

# Graham Gobieski

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gobieski.com

5000 Forbes Avenue  
Gates-Hillman Center  
Pittsburgh, Pennsylvania 15213

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## Research Interests

I am primarily interested in improving the energy-efficiency of low-power computers and the applications that such compute devices enable. Energy-efficiency is key; for devices powered by batteries, energy efficiency determines the lifetime of the device and for energy-harvesting devices, energy-efficiency determines which applications are feasible. My research encompasses both hardware and software solutions to improving energy-efficiency. Broadly, I work on microarchitecture, programming models, computer architecture, digital design and machine learning.

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## Education

<b>Carnegie Mellon University</b> PhD Candidate Advised by Profs. Nathan Beckmann and Brandon Lucia	2017-Present
<b>Columbia University</b> Rabi Scholar BA Computer Science, Minor Chemistry	2013-2017

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## Awards

<b>Apple Scholars in AI/ML</b> PhD Research Fellowship	2019-Present
<b>Rabi Scholar</b> Undergraduate Research Fellowship	2013-2017

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## Professional Experience

<b>Carnegie Mellon University</b> PhD student for Profs. Nathan Beckmann and Brandon Lucia Work on ultra-low-power architecture with a focus on machine learning applications	2017-Present
<b>Apple</b> PhD intern in Platform Architecture Worked on accelerating machine inference on Apple Neural Engine	2021
<b>Columbia University</b> Research assistant for Prof. Junfeng Yang Worked on methods to prevent return-oriented programming attacks	2016-2017
<b>MongoDB</b> Worked on SQL-to-MongoDB translator service	2016
<b>Columbia University</b> Research assistant for Prof. Luis Campos	2013-2016

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Worked on class of aromatic, positively-charged polymers with applications to fuel cells

## Cleveland Clinic

2012-2013

Research assistant for Drs. Grahame Kidd and Bruce Trapp

Worked on automatic segmentation of 3D microscope image datasets

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## Publications

### **SNAFU: An Ultra-low-power, Energy-minimal CGRA-Generation Framework and Architecture**

ISCA 2021

Acceptance: 19%

*Graham Gobieski, Oguz Atli, Ken Mai, Brandon Lucia, Nathan Beckmann*

### **MANIC: A Vector-Dataflow Architecture for Ultra-Low-Power Embedded Systems**

MICRO 2019

Acceptance: 23%

*Graham Gobieski, Amolak Nagi, Nathan Serafin, Mehmet Meric Isgenc, Nathan Beckmann, Brandon Lucia*

### **Intelligence Beyond the Edge: Inference on Intermittent Embedded Systems**

ASPLOS 2019

Acceptance: 21%

*Graham Gobieski, Brandon Lucia, Nathan Beckmann*

### **Intermittent Deep Neural Network Inference**

SysML 2018

Acceptance: 57%

*Graham Gobieski, Nathan Beckmann, Brandon Lucia*

### **Shuffler: Fast and deployable continuous code re-randomization**

OSDI 2016

Acceptance: 19%

*David Williams-King, Graham Gobieski, Kent Williams-King, James Blake, Xinhao Yuan, Patrick Colp, Michelle Zheng, Vasileios Kemerlis, Junfeng Yang, William Aiello*

### **Clickable poly (ionic liquids): A materials platform for transfection**

Angewandte

Chemie

Acceptance: 28%

*Jessica Freyer, Spencer Brucks, Graham Gobieski, Sebastian Russell, Carrie Yozwiak, Mengzhen Sun, Zhixing Chen, Yivan Jiang, Jeffrey Bandar, Brent Stockwell, Tristan Lambert, Luis Campos*

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## Posters

### **MANIC: A Vector-Dataflow Architecture for Ultra-Low-Power Embedded Systems**

MICRO 2019

October 2019

*Graham Gobieski, Amolak Nagi, Nathan Serafin, Mehmet Meric Isgenc, Nathan Beckmann, Brandon Lucia*

### **MANIC: A Vector-Dataflow Architecture for Ultra-Low-Power Embedded Systems**

Arm Research

Summit

September 2019

*Graham Gobieski, Amolak Nagi, Nathan Serafin, Mehmet Meric Isgenc, Nathan Beckmann, Brandon Lucia*

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<b>MANIC: An Energy-Efficient, Parallel Architecture for Ultra-Low-Power Embedded Systems</b> Graham Gobieski, Amolak Nagi, Nathan Serafin, Mehmet Meric Isgenc, Nathan Beckmann, Brandon Lucia	PDL (Parallel Data Lab) May 2019
<b>Intelligence Beyond the Edge: Inference on Intermittent Embedded Systems</b> Graham Gobieski, Brandon Lucia, Nathan Beckmann	ASPLOS 2019 April 2019
<b>Intermittent Deep Neural Network Inference</b> Graham Gobieski, Nathan Beckmann, Brandon Lucia	SysML 2018 January 2018

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## Talks

<b>SNAFU: An Ultra-low-power, Energy-minimal CGRA-Generation Framework and Architecture</b>	ISCA 2021 June 2021
<b>Architectures for Energy-minimal, On-device Machine Learning</b>	AMD May 2021
<b>Architectures for Energy-minimal, On-device Machine Learning</b>	Apple May 2021
<b>MANIC: A Vector-Dataflow Architecture for Ultra-Low-Power Embedded Systems</b>	MICRO 2019 October 2019
<b>Intelligence Beyond the Edge: Inference on Intermittent Embedded Systems</b>	ASPLOS 2019 April 2019

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## Teaching

<b>Graduate Computer Architecture</b> Teaching assistant for Prof. Nathan Beckmann	Carnegie Mellon 2020
<b>Parallel Computer Architecture and Programming</b> Teaching assistant for Prof. Nathan Beckmann and Randal Bryant	Carnegie Mellon 2019
<b>Programming Languages and Translators</b> Teaching assistant for Prof. Stephen Edwards	Columbia University 2016-2017
<b>Honors Introduction to Computer Science</b> Teaching assistant for Prof. John Kender	Columbia University 2015

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## Technical Skills

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**Languages:** C, C++, Python, System Verilog, Shell

**Tools:** Cadence Genus, Cadence Xcelium, PyTorch, Verilator, MongoDB

**Simulation:** RTL simulation and custom architectural simulation

**Platforms:** RISC-V, MSP430, ARM M-class MCUs, Linux, Nvidia GPU

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## Personal

Background: Born 1995 in Cleveland, Ohio

Citizenship: United States of America

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Last Updated: September 2021