YANWEN XU

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EDUCATION

University of California, Santa Cruz September 2020 - Present (expected Spring 2025)
Ph.D. in Computer Science and Engineering ADVISOR: TYLER SORENSEN

- RESEARCH FOCUS: Accelerator-oriented programming models for heterogeneous computing architectures, with an emphasis on optimizing modern edge-computing workloads through the use of C++17 with CUDA and SYCL.

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

- **Awards:** Dean's Honor List; Ambitious Summer Award; Winner of the 2018 UCSC ACM Hackathon.

RESEARCH EXPERIENCE

Languages, Systems, and Data Lab, UC Santa Cruz March 2021 - Present
Ph.D. Researcher

- Conducting research on heterogeneous programming models and scheduling approaches for workloads with varied computational phases, intensities, and memory access patterns; emphasizing on optimization for unified memory architectures.
- Accelerating modern edge-computing workloads on heterogeneous CPU-GPU systems with CUDA, SYCL, and Vulkan; and CPU-FPGA systems with HLS.

DECADES Project Software Team, Princeton University March 2021 - May 2023
External Collaborator

- Collaborated with a multi-university team (Princeton, Columbia, UCSC) on the DECADES project, on designing a heterogeneous many-core system; and providing the software stack, e.g., compilers and runtime for applications to efficiently execute on the architecture..
- Innovated a heterogeneous decoupling method that achieved a 2× performance increase (compared to the previous approach of the team) for the Barnes-Hut benchmark using the CPU-FPGA DECADES processing units.
- Engaged in the evaluation of the CPU-Accelerator model, and investigated HW/SW co-design for the DECADES architecture; Results were included in the phase 2 of DECADES evaluation and the project was selected to phase 3 in the DARPA Software Defined Hardware program.

Augmented Design Lab, UC Santa Cruz May 2019 - August 2020
Undergraduate Researcher

- Developed Unreal Engine plugins for procedural content generation, enabling dynamic creation of complex testing scenarios such as intersections, crucial for autonomous vehicle simulation purposes.
- This is a collaboration with Ford Motor Company, Autonomy Divisions.

PUBLICATIONS (CONFERENCE)

- **Yanwen Xu**, Ang Li, Tyler Sorensen. Redwood: Flexible and Portable Heterogeneous Tree Traversal Workloads. *IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS) 2023*
  - Has CUDA and SYCL backends: //github.com/xuyanwen2012/redwood-rt

PUBLICATIONS (WORKSHOP/POSTER)

- **Yanwen Xu**, Ang Li, Tyler Sorensen. Evaluating Shared Memory Heterogeneous Systems Using Traverse-Compute Workloads. *Open-Source Computer Architecture Research (OSCAR) 2023 workshop*
- **Yanwen Xu**, Tyler Sorensen. REDwood: Heterogenous Implementation of Tree Applications with Accelerated REDuctions. *Parallel Architectures and Compilation Techniques (PACT) 2022.* ACM Student Research Competition, Poster Session
- Ishaan Paranjape, Abdul Jawad, **Yanwen Xu**, Asiiah Song, Jim Whitehead. A Modular Architecture for Procedural Generation of Towns, Intersections and Scenarios for Testing Autonomous Vehicles. *IEEE Intelligent Vehicles Symposium (IV) 2020 workshop*

TEACHING EXPERIENCE

University of California, Santa Cruz Spring 2022/Fall 2023
Teaching Assistant

- TA for CSE110 *Fundamentals of Compiler Design*:

  Assisted in course development; created program assignment templates and developed a subset of the C language specifically for educational purposes; provided office hours support; and graded assignments and exams.

- TA for CSE13S *Computer Systems and C Programming*:

  Conducted office hours; led lab and discussion sessions; and graded homework.

WORK EXPERIENCE

Xiaomi Interactive Entertainment July 2017 - August 2017
Game Operator Intern *Beijing, China*

- Assisted maintaining newly released Android mobile games on Xiaomi App Store.
- Facilitated negotiations with game developers to explore collaborative opportunities.

IBM (China) Institute of Government Innovation June 2016 - July 2016
Marketing Intern *Beijing, China*

- Participated in survey interviews of colleges and universities, enterprises, and training organizations, analyzed contents, and wrote reports.
- Conducted independent case studies on strategic partnerships between universities and enterprises, and wrote detailed reports summarizing collaborative models and outcomes.

ACADEMIC SERVICES

- Served as a **Sub-reviewer** for the *Workshop on Irregular Applications: Architectures and Algorithms (IA^3)* at the Super Computing (SC) conference in 2022 and 2023.
- Assisted in hosting visiting scholars for the *Cal-Bridge Symposium* at the UCSC in August 2022.