tennis Coach**, Perry Hall High School

## SELECT PUBLICATIONS

**M. Bornstein**, A. Bedi, A. Mohamed, & F. Huang. “FACT or Fiction: Can Truthful Mechanisms Eliminate Federated Free Riding?”. *Neural Information Processing Systems*, 2024.

**M. Bornstein**, N. Nazir, J. Drgona, S. Kundu, & V. Adetola. “Finding MIDDLE Ground: Scalable and Secure Distributed Learning”. *Conference on Information and Knowledge Management*, 2024.

**M. Bornstein**, T. Rabbani, E. Wang, A. Bedi, & F. Huang. “SWIFT: Rapid Decentralized Federated Learning via Wait-Free Model Communication”. *International Conference on Learning Representations*, 2023.

**M. Bornstein\***, T. Rabbani\*, & F. Huang. “Large-Scale Distributed Learning via Private On-Device LSH”. *Neural Information Processing Systems*, 2023.

**M. Bornstein**, T. Tullius, & Y. Bayazitoglu. “Optimal nanoparticles for heat absorption and cost.” *International Journal of Heat and Mass Transfer*, 2019.

## EDUCATION

2019 – 2025 **Doctor of Philosophy**  
Applied Mathematics  
University of Maryland  
GPA: 3.95/4.00

2019 – 2021 **Master of Science**  
Applied Mathematics  
University of Maryland  
GPA: 3.95/4.00

2015 – 2019 **Bachelor of Science**  
Mechanical Engineering  
**Bachelor of Arts**  
Comp. & Applied Mathematics  
Rice University  
GPA: 3.77/4.00

## AWARDS

2024 **Hauptman Fellowship**  
University of Maryland

2019-2020 **Aziz-Osborn Gold Medal in Teaching Excellence**  
University of Maryland

2019 **Best Energy-Related Design**  
Rice University Design Showcase

2017 **NSF Travel Grant Scholarship**  
34th QPRC Conference

2017 **Best Poster and Presentation**  
7th Eubank Conference

## PROGRAMMING SKILLS

Python, PyTorch, TensorFlow, MATLAB

Workshops:

**M. Bornstein\***, T. Rabbani\*, M. Ding, & F. Huang. “Shrinking the Size of Extreme Multi-Label Classification”. *NeurIPS Workshop on Machine Learning and Compression*, 2024.

**M. Bornstein**, A. Bedi, A. Sahu, & F. Huang. “RealFM: A Realistic Mechanism to Incentivize Data Contribution and Device Participation”. *NeurIPS Federated Learning Workshop*, 2023.

Under Submission:

**M. Bornstein**, Z. Che, S. Julapalli, A. Bedi, A. Mohamed, & F. Huang. “Auction-Based Regulation for Artificial Intelligence”.