Jennifer Brana

PhD Student, Carnegie Mellon University

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Research Interests

I am interested in the intersection of hardware and software systems, particularly in the areas of parallel computing and heterogeneous systems. My aim is to increase the scalability and sustainability of future computing systems.

Research areas: computer architecture; computer systems; near-data processing; formal methods; sustainability.

Education

Carnegie Mellon University — *Pittsburgh, PA*

PH.D IN COMPUTER SCIENCE — *June 2023 - Present*

Advisor: NATHAN BECKMANN

University of Portland — *Portland, OR*

B.S. IN COMPUTER SCIENCE, *Cum Laude* — *Aug. 2019 - May 2023*

MINOR IN COMPUTER ENGINEERING.

Publications

Kobold: Simplified Cache Coherence for Cache-Attached Accelerators — *IEEE CAL 2023*

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

Kobold: Simplified Cache Coherence for Cache-Attached Accelerators — *WDDSA @ MICRO 2022*

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

Honors & Awards

2023 **NSF Graduate Research Fellowship,** National Science Foundation
2023 **Cum Laude,** University of Portland
2023 **Outstanding Student Award,** Computer Science Department, University of Portland
2020 **Tau Beta Pi Induction,** Oregon Gamma, University of Portland
All terms **Dean's List,** University of Portland
2019-2023 **President's Scholarship,** University of Portland
2019-2023 **FIRST Robotics Scholarship,** University of Portland

Professional Experience

Carnegie Mellon University — *Pittsburgh, PA*

GRADUATE RESEARCH ASSISTANT — *June 2023 - Present*

- Researching in computer architecture and computer systems.

AMD — *San Jose, CA*

RESEARCH INTERN — *June 2024 - August 2024*

- Researching near-cache computing systems.
- Mentor: Alireza Kaviani

Carnegie Mellon University — *Pittsburgh, PA*

UNDERGRADUATE RESEARCH ASSISTANT — *May 2022 - May 2023*

- Researched design methodologies for novel cache coherence protocols and designed protocols for cache-attached accelerators.
- Worked with Prof. Nathan Beckmann as part of the REU in Software Engineering.

Team Lift — *Portland, OR; Karonga, Malawi*

SENIOR CAPSTONE — *Aug. 2022 - May 2023*

- Designed a connected network of sensors and computation nodes for an infrastructure-limited environment in Malawi, Africa.

University of Portland *Portland, OR*

Undergraduate Researcher *Jan. 2022 - May 2022*

- Investigated CPU specialization methods to increase the performance and efficiency of Viterbi Decoding.

Intelligent, Complex, Adaptive, and Networks Lab *University of Portland*

Undergraduate Research Assistant *May 2021 - August 2021*

- Researched EEG-based view of comprehension of truth statements to understand how humans process undefined statements.

Talks and Presentations

Kobold: Coherence for Near-Cache Accelerators — *CMU Parallel Data Lab Workshop, 7 Nov. 2023*

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

Graduate Student Assembly *Carnegie Mellon University*

Computer Science Department Representative *Fall 2023 - Present*

- PhD student representing the Computer Science Department in the CMU Graduate Student Assembly.

PhD Open House Committee *Carnegie Mellon University*

Member *Spring 2024*

- Organized Open House for prospective PhD students.

Tau Beta Pi *University of Portland*

Oregon Gamma Chapter President *2021 - 2022*

- Planned meetings and activities to engage club members ranging from career development to design competitions.

Society of Women Engineers *University of Portland*

Mentor *2020 - 2023*

- Mentored freshman girls in the engineering program.

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*

Mentoring

Research Advising

Bas Yoovidhya (CMU CS masters student) — *Fall 2023 - Present*

Mayne Mei (University of Michigan CS undergraduate, advised with Prof. Yatin Manerkar) — *Fall 2023*

Skills

Programming Languages	C, C++, Python, Java, Assembly (including RISC-V), MATLAB, Haskell, Verilog HDL, LaTeX
Parallel Computing	Experience in parallel algorithm design and programming using CUDA, OneTBB, and pthreads
Computer Architecture Tools	Experience using gem5, SLICC, McPat, Murphi Model Checker, CACTI, ProtoGen/HieraGen, Pin tools
Other	Proficiency with Unix, SSH, Git/Github, Xcode, VSCode. Experience with LLVM