Austin Ebel

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EDUCATION

Columbia University — 2015-2020
Bachelors of Science, Electrical Engineering — *New York, NY*
GPA: 3.85/4.00

College of William and Mary — 2015-2020
Bachelors of Science, Computer Science — *Williamsburg, VA*
GPA: 3.89/4.00

PUBLICATIONS

Gardner, J., Hunt, K., ***Ebel, A.****, Rose, E., Zylich, S., Jensen, B., Wise, K., Siochi, E., Sauti, G.* Machines as Craftsmen: Localized Parameter Setting Optimization for Fused Filament Fabrication 3D Printing. *Advanced Materials Technologies, 2019*

RESEARCH EXPERIENCE

VLSI Lab, Columbia University — 2021
Supervisor: Mingoo Seok

- This work will explore hardware architectures for machine learning - either related to *TinyML* or *hardware security*.

Research Assistant, Columbia University — 2020-2021
Supervisor: Debasis Mitra

- Used deep reinforcement learning to more accurately model optimal investments in information security.
  - Publication in progress.

NASA Langley Research Center — 2018
Supervisors: John Gardner, Godfrey Sauti

- Created an end-to-end tool for integrating machine learning into the 3D printing process. Resulting prints show increased quality over prints that use only global parameters.
  - Published paper.

RELEVANT PROJECTS

Full-Custom 8-Bit Microprocessor Design

- Designed a fully custom 8-bit microprocessor core in Cadence Virtuoso using IBM's 90nm technology.

Parallelization of Particle Swarm Optimization

- Reduced the runtime complexity of Particle Swarm Optimization (PSO) by making use of parallel computing techniques on GPUs. Optimal use of shared memory, block size, and data transfer techniques were investigated.

Pipelined RISC-V CPU (in progress)

- Working through Berkeley's *EECS151 Introduction to Digital Design and Integrated Circuits* FPGA labs and final project.

ADDITIONAL EXPERIENCE

NASA Jet Propulsion Laboratory 2020
Supervisor: Stirling Algermissen

- Expanded the scope of automated testing procedures for use in NASA's upcoming *SWOT* satellite.

NASA Jet Propulsion Laboratory 2019
Supervisor: Mike Gangl

- Developed a cloud-based service to help hydrologists query existing and future NASA datasets.

PRESENTATIONS

Columbia University Data Science Institute 2021
Poster Session, Data Science Day
Attacker-Defender Investment Strategies in Cybersecurity

Columbia University Data Science Institute 2021
Cybersecurity Center Poster Session
Attacker-Defender Investment Strategies in Cybersecurity

AWARDS

3^{rd} *Place ($150), Columbia Masters Design Expo* 2019
Parallelization of Particle Swarm Optimization

OTHER

An assortment of other, non-hardware related projects can be found on my website: `abe2122.github.io`

TECHNOLOGY SUMMARY

Programming Languages: Python, MATLAB, C++, Verilog
Hardware Tools: Cadence Virtuoso, Calibre, Ultrasim, Xilinx Vivado
Others: Unix, Git, LaTeX