

Jennifer Brana

UNDERGRADUATE, UNIVERSITY OF PORTLAND

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Research Interests

My research interests lie in the design of heterogeneous architectures with a focus on improving the efficiency and programmability of future heterogeneous memory systems.

Research areas: computer architecture; heterogeneous architectures; caching; cache coherence.

Education

University of Portland

B.S. IN COMPUTER SCIENCE

- Minor in Computer Engineering.

Portland, OR

Aug. 2019 - PRESENT

Professional Experience

Computer Organization Research Group (CORGi)

UNDERGRADUATE RESEARCH ASSISTANT

- Designed novel non-inclusive hierarchical cache coherence protocol to simplify the integration of cache-attached accelerators.
- Researched methods to reduce the verification complexity of coherence protocols and to minimize the impact of accelerator integration within the cache hierarchy on processor performance.
- Verified protocols using the Murphi model checker and built discrete-event cache simulator using Python to model protocol behaviour.

Carnegie Mellon University

May 2022 - Present

Team Lift

SENIOR CAPSTONE

- Worked in a team of 5 students to design a cyber-physical system to monitor and control an irrigation system in Karonga, Malawi.
- Explored methods to deploy and connect a network of sensors and computation nodes in an environment lacking basic infrastructure.

Portland, OR

Aug. 2022 - Present

University of Portland

RESEARCH ASSISTANT

- Investigated CPU specialization methods to increase the performance and efficiency of Viterbi Decoding.
- Simulated processor architecture using gem5 and generated modeled processor power consumption using McPat.
- Performed low-level algorithm optimizations using RISC-V assembly language and in-line assembly.

Portland, OR

Jan. 2022 - May 2022

University of Portland

UNDERGRADUATE RESEARCH ASSISTANT

- Researched EEG-based view of comprehension of truth statements to understand how humans process undefined statements.
- Assembled hardware framework for conducting experiments and developed synchronization mechanisms for system components.

Portland, OR

May 2021 - August 2021

ConnectPV

ENGINEERING/OPERATIONS INTERN

- Designed parts and product drafts for solar combiner boxes using SolidWorks.
- Analyzed product line capabilities and communicated with suppliers to implement a new Materials Requirements Planning system.

San Diego, CA

May 2020 - August 2020

Publications

Kobold: Simplified Cache Coherence for Cache-Attached Accelerators

Jennifer Brana, Brian C. Schwedock, Yatin A. Manerkar, Nathan Beckmann

WDDSA @ MICRO 2022

Talks and Posters

Kobold: Simplified Cache Coherence for Cache-Attached Accelerators

WDDSA @ MICRO, 2 Oct. 2022

Kobold: Simplified Cache Coherence for Cache-Attached Accelerators

SRC @ MICRO, 3 Oct. 2022

Comparison of Computer Architecture Specialization Methods for Performance and Power Efficiency

University of Portland Founders' Day, 12 April 2022

Service & Leadership

Tau Beta Pi

University of Portland

CHAPTER PRESIDENT

2021 - 2022

- Responsible for planning meetings and activities to engage club members ranging from career development to design competitions.

Society of Women Engineers

University of Portland

MENTOR

2020 - Present

- Mentored freshman girls in the engineering program.

Tutoring Working Group

University of Portland

STUDENT REPRESENTATIVE

2021

- Worked with faculty members to redesign the tutoring program for the school of engineering to increase freshman and sophomore retention rates.

Teaching

University of Portland

Theory of Computation (CS 357)

Grader, Fall 2022

Digital Systems Design (EE 332)

Tutor, Spring 2022

Signals & Systems (EE 262)

Tutor, Spring 2022

Logic Design (EE 231)

Grader and Tutor, Fall 2021

Electrical Circuits (EE 261)

Tutor, Fall 2021-Spring 2022

Electrical Circuits Lab (EE 271)

Lab Assistant, Spring 2021

Skills

Programming Languages

C, C++, Python, Java, Assembly, MATLAB, Verilog HDL, LaTeX

Parallel Programming

Experience in parallel/GPU computing using CUDA C/C++, OneTBB

Computer Architecture Tools

gem5, McPat, HieraGen/ProtoGen, Murphi model checker

Other

Proficiency with Unix, SSH, Git/Github, Xcode, VSCode. Experience in Agile