

# Daniel Wong

Assistant Professor

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## Education

- 2009  
2015  
**PhD Electrical Engineering**, *University of Southern California*, Los Angeles, CA.  
Thesis: Energy Proportional Computing for Multi-core and Many-core Servers  
Advisor: Murali Annavaram  
Cumulative GPA: 4.0
- 2009  
2011  
**MS Electrical Engineering**, *University of Southern California*, Los Angeles, CA.  
Cumulative GPA: 4.0
- 2006  
2009  
**BS Computer Engineering/Computer Science**, *University of Southern California*, Los Angeles, CA.  
Cumulative GPA: 3.69 Major GPA: 3.74

## Employment

- 2015  
**Assistant Professor**, *University of California, Riverside*, Riverside, CA.  
Department of Electrical and Computer Engineering  
Computer Engineering Program  
Department of Computer Science and Engineering, Cooperating Faculty
- 2014  
**Research Intern**, *Samsung Semiconductor, Inc.*, Milpitas, CA.  
Memory Solutions Lab, Mentor: Hongzhong Zheng, Suhas  
Developed tools to enable performance and cost evaluation of emerging non-volatile memory system architectures.  
Developed Linux device driver performance emulation and Excel-based TCO analysis tool.
- 2011  
**Computation Student Intern**, *Lawrence Livermore National Lab*, Livermore, CA.  
Mentor: Maya Gokhale  
Contributed to early work on Perm, a C library dynamic-memory allocator for persistent heap management.  
Enables lightweight checkpointing and persistency of scientific applications through memory-mapped non-volatile storage.
- 2010  
**Computation Student Intern**, *Lawrence Livermore National Lab*, Livermore, CA.  
Mentor: Maya Gokhale  
Part of the Cyber Defenders program to explore new technologies that can be applied to computer security.  
Implemented and evaluated real-world performance of TFIDF HTTP attack classifier on various compute platforms, including Cisco AXP platform and Tiler-64 multicore processors.

## Research Experience

- 2009  
2015  
**Graduate Research Assistant**, *University of Southern California*, Los Angeles, CA.  
Research on energy proportional servers and energy efficient GPGPUs.
- 2008  
2011  
**Electrical Team/Technical Advisor**, *USC Robotics Society*, University of Southern California.  
Designed and implemented firmware on the Parallax Propeller microcontroller for the SeaBeeIII autonomous underwater vehicle. Firmware is responsible for sensor readings, motor control, and communication with the on-board computer module. Mentored mix of undergraduate and graduate students on embedded systems development.

**Project Lead/VSoE Summer Research Intern, IDM Lab, University of Southern California.**

Advisor: Sven Koenig

Designed and implemented novel hardware and software interface to Lord of the Rings pinball machine. System allows pinball machine to be reprogrammed, essentially turning the pinball machine into an educational and research testbed. Acted as technical advisor for CSCI499: Designing and Implementing Games on Pinball Machines. Managed a team of 6 hardware and software developers (undergraduate and graduate students). University of Alberta replicated our system and resulted in a master's thesis.

## Awards and Honors

- IEEE Micro Top Picks from the Computer Architecture Conferences of 2012
- Provost's PhD Fellowship, University of Southern California, 2009-2013
- Nominated for Google PhD Fellowship by USC, 2014
- Honorable Mention Poster Award, 2nd Annual Ming Hsieh Research Festival, 2012
- Rose Hills Undergraduate Summer Research Fellowship, 2009
- Rose Hills Foundation Scholarship, 2008
- Tau Beta Pi Honor Society, 2008
- Eta Kapp Nu (HKN) Honor Society, 2007

## Publications

Underlined names are students advised by me.

### Journals

- IEEE Micro '13 **Daniel Wong** and Murali Annavaram. *Scaling the Energy Proportionality Wall with KnightShift*. IEEE Micro, 33(3), May 2013. Top Picks from the Computer Architecture Conferences.

### Refereed Conferences and Workshops

- SBAC-PAD '16 Steena Monteiro, Forrest Iandola, and **Daniel Wong**. *STOMP: Statistical Techniques for Optimizing and Modeling Performance of Blocked Sparse Matrix Vector Multiplication*. In Proceedings of the International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD), 2016.
- ISLPED '16 Chih-Hsun Chou, **Daniel Wong**, and Laxmi N. Bhuyan. *DynSleep: Fine-grained Power Management for a Latency-Critical Data Center Application*. In Proceedings of the International Symposium on Low Power Electronics and Design (ISLPED), 2016.
- ISCA '16 **Daniel Wong**. *Peak Efficiency Aware Scheduling for Highly Energy Proportional Servers*. In Proceedings of the 43rd ACM/IEEE International Symposium on Computer Architecture (ISCA), 2016.
- DAC '16 Taeyoung Kim, Zeyu Sun, Chase Cook, Hengyang Zhao, Ruiwen Li, **Daniel Wong**, and Sheldon X.-D. Tan. *Invited - Cross-layer modeling and optimization for electromigration induced reliability*. In Proceedings of the IEEE/ACM Design Automation Conference (DAC), 2016.
- ICS '16 Mohammad Abdel-Majeed, **Daniel Wong**, and Murali Annavaram. *Origami: Folding Warps for Energy Efficient GPUs*. In Proceedings of the ACM International Conference on Supercomputing (ICS), 2016.
- HPCA '16 **Daniel Wong**, Nam Sung Kim, and Murali Annavaram. *Approximating Warps with Intra-warp Operand Value Similarity*. In Proceedings of the 2016 IEEE 22nd International Symposium on High Performance Computer Architecture (HPCA), 2016.
- IISWC '15 **Daniel Wong**, Julia Chen, and Murali Annavaram. *A Retrospective Look Back on the Road Towards Energy Proportionality*. In Proceedings of the 2015 IEEE International Symposium on Workload Characterization (IISWC), 2015. Short paper with poster presentation.
- HPCA '14 **Daniel Wong** and Murali Annavaram. *Implications of High Energy Proportional Servers on Cluster-wide Energy Proportionality*. In Proceedings of the 2014 IEEE 20th International Symposium on High Performance Computer Architecture (HPCA), 2014.

- MICRO '13 Mohammad Abdel-Majeed\*, **Daniel Wong**\*, and Murali Annavaram. *Warped Gates: Gating Aware Scheduling and Power Gating for GPGPUs*. In Proceedings of the 46th Annual IEEE/ACM International Symposium on Microarchitecture, MICRO-46, 2013. *\*Co-authors contributed equally.*
- MICRO '12 **Daniel Wong** and Murali Annavaram. *KnightShift: Scaling the Energy Proportionality Wall Through Server-level Heterogeneity*. In Proceedings of the 45th Annual IEEE/ACM International Symposium on Microarchitecture, MICRO-45, 2012. *Selected as 1 of 11 IEEE Micro Top Picks.*
- WEED '12 **Daniel Wong** and Murali Annavaram. *Evaluating a Prototype KnightShift-enabled Server*. In WEED'12: Workshop on Energy-Efficient Design, 2012.
- MICRO '10 Jainwei Chen, Lakshmi Kumar Dabbiru, **Daniel Wong**, Murali Annavaram, and Michel Dubois. *Adaptive and Speculative Slack Simulations of CMPs on CMPs*. In Proceedings of the 43rd Annual IEEE/ACM International Symposium on Microarchitecture, MICRO-43, 2010.
- FDG '10 **Daniel Wong**, Darren Earl, Fred Zyda, Ryan Zink, Sven Koenig, Allen Pan, Selby Shlosberg, Jaspreet Singh, and Nathan Sturtevant. *Implementing Games on Pinball Machines*. In Proceedings of the Fifth International Conference on the Foundations of Digital Games (FDG), 2010.
- AAAI '10 **Daniel Wong**, Darren Earl, Fred Zyda, and Sven Koenig. *Teaching Robotics and Computer Science with Pinball Machines*. In AAAI Spring Symposium Series, 2010.

### Posters and Technical Reports

- D. Wong**, S. Lloyd, M. Gokhale, *A Memory-mapped Approach to Checkpointing*. Technical Report LLNL-TR-635611, Lawrence Livermore National Laboratory (LLNL), Livermore, CA, 2013.
- I. Karlin, A. Bhatele, B. Chamberlain, J. Cohen, Z. Devito, M. Gokhale, R. Haque, R. Hornung, J. Keasler, D. Laney, E. Luke, S. Lloyd, J. McGraw, R. Neely, D. Richards, M. Schulz, C.H. Still, F. Wang, **D. Wong**, *LULESH Programming Model and Performance Ports Overview*. Technical Report LLNL-TR-608824, Lawrence Livermore National Laboratory (LLNL), Livermore, CA, 2012.
- Daniel Wong** and Murali Annavaram. *Scalable System-level Active Low-Power Mode with Bounded Latency*. Technical Report CENG-2012-5, Department of Electrical Engineering, University of Southern California, 2012.
- Daniel Wong** and Murali Annavaram. *Enhancing server energy efficiency by shifting light burden to an assistant*. 2nd Annual Ming Hsieh Department of Electrical Engineering Research Festival, 2012. Honorable Mention Poster Award, also presented at Sixth USC-Tsinghua Symposium on Green Technology and Energy Informatics.
- Daniel Wong**, Ryan Zink, and Sven Koenig. *Teaching artificial intelligence and robotics via games* [poster abstract]. In AAAI Symposium on Educational Advances in Artificial Intelligence, 2010.
- Daniel Wong** and Maya Gokhale. *Real-world performance of document-similarity web attack classifier in embedded hardware*. LLNL Summer Intern Poster Symposium, 2010.
- John O'Hollaren, Vairavan Laxman, Noah Olsman, Michael Benzimra, **Daniel Wong**, and Nielson Bernardo. *SeaBee III*. Technical report, University of Southern California Competition Robotics (USCR), University of Southern California, 2010.
- Daniel Wong**, Darren Earl, Fred Zyda, and Sven Koenig. *Programming Pinball Machines for Fun and Education*. Technical Report 08-901, Department of Computer Science, University of Southern California, 2008.

## Teaching

### University of California, Riverside

- CS/EE 217 GPU Architecture and Programming, Fall '16
- CS 203 Advanced Computer Architectures, Winter '16, Fall '16
- CS 161 Design and Architecture of Computer Systems, scheduled for Spring '16

## University of Southern California

- CS 101 Fundamentals of Computer Programming, Fall '11
- EE 357 Basic Organization of Computer Systems (Evaluation: 4.76/5.0), Fall '11
- EE 554 Real-time Computer Systems (Evaluation: 4.64/5.0), Spring '12

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## Student Advising

### University of California, Riverside

- Amirali Abdolrashidi (PhD, Computer Science)
- Shahriyar Valielahi Roshan (PhD, Computer Science)
- Marcus Chow (PhD, Computer Science)
- Ruiwen Li (MS, Computer Engineering)
- Todd Larson (BS, Computer Engineering)

### University of Southern California

- Julia Chen (USC, undergrad, Provost Research Fellowship) - Project: Server power measurement instrumentation
- Justin Kuang (USC, undergrad, McNair Scholar) - Project: GPGPU thread remapping
- Yifei Zhang (Tsinghua University, undergrad) - Project: Solr benchmark development
- Garima Aggarwal (USC, undergrad) - Project: KnightShift prototype

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## Professional Activities

### Program Committee Member

- MICRO International Symposium on Microarchitecture, 2016
- NAS International Conference on Networking, Architecture, and Storage, 2016
- ISLPED International Symposium on Low Power Electronics and Design, 2016
- ICCD International Conference on Computer Design, 2016

### Invited Reviewer

- TC IEEE Transactions on Computers, 2016
- CAL Computer Architecture Letters, 2015 - 2016
- TPDS IEEE Transactions on Parallel and Distributed Systems, 2015
- D&T IEEE Design & Test, 2015

### External Reviewer

- IPDPS International Parallel & Distributed Processing Symposium, 2015
- MICRO International Symposium on Microarchitecture, 2014
- ICCD International Conference on Computer Design, 2014
- HiPC International Conference on High Performance Computing, 2014
- WEED Workshop on Energy-Efficient Design, Held in conjunction with ISCA, 2013
- IISWC International Symposium on Workload Characterization, 2012
- ISPASS International Symposium on Performance Analysis of Systems & Software, 2011, 2012
- MobiCASE International Conference on Mobile Computing, Applications, and Services, 2011

### Session Char

- ICS International Conference on Supercomputing, 2016
- ISLPED International Symposium on Low Power Electronics and Design, 2016

## Student Volunteer

CPOM NSF Workshop on Cross-Layer Power Optimization and Management, 2012

## Member

IEEE Institute of Electrical and Electronics Engineers

ACM Association for Computing Machinery

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## Personal

US Citizen