UROC Fall 2023 Opportunities

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School of Computer Science

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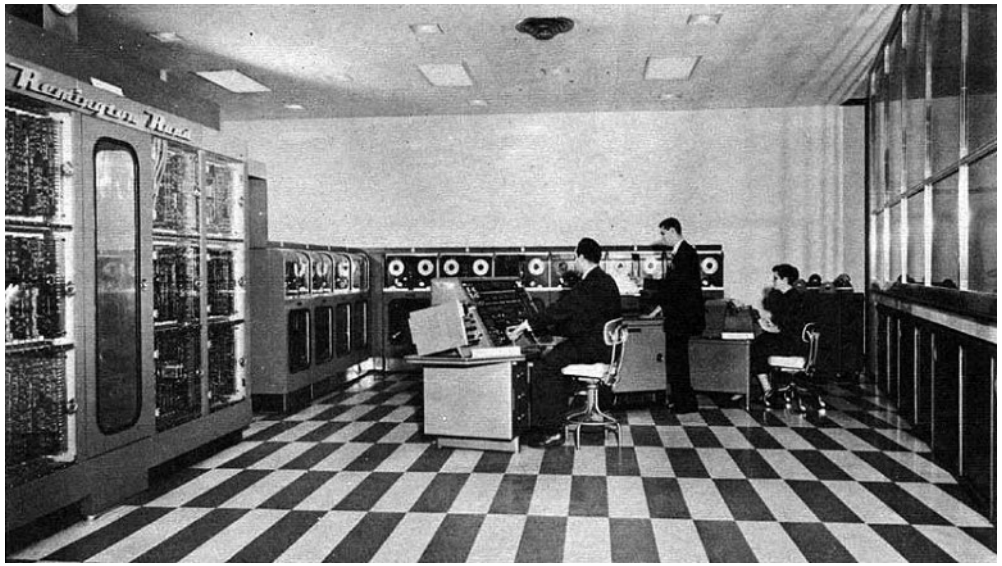
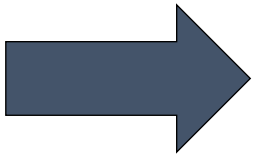
The past 30-50 years has seen great improvements in power and performance due to *transistor scaling*.



Univac 1 – an entire room



Today's hand-held supercomputer

But.. This scaling is coming to an end. We need ***new technologies and techniques*** to continue scaling power and performance.

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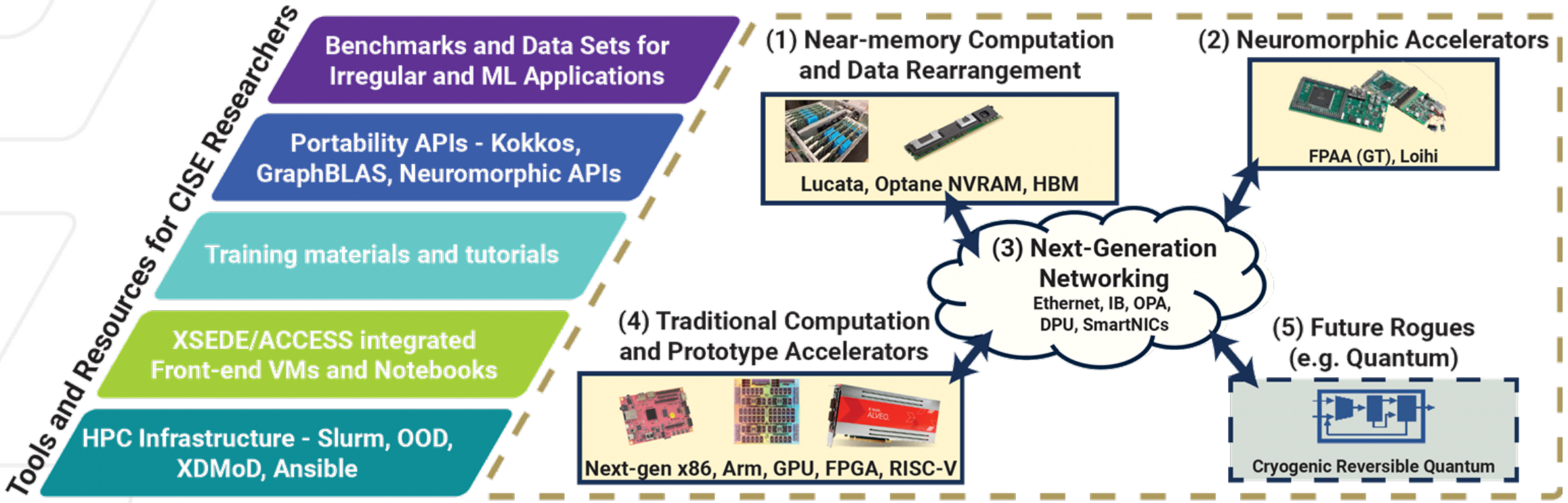
The Rogues Gallery



The Rogues Gallery is a novel architecture testbed with technologies that are currently too “rogue” for mainstream computing.

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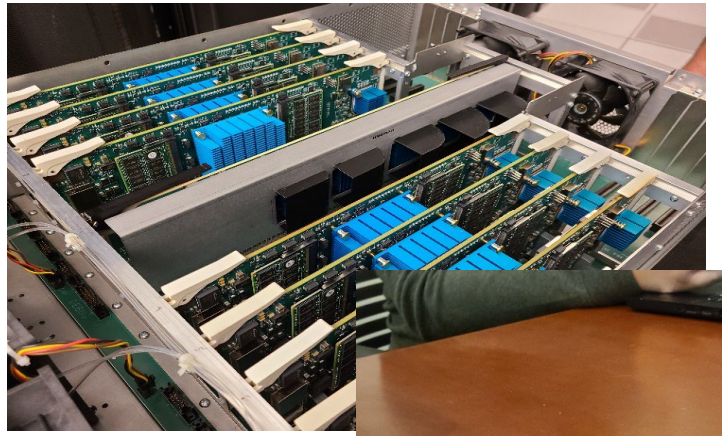
Rogues Gallery VIP Team

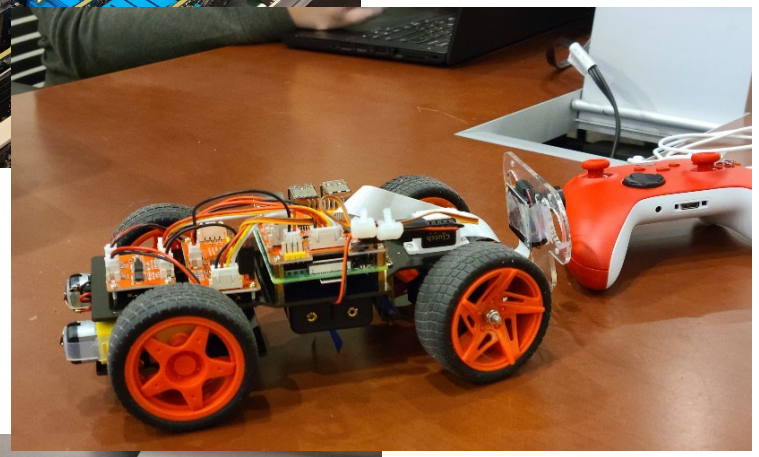
What are we trying to do?

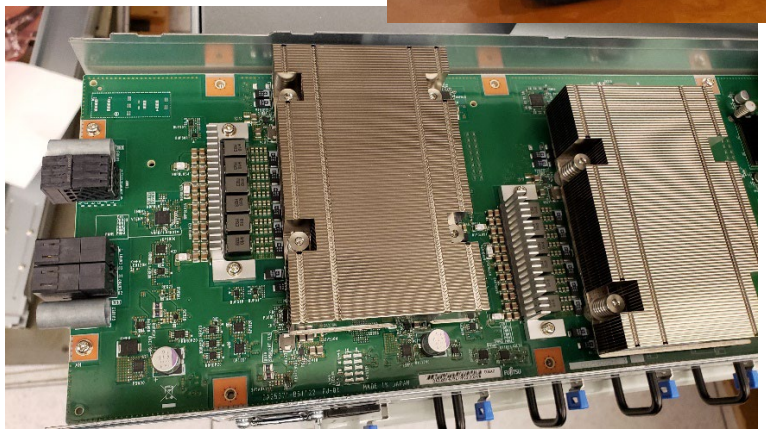
- We are looking at novel hardware and ways to program them via a new testbed called the Rogues Gallery.

What have previous students looked at?

- Machine learning for image recognition on the Emu Chick, a novel machine where computation moves rather than data
- Neuromorphic applications for graph analysis and genomics with the FPAA
- Quantum computing – analysis of tools and benchmarking for current-generation systems







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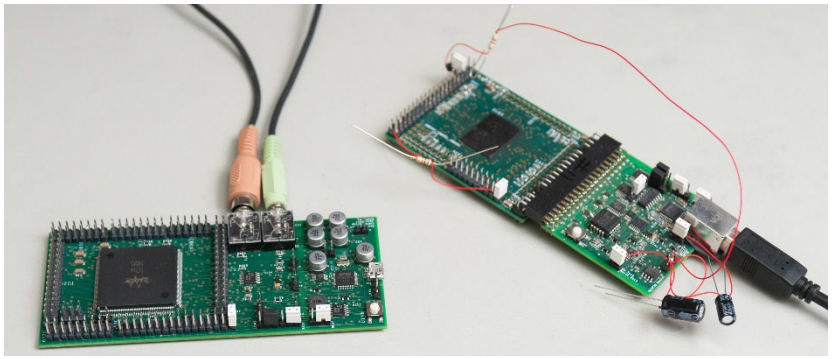
VIP Team Details

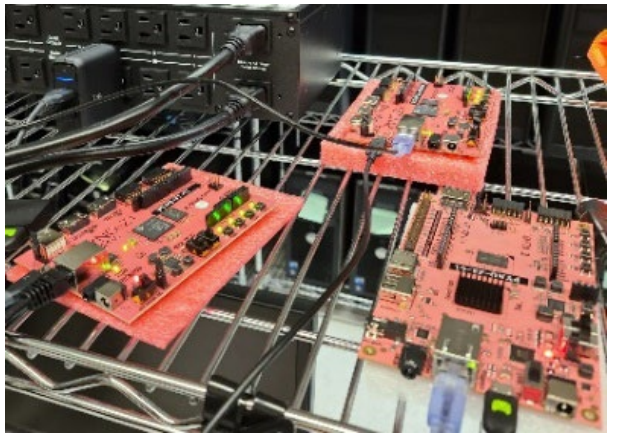
Class meets at 10-10:50 Wednesdays on Coda 12th floor

- 1-3 credit hours; *most work happens with your sub-team!*



Possible teams:

- Near-memory
- Neuromorphic Simulation and FPAA framework
- Quantum Computing
- Reconfigurable Computing



What skills are needed?

- Minimum: Good knowledge of Linux, SSH, previous programming experience (C/C++/Python), linear algebra
- Preferred: Having taken ECE 3400 (for the FPAA), CX 4220 (for near-memory), CS 3220 (reconfigurable)

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Additional Research Opportunities

Software Engineering for Scientific Computing

- Improving the quality of scientific simulations via better software engineering
- We have a new **Open Source Program Office** to promote *open-source computing* best practices

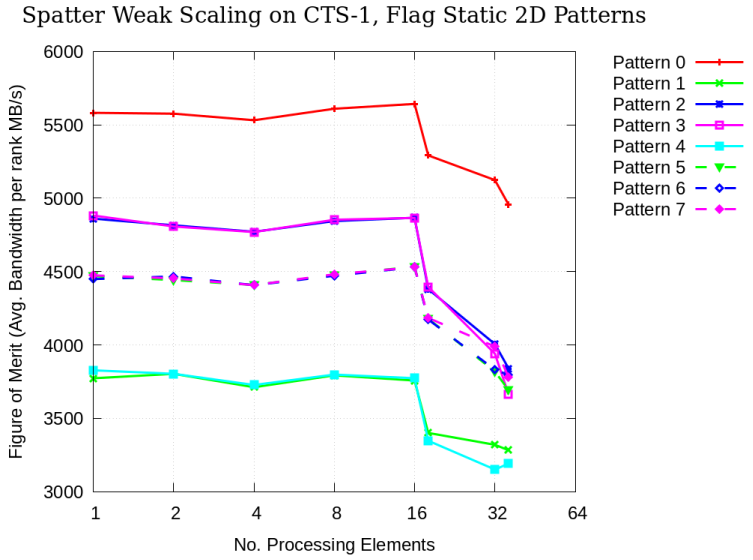
CRNCH Rogues Gallery Development

- Helping to build new documentation and tutorials to support novel architectures as part of the Rogues Gallery
- Working on near-memory benchmarks like ***Spatter***

Neuromorphic Research Framework Development

- Mapping neuromorphic algorithms to the Field Programmable Analog Array using RASP and Nengo tools

Please see https://jyoung3131.github.io/students/student-research/ for more details.



Spatter related research from: https://lanl.github.io/benchmarks/4_spatter/spatter.html

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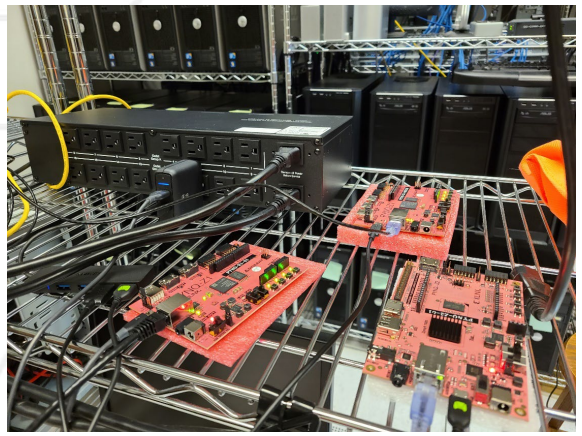
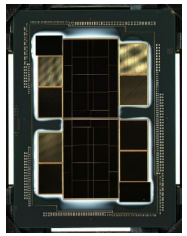
Learn More / Contact Information



Sign up for our VIP team or reach out for research opportunities
https://www.vip.gatech.edu/teams/vwa

See general research opportunities at
https://jyoung3131.github.io/students/student-research/

Email questions to **Dr. Young - jyoung9@gatech.edu**



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