



RICHARD WILSON VUDUC

CURRICULUM VITÆ

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Richard Wilson Vuduc: *Curriculum Vitæ*, © March 2018

[March 26, 2018 at 1:49 – classicthesis version 4.1]

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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
Director of CSE Programs	Georgia Tech	Jul. '13–Jan. '17
Associate Chair of Academic Affairs in CSE	Georgia Tech	Aug. '13–Dec. '16
Associate Professor with tenure	Georgia Tech	Aug. '13–present
Assistant Professor	Georgia Tech	Aug. '07–Jul. '13
Postdoc	Lawrence Livermore National Laboratory	Nov. '04–Jul. '07
Postdoc	University of California, Berkeley	Jan. '04–Oct. '04
Graduate student	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:

- Algorithms and performance analysis, with respect to time, space, energy, and power

- Performance engineering
- 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 algorithms and software.

2

TEACHING

2.1 COURSES TAUGHT

WHEN	COURSE	SIZE	SCORE	NOTES
Fall '17	CSE 6220-OMS: Intro to HPC	64	4.8	
Fall '17	CSE 6040-OMS: Comp for Data Analysis	141	4.7	New
Fall '17	CSE 6040: Comp for Data Analysis	60	4.2	
Fall '17	CSE 6001: Intro to CSE	8	4.9	
Spring '16	CSE 6220-OMS: Intro to HPC	36	4.8	
Spring '16	CX 4230: Modeling & simulation	29	5.0	New version
Fall '15	CSE 6220-OMS: Intro to HPC	41	4.6	New version
Fall '15	CSE 6040: Comp for Data Analysis	37	4.1	New version
Fall '15	CSE 6001: Intro to CSE	18	4.9	
Spring '15	CX 4230: Modeling & simulation	32	4.9	New version
Fall '14	CSE 6001: Intro to CSE	20	4.1	New version
Fall '14	CSE 6230: High-performance Computing Tools and Applications	41	4.5	
Fall '13	CSE 6001: Intro to CSE	9	4.8	New version
Fall '13	CSE 6230: High-performance Computing Tools and Applications	36	4.1	New version
Spring '13	CSE 6220: Intro to HPC	60	4.4	New version
Fall '12	CSE 6230: High-performance Computing Tools and Applications	55	4.5	New version
Spring '12	CS 4225: Intro to HPC	12	4.4	New version
Fall '11	CSE 6230: HPC Tools & Apps	49	4.3	New version
Spring '11	CS 4335 / CSE/ECE 6730: Modeling and Simulation	36	4.6	New version
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 version
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 (as primary advisor)*

- Casey BATTAGLINO (CoC/CSE)
Fall 2010–present
- Kenneth CZECHOWSKI (CoC/CSE)
Fall 2011–present
- Marat DUKHAN (CoC/CSE)
Fall 2012–present
- Srinivas ESWAR (CoC/CS)
Fall 2016–present¹
- Michael ISAEV (CoC/CS)
Spring 2017–present
- Sara KARAMATI (CoC/CSE)
Fall 2014–present
- Jiajia LI (CoC/CSE)
Spring 2015–present
- Piyush Kumar SAO (CoC/CSE)
Fall 2011–present
- Patrick LAVIN (CoC/CSE)
Fall 2016–present

New '17-'18 Item

Graduated or no longer supervising:

- Daniel BROWNE (CoC/CSE)
Spring 2012–Spring 2016
- Aparna CHANDRAMOWLISHWARAN (CoC/CSE)
Fall 2008–Fall 2013
PLACEMENT: Assistant Professor at UC Irvine
- Jee CHOI (CoE/ECE)
Fall 2008–Spring 2015
PLACEMENT: IBM T.J. Watson Research Lab
- Raghul GUNASEKARAN (CoC/CSE)
Fall 2010–Fall 2012
- Mohammad HOSSAIN (CoC/CS)
Spring 2014–Fall 2016
PLACEMENT: Facebook

¹ I originally met and began working with Srinivas in Spring 2015, when he was an M.S. student at Georgia Tech.

- Cong HOU (CoC/CS)
Summer 2009–Spring 2013
PLACEMENT: Google
- Sangmin PARK (CoC/CS; M.J. Harrold)
Fall 2008–Summer 2014
PLACEMENT: Two Sigma
- Zhengkai WU (CoC/ECE)
Spring 2014–Summer 2017

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

- George VULOV (CoC/CSE; R. Fujimoto)
Fall 2009–Fall 2011

2.2.3 *M.S. Students Supervised*

Graduated and/or no longer supervising:

- Vaibhav BEDIA (CoC/CS)
Spring 2014–Fall 2014
PLACED: [Apple](#)
- Stefan HENNEKING (CoC/CS)
Spring 2015–Spring 2016 THESIS: Tuned and wildly asynchronous stencil kernels for hybrid CPU/GPU platforms.
COMMITTEE: Richard VUDUC (advisor, CoC/CSE), Edmond CHOW (CoC/CSE), Mark Adams (Lawrence Berkeley National Laboratory)
NOW AT: UT Austin (ICES PhD program)
- Robert LEE (CoC/CSE)
Spring 2014–Spring 2016
PLACEMENT: Tower Research Capital (NYC)
- Chris McCLANAHAN (CoC/CS)
Fall 2010–Spring 2011
PLACED: [AccelerEyes](#)
- David S. NOBLE, Jr. (CoC/CSE)
Fall 2010–Spring 2013
PLACED: [CD-Adapco](#)
- Shruti PADAMATI (CoC/CS)
Spring 2014
- Niveditha RAVEENDRAN (CoC/CS)
Spring 2014
PLACED: [Oracle](#)
- Archana VENKATESH (CoC/CS)
Spring 2014–Fall 2014
PLACED: [Apple](#)

- 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.

- DeVon INGRAM
Spring 2016
- Chaitanya ALURU (UC Berkeley)
Summer 2014
- Lawrence MOORE
Summer 2014
- Austin TUCKER (Morehouse College)
Summer 2013
- Hyangjin LEE
Summer 2013
- Lesly SANDOVAL (Georgia State University)
Summer 2011
- Gurbinder Gill SINGH (IIT-Roorkee)
Summer 2011
- 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

- LOCKHEED MARTIN EXCELLENCE IN TEACHING AWARD
Spring 2013
- THANK-A-TEACHER
Fall 2012
CETL and GT Student Ambassadors
- 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

Web citation indexes:

- Google Scholar: <http://scholar.google.com/citations?user=CCGI7x4AAAAJ&hl=en>
- Microsoft Academic Search: <http://academic.research.microsoft.com/Author/255921/richard-w-vuduc>

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] Zhihui Du, Rong Ge, Victor W. Lee, Richard Vuduc, David A. Bader, and Ligang He. Modeling the power variability of core speed scaling on homogeneous multicore processors. *Scientific Programming*, 2017(8686971):13, 2017.
<http://dx.doi.org/10.1155/2017/8686971>.
- [J2] Yang You, James Demmel, Kenneth Czechowski, Le Song, and Richard Vuduc. Design and implementation of a communication-optimal classifier for distributed kernel support vector machines. *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, 28(4):974–988, 2016.
Extends conference version: doi:10.1109/IPDPS.2015.117.
<http://dx.doi.org/10.1109/TPDS.2016.2608823>.
- [J3] Sangmin Park, Richard Vuduc, and Mary Jean Harrold. UNICORN: a unified approach for localizing non-deadlock concurrency bugs. *Software: Testing, Verification, and Reliability*, 25(3):167–190, May 2015.
Extends conference version: doi:10.1109/ICST.2012.85.
<http://dx.doi.org/10.1002/stvr.1523>.
- [J4] Agata Rozga, Tricia Z. King, Richard W. Vuduc, and Diana L. Robins. Undifferentiated facial electromyography responses to dynamic, audio-visual emotion displays in individuals with autism spectrum disorders. *Developmental Science*, 2013.
<http://dx.doi.org/10.1111/desc.12062>.
- [J5] Ilya Lashuk, Aparna Chandramowliswaran, Harper Langston, Tuan-Ahn Nguyen, Rahul Sampath, Aashay Shringarpure, Richard Vuduc, Lexing Ying, Denis Zorin, and George Biros.

New '17-'18 Item

- A massively parallel adaptive fast multipole method on heterogeneous architectures. *Communications of the ACM (CACM)*, 55(5):101–109, May 2012.
Extends conference version: doi:10.1145/1654059.1654118.
<http://dx.doi.org/10.1145/2160718.2160740>.
- [J6] Jaekyu Lee, Hyesoon Kim, and Richard Vuduc. When prefetching works, when it doesn't, and why. *ACM Trans. Architecture and Code Optimization (TACO)*, 9(1), March 2012.
<http://dx.doi.org/10.1145/2133382.2133384>.
- [J7] Richard Vuduc and Kenneth Czechowski. What GPU computing means for high-end systems. *IEEE Micro*, 31(4):74–78, July/August 2011.
<http://dx.doi.org/10.1109/MM.2011.78>.
- [J8] 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: doi:10.1145/1362622.1362674.
<http://dx.doi.org/10.1016/j.parco.2008.12.006>.
Most Downloaded Paper, Q1 2009: <http://tinyurl.com/yllkfee>.
- [J9] 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>.
- [J10] 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>.
- [J11] 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>.
- [J12] 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: doi:10.1007/3-540-45545-0_21.
<http://dx.doi.org/10.1177/1094342004041293>.
- [J13] 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>.

- [J14] 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] Jee Choi and Richard Vuduc. A brief history and introduction to GPGPU. In Xuan Shi, Volodymyr Kindratenko, and Chaowei Yang, editors, *Modern Accelerator Technologies for Geographic Information Science*, pages 9–23, Boston, MA, USA, 2013. Springer.
http://dx.doi.org/10.1007/978-1-4614-8745-6_2.
- [B2] Seunghwa Kang, Nitin Arora, Aashay Shringarpure, Richard W. Vuduc, and David A. Bader. Evaluating multicore processors and accelerators for dense numerical computations. In Sanguthevar Rajasekaran, Lance Fiondella, Mohamed Ahmed, and Reda A. Ammar, editors, *Multicore computing: Algorithms, architectures, and applications*. Chapman and Hall/CRC, 2013.
- [B3] Hyesoon Kim, Richard Vuduc, Sara Baghsorkhi, Jee Choi, and Wen mei Hwu. *Performance analysis and tuning for general purpose graphics processing units (GPGPU)*. Synthesis Lectures on Computer Architecture. Morgan & Claypool Publishers, San Rafael, CA, USA, November 2012.
- [B4] Richard W. Vuduc. Autotuning (definition). In David Padua, editor, *Encyclopedia of Parallel Computing*. Springer, 2011.
- [B5] 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, 2010.

3.4 CONFERENCE PUBLICATIONS (REFEREED)

- [C1] Sara Karamati, Jeffrey Young, and Richard Vuduc. An energy-efficient single-source shortest path algorithm. In *Proceedings of the IEEE Parallel and Distributed Processing Symposium (IPDPS)*, Vancouver, BC, Canada, May 2018. (accepted). New '17-'18 Item
- [C2] Piyush Sao, Xiaoye Li, and Richard Vuduc. A 3D LU factorization algorithm for sparse matrices. In *Proceedings of the International Parallel and Distributed Processing Symposium (IPDPS)*, Vancouver, BC, Canada, May 2018. (accepted). New '17-'18 Item
- [C3] Ioakeim Perros, Evangelos E. Papalexakis, Fei Wang, Richard Vuduc, Elizabeth Searles, Michael Thompson, and Jimeng Sun.

- SPARTan: Scalable PARAFAC2 for large and sparse data. In *Proceedings of the 23rd SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, Halifax, Canada, August 2017. *Conference version of arXiv:1703.04219v1*. New '17-'18 Item
Acceptance rate: [8.6%].
- [C4] Jiajia Li, Jee Choi, Ioakeim Perros, Jimeng Sun, and Richard Vuduc. Model-driven sparse CP decomposition for high-order tensors. In *Proceedings of the IEEE Parallel and Distributed Processing Symposium (IPDPS)*, Orlando, FL, USA, May 29–June 2 2017. New '17-'18 Item
Acceptance rate: [23%].
- [C5] Ioakeim Perros, Fei Wang, Ping Zhang, Peter Walker, Richard Vuduc, Jyotishman Pathak, and Jimeng Sun. Polyadic regression and its application to chemogenomics. In *Proceedings of the SIAM International Conference on Data Mining (SDM)*, April 2017. New '17-'18 Item
- [C6] Mohammad M. Hossain, Chandra Nath, Tommy M. Tucker, Thomas R. Kurfess, and Richard W. Vuduc. A graphical approach for freeform surface offsetting with GPU acceleration for subtractive 3D printing. In *Proceedings of the 11th ASME Manufacturing Science and Engineering Conference (MSEC)*, Blacksburg, VA, USA, June 2016.
- [C7] Zhengkai Wu, Thomas M. Tucker, Chandra Nath, Thomas R. Kurfess, and Richard W. Vuduc. Step ring based 3D path planning via GPU simulation for subtractive 3D printing. In *Proceedings of the 11th ASME Manufacturing Science and Engineering Conference (MSEC)*, Blacksburg, VA, USA, June 2016.
- [C8] Mohammad Hossain, Tommy Tucker, Thomas Kurfess, and Richard Vuduc. HDT: A hybrid structure for extreme-resolution 3D sparse data modeling. In *Proceedings of the International Parallel and Distributed Processing Symposium (IPDPS)*, Chicago, IL, USA, May 2016.
Acceptance rate: [114/496=23%].
<http://ipdps.org>.
- [C9] Jiajia Li, Casey Battaglini, Ioakeim Perros, Jimeng Sun, and Richard Vuduc. An input-adaptive and in-place dense tensor-times-matrix multiply. In *Proc. ACM/IEEE Conf. Supercomputing (SC)*, Austin, TX, USA, November 2015.
Acceptance rate: [79/358=22.1%].
<http://dx.doi.org/10.1145/2807591.2807671>.
- [C10] Ioakeim Perros, Robert Chen, Richard Vuduc, and Jimeng Sun. Sparse hierarchical Tucker factorization and its application to healthcare. In *Proc. IEEE Int'l. Conf. Data Mining (ICDM)*, Stony Brook, NY, USA, November 2015.
(short paper).
- [C11] Oded Green, Marat Dukhan, and Richard Vuduc. Branch-avoiding graph algorithms. In *Proc. ACM Symp. Parallel Algorithms and Architectures (SPAA)*, Portland, OR, USA, June 2015.

- [C12] Yang You, James Demmel, Kenneth Czechowski, Le Song, and Richard Vuduc. CA-SVM: Communication-avoiding support vector machines on clusters. In *Proceedings of the International Parallel and Distributed Processing Symposium (IPDPS)*, Hyderabad, India, May 2015.
Winner, Best Paper (algorithms track).
 Acceptance rate: [108/496=21.8%].
<http://dx.doi.org/10.1109/IPDPS.2015.117>.
- [C13] Piyush Sao, Xing Liu, Richard Vuduc, and Xiaoye Li. A sparse direct solver for distributed memory Xeon Phi-accelerated systems. In *Proceedings of the International Parallel and Distributed Processing Symposium (IPDPS)*, Hyderabad, India, May 2015.
 Acceptance rate: [108/496=21.8%].
<http://dx.doi.org/10.1109/IPDPS.2015.104>.
- [C14] Piyush Sao, Richard Vuduc, and Xiaoye Li. A distributed CPU-GPU sparse direct solver. In *Proceedings of the 20th International European Conference on Parallel Processing (Euro-Par)*, Porto, Portugal, August 2014.
http://dx.doi.org/10.1007/978-3-319-09873-9_41.
- [C15] Kenneth Czechowski, Victor W. Lee, Ed Grochowski, Ronny Ronen, Ronak Singhal, Richard Vuduc, and Pradeep Dubey. Improving the energy efficiency of big cores. In *Proc. ACM/IEEE Int'l. Symp. on Computer Architecture (ISCA)*, Minneapolis, MN, USA, June 2014.
<http://dx.doi.org/10.1145/2678373.2665743>.
- [C16] Jee Choi, Marat Dukhan, Xing Liu, and Richard Vuduc. Algorithmic time, energy, and power on candidate HPC compute building blocks. In *Proc. IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS)*, Phoenix, AZ, USA, May 2014.
<http://dx.doi.org/10.1109/IPDPS.2014.54>.
- [C17] Piyush Sao and Richard Vuduc. Self-stabilizing iterative solvers. In *Proc. 4th Wkshp. Latest Advances in Scalable Algorithms for Large-scale Systems (ScalA)*, Denver, CO, USA, November 2013.
<http://dx.doi.org/10.1145/2530268.2530272>.
- [C18] Marat Dukhan and Richard Vuduc. Methods for high-throughput computation of elementary functions. In *Proc. 10th Int'l. Conf. Parallel Processing and Applied Mathematics (PPAM)*, September 2013.
- [C19] Sangmin Park, Mary Jean Harrold, and Richard Vuduc. Griffin: Grouping suspicious memory-access patterns to improve understanding of concurrency bugs. In *Proc. Int'l. Symp. Software Testing and Analysis (ISSTA)*, Lugano, Switzerland, July 2013.
 Acceptance rate: [32/124=25.8%].
- [C20] Jee Choi, Dan Bedard, Rob Fowler, and Richard Vuduc. A roofline model of energy. In *Proc. IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS)*, Boston, MA, USA, May 2013.

This paper is a short peer-reviewed conference version of the following technical report: <https://smartech.gatech.edu/xmlui/handle/1853/45737>.

Acceptance rate: [106/494=21.5%].

<http://dx.doi.org/10.1109/IPDPS.2013.77>.

- [C21] Kenneth Czechowski and Richard Vuduc. A theoretical framework for algorithm-architecture co-design. In *Proc. IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS)*, Boston, MA, USA, May 2013.

Acceptance rate: [106/494=21.5%].

<http://dx.doi.org/10.1109/IPDPS.2013.99>.

- [C22] William B. March, Kenneth Czechowski, Marat Dukhan, Thomas Benson, Dongryeol Lee, Andrew J. Connolly, Richard Vuduc, Edmond Chow, and Alexander G. Gray. Optimizing the computation of n-point correlations on large-scale astronomical data. In *Proc. ACM/IEEE Conf. Supercomputing (SC)*, November 2012.

Acceptance rate: [100/472=21.2%].

<http://dl.acm.org/citation.cfm?id=2389097>.

- [C23] Aparna Chandramowliswaran, Jee Whan Choi, Kamesh Madhuri, and Richard Vuduc. Towards a communication optimal fast multipole method and its implications for exascale. In *Proc. ACM Symp. Parallel Algorithms and Architectures (SPAA)*, Pittsburgh, PA, USA, June 2012.

Brief announcement.

<http://dx.doi.org/10.1145/2312005.2312039>.

- [C24] Kenneth Czechowski, Chris McClanahan, Casey Battaglini, Karthik Iyer, P.-K. Yeung, and Richard Vuduc. On the communication complexity of 3D FFTs and its implications for exascale. In *Proc. ACM Int'l. Conf. Supercomputing (ICS)*, San Servolo Island, Venice, Italy, June 2012.

Acceptance rate: [36/161=22.4%].

<http://dx.doi.org/10.1145/2304576.2304604>.

- [C25] Dongryeol Lee, Richard Vuduc, and Alexander G. Gray. A distributed kernel summation framework for general-dimension machine learning. In *Proc. SIAM Int'l. Conf. Data Mining (SDM)*, Anaheim, CA, USA, April 2012.

Winner, Best Paper.

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

- [C26] 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.

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

<http://dx.doi.org/10.1109/ICST.2012.85>.

- [C27] 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.

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

<http://www.cc.gatech.edu/~chou3/ProgramInversion.pdf>.

- [C28] Jaewoong Sim, Aniruddha Dasgputa, Hyesoon Kim, and Richard Vuduc. 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.
Acceptance rate: [26/175=14.9%].
<http://dx.doi.org/10.1145/2145816.2145819>.

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3.5 WORKSHOP PUBLICATIONS (REFEREED)

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New '17-'18 Item

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 Acceptance rate: [23/46=50%].
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Winner, Best Paper.
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- [W27] 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.
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3.6 OTHER PUBLICATIONS (NON-REFEREED)

[O1] Ioakeim Perros, Evangelos E. Papalexakis, Fei Wang, Richard Vuduc, Elizabeth Searles, Michael Thompson, and Jimeng Sun. SPARTan: Scalable PARAFAC2 for large and sparse data, March 2017.
[arXiv:1703.04219](https://arxiv.org/abs/1703.04219).

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[O2] Ioakeim Perros, Robert Chen, Richard Vuduc, and Jimeng Sun. Sparse hierarchical Tucker factorization and its application to healthcare. Technical Report arXiv:1610.07722, October 2016.
Extended version of a conference short paper.
<https://arxiv.org/abs/1610.07722>.

[O3] Marat Dukhan, Richard Vuduc, and Jason Riedy. Wanted: Floating-point add round-off error instruction. arXiv:1603.00491, March 2016.
<http://arxiv.org/abs/1603.00491>.

[O4] 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>.

[O5] 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 power-tunable single-source shortest path algorithm. **Invited keynote** for the 2nd International Workshop on Deepening Performance Models for Automatic Tuning (DPMAT), August 2017.
<http://www.abc-lib.org/Workshop/DPMAT2017.html>.

New '17-'18 Item

[T2] How much time, energy, and power does my algorithm need? **Invited talk** for the Texas A&M University Computer Engineering and Systems Group (CESG) Seminar, April 2017.
<http://hpcgarage.org/aggies>.

New '17-'18 Item

[T3] How much time, energy, and power does my algorithm need? **Invited talk** for University of Alabama, Birmingham, Dept. of Computer and Information Sciences Seminar, September 2016.
<http://hpcgarage.org/uab>.

- [T4] How much time, energy, and power does my algorithm need? **Invited keynote** at the International Symposium on Memory Systems (MEMSYS, memsys.io), October 2016.
<http://hpcgarage.org/memsys16>.
- [T5] High-speed data analysis through specialization. **Panelist**, HPC “Power Users,” Georgia Tech HPC External Advisory Group Meeting, May 2016.
<http://hpcgarage.org/eag>.
- [T6] How much time, energy, and power does my algorithm need? **Invited talk** at the University of California, Irvine, April 2016.
<http://hpcgarage.org/uci>.
- [T7] How much time, energy, and power does my algorithm need? **Invited talk** at the University of Texas at Austin, March 2016.
<http://hpcgarage.org/longhorns>.
- [T8] Performance understanding. **Invited talk** at SPPEXA’16, January 2016.
<http://hpcgarage.org/sppexa16>.
- [T9] Is there life after Moore? **Invited keynote** at Post-Moore Computing Workshop in Japan, December 2015.
<http://hpcgarage.org/jppm15/>.
- [T10] On algorithmic time, energy, and power. **Invited keynote** at the 11th Workshop on High-Performance, Power-Aware Computing (HPPAC), at IPDPS’15, March 2015.
<http://hpcgarage.org/ipdps15>.
- [T11] Computer science aspects of the fast multipole method. **Featured Minisymposium Talk** at the SIAM Meeting on Computational Science and Engineering (CSE), March 2015.
<http://hpcgarage.org/cse15>.
- [T12] A roofline model of energy. Platform for Advanced Scientific Computing (PASC) meeting, June 2014.
<http://hpcgarage.org/pasc14/>.
- [T13] (position talk) execution under a power constraint is about optimal control. **Invited panelist** at the High-Performance, Power-Aware Computing (HPPAC) Workshop at IPDPS’14, May 2014.
<http://hpcgarage.org/hppac14/>.
- [T14] On the time, energy, and power to execute an algorithm. **Invited keynote** at the SIAM Conference on Parallel Processing for Scientific Computing (SIAM PP), February 2014.
<http://www.siam.org/meetings/pp14/>.
- [T15] Performance engineering practice. Invited talk at the IEEE VIS Workshop on Visualization and Analysis of Performance of Large-scale Software, October 14 2013.
<http://hpcgarage.org/vapls13>.
<http://www.sci.utah.edu/vapls2013>.

- [T16] Generalized roofline analysis? Dagstuhl Seminar 13401: Automatic application autotuning for HPC architectures, September 30–October 4 2013.
<http://hpcgarage.org/13401>; http://drops.dagstuhl.de/opus/volltexte/2014/4423/pdf/dagrep_v003_i009_p214_s13401.pdf.
<http://www.dagstuhl.de/en/program/calendar/semhp/?semnr=13401>.
- [T17] How much (execution) time, energy, and power will my algorithm cost? **Invited keynote** at the Int'l. Conf. Parallel Processing and Applied Mathematics (PPAM), September 8–11 2013.
<http://hpcgarage.org/ppam13>.
<http://ppam.pl/>.
- [T18] Generalized roofline analysis. Invited talk at ModSim: the US Department of Energy Workshop on Modeling and Simulation of Exascale Systems and Applications, September 18–19 2013.
<http://hpcgarage.org/modsim13>.
<http://hpc.pnl.gov/modsim/2013/>.
- [T19] Can (your) algorithms inform architectures? Invited talk at Examath: The US Department of Energy Applied Mathematics Research for Exascale Computing, August 2013.
<http://hpcgarage.org/examath13/>.
<https://collab.mcs.anl.gov/display/examath>.
- [T20] What do first principles of algorithms and architectures say about hybrid systems? **Invited keynote** at the 3rd Int'l. Wkshp. Accelerators and Hybrid Exascale Systems (AsHES), May 2013.
<http://hpcgarage.org/ashes2013/>.
<http://www.mcs.anl.gov/events/workshops/ashes/2013>.
- [T21] 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.
<http://nkl.cc.u-tokyo.ac.jp/VECPAR2012>.
- [T22] A theory for co-designing algorithms and architectures under power and chip-area constraints. Invited talk at the Young and Bright HPC Researchers session, International Supercomputing Conference (ISC), Hamburg, Germany, June 17–21 2012.
<http://www.isc-events.com/isc12/>.
- [T23] Will exascale computing *really* require new algorithms and programming models? **Invited panelist** at the IEEE Int'l. Parallel and Distributed Processing Symposium (IPDPS), Shanghai, China, May 2012.
<http://ipdps.org>.
- [T24] How might algorithms inform architectures at exascale? **Invited keynote** at the Scalable Hierarchical Algorithms for Extreme Computing (SHAX-C) Workshop, King Abdullah University of Science and Technology (KAUST), Saudi Arabia, April 28–

30 2012.

<http://vuduc.org/talks/2012-SHAX-C/>.

- [T25] A theory of co-design? **Invited keynote** at the Partnership for Advanced Computing in Europe (PRACE) Future Technologies Workshop, Dansbury, UK, April 11 2012.
<http://vuduc.org/talks/2012-PRACE/>.
- [T26] 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.
<http://icerm.brown.edu/tw12-1-exascale>.
- [T27] Balance principles for algorithm-architecture co-design. ECE Seminar, Carnegie Mellon University, October 27 2011.
- [T28] 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/>.
- [T29] 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>.
- [T30] 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/session/dsp_programsess.cfm?SESSIONCODE=12156.
- [T31] 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/>.
- [T32] Performance principles and practice. Invited talk at the Int'l. Supercomputing Conference (ISC), Hamburg, Germany, June 19–23 2011.
<http://www.supercomp.de/isc11>.
- [T33] 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>.
- [T34] Performance principles and practice. Supercomputing Interest Community Seminar, IBM TJ Watson Laboratory, Yorktown Heights, NY, USA, May 6 2011.

- [T35] Performance principles and practice. **Invited talk** at the Salishan Conference on High-Speed Computing, sponsored by the US Dept. of Energy, Glendon, OR, USA, April 25–28 2011.
<http://www.lanl.gov/orgs/hpc/salishan/>.
- [T36] Performance engineering of a petascale blood flow simulator. Invited seminar at the University of California, Berkeley, April 21 2011.
- [T37] 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.*
- [T38] 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>.
- [T39] 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.
- [T40] 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>.
- [T41] 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/>.
- [T42] 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>.
- [T43] 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>.
- [T44] 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/>.

- [T45] Parallel n-body solvers: Lessons learned in the multicore/many-core era. Yahoo! Labs, Bangalore, India, January 2010.
- [T46] 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.
- [T47] 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>.
- [T48] 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.
- [T49] Recent progress in autotuning. Intel Corporation, Hudson, MA, USA, August 2008.
- [T50] 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>.
- [T51] Tuning sparse matrix-vector multiply for multicore. Courant Institute, New York University, USA, April 2008.
- [T52] Tuning sparse matrix-vector multiply for multicore. Oak Ridge National Laboratory, Oak Ridge, TN, USA, April 2008.
- [T53] 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.
- [T54] 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.

- [T55] 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/>.
- [T56] OSKI: A library of automatically tuned sparse matrix kernels. Kyōtō University, Japan, October 2006.
- [T57] Automatically tuned sparse matrix kernels. High-Performance Computing Seminar, Pomona College, USA, September 2006.
- [T58] The Optimized Sparse Kernel Interface. Bay Area Scientific Computing Day, Livermore, CA, USA, March 2006.
<https://computation.llnl.gov/casc/workshops/bascd/2006/>.
- [T59] 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>.
- [T60] Automatically tuned sparse matrix kernels. University of Rome, Tor Vegata, Italy, July 2005.

3.8 RESEARCH PROPOSALS AND GRANTS — PRINCIPAL INVESTIGATOR (PI) OR CO-PI

3.8.1 *Approved and Funded*

1. FASTER, SMALLER, AND MORE ENERGY-EFFICIENT INFERENCE USING CODEBOOK-BASED QUANTIZATION AND FPGAs
PI: Richard Vuduc
Co-PIs: Jeffrey Young (CS+CSE), Michael Isaev (CS)
Facebook: [Caffe2 Research Award Competition](#)
September 2017 *New '17-'18 Item*
Awarded: \$40k
2. CDS&E: SUPERSTARLU–STACKED, ACCELERATED ALGORITHMS FOR SPARSE LINEAR SYSTEMS
PI: Jeffrey Young (CS+CSE)
Co-PIs: Jason Riedy (CSE), Richard Vuduc
National Science Foundation, [Award 1710371](#)
August 2017–July 2020 *New '17-'18 Item*
Awarded: \$500,000
3. A PRACTICAL LOWER-BOUND ON THE EXECUTION TIME OF CERTAIN STENCIL KERNELS
PI: Richard Vuduc
Co-PI: Jeffrey Young (CS+CSE)
ExxonMobil
July 2017–June 2018 *New '17-'18 Item*
Awarded: \$92k

4. POST-GPU ARCHITECTURES AND SOFTWARE FOR TENSOR COMPUTATIONS
 PI: Richard Vuduc
 Co-PI: Jeffrey Young (CS+CSE)
 Sandia National Laboratories, LDRD subcontract
 October 2016–October 2018
 Awarded: \$184k
5. PFI:BIC: NEXT GENERATION REAL-TIME DISTRIBUTED MANUFACTURING SERVICE SYSTEMS USING DIGITAL PROCESS PLANNING AND GPU-ACCELERATED PARALLEL COMPUTING
 PI: Thomas Kurfess (ME)
 Co-PIs: Francis Durso (Psychology), Christopher Saldana (ME), Cassandra Telenko (ME), Richard Vuduc
 National Science Foundation, [Award 1631803](#)
 September 2016–August 2019
 Awarded: \$1 million
6. EAGER-DYNAMICDATA: POWER AWARE DATA DRIVEN DISTRIBUTED SIMULATION ON MICRO-CLUSTER PLATFORMS
 PI: Richard Fujimoto
 Co-PIs: Richard Vuduc, Michael Hunter (CEE)
 National Science Foundation, [EAGER-DynamicData, Award 1462503](#)
 September 2015–August 2017
 Requested: \$300,000 over 2 years; Awarded: \$240,000 over 2 years
7. EAGER: SCALING UP MACHINE LEARNING WITH VIRTUAL MEMORY
 PI: Polo Chau
 Co-PIs: Richard Vuduc
 National Science Foundation, [Award 1551614](#)
 September 2015–August 2017
 Requested: \$184,904 over 1 year; Awarded: \$184,904 1 year
8. XPS: FULL: DSD: A PARALLEL TENSOR INFRASTRUCTURE (PARTII) FOR DATA ANALYSIS
 PI: Richard Vuduc
 Co-PI: Jimeng Sun
 National Science Foundation, [Exploiting Parallelism and Scalability \(XPS\), Award 1533768](#)
 August 2015–July 2019
 Requested: \$1 million over 4 years; Awarded: \$750,000 over 4 years
9. COLLABORATIVE RESEARCH: EMBRACE: EVOLVABLE METHODS FOR BENCHMARKING REALISM THROUGH APPLICATION AND COMMUNITY ENGAGEMENT
 PI: David A. Bader & Jack Dongarra (UTK)
 Co-PIs: E. J. Riedy, Richard Vuduc, Piotr Luszczek (UTK)
 National Science Foundation, [Benchmarks of Realistic Scientific Application Performance \(BRAP\) of Large-scale Computing Systems, Award 1535058](#)
 August 2015–July 2018
 Requested: \$500,000 over 2 years; Awarded: \$250,000 over 2 years

10. SHF: SMALL: HOW MUCH EXECUTION TIME, ENERGY, AND POWER DOES AN ALGORITHM NEED?
 PI: Richard Vuduc (CoC/CSE)
 National Science Foundation, [Award 1422935](#)
 June 2014–May 2018

11. VANCOUVER2: VANCOUVER2: IMPROVING PROGRAMMABILITY OF CONTEMPORARY HETEROGENEOUS ARCHITECTURES
 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
 June 2014–May 2017

12. SI2-SSI: COLLABORATIVE: THE XSCALA PROJECT: A COMMUNITY REPOSITORY FOR MODEL-DRIVEN DESIGN AND TUNING OF DATA-INTENSIVE APPLICATIONS FOR EXTREME-SCALE ACCELERATOR-BASED SYSTEMS
 PI: David A. Bader (CoC/CSE)
 Co-PIs: Viktor Prasanna (University of Southern California), Edward J. Riedy (CoC/CSE), Richard Vuduc (CoC/CSE)
 National Science Foundation, [Award 1339745](#)
 October 2013–September 2018

13. XPS:CLCCA: OPTIMIZING HETEROGENEOUS PLATFORMS FOR UNSTRUCTURED PARALLELISM
 PI: Sudha Yalamanchili (CoE/ECE)
 Co-PIs: Hyesoon Kim (CoC/CS), Richard VUduc (CoC/CSE)
 National Science Foundation, [Award 1337177](#)
 September 2013–August 2016

14. CPS: SYNERGY: CONVERTING MULTI-AXIS MACHINE TOOLS INTO SUBTRACTIVE 3D PRINTERS BY USING INTELLIGENT DISCRETE GEOMETRY DATA STRUCTURES DESIGNED FOR PARALLEL AND DISTRIBUTED COMPUTING
 PI: Thomas Kurfess (CoE/ME)
 Co-PI: Richard Vuduc (CoC/CSE)
 National Science Foundation, [Award 1329742](#)
 September 2013–August 2016

15. A NEW THEORY OF ALGORITHM-ARCHITECTURE CO-DESIGN
 PI: Richard Vuduc
 Defense Advanced Research Projects Agency, [DARPA-BAA-11-34](#) (I2O Office-wide)
 Computer Science Study Group, Phase 3 option
 December 2012–December 2014

16. 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

17. COMPILER-SUPPORT FOR REVERSE COMPUTATION

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

18. 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

19. 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

20. 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

21. CAREER: AUTOTUNING FOUNDATIONS FOR EXASCALE SYSTEMS

PI: Richard Vuduc
 National Science Foundation, [Award 0953100](#)
 June 2010–May 2014

22. 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

23. AUTOTUNING APPLICATIONS FOR EMERGING MULTICORE PLATFORMS
 PI: Richard Vuduc
 Co-PI: Chi-Keung Luk (Intel Corporation)
 2009–2010
24. 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), Hye-
 soon Kim (CoC/CS), Richard Vuduc (CoC/CSE)
 National Science Foundation, [Award 0934114](#)
 August 2009–July 2010
25. FROM ALGORITHMS TO HARDWARE: BLUEPRINTS TO SUPPORT CO-
 OPERATIVE HARDWARE/SOFTWARE PREFETCHING IN DATA-INTENSIVE
 APPLICATIONS
 Co-PIs: Hyesoon Kim, Richard Vuduc
 Raytheon Faculty Fellowship
 August 2009–May 2010
26. 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
27. QAMELEON: HARDWARE/SOFTWARE CO-OPERATIVE AUTOMATED TUN-
 ING 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
28. 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
29. 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

3.9 RESEARCH HONORS AND AWARDS

1. May 2015: Winner, Best paper (software track) at the IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS).
2. April 2013: Lockheed Martin Excellence in Teaching Award
3. April 2012: Winner, Best Paper at the SIAM Conference on Data Mining (SDM)
4. November 2010: Winner, Gordon Bell Prize at ACM/IEEE Conf. Supercomputing (SC)
5. April 2010: College of Computing's Outstanding Junior Faculty Research Award
6. April 2010: Winner, Best paper (software track) at the IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS).
7. January 2010: NSF CAREER Awardee.
8. November 2009: Finalist, Best paper at SC
9. November 2009: Winner, R&D 100 Award for ROSE (joint with Lawrence Livermore National Laboratory)
10. April 2009: Panelist, DARPA Computer Science Study Panel (CSSP). One of twelve panelists selected nationally among untenured US citizen professors.
11. July 2006: Winner, Best paper at Parallel and Distributed Testing and Debugging (PADTAD)
12. September 2004: Winner, Best paper at Int'l. Conf. Parallel Processing (ICPP)
13. 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)
14. June 2002: Winner, Best student paper at Workshop on Performance Optimization of High-level Languages and Libraries, joint with ICS
15. November 2002: Finalist, Best student paper at SC
16. 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. 2018–2020, Chair (elected), Society for Industrial and Applied Mathematics, Activity Group on Supercomputing (SIAM/SC)
2. 2016–2018, Vice Chair (elected), Society for Industrial and Applied Mathematics, Activity Group on Supercomputing (SIAM/SC)
3. 2015–present, Executive Committee, Newsletter Editor, Association of Computing Machinery (ACM) Special Interest Group on High-Performance Computing (ACM SIGHPC)
4. 2010–2012, Secretary (elected), Society for Industrial and Applied Mathematics, Activity Group on Supercomputing (SIAM/SC)
5. Member, ACM
6. Member, SIAM
7. Member, Institute of Electrical and Electronics Engineers (IEEE)
8. Member, USENIX Association

4.1.2 *Journals*

1. Associate Editor, IEEE Transactions on Parallel and Distributed Systems (TPDS), 2015–2017
2. Associate Editor, International Journal of High-Performance Computing Applications (IJHPCA), 2012–present
3. Guest Co-editor, International Journal of High-Performance Computing Applications (IJHPCA), special issue on Autotuning, doi:10.1177/1094342013495303, 2013

4.1.3 *Conference Committee Activities*4.1.3.1 *Conferences*

1. Program Committee, Platform for Advanced Scientific Computing (PASC) Conference, 2018
2. Program Committee, SIAM Workshop on Combinatorial Scientific Computing, 2018
3. Panels Vice-Chair, ACM/IEEE Conf. Supercomputing (SC), 2018

*New '17-'18 Item**New '17-'18 Item**New '17-'18 Item*

4. Program Committee, Post-Moore's Era Supercomputing (PMES) Workshop, 2017 *New '17-'18 Item*
5. Program Committee, IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS), Applications track, 2017 *New '17-'18 Item*
6. Ph.D. Forum Committee, Int'l. Supercomputing Conference (ISC), 2017 *New '17-'18 Item*
7. Research Posters Committee, Int'l. Supercomputing Conference (ISC), 2017 *New '17-'18 Item*
8. Program Co-Chair, IEEE CLUSTER, 2017 *New '17-'18 Item*
9. Program Committee, Post-Moore's Era Supercomputing (PMES) Workshop, 2016
10. Technical Papers Vice-Chair,¹ ACM/IEEE Conf. Supercomputing (SC), 2016
11. Co-chair, SIAM Conf. Parallel Processing (SIAM PP), 2016
12. Program Committee, International Conference on Parallel Processing (ICPP), 2016
13. Tutorials Co-chair,² ACM/IEEE Conf. Supercomputing (SC), 2015
14. General co-chair, IEEE Int'l. Symposium on Workload Characterization (IISWC), 2015
15. Program Committee, ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC), 2015
16. Program Committee Track Chair, IEEE Cluster, "Applications, Algorithms, and Performance" track, 2015
17. Program Committee, IEEE/ACM Symp. on Cluster, Cloud, and Grid Computing (CCGrid), Programming Models and Runtime Systems area, 2015
18. Program Committee, NSF eXtreme Science and Engineering Discovery Environment Conference (XSEDE), Technology track, 2014
19. Program Committee, IEEE/ACM Symp. on Cluster, Cloud, and Grid Computing (CCGrid), Doctoral symposium, 2014
20. Program Committee, ACM/IEEE Conf. Supercomputing (SC), Programming systems track, 2014
21. Program Committee, ACM/IEEE Conf. Supercomputing (SC), Workshops track, 2014
22. Program Committee, ACM/IEEE Conf. Supercomputing (SC), Doctoral Showcase, 2014

¹ Together with Lois McInnes Curfman (Argonne National Laboratory), we implemented double-blind review for SC'16.

² Together with CJ Newburn (then at Intel), we implemented online distribution of tutorial notes for SC'15.

23. Program Committee, Int'l. Mtg. High-Performance Computing for Computational Sci. (VECPAR), 2014
24. Workshop and Tutorials Committee Co-Chair, ACM Int'l. Conf. Supercomputing (ICS), 2013
25. Program Committee Track Co-Chair, ACM/IEEE Conf. Supercomputing (SC), 2013
26. Program Committee Co-Chair, ACM SIGPLAN Symp. Principles and Practice of Parallel Programming (PPoPP), 2013
27. Program Committee, Int'l. Green Computing Conference (IGCC), 2013
28. Program Committee, ACM/IEEE Conf. Supercomputing (SC), Performance track, 2012
29. Program Committee, Int'l. Wkshp. Modern Accelerator Technologies for GIScience (MAT4GIScience), 2012
30. Program Committee, Int'l. Conf. Parallel Processing (ICPP), Performance track, 2012
31. Program Committee, IEEE Int'l. Parallel and Distributed Processing Symp. (IPDPS), Algorithms track, 2012
32. PhD Forum Committee, IPDPS, 2012
33. Program Committee, SIAM Conf. Parallel Processing (SIAM PP), 2012
34. Program Committee, Int'l. Conf. High-Performance Computing (HiPC), Software track, 2011
35. Program Committee, Workshop on GPU Computing, at Int'l. Conf. Parallel Processing and Applied Mathematics (PPAM), 2011
36. Program Committee, ACM Student Research Competition and Poster Session at the ACM Int'l. Conf. Supercomputing (ICS), 2011
37. Program Committee, SC, Performance track, 2011
38. Program Committee, IPDPS, Software track, 2011
39. PhD Forum Committee, IPDPS, 2011
40. Program Committee, IEEE/ACM Int'l. Symp. Code Generation and Optimization (CGO), 2011
41. Program Committee, HiPC, 2010
42. Program Committee, SC, Applications track, 2010
43. Program Committee, Conf. Partitioned Global Address Space (PGAS) Programming Models, 2010
44. Program Committee, Int'l. Mtg. High-Performance Computing for Computational Sci. (VECPAR), 2010

45. Program Committee, ACM Int'l. Conf. Computing Frontiers (CF), 2010
46. Program Committee, PPOPP, 2010
47. Program Committee, SC, Applications track, 2009
48. Program Committee, Int'l. Conf. High-Performance Computing (HiPC), 2008
49. Program Committee, IEEE Int'l. Conf. Computational Sci. Eng. (CSE), 2008
50. Poster Committee, SC, 2005

4.1.3.2 Workshops

1. Program Co-Chair, The 13th Workshop on High-Performance, Power-Aware Computing (HPPAC), 2017 *New '17-'18 Item*
2. Co-organizer, The 1st Workshop on Evolvable Methods for Benchmarking Realism and Community Engagement (EMBRACE), 2017 *New '17-'18 Item*
3. Program Committee, Int'l. Wkshp. Automatic Performance Tuning (iWAPT), 2013–2017 *New '17-'18 Item*
4. Co-organizer, Workshop on Power and Energy Aspects of Computing (PEAC), 2013, 2015
5. Program Chair, Int'l. Wkshp. Automatic Performance Tuning (iWAPT), 2012
6. Program Chair, Concurrent Collections (CnC) Workshop, 2011
7. Program Committee, High-Performance Scientific Software at EuroPar, 2011
8. Program Committee, USENIX Wkshp. Hot Topics in Parallelism (HotPar), 2011
9. Vice Program Chair, iWAPT, 2011
10. Program Committee, International Workshop on Multicore Software Engineering at ACM/IEEE Int'l. Conf. Software Eng., 2011
11. Program Committee, Workshop on Application/Architecture Co-design for Extreme-scale Computing at IEEE Cluster, 2010
12. Organizing Committee, Concurrent Collections Workshop at LCPC, 2010
13. Program Committee, iWAPT, 2010
14. Program Committee, IEEE Int'l. Symp. Workload Characterization (IISWC), 2010
15. Local Organizing Chair, IISWC, 2010

16. Steering Committee, Wkshp. Statistical Machine Learning applied to ARchitecture and compilaTion (SMART), 2010
17. Program Committee, HotPar, 2010
18. Program Committee, iWAPT, 2009
19. Program Committee, SMART, 2008
20. Program Committee, iWAPT, 2008
21. Program Committee, IEEE Int'l. Wkshp. Parallel and Distributed Scientific and Eng. Computing (PDSEC), 2008
22. Program Committee, iWAPT, 2007
23. Program Committee, Wkshp. Performance Optimization of High-level Languages and Libraries (POHLL), 2007
24. Program Committee, SMART, 2007
25. Program Committee, POHLL, 2006

4.1.3.3 *Workshop and External Course Organization*

1. Co-organizer, Minisymposium on Energy-aware High-Performance Computing, SIAM Parallel Processing (PP), Feb. 2012
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
3. Co-organizer, Tutorial on Performance analysis and tuning for GPGPUs, at the IEEE Int'l. Symp. High Performance Computer Architecture (HPCA), Feb. 2011
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

1. CSE, Qualifying Exam Committee, CoC, 2008–2018 AY. *New '17-'18 Item*
2. CoC CS Graduate Curriculum Committee, 2015–2018 AY. *New '17-'18 Item*
3. CoC Undergraduate Curriculum Committee, 2015–2018 AY. *New '17-'18 Item*
4. College of Computing Dean Review Committee, 2015.
5. Data Science and Engineering Faculty Council, 2014–2015 AY.
6. CoC Dean's Advisory Committee, 2014–2015 AY.
7. CoC Undergraduate Curriculum Committee, 2014–2015 AY.
8. CETL TA Awards Selection Committee, 2014.
9. Associate Chair for Academic Affairs, CSE, 2013–2015 AY.
10. Director of Graduate Programs, CSE, 2013–2016 AY.
11. Brooks Byers Professorships Committee, 2013–2014 AY.
12. CSE Awards Committee Chair, CoC, 2012–2013 AY.
13. CoC Awards Committee Member, 2012–2013 AY.
14. CoC MOOMS Committee Member, 2012–2013 AY.
15. CSE Chair Search Committee Member, 2012–2013 AY.
16. CSE Seminar Co-organizer, CoC, 2012–2013 AY.
17. CSE School Advisory Committee (SAC), CoC, 2011–2012 AY. Committee, (SAC), CoC, 2011–2012 Academic Year (AY).
18. CSE, Space Planning Committee, CoC, 2011–2012 AY.
19. CSE, Graduate Admissions and Recruiting Committee, CoC, 2010–2011 Academic Year (AY).
20. Undergraduate Curriculum Advisory Committee on Parallel Computing, College of Computing (CoC), 2009–2010 AY.
21. CSE Chair Advisory Committee, CoC, 2009–2010 AY.
22. Computer Science (CS) PhD Recruiting Weekend Committee, CoC, 2008–2009 AY.
23. CSE Review of the Chair Committee, CoC, 2008–2009 AY.
24. CSE Faculty Recruiting Committee (FRC), CoC, 2008–2009 AY.
25. Faculty Computer Committee (FCC), CoC, 2008–2009 AY.
26. CSE PhD Admissions Committee, CoC, 2008–2009 AY.
27. CS PhD Admissions Committee, CoC, 2008–2009 AY.
28. CSE Chair Advisory Committee, CoC, 2008–2009 AY.

29. CSE FRC, CoC, 2008–2009 AY.
30. CSE PhD Admissions Committee, 2007–2008 AY.
31. CS PhD Admissions Committee, 2007–2008 AY.
32. Teaching Assistanceship Requirement Grandfathering Committee, CoC. 2007–2008 AY.
33. FCC, CoC, 2007–2008 AY.
34. Awards Committee, CoC, 2007–2008 AY.

4.3 MEMBER OF PH.D. EXAMINING COMMITTEES

1. Qi GE – Advisor: John WISE
CoS/Physics, Thesis Defense, Spring 2018 *New '17-'18 Item*
2. Anirban CHATTERJEE – Advisor: Yichang (James) TSAI
CoE/CSE-CEE, Qualifying Exam, Spring 2018 *New '17-'18 Item*
3. Patrick LAVIN – Co-advisors: Richard VUDUC and Jeff YOUNG
CoC/CSE, Qualifying Exam, Spring 2018 *New '17-'18 Item*
4. Srinivas ESWAR – Co-advisors: Richard VUDUC and Haesun PARK
CoC/CSE, Qualifying Exam, Spring 2018 *New '17-'18 Item*
5. Mark JACKSON – Advisor: Richard FUJIMOTO
CoC/CSE, Qualifying Exam, Spring 2018 *New '17-'18 Item*
6. Jiajia LI – Advisor: Richard VUDUC
CoC/CSE, Thesis Proposal, Spring 2018 *New '17-'18 Item*
7. Jordi WOLFSON-POU – Advisor: Edmond CHOW
CoC/CS, Qualifying Exam, Fall 2017 *New '17-'18 Item*
8. Siddharth BISWAL – Advisor: Jimeng SUN
CoC/CS, Qualifying Exam, Fall 2017 *New '17-'18 Item*
9. Sungtae AN – Advisor: Jimeng SUN
CoC/CS, Qualifying Exam, Fall 2017 *New '17-'18 Item*
10. Lluís MUNGUÍA – Advisor: David BADER
CoC/CSE, Thesis Defense, Fall 2017 *New '17-'18 Item*
11. Chao CHEN – Advisor: Greg EISENHAUER
CoC/CS, Qualifying Exam, Fall 2017 *New '17-'18 Item*
12. Yuanzheng ZHU – Advisor: Cyrus AIDUN
CoE/ME, Thesis Proposal, Fall 2017 *New '17-'18 Item*
13. SaBra NEAL – Advisor: Richard FUJIMOTO
CoC/CSE, Thesis Proposal, Fall 2017 *New '17-'18 Item*
14. Nagakishore JAMMULA – Advisor: Srinivas ALURU
CoC/CSE, Thesis Proposal, Fall 2017 *New '17-'18 Item*

15. Girish MURURU – Advisor: Santosh PANDE
CoC/CS, Qualifying Exam, Fall 2017 *New '17-'18 Item*
16. Muyuan LI – Advisor: Ken BROWN
CoC/CSE/Chem, Qualifying Exam, Fall 2017 *New '17-'18 Item*
17. Xin XING – Advisor: Edmond CHOW
CoS/CSE/Math, Qualifying Exam, Spring 2017 *New '17-'18 Item*
18. Chao SHI – Advisor: John WISE
CoS/Physics, Thesis Defense, Spring 2017 *New '17-'18 Item*
19. Tony PAN – Advisor: Srinivas ALURU
CoC/CSE, Thesis Proposal, Spring 2017 *New '17-'18 Item*
20. Lifeng NAI – Advisor: Hyesoon KIM
CoC/CS, Thesis Defense, Fall 2016
21. Joo Hwan LEE – Advisor: Hyesoon KIM
CoC/CS, Thesis Defense, Fall 2016
22. Anshuman GOSWAMI – Advisor: Karsten SCHWAN and Matthew WOLF (GT/ORNL)
CoC/CS, Thesis Defense, Fall 2016
23. Eric ANGER – Advisor: Sudha YALAMANCHILI
CoE/ECE, Thesis Defense, Fall 2016
24. Jin WANG – Advisor: Sudha YALAMANCHILI
CoE/ECE, Thesis Defense, Fall 2016
25. Marat DUKHAN – Advisor: Richard VUDUC
CoC/CS, Thesis Proposal, Fall 2016
26. Caleb ROBINSON – Advisor: Bistra DILKINA
CoC/CSE, Qualifying Exam, Fall 2016
27. Jordi WOLFSON-POU – Advisor: Edmond CHOW
CoC/CSE, Qualifying Exam, Fall 2016
28. Rahul NIHALANI – Advisor: Srinivas ALURU
CoC/CSE, Thesis Proposal, Fall 2016
29. Ankit SRIVASTAVA – Advisor: Srinivas ALURU
CoC/CSE, Qualifying Exam, Fall 2016
30. Mohammad HOSSAIN – Advisor: Richard VUDUC
CoC/CS, Thesis Defense, Fall 2016
31. Piyush SAO – Advisor: Richard VUDUC
CoC/CSE, Thesis Proposal, Fall 2016
32. Philip PECHER – Advisor: Richard FUJIMOTO
CoE/CSE-ISyE, Thesis Proposal, Fall 2016
33. Syed Minhaj HASSAN – Advisor: Sudha YALAMANCHILI
CoE/ECE, Thesis Defense, Fall 2016

34. Chris FORSTER – Advisor: Marc SMITH
CoE/ME, Thesis Defense, Summer 2016
35. Matthew KINSEY – Advisor: Pablo LAGUNA
CoS/Physics, Thesis Defense, Summer 2016
36. Dipanjan SENGUPTA – Advisor: Karsten SCHWAN / Matthew WOLF
CoC/CS, Thesis Defense, Summer 2016
37. James FAIRBANKS – Advisor: David BADER
CoC/CSE, Thesis Defense, Spring 2016
38. Tushar KUMAR – Advisor: Sudha YALAMANCHILI
CoE/ECE, Thesis Defense, Spring 2016
39. Ramakrishnan (Ramki) KANNAN – Advisor: Haesun PARK
CoC/CS, Thesis Defense, Spring 2016
40. Haicheng WU – Advisor: Sudha YALAMANCHILI
CoE/ECE, Thesis Defense, Spring 2016
41. Jai DAYAL – Advisor: Karsten SCHWAN / Matthew WOLF
CoC/CS, Thesis Proposal, Spring 2016
42. Joo Hwan LEE – Advisor: Hyesoon KIM
CoC/CS, Thesis Proposal, Spring 2016
43. Anshuman GOSWAMI – Advisor: Karsten SCHWAN / Matthew WOLF
CoC/CS, Thesis Proposal, Spring 2016
44. Jin WANG – Advisor: Sudha YALAMANCHILI
CoC/ECE, Thesis Proposal, Spring 2016
45. Eric ANGER – Advisor: Sudha YALAMANCHILI
CoC/ECE, Thesis Proposal, Spring 2016
46. Parsa BANIHASHEMI – Advisor: Kenneth WILL
CoE/CEE, Thesis Defense, Fall 2015
47. Naila FAROOQUI – Advisor: Karsten SCHWAN
CoC/CS, Thesis Defense, Fall 2015
48. Brian RAILING – Advisor: Tom CONTE
CoC/CS, Thesis Defense, Fall 2015
49. Ryan CURTIN – Advisor: Mark CLEMENTS
CoE/ECE, Thesis Defense, Summer 2015
50. Aaron HOWELL – Advisor: Cyrus AIDUN
CoE/ME, Thesis Defense, Spring 2015
51. Indranil ROY – Advisor: Srinivas ALURU
CoC/CSE, Thesis Defense, Spring 2015
52. Jee Whan CHOI – Advisor: Richard VUDUC
CoE/ECE, Thesis Defense, Spring 2015

53. Xing LIU – Advisor: Edmond CHOW
CoC/CSE, Thesis Defense, Fall 2014
54. Naila FAROOQUI – Advisor: Karsten SCHWAN
CoC/CS, Thesis Proposal, Fall 2014
55. Parsa BANIHASHEMI – Advisor: Kenneth WILL
CoE/CEE, Thesis Proposal, Fall 2014
56. Nagesh B. LAKSHMINARAYANA – Advisor: Hyesoon KIM
CoE/ECE, Thesis Defense, Fall 2014
57. Sangmin PARK – Advisor: Mary Jean HARROLD & Richard VUDUC
CoC/CS, Thesis Defense, Summer 2014
58. Kaushik RAVICHANDRAN – Advisor: Santosh PANDE
CoC/CS, Thesis Defense, Summer 2014
59. Indranil ROY – Advisor: Srinivas ALURU
CoC/CSE, Thesis Proposal, Spring 2014
60. Kartik IYER – Advisor: P.-K. YEUNG
CoC/AE, Thesis Defense, Spring 2014
61. Seongcheol BAEK – Advisor: Jongman KIM
CoE/ECE, Thesis Defense, Spring 2014
62. Vipin SACHDEVA – Advisor: David BADER
CoC/CSE, Thesis Proposal, Spring 2014
63. Zhaoming YIN – Advisor: David BADER
CoC/CSE, Thesis Defense, Spring 2014
64. Xing LIU – Advisor: Edmond CHOW
CoC/CSE, Thesis Proposal, Spring 2014
65. Oded GREEN – Advisor: David BADER
CoC/CSE, Thesis Defense, Spring 2014
66. Fang ZHENG – Advisor: Karsten SCHWAN
CoC/CS, Thesis Defense, Spring 2014
67. Yu TOMITA – Advisor: Ken BROWN
CoS/CSE-CHEM, Thesis Defense, Spring 2014
68. Ryan CURTIN – Advisor: Alex GRAY
CoE/ECE, Thesis Proposal, Spring 2014
69. Aaron HOWELL, College of Engineering, School of Mechanical
Engineering
Thesis Proposal, Fall 2013
Advisor: Cyrus AIDUN (CoC/ME)
70. Philip PECHER, College of Engineering, School of Industrial and
Systems Engineering
Qualifying Exam (CSE-ISyE), Fall 2013
Advisor: Richard FUJIMOTO

71. Aftab PATEL, College of Computing, School of Computational Science and Engineering
Qualifying Exam, Fall 2013
Advisor: Edmond CHOW
72. Lluís MUNGUÍA, College of Computing, School of Computational Science and Engineering
Qualifying Exam, Fall 2013
Advisor: David A. BADER
73. Jane KANG, College of Engineering, School of Mechanical Engineering
Thesis Proposal, Fall 2013
Advisor: Cyrus AIDUN
74. Junghee LEE, College of Engineering, School of Electrical and Computer Engineering
Thesis Proposal, Fall 2013
Advisor: Jongman KIM
75. James FAIRBANKS, College of Computing, School of Computational Science and Engineering
Qualifying Exam, Fall 2013
Advisor: David A. BADER
76. Nagesh LAKSHMINARAYANA, College of Computing, School of Computer Science
Thesis Proposal, Fall 2013
Advisor: Hyesoon KIM (CoC/CS)
77. Hana STRAKOVA, University of Vienna
Thesis Defense, Fall 2013
Advisor: Wilfried GANSTERER
78. Fang ZHENG, College of Computing, School of Computer Science
Thesis Defense, Summer 2013
Advisor: Karsten SCHWAN (CoC/CSE)
79. William MARCH, CoC, CSE
Thesis Defense, Spring 2013
Advisor: Alexander GRAY (CoC/CSE)
80. Ryan RIEGEL, College of Computing, School of Computational Science and Engineering
Thesis Defense, Spring 2013
Advisor: Alexander GRAY (CoC/CSE)
81. Chris FORSTER, College of Engineering, School of Mechanical Engineering
Thesis Proposal, Spring 2013
Advisor: Marc SMITH (CoE/ME)
82. Kaushik RAVICHANDRAN, College of Computing, School of Computer Science
Thesis Proposal, Spring 2013
Advisor: Santosh PANDE (CoC/CSE)

83. Zhaoming YIN, College of Computing, School of Computational Science and Engineering
Thesis Proposal, Spring 2013
Advisor: David BADER (CoC/CSE)
84. Da KUANG, College of Computing, School of Computational Science and Engineering
Thesis Proposal, Spring 2013
Advisor: Haesun PARK (CoC/CSE)
85. Aparna CHANDRAMOWLISHWARAN, College of Engineering, School of Electrical and Computer Engineering
Thesis Defense, Spring 2013
Advisor: Richard VUDUC (CoC/CSE)
86. Cong HOU, College of Engineering, School of Electrical and Computer Engineering
Thesis Defense, Spring 2013
Advisor: Richard VUDUC (CoC/CSE)
87. Oded GREEN, College of Computing, School of Computational Science and Engineering
Thesis Proposal, Spring 2013
Advisor: David BADER (CoC/CSE)
88. David EDIGER, College of Engineering, School of Electrical and Computer Engineering
Thesis Defense, Spring 2013
Advisor: David BADER (CoC/CSE)
89. Sooraj BHAT, College of Computing, School of Computer Science
Thesis Defense, Spring 2013
Advisor: Alexander G. GRAY (CoC/CSE)
90. Nan DU, College of Computing, School of Computational Science and Engineering (CSE)
Qualifying Exam, Spring 2013
Advisor: Le SONG (CoC/CSE)
91. Marat DUKHAN, College of Computing, School of Computational Science and Engineering (CSE)
Qualifying Exam, Spring 2013
Advisor: Richard VUDUC (CoC/CSE)
92. Anita ZAKRZEWSKA, CoC, CSE
Qualifying Exam, Spring 2012
Advisor: David A. BADER (CoC/CSE)
93. Kartik IYER, College of Engineering (CoE), Aerospace Engineering (AE)
Thesis Proposal, Fall 2012
Advisor: P.-K. YEUNG (CoE/AE)
94. Ying LI, College of Computing, Computational Science and Engineering (CSE)

- Thesis Defense, Fall 2012
Advisor: Richard FUJIMOTO (CoC/CSE)
95. Sunpyo HONG, CoE, Electrical and Computer Engineering (ECE)
Thesis Defense, Fall 2012
Advisor: Hyesoon KIM (CoC/CS)
96. Dongryeol LEE, CoC/CSE
Thesis Defense, Spring 2012
Advisor: Alexander GRAY (CoC/CSE)
97. Abtin RAHIMIAN, CoC, CSE
Thesis Defense, Spring 2012
Advisor: George BIROS (CoC/CSE; UT Austin)
98. Oded GREEN, CoC, CSE
Qualifying Exam, Spring 2012
Advisor: David A. BADER (CoC/CSE)
99. Oguz KAYA, CoC, CSE
Qualifying Exam, Spring 2012
Advisor: Edmond CHOW (CoC/CSE)
100. Kenneth CZECHOWSKI, CoC, CSE
Qualifying Exam, Spring 2012
Advisor: Richard VUDUC (CoC/CSE)
101. Raghul GUNASEKARAN, CoC, CSE
Qualifying Exam, Spring 2012
Advisor: Richard VUDUC (CoC/CSE)
102. Liangda LI, CoC, CSE
Qualifying Exam, Spring 2012
Advisor: Haesun PARK (CoC/CSE)
103. Nitin ARORA, College of Engineering (CoE), Aerospace Engineering (AE)
Thesis Defense, Fall 2011
Advisor: Ryan RUSSELL (CoE/AE)
104. Bo XIAO, CoC, CSE
Qualifying Exam, Fall 2011
Advisor: George BIROS (CoC/CSE + CoC/Biomedical Engineering (BME))
105. Sangho LEE, CoC, Computer Science (CS)
Qualifying Exam, Fall 2011
Advisor: Santosh PANDE (CoC/CS)
106. Kaushik RAVICHANDRAN, CoC, CS
Qualifying Exam, Fall 2011
Advisor: Santosh PANDE (CoC/CS)
107. Jingfang LIU, College of Science, Mathematics
Qualifying Exam, Fall 2011
Advisor: Haomin ZHOU (CoS/Math)

108. Cong HOU, CoC, CS
Qualifying Exam, Summer 2011
Advisor: Richard VUDUC (CoC/CSE)
109. Asif SALAHUDDIN, CoE, Mechanical Engineering (ME)
Thesis Proposal, Summer 2009
Thesis Defense, Summer 2011
Advisor: Cyrus AIDUN (CoC/ME)
110. Jaswanth SREERAM, CoC, CS
Thesis Proposal, Spring 2011
Advisor: Santosh PANDE (CoC/CS)
111. Abtin RAHIMIAN, CoC, CSE
Thesis Proposal, Spring 2011
Advisor: George BIROS (CoC/CSE + CoE/BME)
112. Pushkar PANDE, CoC, CSE
Qualifying Exam, Spring 2011
Advisor: David BADER (CoC/CSE)
113. Xing LIU, CoC, CSE
Qualifying Exam, Spring 2011
Advisor: David BADER (CoC/CSE)
114. George VULOV, CoC, CSE
Qualifying Exam, Spring 2011
Advisor: Richard FUJIMOTO (CoC/CSE), Richard VUDUC (co-advisor,
CoC/CSE)
115. Sangmin PARK, CoC, CS
Qualifying Exam, Fall 2010
Advisor: Mary Jean HARROLD (CoC/CS), Richard VUDUC (co-advisor,
CoC/CSE)
116. Jiang BIAN, CoC, CSE
Thesis Proposal, Spring 2010
Advisor: Hongyuan ZHA (CoC/CSE)
117. Dongryeol LEE, CoC, CSE
Thesis Proposal, Spring 2010
Advisor: Alexander GRAY (CoC/CSE)
118. Sooraj BHAT, CoC, CS
Thesis Proposal, Spring 2010
Advisor: Alexander GRAY (CoC/CSE)
119. William MARCH, CoC, CSE
Qualifying Exam, Spring 2010
Advisor: Alexander GRAY (CoC/CSE)
120. Murat Efe GUNAY, CoE, Civil Engineering (CE)
Thesis Proposal, Summer 2009
Thesis Defense, Spring 2010
Advisor: Kenneth WILLS (CoE/CE)

121. Aparna CHANDRAMOWLISHWARAN, CoC, CSE
Qualifying Exam, Fall 2009
Advisor: Richard VUDUC (CoC/CSE)
122. Mingxuan SUN, CoC, CS
Qualifying Exam, Fall 2009
Advisor: Guy LEBANON
123. Parikshit RAM, CoC, CS
Qualifying Exam, Fall 2009
Advisor: Alexander GRAY
124. Virat AGARWAL, CoC, CSE
Thesis Proposal, Summer 2009
Advisor: David BADER
125. 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)
126. Steven P. CRAIN, CoC, CSE
Qualifying Exam, Spring 2009
Advisor: Hongyuan ZHA (CoC/CSE)
127. Haw-Jing "Michael" Lo, CoE, 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)
128. Jaegul CHOO, CoC, CSE
Qualifying Exam, Spring 2009
Advisor: Haesun PARK (CoC/CSE)
129. Rahul SAMPATH, CoC, CSE
Thesis Proposal, Spring 2009
Advisor: George BIROS (CoC/CSE + CoE/BME)
130. Manisha GAJBE, CoC, CS
Qualifying Exam, Spring 2009
Advisor: David BADER (CoC/CSE)
131. Hasan ABBASI, CoC, CS
Thesis Proposal, Spring 2009
Advisor: Karsten SCHWAN (CoC/CS)
132. Dongreol LEE, CoC, CS
Qualifying Exam, Fall 2008
Advisor: Alexander GRAY (CoC/CSE)
133. Ryan RIEGEL, CoC, CS
Qualifying Exam, Spring 2008
Advisor: Alexander GRAY (CoC/CSE)

134. Alfred PARK, CoC, CS
Ph.D. Thesis: Master/worker parallel discrete event simulation
Advisor: Richard FUJIMOTO (CoC/CSE)
135. Kamesh MADDURI, CoC, CS
Ph.D. Thesis: A high-performance framework for analyzing massive complex networks
Advisor: David BADER (CoC/CSE)
136. 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. Oguz KAYA – Advisors: Yves ROBERT and Bora UCAR
ENS-Lyon, Thesis Defense, Fall 2017 *New '17-'18 Item*
2. Richard VERAS – Advisor: Franz FRANCHETTI
Carnegie Mellon University / ECE, Thesis Defense, Summer 2017 *New '17-'18 Item*
3. Amir GHOLAMI – Advisor: George BIROS
University of Texas at Austin / ICES, Thesis Defense, Summer 2017 *New '17-'18 Item*
4. Victoria Caparros CABEZAS – Advisor: Markus PÜSCHEL
ETH Zürich, Thesis Defense, Fall 2016
5. Richard VERAS – Advisor: Franz FRANCHETTI
Carnegie Mellon University / ECE, Thesis Proposal, Spring 2016
6. 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. Thuy Vy NGUYEN – Advisor: Richard FUJIMOTO
CoC/CSE, MS Thesis Proposal, Summer 2017 *New '17-'18 Item*
2. Daniel R. BROWNE, CoE, AE
Summer 2011
Thesis: Enabling collaborative behaviors among CubeSats
Advisor: Ryan RUSSELL (CoE/AE)
3. Sundaresan Venkatasubramanian, CoC, CS
Spring 2009
Thesis: Tuned and wildly asynchronous algorithms for hybrid CPU/GPU platforms
Advisor: Richard VUDUC

4. Rick Quax, CoC, CS
Fall 2008
Thesis: Modeling and simulating the propagation of infectious diseases using complex networks
Advisor: David BADER
5. Amrita Mathuriya, CoC, CS
Fall 2008
Thesis: GTfold: A scalable multicore code for RNA secondary prediction
Advisor: David BADER

4.6 RESEARCH PROJECT REVIEWER

1. The Partnership for Advanced Computing in Europe (PRACE), 2017 *New '17-'18 Item*
2. The Netherlands Organisation for Scientific Research (NWO), Technology Foundation STW, 2016
3. Inria (French National Institute for Computer Science and Applied Mathematics), 2016
4. Department of Energy, 2016
5. National Science Foundation, 2016
6. Department of Energy, 2015, 2016
7. National Science Foundation, 2015
8. Department of Energy, 2014
9. National Science Foundation, 2014
10. National Science Foundation, 2013
11. Department of Energy, 2012
12. National Science Foundation, 2012
13. National Science Foundation, 2011
14. Department of Energy, 2010
15. Department of Energy, 2009
16. National Science Foundation, 2008

4.7 OTHER REVIEWING ACTIVITIES

1. Reviewer for the ACM SIGHPC / Intel Fellowships in Computational and Data Science, 2017–2018 *New '17-'18 Item*
2. Reviewer for the ACM SIGHPC / Intel Fellowships in Computational and Data Science, 2016–2017

4.8 CIVIC AND OTHER ACTIVITIES

1. Judge, Georgia Science and Engineering Fair, 2013
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

1. Invited participant, US National Academy of Engineering Frontiers of Engineering (US NAE-FOE) Symposium, September 2015

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

5.2 INVITED PANEL SPEAKER

1. Panel on Career Networking for the [SC16 Early Career Program](#), 2016
2. Panel on Career Networking for the [SC15 Early Career Program](#), 2015
3. Panel on [High-Performance Power-Aware Computing \(HPPAC\)](#) at [IPDPS](#), Phoenix, AZ, USA, May 2014
4. Birds-of-a-Feather Session on [Community MOOCs for Computing Technologies and Applications](#), at [SC](#), Denver, CO, USA, November 2013
5. Panel on Algorithms at [IPDPS](#), Shanghai, China, May 2012
6. Panel on Communication and Synchronization Primitives, US Dept. of Energy (DOE), Advanced Scientific Computing Research (ASCR), [Workshop on Exascale Programming Challenges](#), July 2011.
7. Panel on AMD Fusion-like Processors in HPC, AMD Fusion Developers' Summit, June 2011.

8. 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.
9. Panel on New HPC-Challenge Benchmark Candidates, Georgia Tech, November 2008.

5.3 REVIEWER WORK FOR TECHNICAL PUBLICATIONS

5.3.1 *Books and book proposals*

1. MIT Press, 2015.
2. CRC Press, 2008, 2010–2014, 2016–2017.
3. John Wiley & Sons, 2013.

5.3.2 *Journals*

1. ACM Transactions on Parallel Computing (TOPC), 2013, 2014.
2. International Journal on High Performance Computing Applications (IJHPCA), 2002, 2004, 2009, 2011, 2013, 2014.
3. SIAM J. Scientific Computing (SISC), 2008, 2009, 2011, 2012, 2014, 2015, 2016.
4. IEEE Trans. Par. Distrib. Sys. (TPDS), 2009, 2010, 2011, 2012.
5. ACM Trans. Architecture and Code Optimization (ACM TACO), 2009, 2012.
6. J. Parallel Computing (ParCo), 2008, 2009.
7. ACM Trans. Mathematical Software (ACM-TOMS), 2008.
8. J. Parallel and Distributed Computing (JPDC), 2008, 2010.
9. Software: Practice and Experience, 2008.
10. Concurrency and Computation: Practice and Experience (CC:PE), 2007.
11. Parallel Processing Letters, 2004.
12. Proc. IEEE, 2004.
13. J. Functional Programming (JFP), 2001.

5.3.3 *Conferences and Workshops*

1. Innovative Parallel Computing Conference (InPar), 2012
2. ACM SIGPLAN Symp. Principles and Practice of Parallel Programming (PPoPP), 2011, 2012

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.