



College of
Computing

Computational Science and Engineering



RICHARD WILSON VUDUC

CURRICULUM VITÆ

Georgia Institute of Technology
College of Computing
Computational Science and Engineering Division

266 Ferst Drive
Atlanta, Georgia 30332-0765, USA
+1 404.385.3355 (voice)
+1 404.385.7337 (fax)
richie@cc.gatech.edu
www.cc.gatech.edu/~richie

Richard Wilson Vuduc: *Curriculum Vitæ*, © January 2012

[January 17, 2012 at 16:57]

CONTENTS

I	CURRICULUM VITÆ	3
1	BIOGRAPHICAL DATA	4
1.1	Educational Background	4
1.2	Employment History	4
1.3	Current Fields of Interest	4
2	TEACHING	5
2.1	Courses Taught	5
2.2	Individual Student Guidance	5
2.2.1	Ph.D. Students Supervised (primary)	5
2.2.2	Ph.D. Students Supervised (as co-advisor)	6
2.2.3	M.S. Thesis Students Supervised	6
2.2.4	Undergraduate Students Supervised	6
2.3	Teaching Honors and Awards	7
3	RESEARCH	9
3.1	Theses	9
3.2	Journal Articles (refereed)	9
3.3	Book Contributions	10
3.4	Conference Publications (refereed)	10
3.5	Workshop Publications (refereed)	15
3.6	Other Publications (non-refereed)	17
3.7	Invited Keynotes and Talks	17
3.8	Research Proposals and Grants (Principal Investigator)	21
3.8.1	Approved and Funded	21
3.9	Research Proposals and Grants (Contributor)	22
3.9.1	Approved and Funded	22
3.10	Research Honors and Awards	23
4	SERVICE	25
4.1	Professional Activities	25
4.1.1	Membership and Activities in Professional Societies	25
4.1.2	Conference Committee Activities	25
4.2	On-campus Georgia Tech Committees	28
4.3	Member of Ph.D. Examining Committees	29
4.4	Member of Ph.D. Examining Committees (External)	31
4.5	Member of Masters Examining Committees	31
4.6	Research Project Reviewer	32
4.7	Civic and Other Activities	32
5	PROFESSIONAL RECOGNITION	33
5.1	Invited Conference Session Chairmanships	33
5.2	Invited Panel Speaker	33
5.3	Reviewer Work for Technical Publications	33
5.3.1	Book proposals	33
5.3.2	Books	33
5.3.3	Journals	34
5.3.4	Conferences and Workshops	34

Part I
CURRICULUM VITÆ

BIOGRAPHICAL DATA

1.1 EDUCATIONAL BACKGROUND

DEGREE	YEAR	UNIVERSITY	FIELD
Ph.D	2004	University of California, Berkeley	Computer Science
B.S.	1997	Cornell University	Computer Science

1.2 EMPLOYMENT HISTORY

TITLE	ORGANIZATION	WHEN
Assistant Professor	Georgia Tech	Aug. '07–present
Postdoc	Lawrence Livermore National Laboratory	Nov. '04–Jul. '07
Postdoc	University of California, Berkeley	Jan. '04–Oct. '04
Postdoc	University of California, Berkeley	Aug. '97–Jan. '04
Research Intern	Institute for Defense Analyses	Aug. '94–Jun. '96

1.3 CURRENT FIELDS OF INTEREST

MY RESEARCH IN HIGH-PERFORMANCE COMPUTING (HPC) SYSTEMS addresses fundamental questions of how to analyze, to tune, and to debug software automatically for complex and rapidly-evolving architectures, including current multicore and future manycore systems. I am particularly interested in these questions from the perspective of computational science and engineering (CSE) applications, including those that require massive-scale data analysis.

The following are my current focus areas:

- High-performance parallel programming models
- Automated performance tuning, or “autotuning”
- Performance analysis
- Performance and correctness debugging

I believe that the advances my research lab is making in these areas, when taken together, are helping to create more productive environments for developing high-performance code.

TEACHING

2.1 COURSES TAUGHT

WHEN	COURSE	SIZE	SCORE	NOTES
Fall '11	CSE 6230: High-performance Computing Tools and Applications	49	4.3	New ver- sion
Spring '11	CS 4335 / CSE/ECE 6730: Modeling and Simulation	36	4.6	New ver- sion
Fall '10	CSE 8803 HPC: Hot Topics in Parallel Computing	12	5.0	New course
Spring '10	CS 4225: Introduction to HPC	17	4.5	
Fall '09	CSE 6230: HPC Tools and Applications	13	4.9	
Spring '09	CS 4643 / MATH 4641: Numerical Analysis II	—	—	Cancelled
Fall '08	CSE / CS 6230: HPC Tools and Applications	35	4.1	New ver- sion
Spring '08	CSE 8803 PNA: Parallel Numerical Algorithms	21	4.6	New course

NOTE: Scores indicate the *Overall Teaching Effectiveness* summary rating (maximum value is 5.0) given by students in the Georgia Tech Course-Instructor Opinion Survey (CIOS).

2.2 INDIVIDUAL STUDENT GUIDANCE

2.2.1 *Ph.D. Students Supervised (primary)*

- Kent CZECHOWSKI (CoC/CSE)
Fall 2011–present
- Piyush Kumaro SAO (CoC/CSE)
Fall 2011–present
- Casey BATTAGLINO (CoC/CSE)
Fall 2010–present
- Cong HOU (CoC/CS)
Summer 2009–present

New '11-'12 Item

New '11-'12 Item

- Jee CHOI (CoE/ECE)
Fall 2008–present
- Aparna CHANDRAMOWLISHWARAN (CoC/CSE)
Fall 2008–present

2.2.2 *Ph.D. Students Supervised (as co-advisor)*

- George VULOV (CoC/CSE)
Fall 2009–present
- Sangmin PARK (CoC/CS)
Fall 2008–present

2.2.3 *M.S. Thesis Students Supervised*

- David S. NOBLE, Jr. (CoC/CSE)
Fall 2010–Spring 2011
- Chris McCLANAHAN (CoC/CS)
Fall 2010–Spring 2011
- Sundaresan VENKATASUBRAMANIAN (CoC/CS)
Spring 2008
 THESIS: Tuned and wildly asynchronous stencil kernels for hybrid CPU/GPU platforms.
 COMMITTEE: Richard VUDUC (advisor, CoC/CSE), Hyesoon KIM (CoC/CS), Jeffrey VETTER (CoC/CSE & ORNL)
 PLACED: Amazon.com

2.2.4 *Undergraduate Students Supervised*

Students are from Georgia Tech unless otherwise noted.

- Lesly SANDOVAL (Georgia State University)
Summer 2011
New '11-'12 Item
- Gurbinder Gill SINGH (IIT-Roorkee)
Summer 2011
New '11-'12 Item
- Ashish NARASIMHAM
Fall 2009–Fall 2011
- Japnik SINGH (IIT-Bombay)
Summer 2010
- Piyush Kumar SAO (IIT-Madras)
Summer 2010
- Nimit NIGANIA (IIT-Madras)
Summer 2009
- Amik SINGH (IIT-Roorkee)
Summer 2009

- Jada JEFFRIES (Hampton University)
Summer 2009
- Gaurav CHADHA (IIT-Guwahati)
Summer 2008
PLACED: Ph.D. program at U. Michigan, EECS Dept.
- Lauren GRACIA (U. Houston–Downtown)
Summer 2008
PLACED: Chevron

2.3 TEACHING HONORS AND AWARDS

- THANK-A-TEACHER
Spring 2010
CETL and GT Student Ambassadors
- THANK-A-TEACHER
Spring 2009
CETL and GT Student Ambassadors
- OUTSTANDING GRADUATE STUDENT INSTRUCTOR (UC Berkeley)
Fall 1997
Awarded to fewer than 10% of graduate students campus-wide.

RESEARCH

Visit my Google Scholar page:

<http://scholar.google.com/citations?user=CCGI7x4AAAAJ&hl=en>

3.1 THESES

- **PH.D.:** *Automatic performance tuning of sparse matrix kernels*
COMPLETED: January 2004
ADVISORS: James W. DEMMEL (primary), Katherine A. YELICK

3.2 JOURNAL ARTICLES (REFEREED)

- [J1] Jaekyu Lee, Hyesoon Kim, and Richard Vuduc. When prefetching works, when it doesn't, and why. *ACM Trans. Architecture and Code Optimization (TACO)*, 2012. *New '11-'12 Item*
(accepted).
- [J2] Richard Vuduc and Kenneth Czechowski. What GPU computing means for high-end systems. *IEEE Micro*, 31(4):74–78, July / August 2011. *New '11-'12 Item*
<http://dx.doi.org/10.1109/MM.2011.78>.
- [J3] Sam Williams, Richard Vuduc, Leonid Oliker, John Shalf, Katherine Yelick, and James Demmel. Optimizing sparse matrix-vector multiply on emerging multicore platforms. *Parallel Computing (ParCo)*, 35(3):178–194, March 2009.
Extends conference version: <http://dx.doi.org/10.1145/1362622.1362674>.
<http://dx.doi.org/10.1016/j.parco.2008.12.006>.
Most Downloaded Paper, Q1 2009: <http://tinyurl.com/yllkfee>.
- [J4] Rajesh Nishtala, Richard Vuduc, James W. Demmel, and Katherine A. Yelick. When cache blocking sparse matrix vector multiply works and why. *Applicable Algebra in Engineering, Communication, and Computing: Special Issue on Computational Linear Algebra and Sparse Matrix Computations*, March 2007.
<http://dx.doi.org/10.1007/s00200-007-0038-9>.
- [J5] James Demmel, Jack Dongarra, Viktor Eijkhout, Erika Fuentes, Antoine Petit, Richard Vuduc, R. Clint Whaley, and Katherine Yelick. Self-adapting linear algebra algorithms and software. *Proc. IEEE*, 93(2):293–312, February 2005.
<http://dx.doi.org/10.1109/JPROC.2004.840848>.
- [J6] Eun-Jin Im, Katherine Yelick, and Richard Vuduc. SPARSITY: Optimization framework for sparse matrix kernels. *Int'l. J. High Performance Computing Applications (IJHPCA)*, 18(1):135–158, February

2004.

<http://dx.doi.org/10.1177/1094342004041296>.

- [J7] Richard Vuduc, James Demmel, and Jeff Bilmes. Statistical models for empirical search-based performance tuning. *Int'l. J. High Performance Computing Applications (IJHPCA)*, 18(1):65–94, 2004. Extends conference version: http://dx.doi.org/10.1007/3-540-45545-0_21.

<http://dx.doi.org/10.1177/1094342004041293>.

- [J8] Bohdan Balko, Irvin W. Kay, James D. Silk, Richard Vuduc, and John W. Neuberger. Superfluorescence in the presence of inhomogeneous broadening. *Hyperfine Interactions: Special Issue on the Gamma-Ray Laser*, 107(1–4):369–379, June 1997.

<http://dx.doi.org/10.1023/A:1012020225589>.

- [J9] Bohdan Balko, Irvin W. Kay, Richard Vuduc, and John W. Neuberger. Recovery of superfluorescence in inhomogeneously broadened systems through rapid relaxation. *Phys. Rev. B*, 55(18):12079–12085, May 1997.

<http://dx.doi.org/10.1103/PhysRevB.55.12079>.

3.3 BOOK CONTRIBUTIONS

- [B1] Seunghwa Kang, Nitin Arora, Aashay Shringarpure, Richard W. Vuduc, and David A. Bader. On the evaluation of current multicore processors and accelerator architectures for dense numerical computations. In Mohamed Ahmed, Reda Ammar, and Sanguthevar Rajasekaran, editors, *Multi- and Many-core Technologies: Architecture, Programming, Algorithms, and Applications*. CRC Press, 2011.

New '11–'12 Item

- [B2] Sam Williams, Nathan Bell, Jee Choi, Michael Garland, Leonid Oliker, and Richard Vuduc. Sparse matrix vector multiplication on multicore and accelerator systems. In Jakub Kurzak, David A. Bader, and Jack Dongarra, editors, *Scientific Computing with Multicore Processors and Accelerators*. CRC Press, 2011.

New '11–'12 Item

- [B3] Richard W. Vuduc. Autotuning. In David Padua, editor, *Encyclopedia of Parallel Computing*. Springer, 2010.

3.4 CONFERENCE PUBLICATIONS (REFEREED)

- [C1] Dongryeol Lee, Richard Vuduc, and Alexander G. Gray. A hybrid MPI/OpenMP kernel summation framework for large scale data analysis. In *Proc. SIAM Int'l. Conf. Data Mining (SDM)*, Anaheim, CA, USA, April 2012. (accepted).

New '11–'12 Item

Acceptance rate: [53 (talks)/363=14.6%].

- [C2] Sangmin Park, Richard Vuduc, and Mary Jean Harrold. A unified approach for localizing non-deadlock concurrency bugs. In *Proc. IEEE Int'l. Conf. Software Testing, Verification, and Validation (ICST)*, Montréal, Canada, April 2012.

New '11–'12 Item

(accepted).

Acceptance rate: [39/145=26.9%].

- [C3] Cong Hou, George Vulov, Daniel Quinlan, David Jefferson, Richard Fujimoto, and Richard Vuduc. A new method for program inversion. In *Proc. Int'l. Conf. Compiler Construction (CC)*, Tallinn, Estonia, March 2012.

New '11-'12 Item

(accepted).

Acceptance rate: [13/51=25.5%].

- [C4] Jaewoong Sim, Aniruddha Dasgputa, Hyesoon Kim, and Richard Vuduc. GPUPerf: A performance analysis framework for identifying performance benefits in GPGPU applications. In *Proc. ACM SIGPLAN Symp. Principles and Practice of Parallel Programming (PPoPP)*, New Orleans, LA, USA, February 2012.

New '11-'12 Item

(to appear).

Acceptance rate: [26/175=14.9%].

- [C5] Sooraj Bhat, Ashish Agarwal, Richard Vuduc, and Alexander Gray. A type theory for probability density functions. In *ACM SIGACT-SIGPLAN Symp. Principles of Programming Languages (POPL 2012)*, Philadelphia, PA, USA, January 2012.

New '11-'12 Item

(accepted).

Acceptance rate: [44/205=21.5%].

- [C6] Kenneth Czechowski, Chris McClanahan, Casey Battaglini, Kartik Iyer, P.-K. Yeung, and Richard Vuduc. Prospects for scalable 3D FFTs on heterogeneous exascale systems. In *In Proc. ACM/IEEE Conf. Supercomputing (SC)*, November 2011.

New '11-'12 Item

(poster; to appear); extended version available as Georgia Tech report GT-CSE-11-02.

- [C7] Jaekyu Lee, Nagesh B. Lakshminarayana, Hyesoon Kim, and Richard Vuduc. Hardware and software prefetching mechanisms for GPGPU applications. In *Proc. IEEE/ACM Int'l. Symp. Microarchitecture (MICRO)*, Atlanta, GA, USA, December 2010.

Acceptance rate: [45/248=18.1%].

- [C8] Aparna Chandramowlishwaran, Kamesh Madduri, and Richard Vuduc. Diagnosis, tuning, and redesign for multicore performance: A case study of the fast multipole method. In *Proc. ACM/IEEE Conf. Supercomputing (SC)*, New Orleans, LA, USA, November 2010.

Acceptance rate: [51/253=20.2%].

<http://dx.doi.org/10.1109/SC.2010.19>.

- [C9] Abtin Rahimian, Ilya Lashuk, Aparna Chandramowlishwaran, Dhairya Malhotra, Logan Moon, Rahul Sampath, Aashay Shringarpure, Shravan Veerapaneni, Jeffrey Vetter, Richard Vuduc, Denis Zorin, and George Biros. Petascale direct numerical simulation of blood flow on 200k cores and heterogeneous architectures. In *Proc. ACM/IEEE Conf. Supercomputing (SC)*, New Orleans, LA, USA, November 2010.

Winner, Gordon Bell Prize.

Acceptance rate: [51/253=20.2%].
<http://dx.doi.org/10.1109/SC.2010.42>.

[C10] Sangmin Park, Richard W. Vuduc, and Mary Jean Harrold. FALCON: Fault localization for concurrent programs. In *Proc. ACM/IEEE Int'l. Conf. Software Eng., Cape Town, South Africa, May 2010*.

Acceptance rate: [52/380=13.7%].
<http://dx.doi.org/10.1145/1806799.1806838>.

[C11] Aparna Chandramowlishwaran, Kathleen Knobe, and Richard Vuduc. Performance evaluation of Concurrent Collections on high-performance multicore computing systems. In *Proc. IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS), Atlanta, GA, USA, April 2010*.

Winner, Best Paper (software track).
 Acceptance rate: [127/527=24.1%].
<http://dx.doi.org/10.1109/IPDPS.2010.5470404>.

[C12] Aparna Chandramowlishwaran, Samuel Williams, Leonid Oliker, Ilya Lashuk, George Biros, and Richard Vuduc. Optimizing and tuning the fast multipole method for state-of-the-art multicore architectures. In *Proc. IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS), Atlanta, GA, USA, April 2010*.

Acceptance rate: [127/527=24.1%].

[C13] Jee Whan Choi, Amik Singh, and Richard W. Vuduc. Model-driven autotuning of sparse matrix-vector multiply on GPUs. In *Proc. ACM SIGPLAN Symp. Principles and Practice of Parallel Programming (PPoPP), Bangalore, India, January 2010*.

Acceptance rate: [29/173=16.8%].
<http://dx.doi.org/10.1145/1693453.1693471>.

[C14] Aparna Chandramowlishwaran, Kathleen Knobe, and Richard Vuduc. Applying the Concurrent Collections programming model to asynchronous parallel dense linear algebra. In *Proc. ACM SIGPLAN Symp. Principles and Practice of Parallel Programming (PPoPP), Bangalore, India, January 2010 (poster)*.

Acceptance rate: [Papers+posters: 45/173=26.1%].
<http://dx.doi.org/10.1145/1693453.1693506>.

[C15] Ilya Lashuk, Aparna Chandramowlishwaran, Harper Langston, Tuan-Anh Nguyen, Rahul Sampath, Aashay Shringarpure, Richard Vuduc, Lexing Ying, Denis Zorin, and George Biros. A massively parallel adaptive fast multipole method on heterogeneous architectures. In *Proc. ACM/IEEE Conf. Supercomputing (SC), Portland, OR, USA, November 2009*.

Finalist, Best Paper.
 Acceptance rate: [59/261=22.6%].
<http://doi.acm.org/10.1145/1654059.1654118>.

[C16] Nitin Arora, Aashay Shringarpure, and Richard Vuduc. Direct n -body kernels for multicore platforms. In *Proc. Int'l. Conf. Parallel*

Processing (ICPP), Vienna, Austria, September 2009.

Acceptance rate: [71/220=32.3%].

<http://dx.doi.org/10.1109/ICPP.2009.71>.

- [C17] Nitin Arora, Ryan P. Russell, and Richard W. Vuduc. Fast sensitivity computations for numerical optimizations. In *Proc. AAS/AIAA Astrodynamics Specialist Conference*, AAS 09-435, Pittsburgh, PA, USA, August 2009.

<http://soliton.ae.gatech.edu/people/rrussell/>

[FinalPublications/ConferencePapers/09AugAAS_09-392_p2pLowthrust.pdf](http://soliton.ae.gatech.edu/people/rrussell/FinalPublications/ConferencePapers/09AugAAS_09-392_p2pLowthrust.pdf).

- [C18] Sundaresan Venkatasubramanian and Richard W. Vuduc. Tuned and wildly asynchronous stencil kernels for hybrid CPU/GPU platforms. In *Proc. ACM Int'l. Conf. Supercomputing (ICS)*, New York, NY, USA, June 2009.

Acceptance rate: [47/191=25%].

<http://dx.doi.org/10.1145/1542275.1542312>.

- [C19] Seunghwa Kang, David Bader, and Richard Vuduc. Understanding the design trade-offs among current multicore systems for numerical computations. In *Proc. IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS)*, Rome, Italy, May 2009.

Acceptance rate: [101/440=23.0%].

<http://doi.ieeecomputersociety.org/10.1109/IPDPS.2009.5161055>.

- [C20] Manisha Gajbe, Andrew Canning, John Shalf, Lin-Wang Wang, Harvey Wasserman, and Richard Vuduc. Auto-tuning distributed-memory 3-dimensional fast Fourier transforms on the Cray XT4. In *Proc. Cray User's Group (CUG) Meeting*, Atlanta, GA, USA, May 2009.

[http://www.cug.org/5-publications/proceedings_attendee_](http://www.cug.org/5-publications/proceedings_attendee_lists/CUG09CD/S09_Proceedings/pages/authors/11-15Wednesday/14C-Gajbe/GAJBE-paper.pdf)

[lists/CUG09CD/S09_Proceedings/pages/authors/11-15Wednesday/14C-Gajbe/GAJBE-paper.pdf](http://www.cug.org/5-publications/proceedings_attendee_lists/CUG09CD/S09_Proceedings/pages/authors/11-15Wednesday/14C-Gajbe/GAJBE-paper.pdf).

- [C21] Sam Williams, Leonid Oliker, Richard Vuduc, John Shalf, Katherine Yelick, and James Demmel. Optimization of sparse matrix-vector multiplication on emerging multicore platforms. In *Proc. ACM/IEEE Conf. Supercomputing (SC)*, 2007.

Acceptance rate: [54/268=20.1%].

<http://dx.doi.org/10.1145/1362622.1362674>.

- [C22] Dan Quinlan, Richard Vuduc, Thomas Panas, Jochen Härdtlein, and Andreas Sæbjørnsen. Support for whole-program analysis and the verification of the one-definition rule in C++. In *Proc. Static Analysis Summit (SAS)*, volume NIST Special Publication 500-262, pages 27–35, 2006.

http://samate.nist.gov/docs/NIST_Special_Publication_500-262.pdf.

- [C23] Dan Quinlan, Shmuel Ur, and Richard Vuduc. An extensible open-source compiler infrastructure for testing. In *Proc. IBM Haifa Verification Conf. (VC)*, volume LNCS 3875, pages 116–133, Haifa,

Israel, November 2005. Springer Berlin / Heidelberg.
http://dx.doi.org/10.1007/11678779_9.

[C24] Richard W. Vuduc and Hyun-Jin Moon. Fast sparse matrix-vector multiplication by exploiting variable block structure. In *Proc. High-Performance Computing and Communications Conf. (HPCC)*, volume LNCS 3726, pages 807–816, Sorrento, Italy, September 2005. Springer.
 Acceptance rate: [116/387=30%].
http://dx.doi.org/10.1007/11557654_91.

[C25] Richard Vuduc, James W. Demmel, and Katherine A. Yelick. OSKI: A library of automatically tuned sparse matrix kernels. In *Proc. SciDAC, J. Physics: Conf. Ser.*, volume 16, pages 521–530, 2005.
<http://dx.doi.org/10.1088/1742-6596/16/1/071>.

[C26] Benjamin C. Lee, Richard Vuduc, James Demmel, and Katherine Yelick. Performance models for evaluation and automatic tuning of symmetric sparse matrix-vector multiply. In *Proc. Int'l. Conf. Parallel Processing (ICPP)*, Montreal, Canada, August 2004.
Winner, Best Paper.
 Acceptance rate: [65/190=34.2%].
<http://dx.doi.org/10.1109/ICPP.2004.1327917>.

[C27] Richard Vuduc, James W. Demmel, Katherine A. Yelick, Shoaib Kamil, Rajesh Nishtala, and Benjamin Lee. Performance optimizations and bounds for sparse matrix-vector multiply. In *Proc. ACM/IEEE Conf. Supercomputing (SC)*, Baltimore, MD, USA, November 2002.
Finalist, Best Student Paper.
<http://portal.acm.org/citation.cfm?id=762822>.

[C28] Richard Vuduc, James W. Demmel, and Jeff A. Bilmes. Statistical models for empirical search-based performance tuning. In *Proc. Int'l. Conf. Computational Science (ICCS)*, volume LNCS 2073, pages 117–126, San Francisco, CA, USA, May 2001. Springer Berlin / Heidelberg.
Extends workshop version: <http://www.eecs.harvard.edu/~smith/fddo3/papers/107.ps>.
http://dx.doi.org/10.1007/3-540-45545-0_21.

[C29] Danyel Fisher, Kris Hildrum, Jason Hong, Mark Newman, Megan Thomas, and Richard Vuduc. SWAMI: A framework for collaborative filtering algorithm development and evaluation. In *Proc. ACM Conf. Research and Development in Information Retrieval (SIGIR)*, pages 366–368, Athens, Greece, July 2000.
(poster).
<http://dx.doi.org/10.1145/345508.345658>.

[C30] Bohdan Balko, Irvin Kay, Richard Vuduc, and John Neuberger. An investigation of the possible enhancement of nuclear superfluorescence through crystalline and hyperfine interaction effects. In *Proc. Lasers '95*, page 308, 1996.

3.5 WORKSHOP PUBLICATIONS (REFEREED)

- [W1] Raghul Gunasekaran, David Dillow, Galen Shipman, Richard Vuduc, and Edmond Chow. Characterizing application runtime behavior from system logs and metrics. In *Proc. Int'l. Wkshp. Characterizing Applications for Heterogeneous Exascale Systems (CACHES)*, Tucson, AZ, USA, June 2011. New '11-'12 Item
- [W2] Kenneth Czechowski, Casey Battaglini, Chris McClanahan, Aparna Chandramowlishwaran, and Richard Vuduc. Balance principles for algorithm-architecture co-design. In *Proc. USENIX Wkshp. Hot Topics in Parallelism (HotPar)*, Berkeley, CA, USA, May 2011. New '11-'12 Item
 Acceptance rate: [Talks: 16/45=35.5%].
http://www.usenix.org/events/hotpar11/tech/final_files/Czechowski.pdf.
- [W3] Richard Vuduc, Aparna Chandramowlishwaran, Jee Whan Choi, Murat Efe Guney, and Aashay Shringarpure. On the limits of GPU acceleration. In *Proc. USENIX Wkshp. Hot Topics in Parallelism (HotPar)*, Berkeley, CA, USA, June 2010.
 Acceptance rate: [Talks: 16/68=23.5%].
- [W4] Sooraj Bhat, Ashish Agarwal, Alexander Gray, and Richard Vuduc. Toward interactive statistical modeling. *Procedia Computer Science*, 1(1):1829–1838, May–June 2010.
Proc. Int'l. Conf. Computational Science (ICCS), Wkshp. Automated Program Generation for Computational Science (APGCS).
<http://dx.doi.org/10.1016/j.procs.2010.04.205>.
 Acceptance rate: [10/21=47.6%].
- [W5] Chunhua Liao, Daniel J. Quinlan, Richard Vuduc, and Thomas Panas. Effective source-to-source outlining to support whole program empirical optimization. In *Proc. Int'l. Wkshp. Languages and Compilers for Parallel Computing (LCPC)*, volume LNCS, Newark, DE, USA, October 2009.
http://dx.doi.org/10.1007/978-3-642-13374-9_21.
- [W6] Aparna Chandramowlishwaran, Abhinav Karhu, Ketan Umare, and Richard Vuduc. Numerical algorithms with tunable parallelism. In *Proc. Wkshp. Software Tools for Multicore Systems (STMCS), at IEEE/ACM Int'l. Symp. Code Generation and Optimization (CGO)*, Boston, MA, USA, April 2008.
<http://people.csail.mit.edu/rabbah/conferences/08/cgo/stmcs/papers/vuduc-stmcs08.pdf>.
- [W7] Thomas Panas, Dan Quinlan, and Richard Vuduc. Analyzing and visualizing whole program architectures. In *Proc. Wkshp. Aerospace Software Engineering (AeroSE), at ACM/IEEE Int'l. Conf. Software Eng. (ICSE)*, Minneapolis, MN, USA, May 2007. Also: Lawrence Livermore National Laboratory Technical Report UCRL-PROC-231453.
<http://www.osti.gov/bridge/servlets/purl/909924-c8K5TR/909924.pdf>.

[W8] Thomas Panas, Dan Quinlan, and Richard Vuduc. Tool support for inspecting the code quality of HPC applications. In *Proc. Wkshp. Software Eng. for High-Performance Computing Applications (SE-HPC), at ACM/IEEE Int'l. Conf. Software Eng. (ICSE)*, Minneapolis, MN, USA, May 2007.

<http://dx.doi.org/10.1109/SE-HPC.2007.8>.

[W9] Dan Quinlan, Richard Vuduc, and Ghassan Mishserghi. Techniques for specifying bug patterns. In *Proc. ACM Wkshp. Parallel and Distributed Systems: Testing and Debugging (PADTAD), at Int'l. Symp. Software Testing and Analysis (ISSTA)*, Portland, ME, USA, July 2007.

Winner, Best Paper.

<http://doi.acm.org/10.1145/1273647.1273654>.

[W10] Qing Yi, Keith Seymour, Haihang You, Richard Vuduc, and Dan Quinlan. POET: Parameterized Optimizations for Empirical Tuning. In *Proc. Wkshp. Performance Optimization of High-level Languages and Libraries (POHLL), at IEEE Int'l. Par. Distrib. Processing Symp. (IPDPS)*, pages 1–8, Long Beach, CA, USA, March 2007.

<http://dx.doi.org/10.1109/IPDPS.2007.370637>.

[W11] Dan Quinlan, Markus Schordan, Richard Vuduc, and Qing Yi. Annotating user-defined abstractions for optimization. In *Proc. Wkshp. Performance Optimization of High-level Languages and Libraries (POHLL), at IEEE Int'l. Par. Distrib. Processing Symp. (IPDPS)*, Rhodes, Greece, April 2006.

<http://dx.doi.org/10.1109/IPDPS.2006.1639722>.

[W12] Richard Vuduc, Martin Schulz, Dan Quinlan, and Bronis de Supinski. Improving distributed memory applications testing by message perturbation. In *Proc. ACM Wkshp. Parallel and Distributed Systems: Testing and Debugging (PADTAD), at Int'l. Symp. Software Testing and Analysis (ISSTA)*, Portland, ME, USA, July 2006.

Winner, Best Paper.

<http://dx.doi.org/10.1145/1147403.1147409>.

[W13] Richard Vuduc, Attila Gyulassy, James W. Demmel, and Katherine A. Yelick. Memory hierarchy optimizations and bounds for sparse $A^T Ax$. In *Proc. Wkshp. Parallel Linear Algebra (PLA), at Int'l. Conf. Computational Sci. (ICCS)*, volume LNCS 2659, pages 705–714, Melbourne, Australia, June 2003. Springer Berlin / Heidelberg.

http://dx.doi.org/10.1007/3-540-44863-2_69.

[W14] Richard Vuduc, Shoaib Kamil, Jen Hsu, Rajesh Nishtala, James W. Demmel, and Katherine A. Yelick. Automatic performance tuning and analysis of sparse triangular solve. In *Proc. Wkshp. Performance Optimization of High-level Languages and Libraries (POHLL), at ACM Int'l. Conf. Supercomputing (ICS)*, New York, USA, June 2002.

Winner, Best Presentation; Winner, Best Student Paper.

<http://www.ece.lsu.edu/jxr/pohl1-02/papers/vuduc.pdf>.

- [W15] Richard Vuduc, James Demmel, and Jeff Bilmes. Statistical modeling of feedback data in an automatic tuning system. In *Proc. ACM Wkshp. Feedback-Directed Dynamic Optimization (FDDO), at Int'l. Symp. Microarchitecture (MICRO)*, Monterey, CA, USA, December 2000.

Winner, Best Presentation.

<http://www.eecs.harvard.edu/~smith/fddo3/papers/107.ps>.

- [W16] Richard Vuduc and James W. Demmel. Code generators for automatic tuning of numerical kernels: Experiences with FFTW. In *Proc. Semantics, Applications, and Implementation of Program Generation (SAIG), at ACM SIGPLAN Int'l. Conf. Functional Programming (ICFP)*, Montréal, Canada, September 2000.

http://dx.doi.org/10.1007/3-540-45350-4_14.

3.6 OTHER PUBLICATIONS (NON-REFEREED)

- [O1] Yuan Zhao, Qing Yi, Ken Kennedy, Dan Quinlan, and Richard Vuduc. Parameterizing loop fusion for automated empirical tuning. Technical Report UCRL-TR-217808, Center for Applied Scientific Computing, Lawrence Livermore National Laboratory, California, USA, December 2005.

<http://dx.doi.org/10.2172/890608>.

- [O2] E. Jason Riedy and Richard Vuduc. Microbenchmarking the Tera MTA. <http://vuduc.org/pubs/riedy99-tera-report.pdf>, May 1998.

3.7 INVITED KEYNOTES AND TALKS

- [T1] A theory for co-designing algorithms and architectures under power and chip-area constraints. **Invited keynote** at the 10th Int'l. Mtg. on High-Performance Computing for Computational Science (VECPAR), Kobe, Japan., July 17–20 2012.

New '11-'12 Item

<http://nkl.cc.u-tokyo.ac.jp/VECPAR2012>.

- [T2] A theory for co-designing algorithms and architectures under power and chip-area constraints. **Invited talk** at the International Supercomputing Conference (ISC), June 17-21 2012.

New '11-'12 Item

<http://www.isc-events.com/isc12/>.

- [T3] Principles of algorithm-architecture co-design. **Invited talk** at the Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, RI, USA, January 9–13 2012.

New '11-'12 Item

<http://icerm.brown.edu/tw12-1-exascale>.

- [T4] Balance principles for algorithm-architecture co-design. ECE Seminar, Carnegie Mellon University, October 27 2011.

New '11-'12 Item

- New '11-'12 Item* [T5] Balance principles for algorithm-architecture co-design. **Invited keynote** at Facing the Multicore Challenge II: A Conference for Young Scientists, September 28–30 2011.
<http://www.multicore-challenge.org/>.
- New '11-'12 Item* [T6] State-of-the-art and future directions in autotuning. **Invited keynote** at the 9th Int'l. Conf. Parallel Processing and Applied Mathematics (PPAM), Toruń, Poland, September 11–14 2011.
<http://ppam.pl>.
- New '11-'12 Item* [T7] CnC for HPC. Int'l. Conf. Industrial and Applied Mathematics (ICIAM), Minisymposium on Creating the Next Generation of High Performance Numerical Computing Capabilities, Vancouver, BC, Canada, July 2011.
http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=12156.
- New '11-'12 Item* [T8] Performance and correctness of software for large-scale heterogeneous systems. **Invited keynote** at the Wkshp. Exploiting Concurrency Efficiently and Correctly (EC²), July 14–15 2011.
<http://www.cse.psu.edu/~swarat/ec2/>.
- New '11-'12 Item* [T9] Performance principles and practice. Invited talk at the Int'l. Supercomputing Conference (ISC), Hamburg, Germany, June 19–23 2011.
<http://www.supercomp.de/isc11>.
- New '11-'12 Item* [T10] Parallel performance analysis principles and practice. Invited talk at the Parallel Algorithms, Programming, Architectures (PAPA) Workshop, at the Design Automation Conference (DAC), June 5 2011.
<http://papaworkshop.com>.
- New '11-'12 Item* [T11] Performance principles and practice. Supercomputing Interest Community Seminar, IBM TJ Watson Laboratory, Yorktown Heights, NY, USA, May 6 2011.
- New '11-'12 Item* [T12] Performance principles and practice. Invited talk at the Salishan Conference on High-Speed Computing, sponsored by the US Dept. of Energy, Gleneden, OR, USA, April 25–28 2011.
<http://www.lanl.gov/orgs/hpc/salishan/>.
- New '11-'12 Item* [T13] Performance engineering of a petascale blood flow simulator. Invited seminar at the University of California, Berkeley, April 21 2011.
- New '11-'12 Item* [T14] Performance principles and practice. Invited talk at the Wkshp. High-Performance Computing and Emerging Architectures, Institute for Mathematics and Its Applications at the University of Minnesota, organized by L.A. Barba, E. Darve, D. Keyes, January 10–14 2011.
<http://www.ima.umn.edu/2010-2011/W1.10-14.11/> – *Talk cancelled due to weather.*

- [T15] Should I port my code to a GPU? Scientific Computing and Numerics (SCAN) Seminar, organized by D. Bindel and A. Vladimirsky, Cornell University, November 8 2010.
<http://www.math.cornell.edu/~scan/index-f10.html>.
- [T16] Opportunities and challenges in GPU co-processing. National Science Foundation Workshop on Accelerators for Data-Intensive Applications, organized by V. Prasanna and D. Bader, October 13 2010.
- [T17] On the opportunities and limits of GPU co-processing. Invited talk at the 2nd NSF Wkshp. Frontiers of Multicore Computing (FMC-II), organized by S. Zhou, Y. Yesha, and M. Halem, at the University of Maryland, Baltimore County, September 22–23 2010.
<http://www.mc2.umbc.edu/workshops/fmc2.php>.
- [T18] Should I port my code to a GPU? Invited talk at the Clusters, Clouds, and Grids for Scientific Computing (CCGSC), organized by J. Dongarra and B. Tourancheau, Flat Rock, NC, USA, September 7–10 2010.
<http://web.eecs.utk.edu/~dongarra/ccgsc2010/>.
- [T19] On the limits of and opportunities for GPU acceleration. Invited talk at the Scientific Discovery through Advanced Computing (SciDAC), US Department of Energy, Chattanooga, Tennessee, July 13 2010.
<http://computing.ornl.gov/workshops/scidac2010>.
- [T20] Generalized n -body problems: From fast algorithms to fast code. Dagstuhl Seminar 10191 on Program Composition and Optimization: Autotuning, Scheduling, Metaprogramming and Beyond, May 2010.
<http://www.dagstuhl.de/en/program/calendar/semhp/?semnr=10191>.
- [T21] Optimizing and tuning the fast multipole method for state-of-the-art multicore architectures. SIAM Conf. Parallel Processing (SIAM PP), Seattle, WA, USA, February 2010.
<http://www.siam.org/meetings/pp10/>.
- [T22] Parallel n -body solvers: Lessons learned in the multicore/many-core era. Yahoo! Labs, Bangalore, India, January 2010.
- [T23] Parallel n -body solvers: Lessons learned in the multicore/many-core era. NIPS Wkshp. Large-scale Machine Learning: Parallelism and Massive Datasets, <http://www.select.cs.cmu.edu/meetings/biglearn09/>, Vancouver, British Columbia, Canada, December 2009.
- [T24] Toward scalable particle methods for physics and data analysis. Wkshp. Performance Analysis on Extreme-Scale Systems and Applications, at the Los Alamos Computer Science Symposium (LACSS), Santa Fe, NM, USA, October 2009.
<http://www.lanl.gov/conferences/lacss/2009/agenda/workshops.shtml>.

- [T25] Toward a programming model for data analysis and mining. Minisymposium on The Potential of Computational Algorithms in Datamining, at the SIAM Conf. Computational Sci. Eng. (SIAM CSE), Miami, FL, USA, March 2009.
http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=8103.
- [T26] Recent progress in autotuning. Intel Corporation, Hudson, MA, USA, August 2008.
- [T27] Expressing data structure transformations for an automatically tuned sparse matrix library. Lua Workshop, George Washington University, Washington, DC, USA, July 2008.
<http://www.lua.org/wshop08.html#vuduc>.
- [T28] Tuning sparse matrix-vector multiply for multicore. Courant Institute, New York University, USA, April 2008.
- [T29] Tuning sparse matrix-vector multiply for multicore. Oak Ridge National Laboratory, Oak Ridge, TN, USA, April 2008.
- [T30] Tuning sparse matrix-vector multiply for multicore. Minisymposium on Algorithms and Optimizations Targeting Multi-Core Architectures, SIAM Conf. Parallel Processing (SIAM PP), Atlanta, GA, USA, March 2008.
http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=6762.
- [T31] Automated data structure transformations for sparse matrix kernels. Minisymposium on Tools for the Development of High-performance Scientific Applications, SIAM Conf. Parallel Processing (SIAM PP), Atlanta, GA, USA, March 2008.
http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=6765.
- [T32] OSKI: A library of automatically tuned sparse matrix kernels. **Invited keynote** at the Int'l. Wkshp. Automatic Performance Tuning (iWAPT), Tōkyō, Japan, October 2006.
<http://iwapt.org/2006/>.
- [T33] OSKI: A library of automatically tuned sparse matrix kernels. Kyōtō University, Japan, October 2006.
- [T34] Automatically tuned sparse matrix kernels. High-Performance Computing Seminar, Pomona College, USA, September 2006.
- [T35] The Optimized Sparse Kernel Interface. Bay Area Scientific Computing Day, Livermore, CA, USA, March 2006.
<https://computation.llnl.gov/casc/workshops/bascd/2006/>.
- [T36] Tutorial: The ROSE source-to-source infrastructure. IEEE Int'l. Conf. Parallel Architecture and Compilation Techniques (PACT), St. Louis, MO, USA, September 2005.
<http://www.informatik.uni-trier.de/~ley/db/conf/IEEEpact/IEEEpact2005.html>.

[T37] Automatically tuned sparse matrix kernels. University of Rome, Tor Vegata, Italy, July 2005.

3.8 RESEARCH PROPOSALS AND GRANTS (PRINCIPAL INVESTIGATOR)

3.8.1 *Approved and Funded*

1. COMPILER-SUPPORT FOR REVERSE COMPUTATION

PI: Richard Vuduc (CoC/CSE)
Lawrence Livermore National Laboratory
January 2011–May 2011

New '11-'12 Item

2. TOWARD EXASCALE PSEUDO-SPECTRAL CODES FOR TURBULENCE SIMULATIONS ON GPGPUs

PI: Richard Vuduc (CoC/CSE)
Co-PI: P.K. Yeung (CoE/AE)
Georgia Institute of Technology, Institute for Data and HPC Type I Seed Grant Program
AY 2010–2011

3. CAREER: AUTOTUNING FOUNDATIONS FOR EXASCALE SYSTEMS

PI: Richard Vuduc
National Science Foundation, *Award 0953100*
June 2010–May 2014

4. FOUNDATIONS FOR A HIGH-SPEED, LOW-POWER DATA ANALYTICS APPLIANCE

PI: Richard Vuduc
Defense Advanced Research Projects Agency
Computer Science Study Group, Phase 2
June 2010–May 2012

5. AUTOTUNING APPLICATIONS FOR EMERGING MULTICORE PLATFORMS

PI: Richard Vuduc
Co-PI: Chi-Keung Luk (Intel Corporation)
2009–2010

6. FROM ALGORITHMS TO HARDWARE: BLUEPRINTS TO SUPPORT COOPERATIVE HARDWARE/SOFTWARE PREFETCHING IN DATA-INTENSIVE APPLICATIONS

Co-PIs: Hyesoon Kim, Richard Vuduc
Raytheon Faculty Fellowship
August 2009–May 2010

7. ALGORITHMS AND SOFTWARE WITH TUNABLE PARALLELISM

PI: Richard Vuduc

Defense Advanced Research Projects Agency
 Computer Science Study Group (RA-08-52)
 April 2009–April 2010

8. THOR: A NEW PROGRAMMING MODEL FOR DATA ANALYSIS AND MINING

PI: Richard Vuduc
 Co-PI: Alexander G. Gray (CoC/CSE)
 National Science Foundation, Award 0833136
 September 2008–August 2010

3.9 RESEARCH PROPOSALS AND GRANTS (CONTRIBUTOR)

3.9.1 *Approved and Funded*

1. CCF: SHF: SMALL: LOCALIZATION AND EXPLANATION OF FAULTS IN CONCURRENT SOFTWARE

PI: Mary Jean Harrold (CoC/CS)
 Co-PI: Richard Vuduc (CoC/CSE)
 National Science Foundation, Award 1116210
 July 2011–June 2014

2. MLPACK: SCALABLE MACHINE LEARNING SOFTWARE FOR LARGE-SCALE SCIENCE

PI: Alexander Gray
 Co-PIs: Richard Vuduc, Haesun Park, Yu (Cathy) Jiao, John McDonald, Gordon Richards, Alexander Shapiro, Jeffrey Vetter
 Georgia Institute of Technology, Institute for Data and HPC Type II Seed Grant Program
 AY 2010–2011

3. VANCOUVER: DESIGNING A NEXT-GENERATION SOFTWARE INFRASTRUCTURE FOR HETEROGENEOUS EXASCALE COMPUTING

PI: Jeffrey Vetter (CoC/CSE + ORNL)
 Co-PIs: Wen-Mei Hwu (University of Illinois, Urbana-Champaign), Allen Maloney (University of Oregon), Richard Vuduc (CoC/CSE)
 Department of Energy, X-Stack
 September 2010–August 2013

4. COLLABORATIVE RESEARCH: ESTABLISHING A CENTER FOR HYBRID MULTICORE PRODUCTIVITY RESEARCH

PI: David A. Bader (CoC/CSE), Thomas Conte (CoC/CS)
 Co-PIs: Nathan Clark (CoC/CS), Ada Gavrilovska (CoC/CS), Hyesoon Kim (CoC/CS), Richard Vuduc (CoC/CSE)
 National Science Foundation, Award 0934114
 August 2009–July 2010

5. QAMELEON: HARDWARE/SOFTWARE CO-OPERATIVE AUTOMATED TUNING FOR HETEROGENEOUS ARCHITECTURES
 PI: Hyesoon Kim (CoC/CS)
 Co-PI: Richard Vuduc (CoC/CSE)
 National Science Foundation, joint with Semiconductor Research Corporation, [Award 0903447](#)
 August 2009–July 2012

6. COLLABORATIVE RESEARCH: ESTABLISHING AN I/UCRC CENTER FOR MULTICORE PRODUCTIVITY RESEARCH (CMPR)
 PI: Milt Halem (University of Maryland, Baltimore County)
 Co-PIs: David A. Bader (CoC/CSE), Paul Woodward (University of Minnesota), Paul Sheldon (University of California, San Diego)
 Contributors: Richard Vuduc (CoC/CSE)
 National Science Foundation, [Award 0831110](#)
 August 2008

3.10 RESEARCH HONORS AND AWARDS

1. November 2010: Winner, Gordon Bell Prize at ACM/IEEE Conf. Supercomputing (SC)
2. April 2010: College of Computing's Outstanding Junior Faculty Research Award
3. April 2010: Winner, Best paper (software track) at the IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS).
4. January 2010: NSF CAREER Awardee.
5. November 2009: Finalist, Best paper at SC
6. November 2009: Winner, R&D 100 Award for ROSE (joint with Lawrence Livermore National Laboratory)
7. April 2009: Panelist, DARPA Computer Science Study Panel (CSSP). One of twelve panelists selected nationally among untenured US citizen professors.
8. July 2006: Winner, Best paper at Parallel and Distributed Testing and Debugging (PADTAD)
9. September 2004: Winner, Best paper at Int'l. Conf. Parallel Processing (ICPP)
10. June 2002: Winner, Best student presentation at Workshop on Performance Optimization of High-level Languages and Libraries, joint with the ACM Int'l. Conf. Supercomputing (ICS)
11. June 2002: Winner, Best student paper at Workshop on Performance Optimization of High-level Languages and Libraries, joint with ICS
12. November 2002: Finalist, Best student paper at SC

13. December 2000: Winner, Best presentation at Workshop on Feedback-directed Dynamic Optimization (FDDO), joint with the IEEE Int'l. Symp. Microarchitecture (MICRO)

SERVICE

4.1 PROFESSIONAL ACTIVITIES

4.1.1 *Membership and Activities in Professional Societies*

1. 2010–2012, Secretary (elected), Society for Industrial and Applied Mathematics, Activity Group on Supercomputing (SIAM/CSE)
2. Member, Association for Computing Machinery (ACM)
3. Member, SIAM
4. Member, Institute of Electrical and Electronics Engineers (IEEE)
5. Member, USENIX Association

4.1.2 *Conference Committee Activities*4.1.2.1 *Conferences*

1. Program Committee, *ACM/IEEE Conf. Supercomputing (SC), Performance track, 2012* *New '11-'12 Item*
2. Program Committee, *Int'l. Conf. Parallel Processing (ICPP), Performance track, 2012* *New '11-'12 Item*
3. Program Committee, *IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS), Algorithms track, 2012* *New '11-'12 Item*
4. PhD Forum Committee, *IPDPS, 2012* *New '11-'12 Item*
5. Program Committee, *SIAM Conf. Parallel Processing (SIAM PP), 2012* *New '11-'12 Item*
6. Program Committee, *Int'l. Conf. High-Performance Computing (HiPC), Software track, 2011* *New '11-'12 Item*
7. Program Committee, *Workshop on GPU Computing, at Int'l. Conf. Parallel Processing and Applied Mathematics (PPAM), 2011* *New '11-'12 Item*
8. Program Committee, *ACM Student Research Competition and Poster Session at the ACM Int'l. Conf. Supercomputing (ICS), 2011* *New '11-'12 Item*
9. Program Committee, *SC, Performance track, 2011* *New '11-'12 Item*
10. Program Committee, *IPDPS, Software track, 2011* *New '11-'12 Item*
11. PhD Forum Committee, *IPDPS, 2011* *New '11-'12 Item*
12. Program Committee, *IEEE/ACM Int'l. Symp. Code Generation and Optimization (CGO), 2011* *New '11-'12 Item*

13. Program Committee, *HiPC*, 2010
14. Program Committee, *SC*, Applications track, 2010
15. Program Committee, *Conf. Partitioned Global Address Space (PGAS) Programming Models*, 2010
16. Program Committee, *Int'l. Mtg. High-Performance Computing for Computational Sci. (VECPAR)*, 2010
17. Program Committee, *ACM Int'l. Conf. Computing Frontiers (CF)*, 2010
18. Program Committee, *ACM SIGPLAN Symp. Principles and Practice of Parallel Programming (PPoPP)*, 2010
19. Program Committee, *SC*, Applications track, 2009
20. Program Committee, *Int'l. Conf. High-Performance Computing (HiPC)*, 2008
21. Program Committee, *IEEE Int'l. Conf. Computational Sci. Eng. (CSE)*, 2008
22. Poster Committee, *SC*, 2005

4.1.2.2 Workshops

- New '11-'12 Item* 1. Program Chair, *Int'l. Wkshp. Automatic Performance Tuning (iWAPT)*, 2012
- New '11-'12 Item* 2. Program Chair, *Concurrent Collections (CnC) Workshop*, 2011
- New '11-'12 Item* 3. Program Committee, *High-Performance Scientific Software at Euro-Par*, 2011
- New '11-'12 Item* 4. Program Committee, *USENIX Wkshp. Hot Topics in Parallelism (HotPar)*, 2011
- New '11-'12 Item* 5. Vice Program Chair, *iWAPT*, 2011
- New '11-'12 Item* 6. Program Committee, *International Workshop on Multicore Software Engineering at ACM/IEEE Int'l. Conf. Software Eng.*, 2011
7. Program Committee, *Workshop on Application/Architecture Co-design for Extreme-scale Computing at IEEE Cluster*, 2010
8. Organizing Committee, *Concurrent Collections Workshop at LCPC*, 2010
9. Program Committee, *iWAPT*, 2010
10. Program Committee, *IEEE Int'l. Symp. Workload Characterization (IISWC)*, 2010
11. Local Organizing Chair, *IISWC*, 2010
12. Steering Committee, *Wkshp. Statistical Machine Learning applied to ARchitecture and compilaTion (SMART)*, 2010

13. Program Committee, [HotPar](#), 2010
14. Program Committee, [iWAPT](#), 2009
15. Program Committee, [SMART](#), 2008
16. Program Committee, [iWAPT](#), 2008
17. Program Committee, [IEEE Int'l. Wkshp. Parallel and Distributed Scientific and Eng. Computing \(PDSEC\)](#), 2008
18. Program Committee, [iWAPT](#), 2007
19. Program Committee, [Wkshp. Performance Optimization of High-level Languages and Libraries \(POHLL\)](#), 2007
20. Program Committee, [SMART](#), 2007
21. Program Committee, [POHLL](#), 2006

4.1.2.3 *Workshop and External Course Organization*

1. Co-organizer, [Minisymposium on Energy-aware High-Performance Computing](#), [SIAM Parallel Processing \(PP\)](#), Feb. 2012 *New '11-'12 Item*
2. Co-organizer, [Wkshp. Libraries and Autotuning for Extreme Scale Systems](#), for the US Dept. of Energy Center for Scalable Application Development Software ([DOE CScADS](#)), Aug. 2011 *New '11-'12 Item*
3. Co-organizer, Tutorial on Performance analysis and tuning for GPGPUs, at the [IEEE Int'l. Symp. High Performance Computer Architecture \(HPCA\)](#), Feb. 2011 *New '11-'12 Item*
4. Co-organizer, Tutorial on Performance analysis and tuning for GPGPUs, at the [ACM/IEEE Int'l. Symp. Microarchitecture \(MICRO\)](#), Dec. 2010
5. Co-organizer, [Wkshp. Libraries and Autotuning for Petascale Applications](#), for US DOE CScADS, Aug. 2010
6. Co-organizer, Tutorial on Performance Analysis and Optimization for GPUs, at NSF TeraGrid Conf., Aug. 2010
7. Co-organizer, [Wkshp. Libraries and Autotuning for Petascale Applications](#), for US DOE CScADS, Jul. 2009
8. Co-organizer, [Wkshp. Automatic Tuning for Petascale Systems](#), for US DOE CScADS, Aug. 2008
9. Co-organizer, Minisymposium on Adaptive Tools and Frameworks for High-Performance Numerical Computations, [SIAM PP](#), Mar. 2006
10. Co-organizer, Tutorial on "ROSE C/C++ Source-to-source Translator," Int'l. Conf. Parallel Architectures and Compilation Techniques ([PACT](#)), Sep. 2005

4.2 ON-CAMPUS GEORGIA TECH COMMITTEES

- New '11-'12 Item* 1. Computational Science and Engineering (CSE) School Advisory Committee, (SAC), CoC, 2011–2012 Academic Year (AY).
- New '11-'12 Item* 2. CSE, Space Planning Committee, CoC, 2011–2012 AY.
- New '11-'12 Item* 3. CSE, Qualifying Exam Committee, CoC, 2011–2012 AY.
- 4. CSE, Graduate Admissions and Recruiting Committee, CoC, 2010–2011 Academic Year (AY).
- 5. CSE, Qualifying Exam Committee, CoC, 2010–2011 AY.
- 6. Undergraduate Curriculum Advisory Committee on Parallel Computing, College of Computing (CoC), 2009–2010 AY.
- 7. CSE, Qualifying Exam Committee, CoC, 2009–2010 AY.
- 8. CSE Chair Advisory Committee, CoC, 2009–2010 AY.
- 9. Computer Science (CS) PhD Recruiting Weekend Committee, CoC, 2008–2009 AY.
- 10. CSE Review of the Chair Committee, CoC, 2008–2009 AY.
- 11. CSE Faculty Recruiting Committee (FRC), CoC, 2008–2009 AY.
- 12. Faculty Computer Committee (FCC), CoC, 2008–2009 AY.
- 13. CSE PhD Admissions Committee, CoC, 2008–2009 AY.
- 14. CS PhD Admissions Committee, CoC, 2008–2009 AY.
- 15. CSE Qualifying Exam Committee, CoC, 2008–2009 AY.
- 16. CSE Chair Advisory Committee, CoC, 2008–2009 AY.
- 17. CSE FRC, CoC, 2008–2009 AY.
- 18. CSE PhD Admissions Committee, 2007–2008 AY.
- 19. CS PhD Admissions Committee, 2007–2008 AY.
- 20. Teaching Assistanceship Requirement Grandfathering Committee, CoC. 2007–2008 AY.
- 21. FCC, CoC, 2007–2008 AY.
- 22. Awards Committee, CoC, 2007–2008 AY.

4.3 MEMBER OF PH.D. EXAMINING COMMITTEES

1. Nitin ARORA, College of Engineering (CoE), Aerospace Engineering (AE)
Thesis Proposal, Fall 2011 *New '11-'12 Item*
Advisor: Ryan RUSSELL (CoE/AE)
2. Bo XIAO, College of Computing (CoC), Computational Science and Engineering (CSE)
Qualifying Exam, Fall 2011 *New '11-'12 Item*
Advisor: George BIROS (CoC/CSE + CoC/Biomedical Engineering (BME))
3. Sangho LEE, CoC, Computer Science (CS)
Qualifying Exam, Fall 2011 *New '11-'12 Item*
Advisor: Santosh PANDE (CoC/CS)
4. Kaushik RAVICHANDRAN, CoC, CS
Qualifying Exam, Fall 2011 *New '11-'12 Item*
Advisor: Santosh PANDE (CoC/CS)
5. Jingfang LIU, College of Science, Mathematics
Qualifying Exam, Fall 2011 *New '11-'12 Item*
Advisor: Haomin ZHOU (CoS/Math)
6. Cong HOU, CoC, CS
Qualifying Exam, Summer 2011 *New '11-'12 Item*
Advisor: Richard VUDUC (CoC/CSE)
7. Asif SALAHUDDIN, CoE, Mechanical Engineering (ME)
Thesis Proposal, Summer 2009
Thesis Defense, Summer 2011 *New '11-'12 Item*
Advisor: Cyrus AIDUN (CoC/ME)
8. Jaswanth SREERAM, CoC, CS
Thesis Proposal, Spring 2011 *New '11-'12 Item*
Advisor: Santosh PANDE (CoC/CS)
9. Abtin RAHIMIAN, CoC, CSE
Thesis Proposal, Spring 2011 *New '11-'12 Item*
Advisor: George BIROS (CoC/CSE + CoE/BME)
10. Pushkar PANDE, CoC, CSE
Qualifying Exam, Spring 2011 *New '11-'12 Item*
Advisor: David BADER (CoC/CSE)
11. Xing LIU, CoC, CSE
Qualifying Exam, Spring 2011 *New '11-'12 Item*
Advisor: David BADER (CoC/CSE)
12. George VULOV, CoC, CSE
Qualifying Exam, Spring 2011 *New '11-'12 Item*
Advisor: Richard FUJIMOTO (CoC/CSE), Richard VUDUC (co-advisor, CoC/CSE)

13. Sangmin PARK, CoC, CS
Qualifying Exam, Fall 2010
Advisor: Mary Jean HARROLD (CoC/CS), Richard VUDUC (co-
advisor, CoC/CSE)
14. Jiang BIAN, CoC, CSE
Thesis Proposal, Spring 2010
Advisor: Hongyuan ZHA (CoC/CSE)
15. Dongryeol LEE, CoC, CSE
Thesis Proposal, Spring 2010
Advisor: Alexander G. GRAY (CoC/CSE)
16. Sooraj BHAT, CoC, CS
Thesis Proposal, Spring 2010
Advisor: Alexander G. GRAY (CoC/CSE)
17. William MARCH, CoC, CSE
Qualifying Exam, Spring 2010
Advisor: Alexander G. GRAY (CoC/CSE)
18. Murat Efe GUNAY, CoE, Civil Engineering (CE)
Thesis Proposal, Summer 2009
Thesis Defense, Spring 2010
Advisor: Kenneth WILLS (CoE/CE)
19. Aparna CHANDRAMOWLISHWARAN, CoC, CSE
Qualifying Exam, Fall 2009
Advisor: Richard VUDUC (CoC/CSE)
20. Mingxuan SUN, CoC, CS
Qualifying Exam, Fall 2009
Advisor: Guy LEBANON
21. Parikshit RAM, CoC, CS
Qualifying Exam, Fall 2009
Advisor: Alexander GRAY
22. Virat AGARWAL, CoC, CSE
Thesis Proposal, Summer 2009
Advisor: David BADER
23. Rahul SAMPATH, CoC, CSE
Spring 2009
Ph.D. Thesis: A parallel geometric multigrid method for finite
elements on octrees applied to elastic image registration
Advisor: George BIROS (CoC/CSE + CoE/BME)
24. Steven P. CRAIN, CoC, CSE
Qualifying Exam, Spring 2009
Advisor: Hongyuan ZHA (CoC/CSE)
25. Haw-Jing "Michael" LO, CoE, Electrical and Computer Engineer-
ing (ECE)
Spring 2009
Ph.D. Thesis: Design of a reusable distributed arithmetic filter

and its application to the affine projection algorithm
 Advisor: David ANDERSON (CoE/ECE)

26. Jaegul CHOO, CoC, CSE
 Qualifying Exam, Spring 2009
 Advisor: Haesun PARK (CoC/CSE)
27. Rahul SAMPATH, CoC, CSE
 Thesis Proposal, Spring 2009
 Advisor: George BIROS (CoC/CSE + CoE/BME)
28. Manisha GAJBE, CoC, CS
 Qualifying Exam, Spring 2009
 Advisor: David BADER (CoC/CSE)
29. Hasan ABBASI, CoC, CS
 Thesis Proposal, Spring 2009
 Advisor: Karsten SCHWAN (CoC/CS)
30. Dongreol LEE, CoC, CS
 Qualifying Exam, Fall 2008
 Advisor: Alexander GRAY (CoC/CSE)
31. Ryan RIEGEL, CoC, CS
 Qualifying Exam, Spring 2008
 Advisor: Alexander GRAY (CoC/CSE)
32. Alfred PARK, CoC, CS
 Ph.D. Thesis: Master/worker parallel discrete event simulation
 Advisor: Richard FUJIMOTO (CoC/CSE)
33. Kamesh MADDURI, CoC, CS
 Ph.D. Thesis: A high-performance framework for analyzing massive complex networks
 Advisor: David BADER (CoC/CSE)
34. Michael P. HOLMES, CoC, CS
 Ph.D. Thesis: Multi-tree Monte Carlo methods for fast, scalable machine learning
 Advisors: Charles ISBELL (primary; CoC/IC), Alexander GRAY (CoC/CSE)

4.4 MEMBER OF PH.D. EXAMINING COMMITTEES (EXTERNAL)

1. Dimitar LUKARSKI
 Mathematics, Karlsruhe Institute of Technology (KIT)
 Spring 2012
 Thesis: Parallel sparse linear algebra for multi-core and many-core platforms
 Advisor: Jan-Philipp Weiß (KIT)

4.5 MEMBER OF MASTERS EXAMINING COMMITTEES

1. Daniel R. BROWNE, CoE, AE
 Summer 2011
 Thesis: Enabling collaborative behaviors among CubeSats
 Advisor: Ryan RUSSELL (CoE/AE)

2. Sundaresan Venkatasubramanian, CoC, CS
Spring 2009
Thesis: Tuned and wildly asynchronous algorithms for hybrid CPU/GPU platforms
Advisor: Richard VUDUC
3. Rick Quax, CoC, CS
Fall 2008
Thesis: Modeling and simulating the propagation of infectious diseases using complex networks
Advisor: David BADER
4. Amrita Mathuriya, CoC, CS
Fall 2008
Thesis: GTfold: A scalable multicore code for RNA secondary prediction
Advisor: David BADER

4.6 RESEARCH PROJECT REVIEWER

- New '11-'12 Item*
1. National Science Foundation, 2011
 2. Department of Energy, 2010
 3. Department of Energy, 2009
 4. National Science Foundation, 2008

4.7 CIVIC AND OTHER ACTIVITIES

- New '11-'12 Item*
1. Judge, Georgia Science and Engineering Fair, 2012
 - New '11-'12 Item*
 2. Judge, Georgia Science and Engineering Fair, 2011
 3. Judge, Georgia Science and Engineering Fair, 2010
 4. Judge, Georgia Science and Engineering Fair, 2009
 5. Speaker, Advice on Preparing a Research Statement, CoC Job Hunting Seminar, 2009
 6. Reader, Georgia Junior Humanities and Science Fair, 2008
 7. Speaker, Advice on Preparing a Research Statement, CoC Job Hunting Seminar, 2008

PROFESSIONAL RECOGNITION

5.1 INVITED CONFERENCE SESSION CHAIRMANSHIPS

1. Session Co-Chair, Autotuning Minisymposium at the Int'l. Conf. Parallel Processing and Applied Mathematics (PPAM), September 2011
2. Session Chair, Panel on Unconventional Wisdom in Multicore (at IPDPS), Atlanta, GA, April 2010
3. Session Co-Chair, Workshop on Parallel Matrix Algorithms and Applications (PMAA), Basel, Switzerland, June 2010
4. Session Chair, Symposium on Computing Systems and Technologies, Georgia Institute of Technology, Atlanta, GA, April 2008
5. Session Co-Chair, Minisymposium on Adaptive Tools and Frameworks for High Performance Numerical Computations, SIAM Parallel Processing, 2006

New '11-'12 Item

5.2 INVITED PANEL SPEAKER

1. Panel on Communication and Synchronization Primitives, US Dept. of Energy (DOE), Advanced Scientific Computing Research (ASCR) *Workshop on Exascale Programming Challenges*, July 2011.
2. Panel on AMD Fusion-like Processors in HPC, AMD Fusion Developers' Summit, June 2011.
3. Panel on MPI+Manycore Issues and Plans, Sandia National Laboratories Computer Science Research Institute (CSRI) Workshop on Next-generation Scalable Application: When MPI-only is Not Enough, May 2008.
4. Panel on New HPC-Challenge Benchmark Candidates, Georgia Tech, November 2008.

*New '11-'12 Item**New '11-'12 Item*

5.3 REVIEWER WORK FOR TECHNICAL PUBLICATIONS

5.3.1 *Book proposals*

1. CRC Press, 2008.

5.3.2 *Books*

1. CRC Press, 2011.
2. CRC Press, 2010.

New '11-'12 Item

5.3.3 *Journals*

- New '11-'12 Item* 1. Int'l. J. High Performance Computing Applications (IJHPCA), 2002, 2004, 2009, 2011.
- New '11-'12 Item* 2. SIAM J. Scientific Computing (SISC), 2008, 2009, 2011, 2012.
- New '11-'12 Item* 3. IEEE Trans. Par. Distrib. Sys. (TPDS), 2009, 2010, 2011.
- 4. ACM Trans. Architecture and Code Optimization (ACM TACO), 2009.
- 5. J. Parallel Computing (ParCo), 2008, 2009.
- 6. ACM Trans. Mathematical Software (ACM-TOMS), 2008.
- 7. J. Parallel and Distributed Computing (JPDC), 2008, 2010.
- 8. Software: Practice and Experience, 2008.
- 9. Concurrency and Computation: Practice and Experience (CC:PE), 2007.
- 10. Parallel Processing Letters, 2004.
- 11. Proc. IEEE, 2004.
- 12. J. Functional Programming (JFP), 2001.

5.3.4 *Conferences and Workshops*

- New '11-'12 Item* 1. Innovative Parallel Computing Conference (InPar), 2012
- New '11-'12 Item* 2. ACM SIGPLAN Symp. Principles and Practice of Parallel Programming (PPoPP), 2011, 2012
- New '11-'12 Item* 3. IEEE/ACM Int'l. Symp. Microarchitecture (MICRO), 2011
- 4. IEEE Int'l. Par. Distrib. Processing Symp. (IPDPS), 2010.
- 5. Workshop on General-Purpose Computation on Graphics Processing Units (GPGPU), 2009, 2010.
- 6. Winter Simulation Conference (WSC), 2009.
- 7. Int'l. Symp. Computer Architecture (ISCA), 2008.
- 8. Computing Frontiers (CF), 2008.
- 9. Int'l Conf. High-Performance Computing and Communications (HPCC), 2007.
- 10. ACM/IEEE Conf. Supercomputing (SC), 2007.
- 11. ACM Int'l. Conf. Supercomputing (ICS), 2007.
- 12. Network and Parallel Computing (NPC), 2006.
- 13. Euro-Par, 2006.

14. Combinatorial Scientific Computing, 2005.
15. ACM Symposium on Parallel Algorithms and Architectures (SPAA), 2003, 2004.
16. ACM Conf. Programming Language Design and Implementation (PLDI), 2003.
17. Int'l. Conf. Computational Science (ICCS), 2001.
18. ACM Conf. Principles of Programming Languages (POPL), 2000.