

# Harrison Williams

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## RESEARCH INTERESTS

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I am broadly interested in embedded/IoT system design, networking, and computer architecture. My PhD research focuses on novel chip- and board-level hardware designs alongside software techniques to bring new capabilities to and improve the efficiency of batteryless energy harvesting systems.

## EDUCATION

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<b>Virginia Tech</b>	Blacksburg, VA
PhD, Computer Science	2019 – 2024 (Expected)
PhD Advisor: Dr. Matthew Hicks	
Dual B.S., Electrical & Computer Engineering	2015 – 2019

## PUBLICATIONS

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- [2] **Failure Sentinels: Ubiquitous Just-in-time Intermittent Computation via Low-cost Hardware Support for Voltage Monitoring.** [Harrison Williams](#), Michael Moukarzel, and Matthew Hicks. *International Symposium on Computer Architecture (ISCA)*, 2021.
- [1] **Forget Failure: Exploiting SRAM Data Remanence for Low-overhead Intermittent Computation.** [Harrison Williams](#), Xun Jian, and Matthew Hicks. *Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, 2020.

## RESEARCH EXPERIENCE

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<b>Graduate Research Assistant</b>	2019 – Present
<i>Virginia Tech</i>	<i>Blacksburg, VA</i>
<ul style="list-style-type: none"><li>Designed and implemented a circuit board for power-adaptive energy buffering using variable capacitor banks on energy harvesting systems.</li><li>Designed standalone low-voltage circuit enabling software-free peripheral operation on energy harvesting systems.</li><li>Designed low-power, variable-resolution integrated voltage supervision circuits.</li><li>Developed software libraries using volatile data retention for intermittent execution on batteryless systems using memory-constrained microcontrollers.</li></ul>	
<b>Undergraduate Research Assistant</b>	2017 – 2019
<i>Virginia Tech</i>	<i>Blacksburg, VA</i>
<ul style="list-style-type: none"><li>Worked with faculty and other undergraduate students to develop a system to detect recycled microcontrollers and processors based on memory decay.</li><li>Built hardware and software systems to rapidly age microcontrollers and collect/analyze memory startup statistics.</li></ul>	

## PROFESSIONAL EXPERIENCE

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<b>Technical Intern</b>	Summers 2017, 2018
<i>Raytheon Missile Systems</i>	<i>Tucson, AZ</i>
<ul style="list-style-type: none"><li>Member of verification team supporting programs in the configurable digital logic department.</li><li>Developed tests for combinational logic and state machines.</li><li>Designed software abstractions for simulating communication interfaces across missile hardware stack.</li></ul>	

## GRANT PREPARATION

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### [1] **SHF: Small: Circuit Support for Maintaining the Continuous-power Abstraction in Energy Harvesting Systems**

- Principal Investigator: Dr. Matthew Hicks.
- Submitted to NSF Software and Hardware Foundations, August 2022.
- Role: Co-author. My work on hardware support for batteryless systems was the basis of this grant. I provided preliminary data and wrote the grant with Dr. Hicks.

## TECHNICAL REVIEWING

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### **External Reviewer:**

Architectural Support for Programming Languages and Operating Systems	ASPLOS '23, '20
European Conference on Computer Systems	EuroSys '22
Transactions on Embedded Computing Systems	TECS '21
Design Automation Conference	DAC '20
Languages, Compilers, Tools and Theory of Embedded Systems	LCTES '20
International Workshop on Energy Harvesting & Energy-Neutral Sensing Systems	ENSys '19

## RECOGNITION

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<b>Davenport Leadership Scholarship</b>	2022
<b>NSF Graduate Research Fellowship Program</b>	2021
<i>Honorable Mention</i>	

## TEACHING

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<b>Graduate Teaching Assistant</b>	2019
<i>Virginia Tech</i>	<i>Blacksburg, VA</i>
<ul style="list-style-type: none"><li>• Teaching Assistant for CS 4264: "Principals of Computer Security", an undergraduate class on the foundation of building, using, and managing secure systems.</li><li>• Developed and graded homework and projects, graded tests.</li><li>• Held office hours and helped students with completing projects and understanding class material.</li></ul>	

## TECHNICAL SKILLS

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### **Programming Languages**

Experienced: Python, C, MSP430 Assembly, Verilog

Familiar: C++, x86 Assembly

### **Software**

Experienced: LTSpice, Modelsim, EAGLE

Familiar: MATLAB, Vivado