

ANTHONY ETIM

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RESEARCH INTERESTS

My research interests lie in computer architecture and hardware security, as well as attacks and defenses in machine learning accelerators and algorithms to exploit vulnerabilities and leak sensitive information.

EDUCATION

- Yale University**, New Haven, CT August 2021 – Present
Ph.D. in Electrical Engineering
Research Assistant, Computer Architecture and Security (CAS) Lab.
Advisor: Prof. Jakub Szefer
- Yale University**, New Haven, CT August 2021 – May 2024
M.S., M.Phil. in Electrical Engineering
- Villanova University**, Villanova, PA August 2017 – May 2021
B.S. in Electrical Engineering,
Minors in Computer Science and Computer Engineering

TECHNICAL SKILLS

Programming: Python, C++, C, MATLAB, Java, SQL, VHDL, Verilog, SystemVerilog, Haskell
Tools: AWS, Xilinx Vivado/ISE, Quartus
Technological Devices: Raspberry Pi, Arduino
Expertise: FPGA, Computer Architecture, Hardware Security, Machine Learning

PUBLICATIONS

- **Anthony Etim**, Shanquan Tian, and Jakub Szefer. “Extending FPGA Information Leaks with Trojan Phantom Circuits”. Accepted by the IEEE International Symposium on Secure and Private Execution Environment Design (**SEED**), 2024.
- Theodoros Trochatos, **Anthony Etim**, and Jakub Szefer. “Covert-channels in FPGA-enabled SmartSSDs”. Accepted by the 22nd International Conference on Field-Programmable Technology (**FPT**), 2023 Journal Track at ACM Transactions on Reconfigurable Technology and System (**TRETS**).

RESEARCH EXPRIENCE

- Yale University**, *Graduate Researcher*, New Haven, CT August 2021 – Present
- Ongoing research on novel attacks and defenses in machine learning algorithms.
 - Ongoing research on fault-injection attacks and defenses against cryptographic code in hardware.
 - Conducted research on attacks on machine learning accelerators to exploit vulnerabilities and extract sensitive information.
 - Conducted research on information leaks in FPGA-accelerated cloud environments using Ring Oscillators (ROs) and Time to Digital Converters (TDCs) to sense voltage and thermal changes.

Villanova University, Undergraduate Researcher, Villanova, PA Fall 2020 – Spring 2021

- Developed a deep neural network to achieve a secrecy capacity for efficient, reliable and secure transmission of information.

Villanova University, Undergraduate Researcher, Villanova, PA Fall 2020

- Used Matrix Singular Value Decomposition (SVD) technique to optimize the deep neural network (DNN) on the AVNET Ultra96-V2 FPGA development board.
- Evaluated the performance, accuracy, and energy consumption of the optimized system.

Villanova University, Undergraduate Researcher, Villanova, PA Spring 2020

- Estimated the added value and future costs of coordinated economics dispatch in Central America through the electrical system load.
- Trained the neural network to forecast the electrical system load.

Villanova University, Undergraduate Researcher, Villanova, PA Summer 2019

- Collaborated with a team of 3 in conjunction with L3 Harris in the creation of an efficient food purchasing and tracking system for dining services to reduce food waste.
- Developed software system that is simple to populate and used to track purchased quantities and consumption to reduce waste significantly.
- Filed a provisional patent for the software system.

Villanova University, Undergraduate Researcher, Villanova, PA March 2018 – May 2019

- Conducted research on the development of the flow network modeling tool Villanova Thermodynamic Analysis of Systems (VTAS), which models the energy flows throughout a data center.
- Upgraded the Graphical User Interface (GUI) for the Villanova Thermodynamic Analysis of Systems (VTAS) data center flow network modeling tool.
- Developed the GUI Interface for the VTAS electrical system layout.

PROFESSIONAL EXPERIENCE

Electrical Engineering Intern, National Grid, Albany, NY, Remote Summer 2020

- Collaborated with a team of 4 engineers to help reorganize and plan the grid network using various tools.
- Modelled data to fit various design requirements and constraints of the power system.
- Assisted in the management and creation of a SharePoint Setting Repository for the handoff of smart control settings to the field device engineers.
- Collaborated with other engineers to build a database of DMX and control house plans for the grid network.

Web Developer Intern, Kumba Africa, Philadelphia, PA Summer 2018

- Built reusable code to be utilized in other projects, effectively streamlining spending.
- Contributed back-end experience and collaborated on APIs.

- Collaborated on the design and development on a team of 4 of client and server database applications.
- Analyzed project requirements to find bugs and eliminate issues within a timely manner.

TEACHING EXPERIENCE

- **Teaching Fellow**, Yale University, New Haven, CT Spring 2023
Introduction to Computer Engineering (EENG 201)
- **Teaching Fellow**, Yale University, New Haven, CT Fall 2022
Introduction to Electronics (EENG 200)

POSTERS

- April. 2024. Extending FPGA Information Leaks with Trojan Phantom Circuits. New England Hardware Security Day, Worcester Polytechnic Institute, MA.
- April. 2023. Thermal Covert Channels on SmartSSDs. New England Hardware Security Day, Northeastern University, MA.
- Oct. 2019. Feastimate. Future of Packaging Consortium, Villanova University, PA
- April. 2019. Improving the user interface of Data center modeling Software. (Project #1) Center for Energy-Smart Electronic Systems, Industrial Advisory Board Meeting at Binghamton University, NY.
- Oct. 2018. Improving the user interface of Data center modeling Software. (Project #1) Center for Energy-Smart Electronic Systems, Industrial Advisory Board Meeting at Villanova University, PA.
- Sep. 2018. Improving the user interface of Data center modeling Software. Undergraduate Research Symposium at Villanova University, PA.

SERVICE

- **Yale Cloud Computing and FPGA Security Symposium (CCFS) 2022**, Co-organizer November 2022
- **Yale Grad Society of Women Engineers**, Undergrad Liaison Co-chair Fall 2022 - Present

LEADERSHIP EXPERIENCE

Tau Beta Pi, National Engineering Honor Society, Villanova Chapter, Vice-President March 2020-May 2021

- Planned and conducted various professional events for the chapter's members such as the initiation information session for new members.
- Helped in the advancement of the technical and professional education of the active members by connecting them with various alumni.

Villanova Engineering Student Council, Co-Chair September 2019- May 2021

- Planned events for the College of Engineering and acted as a bridge between the students and faculty.

- Represented Villanova chapter at the 2017 Fall Regional Conference in Greensboro, NC.

SELECTED HONORS AND AWARDS

- Yale New Student Fellowship September 2021
- Dean's Award for Academic Excellence May 2021
- Dean's Award for Meritorious Service May 2021
- Dean's List Every Semester
- Klingler Unitas Prize, Villanova Student Entrepreneurship Competition April 2020
- Klingler Unitas Prize, Villanova Student Entrepreneurship Competition April 2019
- Tau Beta Pi, the National Engineering Honor Society, Selected based on academic ranking 1/8th of the junior class. Spring 2020