Davis Blalock

dblalock@mit.edu | https://smarturl.it/dblalock

EDUCATION

Massachusetts Institute of Technology, 2014 -

- Computer Science M.S. 2014-2016, Ph.D. 2016-present

University of Virginia, 2010 - 2014

- Majors: Electrical Engineering and Cognitive Science (computer science concentration)
- Cumulative GPA: 3.99 / 4.00

HONORS & AWARDS

National

- 2018 Qualcomm Innovation Fellowship
- 2014 National Science Foundation Graduate Research Fellow
- 2013 Barry M. Goldwater Scholar

University

- 2014 MIT Harold E. Edgerton Fellowship *(~10 incoming EECS PhD students)*
- 2014 SEAS Edgar F. Shannon award *(1 recipient, academics and service)*
- 2014 SEAS "Outstanding Student" award *(4 recipients, academics and leadership)*
- 2013 ECE Dept. Chairperson's award *(3 recipients, academics and leadership)*
- 2013 ECE Dept. James S. Miller award *(3 recipients, academics)*
- 2013 One of three undergraduates selected to teach a "student-taught class"
- 2010 Rodman Scholar *(top ~5% of incoming engineering class)*

ACADEMIC RESEARCH EXPERIENCE

John Guttag Research Group, *Graduate Research Assistant* August 2014-Present

- Designing machine learning algorithms that require less time, space, and labeled data
- Learning from sequences and time series with few and weak labels (ICDM 2016, NeurIPS 2018)
- Accelerating fundamental machine learning operations while also saving space (KDD 2017)
- Rapidly compressing data to save space in both databases and low-power devices (UBICOMP 2018)
- Currently working on accelerating convolutional neural networks, as well as building a federated learning system with a strong threat model

Levy Lab, *Undergraduate Researcher* May 2013 - Jan 2014

- Investigated information-theoretic properties of biological neural networks (PLoS Comp Bio 2015)
- Created open-source tools for simulation of adaptive synaptogenesis networks in MATLAB

INERTIA Research Group, *Undergraduate Researcher* Sep 2012 - Jun 2014

- Designed and implemented high speed algorithm for online classification on low-power hardware
- Android and embedded C development for wearable platform

INDUSTRY RESEARCH EXPERIENCE

Google Research & Machine Intelligence Team, *PhD Intern* May 2016 - August 2016

- Extended TensorFlow Wide & Deep models to sequence data
- Ran experiments on hundreds of millions of examples using distributed training infrastructure
- Code now used in production within a popular Google product

PocketSonics, Inc, *Intern* July 2010 - Jan 2013

- Worked with UVA professors commercializing breakthrough handheld ultrasound imaging technology
- Helped create multicore C/C++ pipeline for real-time data processing using pthread
- Led development of Android-based user interface, including Android framework alterations
- Performed extensive software testing and documentation for FDA certification

PUBLICATIONS

Shanmugam, Divya, **Davis W. Blalock**, Jen Gong, and John V. Guttag. "Multiple Instance Learning for ECG Risk Stratification." NIPS Machine Learning for Healthcare workshop. Spotlight presentation (top 6% of submissions).

Davis W. Blalock and John V. Guttag. "Sprintz: Time Series Compression for the Internet of Things." IMWUT/UBICOMP 2018.

Davis W. Blalock and John V. Guttag. "Bolt: Accelerated Data Mining with Fast Vector Compression." Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. ACM, 2017.

Davis W. Blalock, and John V. Guttag. 2016. "EXTRACT: Strong Examples from Weakly-Labeled Sensor Data." In Proceedings of the 16th IEEE International Conference on Data Mining. IEEE, 799–804.

Davis W. Blalock, and John V. Guttag. 2016. "Feature Flocks: Accurate Pattern Discovery in Multivariate Time Series." M.S. Thesis at the Massachusetts Institute of Technology.

Blake T. Thomas, **Davis W. Blalock**, and William B Levy. 2015. "Adaptive Synaptogenesis Constructs Neural Codes that Benefit Discrimination." PLoS Computational Biology 11, 7 (2015).

TEACHING

6.000 - "Introduction to Computer Science and Programming in Python", *TA* Aug 2016 - Dec 2016
- Designed assignments, graded exams, and held office hours for class of 400+ students.

ENGR 1501 - "Brain Hacks", *Instructor* Aug 2013 - Dec 2013
- Developed and taught a class on highlights of psychology and neuroscience useful for everyday life
- Also covered basic game theory, ethology, behavioral economics, and decision theory
- Designed and implemented curriculum, graded all assignments, and lectured every week

Eta Kappa Nu Honor Society, *Tutor* Aug 2013 - May 2014
- Tutored undergraduates on electrical and computer engineering material

OTHER PROJECTS

Helping to run a startup incubator, two macOS apps, a real-time gesture recognizer on a 20MHz microcontroller, an iOS app for streaming mobile/wearable sensor data, a Paxos-based key-value store in Go, a Marionette.js app for fitness tracking, a C++ array library, cognitive science essays, a novel, others

SKILLS

Software
- Python *(TensorFlow, Keras, NumPy, SciPy, Pandas, Scikit-Learn)*, C, C++, Java *(Android)*, x86 assembly (esp. AVX/AVX2), Objective-C *(iOS, Mac)*, Go, MATLAB, Bash, basic HTML/CSS/JS
- Experienced with software engineering practices
- Experienced with performance engineering at both the algorithm and implementation level

Machine Learning and Data Mining
- Comfortable with numerous machine learning algorithms, as well as their application in practice
- Particular experience with time series and design of high performance learning algorithms

Working with a Team
- Enjoy mentoring younger students
- Experience as project manager on engineering projects throughout graduate school, college, and high school
- Organized 30+ club and other events in graduate school, and many more as an undergraduate
- Excellent communicator and writer