

JACOB MURRAY

EDUCATION

- Aug 2010 – Aug 2014** **Washington State University** **Pullman, WA**
PhD in Electrical and Computer Engineering
- GPA: 3.98.
 - Outstanding Graduate Student 2014 in Computer Engineering
 - Outstanding Teaching Assistant 2011 in Computer Engineering
 - Research interests: Networks-on-chip, Green Computing, Microelectronics

- Aug 2006 – May 2010** **Washington State University** **Pullman, WA**
Bachelors of Science in Computer Engineering, Magna Cum Laude
- GPA: 3.86.
 - Outstanding Senior 2010 in Computer Engineering
 - Presidents Honor Roll
 - Electrical Engineering, Computer Science, Mathematics minors

RESEARCH

Graduate Research Projects

- Thermal evaluation of Network-on-Chip (NoC) with long-range wireless shortcuts
 - Characterization and evaluation of network thermal-profiles of conventional NoCs
 - Design of simulated annealing approach to determine placement of NoC shortcuts
 - Design of non-traditional NoC architectures to improve network thermal-profile
 - Design and optimization of irregular network routing strategies for improving network temperatures
- Dynamic Voltage and Frequency Scaling (DVFS) on Wireless NoC Architectures
 - Design of a history-based DVFS methodology for NoC architectures
 - Optimization (minimum energy-delay) strategy for link-level DVFS
 - Design of dual-level (CPU- and switch-level) DVFS methodologies for wireless NoCs
- Dynamic Thermal Management (DTM) in Wireless NoC Architectures
 - Design of temperature-aware rerouting methodology for irregular network topologies
 - Optimization (maximum hotspot temperature reduction) strategy for adaptive routing methodologies
 - Design of dual-level (CPU- and switch-level) DTM methodologies for wireless NoCs
- Joint Dynamic Thermal Management (DTM) and Dynamic Voltage and Frequency Scaling (DVFS) on Wireless NoC Architectures
 - Design of joint DTM and DVFS methodologies on wireless NoCs
 - Design of dual-level (CPU- and switch-level) DTM/DVFS methodologies on wireless NoCs

Undergraduate Research Projects

- Invented USB flash drive device capable of direct file transfer with another flash drive
 - Design of USB flash drive prototype using FPGA board
 - Implemented device capable of USB on-the-go (OTG) file transfer capability
 - Led a senior design team to 3rd place in Washington State University Business Plan Competition
 - Competed as an undergraduate finalist (top 5) in the 2010 National Collegiate Inventors Competition

JOURNAL AND BOOK PUBLICATIONS

- **Jacob Murray**, Paul Wettin, Partha P. Pande, Behrooz Shirazi. 2016. "Sustainable Wireless Network-on-Chip Architectures". **Elsevier**
- Michael Carosino, Jiyang Yu, Yiming Chen, Morteza Mehrnosh, Benjamin Belzer, Krishnamoorthy Sivakumar, Roger Wood, **Jacob Murray**, Paul Wettin. 2014. "Iterative Detection and Decoding for TDMR with 2D Intersymbol Interference using the Four-Rectangular-Grain Model". **IEEE Transactions on Magnetics**.
- **Jacob Murray**, Nghia Tang, Partha Pratim Pande, Deukhyoun Heo, Behrooz Shirazi. 2014. "DVFS Pruning for Wireless NoC Architectures". **IEEE Design and Test of Computers**.
- **Jacob Murray**, Ryan Kim, Paul Wettin, Partha Pratim Pande, Behrooz Shirazi. 2014. "Performance Evaluation of

- Congestion-Aware Routing with DVFS on a Millimeter-Wave Small World Wireless NoC". **ACM Journal on Emerging Technologies in Computing Systems**.
- Paul Wettin, Ryan Kim, **Jacob Murray**, Ryan Kim, Xinmin Yu, Partha Pande, Amlan Ganguly, Deuk Heo. 2014. "Design Space Exploration for Wireless NoCs Incorporating Irregular Network Routing". **IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems**.
 - **Jacob Murray**, Teng Lu, Paul Wettin, Partha Pande, Behrooz Shirazi. 2013. "Dual-Level DVFS-enabled Millimeter-Wave Wireless NoC Architectures". **ACM Journal on Emerging Technologies in Computing Systems**.
 - **Jacob Murray**, Teng Lu, Partha P. Pande, Behrooz Shirazi. 2013. "Sustainable DVFS-enabled Multi-Core Architectures with on-chip Wireless Links". **Advances in Computers Green and Sustainable Computing Part II Volume 88**, 125-158.

CONFERENCE PUBLICATIONS

- **Jacob Murray**, Paul Wettin, Partha Pande, Behrooz Shirazi. 2014. "Small-World Wireless NoCs with Joint DTM and DVFS". In Design Automation Conference (**DAC'14**). San Francisco, CA (Accepted as Work in Progress)
- **Jacob Murray**, Paul Wettin, Ryan Kim, Xinmin Yu, Partha Pande, Behrooz Shirazi, Deukhyoun Heo. 2014. "Thermal Hotspot Reduction in mm-Wave Wireless NoC Architectures". In Proceedings of the International Symposium on Quality Electronic Design (**ISQED'14**). Santa Clara, CA, USA (Accepted)
- Paul Wettin, **Jacob Murray**, Ryan Kim, Xinmin Yu, Partha Pande, Deukhyoun Heo. 2014. "Performance Evaluation of Wireless NoCs in Presence of Irregular Network Routing Strategies". In Proceedings of Design, Automation & Test in Europe (**DATE'14**). Dresden, Germany (Accepted)
- Michael Carosino, Yiming Chen, Benjamin Belzer, Krishnamoorthy Sivakumar, **Jacob Murray**, Paul Wettin. 2013. "Iterative Detection and Decoding for the Four-Rectangular-Grain TDMR Model". In Proceedings of the 51st Allerton Conference on Communication, Control, and Computing (**Allerton'13**). Monticello, IL, USA
- **Jacob Murray**, Paul Wettin, Partha Pande, Behrooz Shirazi, Nishad Nerurkar, Amlan Ganguly. 2013. "Evaluating Effects of Thermal Management in Wireless NoC-Enabled Multicore Architectures". In Proceedings of the IEEE International Green Computing Conference (**IGCC'13**). Arlington, VA, USA
- Paul Wettin, **Jacob Murray**, Partha P. Pande, Behrooz Shirazi, Amlan Ganguly. 2013. "Energy-Efficient Multicore Chip Design through Cross-Layer Approach". In Proceedings of Design, Automation & Test in Europe (**DATE'13**). Grenoble, France.
- **Jacob Murray**, Rajath Hegde, Teng Lu, Partha P. Pande, Behrooz Shirazi. 2013. "Sustainable Dual-Level DVFS-enabled NoC with on-chip Wireless Links". In Proceedings of the International Symposium on Quality Electronic Design (**ISQED'13**). Santa Clara, CA, USA, 135-142.
- **Jacob Murray**, Partha P. Pande, and Behrooz Shirazi. 2012. DVFS-Enabled Sustainable Wireless NoC Architecture. In Proceedings of the IEEE International SOC Conference (**IEEE-SOCC'12**). IEEE, Niagara Falls, NY, USA, 301-306.
- **Jacob Murray**, John Klingner, Partha P. Pande, and Behrooz Shirazi. 2012. Sustainable multi-core architecture with on-chip wireless links. In Proceedings of the great lakes symposium on VLSI (**GLSVLSI '12**). ACM, New York, NY, USA, 263-266.

EXPERIENCE

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|--|-----------------------------------|--------------------|
| May 2014 – Current | WSU College of Engineering | Everett, WA |
| <i>Clinical Assistant Professor, Program Coordinator of Electrical Engineering – WSU North Puget Sound at Everett</i> | | |
| Aug 2010 – May 2014 | WSU College of Engineering | Pullman, WA |
| <i>Graduate Research Assistant (RA) / Teaching Assistant (TA)</i> | | |
| <ul style="list-style-type: none"> • RA for EECS Dept. • TA for EECS Dept. (CPTS 121/122, CPTS 466/566, EE 434, EE 466/586). | | |
| Aug 2011 – Dec 2013 | WSU College of Engineering | Pullman, WA |
| <i>Instructor</i> | | |
| <ul style="list-style-type: none"> • Instructor for EECS Dept. (Teaching EE 434). • Instructor for the College of Engineering (Teaching ENGR 120). | | |
| May 2013 – Aug 2013 | Marvell Semiconductor | Boise, ID |
| <i>Intern</i> | | |

- Hardware Engineering Intern at Marvell Semiconductor working on Front End Verification and Design.

May 2012 – Aug 2012 **Cadwell Labs** **Pasco, WA**

Intern

- Software Engineering Intern at Cadwell Labs specializing in mobile computing for biomedical devices.

May 2011 - Aug 2011 **AHA, Comtech EF Data Corp** **Moscow, ID**

Intern

- Hardware Engineering Intern at AHA products group specializing in hardware accelerated RSA research. Developed VHDL modules for FPGA. Researched hardware acceleration using openSSL.

Jun 2009 - Sep 2010 **Schweitzer Engineering Laboratories** **Pullman, WA**

Intern

- Hardware/Software Engineering Intern at Schweitzer Engineering Laboratories specializing in synchrophasor research.

Aug 2008 – Dec 2009 **WSU Department of Mathematics** **Pullman, WA**

Undergraduate Teaching Assistant

- TA for Department of Mathematics (MATH 107, MATH 273).

Aug 2007 - May 2009 **WSU Department of Engineering** **Pullman, WA**

Tutor

- Tutor of science and math fields for WSU Department of Engineering.

Jun 2008 - Aug 2008 **Battelle, PNNL** **Richland, WA**

SULI Intern

- Worked at Pacific Northwest National Laboratory for the DOE.

SUMMARY OF QUALIFICATIONS

- Proficient with C, C++, C#, VHDL, Verilog, System Verilog, Matlab, and MIPS Assembly.
- Experience with Synopsys, Cadence, Quartus, Xilinx, WinSpice, Simics, GEM5.

EXTRACURRICULAR ACTIVITIES

- Senior Design Team Leader (developed a product, won 3rd place at WSU Business Plan Competition. Finalist, 1 of 5 undergraduate teams in the 2010 National Collegiate Inventors Competition hosted by inventnow and USPTO)
- Harold Frank Entrepreneurship, 2009-2010
- Tau Beta Pi Member (National Engineering Honors Society), 2009-Current
- IEEE Member, 2006-Current
- National Honors Society Member, 2005-Current

REFERENCES

Dr. Partha Pande – Associate Professor
 Washington State University, EME 503
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Dr. Behrooz Shirazi – Director of School of Electrical Engineering and Computer Science
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Dr. Robert Olsen – Associate Dean of College of Engineering and Architecture
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