

# Michael S. Davinroy

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## EDUCATION

**Northeastern University, Boston, MA** Sept. 2020-Present  
PhD Student, Khoury College of Computer Sciences

**Swarthmore College, Swarthmore, PA** Aug. 2015-May 2019  
Honors Bachelors of Arts in Computer Science and Honors Mathematics Minor; Major GPA: 3.86; GPA: 3.79  
Awards: *Thomas W. Nash '74 Scholarship; Frederick J. Wiest Jr. '37 and Elizabeth S. Wiest '38 Scholarship*

## TECHNICAL SKILLS

**Programming/Typesetting Languages**: C, C++, Python, Typescript/Javascript, and LaTeX

**Relevant Coursework**: Parallel and Distributed Computing, Operating Systems, Complexity Theory, Algorithms, Algorithmic Game Theory, Artificial Intelligence, Data Visualization, and Linear/Abstract Algebra

**Technologies**: Pytorch, Keras/Tensorflow, MPI, Wireshark, GDB, Valgrind, and Qemu/KVM

**Academic Papers / Posters**: How to Own NAS in Your Spare Time by Hong et al. [ICLR 2020]; SmartK: Efficient, Scalable, and Winning Parallel MCTS by Davinroy et al. [SuperComputing 2019]; Security analysis of deep neural networks operating in the presence of cache side-channel attacks by Davinroy et al. [arXiv]

## TECHNICAL PROJECTS

**Cache Side Channel Attacks**, University of Maryland, College Park Jun. 2018-Sept. 2020

- Developed a novel attack on deep neural networks that steals architectural information from a victim
- Analyzed the general security of neural networks against cache side channel vulnerabilities
- Observed our attack in conjunction with other current adversarial machine learning techniques
- Utilized observations from our attack to develop novel, user-level defenses against this class of attacks

**Parallel Monte-Carlo Tree Search**, Swarthmore College Mar. 2018-Nov. 2019

- Conceptualized a new way to parallelize MCTS on a cluster of memory-constrained nodes using MPI
- Tested our model against other parallelizations of MCTS to experimentally verify our model's efficacy
- Presented a peer reviewed poster as the first author at a SuperComputing '19, a top tier HPC conference

**Adversarial Machine Learning**, Washington University in Saint Louis Oct. 2019-May 2020

- Brainstormed potential research directions and approaches to attack self-driving cars (Autoware)
- Implementing adversarial machine learning attacks in both simulated (LGSVL) and real environments

**Computer Networks**, Instructed by Dr. Kevin Webb Aug. 2017-Dec. 2017

- Built a web client and a parallelized web server to understand common web applications and protocols
- Engineered a DNS server to implement IP address resolution to better comprehend DNS architecture
- Designed and implemented a protocol for communication between a network jukebox server and client
- Constructed a reliable, go-back-n transport protocol to send packets on top of an unreliable network
- Programmed a router on a simulated network to obtain experience with network layer forwarding

## WORK EXPERIENCE

**Computer Science Teaching Assistant**, Swarthmore College Aug. 2017-May 2019

- Taught Data Structures and Algorithms, Introduction to Computer Systems, and Theory of Computation
- Presented logistical changes in planning to professors to increase learning outcomes for peer students
- Guided peer students in designing and debugging their C and C++ code to teach better coding practices
- Ran weekly study sessions attended by 20-30 students to provide a space for student inquiry and growth

**Director of Nature Activities**, Camp Ondessonk Jun. 2013-Aug. 2017

- Directed 10 junior staff members to ensure smooth development and implementation of camp activities
- Coordinated nature-related activities for about 3,000 campers resulting in camper and parent satisfaction
- Guided backcountry trips to enlighten campers to the joys and learning opportunities present in nature
- Created new educational programming for campers to establish precedence for future staff members

Interests: Outdoor activities, board and card strategy games, and playing Balinese gamelan music