

Xuan Wang

xuw009@ucsd.edu / 858-263-8287

<https://xuan-wang-summer.github.io/xuanwang.github.io/>

Education

University of California, San Diego

GPA: 4.0 / 4.0

Ph.D. in Computer Science and Engineering

Expected 2027

Advisor: Prof. Tajana Rosing

University of California, San Diego (Double Major) (Cum Laude)

GPA: 3.86 / 4.0

B.S in Computer Engineering (Major GPA: 3.894 / 4.0)

Jun. 2023

B.S in Applied Mathematics (Major GPA: 3.976 / 4.0)

Jun. 2023

Publication

- **Xuan Wang***, Minxuan Zhou*, Tajana Rosing, “**Fast-OverlaPIM**: A Fast Overlap-driven Mapping Framework for Processing In-Memory Neural Network Acceleration”, *in submission*.
- Behnam Khaleghi, Xiaofan Yu, Jaeyoung Kang, **Xuan Wang**, Tajana Rosing, “Private and Efficient Learning at the Edge with Hyperdimensional Computing”, *in submission*.
- Minxuan Zhou*, **Xuan Wang***, Tajana Rosing, “**OverlaPIM**: Overlap Optimization for Processing In-Memory Neural Network Acceleration”, *Design, Automation, and Test in Europe (DATE '2023)*.

* Co-first authors.

Selected Research Projects

Domain-Specific Acceleration with Fully Homomorphic Encryption (Advised by Prof. Tajana Rosing)

Oct. 2023- Present

- Investigating fully homomorphic encryption and hardware simulators for domain-specific acceleration.

(Fast-)OverlaPIM: Overlap Optimization for PIM NN Acceleration (Advised by Prof. Tajana Rosing)

Apr. 2021- Oct. 2023

- Developed **OverlaPIM**, a hardware-software co-design DNN mapping framework on PIM, produced **2.10x to 4.11x** faster mappings through input-output computational overlap and transformation in C++ with baseline Timeloop.
- Optimized framework to evaluate whole DNN model in design space instead of a single layer.
- Co-designed between architecture constrains and framework to generate better mapping in **(Fast-)OverlaPIM**.

Genomics Pairwise Sequence Alignment Acceleration (Advised by Prof. Yatish Turakhia)

Apr.2022 - Sept.2022

- Implemented PEs and SRAMs ASIC design for genomics pairwise sequence alignment acceleration in System Verilog.
- Collected ALUTs resources, registers, and Fmax data by synthesizing on Vivado.

BASEDNet: Baseline Detection for Historical Documents (Advised by Prof. Taylor Berg-Kirkpatrick)

Oct. 2020 – Jun.2021

- 1 of 49 students chosen for CSE Early Research Scholars.
- Implemented BASEDNet, a DNN model in Tensorflow and evaluated using the IoU formula.

Technical Skills/Selected Coursework

- **Technical Language**: C++, Python, C, System Verilog, Java, Julia, SageMath, Markdown ARM assembly, HTML.
- **Tools and Skills**: OpenGL, Cuda, PyTorch, MATLAB, Vivado, LTspice, LaTeX, Unix/Linux, Git, VS Code, Visual Studio, Bash, GitHub, TensorFlow, Docker, NumPy, Jupyter Notebook.
- **CS Coursework**: Computer Architecture, Parallel Computing, Operating System, Fully Homomorphic Encryption, Digital System Design, Circuit Design, Artificial Intelligence, Data Mining, Data Structure, Algorithm, Prob & Stats, Signal & System.
- **Mathematics Coursework**: Linear & Nonlinear Optimization, Graph Theory, Combinatorics, Geometric Computer Graphics, Real Analysis, Advanced Linear Algebra, Calculus.

Honors and Awards

- **TRELS** (Triton Research & Experimental Learning Scholars) Quarterly Awards (WI23)
- **Tau Beta Pi** Engineering Honor Society (2021-present)
- Thurgood Marshall College Honor Program (2021-2023)
- **Provost Honors**: FA19, WI20, SP20, WI21, SP21, FA21, WI22, SP22.
- Provincial Second Prize in National Chemistry Olympiad (2018).