Timothy Jacques

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Education

University of California, Los Angeles (UCLA) — Los Angeles, CA
B.S. Computer Engineering, August 2020 – March 2024 — GPA: **3.86**
M.S. Electrical and Computer Engineering, Expected start Fall 2024

Courses Digital Electronic Circuits, Adv. Computer Arch., Digital Signal Processing, Operating Systems, Software Const., Data Science

Experience

UCLA Communications Systems Lab — Los Angeles, CA
Undergraduate Researcher under Professor Richard Wesel, PhD — May 2023 – Present
- Designed an end-to-end hardware testbench on a Xilinx MPSoC FPGA to benchmark an LDPC decoder implementation
- Utilized Vivado, Vitis IDE to design encoder and noise generator modules, integrate embedded CPU and FPGA using AXI-Stream
- Performed simulations in MATLAB, Python, and CUDA to verify hardware results and to optimize RTL, improving performance by 15%

UCLA Secure Systems and Architectures Lab — Los Angeles, CA
Undergraduate Researcher under Professor Nader Sehatbakhsh, PhD — October 2021 – September 2022
- Developed covert data transmission methods that utilize side-channel RF emissions from tranceiverless embedded devices
- Designed MATLAB DSP and ML pipeline for side-channel based device identification that achieved 92% accuracy
- Publications:
  - *"Everything has its Bad Side and Good Side: Turning Processors to Low Overhead Radios Using Side-Channels."*
    Justin Feng, **Timothy Jacques**, Omid Abari, and Nader Sehatbakhsh.
    The 22nd International Conference on Information Processing in Sensor Networks (IPSN '23).
  - *"Fingerprinting IoT Devices Using Latent Physical Side-Channels."*
    Justin Feng, Tianyi Zhao, Shamik Sarkar, Dominic Konrad, **Timothy Jacques**, Danijela Cabric, and Nader Sehatbakhsh.
    Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT '23).

IEEE at UCLA — Los Angeles, CA
FPGA Digital Design Project Lead (22-23), Project Member (21-22) — May 2022 – June 2023
- Led FPGA project that introduces students to Verilog, digital design fundamentals, RTL simulation, and hardware DSP
- Redesigned project curriculum to include FPGA design lectures on FSMs, I^2C drivers, pipelining, Fast Fourier transforms, VGA
- Prepared 8 lectures, 8 labs, and 5 hands-on workshops for 60 students over the course of the school year

IEEE at UCLA — Los Angeles, CA
Micromouse Project Lead (21-22), Project Member (20-21) — May 2021 – June 2022
- Led autonomous maze-solving robot project involving PCB Design, PID controllers, and maze-solving algorithms
- Managed year-long budget and coordinated a competition between 3 universities with over 25 individual teams
- Researched and developed custom STM32 microcontroller board with infrared sensors, motors, and power electronics
- Prepared 6 technical lectures, 8 hands-on assignments, labs, and code skeletons for >75 students

Fluid Components International — San Marcos, CA
Electrical Engineering Intern — Summer 2020, Summer 2021
- Wrote calibration program for industrial flowmeters, increasing production speed by 200% and tightening tolerances by 15%
- Diagnosed and repaired >50 malfunctioning motherboards at the SMD component level, patched firmware root issue

Projects

Simulated RISC-V Processor | Honors Advanced Computer Architecture Project — November 2022 - December 2022
- Implemented 2-issue, 7-stage pipelined, out-of-order RISC-V processor in SystemVerilog to handle R, S, I-type instructions
- Utilized ModelSim to write, simulate, and debug logic modules using batch scripts and waveform analysis

FPGA Brickbreaker Game | SystemVerilog FPGA Project — April 2022
- Recreated classic arcade game on Intel Altera FPGA using custom hardware VGA display and I^2C controllers
- Reverse-engineered Wii Nunchuck I^2C protocol using genuine Wii hardware and logic analyzer to control player in game
- Used Intel Quartus, ModelSim to implement collision FSMs, I^2C nunchuck driver, and to debug, testbench modules

Skills

Languages SystemVerilog, MATLAB, Embedded C, Python, C++
Software Xilinx Vivado, Vitis, Intel Quartus, ModelSim, Linux, Git, Bash, Autodesk EAGLE, Fusion 360
Tools SMD Soldering, Logic Analyzer, Oscilloscope, Software-Defined Radio, Signal Analyzer, 3D Printing