**Stephen A. Edwards**
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## Research Interests

Languages and compilers for Embedded Systems. Computer-Aided Digital Design.

## Education

University of California, Berkeley Ph.D in Electrical Engineering 1994–1997
Ph.D, Electrical Engineering. Edward A. Lee, advisor
Thesis: *The Specification and Execution of Heterogeneous Synchronous Reactive Systems*.

University of California, Berkeley M.S. in Electrical Engineering. 1992–1994
A. Richard Newton, advisor
Thesis: *An Esterel Compiler for a Synchronous/Reactive Development System*.

California Institute of Technology B.S. with Honors, Electrical Engineering 1988–1992

## Experience

Columbia University, New York 2006–present
Associate professor, Department of Computer Science
Tenure awared June, 2008

Columbia University, New York 2001–2006
Assistant professor, Department of Computer Science

Synopsys, Mountain View, California 1998–2001
Senior R&D Engineer

Simplex Solutions, Sunnyvale, California 1997–1998
Senior Member of Technical Staff.

Interval Research Corporation, Palo Alto, California 1993
Researcher.

Vitesse Semiconductor, Camarillo, California 1991
VLSI Design Engineer.

Microsoft, Redmond, Washington 1990
Hardware Design Engineer.

## Honors and Awards

Best paper award March 2006
Design Automation and Test in Europe
Munich, Germany (given to 2 of 800+ submissions)

Senior Member 2006
IEEE (Institute of Electrical and Electronics Engineers)
This is the main professional organization for Electrical Engineers

National Science Foundation Faculty Early Career Development ("CAREER") Award 2002
"Designing Embedded Systems with Domain-Specific Languages"
I won this award the first time I applied.

NSF Graduate Research Fellowship 1994–1996
Three years tuition & stipend, awarded annually to about 800 of 5000 applicants.

California Fellowship in Microelectronics 1992–1993
One year tuition plus stipend.

Caltech Merit Award 1990–1991, 1991–1992
One year full tuition, awarded annually to about 45 of 800 undergraduates.

## Research Support

*All were new grants.*

NSF CCF-SHF: \$625k total (my share \$208k) 2011–2014
*SHF:Medium:Type-Specific Instruction Processing*
with Martha A. Kim and Ken Ross.

NSF CSR-EHS, \$200k (\$50k $\times$ 4 years) 2007–2010
*PRET: Precision Timed Architectures*
with Edward A. Lee

NSF CSR-EHS, \$240k 2006–2008
*SHIM: Developing Embedded Systems with Deterministic Concurrency*
I was sole PI.

Gift from Altera, \$20k 2006
*Hardware Software Co-Synthesis from SHIM*,

Joint Semiconductor Research Corporation/Microelectronic Design Center, \$300k 2003–2006
*High-Level Synthesis from the Synchronous Language Esterel*
I was sole PI.

New York State, NYSTAR program, matching funds, \$11k 2002

Hardware grant from Intel, \$13k 2002

Gift from Intel, \$25k 2002
*High-level Synthesis from the Synchronous Language Esterel*

NSF Faculty Early Career Development (CAREER) Award, \$300k 2002–2007
*Designing Embedded Systems with Domain-Specific Languages*
I was sole PI.

**Released Software**

The Columbia Esterel Compiler (2003–)

- Only open-source compiler for the Esterel language.
- Generates the most efficient C code for Esterel of any known compiler, including the commercial implementation.
- Used at Freescale semiconductor, NASA, University of Kiel, and University of Auckland. Cited in about 15 papers.
- The CEC-Users mailing list has 32 subscribers from companies including Motorola, TI, Esterel Technologies, Philips, Intel, IBM, and Xilinx
- http://www1.cs.columbia.edu/~sedwards/cec/

The EstBench Esterel benchmark suite (2004)

- Only public benchmark suite for the Esterel language
- Cited in about ten papers
- http://www1.cs.columbia.edu/~sedwards/software.html

The Ext C-code documentation extraction system (1997)

- Used in the widely-distributed VIS and CUDD software packages (at University of Colorado, Boulder). Cited in a few papers.
- http://www1.cs.columbia.edu/~sedwards/ext/

# Publications

### Patent

US Patent 7,100,164. "Method & Apparatus for Converting a Concurrent Control Flow Graph into a Sequential Control Flow Graph." Filed January 6th, 2000, issued September 29th, 2006.

### Books

[1] Dumitru Potop-Butucaru, Stephen A. Edwards, and Gérard Berry. *Compiling Esterel*. Springer, 2007.

[2] Stephen A. Edwards. *Languages for Digital Embedded Systems*. Kluwer, Boston, Massachusetts, September 2000.

### Chapters in Books

[3] Stephen A. Edwards and Nalini Vasudevan. Compiling SHIM. In Sandeep K. Shukla and Jean-Pierre Talpin, editors, *Synthesis of Embedded Software: Frameworks and Methodologies for Correctness by Construction*, chapter 4, pages 121–146. Springer, 2010.

[4] Stephen A. Edwards. Design and verification languages. In Luciano Lavagno, Grant Martin, and Lou Scheffer, editors, *Electronic Design Automation for Integrated Circuits Handbook*. CRC Press, Boca Raton, Florida, 2006.

[5] Stephen A. Edwards. Languages for embedded systems. In Richard Zurawski, editor, *The Embedded Systems Handbook*, pages 7–1–7–19. CRC Press, Boca Raton, Florida, 2005.

[6] Stephen A. Edwards. Languages for embedded systems. In Richard Zurawski, editor, *The Industrial Information Technology Handbook*, pages 85–1–85–18. CRC Press, Boca Raton, Florida, 2004.

### Journal Papers

*All journal papers were peer-reviewed. The Proceedings of the IEEE papers were invited, as all papers in that journal are.*

[7] Lisa Wu, Martha A. Kim, and Stephen A. Edwards. Cache impacts of datatype acceleration. *Computer Architecture Letters*, 2011. To Appear.

[8] Nalini Vasudevan and Stephen A. Edwards. Buffer sharing in rendezvous programs. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, 29(10):1471–1480, October 2010.

[9] Marcio Buss, Daniel Brand, Vugranam Sreedhar, and Stephen A. Edwards. A novel analysis space for pointer analysis and its application for bug finding. *Science of Computer Programming*, 2009. doi: 10.1016/j.scico.2009.08.002.

[10] Cristian Soviani, Ilija Hadžić, and Stephen A. Edwards. Synthesis and optimization of pipelined packet processors. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, 28(2):231–244, February 2009.

[11] Osama Neiroukh, Stephen A. Edwards, and Xiaoyu Song. Transforming cyclic circuits into acyclic equivalents. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, 27(10):1775–1787, October 2008.

[12] Stephen A. Edwards and Jia Zeng. Code generation in the Columbia Esterel Compiler. *EURASIP Journal on Embedded Systems*, 2007:Article ID 52651, 31 pages, 2007.

[13] Cristian Soviani, Olivier Tardieu, and Stephen A. Edwards. Optimizing sequential cycles through Shannon decomposition and retiming. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, 26(3):456–467, March 2007.

[14] Stephen A. Edwards. The challenges of synthesizing hardware from C-like languages. *IEEE Design & Test of Computers*, 23(5):375–386, September/October 2006.

[15] Stephen A. Edwards and Olivier Tardieu. SHIM: A deterministic model for heterogeneous embedded systems. *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, 14(8):854–867, August 2006.

[16] Stephen A. Edwards. Experiences teaching an FPGA-based embedded systems class. *ACM SIGBED Review*, 2(4):56–62, October 2005. Originally presented at the Workshop on Embedded Systems Education.

[17] Stephen A. Edwards and Edward A. Lee. The semantics and execution of a synchronous block-diagram language. *Science of Computer Programming*, 48(1):21–42, July 2003. 16 citations on Google Scholar.

[18] Stephen A. Edwards. Tutorial: Compiling concurrent languages for sequential processors. *ACM Transactions on Design Automation of Electronic Systems*, 8(2):141–187, April 2003. 19 citations on Google Scholar.

[19] Albert Benveniste, Paul Caspi, Stephen A. Edwards, Nicolas Halbwachs, Paul Le Guernic, and Robert de Simone. The synchronous languages 12 years later. *Proceedings of the IEEE*, 91(1):64–83, January 2003. Invited. 174 citations on Google Scholar.

[20] Stephen A. Edwards. An Esterel compiler for large control-dominated systems. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, 21(2):169–183, February 2002. 37 citations on Google Scholar.

[21] Stephen Edwards, Luciano Lavagno, Edward A. Lee, and Alberto Sangiovanni-Vincentelli. Design of embedded systems: Formal models, validation, and synthesis. *Proceedings of the IEEE*, 85(3):366–390, March 1997. Invited. 272 citations on Google Scholar.

**Conference Papers**

*All conference papers were peer-reviewed. In my area, conference papers are preferred over journals because conferences are more selective and more widely read.*

[22] Nalini Vasudevan, Kedar Namjoshi, and Stephen A. Edwards. Simple and fast biased locks. In *Proceedings of the International Conference on Parallel Architectures and Compilation Techniques (PACT)*, pages 65–74, Vienna, Austria, September 2010.

[23] Stephen A. Edwards, Sungjun Kim, Edward A. Lee, Isaac Liu, Hiren D. Patel, and Martin Schoeberl. A disruptive computer design idea: Architectures with repeatable timing. In *Proceedings of the IEEE International Conference on Computer Design (ICCD)*, Lake Tahoe, CA, October 2009.

[24] Baolin Shao, Nalini Vasudevan, and Stephen A. Edwards. Compositional deadlock detection for rendezvous communication. In *Proceedings of the International Conference on Embedded Software (Emsoft)*, pages 59–66, Grenoble, France, October 2009. 33/106 = 31%.

[25] Nalini Vasudevan and Stephen A. Edwards. Buffer sharing in CSP-like programs. In *Proceedings of the International Conference on Formal Methods and Models for Codesign (MEMOCODE)*, Cambridge, Massachusetts, July 2009. 15/42 = 36%.

[26] Nalini Vasudevan and Stephen A. Edwards. A determinizing compiler. In *Programming Languages Design and Implementation (PLDI) - Fun Ideas and Thoughts Session*, Dublin, Ireland, June 2009.

[27] Nalini Vasudevan, Olivier Tardieu, Julian Dolby, and Stephen A. Edwards. Compile-time analysis and specialization of clocks in concurrent programs. In *Proceedings of Compiler Construction (CC)*, volume 5501 of *Lecture Notes in Computer Science*, pages 48–62, York, United Kingdom, March 2009.

[28] Nalini Vasudevan and Stephen A. Edwards. Celling SHIM: Compiling deterministic concurrency to a heterogeneous multicore. In *Proceedings of the Symposium on Applied Computing (SAC)*, volume III, pages 1626–1631, Honolulu, Hawaii, March 2009. 1084/316 = 29%.

[29] Ben Lickly, Isaac Liu, Sungjun Kim, Hiren D. Patel, Stephen A. Edwards, and Edward A. Lee. Predictable programming on a precision timed architecture. In *Proceedings of the International Conference on Compilers, Architecture, and Synthesis for Embedded Systems (CASES)*, pages 137–146, Atlanta, Georgia, October 2008.

[30] Nalini Vasudevan and Stephen A. Edwards. Static deadlock detection for the SHIM concurrent language. In *Proceedings of the International Conference on Formal Methods and Models for Codesign (MEMOCODE)*, pages 49–58, Anaheim, California, June 2008.

[31] Nalini Vasudevan, Satnam Singh, and Stephen A. Edwards. A deterministic multi-way rendezvous library for Haskell. In *Proceedings of the International Parallel and Distributed Processing Symposium (IPDPS)*, pages 1–12, Miami, Florida, April 2008. 105/410 = 25%.

[32] Stephen A. Edwards, Nalini Vasudevan, and Olivier Tardieu. Programming shared memory multiprocessors with deterministic message-passing concurrency: Compiling SHIM to Pthreads. In *Proceedings of Design, Automation, and Test in Europe (DATE)*, pages 1498–1503, Munich, Germany, March 2008.

[33] Marcio Buss, Daniel Brand, Vugranam Sreedhar, and Stephen A. Edwards. Flexible pointer analysis using assign-fetch graphs. In *Proceedings of the Symposium on Applied Computing (SAC)*, pages 234–239, Fortaleza, Ceará, Brazil, March 2008. 384/1307 = 29.3%.

[34] Stephen A. Edwards and Edward A. Lee. The case for the precision timed (PRET) machine. In *Proceedings of the 44th Design Automation Conference*, pages 264–265, San Diego, California, June 2007. 8/54 = 15% ("WACI" track).

[35] Haim Cohen and Stephen A. Edwards. {sets}—a lightweight constraint programming language based on ROBDDs. In *Proceedings of the IADIS International Conference on Applied Computing*, Salamanca, Spain, February 2007.

[36] Olivier Tardieu and Stephen A. Edwards. Scheduling-independent threads and exceptions in SHIM. In *Proceedings of the International Conference on Embedded Software (Emsoft)*, pages 142–151, Seoul, Korea, October 2006. 31/94 = 33%.

[37] Olivier Tardieu and Stephen A. Edwards. R-SHIM: Deterministic concurrency with recursion and shared variables. In *Proceedings of the International Conference on Formal Methods and Models for Codesign (MEMOCODE)*, page 202, Napa, California, July 2006. 17 papers + 6 posters / 43 = 53%.

[38] Nicholas Jun Hao Ip and Stephen A. Edwards. A processor extension for cycle-accurate real-time software. In *Proceedings of the IFIP International Conference on Embedded and Ubiquitous Computing (EUC)*, volume 4096 of *Lecture Notes in Computer Science*, pages 449–458, Seoul, Korea, August 2006. approx. 125/500 = 25%.

[39] Stephen A. Edwards and Olivier Tardieu. Efficient code generation from SHIM models. In *Proceedings of Languages, Compilers, and Tools for Embedded Systems (LCTES)*, pages 125–134, Ottawa, Canada, June 2006. 21/83 = 25%.

[40] Cristian Soviani, Ilija Hadžić, and Stephen A. Edwards. Synthesis of high-performance packet processing pipelines. In *Proceedings of the 43rd Design Automation Conference*, pages 679–682, San Francisco, California, July 2006. 180/865 = 20%.

[41] Cristian Soviani, Olivier Tardieu, and Stephen A. Edwards. Optimizing sequential cycles through Shannon decomposition and retiming. In *Proceedings of Design, Automation, and Test in Europe (DATE)*, pages 1085–1090, Munich, Germany, March 2006. 233/834 = 28%, **Best paper award**.

[42] Osama Neiroukh, Stephen A. Edwards, and Xiaoyu Song. An efficient algorithm for the analysis of cyclic circuits. In *Proceedings of the Symposium on VLSI (ISVLSI)*, pages 303–308, Karlsruhe, Germany, March 2006. 64/151 = 42%.

[43] Jia Zeng and Stephen A. Edwards. Separate compilation for synchronous modules. In *Proceedings of the 2nd International Conference on Embedded Software and Systems (ICESS)*, volume 3820 of *Lecture Notes in Computer Science*, pages 129–140, Xi'an, China, December 2005. 140/360 = 39% overall, 63/360 = 17% for proceedings.

[44] Olivier Tardieu and Stephen A. Edwards. Approximate reachability for dead code elimination in Esterel*. In *Proceedings of the Third International Symposium on Automated Technology for Verification and Analysis (ATVA)*, volume 3707 of *Lecture Notes in Computer Science*, pages 323–337, Taipei, Taiwan, October 2005. 33/95 = 35%.

[45] Stephen A. Edwards and Olivier Tardieu. SHIM: A deterministic model for heterogeneous embedded systems. In *Proceedings of the International Conference on Embedded Software (Emsoft)*, pages 37–44, Jersey City, New Jersey, September 2005. 25/88 = 28%, 10 citations on Google Scholar.

[46] Stephen A. Edwards and Olivier Tardieu. Deterministic receptive processes are Kahn processes. In *Proceedings of the International Conference on Formal Methods and Models for Codesign (MEMOCODE)*, pages 37–44, Verona, Italy, July 2005. 17/47 = 36%.

[47] Christopher L. Conway, Kedar S. Namjoshi, Dennis Dams, and Stephen A. Edwards. Incremental algorithms for inter-procedural analysis of safety properties. In *Proceedings of the 17th International Conference on Computer-Aided Verification (CAV)*, volume 3576 of *Lecture Notes in Computer Science*, pages 449–461, Edinburgh, Scotland, June 2005. 32/123 = 26%.

[48] Stephen A. Edwards. The challenges of hardware synthesis from C-like languages. In *Proceedings of Design, Automation, and Test in Europe (DATE)*, pages 66–67, Munich, Germany, March 2005. 176/825 = 21%. 17 citations on Google Scholar., Invited.

[49] Jia Zeng, Cristian Soviani, and Stephen A. Edwards. Generating fast code from concurrent program dependence graphs. In *Proceedings of Languages, Compilers, and Tools for Embedded Systems (LCTES)*, pages 175–181, Washington, DC, June 2004. 28/120 = 23%.

[50] Christopher L. Conway and Stephen A. Edwards. NDL: A domain-specific language for device drivers. In *Proceedings of Languages, Compilers, and Tools for Embedded Systems (LCTES)*, pages 30–36, Washington, DC, June 2004. 28/120 = 23%.

[51] Stephen A. Edwards. Making cyclic circuits acyclic. In *Proceedings of the 40th Design Automation Conference*, pages 159–162, Anaheim, California, June 2003. 152/628 = 24%. 13 citations on Google Scholar.

[52] Stephen Jan, Paolo de Dios, and Stephen A. Edwards. Porting a network cryptographic service to the RMC2000: A case study in embedded software development. In *Designers' Forum: Design Automation and Test in Europe Conference and Exhibition*, pages 150–155, Munich, Germany, March 2003. 98 long + 54 short + 36 designer's forum/590 = 32%, Also appears as Chapter 13 of *Embedded Software for SoC*, Jerraya, Yoo, Verkest and Wehn eds., Kluwer, 2003.

[53] Sandeep Shukla, Stephen A. Edwards, Jean-Pierre Talpin, and Rajesh K. Gupta. Tutorial: High level modeling and validation methodologies for embedded systems: bridging the productivity gap. In *Proceedings of the 16th International Conference on VLSI Design*, pages 9–14, New Delhi, India, January 2003.

[54] Stephen A. Edwards, Tony Ma, and Robert Damiano. Using a hardware model checker to verify software. In *Proceedings of the 4th International Conference on ASIC (ASICON)*, pages 85–90, Shanghai, China, October 2001.

[55] Stephen A. Edwards. Compiling Esterel into sequential code. In *Proceedings of the 37th Design Automation Conference*, pages 322–327, Los Angeles, California, June 2000. Association for Computing Machinery. 154/445 = 35%, Cited by 47 in Google Scholar.

[56] Gitanjali Swamy, Stephen Edwards, and Robert Brayton. Efficient verification and synthesis using design commonalities. In *Proceedings of the Eleventh International Conference on VLSI Design (VLSI'98)*, pages 542–551, Chennai, India, January 1998.

[57] Robert K. Brayton, Gary D. Hachtel, Alberto L. Sangiovanni-Vincentelli, Fabio Somenzi, Adnan Aziz, Szu-Tsung Cheng, Stephen A. Edwards, Sunil P. Khatri, Yuji Kukimoto, Abelardo Pardo, Shaz Qadeer, Rajeev K. Ranjan, Shaker Sarwary, Thomas R. Shiple, Gitanjali Swamy, and Tiziano Villa. VIS. In *Formal Methods in Computer-Aided Design (FMCAD)*, volume 1166, pages 248–256, Palo Alto, California, November 1996.

[58] Robert K. Brayton, Gary D. Hachtel, Alberto Sangiovanni-Vincentelli, Fabio Somenzi, Adnan Aziz, Szu-Tsung Cheng, Stephen Edwards, Sunil Khatri, Yuji Kukimoto, Abelardo Pardo, Shaz Qadeer, Rajeev K. Ranjan, Shaker Sarwary, Thomas R. Shiple, Gitanjali Swamy, and Tiziano Villa. VIS: A system for verification and synthesis. In *Proceedings of the 8th International Conference on Computer-Aided Verification (CAV)*, volume 1102 of *Lecture Notes in Computer Science*, pages 428–432, New Brunswick, New Jersey, July 1996. Springer. 32/93 = 34%, 367 citations on Google Scholar.

### Workshop Papers

*All workshop papers were peer-reviewed. Those at IWLS have limited distribution.*

[59] Martha A. Kim and Stephen A. Edwards. Computation vs. memory systems: Pinning down accelerator bottlenecks. In *Proceedings of the Workshop on Architectural and Microarchitectural Support for Binary Translation (AMAS-BT)*, Saint-Malo, France, June 2010.

[60] Nalini Vasudevan and Stephen A. Edwards. Determinism should ensure deadlock-freedom. In *Proceedings of the 2nd USENIX Workshop on Hot Topics in Parallelism (HotPar)*, Berkeley, California, June 2010.

[61] Nalini Vasudevan and Stephen A. Edwards. Ensuring deterministic concurrency through compilation. In *Proceedings of the IEEE International Parallel and Distributed Processing Symposium Workshops*, Atlanta, USA, April 2010.

[62] Stephen A. Edwards. Concurrency and communication: Lessons from the SHIM project. In *Proceedings of the Workshop on Software Technologies for Future Embedded and Ubiquitious Systems (SEUS)*, volume 5860 of *Lecture Notes in Computer Science*, pages 276–287, Newport Beach, California, November 2009. Springer. Invited.

[63] Stephen A. Edwards, Sungjun Kim, Edward A. Lee, Hiren D. Patel, and Martin Schoeberl. Reconciling repeatable timing with pipelining and memory hierarchy. In *Proceedings of the Workshop on Reconciling Performance with Predictability (RePP)*, Grenoble, France, October 2009.

[64] Stephen A. Edwards and Jia Zeng. Static elaboration of recursion for concurrent software. In *Proceedings of the Workshop on Partial Evaluation and Program Manipulation (PEPM)*, pages 71–80, San Francisco, California, January 2008. 20/74 = 27%.

[65] Cristian Soviani and Stephen A. Edwards. FIFO sizing for high-performance pipelines. In *Proceedings of the International Workshop on Logic Synthesis (IWLS)*, San Diego, California, June 2007.

[66] Olivier Tardieu and Stephen A. Edwards. Instantaneous transitions in Esterel. In *Proceedings of the Workshop on Model-Driven High-Level Programming of Embedded Systems (SLA++P)*, Braga, Portugal, March 2007. 9/16 = 56%.

[67] Becky Plummer, Mukul Khajanchi, and Stephen A. Edwards. An Esterel virtual machine for embedded systems. In *Proceedings of Synchronous Languages, Applications, and Programming (SLAP)*, Electronic Notes in Theoretical Computer Science, pages 1–14, Vienna, Austria, March 2006.

[68] Jia Zeng, Chuck Mitchell, and Stephen A. Edwards. A domain-specific language for generating dataflow analyzers. In *Proceedings of the Sixth Workshop on Language Descriptions, Tools and Applications*, Vienna, Austria, April 2006. 7/21 = 33%.

[69] Stephen A. Edwards. Using program specialization to speed SystemC fixed-point simulation. In *Proceedings of the Workshop on Partial Evaluation and Program Manipulation (PEPM)*, pages 21–28, Charleston, South Carolina, January 2006. 17/29 = 59%.

[70] Cristian Soviani, Stephen A. Edwards, and Angelos Keromytis. Adding a flow-oriented paradigm to commodity operating systems. In *Proceedings of the Workshop on Interaction between Operating System and Computer Architecture (IOSCA)*, pages 1–6, Austin, Texas, October 2005.

[71] Marcio Buss, Stephen A. Edwards, Bin Yao, and Daniel Waddington. Pointer analysis for source-to-source transformations. In *Proceedings of the 5th International Workshop on Source Code Analysis and Manipulation (SCAM)*, pages 139–148, Budapest, Hungary, September 2005. 18/48 = 38%.

[72] Cristian Soviani, Olivier Tardieu, and Stephen A. Edwards. High-level optimization by combining retiming and Shannon decomposition. In *Proceedings of the International Workshop on Logic Synthesis (IWLS)*, pages 16–23, Lake Arrowhead, California, June 2005. 33/67 = 49%.

[73] Cristian Soviani and Stephen A. Edwards. Challenges in synthesizing fast control-dominated circuits. In *Proceedings of the International Workshop on Logic Synthesis (IWLS)*, pages 326–332, Lake Arrowhead, California, June 2005. 34 posters/67 = 51%.

[74] Stephen A. Edwards. SHIM: A language for hardware/software integration. In *Proceedings of Synchronous Languages, Applications, and Programming (SLAP)*, Electronic Notes in Theoretical Computer Science, Edinburgh, Scotland, April 2005. 9/17 = 53%.

[75] Stephen A. Edwards. SHIM: A language for hardware/software integration. In *Proceedings of SYNCHRON*, Schloss Dagstuhl, Germany, December 2004.

[76] Stephen A. Edwards. The challenges of hardware synthesis from C-like languages. In *Proceedings of the International Workshop on Logic Synthesis (IWLS)*, pages 509–516, Temecula, California, June 2004. 33 talks/70 = 47%.

[77] Stephen A. Edwards, Vimal Kapadia, and Michael Halas. Compiling Esterel into static discrete-event code. In *Proceedings of Synchronous Languages, Applications, and Programming (SLAP)*, volume 153(4) of *Electronic Notes in Theoretical Computer Science*, pages 107–121, Barcelona, Spain, March 2004. Elsevier Science. 7/10 = 70%, 12 citations on Google Scholar.

[78] Stephen A. Edwards. High-level synthesis from the synchronous language Esterel. In *Proceedings of the International Workshop on Logic Synthesis (IWLS)*, New Orleans, Louisiana, June 2002. 22 long talks/80 = 28%. 14 citations on Google Scholar.

[79] Stephen A. Edwards. ESUIF: An open Esterel compiler. In *Proceedings of Synchronous Languages, Applications, and Programming (SLAP)*, volume 65(5) of *Electronic Notes in Theoretical Computer Science*, page 71, Grenoble, France, April 2002. Elsevier Science. 13/16 = 81%.

[80] Stephen A. Edwards. Compiling Esterel into sequential code. In *Proceedings of the 7th International Workshop on Hardware/Software Codesign (CODES)*, pages 147–151, Rome, Italy, May 1999. Association for Computing Machinery. 20/90 = 22%.

[81] Gitanjali Swamy, Stephen Edwards, and Robert Brayton. Efficient verification and synthesis using design commonalities. In *Proceedings of the International Workshop on Logic Synthesis (IWLS)*, Tahoe City, California, May 1997.

[82] Arlindo L. Oliveira and Stephen Edwards. Limits of exact algorithms for inference of minimum size finite state machines. In *Proceedings of the Seventh Annual Workshop on Algorithmic Learning Theory (ALT)*, volume 1160 of *Lecture Notes in Computer Science*, pages 59–66, Sydney, Australia, October 1996. Springer-Verlag. 16 long + 8 short/41 = 59%.

**Theses**

[83] Nalini Vasudevan. *Efficient, Deterministic and Deadlock-free Concurrency*. PhD thesis, Columbia University, New York, New York, USA, March 2011. CUCS–013–11.

[84] Marcio Buss. *Summary-Based Pointer Analysis Framework for Modular Bug Finding*. PhD thesis, Columbia University, New York, New York, USA, February 2008. CUCS–013–08.

[85] Jia Zeng. *Partial Evaluation for Code Generation from Domain-Specific Languages*. PhD thesis, Columbia University, New York, New York, USA, November 2007. CUCS–048–07.

[86] Cristian Soviani. *High Level Synthesis for Packet Processing Pipelines*. PhD thesis, Columbia University, New York, New York, USA, October 2007. CUCS–041–07.

[87] Stephen Anthony Edwards. *The Specification and Execution of Heterogeneous Synchronous Reactive Systems*. PhD thesis, University of California, Berkeley, 1997. 44 citations on Google Scholar, Available as UCB/ERL M97/31.

[88] Stephen Edwards. An Esterel compiler for a synchronous/reactive development system. Master's thesis, University of California, Berkeley, June 1994. Available as UCB/ERL M94/43.

**Technical Reports**

[89] Sungjun Kim, Hiren D. Patel, and Stephen A. Edwards. Using a model checker to determine worst-case execution time. Technical Report CUCS–038–09, Columbia University, Department of Computer Science, New York, New York, USA, September 2009.

[90] Devesh Dedhia. Example application under PRET environment — programming a MultiMediaCard. Technical Report CUCS–005–09, Columbia University, Department of Computer Science, New York, New York, USA, January 2009.

[91] Stephen A. Edwards. Retrocomputing on an FPGA. *Circuit Cellar*, 233:24–35, December 2009. Not peer-reviewed.

[92] Keerti Joshi and Delvin Kellebrew. A MPEG decoder in SHIM. Technical Report CUCS–057–08, Columbia University, Department of Computer Science, New York, New York, USA, December 2008.

[93] Nishant R. Shah. Memory issues in PRET machines. Technical Report CUCS–059–08, Columbia University, Department of Computer Science, New York, New York, USA, December 2008.

[94] David Lariviere and Stephen A. Edwards. uClinux on the Altera DE2. Technical Report CUCS–055–08, Columbia University, Department of Computer Science, New York, New York, USA, December 2008.

[95] Ravindra Babu Ganapathi and Stephen A. Edwards. SHIM optimization: Elimination of unstructured loops. Technical Report CUCS–054–08, Columbia University, Department of Computer Science, New York, New York, USA, December 2008.

[96] Dave Aaron Smith, Nalini Vasudevan, and Stephen Edwards. Static deadlock detection in SHIM with an automata type checking system. Technical Report CUCS–053–08, Columbia University, Department of Computer Science, New York, New York, USA, December 2008.

[97] Nalini Vasudevan, Olivier Tardieu, Julian Dolby, and Stephen A. Edwards. Analysis of clocks in x10 programs (extended). Technical Report CUCS–052–08, Columbia University, Department of Computer Science, New York, New York, USA, December 2008.

[98] Ben Lickly, Isaac Liu, Sungjun Kim, Hiren D. Patel, Stephen A. Edwards, and Edward A. Lee. Predictable programming on a precision timed architecture. Technical Report UCB/EECS-2008-40, University of California, Berkeley, April 2008.

[99] Marcio Buss, Daniel Brand, Vugranam Sreedhar, and Stephen A. Edwards. A new abstraction for summary-based pointer analysis. Technical Report RC24104, IBM, New York, 2007.

[100] Chen-Chun Huang, Javier Coca, Yashket Gupta, and Stephen A. Edwards. An implementation of a Renesas H8/300 microprocessor with a cycle-level timing extension. Technical Report CUCS–051–06, Columbia University, Department of Computer Science, New York, New York, USA, December 2006.

[101] Nalini Vasudevan and Stephen A. Edwards. A JPEG decoder in SHIM. Technical Report CUCS–048–06, Columbia University, Department of Computer Science, New York, New York, USA, December 2006.

[102] Smridh Thapar, Olivier Tardieu, and Stephen A. Edwards. Arrays in SHIM: A proposal. Technical Report CUCS–047–06, Columbia University, Department of Computer Science, New York, New York, USA, December 2006.

[103] Stephen A. Edwards and Edward A. Lee. The case for the precision timed (PRET) machine. Technical Report UCB/EECS-2006-149, EECS Department, University of California, Berkeley, November 2006.

[104] Neesha Subramaniam, Ohan Oda, and Stephen A. Edwards. Macshim: Compiling matlab to a scheduling-independent concurrent language. Technical Report CUCS–038–06, Columbia University, Department of Computer Science, New York, New York, USA, September 2006.

[105] Olivier Tardieu and Stephen A. Edwards. Specifying confluent processes. Technical Report CUCS–037–06, Columbia University, Department of Computer Science, New York, New York, USA, September 2006.

[106] Olivier Tardieu and Stephen A. Edwards. Scheduling-independent threads and exceptions in SHIM. Technical Report CUCS–036–06, Columbia University, Department of Computer Science, New York, New York, USA, September 2006.

[107] Marcio Buss, Stephen A. Edwards, Bin Yao, and Daniel Waddington. Pointer analysis for C programs through AST traversal. Technical Report CUCS–028–05, Columbia University, Department of Computer Science, New York, New York, USA, 2005.

[108] Christopher L. Conway, Kedar S. Namjoshi, Dennis Dams, and Stephen A. Edwards. Incremental algorithms for inter-procedural analysis of safety properties. Technical Report CUCS–018–05, Columbia University, Department of Computer Science, New York, New York, USA, 2005.

[109] Stephen A. Edwards and Chun Li. Determining interfaces using type inference. Technical Report CUCS–052–04, Columbia University, Department of Computer Science, New York, New York, USA, December 2004.

[110] Cristian Soviani, Jia Zeng, and Stephen A. Edwards. Sequential challenges in synthesizing Esterel. Technical Report CUCS–051–04, Columbia University, Department of Computer Science, New York, New York, USA, December 2004.

[111] Stephen A. Edwards. Design and verification languages. Technical Report CUCS–046–04, Columbia University, Department of Computer Science, New York, New York, USA, 2004.

[112] Hanoril Estevez and Stephen A. Edwards. Live CD cluster performance. Technical Report CUCS–037–04, Columbia University, Department of Computer Science, New York, New York, USA, 2004.

[113] Cristian Soviani, Jia Zeng, and Stephen A. Edwards. Improved controller synthesis from Esterel. Technical Report CUCS–015–04, Columbia University, Department of Computer Science, New York, New York, USA, 2004.

[114] Stephen A. Edwards. Design languages for embedded systems. Technical Report CUCS–009–03, Columbia University, Department of Computer Science, New York, New York, USA, 2004.

# Professional Activities

**Professional Society Memberships**

Senior Member, IEEE 2006–

Member, ACM 2006–

Member, IEEE 1994–2006

**Standarization Committees**

Vice Chair, IEEE P1778 Esterel Standardization Committee, 2007–

**Journal Activities**

- IEEE Transactions on Computer Aided Design of Integrated Circuits and Systems
  *Top journal in my area.*
  Associate Editor 2006–
  Guest Editor, special section on the Intl. Workshop on Logic and Synthesis May 2006
  Reviewer 1994, 2001–2003, 2006–2009
- ACM Transactions on Embedded Computer Systems
  Associate Editor 2008–
  Reviewer 2004, 2006–2007, 2009–2011
- IEEE Transactions on Industrial Informatics
  Associate Editor 2007–
  Reviewer 2009
- EURASIP International Journal of Embedded Systems
  Associate Editor 2004–
  Reviewer 2007–2010
- IEEE Embedded Systems Letters
  Reviewer 2010–
- Real-Time Systems
  Reviewer 2010
- Science of Computer Programming
  Reviewer 2010–2011

**Conference/Workshop Activities**

- Design Automation Conference (DAC)
  *Top conference in my area; 15%-20% paper acceptance rate*
  Technical Subcommittee Chair, *Managed four TPC members and 50+ papers.* 2006–2007, 2011
  TPC Member, *Responsible for 30+ paper reviews per year.* 2004–2006, 2012
  Reviewer 1996–2004, 2008–
- Design, Automation, and Test in Europe (DATE)
  *Second-to-top conference in my area.*
  Topic Committee Member 2002–2004, 2007

- International Conference on Computer-Aided Design (ICCAD)
  *Third-to-top conference in my area.*
  TPC Subcommittee Chair, *Invited to head new embedded systems software track* 2011

- International Workshop on Logic and Synthesis (IWLS)
  *Main workshop for logic synthesis, approx. 100 attendees*
  Program Chair 2006
  General Chair 2005
  Publicity and Publications Chair 2003–2004
  TPC Member 2003–2009, 2011

- Embedded Systems Week
  Local Arrangements Chair 2005
  Publicity Chair (EMSOFT conference) 2003–2004
  TPC Member (EMSOFT conference) 2004–2006, 2010
  TPC Member (CODES+ISSS conference) 2008, 2009, 2010
  Reviewer (EMSOFT conference) 2008, 2011

- Synchronous Languages, Applications, and Programming (SLAP)
  Steering Committee Member 2006–
  TPC Member 2002–2006

- Memocode conference
  Program Chair 2007–2008
  Design Contest Chair 2012
  Publicity Chair 2003–2004, 2006
  TPC Member 2003–2007, 2009, 2011
  Panel Organizer 2009

- Languages, Compilers, and Techniques for Embedded Systems (LCTES)
  TPC Member 2006, 2010

- IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)
  TPC Member 2005, 2006

- Embedded and Ubiquitous Computing (EUC)
  TPC Member 2006–2008

- International Conference on Computer Design (ICCD)
  TPC Member 2004–2005

- Applications of Concurrency to System Design (ACSD)
  TPC Member 2004–2008

- Workshop on Modeling, Validation and Heterogeneity (MoVaH)
  TPC Member 2008

- ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation (PEPM)
  TPC Member 2008

- International Conference on Hybrid Systems: Computation and Control (HSCC)
  TPC Member 2008

- Language Descriptions Tools, Analysis (LDTA)
  TPC Member 2009
- International Conference on Software Language Engineering (SLE)
  TPC Member 2009, 2010
- Real-time Systems Symposium (RTSS)
  TPC Member 2009

**Grant Reviews**

NSF: 2002, 2003, 2008, 2010, 2012 (Panels).

ANR (French National Research Agency): 2011.

DFG (German Excellence Initiative): January 2012.

**Paper Reviews**

ACM Transactions on Programming Languages and Systems (TOPLAS) 2001
Computer-Aided Verification (CAV) 1996, 2001
Correct Hardware Design and Verification Methods (CHARME) 1999
Design Automation and Test in Europe (DATE) 2001
Formal Aspects of Computing (FAC) 2002
Formal Methods for Industrial Critical Systems (FMICS) 2001
IEEE Transactions on Computers 2003, 2007–2009
International Conference on Computer-Aided Design (ICCAD) 1999–2003
International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 1996
IFIP Workshop on Logic & Architecture Synthesis (IWLAS) 1994
Semantic Foundations of Engineering Design Languages (SFEDL) 2004
Sigmetrics 2004
Formal Methods in System Design (FMSD) 2004, 2007
Integration—The VLSI Journal 2004
International Conference on Embedded Software and Systems (ICESS) 2005, 2008, 2009
Code Generation and Optimization (CGO) 2005
Architectural Support for Programming Languages and Operating Systems (ASPLOS) 2006
Principles of Programming Languages (POPL) 2007
Fundamenta Informaticae 2007–2008
Programming Language Design and Implementation (PLDI) 2008
IEEE Design and Test of Computers 2008
International Colloquium on Automata, Languages and Programming (ICALP) 2008
IEEE Conference on Automation Science and Engineering (CASE) 2008
Electronics and Telecommunications Research Institute (ETRI) Journal 2008
The 6th IFIP Workshop on Software Technologies for Future Embedded & Ubiquitous Systems (SEUS) 2008
IEEE Transactions on Very Large Scale Integration Systems (TVLSI) 2008, 2009
IEEE Transactions on Design Automation of Electronic Systems (TODAES) 2008, 2009, 2011

Compiler Construction (CC) 2008
Annual Symposium on Parallelism in Algorithms and Architectures (SPAA) 2011
Software: Practice and Experience (SPE) 2011
IEEE International Symposia on Multiple-Valued Logic (ISMVL) 2011

**Invited Talks**

*Conferences/Other*

What Do We Do With $10^{12}$ Transistors? The Case for Precision Timing February 21, 2008
Presented at the DSRC TeraChip Workshop, Stanford, California.

Verification Challenges in the SHIM Concurrent Language May 18, 2007
Invited talk at the Third Northeast Verification Seminar, NEC, Princeton, New Jersey.

Verification: What Works and What Does Not? May 18, 2007
Panel at the Third Northeast Verification Seminar, NEC, Princeton, New Jersey.

Using and Compiling Esterel July 11th, 2005
Invited Tutorial, Memocode conference, Verona, Italy.

The Future of Embedded Linux. June 30, 2005
Panel at C3Expo, New York, NY.

Languages for Embedded Systems August 2–6, 2004
Week-long course at National Chiao Tung University, Hsinchu, Taiwan.

Linux for EDA November 2003
Tutorial at the International Conference on Computer-Aided Design (ICCAD), San Jose, California.

High-Level Modeling and Validation Methodologies for Embedded Systems:
Bridging the Productivity Gap January 4, 2003
Presented at VLSI Design 2003, New Delhi, India.
With Sandeep K. Shukla, Jean Pierre Talpin, and Rajesh K. Gupta.

System-on-a-chip and the Coming Design Revolution November 1, 2002
Invited talk at the Second Annual Emerging Information Technology Conference (EITC), Princeton, New Jersey.

Scaling the Abstraction Cliff: High-level Languages for System Design March 2001
Tutorial A2 at the Design, Automation and Test in Europe (DATE 2001) Munich, Germany.

*Universities/Industry*

Concurrency and Communication: Lessons from the SHIM Project August 6, 2010
Cambridge University, UK

Concurrency and Communication: Lessons from the SHIM Project July 23, 2010
Microsoft Research, Cambridge, UK

Concurrency and Communication: Lessons from the SHIM Project July 5, 2010
University of the Philippines, Manila

Programming Shared Memory Multiprocessors with Deterministic Message-Passing Concurrency: Compiling SHIM to Pthreads August 8, 2008

National Taiwan University, Taipei, Taiwan

What Do We Do With $10^{12}$ Transistors? The Case for Precision Timing — February 20, 2008
Google, Mountain View, California

Precision-Timed (PRET) Machines — January 9, 2007
Altera, San Jose, California

Precision-Timed (PRET) Machines — July 6, 2007
National Taiwan University, Taipei, Taiwan

SHIM: A Scheduling-Independent Concurrent Language for Embedded Systems — May 10, 2007
Princeton University, New Jersey

SHIM: A Scheduling-Independent Concurrent Language for Embedded Systems — April 27, 2007
University of Pennsylvania, Philadelphia

SHIM: A Scheduling-Independent Concurrent Language for Embedded Systems — March 16, 2007
MIT, Boston, Massachusetts

SHIM: A Scheduling-Independent Concurrent Language for Embedded Systems — March 13, 2007
CEA, Grenoble, France

SHIM: A Scheduling-Independent Concurrent Language for Embedded Systems — November 8, 2006
University of California, Berkeley

The Challenges of Hardware Synthesis from C-Like Languages — September 18, 2006
ECSI-UBS Workshop on High Level Synthesis, Darmstadt, Germany.

SHIM: A Deterministic Language for Embedded Systems — August 28, 2006
SpringSoft, Hsinchu, Taiwan.

SHIM: A Deterministic Language for Embedded Systems — August 28, 2006
National Chiao Tung University (NCTU), Hsinchu, Taiwan.

SHIM: A Deterministic Language for Embedded Systems — August 23, 2006
Microsoft Research, Bangalore, India.

SHIM: A Deterministic Language for Embedded Systems — August 11, 2006
Tsinghua University, Hsinchu, Taiwan.

SHIM: A Deterministic Language for Embedded Systems — August 10, 2006
National Taiwan University, Taipei.

SHIM: A Deterministic Language for Embedded Systems — August 4, 2006
Seoul National University, Korea.

SHIM: A Deterministic Language for Embedded Systems — July 21, 2006
University of Kiel, Germany.

SHIM: A Deterministic Model for Heterogeneous Embedded Systems — December 9, 2005
Verimag, Grenoble, France.

SHIM: A Deterministic Model for Heterogeneous Embedded Systems — November 10, 2005
University of California at Berkeley.

SHIM: A Deterministic Model for Heterogeneous Embedded Systems — November 9, 2005
Xilinx, San Jose, California.

SHIM: A Deterministic Model for Heterogeneous Embedded Systems — October 7th, 2005

National Instruments and the University of Texas at Austin.

SHIM: A Deterministic Model for Heterogeneous Embedded Systems — August 16th, 2005
Tsinghua University, Hsinchu, Taiwan.

Deterministic Receptive Processes are Kahn Processes. — June 22, 2005
INRIA, Sophia-Antipolis, France.

SHIM: A Language for Hardware/Software Integration. — April 7, 2005
University of California, Irvine.

Using and Compiling Esterel — August 17, 2004
National Chung Cheng University, Chai-Yi, Taiwan.

Making cyclic circuits acyclic — March 3, 2003
Carnegie Mellon, Pittsburgh.

Compiling Esterel — January 13, 2003
Indian Institute of Technology, Delhi.

Compiling Esterel into Better Circuits and Faster Simulations. — November 5, 2002
Intel, Hillsboro, Oregon.

Compiling Esterel — October 10, 2002
Cambridge University, UK.

Compiling Esterel — September 5, 2002
University of California, Berkeley.

Compiling Esterel — August 26, 2002
University of Calgary, Alberta, Canada.

Compiling Esterel — August 19, 2002
Microsoft Research, Redmond, Washington.

High-level Synthesis from the Synchronous Language Esterel — August 8, 2002
Intel, Hillsboro, Oregon.

An Overview of the Electronic Design Automation (EDA) Field — July 16, 2002
Yuan Ze University, Chungli, Taiwan.

Compiling Esterel — July 8, 2002
National Taiwan University (Taida), Taipei, Taiwan.

Compiling Esterel — April 2002
A discussion of my first Esterel compiler along with ongoing work on ESUIF.
Princeton, New Jersey.

ESUIF: An Open Esterel Compiler — March 2002
A work-in-progress description of the ESUIF Esterel compiler.
IRISA/INRIA Rennes, France.

Esterel and Other Projects — October 2001
A summary of existing Esterel work and future plans
Intel, Hillsboro, Oregon.

Compiling Esterel into Sequential Code, — April 28, 1999
University of California, Berkeley, CAD Group Seminar.

Synchronous Reactive Systems. February 1997
University of Texas, Austin.

# Departmental

**Ph.D Students**

| | |
|---|---|
| Baolin Shao | Fall 2008–Fall 2010 |
| Sungjun Kim | Spring 2008–Fall 2011 |
| Kristina Chodorow | Fall 2007 |
| Nalini Vasudevan | Spring 2007–Fall 2010 |
| Marcio Buss | Spring 2004–Spring 2008 |
| Jia Zeng | Fall 2002–Spring 2008 |
| Cristian Soviani | Fall 2002–Fall 2007 |
| Christopher L. Conway | Summer 2002–Spring 2006 |

**Postdoctoral Researcher**

| | |
|---|---|
| Olivier Tardieu | Spring 2005–Fall 2006 |

**External PhD Committees**

| | |
|---|---|
| Francesco Leonardi, University of Trento, Italy | March 2009 |
| Jan Lukoschus, University of Kiel, Germany | July 2006 |
| Matthieu Moy, Verimag, Grenoble, France | December 2005 |
| Olivier Tardieu, Ecole des Mines, Sophia-Antipolis, France | October 2004 |
| “Jacky” Dumitru Potop-Butucaru, Ecole des Mines, Sophia-Antipolis, France | November 2002 |
| Sean Gibb, University of Calgary, Alberta, Canada | August 2002 |

**Internal Dissertation Defenses**

| | |
|---|---|
| Rebecca Collins (Luca Carloni) | November 23, 2010 |
| Cheng-Hong Li (Luca Carloni) | July 22, 2009 |
| Cheoljoo Jeong (Steve Nowick) | October 22, 2007 |
| Cristian Soviani | August 30, 2007 |
| Jia Zeng | August 30, 2007 |
| Krysta Svore (Al Aho) | March 31, 2006 |
| Saravanan Rajapandian (Ken Shepard, EE) | May 20, 2005 |
| Tiberiu Chelcea (Steve Nowick) | December 8, 2003 |
| Yu Zheng (Ken Shepard, EE) | June 9, 2003 |
| Henry Li (Charles Zukowski, EE) | Febriary 1, 2002 |

Michael Theobald (Steve Nowick) December 18, 2001

**Internal Thesis Proposal Committees**

Cheng-Hong Li (Luca Carloni) December 3, 2007

Mark Eaddy (Al Aho) December 13, 2006

Marcio Buss April 27, 2006

Jia Zeng May 2, 2006

Cristian Soviani May 2, 2006

Krysta Svore (Al Aho) March 31, 2006

Chris Conway May 12, 2006

**Committees**

PhD Committee 2003–

Academic Commitee 2003–

Recruiting
Hosted one candidate 2002
Hosted two candidates 2004
Hosted three candidates 2007
Hosted one candidate 2008

Visibility Committee 2005
*Revamped CS department web page*

Class Scheduling Spring 2011
*Scheduling all classes taught in the CS department*

**Undergraduate/Masters Research Projects Supervised**

| Student | Work resulted in | | Year |
|---|---|---|---|
| | Tech. Report | Published Paper | |
| Devesh Dedhia | • | | 2008 |
| Delvin Kelleybrew | • | | 2008 |
| Keerti Joshi | • | | 2008 |
| Nishant R. Shah | • | | 2008 |
| Ravindra Babu Ganapathi | • | | 2008 |
| Dave A. Smith | • | | 2008 |
| Phong Pham | | | 2007 |
| Haim Cohen | | • | 2006 |
| Chen-Chun Huang | • | | 2006 |
| Javier Coca | • | | 2006 |
| Yashket Gupta | • | | 2006 |
| Wei Chung Hsu | • | | 2006 |
| David Lariviere | • | | 2006 |
| Smridh Thapar | • | | 2006 |
| Nalini Vasudevan | • | | 2006 |
| Neesha Subramaniam | • | | 2006 |
| Ohan Oda | • | | 2006 |
| Bryan Gwin | | | 2006 |
| Mukul Khajanchi | | • | 2006 |
| Rebecca Plummer | | • | 2005 |
| Nicholas Ip | | • | 2005 |
| Chun Li | • | | 2004 |
| John Shick | | | 2004 |
| Erin Adelman | | | 2004 |
| Hanoril Estevez | • | | 2004 |
| Clarke Landis | | | 2003 |
| Noel Vega | • | | 2003 |
| Michael Anikin | | | 2003 |
| Michael Halas | | • | 2003 |
| Vimal Kapadia | | • | 2003 |
| Seema Gupta | | | 2003 |
| Miquad Mohammad | | | 2003 |
| Thomas Heydt-Benjamin | • | | 2003 |
| Mikhal Litvin | | | 2003 |
| Avi Shinnar | | • | 2002 |
| Jose Brunheroto | | | 2001 |

# Teaching

I teach CSEE 3827: Fundamentals of Computer Systems—a introductory combination digital design and computer architecture course required of all CS, CE, and EE students.

| **Semester** | F 2011 |
|---|---|
| **Enrollment** | 84 |

I developed CSEE W4840: Embedded System Design—a new "capstone" lab course for Computer Engineering and Electrical Engineering majors. Seniors are required to take one of three such courses. In it, students design and implement embedded systems using state-of-the-art FPGA boards. Projects have included video games, music synthesizers, and robots.

| **Semester** | Sp 2004 | Sp 2005 | Sp 2006 | Sp 2007 | Sp 2008 | Sp 2009 | Sp 2010 | Sp 2011 |
|---|---|---|---|---|---|---|---|---|
| **Enrollment** | 57 | 45 | 40 | 34 | 25 | 28 | 23 | 37 |

Student comments:

"Prof. Edwards is an amazing teacher. I have always enjoyed his lectures." (Spring 2007)

"His in class presentation is the best I have seen. He is approachable by students and always gives a straight answer to his students. Finally he takes an interest in what the student is doing though out the course." (Spring 2007)

"Professor Edwards is a very knowledgeable teacher who keeps the classroom interesting and moreover is very help in one-on-one lab settings. He has a genuine interest in what you are trying to accomplish and this is a first that I have seen among all Columbia professors during my 4 years here. To me he seems like the epitome of what a teacher should be." (Spring 2006)

"I've always found Prof. Edwards to bring passion and energy to his lectures. He makes it easy to want to learn more." (Spring 2006)

"For the time and effort he puts into his presentations and labs. Edwards and his TAs do almost as much work as the students." (Spring 2005)

I also teach COMS W4115: Programming Languages and Translators, a senior/masters compilers class:

| **Semester** | Sp 2002 | Sp 2003 | F 2003 | F 2004 | F 2005 | F 2006 | Sp 2007 | F 2007 |
|---|---|---|---|---|---|---|---|---|
| **Enrollment** | 107 | 86 | 58 | 52 | 59 | 55 | 58 | 68 |
| **Semester** | F 2008 | F 2010 | F 2011 | | | | | |
| **Enrollment** | 64 | 61 | 70 | | | | | |

Student comments:

"Professor Edwards was absolutely incredible and I almost failed." (Fall 2006)

"Professor Edwards is the most accessible instructor I've ever had - and he teaches a class about compilers. He's an amazing man." (Fall 2006)

"His classes are extremely enjoyable the best course I have taken so far." (Fall 2006)

"Of the four courses that I took this semester all had good professors but Stephen Edwards was outstanding in his delivery, his ability to use wit [made] his material interesting, and in the quality of the notes and management of the course. I would therefore give him my vote for the Distinguished Faculty award." (Fall 2006)

"This is a course that I did not really want to take and have little aptitude for. Professor Edwards turned something which could have been very uninteresting into something lively and interesting—this is something I really appreciate." (Fall 2006)

"Great professor made subject interesting and explained difficult concepts well. I felt like I even learned from the exams." (Fall 2005)

"Now I know why people call [him] one of the best professors. His wit in the class just make everyone fall into the class." (Fall 2005)

"Prf. Edwards is one of the few lecturers I've met who actually makes the classes very interesting. He's always inserting funny anecdotes and ties in stories with concepts really well. It s been a pleasure to take PLT with him. Even outside the classroom Prof. Edwards is very friendly and fun to talk to. Would definitely be happy to see him get the SEAS Distnguished Faculty Award." (Fall 2005)

"Edwards was a great lecturer a great motivator and created a great class. The class was so formative in my CS educational career that I would consider it the most valuable and one of the most interesting." (Fall 2005)

"His demeanor inside and outside of the classroom is truly one of the greatest I have seen in my four years at Columbia. It is one of the few classes in the engineering school I look forward to going to everyday just to see what he'll talk about next." (Fall 2005)

"Prof. Edwards is a great lecturer and really knows his stuff. The class is really well organized." (Fall 2004)

"One of the best and most useful classes I have ever taken in the CS department." (Fall 2004)

"I really enjoyed the classroom delivery. The professor did a great job in explaining the concepts. I never felt lost in the material." (Fall 2004)

COMS W4995–02: Languages for Embedded System Design
Graduate-level class of my own devising based on my book.

| **Semester** | F 2001 | F 2002 |
|---|---|---|
| **Enrollment** | 23 | 16 |

**Student Teaching**

University of California, Berkeley 1995
Head teaching assistant.
Supervised seven teaching assistants overseeing a 200-student upper-division logic design course (CS 150, taught by Richard Newton). Designed and wrote labs. Conducted weekly recitation section, gave substitute lectures to entire class, graded tests.

California Institute of Technology 1990–1992
Teaching assistant.
Wrote assignments and conducted a recitation section for the 30-student microprocessor design course (CS 51, 52, and 53). Designed sound I/O circuitry and PC board for class project.