

Jennifer F. SWITZER

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RESEARCH INTERESTS

I am interested in computing tools that help people and industry build safer, more reliable, and more sustainable systems. For my M.Eng. I am doing research in **computer systems security** for **embedded devices**. I am broadly interested in **computing for social good and sustainability**, and have completed research projects and internships in energy use monitoring, renewable energy, and environmental sustainability.

EDUCATION

JUNE 2020	MASTER OF ENGINEERING IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCE Massachusetts Institute of Technology , Cambridge MA GPA 5.0/5.0 M.Eng. Concentration in computer systems
JUNE 2018	BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCE Massachusetts Institute of Technology , Cambridge MA GPA 4.7/5.0 HASS Concentration in Spanish

RESEARCH AND WORK EXPERIENCE

<i>Current</i> JAN 2018	Graduate Research Assistant, COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE LAB (CSAIL), MIT <ul style="list-style-type: none">Contributed to the development of a secure operating system for embedded devices.Developed a Rust compiler plugin that ensures type safety across compilation boundaries even when untyped information is sent over IPC (Inter-Process Communication).Created proof of concepts of security vulnerabilities in current secure operating systems.
MARCH 2018 FEB 2017	Undergraduate Researcher, THE RESEARCH LAB OF ELECTRONICS (RLE), MIT <ul style="list-style-type: none">Built a web-based dashboard for real-time energy use monitoring analytics, which was installed on two Coast Guard cutters. The dashboard resulted in an academic paper.Developed a Python-based management console for a non-intrusive load monitoring (NILM) system running on Linux.
AUG 2016 JUNE 2016	Data Analytics Intern, GREENWATCH, Wavre Belgium <ul style="list-style-type: none">Analysed energy production data from more than 2,000 solar installations across Belgium using the C# MongoDB driver and Apache Spark, in order to develop a method of distinguishing the cause of low energy production.
FEB 2017 FEB 2016	Undergraduate Researcher, CSAIL, MIT <ul style="list-style-type: none">Contributed to an experimental middle-school computer science curriculum focused on hands-on learning, which was deployed in approximately 10 middle schools in Hong Kong.Built and tested tutorial Android apps, and developed lesson plans and student guides.
AUGUST 2015 JUNE 2015	Environmental Engineering Intern, TALISMAN ENERGY, Edson, Alberta, Canada <ul style="list-style-type: none">Performed environmental tests and data analysis to evaluate the effectiveness of a gas plant's water disposal systemCreated a plan to improve environmental sustainability and save \$80,000 yearly by altering water holding techniques
MAY 2015 OCT 2014	Undergraduate Researcher, DEPARTMENT OF NUCLEAR SCIENCE AND ENGINEERING, MIT <ul style="list-style-type: none">Worked with a team developing a new, safer material for use as fuel cladding in fission reactorsOperated a scanning electron microscope in order to image the material and analyze its ability to withstand mechanical and temperature induced stress

PUBLICATIONS AND POSTERS

- Andre Abouljian, Daisy H Green, Jennifer F Switzer, Thomas J Kane, Gregory V Bredariol, Peter Lindahl, John S Donnal, and Steven B Leeb. NilM dashboard: A power system monitor for electromechanical equipment diagnostics. *IEEE Transactions on Industrial Informatics*, 15(3):1405–1414, 2018
- Switzer, JF, Abouljian, A, Leeb, S. A user dashboard for a Non-Intrusive Load Monitoring (NILM) system. Poster presented at: 2017 MIT Energy Initiative Research Symposium; 2017 Dec 4-5; Cambridge, MA.

TEACHING AND LEADERSHIP EXPERIENCE

Current
MAY 2016

President, MIT Women's Initiative

- The MIT Women's Initiative holds yearly STEM workshops for girls in over ten school districts across the US, hosted by female MIT student ambassadors.
- As president, I preside over weekly meetings attended by approximately 15 MIT women volunteers, and coordinate sponsorship and publicity.
- As an ambassador of the program, I have also lead workshops at over 10 different schools, to audiences as large as 300 students.

SEPT 2019
SEPT 2017

Tutor, MIT ESL Program for Service Employees

- Created English as a Second Language (ESL) lesson plans and provide weekly in-person tutoring for an MIT service employee, to help them achieve career or personal goals such as work advancement or citizenship.

MAY 2016
JAN 2016

Lab assistant, Math for Computer Science, MIT

- Led a team of 8 students as they completed class problems; provided feedback and answered questions; graded their assignments and exams.

CLASS PROJECTS

- FALL 2019 | A GREEN BLOCKCHAIN CONSENSUS ALGORITHM (6.S898): Developing a proof of concept for a blockchain consensus algorithm based on performing useful computations for climate modeling.
- SPRING 2019 | A TERMINAL-BASED ADVENTURE GAME (6.945): Built a terminal-based adventure game, including ASCII graphics, from scratch in Scheme.
- FALL 2017 | DECAF COMPILER (6.035): Built a compiler for Decaf, a strongly-typed, object-oriented language. Implemented dataflow optimizations.
- SPRING 2017 | LED PAC-MAN GAME (6.115): Implemented a Pac-Man game on a 32-by-32 RGB LED array using PSoC and 8051 microcontrollers.
- FALL 2016 | PEAK POWER CONTROLLER (6.131): Implemented peak power tracking by hysteresis control for a photovoltaic cell.

SKILLS

- **Natural languages:** Intermediate Spanish, fluent French
- **Programming languages:** Python, Rust, Java, C, C++, Assembly, Linux, Julia, MATLAB, C#, Scheme, JavaScript, HTML/CSS

OTHER INTERESTS

- Female empowerment
- Yoga, running, hiking, camping
- Reading and creative writing (esp. Sci-Fi/Fantasy)