

# Paul Jackson

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## Education

Princeton University, Princeton, NJ (Ph.D. Student 2015 – Present, M.A. 2017)

Focus: Energy Efficiency and Scalable Manycore Computer Architectures  
Advisor: David Wentzlaff

Cornell University, Ithaca, N.Y. 14853 (B.S. 2015)

Major: Electrical and Computer Engineering, GPA: 3.901  
Minor: Computer Science

## Project Experience

Princeton Parallel Research Group (2016 – Present), Prof. David Wentzlaff

*Sub-word Serial Computation* – Analyze bit-parallel core for energy and area savings potential. Perform area, energy, and power analysis with Synopsys Design Compiler, IC Compiler, and PrimeTime. Design and implement a sub-word serial RISC-V processor in Verilog, optimizing microarchitectural parameters to improve energy and area characteristics. Optimize critical path for timing and energy efficiency.

*DECADES* – Design intelligent storage tile for heterogeneous manycore architecture performing decoupled computation to be taped out in early 2020. Perform detailed profiling of machine learning and graph applications to identify target workloads.

*OpenPiton* – Develop and test new features of software suite used in cutting-edge research on many-core processors. Integrate novel RISC-V core into infrastructure into coherent memory system. Improve gate-level simulation infrastructure to verify physical implementation functionality. Compile SPARC cross-compiler to enable more complex software tests.

*Piton* – Characterize power performance of 25-core academic chip on SPEC2006 benchmark suite. Write parallel histogram assembly application to benchmark multithread vs. multicore energy consumption.

*Biodegradable Computing* – Build cross compiler to enable high-level benchmarks to run on architectural simulators simulating biodegradable technologies

Undergraduate Researcher (2014), Prof. Christopher Batten

Created, optimized, and analyzed performance of benchmarks evaluating the Xloops architecture, which extracts fine-grain parallelism inherent in executing multiple iterations of a software loop.

Undergraduate Researcher (June-August 2013), Prof. Zhiru Zhang

Used high-level synthesis to turn a C-based image processing algorithm into a hardware design on an FPGA. Used Vivado HLS and Xilinx Design Suite to create preliminary design for more complex hardware system implementing a similar image processing algorithm.

Cornell University Satellite Team, CUSat (Fall 2011 – Spring 2014), Prof. Mason Peck

*Program Manager (Spring 2013 – Spring 2014)* – Coordinated the subsystem teams and kept the team on schedule in preparation for launch and throughout mission life of a nanosatellite launched in September 2013.

*Systems Engineering Lead (Fall 2012)* – Primary Air Force Research Laboratory contact, including on-site system troubleshooting; responsible for satellite hardware and software interactions and the systems-level satellite behavior; reviewed extensive flight code written in C; performed analysis on failures in flight hardware determining exact root causes for failures.

*Mission Operations Co-Lead (2012)* – Led sub-team through Mission Readiness Review; trained new members to use InControl software and MATLAB simulator; held weekly mission rehearsals to prepare for Fall 2013 launch.

## **Work History**

Intern, The MITRE Corporation (May-August 2014)

Designed application and GUI using C# with a C++ back-end to improve image processing analysis.

Lab Support, Cornell MAE Labs (June-August 2012)

Designed layout for breakout board for accelerometer IC, improved machining skills by creating fixtures to attach breakout boards to beams for measuring oscillation accelerations. Resulting product used in MAE course labs.

## **Teaching Experience**

Assistant Instructor – ELE475 Computer Architecture (Fall 2016)

Led help sessions and held office hours to aid graduate and undergraduate students understand the concepts and fundamentals in computer architecture to aid in laboratory assignments.

Assistant Instructor – Coursera – Computer Architecture (Summer 2016-Present)

Actively participate in online course discussion forums by answering questions and sparking discussion about course content. Redesign course assessments to better utilize MOOC infrastructure.

## **Awards and Honors**

National Defense Science & Engineering Graduate Fellowship – 2017

Magna Cum Laude – 2015 – Cornell University

Engineering Learning Initiatives Undergraduate Summer Research Award – 2013

Dean's List (8 of 8 semesters) – 2011 to 2015 – Cornell University

## **Publications**

Ting-Jung Chang, Zhuozhi Yao, **Paul J. Jackson**, Barry P. Rand, and David Wentzlaff, "Architectural Tradeoffs for Biodegradable Computing", In Proceedings of the 50<sup>th</sup> International Symposium on Microarchitecture, MICRO 2017

Michael McKeown, Alexey Lavrov, Mohammad Shahrads, **Paul J. Jackson**, Yaosheng Fu, Jonathan Balkind, Tri Nguyen, Katie Lim, Yanqi Zhou, and David Wentzlaff, "Power and Energy Characterization of an Open Source 25-core Manycore Processor", In Proceedings of the 24th IEEE International Symposium on High-Performance Computer Architecture (HPCA '18), February 2018.