

John Douglas Owens

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RESEARCH INTERESTS Computer systems; parallel computing, general-purpose computation on graphics hardware / GPU computing, parallel algorithms and data structures, graphics architectures, parallel architectures and programming models.

EDUCATION **Stanford University** Stanford, California
Department of Electrical Engineering 1995–2003
Ph.D., Electrical Engineering, January 2003
M.S., Electrical Engineering, March 1997
Advisors: Professors William J. Dally and Pat Hanrahan
Dissertation Topic: “Computer Graphics on a Stream Architecture”

University of California, Berkeley Berkeley, California
Department of Electrical Engineering and Computer Sciences 1991–1995
B.S., Highest Honors, Electrical Engineering and Computer Sciences, June 1995

EXPERIENCE **University of California, Davis** Davis, California
Child Family Professor of Engineering and Entrepreneurship 2014–
Associate Professor 2008–2014
Assistant Professor 2003–2008
Professor in the Department of Electrical and Computer Engineering; member of Graduate Groups of Electrical and Computer Engineering, Computer Science, and Applied Mathematics. Visiting Scientist, Lawrence Berkeley National Laboratory. Visiting Scientist, Los Alamos National Laboratory.

Twitter San Francisco, California
Software Engineer (Sabbatical) July–December 2012
Engineer in Core System Libraries group in Twitter’s Runtime Systems division.

Stanford University Stanford, California
Research Assistant 1997–2002
An architect of the Imagine Stream Processor under the direction of Professor William J. Dally. Responsible for major portions of hardware and software design for Imagine and its tools and applications.

Stanford University Stanford, California
Teaching Assistant Fall 2001
Teaching assistant for Computer Science 99S, “The Coming Revolution in Computer Architecture”, under Professor William J. Dally. Designed course with Professor Dally, including lecture topics, readings, and laboratories.

Interval Research Corporation Palo Alto, California
Consultant 1997–2000
Investigated new graphics architectures under the direction of Dr. Matt Regan.

Stanford University Stanford, California
Research Assistant 1995–1997
Under the direction of Professor Pat Hanrahan, designed and built the Lightning distributed

framebuffer.

Silicon Studio, Silicon Graphics Inc. Mountain View, California
Software Engineer Summer 1995
Performed development work on SGI's Firewalker video-game authoring system, mastering game titles to game platforms.

University of California, Berkeley Berkeley, California
Teaching Assistant Spring 1995
Teaching assistant for Computer Science 150, "Digital Design", under Professor Richard Newton. Responsible for laboratory section, office hours, grading, and midterm review.

Intel Corporation, P7 Architecture Group Santa Clara, California
Design Engineer Summer 1994
Designed and implemented graphical user interface to Intel's Sphinx microarchitecture simulator.

First Person Inc. (subsidiary of Sun Microsystems Inc.) Palo Alto, California
Hardware Designer Summer 1993
Assisted in design of NTSC SBus-compatible framebuffer.

ViewStar Corporation Emeryville, California
Quality Assurance Engineer Summer 1992
Tested and debugged ViewStar's Document Management System.

Oracle Corporation Redwood Shores, California
Technical Staff Summer 1991
Tested and debugged Oracle for Macintosh.

**REFEREED
PUBLICATIONS**

Pinar Muyan-Özçelik and John D. Owens. "Methods for Multitasking among Real-time Embedded Compute Tasks Running on the GPU". *Concurrency and Computation: Practice and Experience*, 29(5), August 2017.

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Yangzihao Wang, Sean Baxter, and John D. Owens. "Mini-Gunrock: A Lightweight Graph Analytics Framework on the GPU". In *Graph Algorithms Building Blocks*, GABB 2017, pages 616–626. May 2017.

Saman Ashkiani, Andrew A. Davidson, Ulrich Meyer, and John D. Owens. "GPU Multisplit: an extended study of a parallel algorithm". *ACM Transactions on Parallel Computing*, 2017.

Yangzihao Wang, Yuechao Pan, Andrew Davidson, Yuduo Wu, Carl Yang, Leyuan Wang, Muhammad Osama, Chenshan Yuan, Weitang Liu, Andy T. Riffel, and John D. Owens. "Gunrock: GPU Graph Analytics". *ACM Transactions on Parallel Computing*, 2017.

Jonathan Y. Kemal, Roger L. Davis, and John D. Owens. "Multidisciplinary simulation acceleration using multiple shared memory graphical processing units". *International Journal of High Performance Computing Applications*, 30(4):486–508, November 2016.

Ross K. Gegan, Vishal Ahuja, John D. Owens, and Dipak Ghosal. “Real-Time GPU-based Timing Channel Detection using Entropy”. In *Proceedings of the IEEE Conference on Communications and Network Security*, CNS 2016, pages 296–305. October 2016.

Jeremy Kepner, Peter Aaltonen, David Bader, Aydın Buluç, Franz Franchetti, John Gilbert, Dylan Hutchison, Manoj Kumar, Andrew Lumsdaine, Henning Meyerhenke, Scott McMillan, Jose Moreira, John D. Owens, Carl Yang, Marcin Zalewski, and Timothy Mattson. “Mathematical Foundations of the GraphBLAS”. In *Proceedings of the IEEE High Performance Extreme Computing Conference*. September 2016.

Leyuan Wang, Sean Baxter, and John D. Owens. “Fast Parallel Skew and Prefix-Doubling Suffix Array Construction on the GPU”. *Concurrency and Computation: Practice & Experience*, 28(12):3466–3484, 25 August 2016.

Saman Ashkiani, Nina Amenta, and John D. Owens. “Parallel Approaches to the String Matching Problem on the GPU”. In *Proceedings of the 28th ACM Symposium on Parallelism in Algorithms and Architectures*, SPAA 2016, pages 275–285. July 2016.

Mohamed S. Ebeida, Ahmad A. Rushdi, Muhammad A. Awad, Ahmed H. Mahmoud, Dong-Ming Yan, Shawn A. English, John D. Owens, Chandrajit L. Bajaj, and Scott A. Mitchell. “Disk Density Tuning of a Maximal Random Packing”. *Computer Graphics Forum*, 35(5):259–269, June 2016.

Leyuan Wang, Yangzihao Wang, Carl Yang, and John D. Owens. “A Comparative Study on Exact Triangle Counting Algorithms on the GPU”. In *Proceedings of the 1st High Performance Graph Processing Workshop*, HPGP ’16, pages 1–8. May 2016.

Saman Ashkiani, Andrew A. Davidson, Ulrich Meyer, and John D. Owens. “GPU Multisplit”. In *Proceedings of the 21st ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, PPOPP 2016, pages 12:1–12:13. March 2016.

Pınar Muyan-Özçelik and John D. Owens. “Multitasking Real-time Embedded GPU Computing Tasks”. In *Proceedings of the 7th International Workshop on Programming Models and Applications for Multicores and Manycores*, PMAM 2016, pages 78–87. March 2016.

Yangzihao Wang, Andrew Davidson, Yuechao Pan, Yuduo Wu, Andy Riffel, and John D. Owens. “Gunrock: A High-Performance Graph Processing Library on the GPU”. In *Proceedings of the 21st ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, PPOPP 2016, pages 11:1–11:12. March 2016. Distinguished Paper.

Mikhail M. Shashkov, Jason Mak, Shawn Recker, Connie Nguyen, John Owens, and Kenneth I. Joy. “Efficient Dense Reconstruction Using Geometry and Image Consistency Constraints”. In *Proceedings of the IEEE Applied Imagery Pattern Recognition Workshop*, AIPR 2015. October 2015.

Yuduo Wu, Yangzihao Wang, Yuechao Pan, Carl Yang, and John D. Owens. “Performance Characterization of High-Level Programming Models for GPU Graph Analytics”. In *IEEE International Symposium on Workload Characterization*, IISWC-2015, pages 66–75. October 2015. Best Paper finalist.

Anjul Patney, Stanley Tzeng, Kerry A. Seitz, Jr., and John D. Owens. “Piko: A Framework for Authoring Programmable Graphics Pipelines”. *ACM Transactions on Graphics*, 34(4):147:1–147:13, August 2015.

Leyuan Wang, Sean Baxter, and John D. Owens. “Fast Suffix Array on the GPU”. In *Euro-Par 2015: Proceedings of the 21st International European Conference on Parallel and Distributed Computing*, Lecture Notes in Computer Science, pages 573–587. Springer, August 2015. Distinguished Paper.

Carl Yang, Yangzihao Wang, and John D. Owens. “Fast Sparse Matrix and Sparse Vector Multiplication Algorithm on the GPU”. In *Graph Algorithms Building Blocks*, GABB 2015, pages 841–847. May 2015.

Thomas Weber, Michael Wimmer, and John D. Owens. “Parallel Reyes-style Adaptive Subdivision with Bounded Memory Usage”. In *Proceedings of the ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games*, i3D 2015, pages 39–45. February/March 2015.

Jonathan Kemal, Roger L. Davis, and John D. Owens. “Multidisciplinary Simulation Acceleration using Multiple Shared-Memory Graphical Processing Units”. In *AIAA Infotech @ Aerospace*, AIAA Science and Technology Forum. January 2015.

Mohamed Ebeida, Scott Mitchell, Anjul Patney, Andrew Davidson, Stanley Tzeng, Muhammad Awad, Ahmed Mahmoud, and John D. Owens. “Exercises in High-Dimensional Sampling: Maximal Poisson-disk Sampling and k -d Darts”. In Janine Bennett, Fabien Vivodtzev, and Valerio Pascucci, editors, *Topological and Statistical Methods for Complex Data – Tackling Large-Scale, High-Dimensional, and Multivariate Data Sets*, pages 221–238. Springer, November 2014.

Jason Mak, Mauricio Hess-Flores, Shawn Recker, John D. Owens, and Kenneth I. Joy. “A Comparative Study of Recent GPU-Accelerated Multi-View Sequential Reconstruction Triangulation Methods for Large-Scale Scenes”. In C. V. Jawahar and Shiguang Shan, editors, *Big Data in 3D Computer Vision (Computer Vision—ACCV 2014 Workshops)*, volume 9008 of *Lecture Notes in Computer Science*, pages 254–269. Springer International Publishing, November 2014.

Afton Geil, Yangzihao Wang, and John D. Owens. “WTF, GPU! Computing Twitter’s Who-To-Follow on the GPU”. In *Proceedings of the Second ACM Conference on Online Social Networks*, COSN ’14, pages 63–68. October 2014.

Andrew Davidson, Sean Baxter, Michael Garland, and John D. Owens. “Work-Efficient Parallel GPU Methods for Single Source Shortest Paths”. In *Proceedings of the 28th IEEE International Parallel and Distributed Processing Symposium*, IPDPS 2014, pages 349–359. May 2014.

Jason Mak, Mauricio Hess-Flores, Shawn Recker, John D. Owens, and Kenneth I. Joy. “GPU-Accelerated and Efficient Multi-View Triangulation for Scene Reconstruction”. In *Proceedings of the IEEE Winter Conference on Applications of Computer Vision*, WACV ’14, pages 61–68. March 2014.

Mohamed S. Ebeida, Anjul Patney, Scott A. Mitchell, Keith R. Dalbey, Andrew A. Davidson, and John D. Owens. “ k -d Darts: Sampling by k -Dimensional Flat Searches”. *ACM Transactions on Graphics*, 33(1):3:1–3:16, January 2014.

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Stanley Tzeng, Brandon Lloyd, and John D. Owens. “A GPU Task-Parallel Model with Dependency Resolution”. *IEEE Computer*, 45(8):34–41, August 2012.

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Andrew Davidson, David Tarjan, Michael Garland, and John D. Owens. “Efficient Parallel Merge Sort for Fixed and Variable Length Keys”. In *Proceedings of Innovative Parallel Computing*, InPar '12. May 2012.

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Andrew Davidson and John Owens. “Toward Techniques for Auto-tuning GPU Algorithms”. In Kristján Jónasson, editor, *Applied Parallel and Scientific Computing*, volume 7134 of *Lecture Notes in Computer Science*, pages 110–119. Springer Berlin / Heidelberg, February 2012.

Yao Zhang, John Ludd Recker, Robert Ulichney, Ingeborg Tastl, and John D. Owens. “Plane-dependent Error Diffusion on a GPU”. In *Proceedings of SPIE: IS&T/SPIE Electronic Imaging 2012 / Parallel Processing for Imaging Applications II*, volume 8295B, pages 8295B–59:1–10. January 2012.

Mohamed S. Ebeida, Anjul Patney, John D. Owens, and Eric Mestreau. “Isotropic conforming refinement of quadrilateral and hexahedral meshes using two-refinement templates”. *International Journal for Numerical Methods in Engineering*, 88(10):974–985, 9 December 2011.

Kshitij Gupta and John D. Owens. “Compute & Memory Optimizations for High-Quality Speech Recognition on Low-End GPU Processors”. In *Proceedings of the 2011 International Conference on High Performance Computing*, HiPC 2011. December 2011.

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Mark Silberstein, Assaf Schuster, and John D. Owens. “Applying Software-Managed Caching and CPU/GPU Task Scheduling for Accelerating Dynamic Workloads”. In Wen-mei W. Hwu, editor, *GPU Computing Gems*, volume 2, chapter 36, pages 501–517. Morgan Kaufmann, October 2011.

Jeff A. Stuart, Pavan Balaji, and John D. Owens. “Extending MPI to Accelerators”. In *Proceedings of the First Workshop on Architectures and Systems for Big Data*, ASBD 2011, pages 19–23. October 2011.

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John Jenkins, Isha Arkatkar, John D. Owens, Alok Choudhary, and Nagiza F. Samatova. “Lessons Learned from Exploring the Backtracking Paradigm on the GPU”. In *Euro-Par 2011: Proceedings of the 17th International European Conference on Parallel and Distributed Computing*, volume 6853 of *Lecture Notes in Computer Science*, pages 425–437. Springer, August/September 2011.

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Mohamed S. Ebeida, Anjul Patney, Scott A. Mitchell, Andrew Davidson, Patrick M. Knupp, and John D. Owens. “Efficient Maximal Poisson-Disk Sampling”. *ACM Transactions on Graphics*, 30(4):49:1–49:12, July 2011.

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Vladimir Glavtchev, Pınar Muyan-Özçelik, Jeffery M. Ota, and John D. Owens. “Feature-Based Speed Limit Sign Detection Using a Graphics Processing Unit”. In *Proceedings of the 2011 IEEE Intelligent Vehicles Symposium, IV '11*, pages 195–200. June 2011.

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Andrew Davidson, Yao Zhang, and John D. Owens. “An Auto-tuned Method for Solving Large Tridiagonal Systems on the GPU”. In *Proceedings of the 25th IEEE International Parallel and Distributed Processing Symposium, IPDPS 2011*, pages 956–965. May 2011.

Jeff A. Stuart and John D. Owens. “Multi-GPU MapReduce on GPU Clusters”. In *Proceedings of the 25th IEEE International Parallel and Distributed Processing Symposium, IPDPS 2011*, pages 1068–1079. May 2011.

Andrew Davidson and John D. Owens. “Register Packing for Cyclic Reduction: A Case Study”. In *Proceedings of the Fourth Workshop on General Purpose Processing on Graphics Processing Units, GPGPU-4*, pages 4:1–4:6. March 2011.

Pınar Muyan-Özçelik, Vladimir Glavtchev, Jeffery M. Ota, and John D. Owens. “Real-Time Speed-Limit-Sign Recognition on an Embedded System Using a GPU”. In Wen-mei W. Hwu, editor, *GPU Computing Gems*, volume 1, chapter 32, pages 497–516. Morgan Kaufmann, February 2011.

Yao Zhang and John D. Owens. “A Quantitative Performance Analysis Model for GPU Architectures”. In *Proceedings of the 17th IEEE International Symposium on High-Performance Computer Architecture, HPCA-17*, pages 382–393. February 2011.

Shubhabrata Sengupta, Mark Harris, Michael Garland, and John D. Owens. “Efficient Parallel Scan Algorithms for many-core GPUs”. In Jakub Kurzak, David A. Bader, and Jack Dongarra, editors, *Scientific Computing with Multicore and Accelerators*, Chapman & Hall/CRC Computa-

tional Science, chapter 19, pages 413–442. Taylor & Francis, January 2011.

Yao Zhang, John Ludd Recker, Robert Ulichney, Giordano B. Beretta, Ingeborg Tastl, I-Jong Lin, and John D. Owens. “A Parallel Error Diffusion Implementation on a GPU”. In *Proceedings of SPIE: IS&T/SPIE Electronic Imaging 2011 / Parallel Processing for Imaging Applications*, volume 7872, pages 78720K:1–9. January 2011.

Pınar Muyan-Özçelik, Vladimir Glavtchev, Jeffery M. Ota, and John D. Owens. “A Template-Based Approach for Real-Time Speed-Limit-Sign Recognition on an Embedded System using GPU Computing”. In Michael Goesele, Stefan Roth, Arjan Kuijper, Bernt Schiele, and Konrad Schindler, editors, *DAGM 2010: Proceedings of the 32nd Annual Symposium of the German Association for Pattern Recognition*, volume 6376 of *Lecture Notes in Computer Science*, pages 162–171. Springer, September 2010.

Andrew Davidson and John D. Owens. “Toward Techniques for Auto-Tuning GPU Algorithms”. In *State of the Art in Scientific and Parallel Computing*, Para 2010. June 2010.

Anjul Patney, Stanley Tzeng, and John D. Owens. “Fragment-Parallel Composite and Filter”. *Computer Graphics Forum (Proceedings of the Eurographics Symposium on Rendering)*, 29(4):1251–1258, June 2010.

Everett H. Phillips, Roger L. Davis, and John D. Owens. “Unsteady Turbulent Simulations on a Cluster of Graphics Processors”. In *Proceedings of the 40th AIAA Fluid Dynamics Conference*, AIAA 2010-5036. June 2010.

Jeff A. Stuart, Cheng-Kai Chen, Kwan-Liu Ma, and John D. Owens. “Multi-GPU Volume Rendering using MapReduce”. In *Proceedings of the 19th ACM International Symposium on High Performance Distributed Computing / The First International Workshop on MapReduce and its Applications*, HPDC '10 / MAPREDUCE '10, pages 841–848. June 2010.

Stanley Tzeng, Anjul Patney, and John D. Owens. “Task Management for Irregular-Parallel Workloads on the GPU”. In *Proceedings of High Performance Graphics*, HPG '10, pages 29–37. June 2010.

Yao Zhang, Jonathan Cohen, and John D. Owens. “Fast Tridiagonal Solvers on the GPU”. In *Proceedings of the 15th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, PPOPP 2010, pages 127–136. January 2010.

Dan A. Alcantara, Andrei Sharf, Fatemeh Abbasi, Shubhabrata Sengupta, Michael Mitzenmacher, John D. Owens, and Nina Amenta. “Real-Time Parallel Hashing on the GPU”. *ACM Transactions on Graphics*, 28(5):154:1–154:9, December 2009.

Kshitij Gupta and John D. Owens. “Three-Layer Optimizations for Fast GMM Computations on GPU-like Parallel Processors”. In *Proceedings of the IEEE Workshop on Automatic Speech Recognition & Understanding*, ASRU 2009, pages 146–151. December 2009.

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Luke J. Gosink, Kesheng Wu, E. Wes Bethel, John D. Owens, and Kenneth I. Joy. “Data Parallel Bin-Based Indexing for Answering Queries on Multi-Core Architectures”. In *Proceedings of the 21st International Conference on Scientific and Statistical Database Management*, volume 5566 of *Lecture Notes in Computer Science*, pages 110–129. Springer, June 2009.

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Pinar Muyan-Özçelik, John D. Owens, Junyi Xia, and Sanjiv S. Samant. "Fast Deformable Registration on the GPU: A CUDA Implementation of Demons". In *Proceedings of the 2008 International Conference on Computational Science and Its Applications (First Technical Session on UnConventional High Performance Computing)*, UCHPC '08, pages 223–233. July 2008.

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Ujval J. Kapasi, William J. Dally, Brucek Khailany, John D. Owens, and Scott Rixner. “The Imagine Stream Processor”. In *Proceedings of the IEEE International Conference on Computer Design*, ICCD 2002, pages 282–288. Freiburg, Germany, September 2002.

John D. Owens, Brucek Khailany, Brian Towles, and William J. Dally. “Comparing Reyes and OpenGL on a Stream Architecture”. In *Proceedings of the ACM SIGGRAPH/EUROGRAPHICS Conference on Graphics Hardware*, GH '02, pages 47–56. September 2002.

John D. Owens, Ujval J. Kapasi, Peter Mattson, Brian Towles, Ben Serebrin, Scott Rixner, and William J. Dally. “Media Processing Applications on the Imagine Stream Processor”. In *Proceedings of the IEEE International Conference on Computer Design*, ICCD 2002, pages 295–302. Freiburg, Germany, September 2002.

Ben Serebrin, John D. Owens, Brucek Khailany, Peter Mattson, Ujval J. Kapasi, Chen H. Chen, Jinyung Namkoong, Stephen P. Crago, Scott Rixner, and William J. Dally. “A Stream Processor Development Platform”. In *Proceedings of the IEEE International Conference on Computer Design*, ICCD 2002, pages 303–308. Freiburg, Germany, September 2002.

Ujval J. Kapasi, Peter Mattson, William J. Dally, John D. Owens, and Brian Towles. “Stream Scheduling”. In *Proceedings of the 3rd Workshop on Media and Streaming Processors*, pages 101–106. Austin, TX, 2 December 2001.

Brucek Khailany, William J. Dally, Ujval J. Kapasi, Peter Mattson, Jinyung Namkoong, John D. Owens, Brian Towles, Andrew Chang, and Scott Rixner. “Imagine: Media Processing with Streams”. *IEEE Micro*, 21(2):35–46, March/April 2001.

Ujval J. Kapasi, William J. Dally, Scott Rixner, Peter R. Mattson, John D. Owens, and Brucek Khailany. “Efficient Conditional Operations for Data-parallel Architectures”. In *Proceedings of the 33rd Annual ACM/IEEE International Symposium on Microarchitecture*, MICRO-33, pages 159–170. December 2000.

Peter Mattson, William J. Dally, Scott Rixner, Ujval J. Kapasi, and John D. Owens. “Communication Scheduling”. In *Proceedings of the Ninth International Conference on Architectural Support for Programming Languages and Operating Systems*, ASPLOS-IX, pages 82–92. November 2000.

Brucek Khailany, William J. Dally, Scott Rixner, Ujval J. Kapasi, Peter Mattson, Jin Namkoong, John D. Owens, and Brian Towles. “Imagine: Signal and Image Processing Using Streams”. In *Hotchips 12*. August 2000.

John D. Owens, William J. Dally, Ujval J. Kapasi, Scott Rixner, Peter Mattson, and Ben Mowery. “Polygon Rendering on a Stream Architecture”. In *Proceedings of the ACM SIGGRAPH/Eurographics Workshop on Graphics Hardware*, HWWS ’00, pages 23–32. August 2000.

Scott Rixner, William J. Dally, Ujval J. Kapasi, Peter Mattson, and John D. Owens. “Memory Access Scheduling”. In *Proceedings of the 27th International Symposium on Computer Architecture*, ISCA-2000, pages 128–138. June 2000.

Scott Rixner, William J. Dally, Brucek Khailany, Peter Mattson, Ujval Kapasi, and John D. Owens. “Register Organization for Media Processing”. In *Proceedings of the Sixth Annual International Symposium on High-Performance Computer Architecture*, HPCA-6, pages 375–386. January 2000.

Scott Rixner, William J. Dally, Ujval J. Kapasi, Brucek Khailany, Abelardo Lopez-Lagunas, Peter Mattson, and John D. Owens. “A Bandwidth-Efficient Architecture for Media Processing”. In *Proceedings of the 31st Annual ACM/IEEE International Symposium on Microarchitecture*, MICRO-31, pages 3–13. December 1998.

OTHER PUBLICATIONS

Saman Ashkiani, Shengren Li, Martin Farach-Colton, Nina Amenta, and John D. Owens. “GPU LSM: A Dynamic Dictionary Data Structure for the GPU”. *CoRR*, abs/1707.05354(1707.05354v1), July 2017.

Kerry A. Seitz, Jr., Alex Kennedy, Owen Ransom, Bassam A. Younis, and John D. Owens. “A GPU Implementation for Two-Dimensional Shallow Water Modeling”. *CoRR*, abs/1309.1230(1309.1230v1), September 2013.

Stanley Tzeng and John D. Owens. “Finding Convex Hulls Using Quickhull on the GPU”. *CoRR*, abs/1201.2936(1201.2936v1), January 2012.

Jeff A. Stuart and John D. Owens. “Efficient Synchronization Primitives for GPUs”. *CoRR*, abs/1110.4623(1110.4623v1), October 2011.

Luke J. Gosink, Kesheng Wu, E. Wes Bethel, John D. Owens, and Kenneth I. Joy. “Bin-Hash Indexing: A Parallel Method For Fast Query Processing”. Technical Report LBNL-729E, Lawrence Berkeley National Laboratory, 20 August 2008.

Michael Kass, Aaron Lefohn, and John Owens. “Interactive Depth of Field Using Simulated Diffusion on a GPU”. Technical Report #06-01, Pixar Animation Studios, January 2006.

John D. Owens, Shubhabrata Sengupta, and Daniel Horn. “Assessment of Graphic Processing Units (GPUs) for Department of Defense (DoD) Digital Signal Processing (DSP) Applications”. Technical Report ECE-CE-2005-3, Department of Electrical and Computer Engineering, University of California, Davis, October 2005.

John D. Owens. “GPUs tapped for general computing”. *EE Times*, 13 December 2004.

John D. Owens. “On The Scalability of Sensor Network Routing and Compression Algorithms”. Technical Report ECE-CE-2004-1, Computer Engineering Research Laboratory, University of California, Davis, 2004.

Leo Szumel and John D. Owens. "On the Feasibility of the UC Davis Metanet". Technical Report ECE-CE-2003-2, Computer Engineering Research Laboratory, University of California, Davis, 2003.

John D. Owens. *Computer Graphics on a Stream Architecture*. Ph.D. thesis, Stanford University, November 2002.

Publication links are available at <http://www.ece.ucdavis.edu/~jowens/pubs.html>.

FUNDING

Adobe Systems Inc. Unrestricted gift. January 2017. \$7,500.

National Science Foundation (Award # DMS-1622501) *High-Performance, High-Level Tools for Statistical Inference and Unsupervised Learning*. Program: Computational and Data-Enabled Science and Engineering in Mathematical and Statistical Sciences. PI J. Owens; co-PIs J. Bezanson, J. Fisher, A. Edelman (MIT). 15 Sept. 2016–15 Sept. 2019. \$480,000 (total), \$164,612 (UCD).

National Science Foundation (Award # CCF-1637442) *Theory and implementation of dynamic data structures for the GPU*. Program: AitF—Algorithms in the Field. PI J. Owens; co-PI M. Farach-Colton (Rutgers). September 2016–August 2020. \$438,876 (UCD).

National Science Foundation (Award # CCF-1629657) *PARAGRAPH: Parallel, Scalable Graph Analytics*. XPS—Exploiting Parallelism & Scalability. PI P. Sadayappan (Ohio State); co-PIs J. Owens, S. Parthasarathy (Ohio State), L.-N. Pouchet (Ohio State). September 2016–August 2019. Proposed \$375,000 (UCD); funded at \$328,123.

Sandia National Laboratories. *Scalable Methods for High-Dimensional Numerical Integration and Uncertainty Quantification Problems*. 1 October 2015–30 September 2016. \$75,000.

Stratovan Corporation. Unrestricted gift. September 2015–March 2017. \$81,445.

Department of Defense Advanced Research Projects Agency (DARPA) SBIR SB152-004 ("Many-Core Acceleration of Common Graph Programming Frameworks"). PI G. Jayachandran (Onu Technology, Inc.), co-PI J. Owens. Funded directly as Phase II: award W911NF-16-C-0020. January 2016–December 2017. Total funding: \$1,399,583.

Adobe Digital Marketing Research Award. *Scaling Convex Optimization with GPUs*. PI J. Owens, co-PI S. Boyd (Stanford University). October 2014. \$50,000.

National Academy of Engineering Frontiers of Engineering Program, based on funding from The Grainger Foundation. *Parallel Matrix Factorization: Towards GPUs in the Data Center*. PI J. Owens, co-PI T. Sahai (United Technologies Research Center). 1 April 2014–31 May 2016. \$30,000.

Department of Defense Advanced Research Projects Agency (DARPA) STTR ST13B-004 ("Data-Parallel Analytics on Graphics Processing Units (GPUs)"). *A High-Level Operator Abstraction for GPU Graph Analytics*. PI E. Elsen (Royal Caliber LLC), co-PI J. Owens. Phase I: January–June 2014, award D14PC00023. \$70,000 (UCD: \$37,500). Phase II: 15 January 2015–31 March 2016, award D15PC00010. (UCD: \$370,000).

Department of Defense (XDATA program). *An XDATA Architecture for Federated Graph Models and Multi-Tier Asymmetric Computing*. October 2012–September 2017. Prime contractor: Sotera Defense Solutions, Inc., US Army award W911QX-12-C-0059 (prime contractor Oct. 2012–July 2013; SYSTAP LLC; prime contractor Aug. 2013–July 2016: L-3 Data Tactics). UCD funding: Oct. 2012–July 2013: \$74,230.37; Aug. 2013–Dec. 2013: \$119,443; Jan. 2014–Jan. 2016: \$629,203;

Aug. 2016–Sept. 2017: \$400,000.

Department of Energy, Sandia National Laboratories, Laboratory Directed Research and Development (LDRD) program. *Efficient Probability of Failure Calculations for QMU using Computational Geometry*. (Proposal No. 13-0144, award # 1292969). PI S. Mitchell (Sandia National Laboratories), co-PIs M. Ebeida, B. Adams, V. Romero, J. Owens. FY13–15 (22 October 2012–31 October 2014). \$1.6M (UCD portion \$120,000).

UC Lab Fees Research Program Award 12-LR-238449. *Probabilistic Algorithms for New Computer Architectures*. PI L. Monroe (Los Alamos National Laboratory), co-PIs J. Wendelberger (LANL), S. Michalak (LANL), J. Owens. July 2012–September 2015 (no-cost extension to September 2016). \$764,396.

Advanced Micro Devices (AMD). Unrestricted gift. June 2012. \$75,000.

National Science Foundation Supplemental Funding Request (high-school-student research supplement), *SHF:Small:Software Fundamentals for Manycore Systems* (award # 1017399, existing award # 1017399). PI J. Owens. Awarded June 2012. \$4800.

Intel Science and Technology Center for Visual Computing. PI P. Hanrahan (Stanford), theme leads M. Agrawala (Berkeley), D. James (Cornell), J. Owens (UC Davis), S. Seitz (Washington). 8 universities participating, ~30 PIs. January 2011–December 2015. \$15M over 5 years.

National Science Foundation (Award # OCI-1032859) *SDCI: HPC: Improvement: Infrastructure for Multi-Node Manycore Computing*. Office of Cyberinfrastructure. PI J. Owens. September 2010–August 2015. \$391,859.

National Science Foundation (Award # CCF-1017399) *SHF:Small:Software Fundamentals for Manycore Systems*. Division of Computer and Communication Foundations—Software and Hardware Foundations. PI J. Owens. August 2010–July 2015. \$499,825.

Center for Information Technology Research in the Interest of Society (CITRIS) seed funding grant *Computational Tools for River and Estuary Flow Prediction*. PI J. Owens, co-PI B. Younis. Fall 2010–Summer 2011. \$70,810.

National Science Foundation (Award # IIS-0964357) *HCC: Medium: Collaborative Research: Data-Parallel Hash Tables: Theory, Practice and Applications*. IIS—Human-centered Computing program. PI A. Amenta; co-PIs J. Owens, M. Mitzenmacher (Harvard). August 2010–July 2013. Proposed \$677,994 (UCD); funded at \$532,084.

Department of Defense / Air Force Office of Scientific Research Small Business Technology Transfer (STTR) Program. *Innovative CFD Algorithms, Libraries and Python Frameworks for Hybrid CPU-GPU Compute Architectures* (STTR Topic Number F09B-T18). PI: Dr. E.P.N. Duque (JMSI, Inc. / Intelligent Light). University PIs: J. Owens, R. Davis. \$30,000 (UCD). 1 April–20 December 2010.

Microsoft. Unrestricted gift. April 2010. \$30,000.

National Nuclear Security Administration (NNSA). *Real-Time Three-Dimensional Exploration of Wide-Area High-Resolution Aerial Video* (Award # SC09-PDP08-23). PI K. Joy, co-PI J. Owens. \$800,000.

HP Labs Innovation Research Program. *GPU Completeness: Computational Patterns and Analysis for GPU Computing*. \$70,457 in first year, \$70,000 for second year, \$18,800 for third year. Awarded

in June 2009, renewed in May 2010 and May 2011.

UCD 2009–2010 Committee on Research Small Grant in Aid Award. May 2009. \$2,000.

Intel Microprocessor Technology Labs, *Speech Recognition on Commodity Processors: GPGPU vs. Larrabee*. Unrestricted gift. \$50,000. August 2008–July 2009; renewed as grant (\$50,000), September 2009–September 2010.

UC MICRO proposal *Automotive Computing using the GPU* (award #08-57, tied to BMW, NVIDIA, and Rambus gifts dated March 2008). PI J. Owens. September 2008–December 2009. \$28,208.

BMW. Unrestricted gift. March 2008. \$25,000.

NVIDIA. Unrestricted gift. March 2008. \$25,000.

Rambus. Unrestricted gift. March 2008. \$15,000.

National Science Foundation Supplemental Funding Request (undergraduate research supplement), *Data Structures for Data-Parallel Architectures* (award # 0734164, existing award # 0541448). PI J. Owens. Awarded May 2007. \$6000.

UC Discovery Grant, Industry-University Cooperative Research Program, *Workshop on On- and Off-Chip Interconnection Networks for Multicore Systems* (award # COM06-324), PI J. Owens. \$15,000.

National Science Foundation (CCF), *Workshop on On-And Off-Chip Interconnection Networks for Multicore Systems* (award # 0644602), PI W. Dally, co-PI J. Owens, awarded August 2006. \$29,638.

Undergraduate Education in Parallel Architecture, NVIDIA Teaching Fellowship, Fall 2006. \$25,000.

A Common Software Interface for GPU Data Structures, Los Alamos National Laboratory. PI J. Owens. 15 July 2006–15 September 2006. \$32,663.

Department of Energy “Scientific Discovery through Advanced Computing” program. *SciDAC Institute for Ultra-Scale Visualization* (contract DE-FC02-06-ER25777). PI K.-L. Ma, co-PIs R. Ross, N. Max, H.-W. Shen, K. Moreland, J. Owens, J. Huang, G. Humphreys. 2006–2011. \$8,228,429.

UC MICRO proposal *Scientific Computing for Energy Technology Applications Using Graphics Hardware* (tied to Chevron gift dated October 2005). PI J. Owens. August 2006–December 2007. \$16,625.

Intel Corporation Grant: *CEEL: Computer Engineering Education Laboratories with Wireless Networking Extension at UC Davis*. 2006. PI C.-N. Chuah; co-PIs S. Ghiasi, J. Owens, P. Mohapatra, K. Wilken. \$95,254 (\$50,000 from Intel).

Chevron. Unrestricted gift. October 2005. \$20,000.

National Science Foundation (Award # CCF-0541448) *Data Structures for Data-Parallel Architectures*. Foundations of Computing Processes and Artifacts program. PI J. Owens. July 2006–June 2009. Proposed \$419,436; funded at \$200,000.

Lockheed-Martin (via DOD) *Assessment of GPUs for DoD DSP Applications*. PI J. Owens. June 2005–June 2006. \$50,000.

UC Davis–Los Alamos National Laboratory “Cooperative Agreement for Research and Education” (“CARE”) proposal *Solving the Multipass Partitioning Problem for Graphics Hardware*. PI J. Owens; co-PI P. McCormick, LANL. 1 October 2004–31 January 2005. \$54,708.

Chevron-Texaco. Unrestricted gift. September 2004. \$20,000.

UC MICRO proposal *Scientific Computing for Energy Technology Applications Using Graphics Hardware* (tied to ChevronTexaco gift dated December 2003). PI J. Owens. August 2004–December 2005. \$14,588.

Department of Energy Early Career Principal Investigator Award. *A Programming Framework for Scientific Applications on CPU-GPU Systems*. PI J. Owens. 3 years, 15 August 2004–15 August 2007, granted two one-year no-cost extensions. \$300,000.

Los Alamos National Laboratory. *GPU/MPP Investigations*. PI J. Owens, summer 2004. \$18,000.

Chevron-Texaco. Unrestricted gift. December 2003. \$20,000.

UCD Faculty Research Grant Program. *The UC Davis Metanet: A Scalable, Ubiquitous, Extensible Framework for Sensor Networks*. PI J. Owens. August 2003 (for 2003–2004 academic year). \$14,000.

UCD New Faculty Research Grant. *Client-Side Computation using Graphics Hardware for Video-conferencing and Immersive Environments*. PI J. Owens. January 2003. \$4000.

PATENTS

US 7589719. “Fast Multi-pass Partitioning via Priority Based Scheduling”. John Douglas Owens, Andy Riffel, Aaron Lefohn, Mark Leone, and Kiril Vidimce. Issued 15 September 2009.

US 7100026: “System and Method for Performing Efficient Conditional Vector Operations for Data Parallel Architectures.” William J. Dally, Scott Rixner, John D. Owens, and Ujval J. Kapasi. Issued 29 August 2006.

US 6269435: “System and method for implementing conditional vector operations in which an input vector containing multiple operands to be used in conditional operations is divided into two or more output vectors based on a condition vector”. William J. Dally, Scott Whitney Rixner, John Owens, and Ujval J. Kapasi. Issued 31 July 2001.

EXTERNAL TALKS

2017: NSF AiTF PI meeting, NVIDIA CRADA review (Graph and Data Analytics), NVIDIA GPU Graph Roundtable, AMD

2016: Dagstuhl Seminar 16101, NVIDIA online webinar, National Academy of Engineering Frontiers of Engineering, UC Davis EEC 1 (Introduction to Electrical and Computer Engineering) guest lecture

2015: DARPA XDATA PI meeting, NVIDIA GPU Technology Conference Data Analytics Roundtable, Adobe Data Science Symposium, Indiana University CREST Reconfigurable Execution Framework Testbed Workshop, Lawrence Livermore National Laboratory, Netflix

2014: Dagstuhl Seminar 14091, Adobe Data Science Symposium, Twitter, United Technologies Research Center, Dagstuhl Seminar 14462

2013: Yale University, Intel Science and Technology Center for Visual Computing annual retreat, UC Davis Joint Senate/Administration Retreat on Online Education, UC Davis Department of

Statistics seminar, UC Davis Summer Institute for Teaching with Technology, UC Davis EEC 1 (Introduction to Electrical and Computer Engineering) guest lecture

2012: Lawrence Livermore National Laboratory, Synchronization-reducing and Communication-reducing Algorithms and Programming Models for Large-scale Simulations Workshop (plenary talk), Intel Science and Technology Center for Visual Computing yearly retreat, Intel Science and Technology Center for Visual Computing review, Lawrence Berkeley National Laboratory, UC Davis Graduate Group of Applied Mathematics 7th Annual Mini-Conference, Advanced Micro Devices, Qualcomm Research Silicon Valley, Second Workshop on Architectures and Systems for Big Data (panel)

2011: Twitter, Northrup Grumman, Pacific Northwest National Laboratory, Harvard (CS 264 guest lecture), Intel Science and Technology Center for Visual Computing webinar, Intel Science and Technology Center for Visual Computing yearly retreat, Harvard (Computer Science Colloquium), MIT, Oxford University, Workshop on Hybrid Multi-core Computing, Infosys

2010: Dagstuhl Seminar 10091 (Data Structures), Stanford (CS 448s guest lecture), KLA Tencor, Lawrence Berkeley National Laboratory, Programming Environments for Emerging Parallel Systems (PEEPS), 6th International Workshop on Parallel Matrix Algorithms and Applications (PMAA '10), Oak Ridge National Laboratory, SciDAC 2010, Center for Scalable Application Development Software (CScADS) Workshop on Scientific Data and Analytics for Extreme Scale Computing, ARM External Research Speaker Conference

2009: Nara Institute of Science and Technology, UC Davis Faculty Mentoring Faculty Program, Intel Visual Computing Group Tech Summit (Folsom) (keynote), Heterogeneity in Computing Workshop (keynote), GPU Technology Conference (Santa Clara), Supercomputing 2009 (tutorial)

2008: Architectural Support for Programming Languages and Operating Systems (course), International Ph.D. School in Algorithms for Advanced Processor Architectures (Copenhagen), Lund University (Sweden), Workshop on Programming Massively Parallel Processors (Urbana-Champaign), ACM SIGGRAPH (course), HP Labs, IBM Watson, Cal Poly San Luis Obispo, UCSB

2007: Intel Microprocessor Research Lab (Santa Clara), International Workshop on Logic Synthesis, IEEE/NATEA Annual Conference (2007 New Frontiers in Computing Technology), Rambus Tech Forum (Santa Clara), ACM SIGGRAPH 2007 (course) (San Diego), Microsoft Research Asia, Beijing Capital Normal University, Baidu, Tsinghua University, Apple Computer, Supercomputing 2007 (Austin) (tutorial)

2006: Shell Research (Houston), UC Berkeley, Supercomputing 2006 (tutorial), Intel (Folsom)

2005: Microsoft Research, Intel (Santa Clara), National Center for Atmospheric Research, University of Colorado, Graphics Hardware (panel talk), Eurographics, IEEE Visualization (tutorial), Lawrence Livermore National Laboratory, Lockheed-Martin

2004: Microsoft Research, Intel Research (Berkeley), UCSF, High-Performance Embedded Computing Conference, IEEE Visualization (tutorial)

2003: Pixar Animation Studios, Stanford, Sony Research Laboratory, NVIDIA Corporation, Intel Media Research Laboratory

2002 and earlier: Interval Research Corporation, UCLA, UC Davis, UCSD, Sacramento State University, San Francisco State University

**PROFESSIONAL
SERVICE**

Leadership Service

US Frontiers of Engineering Symposium
—Organizing Committee (2016)
Innovative Parallel Computing (InPar)
—Paper Chair (2012)
Siggraph/Eurographics High Performance Graphics
—Steering Committee (2011–present)
—General Chair (2011)
—Program Chair (2009)
Graphics Hardware
—Papers Chair (2008)
—Publicity Chair (2005, 2006, 2007)
IS&T/SPIE Electronic Imaging: Parallel Processing for Imaging Applications
—Conference Chair (2011)
2006 Workshop on On- and Off-Chip Interconnection Networks for Multicore Systems
—Chair

Program/Paper Committee Service

ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games
—Program Committee (2017, 2009, 2008)
IEEE International Conference on Cluster Computing
—Program Committee (2017)
Graph Algorithms Building Blocks
—Program Committee (2017, 2016)
First Workshop on the Intersection of Graph Algorithms and Machine Learning (GraML)
—Program Committee (2017)
Siggraph/Eurographics High Performance Graphics
—Paper Committee (2017, 2016, 2015, 2014, 2013, 2012, 2010)
IEEE International Parallel & Distributed Processing Symposium (IPDPS)
—Program Committee (2016)
High Performance Graph Data Management and Processing Workshop (HPGDMP)
—Program Committee (2016)
ACM/SIGARCH International Conference on Supercomputing (ICS)
—Program Committee (2015)
Eurographics Symposium on Rendering
—International Program Committee (2015)
IEEE International Conference on High Performance Computing (HiPC)
—Program Committee (2015)
International Conference on Multicore Software Engineering, Performance, and Tools (MUSEPAT)
—Program Committee (2015, 2013)
ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)
—External Review Committee (ERC) (2014)
1st International Workshop on OpenCL
—Program Committee (2013)
Heterogeneous and Unconventional Cluster Architectures and Applications Workshop
—Program Committee (2013)
ADBIS Workshop on GPUs in Databases (GID)
—Program Committee (2013, 2012, 2011)
IEEE International Conference on High Performance Computing (HiPC) Student Research Symposium
—Program Committee (2013)
ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming (PPoPP)
—Program Committee (2012)
International Conference on Parallel Processing (ICPP)
—Program Committee (2012)

20th Euromicro International Conference on Parallel, Distributed and Network-based Processing, Special Session on GPU Computing and Hybrid Computing
 —Program Committee (2012)
 Symposium on Application Accelerators in High Performance Computing
 —Program Committee (2012, 2011, 2009)
 Second Workshop on Hybrid Multi-core Computing (WHMC 2011)
 —Program Committee (2011)
 First International Workshop on Characterizing Applications for Heterogeneous Exascale Systems (CACHES)
 —Program Committee (2011)
 IEEE/ACM Supercomputing
 —Posters Committee (2011)
 —Program Committee (Applications) (2009, 2008)
 Eurographics
 —Program Committee, “Computational Graphics” (2009)
 —International Program Committee, Short Papers (2007)
 Workshop on General Purpose Processing on Graphics Processing Units
 —Program Committee (Second Workshop, 2009)
 —Program Committee (First Workshop, 2007)
 2nd Workshop on Programming Models for Ubiquitous Parallelism (PMUP 2007)
 —Program Committee
 External Participant (report contributor), Recommendations from the DOE/ASCR Workshop on Visual Analysis and Data Exploration for the Exascale Era (2007)
 GPGPU Workshop at the 6th International Conference on Computational Science (ICCS 2006)
 —Program Committee
 Graphics Hardware
 —Program Committee (2004)
 International Workshop on Networked Sensing Systems
 —Program Committee (2005, 2004)

Government Review Service

Department of Energy Exascale Computing Project, Co-Design Centers for Exascale Applications, reviewer (2016)
 Department of Energy Early Career Research Program, reviewer (2015)
 Los Alamos National Laboratory Information & Knowledge Sciences (IKS) Capability Review Committee (2011)
 Department of Energy’s Small Business Innovative Research Program, panelist (2011)
 National Science Foundation proposal panelist and reviewer (2003, 2004, 2005)

TUTORIALS AND COURSES

Panel Moderator, “Industry Panel on Future Directions in Parallel Processing”, IS&T/SPIE Electronic Imaging: Parallel Processing for Imaging Applications, (January 2011)
 IEEE/ACM Supercomputing, co-instructor, full-day tutorials
 —“High Performance Computing with CUDA” (November 2009)
 —“High Performance Computing on GPUs with CUDA” (November 2007)
 —“General Purpose Computation on Graphics Hardware” (November 2006)
 ACM SIGGRAPH, co-instructor, half-day course, “Beyond Programmable Shading: Fundamentals” (August 2008)
 International Ph.D. School in Algorithms for Advanced Processor Architectures, The IT University of Copenhagen, Denmark, Instructor (June 2008)
 Panel Moderator, “GPUs vs. Multicore CPUs: On a Converging Course or Fundamentally Different?”, Graphics Hardware 2008 (June 2008)
 Thirteenth Annual Conference on Architectural Support for Programming Languages and Operating Systems (ACM ASPLOS ‘08), co-instructor, half-day course, “CUDA: A Heterogeneous Parallel Programming Model for Manycore Computing” (March 2008)

ACM SIGGRAPH, co-instructor, full-day course, “General Purpose Computation on Graphics Hardware” (August 2007)
IEEE Visualization, co-instructor, full-day tutorial, “General Purpose Computation on Graphics Hardware” (October 2004, October 2005)

**PROFESSIONAL
REVIEWING**

Conference ACM SIGGRAPH, High Performance Graphics, Graphics Hardware, Eurographics, ACM SIGGRAPH Asia, ACM Symposium on Interactive 3D Graphics and Games, IEEE/ACM Supercomputing, Eurographics Symposium on Rendering, International Symposium on Computer Architecture, ACM Symposium on Parallelism in Algorithms and Architectures, IEEE/ACM International Symposium on Microarchitecture, SIBGRAPI, IEEE International Symposium on Information Theory, Symposium on Application Accelerators in High Performance Computing, International Workshop on Characterizing Applications for Heterogeneous Exascale Systems, European Symposium on Algorithms, African Conference on Computational Mechanics

Journal IEEE Transactions on Visualization and Computer Graphics, IEEE Computer Graphics and Applications, Computer Graphics Forum, Proceedings of the IEEE, IEEE Transactions on Computers, ACM Transactions on Parallel Computing, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Micro, Algorithmica, IEEE Transactions on Knowledge and Data Engineering, SpringerPlus, IEEE Transactions on Mobile Computing, IEEE Transactions on Very Large Scale Integration Systems, IEEE/ACM Transactions on Networking, IEEE Software, ACM Transactions on Architecture and Code Optimization, journal of graphics, gpu, and game tools, ACM Transactions on Mathematical Software, The Computer Journal, Journal of Computer Science and Technology, Journal of Low Power Electronics, International Journal of High Performance Computing Applications, IET Image Processing, Computing in Science & Engineering, Journal of Computer Science and Technology, Computers and Electronics in Agriculture

Books Addison-Wesley, Elsevier, GPU Computing Gems

Government and Nonprofit National Science Foundation (panelist and ad hoc), UC MICRO, Department of Energy SBIR/STTR Program, Department of Energy Early Career Research Program, Natural Sciences and Engineering Research Council of Canada, National Science Centre of Poland, Maryland Industrial Partnerships Program, US Civilian Research and Development Foundation, US-Israel Binational Science Foundation, France-Berkeley Fund

**UNIVERSITY
TEACHING**

EEC 170, Introduction to Computer Architecture (undergraduate)
—Fall 2010, Fall 2007, Winter 2006, Fall 2003
EEC 171, Parallel Architecture (undergraduate)
—Spring 2018, Spring 2017, Spring 2014, Spring 2013, Spring 2012, Spring 2011, Spring 2010, Spring 2009, Spring 2008, Spring 2007
EEC 172, Embedded Systems (undergraduate)
—Fall 2005, Winter 2005, Fall 2004
EEC 180A, Digital Systems (undergraduate)
—Winter 2009
EEC 277, Graphics Architecture (graduate)
—Winter 2017, Winter 2015, Winter 2014, Winter 2013, Winter 2012, Winter 2011, Winter 2010, Winter 2009, Winter 2008, Winter 2007, Winter 2006, Winter 2005, Winter 2004, Spring 2003
EEC 289Q, Modern Parallel Computing (graduate)
—Winter 2018, Winter 2016

**UNIVERSITY
SERVICE**

Working Group on Ensuring Freedom of Expression at UC Davis, 2017
College of Engineering Strategic Planning Committee, UC Davis, 2017

UC Davis Academic Senate Representative Assembly
—Department representative, 2013–15, 2015–17
—Department alternate, 2011–13
Dean of Engineering Search Committee, UC Davis, 2014–15
Chair, Department of Electrical and Computer Engineering Industrial Affiliates Committee, 2011–12, 2012–13
Athletics Administrative Advisory Committee (as representative of the Academic Senate), University of California, Davis, 2005–06, 2006–07, 2007–08, 2008–09, 2009–10, 2010–11
—Financial Aid Task Force (subcommittee of AAAC), 2006–2007
—Street Drug Task Force (subcommittee of AAAC), 2007–2008
—Budget Committee (subcommittee of AAAC), 2010–2011
Committee on Academic Support in Athletics, University of California, Davis, 2006–2007
Faculty advisor, Theta Tau Engineering Fraternity, University of California, Davis, 2005–

**PH.D. GRADUATES
SUPERVISED**

Yangzihao Wang (Ph.D., computer science, completed December 2016). Dissertation title: “Gunrock: A Programming Model and Implementation for Graph Analytics on Graphics Processing Units”. NVIDIA Graduate Fellowship Finalist, 2013–14. First employment: Google.

Andrew Davidson (Ph.D., electrical and computer engineering, completed January 2015). Dissertation title: “Divide-And-Conquer Methods for Data Parallel Machines”. Richard Dorf Graduate Student Award (outstanding ECE graduate student), 2013. First employment: YouTube/Google.

Pınar Muyan-Özçelik (Ph.D., computer science, completed June 2014). Dissertation title: “Running Real-time Tasks on Embedded Systems using GPU Computing”. NVIDIA Graduate Fellowship, 2011–12; Google Anita Borg Memorial Scholarship Finalist, 2009. First employment: assistant professor, computer science, Sacramento State University.

Anjul Patney (Ph.D., electrical and computer engineering, completed December 2013). Dissertation title: “Programmable Graphics Pipelines”. 2014 Zuhair A. Munir Award, honorable mention (2nd place), best doctoral dissertation, UC Davis College of Engineering. NVIDIA Graduate Fellowships, 2009–10, 2010–11. Intel Ph.D. Fellowship, 2011–12. First employment: NVIDIA Research.

Stanley Tzeng (Ph.D., computer science, completed September 2013). Dissertation title: “Scheduling on Manycore and Heterogeneous Graphics Processors”. First employment: NVIDIA.

Kshitij Gupta (Ph.D., electrical and computer engineering, completed September 2012). Dissertation title: “GPU-based Parallel Application Design for Emerging Mobile Devices”. First employment: Aptina.

Jeff Stuart (Ph.D., computer science, completed June 2012). Dissertation title: “High-Performance Computing Software Libraries on Modern GPUs”. First employment: Google Zürich.

Yao Zhang (Ph.D., electrical and computer engineering, completed January 2012). Dissertation title: “Performance Modeling for GPU Architectures”. First employment: postdoc, University of Chicago, then postdoc, Argonne National Laboratory. Current employment: Google.

Shubhabrata Sengupta (Ph.D., computer science, completed December 2010). Dissertation title: “Efficient Primitives and Algorithms for Many-core architectures”. 2008 Best Graduate Researcher Award, UC Davis Computer Science Department. NVIDIA Graduate Fellowships, 2007–8, 2008–9. First employment: Intel Research, then Shazam, then Baidu Research. Current employment: Facebook AI Research Lab.

Eric Lengyel (Ph.D., computer science, completed March 2010). Dissertation title: “Voxel-Based Terrain for Real-Time Virtual Simulations”. First employment: Terathon Software LLC.

Leo Szumel (Ph.D., electrical and computer engineering, completed September 2008). Dissertation title: “On The Programming of Emergent Sensor Network Systems”. First employment: Sentilla. Current employment: Virtual Instruments.

Aaron Lefohn (Ph.D., computer science, completed June 2006). Dissertation title: “Glift: Generic Data Structures for Graphics Hardware”. National Science Foundation Graduate Research Fellowship. 2006 Best Doctoral Dissertation Award, UC Davis Computer Science Department. First employment: Neoptica, acquired by Intel in October 2007. Current employment: director of real-time rendering research, NVIDIA Research.

**M.S. GRADUATES
SUPERVISED**

Yuduo Wu (M.S., electrical and computer engineering, completed September 2015). Thesis title: “Performance Characterization of High-Level Programming Models for GPU Graph Analytics”. First employment: IBM.

Ritesh Patel (M.S., electrical and computer engineering, completed June 2012). Thesis title: “Parallel Lossless Data Compression on the GPU”. First employment: Intel. Current employment: Velo3D.

Will Kohut (M.S., electrical and computer engineering, completed June 2011). Thesis title: “Protein All-Atom Energy Evaluation on a GPU”. First employment: NVIDIA.

Everett Phillips (M.S., mechanical and aerospace engineering, completed March 2010). Co-advised with Dr. Roger Davis, UCD MAE. First employment: NVIDIA.

Vladimir Glavtchev (M.S., electrical and computer engineering, completed December 2009). Thesis title: “EU Speed-limit Sign Detection Using a Graphics Processing Unit (GPU)”. First employment: BMW Group Technology Office, Palo Alto. Subsequent employment: NVIDIA. Current employment: Fyusion.

Adam Moerschell (M.S., electrical and computer engineering, completed March 2007). Thesis title: “Distributed Texture Memory in a Multi-GPU Environment”. First employment: ATI, acquired by AMD. Current employment: Apple.

Scott Goering (M.S., electrical and computer engineering, completed March 2005). Thesis title: “Performance of On-Demand Routing Algorithms in Dense, Constrained Networks”. First employment: Intel.

**CURRENT
STUDENTS**

Currently primary advisor for: Saman Ashkiani (Ph.D., electrical and computer engineering, NVIDIA Graduate Fellowship, 2016–17); Mohammad Awad (Ph.D., electrical and computer engineering); Vehbi Eşref Bayraktar (Ph.D., computer science); Yuxin Chen (Ph.D., computer science); Calina Copos (Ph.D., applied science; NSF Graduate Research Fellowship); Afton Geil (Ph.D., electrical and computer engineering; NSF Graduate Research Fellowship); Ahmed H. Mahmoud (Ph.D., electrical and computer engineering); Weitang Liu (M.S., electrical and computer engineering); Jason Mak (Ph.D., computer science); Collin McCarthy (Ph.D., computer science); Muhammad Osama (M.S., electrical and computer engineering); Yuechao Pan (Ph.D., electrical and computer engineering); Andy Riffel (Ph.D., electrical and computer engineering); Kerry Seitz (Ph.D., computer science; NSF Graduate Research Fellowship); Shalini Venkataraman (Ph.D., computer science); Leyuan Wang (Ph.D., computer science); Carl Yang (Ph.D., electrical and computer engineering); Matthew Yih (M.S., electrical and computer engineering); Chenshan Shari Yuan (M.S., electrical and computer engineering).

**ACTIVITIES AND
HONORS**

Test of Time Award, 2017 High Performance Graphics, for the most cited paper from the 2007 and 2008 predecessor conferences to HPG
Distinguished Paper, ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming, 2016
Distinguished Paper, Euro-Par 2015
Best Paper Finalist, 2015 IEEE International Symposium on Workload Characterization
US Frontiers of Engineering Symposium (National Academy of Engineering), 2013
NVIDIA CUDA Fellow, 2012
“Advisor of Excellence”, Theta Tau Professional Engineering Fraternity, Omicron Gamma chapter (national award, selected from advisors of 55 chapters)
Nominee, ASUCD Excellence in Education Award (College of Engineering), 2010
Finalist, ASUCD Excellence in Education Award (College of Engineering), 2009
ECE Graduate Student Association Award for Graduate Teaching and Mentorship, 2009
Best Paper Award, Graphics Hardware 2007
Nominee, ASUCD Excellence in Education Award (College of Engineering), 2007
NVIDIA Faculty Teaching Fellowship, 2006
Department of Energy Early Career Principal Investigator Award, 2004
Stanford Computer Systems Laboratory Bureaucrat (student representative to faculty), 1996–2000
Stanford Program for Academic Excellence Mentor, 1997–2000
Stanford Women’s Intercollegiate Water Polo Volunteer Assistant Coach, 1999–2002
Stanford College of Engineering Lawrence R. Thielen Memorial Fellowship
Charles Mills Gayley Fellowship for Graduate Study
Eta Kappa Nu (Mu Chapter)
Tau Beta Pi (California Alpha Chapter)
University of California, Berkeley Men’s Intercollegiate Water Polo, 1991–1994
Order of the Golden Bear, University of California, Berkeley
University of California, Berkeley Regents and Alumni Scholar
National Merit Scholar
United States Presidential Scholar
Eagle Scout, Boy Scouts of America