

Jason K. Oberg

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EDUCATION

UNIVERSITY OF CALIFORNIA, SAN DIEGO (GPA: 3.62) La Jolla, CA
September '09-Present

Ph.D. Computer Science

- **Thesis: Hardware and Embedded System Security**
- National Science Foundation Fellow

UNIVERSITY OF CALIFORNIA, SAN DIEGO (GPA: 3.62) La Jolla, CA
September '09-December '12

M.S. Computer Engineering

UNIVERSITY OF CALIFORNIA, SANTA BARBARA (GPA: 3.76) Santa Barbara, CA
September '05-June '09

B.S. Computer Engineering

- Completed Engineering Honors Program and graduated with High Honors (top 8%).
- Tutoring Chair of Tau Beta Pi and tutor of several Electrical and Computer Engineering courses.

RESEARCH INTERESTS

Hardware Security and Privacy; Embedded Systems; Field Programmable Gate Arrays (FPGAs); Embedded high-performance Computing

PROFESSIONAL EXPERIENCE

UNIVERSITY OF CALIFORNIA, SAN DIEGO La Jolla, CA
September '09 - Present

Graduate Student Researcher

- **Focus on Hardware Security**
- Secure analysis of embedded systems and computer architecture.
- Methods for secure hardware and embedded system design and evaluation.

MICROSOFT RESEARCH Redmond, WA
July '11 - October '11

Research Intern

- Worked with the Embedded and Reconfigurable Computing group.
- Built the Kinect's body part recognition algorithm in hardware on an FPGA.
- Involved extensive design with both C and Verilog.

QUALCOMM INCORPORATED San Diego, CA
June '10 - September '10

Systems Engineering Intern

- Performance verification of a graphics core using SystemC.
- Used PERL to aid testing and verification of graphics core's performance.
- Generated test vectors for performance benchmarking of hardware.

TEACHING EXPERIENCE

UNIVERSITY OF CALIFORNIA, SAN DIEGO La Jolla, CA
September '09 - December '09

Teaching Assistant

- 4.52/5 Teaching Assistant Rating
- Taught intro to C-programming, assembly language, and computer architecture.

UNIVERSITY OF CALIFORNIA, SAN DIEGO La Jolla, CA
July '09 - August '09

COSMOS Teaching Assistant

- Taught high school students about embedded systems programming.
- Gave lectures on lab section material and concepts.
- Helped inspire an interest in pursuing a computer science related field.

UNIVERSITY OF CALIFORNIA, SAN DIEGO

La Jolla, CA

Freshman Seminar Volunteer

September '11 – December '12

- Volunteered as instructor for a freshman seminar on robotics.
- Taught basics of programming using Python to freshman.

HONORS AND AWARDS

- National Science Foundation Innovation Corps Grant Awardee April 2013
- Achievement Rewards for College Scientists (ARCS) Award Recipient July 2012
- ACM Student Research Competition Participant June 2011
- National Science Foundation Graduate Research Fellowship May 2011
- Jacobs School Research Expo Best Poster Finalist April 2010, 2011

MENTORING EXPERIENCE

UNIVERSITY OF CALIFORNIA, SAN DIEGO

La Jolla, CA

Jacobs School Underrepresented Undergraduate Mentor

January 2012 – Present

- Mentor underrepresented undergraduates on their career and academic decisions
- Attend social events and meetings to help undergraduate engineers make informed choices

UNIVERSITY OF CALIFORNIA, SAN DIEGO

La Jolla, CA

Undergraduate Research Mentor

January 2010 – Present

- Advising undergraduates on research projects related to hardware security
- Worked very closely with bright undergraduates on assisting with my research

PATENTS

Decision Tree Computation in Hardware,

Jason Oberg, Ken Eguro, Victor Tirva, Padma Parthasarathy, Susan Carrie, Alessandro Forin, and Jonathon Chow.

US Patent App 13/344,473, filed January 5th, 2012.

JOURNAL PUBLICATIONS (ACCEPTED)

1. Expanding Gate Level Information Flow Tracking for Multi-level Security

Wei Hu, Jason Oberg, Janet Barrientos, Dejun Mu, and Ryan Kastner

IEEE Embedded System Letters, vol. 5, no. 2, May 2013

2. Eliminating Timing Information Flows in a Mix-trusted System-on-Chip

Jason Oberg, Timothy Sherwood, and Ryan Kastner

IEEE Design and Test of Computers, March/April 2013

3. A Software-based Dynamic-warp Scheduling Approach for Load-Balancing the Viola-Jones Face Detection Algorithm on GPUs

Tan Nguyen, Daniel Hefenbrock, Jason Oberg, Ryan Kastner, and Scott Baden

Journal of Parallel and Distributed Computing (JPDC), January 2013

4. On the Complexity of Gate Level Information Flow Tracking Logic

Wei Hu, Jason Oberg, Ali Irturk, Mohit Tiwari, Timothy Sherwood, Dejun Mu, and Ryan Kastner,

IEEE Transactions on Information Forensics and Security (TIFS), vol. 7, no. 3, June 2012

5. Theoretical Fundamentals of Gate Level Information Flow Tracking

Wei Hu, Jason Oberg, Ali Irturk, Mohit Tiwari, Timothy Sherwood, Dejun Mu, and Ryan Kastner,

IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), vol. 30, issue 8, August 2011

- 6. Simulate and Eliminate: A Top-to-Bottom Design Methodology for Automatic Generation of Application Specific Architectures**
Ali Irturk, Janarбек Matai, Jason Oberg, Jeffrey Su, and Ryan Kastner,
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), vol. 30, issue 8, August 2011

JOURNAL PUBLICATIONS (SUBMITTED)

- 1. Gate Level Information Flow Tracking for Security Lattices**
Wei Hu, Jason Oberg, Baolei Ma, Ryan Kastner, and Dejun Mu
ACM Transactions on Design Automation of Electronic Systems (TODEAS 2014), in submission

JOURNAL PUBLICATIONS (IN PREPARATION)

- 1. Leveraging Gate-Level Properties to Identify Hardware Timing Channels**
Jason Oberg, Sarah Meiklejohn, Timothy Sherwood, and Ryan Kastner
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD 2014), in preparation

CONFERENCE PUBLICATIONS (ACCEPTED)

- 1. Sapper: A Language for Hardware-Level Security Policy Enforcement**
Xun Li, Vineeth Kashyap, Jason Oberg, Mohit Tiwari, Vasanth Rajarathinam, Ryan Kastner, Timothy Sherwood, Ben Hardekopf and Frederic T. Chong
International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2014)
- 2. SurfNoC: A Low Latency and Provably Non-Interfering approach to Secure Networks-On-Chip**
Hassan M. G. Wassel, Ying Gao, Jason K. Oberg, Ted Huffmire, Ryan Kastner, Frederic T. Chong, Timothy Sherwood
International Symposium on Computer Architecture (ISCA 2013)
- 3. A Practical Testing Framework for Isolating Hardware Timing Channels**
Jason Oberg, Sarah Meiklejohn, Timothy Sherwood, and Ryan Kastner
The conference on Design Automation and Test in Europe (DATE 2013)
- 4. Simultaneous Information Flow Security and Circuit Redundancy in Boolean Gates**
Wei Hu, Jason Oberg, Dejun Mu, and Ryan Kastner
The international conference on Computer-Aided Design (ICCAD 2012)
- 5. Random Decision Tree Body Part Recognition Using FPGAs**
Jason Oberg, Ken Eguro, Ray Bittner, and Alessandro Forin
The International conference on Field Programmable Logic and Applications (FPL 2012)
- 6. Trimmed VLIW: Moving Application Specific Processors Towards High Level Synthesis**
Janarбек Matai, Jason Oberg, Ali Irturk, Taemin Kim, and Ryan Kastner,
The Electronic System Level Synthesis Conference (ESLsyn 2012)
- 7. Enforcing Information Flow Guarantees in Reconfigurable Systems with Mix-trusted IP**
Ryan Kastner, Jason Oberg, Wei Hu, and Ali Irturk,
The conference on Engineering of Reconfigurable Systems and Algorithms (ERSA 2011), invited paper
- 8. Crafting a Usable Microkernel, Processor, and I/O System with Strict and Provable Information Flow Security**
Mohit Tiwari, Jason Oberg, Xun Li, Jonathan K Valamehr, Timothy Levin, Ben Hardekopf, Ryan Kastner, Frederic T. Chong, and Timothy Sherwood,
In Proceedings of the International Symposium on Computer Architecture (ISCA 2011)
- 9. Information Flow Isolation in I2C and USB**
Jason Oberg, Wei Hu, Ali Irturk, Mohit Tiwari, Timothy Sherwood, and Ryan Kastner,
In Proceedings of the Design Automation Conference (DAC 2011)

10. Caisson: A Hardware Description Language for Secure Information Flow

Xun Li, Mohit Tiwari, Jason Oberg, Frederic T. Chong, Tim Sherwood, and Ben Hardekopf,
In Proceedings of the conference on Programming Language Design and Implementation (PLDI 2011)

11. Minimal Multi-Threading: Finding and Removing Redundant Instructions in Multi-Threaded Processors

Guoping Long, Diana Franklin, Susmit Biswas, Pablo Ortiz, Jason Oberg, Dongrui Fan, and Frederic T. Chong,
In Proceedings of the International Symposium on Microarchitecture (MICRO 2010)

12. Accelerating Viola-Jones Face Detection to FPGA-Level using GPUs

Daniel Hefenbrock, Jason Oberg, Nhat Tan Nguyen Thanh, Ryan Kastner, and Scott B. Baden,
In Proceedings of the conference on Field-Programmable Custom Computing Machines (FCCM 2010)

13. Theoretical Analysis of Gate Level Information Flow Tracking

Jason Oberg, Wei Hu, Ali Irturk, Mohit Tiwari, Timothy Sherwood, and Ryan Kastner,
In the Proceedings of the Design Automation Conference (DAC 2010)

14. FPGA-Based Face Detection System Using Haar Classifiers

Jung Uk Cho, Shahnam Mirzaei, Jason Oberg, and Ryan Kastner,
In Proceedings of the International Symposium on Field Programmable Gate Arrays (FPGA 2009)

CONFERENCE PUBLICATIONS (SUBMITTED)

1. Discovering the Source of Taint in Gate Level Information Flow

Bitva Mazloom, Jason Oberg, Ryan Kastner, and Timothy Sherwood
The Design Automation Conference (DAC 2014), in submission

CONFERENCE PUBLICATIONS (IN PREPERATION)

1. Extending Existing Instruction Set Architectures Through 3-D Integration

Jonathan Valamehr, Jason Oberg, Ted Huffmire, Ryan Kastner, and Timothy Sherwood
Conference on Hardware-Oriented Security and Trust (HOST 2014), in preperation

WORKSHOP PUBLICATIONS (ACCEPTED)

1. Sapper: A Language for Provable Hardware Policy Enforcement

Xun Li, Vineeth Kashyap, Jason Oberg, Mohit Tiwari, Vasanth Rajarathinam, Ryan Kastner, Timothy Sherwood, Ben Hardekopf and Frederic T. Chong
Workshop on Programming Languages and Analysis for Security (PLAS 2013).

2. An Improved Encoding Technique for Gate Level Information Flow Tracking

Wei Hu, Jason Oberg, Ali Irturk, Mohit Tiwari, Timothy Sherwood, Dejun Mu, and Ryan Kastner,
The International Workshop on Logic and Synthesis (IWLS 2011)

REFERENCES

Professor Ryan Kastner

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9500 Gilman Drive, Mail Code 0404
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Professor Cynthia Irvine

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Naval Post Graduate School
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