John Douglas Owens

Electrical and Computer Engineering, University of California
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http://www.ece.ucdavis.edu/~jowens/

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

Professional Appointments

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.

Awards and Honors

Distinguished Paper, European Conference on Parallel and Distributed Computing (Euro-Par) 2018
Best Artifact Award, European Conference on Parallel and Distributed Computing (Euro-Par) 2018
ACM Distinguished Member, 2017
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, European Conference on Parallel and Distributed Computing (Euro-Par) 2015
Best Paper Finalist, 2015 IEEE International Symposium on Workload Characterization
US Frontiers of Engineering Symposium (National Academy of Engineering), 2016, 2013
NVIDIA CUDA Fellow, 2012
"Advisor of Excellence", Theta Tau Professional Engineering Fraternity, Omicron Gamma chapter (national award, selected from advisors of 55 chapters)
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
NVIDIA Faculty Teaching Fellowship, 2006
Department of Energy Early Career Principal Investigator Award, 2004
Stanford Program for Academic Excellence Mentor, 1997–2000
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)

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

Workshop on Graphs, Architectures, Programming, and Learning (GrAPL)
—Program Committee (2019)
Special Session on Auto-Tuning for Multicore and GPU (ATMG) at the IEEE International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoC)
—Program Committee (2019)
European Symposium on Algorithms
—Program Committee (Track B, Engineering and Applications Track, 2019)
IEEE International Conference on High Performance Computing (HiPC)
—Program Committee (2018, 2015)
Graph Algorithms Building Blocks
—Program Committee (2018, 2017, 2016)
Supercomputing Asia
—Technical Program Committee (2018)
Workshop on the Intersection of Graph Algorithms and Machine Learning (GraML)
—Program Committee (2018, 2017)
Siggraph/Eurographics High Performance Graphics
—Paper Committee (2018, 2017, 2016, 2015, 2014, 2013, 2012, 2010)
Hawaiian Workshop on Parallel Algorithms and Data Structures
—Organizing Committee (2017)
ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games
—Program Committee (2017, 2009, 2008)
IEEE International Conference on Cluster Computing
—Program Committee (2017)
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)
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)

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 Advisory 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–

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.

Grant/Gift Funding

National Science Foundation (Award # CCF-1823037). *SPX: Collaborative Research: Global Address Programming with Accelerators*. PI J. Owens, co-PIs K. Yelick, A. Buluç (UC Berkeley). 1 Oct. 2018–30 Sept. 2021. $386,025 (UC Davis).

Department of Defense Advanced Research Projects Agency (DARPA). *SYMPHONY: Orchestrating Sparse and Dense Data for Efficient Computation*. Award # HR0011-18-3-0007. 1 June 2018–30 May 2022. $827,790 (UC Davis).

Department of Defense Advanced Research Projects Agency (DARPA). *A Commodity Performance Baseline for HIVE Graph Applications*. Award # FA8650-18-2-7835. 8 June 2018–7 Sept. 2019. $500,000.

Department of Defense Advanced Research Projects Agency (DARPA). *A Commodity Performance Baseline for HIVE Graph Applications*. Northrup Grumman, prime contractor. Nov. 2017–Apr. 2018. $91,756.20.

Adobe Data Science Research Award. *Scalability and Mutability for Large Streaming Graph Problems on the GPU*. PI J. Owens. August 2017. $50,000.

National Science Foundation (Award # OAC-1740333) *SI2-SSE: Gunrock: High-Performance GPU Graph Analytics*. PI J. Owens. 1 Oct. 2017–30 Sept. 2020. $400,000.

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.

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

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 Computer Architecture Letters, 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

Ph.D. Graduates Supervised

Saman Ashkiani (Ph.D., electrical and computer engineering, completed December 2017). Dissertation title: "Parallel Algorithms and Dynamic Data Structures on the Graphics Processing Unit: a warp-centric approach". NVIDIA Graduate Fellowship, 2016–17. First employment: OmniSci (MapD).

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 Brain. Current employment: Tencent.

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, then Google Brain. Current employment: Ant Financial.

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. Current employment: NovuMind Inc.

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). Coadvised 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, Fyusion. Current employment: Marble.

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: Mohammad Awad (Ph.D., electrical and computer engineering); Vehbi Eşref Bayraktar (Ph.D., computer science); Yuxin Chen (Ph.D., computer science); Afton Geil (Ph.D., electrical and computer engineering; NSF Graduate Research Fellowship); Ahmed H. Mahmoud (Ph.D., electrical and computer engineering); Zhongyi Lin (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); Arvin Tashakori (Ph.D., electrical and computer engineering); 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).

Refereed Publications

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Matthew Yih, Jeffrey M. Ota, John D. Owens, and Pınar Muyan-Özçelik. "FPGA versus GPU for Speed-Limit-Sign Recognition". In *Proceedings of the 21st IEEE International Conference on Intelligent Transportation Systems*, ITSC 2018. November 2018.

Carl Yang, Aydın Buluç, and John D. Owens. "Implementing Push-Pull Efficiently in GraphBLAS". In *Proceedings of the International Conference on Parallel Processing*, ICPP 2018, pages 89:1–89:11. August 2018.

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John D. Owens. "Technical Perspective: Graphs, Betweenness Centrality, and the GPU". *Communications of the ACM*, 61(8), August 2018.

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