YANWEN (IVAN) XU

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EDUCATION

University of California, Santa Cruz September 2020 - Present (expected March 2026)
Ph.D. in Computer Science and Engineering ADVISOR: TYLER SORENSEN

- THESIS: *Accelerator-Oriented Programming Models and Compiler Techniques for Edge-Computing Workloads on Heterogeneous CPU-GPU Architectures*

University of California, Santa Cruz September 2016 - June 2020
B.S. Double Major in Computer Science and Computer Game Design

WORK EXPERIENCE

Samsung Advanced Computing Lab September 2025 – Present
Senior Engineer - GPU Compute Team *San Jose, CA*

Mercedes-Benz Research & Development North America April 2024 – September 2024
Embedded Software Intern – Middleware Team *Santa Clara, CA*

- Contributed to the next-generation middleware stack for L3/L4 autonomous driving, focusing on GPU programming model modernization and cross-platform tooling for embedded systems.

IBM Institute of Government Innovation June 2016 - August 2016
Marketing Intern *Beijing, China*

RESEARCH EXPERIENCE

Concurrency and Heterogeneous Programming Lab March 2021 – Present
Ph.D. Researcher *UC Santa Cruz*

- Optimizing real-time ML (CIFAR-based) and robotic (Octree) workloads through fine-grained pipeline-parallel scheduling on big.LITTLE architectures with integrated GPUs. Applied benchmark-driven load balancing using CUDA and Vulkan to accelerate diverse edge workloads under tight compute and power constraints.
- Investigating cross-platform heterogeneous programming models for CPU-GPU-FPGA SoCs in resource-constrained edge computing. Developed *Redwood*, a flexible framework for tree-based applications with CUDA and SYCL backends, enabling unified memory access and portable performance across embedded platforms.

DECADES Project Software Team March 2021 – May 2023
External Research Collaborator *Princeton University*

- Collaborated with Princeton, Columbia, and UCSC on a heterogeneous many-core system, contributing compiler and runtime support for efficient CPU-FPGA/GPU execution.
- Designed a novel heterogeneous decoupling method, achieving a 2× speedup on Barnes-Hut; results were used in Phase 2 of DARPA SDH program and contributed to selection for Phase 3.

Augmented Design Lab May 2019 – August 2020
Undergraduate Researcher *UC Santa Cruz*

- Built procedural simulation tools in Unreal Engine for autonomous vehicle scenario generation; collaborated with Ford Motor Company's Autonomy Division on simulation development.

PUBLICATIONS

- R. Sharma, R. Levine, A. Srikanth,**Yanwen Xu**, T. Sorensen. "GPU Goldmines: Specifying, Executing, and Analyzing Tunable AI Shaders in the Browser using WebGPU." (Under-submission)
- **Yanwen Xu**, R. Sharma, Z. Chen, S. Mistry, T. Sorensen. "BetterTogether: An Interference-Aware Framework for Fine-grained Software Pipelining on Heterogeneous SoCs." *IEEE International Symposium on Workload Characterization (IISWC)*, 2025. [**Best Paper Award**]
- **Yanwen Xu**, A. Li, T. Sorensen. "Evaluating Shared Memory Heterogeneous Systems Using Traverse-Compute Workloads." *Open-Source Computer Architecture Research (OSCAR) Workshop*, 2023.
- **Yanwen Xu**, A. Li, T. Sorensen. "Redwood: Flexible and Portable Heterogeneous Tree Traversal Workloads." *IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*, 2023.
- **Yanwen Xu**, T. Sorensen. "REDwood: Heterogeneous Implementation of Tree Applications with Accelerated REDuctions." *Parallel Architectures and Compilation Techniques (PACT)*, ACM Student Research Competition (SRC), 2022.
- I. Paranjape, A. Jawad, **Yanwen Xu**, A. Song, J. Whitehead. "A Modular Architecture for Procedural Generation of Towns, Intersections and Scenarios for Testing Autonomous Vehicles." *IEEE Intelligent Vehicles Symposium (IV)*, 2020.

TEACHING EXPERIENCE

University of California, Santa Cruz Spring 2022/Fall 2023/Spring 2025

- Teaching Assistant for CSE110A *Fundamentals of Compiler Design*, $\times 2$
  - Developed homework and automated grading infrastructure.
- Teaching Assistant for CSE13S *Computer Systems and C Programming*, $\times 1$
  - Led weekly discussion sections, office hours, and supported grading and student mentoring.

ACADEMIC SERVICES

- Reviewed technical paper submissions for the *Workshop on Irregular Applications: Architectures and Algorithms (IA^3)* at the Supercomputing (SC) conference in 2022, 2023, 2024, and 2025.
- Hosted visiting scholars for the *Cal-Bridge Symposium* at UC Santa Cruz, providing academic and logistical support in August 2022.

SKILLS

Languages	C++17/20, CUDA, SYCL, Python, Rust, C, GLSL
Heterogeneous Computing	GPU programming, Vulkan, Intel oneAPI, ROCm, OpenMP
Embedded Platforms	NVIDIA Jetson Orin, Android, memory-constrained SoCs
Tools	CMake, LLVM, Nsight System, Android NDK, Git, Linux Devel
Simulation	Unreal Engine, ADAS/AV scenario generation
Research Focus	Compiler/runtime co-design, HW/SW co-design, microbenchmarking
Hobbies	USA Fencing Certified Sport Fencing Coach: Provost at Arms.