

Ryan Kastner

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Department of Electrical and Computer Engineering
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Research Interests

Embedded Systems

Reconfigurable Computing

Hybrid reconfigurable systems, FPGA architectures, Configurable processors, Reconfigurable hardware security

Electronic System Level Synthesis

Hardware/Software partitioning, Resource allocation, Binding, Instruction scheduling, Data communication, Low power cache design

Hardware Compilation

Compiler transforms, Hardware synthesis, Intermediate representations, Layout aware optimizations, Instruction generation

Signal Processing

Hardware/Software arithmetic optimizations, System synthesis, Wireless communication, Radiolocation, Acoustic modems

General

Algorithms

Ant colony optimization, Algorithmic design, Complexity analysis

Theory

Models of computation, Language design

Education

University of California, Los Angeles

Doctor of Philosophy in Computer Science, September 2002
Thesis: Synthesis Techniques and Optimizations for Reconfigurable Systems
Advisor: Majid Sarrafzadeh

Los Angeles, CA

Northwestern University

Master of Science, August 2000
Thesis: Methods and Algorithms for Coupling Reduction
Advisor: Majid Sarrafzadeh

Evanston, IL

Northwestern University

Bachelor of Science in Computer Engineering, June 1999
Bachelor of Science in Electrical Engineering, June 1999

Evanston, IL

Publications

(<http://express.ece.ucsb.edu/publications.html>)

Books

[B1] Ryan Kastner, Adam Kaplan and Majid Sarrafzadeh, "**Synthesis Techniques and Optimizations for Reconfigurable Systems**", *Kluwer Academic Publishers*, November 2003, ISBN 1-4020-7598-3 ([order](#))

[B2] Anup Hosangadi, Farzan Fallah and Ryan Kastner, "**Arithmetic Optimization Techniques for Hardware and Software Design**", *Cambridge University Press*, to appear

Patents

[P1] Farzan Fallah, Anup Hosangadi and Ryan Kastner, "**System and Method for Optimizing Polynomial Expressions in a Processing Environment**", provisional application serial number 60/612,387 filed March 17, 2005

[P2] Farzan Fallah, Anup Hosangadi and Ryan Kastner, "**System and Method for Eliminating Common Subexpressions in a Linear System**", provisional application filed

[P3] Farzan Fallah, Anup Hosangadi and Ryan Kastner, "**System and Method for Iteratively Eliminating Common Subexpressions in an Arithmetic System**", provisional application filed, January 13, 2006

Journal Publications

- [J1] Kiarash Bazargan, Ryan Kastner and Majid Sarrafzadeh, "**Fast Template Placement for Reconfigurable Computing Systems**", *IEEE Design and Test - Special Issue on Reconfigurable Computing*, January - March 2000 ([pdf](#))
- [J2] Kiarash Bazargan, Ryan Kastner and Majid Sarrafzadeh, "**3-D Floorplanning: Simulated Annealing and Greedy Placement Methods for Reconfigurable Computing Systems**", *Design Automation for Embedded Systems - RSP'99 Special Issue*, August 2000 ([pdf](#))
- [J3] Ankur Srivastava, Ryan Kastner and Majid Sarrafzadeh, "**On the Complexity of Gate Duplication**", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, September 2001 ([pdf](#))
- [J4] Xiaojian Yang, Ryan Kastner and Majid Sarrafzadeh, "**Congestion Estimation During Top-down Placement**", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, January 2002 ([pdf](#))
- [J5] Ryan Kastner, Elaheh Bozorgzadeh and Majid Sarrafzadeh, "**Pattern Routing: Use and Theory for Increasing Predictability and Avoiding Coupling**", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, July 2002 ([pdf](#))
- [J6] Ryan Kastner, Adam Kaplan, Seda Ogrenci Memik, Elaheh Bozorgzadeh, "**Instruction Generation for Hybrid Reconfigurable Systems**", *ACM Transactions on Design Automation of Electronic Systems*, October, 2002 ([pdf](#))
- [J7] Elaheh Bozorgzadeh, Ryan Kastner and Majid Sarrafzadeh, "**Creating and Exploiting Flexibility in Steiner Trees**", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, May 2003 ([pdf](#))
- [J8] Xiaojian Yang, Maogang Wang, Ryan Kastner, Soheil Ghiasi and Majid Sarrafzadeh, "**Congestion Reduction during Placement with Provably Good Approximation Bound**", *ACM Transactions on Design Automation of Electronic Systems*, July 2003 ([pdf](#))
- [J9] Ankur Srivastava, Ryan Kastner, Chunhong Chen and Majid Sarrafzadeh, "**Timing Driven Gate Duplication**", *IEEE Transactions on Very Large Scale Integrated Systems*, Jan. 2004 ([pdf](#))
- [J10] Seda Ogrenci Memik, Ryan Kastner, Elaheh Bozorgzadeh, and Majid Sarrafzadeh, "**A Scheduling Algorithm for Optimization and Planning in High-level Synthesis**", *ACM Transactions on Design Automation of Electronic Systems*, Vol. 10, No. 1, January 2005 ([pdf](#))
- [J11] Yan Meng, Timothy Sherwood and Ryan Kastner, "**Exploring the Limits of Leakage Power Reduction in Caches**", *ACM Transactions on Architecture and Code Optimization*, November 2005 ([pdf](#))
- [J12] Yan Meng, Wenrui Gong, Ryan Kastner and Timothy Sherwood, "**Algorithm/Architecture Co-exploration for Designing Energy Efficient Channel Estimator**" – *American Scientific Publishers Journal of Low Power Electronics*, December 2005 ([pdf](#))

- [J13] Gang Wang, Wenrui Gong and Ryan Kastner, “**Application Partitioning on Programmable Platforms Using the Ant Colony Optimization**”, *Journal of Embedded Computing*, Vol. 2, Issue 1, 2006 ([pdf](#))
- [J14] Gang Wang, Satish Sivaswamy, Cristinel Ababei, Kia Bazargan, Ryan Kastner and Elaheh Bozorgzadeh, “**Statistical Analysis and Design of Hardwired Routing Pattern FPGAs**”, *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol.25, no.10, Oct. 2006, pp. 2088-102 ([pdf](#))
- [J15] Anup Hosangadi, Farzan Fallah and Ryan Kastner, “**Optimizing Polynomial Expressions by Algebraic Factorization and Common Subexpression Elimination**”, *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol.25, no.10, Oct. 2006, pp. 2012-22 ([pdf](#))
- [J16] Anup Hosangadi, Farzan Fallah and Ryan Kastner, “**Algebraic Methods for Optimizing Constant Multiplications in Linear Systems**”, to appear in the *Springer Journal of VLSI Signal Processing*, submitted March 1, 2005, accepted with minor revision January 9, 2006 (preliminary [pdf](#))
- [J17] Gang Wang, Wenrui Gong, Brian DeRenzi and Ryan Kastner, “**Ant Colony Optimizations for Resource and Timing Constrained Instruction Scheduling**” – to appear in the *IEEE Transactions on Computer-Aided Design*
- [J18] Yan Meng, Andrew Brown, Timothy Sherwood, Ronald Iltis, Hua Lee and Ryan Kastner, “**Matching Pursuit Channel Estimation: Efficient Algorithm Design and Reconfigurable Hardware Implementation**” (preliminary [pdf](#)) – to appear in *IEEE Transactions on Wireless Computing*, submitted June 24, 2005, accepted with minor revisions November 18, 2006
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Book Chapters

- [BC1] Elaheh Bozorgzadeh, Ryan Kastner, Seda Ogreneci Memik and Majid Sarrafzadeh, “**Strategically Programmable Systems**”, *The Computer Engineering Handbook*, CRC Press, December 2001
- [BC2] Elaheh Bozorgzadeh, Adam Kaplan, Ryan Kastner, Seda Ogreneci Memik and Majid Sarrafzadeh, “**Optimization for Reconfigurable Systems Using Hierarchical Abstraction**”, *Multi-level Optimization and VLSI CAD*, J. Cong and J. R. Shinnerl (editors), Kluwer Academic Publishers, Boston, 2002 ([pdf](#))
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Refereed Conference Publications

- [C1] Kiarash Bazargan, Ryan Kastner and Majid Sarrafzadeh, “**3-D Floorplanning: Simulated Annealing and Greedy Placement Methods for Reconfigurable Computing Systems**”, *International Workshop on Rapid System Prototyping (RSP)*, June 1999 ([pdf](#))
- [C2] Ryan Kastner, Kiarash Bazargan and Majid Sarrafzadeh, “**Physical Design for Reconfigurable Computing Systems using Firm Templates**”, *Workshop on Reconfigurable Computing (WoRC)*, October 1999 ([pdf](#), [slides](#))
- [C3] Kiarash Bazargan, Ryan Kastner, Seda Ogreneci and Majid Sarrafzadeh, “**A C to Hardware/Software Compiler**”, *Symposium on Field-Programmable Custom Computing Machines (FCCM)*, April 2000 ([pdf](#)) – poster presentation
- [C4] Ankur Srivastava, Ryan Kastner and Majid Sarrafzadeh, “**Complexity Issues in Gate Duplication**”, *International Workshop on Logic Synthesis (IWLS)*, June 2000 ([pdf](#))

- [C5] Ryan Kastner, Elaheh Bozorgzadeh and Majid Sarrafzadeh, "**Coupling Aware Routing**", *International ASIC/SOC Conference*, September 2000 ([pdf](#), [slides](#))
- [C6] Ankur Srivastava, Ryan Kastner and Majid Sarrafzadeh, "**Timing Driven Gate Duplication: Complexity Issues and Algorithms**", *International Conference on Computer-Aided Design (ICCAD)*, November 2000 ([pdf](#), [slides](#))
- [C7] Ryan Kastner, Elaheh Bozorgzadeh and Majid Sarrafzadeh, "**Predictable Routing**", *International Conference on Computer-Aided Design (ICCAD)*, November 2000 ([pdf](#), [slides](#))
- [C8] Seda Ogrençi Memik, Elaheh Bozorgzadeh, Ryan Kastner and Majid Sarrafzadeh, "**Strategically Programmable Systems**", *Reconfigurable Architecture Workshop (RAW)*, April 2001 ([pdf](#))
- [C9] Majid Sarrafzadeh, Elaheh Bozorgzadeh, Ryan Kastner and Ankur Srivastava, "**Design and Analysis of Physical Design Algorithms**", *International Symposium on Physical Design (ISPD)*, April 2001 ([pdf](#), [slides](#))
- [C10] Xiaojian Yang, Ryan Kastner and Majid Sarrafzadeh, "**Congestion Estimation during Top-down Placement**", *International Symposium on Physical Design (ISPD)*, April 2001 ([pdf](#), [slides](#))
- [C11] Ryan Kastner, Elaheh Bozorgzadeh and Majid Sarrafzadeh, "**An Exact Algorithm for Coupling-Free Routing**", *International Symposium on Physical Design (ISPD)*, April 2001 ([pdf](#), [slides](#))
- [C12] Elaheh Bozorgzadeh, Ryan Kastner and Majid Sarrafzadeh, "**Creating and Exploiting Flexibility in Steiner Trees**", *Design Automation Conference (DAC)*, June 2001 ([pdf](#), [slides](#))
- [C13] Andrew B. Kahng, Ryan Kastner, Stefanus Mantik, Majid Sarrafzadeh and Xiaojian Yang, "**Studies of Timing Structural Properties for Early Evaluation of Circuit Design**", *Workshop on Synthesis and System Integration of Mixed Technologies (SASIMI)*, October 2001 ([pdf](#), [slides](#))
- [C14] Xiaojian Yang, Ryan Kastner and Majid Sarrafzadeh, "**Congestion Reduction During Placement Based on Integer Programming**", *International Conference on Computer-Aided Design (ICCAD)*, November 2001 ([pdf](#), [slides](#))
- [C15] Seda Ogrençi Memik, Elaheh Bozorgzadeh, Ryan Kastner and Majid Sarrafzadeh, "**A Super-Scheduler for Embedded Reconfigurable Systems**", *International Conference on Computer-Aided Design (ICCAD)*, November 2001 ([pdf](#))
- [C16] Ryan Kastner, Seda Ogrençi Memik, Elaheh Bozorgzadeh and Majid Sarrafzadeh, "**Instruction Generation for Hybrid Reconfigurable Systems**", *International Conference on Computer-Aided Design (ICCAD)*, November 2001 ([pdf](#), [slides](#))
- [C17] Elaheh Bozorgzadeh, Seda Ogrençi Memik, Ryan Kastner, and Majid Sarrafzadeh, "**Pattern Selection in Programmable Systems**", *International Symposium of Field Programmable Gate Arrays (FPGA)*, February 2002 ([pdf](#)) – poster presentation
- [C18] Elaheh Bozorgzadeh, Seda Ogrençi Memik, Ryan Kastner and Majid Sarrafzadeh, "**Pattern Selection: Customized Block Allocation for Domain-Specific Programmable Systems**", *International Conference on Engineering of Reconfigurable Systems and Algorithms (ERSA)*, June 2002 ([pdf](#))
- [C19] Ryan Kastner, Christina Hsieh, Miodrag Potkonjak and Majid Sarrafzadeh, "**On the Sensitivity of Incremental Algorithms for Combinatorial Auctions**", *International Workshop on Advanced Issues of E-Commerce & Web-Based Information Systems (WECWIS)*, June 2002 ([pdf](#), [slides](#))

- [C20] Philip Brisk, Adam Kaplan, Ryan Kastner and Majid Sarrafzadeh, "**Instruction Generation and Regularity Extraction for Reconfigurable Processors**", *International Conference on Compilers, Architecture and Synthesis for Embedded Systems (CASES)*, October 2002 ([pdf](#), [slides](#))
- [C21] Adam Kaplan, Majid Sarrafzadeh and Ryan Kastner, "**High-Level Data Communication Optimization for Reconfigurable Systems**", *Workshop on Software Support for Reconfigurable Systems (SSRS)*, co-located with the *International Symposium on High-Performance Computer Architecture (HPCA)*, February 2003 ([pdf](#))
- [C22] Adam Kaplan, Philip Brisk and Ryan Kastner, "**Data Communication Estimation and Reduction for Reconfigurable Systems**", *Design Automation Conference (DAC)*, June 2003 ([pdf](#), [slides](#))
- [C23] Gang Wang, Wenrui Gong and Ryan Kastner, "**A New Approach for Task Level Computational Resource Bi-partitioning**", *IASTED International Conference on Parallel and Distributed Computing and Systems (PDCS)*, November 2003 ([pdf](#), [slides](#)) – Best paper nomination
- [C24] Wenrui Gong, Gang Wang and Ryan Kastner, "**A High Performance Intermediate Representation for Reconfigurable Systems**", *International Conference on Engineering of Reconfigurable Systems and Algorithms (ERSA)*, June 2004 ([pdf](#), [slides](#))
- [C25] Anup Hosangadi, Farzan Fallah and Ryan Kastner, "**Optimizing Polynomial Expressions by Factoring and Eliminating Common Subexpressions**", *International Workshop on Logic and Synthesis (IWLS)*, June 2004 ([pdf](#))
- [C26] Gang Wang, Wenrui Gong and Ryan Kastner, "**System Level Partitioning for Programmable Platforms Using the Ant Colony Optimization**", *International Workshop on Logic and Synthesis (IWLS)*, June 2004 ([pdf](#)) – poster presentation
- [C27] Anup Hosangadi, Farzan Fallah and Ryan Kastner, "**Common Subexpression Elimination Involving Multiple Variables for Linear DSP Synthesis**" *International Conference on Application-specific Systems, Architectures and Processors*, September 2004 ([pdf](#), [slides](#))
- [C28] Anup Hosangadi, Farzan Fallah and Ryan Kastner, "**Factoring and Eliminating Common Subexpressions in Polynomial Expressions**", *International Conference on Computer-Aided Design (ICCAD)*, November 2004 ([pdf](#), [slides](#))
- [C29] Anup Hosangadi, Farzan Fallah and Ryan Kastner, "**Energy Efficient Hardware Synthesis of Polynomial Expressions**", *International Conference on VLSI Design*, January 2005 ([pdf](#), [slides](#)) - **N. N. Biswas Best Student Paper Award**
- [C30] Anup Hosangadi, Farzan Fallah and Ryan Kastner, "**Reducing Hardware Complexity of Linear DSP Systems by Iteratively Eliminating Two Term Common Subexpressions**", *Asia South Pacific Design Automation Conference (ASP-DAC)*, January 2005 ([pdf](#), [slides](#))
- [C31] Yan Meng, Timothy Sherwood and Ryan Kastner, "**On the Limits of Leakage Power Reduction in Caches**", *International Symposium on High-Performance Computer Architecture (HPCA)*, February 2005 ([pdf](#), [slides](#))
- [C32] Satish Sivaswamy, Gang Wang, Cristinel Ababei, Kia Bazargan, Ryan Kastner and Elaheh Bozorgzadeh, "**HARP: Hard-wired Routing Pattern FPGAS**", *International Symposium on Field Programmable Gate Arrays (FPGA)*, February 2005 ([pdf](#), [slides](#))
- [C33] Gang Wang, Wenrui Gong and Ryan Kastner, "**Instruction Scheduling Using MAX-MIN Ant Colony Optimization**", *Great Lakes Symposium on Very Large Scale Integration (GLSVLSI)*, April 2005 ([pdf](#), [slides](#))

- [C34] Anup Hosangadi, Farzan Fallah and Ryan Kastner, “**Simultaneous Optimization of Delay and Number of Operations in Multiplierless Implementation of Linear Systems**” – *International Workshop on Logic and Synthesis (IWLS)*, June 2005 ([pdf](#)) – poster presentation
- [C35] Ryan Kastner, Wenrui Gong, Xin Hao, Forrest Brewer, Adam Kaplan, Philip Brisk and Majid Sarrafzadeh, “**Physically Aware Data Communication Optimization for Hardware Synthesis**” – *International Workshop on Logic and Synthesis (IWLS)*, June 2005 ([pdf](#), [slides](#))
- [C36] Wenrui Gong, Gang Wang and Ryan Kastner, “**Data Partitioning for Reconfigurable Architectures with Distributed Block RAM**” – *International Workshop on Logic and Synthesis (IWLS)*, June 2005 ([pdf](#), [slides](#))
- [C37] Yan Meng, Andrew P. Brown, Timothy Sherwood, Ronald A. Iltis, Hua Lee and Ryan Kastner, “**MP Core: Algorithm and Design Techniques for Efficient Channel Estimation in Wireless Applications**”, *Design Automation Conference (DAC)*, June 2005 ([pdf](#), [slides](#))
- [C38] Wenrui Gong, Yan Meng, Gang Wang, Ryan Kastner and Timothy Sherwood, “**Data Partitioning for Reconfigurable Architectures with Distributed Block RAM**” – *International Conference on Engineering of Reconfigurable Systems and Algorithms (ERSA)*, June 2005 ([pdf](#))
- [C39] Ronald A. Iltis, Hua Lee, Ryan Kastner, Daniel Doonan, Tricia Fu, Rachael Moore and Maurice Chin, “**An Underwater Acoustic Telemetry Modem for Eco-Sensing**” – *MTS/IEEE Oceans*, September 2005 ([pdf](#), [slides](#))
- [C40] Wenrui Gong, Gang Wang and Ryan Kastner “**Storage Assignment during High-level Synthesis for Configurable Architectures**”, *International Conference on Computer-Aided Design (ICCAD)*, November 2005 ([pdf](#), [slides](#))
- [C41] Andrew P. Brown, Ronald A. Iltis and Ryan Kastner, “**Efficient Distributed Algorithms for Data Fusion and Node Localization in Mobile Ad-hoc Networks**”, *International Conference on Mobile Ad-hoc and Sensor Systems (MASS)*, November 2005 ([pdf](#), [slides](#))
- [C42] Yan Meng, Ryan Kastner and Timothy Sherwood, “**Algorithm/Architecture Co-exploration for Designing Energy Efficient Wireless Channel Estimator**”, *Mobile Computing Hardware Architectures: Design and Implementation (MOCHA)*, co-located with the *Hawaii International Conference on System Sciences (HICSS)*, January 2006 ([pdf](#))
- [C43] Shahnam Mirzaei, Anup Hosangadi, and Ryan Kastner, “**High Speed FIR Filter Implementation Using Add and Shift Method**”, *International Symposium on Field Programmable Gate Arrays (FPGA)*, February 2006 – poster presentation
- [C44] Ryan Kastner, Wenrui Gong, Adam Kaplan, Philip Brisk, Majid Sarrafzadeh, Xin Hao, and Forrest Brewer, “**Layout Driven Data Communication Optimization for High Level Synthesis**”, *Design, Automation and Test in Europe Conference (DATE)*, March 2006 ([pdf](#), [slides](#))
- [C45] Anup Hosangadi, Farzan Fallah and Ryan Kastner, “**Optimizing High Speed Arithmetic Circuits Using Three Term Extraction**”, *Design, Automation and Test in Europe Conference (DATE)*, March 2006 ([pdf](#), [slides](#))
- [C46] Gang Wang, Wenrui Gong, and Ryan Kastner, “**Defect-Tolerant Nanocomputing Using Bloom Filters**” ([pdf](#)) – *Symposium on Field-Programmable Custom Computing Machines (FCCM)*, April 2006 – poster presentation
- [C47] Yan Meng, Timothy Sherwood and Ryan Kastner, “**Leakage Power Reduction of Embedded Memories on FPGAs through Location Assignment**”, *Design Automation Conference (DAC)*, July 2006 ([pdf](#), [slides](#))

- [C48] Gang Wang, Wenrui Gong, Brian DeRenzi and Ryan Kastner, “**Design Space Exploration using Time and Resource Duality with the Ant Colony Optimization**”, *Design Automation Conference (DAC)*, July 2006 ([pdf](#), [slides](#))
- [C49] Theodore Huffmire, Shreyas Prasad, Timothy Sherwood and Ryan Kastner, “**Policy-Driven Memory Protection for Reconfigurable Hardware**”, *European Symposium on Research in Computer Security (ESORICS)*, September 2006 ([pdf](#))
- [C50] Hua Lee, Tricia Fu, Daniel Doonan, Christopher Utley, Ronald A. Iltis and Ryan Kastner, “**Design and Development of a Software-Defined Underwater Acoustic Modem for Sensor Networks for Environmental and Ecological Research**” – *MTS/IEEE Oceans*, September 2006 ([pdf](#))
- [C51] Bridget Benson, Grace Chang, Derek Manov, Brian Graham and Ryan Kastner, “**Design of a Low-cost Acoustic Modem for Moored Oceanographic Applications**” - *International Workshop on Underwater Networks (WUWNet)*, September 2006 ([pdf](#), [slides](#))
- [C52] Shahnam Mirzaei, Anup Hosangadi and Ryan Kastner, “**FPGA Implementation of High Speed FIR Filter Using Add and Shift Method**” – *International Conference on Computer Design (ICCD)*, October 2006 ([pdf](#), [slides](#))
- [C53] Daniel Doonan, Tricia Fu, Christopher Utley, Ronald A. Iltis, Ryan Kastner and Hua Lee, “**Design and Experimentation with a Software-Defined Acoustic Telemetry Modem**” – *International Telemetry Conference (ITC)*, October 2006 ([pdf](#))
- [C54] Gang Wang, Wenrui Gong and Ryan Kastner, “**On the Use of Bloom Filters for Defect Maps in Nanocomputing**” – *International Conference on Computer-Aided Design (ICCAD)*, November 2006 ([pdf](#))
- [C55] Ronald Iltis, Shahnam Mirzaei, Ryan Kastner, Richard E. Cagley and Brad T. Weals, “**Carrier Offset and Channel Estimation for Cooperative MIMO Sensor Networks**” – *IEEE Global Telecommunications Conference (GLOBECOM)*, November 2006 ([pdf](#), [ppt](#))
- [C56] Shahnam Mirzaei, Ryan Kastner, Richard E. Cagley and Bradley T. Weals “**Memory Efficient Implementation of Correlation Function in Wireless Applications**” to appear in the *International Symposium on Field Programmable Gate Arrays (FPGA)*, February 2007 – poster presentation
- [C57] Richard E. Cagley, Brad T. Weals, Scott A. McNally, Ronald Iltis, Shahnam Mirzaei and Ryan Kastner, “**Implementation of the Alamouti OSTBC to a Distributed Set of Single-Antenna Wireless Nodes**” – to appear in the *IEEE Wireless Communications and Networking Conference (WCNC)*, March 2007 (preliminary [pdf](#))

Experience

[UCSB Department of Electrical and Computer Engineering](#)

Associate Professor

June 2006 – present

Assistant Professor

September 2002 – June 2006

Member of the Computer Engineering Group. Director of the Extensible, Programmable, Reconfigurable Embedded Systems (ExPRESS) group. Performing research in the area of embedded systems and reconfigurable computing.

[UCLA Embedded and Reconfigurable Computing \(ER\) Lab](#)

Graduate Student Researcher

Sept 2000 – Sept 2002

Involved in several projects in various areas of computer science. Developing compiler techniques for Strategically Programmable Systems, working on novel VLSI CAD placement and routing schemes for congestion minimization and coupling reduction, and creating incremental algorithms and fault tolerant solutions of combinatorial auctions.

[NuCAD, Northwestern University VLSI CAD Group](#)

Graduate Student Researcher

Jan 1999 – Aug 2000

Developed CAD tools for reconfigurable computing and global routing. Used simulated annealing for offline placement on reconfigurable functional unit. Explored faster methods and data structures for the global routing problem and reducing congestion and coupling in the global routing stage.

Teaching

- [ECE 154 - Introduction to Computer Architecture](#) - Fall 2002, Fall 2003, Fall 2004, Fall 2005, Fall 2006
- [ECE 253 - Embedded System Design](#) - Winter 2003, Winter 2004, Winter 2005, Winter 2006, Winter 2006
- [ECE 15B - Assembler Programming](#) - Spring 2003, Spring 2004, Spring 2005, Spring 2006

Other Teaching Contributions:

Developed a new graduate course on “Embedded System Design” (<http://www.ece.ucsb.edu/~kastner/ece253/>). It is taught annually and has become a permanent addition to the curriculum for graduate students. The class focuses on current issues in the design and synthesis of embedded systems. The course is graded primarily on a research project that is carried out over the duration of the quarter. Many of the final reports for the class were close to conference quality and with some reworking, they have been submitted and published in embedded and reconfigurable systems conferences.

Advisees

Undergraduate Projects Directed:

<u>Student</u>	<u>Project</u>	<u>Chair/ Member</u>	<u>Year Degree Completed</u>
Daniel Grund	“Profiling Applications Using the Machine-SUIF Compiler”	Chair	June 2004
Christopher Picardo	“Quantifying Reconfigurable Computing Systems”	Chair	May 2005
Willis Hoang	“Incremental Floorplanning for System Level Design”	Chair	June 2005
Talayeh Sadari	“Implementation of the Recursive Least Square for Adaptive Filtering”	Chair	June 2005
Brian DeRenzi	“High Performance Compiler Optimizations for Hardware Compilation”	Chair	June 2006
Brian Graham		Chair	June 2007
Isaac Lui		Chair	June 2007
Patrick Lai		Chair	June 2007
Ajeshwar Sra		Chair	June 2007
Jonathan Valamehr		Chair	June 2007
Alejandra Ortiz		Chair	June 2008
Jeff White		Chair	June 2008

Graduate Degree Committees:

MS Committees

<u>Student</u>	<u>Year Degree Completed</u>	<u>Chair/ Member</u>	<u>Optional Info (e.g., Current Empl)</u>
Mei-Hsuan Wu		Member	
Talayeh Sadari	November 2006	Member	
Ryan Avery	June 2006	Member	
Christopher Wardman	May 2006	Member	
Paul Bonderson	December 2005	Member	
Rachael Moore	September 2005	Member	
Subhra Bhattacharya	November 2004	Chair	Sun Microsystems

Ph.D. Committees

<u>Student</u>	<u>Year Degree Completed</u>	<u>Chair/Member</u>	<u>Optional Info (e.g., Current Empl)</u>
Onur Guzey		Member	UCSB CS Dept
Theodore Huffmire		Member	UCSB CS Dept
Aravind Vijayakumar		Member	
Gang Wang		Chair	
Andrew Brown		Member	
Wenrui Gong		Chair	
Xin Hao	November 2006	Member	
Feng Lu	July 2006	Member	
Anup Hosangadi	July 2006	Chair	Cadence
Yan Meng	June 2006	Chair	Cadence
Qinghua Liu	November 2005	Member	
Chao-Yang (Steve) Yeh	June 2005	Member	
Francis Afinidad	May 2005	Member	PhD Student at Naval Post Graduate School

Professional Activity

Lectures Presented:

<u>Month/Year</u>	<u>Title</u>	<u>Meeting/Place</u>
May 2004	“Ants in the Ocean: System Design Techniques for Underwater Sensing Applications”	Computer Engineering Seminar Series, Department of Electrical and Computer Engineering, Northwestern University
May 2004	“Using Ants to Solve System Design Problems”	Invited Talk, Southern California Workshop on Parallel and Distributed Processing and Architecture, UCLA
August 2004	“Which Security Features Can/Should be Done in Hardware?”	Panelist, "Recent Developments and Possible Limitations", DARPA Invitational Workshop on Security Challenges at the Foundation: Secure Computing Enabled by Hardware, Firmware and Low-Level Software, Monterey, CA
September 2004	“Eco-Surveillance: UCSB Moorea Coral Reef Long Term Ecological Research”	Invited Talk, NSF workshop on "Environmental Sensor Networks for Research and Education: Building capacity in the lake and coral reef scientific communities", Scripps Institute of Oceanography, San Diego, CA
March 2005	“Software Defined Signal Processing”	Computer Engineering Seminar Series, Dept. of Electrical Engineering, University of Southern California (USC)
August 2005	“Reconfigurable Hardware Security”	CiSR Seminar Series, Naval Postgraduate School
March 2006	“AquaNode: A Solution for Underwater Wireless Networking”	Invited Talk, Coral Reef and Lakes Global Observatory Networks (CREON + GLEON) Meeting, Townsville, Australia

Grants and Contracts:

<u>Year(s)</u>	<u>Source and Title</u>	<u>Amount</u>	<u>Principal Investigator</u>
2004-2007	“Adaptive Radiolocation for Mobile Sensor Networks”, National Science Foundation	\$397,106	Kastner
2005-2006	Research Experience for Undergraduates, National Science Foundation	\$6,000	Kastner
2006-2007	Research Experience for Undergraduates, National Science Foundation	\$12,000	Kastner
2005-2007	“Algebraic Optimizations for Communication Applications”, UC CORE/Fujitsu	\$87,452	Kastner
2005-2008	“CT-T: Collaborative Research: Adaptive Security and Separation in Reconfigurable Hardware”, National Science Foundation	\$603,935	Sherwood
4/2005-9/2006	“The Ecotechnology Initiative”, William M. Keck Foundation	\$86,000	Schmitt
2006-2008	“Seamless Non-Line-Of-Sight Communications for Urban Warfare”, SBIR, Air Force Office of Research	\$225,000	Iltis

Awards and Honors:

Walter P. Murphy Fellowship – Department of Electrical and Computer Engineering, Northwestern University, 2000

Best Paper Nomination - “A New Approach for Task Level Computational Resource Bi-partitioning”, Gang Wang, Wenrui Gong and Ryan Kastner, *IASTED International Conference on Parallel and Distributed Computing and Systems (PDCS)*, November 2003

N. N. Biswas Best Paper Award - Anup Hosangadi, Farzan Fallah and Ryan Kastner, “Energy Efficient Hardware Synthesis of Polynomial Expressions”, *IEEE/ACM International Conference on VLSI Design*, January 2005

Who’s Who in America, Who’s Who of Emerging Leaders

Reviewing and Refereeing Activity:

<u>Date</u>	<u>Activity and for Whom</u>
2/2003	Organizer and Technical Program Committee Member – Workshop on Software Support for Reconfigurable Systems (SSRS), colocated with International Symposium on High Performance Computer Architecture (HPCA), Anaheim, CA
11/2003	Special Session Organizer and Chair - "Synthesis for Programmable Systems", IASTED International Conference on Parallel and Distributed Computing (PDCS)
11/2003	Session Chair - "Scheduling and Resource Allocation", IASTED International Conference on Parallel and Distributed Computing (PDCS)
3/2004	Technical Program Committee Member - International Workshop on Embedded Computing (EC-04) held in conjunction with International Conference on Distributed Computing Systems (ICDCS)
4/2004	Technical Program Committee – IEEE/ACM Great Lakes Symposium on VLSI (GLSVLSI)
5/2004	Review Committee Member – IEEE International Symposium on Circuits and Systems (ISCAS)
6/2004	Technical Program Committee – Engineering of Reconfigurable Systems and Algorithms (ERSA)
8/2004	Technical Program Committee Member - International Workshop on Networked Embedded Computing (NEC-04)

Ryan Kastner – Curriculum Vitae
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<u>Date</u>	<u>Activity and for Whom</u>
8/2004	Technical Program Committee Member - International Conference on Embedded and Ubiquitous Computing (EUC)
11/2004	Technical Program Committee Member – IEEE/ACM International Conference on Computer-Aided Design (ICCAD)
11/2004	Moderator - Session on "Architectural Issues in System Synthesis" - International Conference on Computer-Aided Design (ICCAD)
12/2004	Technical Program Committee Member - International Conference on Embedded Software and Systems (ICCESS)
4/2005	Technical Program Committee – IEEE/ACM Great Lakes Symposium on VLSI (GLSVLSI)
5/2005	Review Committee Member – IEEE International Symposium on Circuits and Systems (ISCAS)
6/2005	Technical Program Committee Member – IEEE/ACM Design Automation Conference (DAC)
6/2005	Technical Program Committee – Engineering of Reconfigurable Systems and Algorithms (ERSA)
6/2005	Technical Program Committee Member - International Workshop on Embedded Computing (EC-05) held in conjunction with International Conference on Distributed Computing Systems (ICDCS)
10/2005	Technical Program Committee – IEEE International Conference on Computer Design (ICCD)
5/2006	Review Committee Member – IEEE International Symposium on Circuits and Systems (ISCAS)
6/2006	Technical Program Committee – Engineering of Reconfigurable Systems and Algorithms (ERSA)
6/2006	Technical Program Committee Member – IEEE/ACM Design Automation Conference (DAC)
10/2006	Co-Chair, Tools and Methodology Track and Technical Program Committee – IEEE International Conference on Computer Design (ICCD)
11/2006	Technical Program Committee Member – IEEE GLOBECOM
3/2007	Technical Program Committee Member – Technical Program Committee Member - Applied Reconfigurable Computing (ARC) Workshop
4/2007	Co-Chair, Architectural Synthesis and Technical Program Committee - IEEE Design, Automation and Test in Europe (DATE)
6/2007	Subcommittee Chair (FPGA Design Tools and Applications) and Technical Program Committee Member – IEEE/ACM Design Automation Conference (DAC)
10/2007	Co-Chair, Tools and Methodology Track and Technical Program Committee – IEEE International Conference on Computer Design (ICCD)
	Reviewer – IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
	Reviewer – IEEE Design & Test of Computers
	Reviewer – IEEE Transactions on Computers
	Reviewer – IEEE Transactions on Very Large Scale Integration Systems
	Reviewer – ACM Transactions on Design Automation for Embedded Systems
	Reviewer – ACM Transactions on Embedded Computing Systems
	Reviewer – Elsevier Information Processing Letters
	Reviewer – Elsevier Innovation, The VLSI Journal
	Reviewer – IASTED International Journal of Computers and Applications
	Reviewer – University of California Microelectronics Innovation and Computer Research Opportunities (MICRO) Program
	Reviewer – University of California Discovery Grant Program
	Reviewer – National Science Foundation
	Reviewer – International Symposium on Microarchitecture
	Reviewer – International Conference on Compilers, Architecture, and Synthesis for Embedded Systems

Special Appointments:

<u>Year(s)</u>	<u>Position/Type of Service</u>
2004 - present	Editor, Journal of Embedded Computing, Cambridge International Science Publishing Ltd
2005 - present	Eta Kappa Nu Advisor, Department of Electrical and Computer Engineering, University of California, Santa Barbara