PAUL A. NAVRÁTIL

Texas Advanced Computing Center
512-471-6245
pnav@tacc.utexas.edu

EDUCATION

Ph.D. Computer Science, The University of Texas at Austin, 2010
Thesis: "Memory-Efficient, Scalable Ray Tracing"
Supervisors: Donald S. Fussell, Calvin Lin

M.S. Computer Science, The University of Texas at Austin, 2006

B.S. Computer Science with honors, The University of Texas at Austin, 1999
Special honors in Computer Science

B.A. Plan II with honors, The University of Texas at Austin, 1999
Dean's Distinguished Graduate in Liberal Arts
Plan II Model Thesis award
Phi Beta Kappa inductee

EMPLOYMENT HISTORY

Director of Visualization – Texas Advanced Computing Center (2017 – present)

- Oversee visualization research activities
- Lead remote visualization and large-scale visualization algorithm research efforts
- Ten direct reports: eight full-time staff, one contractor, one graduate research assistant

Research Scientist – Texas Advanced Computing Center (2016 – present)

- Technical lead for remote visualization systems
- Conduct research in parallel visualization algorithms on multi- and many-core architectures
- Design next-generation remote visualization resources and remote interfaces leveraging web technologies

Adjunct Professor – Division of Statistics and Scientific Computation, The University of Texas at Austin (2011 – present)

- Teach advanced computing curriculum at both the undergraduate and graduate levels
- Develop curriculum for advanced computing courses at both the undergraduate and graduate levels.

Manager - Scalable Visualization Technologies – Texas Advanced Computing Center (2011 – 2017)

- Oversee large-scale visualization resources and visualization research activities
- Lead remote visualization and large-scale visualization algorithm research efforts
- Ten direct reports: eight full-time staff, one contractor, one graduate research assistant

Research Associate – Texas Advanced Computing Center (2010 – 2016)

- Technical lead for remote visualization systems
- Conduct research in parallel visualization algorithms and distributed GPU acceleration
- Design next-generation remote visualization resources

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Visualization Scientist (RESA V) – Texas Advanced Computing Center (2007 – 2010)

- Developed large-scale, distributed memory ray tracing system
- Technical lead for primary remote visualization systems
- Manager for $500,000 visualization laboratory renovation

Graduate Intern Technical – Intel Corporation (summer 2006)

- Studied performance characteristics of real-time ray tracers
  (summer 2006, supervisor: James Hurley)
  - Instrumented two state-of-the-art ray tracers to measure performance characteristics and opportunities for optimization
  - Investigated integrating novel algorithm for coherent processing of secondary rays with existing real-time ray tracing system

Graduate Research Assistant – Los Alamos National Laboratory (summer 2005)

- Investigated cache-efficient ray tracing methods for direct volume visualization
  (summer 2005, supervisor: Allen McPherson)
  - Developed optimized ray tracer to perform direct volume visualization
  - Measured performance of several ray traversal algorithm to determine most suitable method for direct volume visualization

Graduate Research Assistant – University of Texas at Austin (2001 – 2007)

- Developed scientific visualizations and visualization technology
  (2006 – 2007, supervisor: Greg S. Johnson)
  - Developed localized interpolation technique for cosmological point-based datasets to facilitate isosurface extraction and visualization
  - Visualizations published in International Science Grid This Week, The Alcalde
- Investigated cache-efficient ray tracing methods for current-generation hardware
  (2003 - 2006, supervising professor: Bill Mark, with Don Fussell and Calvin Lin)
  - Developed novel ray traversal algorithm to yield superior cache utilization
  - Implemented framework to study cache performance of acceleration structures
  - Developed equations to predict cache behavior of ray traversal

Graduate Research Assistant – University of Texas at Austin (2001 – 2007)

- Investigated compiler assisted optimizations and error detection for OpenGL library
  (2002 - 2003, supervising professor: Calvin Lin)
  - Developed semantic error checking on OpenGL applications and potential library specific-optimizations to OpenGL-based application code using research compiler and user-supplied semantic annotations for library functions
- Investigated representing event probability in a conceptual knowledge system
  (2001 - 2002, supervising professor: Bruce Porter)
  - Explored adding syntax and semantics for probability to a component-based knowledge system
  - Developed representations of concepts from cell synthesis in a component-based knowledge system (a system where complex concepts are built from simpler concepts)

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Software Engineer – Liaison Technology, Inc. **(1999 – 2001)**

- co-developed patented algorithm and core algorithm code for data-mining semi-structured data
- code formed core of two product lines through multiple release cycles
- lead engineer on multiple critical-path product features
- lead technical contact for business development and sales

Lab Research Assistant II – Applied Research Laboratories **(1997-1998)**

- enhanced existing data-mining prototype to improve acquisition of semi-structured data
- developed graphical user interface (GUI) for prototype

BOOKS and COMPILATIONS

Paul Navrátil, Maytal Dahan, editors. Special Issue XSEDE16 & PEARC17 – Practice and Experience in Advanced Research Computing. Concurrency and Computation: Practice and Experience (CPE). 2019.

Paul Navrátil, Maytal Dahan, David Hart, Alana Romanella, Nitin Sukhija, editors. Proceedings of the Fifth Extreme Science and Engineering Discovery Environment Conference (XSEDE16). July 2016.

Carsten Dachsbacher, **Paul Navrátil**, editors. Proceedings of the Eurographics Symposium on Parallel Graphics and Visualization. May 2015.

Paul A. Navrátil. Memory-Efficient, Scalable Ray Tracing. Ph.D. Dissertation, Department of Computer Science, The University of Texas at Austin. August 2010.

JOURNAL ARTICLES and BOOK CHAPTERS

Greg Abram, **Paul Navrátil**, David Rogers and James Ahrens. Distributed Multi-tenant In Situ Analysis using Galaxy. In *In Situ Visualization for Computational Science*, Hank Childs, ed., 2020.

Will Usher, Hyungman Park, Myoungkyu Lee, **Paul Navrátil**, Donald Fussell and Valerio Pascucci. A Simulation-Oblivious Data Transport Model for Flexible In Transit Visualization. In *In Situ Visualization for Computational Science*, Hank Childs, ed., 2020.

Ingo Wald, Greg P. Johnson, Jeff Amstutz, Carson Brownlee, Aaron Knoll, Jim Jeffers, Johannes Günther, **Paul Navrátil**. OSPRay – A CPU Ray Tracing Framework for Scientific Visualization. *IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization)*, 23:1, January 2017, 931—940.

Paul A. Navrátil, Hank Childs, Donald S. Fussell, Calvin Lin. Exploring the Spectrum of Dynamic Scheduling Algorithms for Scalable Distributed-Memory Ray Tracing. *IEEE Transactions on Visualization and Computer Graphics*. 20:6, June 2014. 893—906.

Aaron Knoll, Ingo Wald, **Paul Navrátil**, Anne Bowen, Khairi Reda, Michael E. Papka, Kelly Gaither. RBF Volume Ray Casting on Multicore and Manycore CPUs. *Computer Graphics Forum (Proceedings of Eurographics Conference on Visualization)*. 33:3, 2014.

Joshua D. Rhodes, Charles R. Upshaw, Chioke B. Harris, Colin M. Meehan, David A. Walling, **Paul A. Navrátil**, Ariane L. Beck, Kazunori Nagasawa, Robert L. Fares, Wesley J. Cole, Harsha Kumar, Roger D. Duncan, Chris L. Holcomb, Thomas F. Edgar, Alexis Kwasinski, Michael E. Webber.

Experimental and Data Collection Methods for a Large-Scale Smart Grid Deployment: Methods and First Results. *Energy*, 65:1, February 2014. 462—471.

Paul A. Navrátil, Jarrett L. Johnson and Volker Bromm. Visualization of Cosmological Point-Based Datasets. IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization 2007), November 2007.

OTHER REFEREED PAPERS

Stephanie Zeller, Francesca Samsel, **Paul Navrátil**. Environmental Visualization: Moving Beyond the Rainbows. In *Proceedings of PEARC20.* July 30, 2020.

Christiaan Gribble, Victor Eijkhout, **Paul Navrátil**. Implementing a Prototype System for 3D Reconstruction of Compressible Flow. In *Proceedings of PEARC20*. July 28, 2020.

Colin Ware, Francesca Samsel, David Rogers, **Paul Navrátil**, Ayat Mohammed. Designing Pairs of Colormaps for Visualizing Bivariate Scalar Fields. In *Proceedings of EuroVis 2020.* May 26, 2020.

João Barbosa, **Paul Navrátil**. High-fidelity Rendering for Large Tiled Displays. In *Proceedings of the Intel eXtreme Performance User Group (IXPUG) Conference 2019*. September 25, 2019.

Francesca Samsel, Trinity Obermyer, **Paul Navrátil**. Highlight Insert Colormaps: Luminance for Focused Data Analysis. In *Proceedings of Eurographics Conference on Visualization – Short Papers*. June 2019. 55 – 59.

Greg Abram, **Paul Navrátil**, Pascal Grossett, David Rogers, James Ahrens. "Galaxy: Asynchronous Ray Tracing for Large High-Fidelity Visualization." IEEE Large Data Analysis and Visualization. October 2018.

Hyungman Park, Donald Fussell, **Paul Navrátil**. "SpRay: Speculative Ray Scheduling for Large Data Visualization." IEEE Large Data Analysis and Visualization. October 2018.

Paul Navrátil, Jim Jeffers. "IXPUG In Situ Workshop Report – Best Practices and Lessons Learned." IXPUG Annual Meeting, Austin, Texas, September 2017.

Matt Larsen, Stephanie Labasan, **Paul Navrátil**, Jeremy Meredith, Hank Childs. Volume Rendering via Data-Parallel Primitives. Proceedings of the Eurographics Symposium on Parallel Graphics and Visualization. May 2015.

Matt Larsen, Jeremy Meredith, **Paul Navrátil**, Hank Childs. Ray-Tracing within a Data Parallel Framework. Proceedings of IEEE Pacific Visualization Symposium, April 2015. 279—286.

Aaron Knoll, Cody Hammock, Jo Wozniak, Nathaniel Mendoza, **Paul Navrátil**, Brandt Westing. Picowalls: Portable Tiled Display Walls from Pico Projector Arrays. Proceedings of VISTech 2013. November 22, 2013.

Aaron Knoll, Ingo Wald, **Paul A. Navrátil**, Michael E. Papka, Kelly P. Gaither. Ray Tracing and Volume Rendering Large Molecular Data on Multi-Core and Many-Core Architectures. Proceedings of UltraVis 2013. November 17, 2013.

Cyrus Harrison, **Paul A. Navrátil**, Maysam Moussalem, Ming Jiang, Hank Childs. Efficient Dynamic Derived Field Generation on Many-Core Architectures Using Python. Proceedings of Workshop on Python for High Performance and Scientific Computing (PyHPC) 2012. November 16, 2012.

Paul A. Navrátil, William L. Barth, Hank Childs. Virtual Rheoscopic Fluids for Dense Large-Scale Fluid Flow Visualizations. Proceedings of IEEE Symposium on Large Data Analysis and Visualization (LDAV) 2012. October 14-15, 2012.

Gregory P. Johnson, Gregory D. Abram, Brandt Westing, **Paul A. Navrátil**, Kelly P. Gaither. DisplayCluster: An Interactive Visualization Environment for Tiled Displays. Proceedings of IEEE Cluster 2012. September 24-28, 2012.

Paul A. Navrátil, Donald S. Fussell, Calvin Lin and Hank Childs. Dynamic Scheduling for Large-Scale Distributed-Memory Ray Tracing. Proceedings of Eurographics Symposium on Parallel Graphics and Visualization (EGPGV) 2012. 61—70. May 13-14, 2012. **Awarded Best Paper**

Byungil Jeong, **Paul A. Navrátil**, Kelly P. Gaither, Gregory Abram and Gregory P. Johnson. Configurable Data Prefetching Scheme for Interactive Visualization of Large-Scale Volume Data. Proceedings of Visualization and Data Analysis (VDA) 2012. 8294-17. January 23-25, 2012.

Hank Childs, Eric Brugger, Brad Whitlock, Jeremy Meredith, Sean Ahern, Kathleen Bonnell, Mark Miller, Gunther H. Weber, Cyrus Harrison, David Pugmire, Thomas Fogal, Christoph Carth, Allen Sanderson, E. Wes Bethel, Marc Durant, David Camp, Jean M. Favre, Oliver Rübel, **Paul Navrátil**, Matthew Wheeler, Paul Selby and Fabien Vivodtzev. VisIt: An End-User Tool for Visualizing and Analyzing Very Large Data. Proceedings of the 2011 SciDAC Conference. July, 2011.

Paul A. Navrátil, Donald S. Fussell, Calvin Lin. Increasing Hardware Utilization for Peta-Scale Visualization. Proceedings of the High-End Visualization Workshop. December, 2010.

S. Daruru, S. Dhandapani, G. Gupta, I. Iliev, W. Xu, **P. Navrátil**, N. Marin, J. Ghosh. Distributed, Scalable Clustering for Detecting Halos in Terascale Astronomy Datasets. Proceedings of KDCloud-10. December 2010.

Paul A. Navrátil, Brandt Westing, Greg P. Johnson, Ashwini Athyle, Jose Carreno, Freddy Rojas. A Practical Guide to Large-Tiled Displays. Proceedings of the International Symposium on Visual Computing 2009.

Paul A. Navrátil, Donald S. Fussell, Calvin Lin and William R. Mark. Dynamic Ray Scheduling for Improved System Performance. Proceedings of the Symposium on Interactive Ray Tracing, 2007.

Bruce Porter, Ken Barker, James Fan, **Paul A. Navrátil**, Dan Tecuci, Peter Yeh and Peter Clark. "Mining Answers from Texts and Knowledge Bases: Our Position." Mining Answers from Texts and Knowledge Bases: Papers from the 2002 AAAI Spring Symposium (TR SS-02-06), Sanda M. Harabagiu and Vinay Chaudhri, ed. pp 80 - 81.

Paul A. Navrátil. "TeamTexas: a Simulator Team for RoboCup 1998", Proceedings of the Second RoboCup Workshop, Minoru Asada, ed. pp. 373 - 377.

VISUALIZATIONS

Andrew Solis, Gregory Foss, Matias Fragoso, **Paul Navrátil**. Visualizing Usage on HPC Systems. In *SC20 Scientific Visualization & Data Analytics Showcase*. November 17-19, 2020.

Paul A. Navrátil, William Barth, Karla Vega. The Break of Waves. Discover Magazine Beauty of Big Data gallery. January 2017. http://discovermagazine.com/galleries/2017/january/visualization

Carson Brownlee, Aaron Knoll, **Paul Navrátil**, Kevin Cunningham, Michael Sukop, Sade Garcia. Seeking Its Own Level. Discover Magazine Beauty of Big Data gallery. January 2017. http://discovermagazine.com/galleries/2017/january/visualization

Carson Brownlee, Greg Abram, João Barbosa, Ingo Wald, Jeff Amstutz, **Paul Navrátil**. ParaView + OSPRay: High-Fidelity Ray Tracing for Scientific Visualization. XSEDE16 Visualization Showcase. July 17-21, 2016.

Carson Brownlee, Aaron Knoll, **Paul Navrátil**, Kevin Cunningham, Michael Sukop, Sadé Garcia. Visualizing Groundwater Flow Through Karst Limestone. Proceedings of the Eurographics Symposium on Parallel Graphics and Visualization. May 2015. **Awarded Best Visualization Showcase**.

Paul A. Navrátil, William L. Barth, Hank Childs. Virtual Rheoscopic Fluid for Large Dynamics Visualization. SC12 Visualization Showcase. November 10-16, 2012.

Paul A. Navrátil, William L. Barth. Taylor-Couette Flow in a Virtual Rheoscopic Fluid (visualization). SC11 Scientific Visualization Showcase. November 12-18, 2011.

Paul A. Navrátil, Jarrett Johnson, Volker Bromm. Life and Death of the First Stars (visualization). Finalist, NSF International Science & Engineering Visualization Challenge. November 2010.

Paul A. Navrátil, Jarrett Johnson, Volker Bromm. The Bubble Beginning (visualization). *Bild der Wissenschaft*, August 2010.

Paul A. Navrátil, Jarrett Johnson, Volker Bromm. The Bubble Beginning (visualization). *Discover*, "Presents the Whole Universe" special issue. Fall 2008.

Paul A. Navrátil, Jarrett Johnson, Thomas H. Greif, Volker Bromm. The First Stars (visualization). In: Dennis Overbye. "First Stars Were Brutes, but Died Young, Astronomers Say," *New York Times*, August 1st, 2008.

OTHER PUBLICATIONS

David Waling, **Paul A. Navrátil**. Large-Scale Data Organization for Interactive Analysis. TACC Technical Report TR-12-03. May 4, 2012.

Paul A. Navrátil, Brandt Westing, Greg P. Johnson, Ashwini Athyle, Jose Carreno, Freddy Rojas. A Practical Guide to Large-Tiled Displays. TACC TR-09-04, 2009.

Paul A. Navrátil, Maria Esteva. Visualizing Workplace Dynamics from Natural Digital Archives. Texas Advanced Computing Center: TACC TR-08-04, 2008.

Gregory P. Johnson, **Paul A. Navrátil**, David Gignac, Karl Schulz, Tommy Minyard. The Colt Visualization Cluster. Texas Advanced Computing Center: TACC TR-07-03, 2007.

Paul A. Navrátil and William R. Mark. An Analysis of Ray Tracing Bandwidth Consumption. The University of Texas at Austin, Department of Computer Sciences. Technical Report TR-06-40.

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GRANTS

Co-PI: Driving Natural Gas Systems to Reduced Greenhouse Gas Emissions. University of Texas Energy Institute, $300,000, 1/2020 – 12/2021.

PI: Software-Defined Visualization for Integrated Simulation and Analysis. Intel Center of Excellence, $150,000, 10/2019 – 9/2020.

PI: Software-Defined Visualization for Integrated Simulation and Analysis. Intel Center of Excellence, $187,500, 10/2018 – 9/2019.

PI: Software-Defined Visualization for Integrated Simulation and Analysis. Intel Center of Excellence, $250,000, 10/2017 – 9/2018.

PI: Accelerated 3D Reconstruction and Visualization of Compressible Flow. SURVICE Engineering S17-032001, $194,300, 5/2017 – 3/2019.

co-PI: CRISP Type 2: Natural Gas Production, Electricity, and Water Infrastructures - Economic, Environmental and Agricultural Impacts in the Texas-Mexico Border Region. US NSF CBET-1638258, $2,500,000, 10/2016 – 9/2020.

PI: Software-Defined Visualization for Integrated Simulation and Analysis. Intel Center of Excellence, $250,000, 10/2016 – 9/2017.

PI: Unimpeded In Situ Visualization on Intel Xeon and Intel Xeon Phi. Intel Parallel Computing Center (IPCC), $200,000 10/2016 – 9/2018.

co-PI: Stampede 2: The Next Generation of Petascale Computing for Science and Engineering. US NSF OAC-1540931, $30,000,000, 6/2016 – 5/2020.

PI: Intel Rendering Infrastructure Development Phase 3. Intel Corporation, $54,322, 9/2015 – 12/2015.

PI: Intel Rendering Infrastructure Development Phase 2.5. Intel Corporation, $39,992, 6/2015 – 8/2015.

co-PI: Geomechanical Visualization Development Phase 2. ConocoPhillips, $650,525, 4/2015 – 12/2015.

PI: Intel Rendering Infrastructure Development Phase 2. Intel Corporation, $132,773, 1/2015 – 5/2015.

PI: Optimizing VTK / ParaView on the Intel Xeon and Xeon Phi. Intel Parallel Computing Center (IPCC), $400,000, 10/2014 – 9/2016.

PI: Intel Rendering Infrastructure Development. Intel Corporation, $128,297, 5/2014 – 8/2014.

co-PI: Geomechanical Visualization Development Phase 1. ConocoPhillips, $706,110, 1/2014 – 3/2105.

PI: Collaborative Research: SI2-SSI: A Comprehensive Ray Tracing Framework for Visualization in Distributed-Memory Parallel Environments. US NSF ACI-1339863, $1,198,122, 10/2013 – 9/2016.

PI *(acting)*: Sustainable Places Project Analytics Tool and Portal. US HUD, $450,000, 5/2012 – 2/2014.

PI: High-Frequency Meter Data Analysis. Pecan Street Project, $41,408, 12/2011 – 12/2012.

PI: VisIt GPU Enhancement. Lawrence Livermore National Laboratory, US DOE, $322,731, 4/2011 – 3/2013.

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PATENTS

U.S. 6,782,505: Method and System for Generating Structured Data from Semi-Structured Data Sources. Dan Miranker, Lance Obermeyer, **Paul Navrátil**. Issued August 24, 2004.

DISSERTATION COMMITTEES

Hyungman Park, Department of Electrical and Computer Engineering, The University of Texas at Austin. Speculative Distributed Ray Scheduling for Large Data Visualization (Don Fussell, **Paul Navrátil**, advisors).

Ashley Phelps, Department of Education, The University of Texas at Austin. Attitudes Towards Technology Use In The 21st Century: An Investigation Into The Perspectives Of Preservice Physical Education (Xiaofen Keating, advisor). Defense: August 4, 2020.

Apostolos Athanasiou, Department of Civil, Architectural and Environmental Engineering, The University of Texas at Austin. Non-destructive Evaluation Methods for Structures (Salvatore Salamone, advisor). Defense: December 4, 2019.

Matthew Larsen, Department of Computer and Information Science, The University of Oregon. Performance Modeling of In Situ Rendering (Hank Childs, advisor). Defense: November 21, 2016.

Henry Schreiner, Department of Physics, The University of Texas at Austin. Methods and Simulations of Muon Tomography and Reconstruction (Roy Schwitters, advisor). Defense: May 5, 2016.

SEMESTER CLASSES

TC 310 Applied Logic and Reasoning through Programming and Data Analysis. Plan II Honors Program, The University of Texas at Austin. Spring 2020.

SSC 335 / 394 Scientific and Technical Computing. Division of Statistics and Scientific Computation, The University of Texas at Austin. Spring 2013.

SSC 489R Graduate Research – supervising Ben Urick independent study. Division of Statistics and Scientific Computation, The University of Texas at Austin. Spring 2013.

SSC F375/F395 High-Performance Scientific Computing with GPUs. Division of Statistics and Scientific Computation, The University of Texas at Austin. Summer 2012.

SSC F375/F395 High-Performance Scientific Computing with GPUs. Division of Statistics and Scientific Computation, The University of Texas at Austin. Summer 2011.

SHORT COURSES

Galaxy: Asynchronous Ray Tracing for Large High-Fidelity Visualization Powered by the Intel Rendering Framework (with Greg Abram). Intel Booth tutorial @ SC18. Dallas, Texas. November 14, 2018.

Software-Defined Visualization: Getting the most out of ParaView with OSPRay (with Dave DeMarle). Intel HPC Developer Conference. Salt Lake City, Utah. November 12 - 13, 2016.

Software-Defined Visualization: Data Analysis for Current and Future Cyberinfrastructure. Intel HPC Developer Conference. Austin, Texas. November 15, 2015.

Software-Defined Visualization: Data Analysis for Current and Future Cyberinfrastructure. XSEDE 2015 tutorial, with Ingo Wald. St. Louis, Missouri. July 27, 2015.

Texas A&M GPU Workshop. College Station, Texas. August 10 – 11, 2011.

Visualization on Ranger and Spur. Tutorial session at TeraGrid 2009. Crystal City, Virginia. June 22-25, 2009.

Advanced Scientific Visualization and Visualization Tutorial. Universidade do Porto. Porto, Portugal. May 28-29, 2009.

Basic Scientific Visualization and Visualization Tutorial. Istituto Superior Tecnico, Universidade Tecnica de Lisboa. Lisbon, Portugal. May 25-26, 2009.

Tutorial on Visualization on Ranger and Spur. TeraGrid 2008. Las Vegas, Nevada. June 9 - 13, 2008.

KEYNOTES

Let Me Tell You a Story: Enabling Effective and Scalable Communication of Scientific Insights. The 21st EG/VGTC Conference on Visualization (EuroVis 2019). Porto, Portugal. June 4, 2019.

Visual Analysis at the Texas Advanced Computing Center. Data Visualization Day at HPE Data Science Institute. Houston, Texas. March 8, 2019.

Sailing the Data Deluge: Advanced Computing for Information Visualization and Analysis. The Market Research Technology Event, Las Vegas, Nevada. May 2, 2012.

INVITED TALKS and PRESENTATIONS

"SOLAR Consortium: Accelerated Ray Tracing for Scientific Simulations" - SC19 BOF. November 20, 2019.

DOE Computer Graphics Forum. TACC site update. April 28, 2020

Improving Visualization Technique Uptake in Medical Communities. IEEE VIS Application Spotlight. Vancouver, Canada. October 21, 2019.

Recent Advances in Queuing Ray Tracing for Simulation and In Situ Analysis. Applied Visualization Workshop at Universidade do Minho. Braga, Portugal. June 7, 2019.

Visual Analysis at the Texas Advanced Computing Center. Invited talk at INESC TEC, Universidade do Porto. Porto, Portugal. June 4, 2019.

Software-Defined Visualization IPCC Updates. Achieving Performance on Large-Scale Intel Xeon-Based Systems BOF @ SC18. Dallas, Texas. November 15, 2018.

Galaxy: Asynchronous Ray Tracing for Large High-Fidelity Visualization. TACC Booth talk @ SC18. Dallas, Texas. November 13, 2018.

Visualization Communication at Scale: Opportunities for Improved Efficiency. Sixth Annual MVAPICH User Group (MUG) Meeting. Columbus, Ohio. August 7th, 2018.

TACC Intel Visualization Center of Excellence 2018 Report. Intel Parallel Computing Center Speaker Series. Teleconference from Austin, Texas. August 2nd, 2018.

Seeing the Future: Visual Analysis in the Age of Ubiquitous Computing. Los Alamos National Laboratory Information Science and Technology Seminar Series. Los Alamos, New Mexico. July 25th, 2018.

TACC Intel Visualization Center of Excellence 2017 Report. Intel Parallel Computing Center Speaker Series. Teleconference from Austin, Texas. December 20th, 2017.

Software-Defined In Situ Visualization with KNL on Stampede2. Intel Nerve Center Booth Talk @ SC17. Denver, Colorado. November 15, 2017.

In Situ Workshop Summary: Results Achieved and Next Steps. Intel HPC Developer Conference. Denver, Colorado. November 12, 2017.

IXPUG In Situ Workshop Report - Best Practices and Lessons Learned. 2017 IXPUG US Annual Meeting. Austin, Texas. September 27, 2017.

Remote and In-Situ Visualization at TACC – Best Practices in the Age of Many Core. First International Workshop on US-China Collaborations in Experience and Best Practice in Supercomputing. New Orleans, Louisiana. July 10, 2017.

IXPUG In Situ Workshop Report - Best Practices and Lessons Learned (with Jim Jeffers). Workshop on In Situ Visualization @ ISC17. June 22, 2017.

Software-Defined In-Situ Visualization with KNL on Stampede2. Intel Booth Talk @ ISC17. Frankfurt, Germany. June 21, 2017.

IXPUG In Situ Visualization Workshop Welcome. IXPUG In Situ Visualization Hackathon. Austin, Texas. May 22, 2017.

SDVis and In-Situ Visualization on TACC's Stampede-KNL. Intel HPC Developer Conference. Salt Lake City, Utah. November 13, 2016.

Many-Core Hardware. Guest lecture in Parallel Computing for Scientists and Engineers (UT-Austin courses SDS 374C and SDS 394C). Austin, Texas. April 21, 2016.

Planning for Visualization on the Xeon Phi (with Hank Childs, Ingo Wald, Aaron Knoll). SC15 Birds of a Feather (BOF). Austin, Texas. November 17, 2015.

MPAS-Ocean Rendered with pvOSPRay. Walk-on for Bill Magro Keynote at Intel HPC Developer Conference. Austin, Texas. November 15, 2015.

Introduction to Scientific Visualization and Information Visualization. TACC Summer Supercomputing Institute 2015. Austin, Texas. July 8, 2015.

GLuRay and OSPRay VTK Renderer. Kitware booth talk at SC14. New Orleans, Louisiana. November 18, 2014.

Visualization and Analysis at Exascale: Winning the War on “Big Data”. TACC STAR Partner Workshop. Austin, Texas. September 12, 2014.

TACC, Visualization and You! University of Texas Honors Colloquium. Austin, Texas. July 25, 2014.

Visualization and Analysis at Exascale: Winning the War on “Big Data”. Kitware, Inc. Headquarters. Clifton Park, New York. June 25, 2014.

HPC, Analysis and Visualization with Xeon and Xeon Phi on TACC Stampede. Intel booth talk at SC13. Denver, Colorado. November 20, 2013.

High Fidelity Visualization of Scientific Data (with Tosh Tambe). Intel HPC Roundtable at SC13. Denver, Colorado. November 17, 2013.

Envisioning Scenario Land Use Plans - A GIS Technology Mashup. Panel at Texas GIS Forum, Austin, Texas. October 23, 2013.

TACC, Visualization and You! Invited lecture in How Things Work (UT-Austin course UGS 303). Austin, Texas. October 22, 2013.

TACC, Stampede and Vis. Interview with Steve Waskul for Waskul.tv and Intel at SIGGRAPH. Anaheim, California. July 24, 2013.

Visualization on Stampede. Intel Sponsored Session at SIGGRAPH. Anaheim, California. July 24, 2013.

High-Fidelity Visualization. Industry insider panel with Jon Peddie Research at SIGGRAPH. Anaheim, California. July 24, 2013.

TACC, Visualization and You! University of Texas Honors Colloquium. Austin, Texas. July 19, 2013.

Interactively Visualizing Science Remotely and at Scale. DellXL Consortium Spring Meeting. Santa Cruz, California. April 18, 2013.

GPU Hardware. Guest lecture in Parallel Programming (UT-Austin course CS 380P). Austin, Texas. April 17, 2013.

Enabling the Smart Grid through Big Data. TACC Research Talk at SC12; Salt Lake City, Utah. November 14, 2012.

DisplayCluster: An Interactive Visualization Environment for Tiled Displays. TACC Research Talk at SC12; Salt Lake City, Utah. November 13, 2012.

Enabling the Smart Grid through Big Data. Intel Theater at SC12; Salt Lake City, Utah. November 13, 2012.

How "Big Data" Fits into the Smart Grid Evolution. SXSW Eco; Austin, Texas. October 3, 2012.

How to Succeed in CS, ECE and UT. Magellan's Circle - School of Undergraduate Studies, UT-Austin; Austin, Texas. October 2, 2012.

Smart Homes and Distributed Generation. Panel 37 in Great Lakes Symposium on Smart Grid and the New Energy Economy; Chicago, Illinois. September 26, 2012.

The Stampede Supercomputer and Xeon Phi Processors. Intel Chip Chat episode 227. September 12, 2012.

TACC, Visualization and You! Professor Lecture at Camp Texas; Marble Falls, Texas. August 10 & 12, 2012.

Large Scale Visualization in Linux. Texas Linux Fest. August 4, 2012.

Visualization Clusters: from Tiled Displays to Remote Visualization. Microsoft Research, Seattle, Washington. November 15, 2011.

Visualization Clusters: from Tiled Displays to Remote Visualization. IEEE Cluster 2011, Austin, Texas. September 29, 2011.

General-Purpose GPU Programming: Hardware Considerations. Guest lecture in Parallel Programming (UT-Austin course CS 380P). Austin, Texas. March 28, 2011.

Large-Scale Isosurfacing on a Distributed GPU Cluster. TACC booth, SC10. New Orleans, Louisiana. November 17, 2010.

Large-Scale Isosurfacing on a Distributed GPU Cluster. NVIDIA booth, SC10. New Orleans, Louisiana. November 16, 2010.

Large-Scale Visualizaiton using a GPU Cluster (co-presentation with Byungil Jeong). NVIDIA GPU Technology Conference. San Jose, California. September 20-23, 2010.

Introduction to Longhorn and GPU-based Computing. Lecture and tutorial, IBERGRID 2010. Universidade de Minho. Braga, Portugal. May 28, 2010.

Recent Advances in Large-Scale Visualization. Texas Leadership Society. Austin, Texas. April 22, 2010.

Large-Scale Visualization Technology. Dell HPC Webinar. Austin, Texas. March 30, 2010.

Guest Lecturer for SSC 374E/394E: Visualization and Data Analysis for Scientists and Engineers, Division of Statistics & Scientific Computing, University of Texas at Austin. Fall 2009.

Scripting for Remote Visualization. TACC Summer Supercomputing Institute 2009. Austin, Texas. August 10-14, 2009.

Guest Lecture on Scientific Visualization. Introduction to Scientific/Technical Computing (UT-Austin course SSC 335). Austin, Texas. December 4, 2008.

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SELECT ACADEMIC SERVICE

Chair

Eurographics Symposium on Parallel Graphics and Visualization (PGV) papers: 2015
XSEDE Technical Program: 2016
IXPUG In Situ Visualization Hackathon: 2017 – 2020
SOLAR Ray Tracing Consortium: 2019 – 2020

Committee Member / Panelist

Cloudify Gateways: 2019
Elsevier In Situ Analysis for Computational Science book: 2020
Eurographics Symposium on Parallel Graphics and Visualization (PGV): 2013, 2014
High Performance Data Analysis and Visualization (HPDAV): 2016
High Performance Computing, Networking, Storage, and Analysis (SC): 2015 – 2018
IEEE Visualization (VIS): 2015 – 2017, 2020
IEEE Symposium on Large Data Analysis and Visualization (LDAV): 2014
In Situ Analysis and Visualization (ISAV) Symposium: 2018 – 2020
XSEDE Science Track: 2012, 2013
XSEDE Technology Track: 2012
NSF Information and Intelligent Systems (IIS): 2016, 2020
DOE Advanced Scientific Computing Research (ASCR): 2014, 2017, 2020
DOE Exascale Computing Project Software Technology (ECP-ST) Assessment: 2018 – 2019

Reviewer

ACM Transactions on Programming Languages and Systems (TOPLAS): 2013
ACM Transactions on Graphics (TOG): 2020
Elsevier Computers & Graphics: 2019
Eurographics Symposium on Parallel Graphics and Visualization (PGV): 2012
Hawaii International Conference on System Sciences: 2020
High Performance Computing, Networking, Storage, and Analysis (SC): 2012, 2013
High Performance Graphics (HPG): 2013
IEEE Computer Graphics and Applications (CG&A): 2012, 2013, 2019
IEEE Visualization (VIS): 2011 – 2013
IEEE Visualization Security (VizSec): 2018
IEEE Visual Analytics Science and Technology (VAST): 2016, 2019 – 2020
IEEE Transactions on Parallel and Distributed Systems (TPDS): 2014
IEEE Transactions on Visualization and Computer Graphics (TVCG): 2014 – 2017, 2020
Journal of Computer Science and Technology: 2012, 2013
NSF Information and Intelligent Systems (IIS) ad hoc review: 2013, 2017, 2019 – 2020

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SELECT RECOGNITION

Best Paper Award – Eurographics Symposium on Parallel Graphics and Visualization, 2012

Best Visualization Showcase – Eurographics Symposium on Parallel Graphics and Visualization 2015

Finalist, Illustration – NSF International Science & Engineering Visualization Challenge, 2010

White House Fellows Regional Finalist, 2013

Tejas Club Life Raft Debate Champion, 2013

University of Texas Friar Society, inducted spring 1999

Phi Beta Kappa, inducted spring 1999

Dean's Distinguished Graduate in Liberal Arts, 1999

Plan II Model Thesis award, 1999

Texas Exes Edward S. Guleke award, 1998

University of Texas Parents' Association Outstanding Student, 1998