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 related to either *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 a 14% improvement in quality and a 28% decrease in runtime.
  - 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 from $O(n^2)$ to $O(n)$ 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: `austinebel.net`

TECHNOLOGY SUMMARY

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