

Eric Shaffer

Department of Computer Science
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RESEARCH AREAS Data analytics, visualization, scientific computing, geometry processing, computer graphics, computer science and education.

EDUCATION **PhD Computer Science**, University of Illinois at Urbana-Champaign, 2005
Thesis: Scalable Methods for Processing Massive Geometric Meshes
Advisor: Professor Michael Garland
MS Computer Science, University of Minnesota, Minneapolis, 1996
BS Mathematics and Computer Science, University of Illinois at Urbana-Champaign, 1992

EXPERIENCE **Teaching Assistant Professor** **August 2014 – Present**
Department of Computer Science **University of Illinois**
Responsibilities include developing and teaching courses on Virtual Reality, Computer Graphics, Scientific Visualization, and Numerical Methods. Created and teach the online course Elements of Game Design. Named as Teacher Ranked as Excellent by Their Students.

I also maintain an active research program, developing data analytics and visualization tools. Have served as Principal Investigator (PI) on grants from Exxon-Mobil, The Boeing Company, Caterpillar, and the US Department of Energy. Brought in \$2.5 million in research funding to the University of Illinois.

Assistant Director **January 2013 – August 2014**
Research Scientist/Technical Manager **August 2007 – January 2013**
Computational Science and Engineering **University of Illinois**

Responsible for stewarding the research and educational programs in Computational Science and Engineering, focusing on multi-disciplinary computational science. Co-PI and software development manager for a DOE-funded project to develop visualization tools for oil recovery efforts.

Postdoctoral Research Associate **2005 – 2007**
Center for Simulation of Advanced Rockets **University of Illinois**
Worked on and became technical lead for the meshing team at the DOE-funded Center for Simulation of Advanced Rockets. The Center created the first fully three-dimensional simulation capability for rocket engines, with the capstone being a multi-physics simulation of a 70 million element rocket engine run over the course of three months on over 1000 processing elements.

Research Assistant **2002 – 2005**
Computer Science Department **University of Illinois**

Research Programmer **1996 – 2002**
Pablo Research Group **University of Illinois**

Programmer **1992 – 1994**
IBM **Rochester, MN**

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TEACHING

Named as Teacher Ranked as Excellent by Their Students

- CS 519: Scientific Visualization, Fall 2016, 2017
- CS 419: Production Computer Graphics, Spring 2016, 2017

Courses Taught

- CS 450: Numerical Analysis, Online MCS Spring 2019
University of Illinois, 10 student pilot course
- CS 498VR: Virtual Reality, Fall 2018, Spring 2019
University of Illinois, approximately 200 students per semester.
- CS 199GAM: Elements of Game Design, Winter Session 2018, 2019
University of Illinois, approximately 30 students per session.
- CS 418: Interactive Computer Graphics, Fall 2014–2016, Spring 2017–2019
University of Illinois, approximately 200 students per semester.
- CS 419: Production Computer Graphics, Fall 2014 and 2018, Spring 2016, 2017
University of Illinois, approximately 40 students per semester
- CS 357: Numerical Methods , Spring 2013, 2015, 2016
University of Illinois, approximately 200 students per semester
- CS 519: Scientific Visualization, Spring 2011, 2015, Fall 2015, 2016
University of Illinois, approximately 40 students per semester
- CS 498ES: Undergraduate Research Lab, Fall 2013
University of Illinois, 15 students.
- INFO 103: Introductory Programming for Informatics, Fall 2009–Fall 2012
University of Illinois, 90 students per semester.
- CS 173: Discrete Mathematics, Fall 2008–Spring 2009
University of Illinois, Co-lecturer, 200 students per semester.
- CS 225: Data Structures and Software Principles, Fall 2007–Spring 2008 University of Illinois, Co-lecturer, 220 students per semester.

CURRENT AND PAST GRANTS

Microsoft: Gift of 30 HMDs for the VR Lab [\$6000]	2018
UIUC SIIP: <i>Implementing Process Oriented Guided Inquiry Learning</i> Eric Shaffer (co-PI) [\$12,000]	2018-2019
Exxon-Mobil: <i>Computational Tools for Analysis of Disparate Reservoir Models</i> Eric Shaffer (PI) [\$410,000]	2013 –2018
Dept. of Energy: <i>3-D Visualization and Analysis of Oil and Gas Resources.</i> Eric Shaffer (co-PI) [\$700,000]	2011 – 2015
The Boeing Company: <i>Boeing-UIUC Uncertainty Quantification for CFD</i> Eric Shaffer (PI) [\$70,000]	2012 – 2013
The Boeing Company: <i>Boeing-UIUC Meshing Collaboration</i> Eric Shaffer (PI) [\$500,000]	2007 – 2012
The Boeing Company: <i>Fluid-Structure Interaction Coupling for Aeroelastic Simulations</i> Eric Shaffer (PI) [\$240,000]	2010
Caterpillar Inc.: <i>Meshing and Visualization for Cut-Cell Methods</i> Eric Shaffer (PI) [\$250,000]	2007 – 2009

SELECTED
PUBLICATIONS

Efficient Parallel Optimization of Volume Meshes on Heterogeneous Computing Systems. Z. Cheng, E. Shaffer, R. Yeh, G. Zagaris, L. Olson. Engineering with Computers. 2017.

Deferred Ray Tracing Using Intersection Binning. A.I. Ellis, E. Shaffer, J.C. Hart. High-Performance Graphics, Poster, 2017

How Does the Connectivity of Open-framework Conglomerates within Multi-scale Hierarchical Fluvial Architecture Affect Oil-sweep Efficiency in Waterflooding? N. Gershenzon, M. Soltanian, R. Ritzi, D. Dominic, D. Keefer, E. Shaffer. Geosphere. 2015.

Efficient GPU-based Optimization of Volume Meshes. E. Shaffer, Z. Cheng, R. Yeh, G. Zagaris, L. Olson. International Conference on Parallel Computing - ParCo2013. Sept. 2013.

Mining for Hydrologic Features in LiDAR Data. R. Reizner, E. Shaffer, B. Birman. DMIN'13: The 9th International Conference on Data Mining. July 2013.

GPU Accelerated Derivative-free Mesh Optimization. E. Shaffer and G. Zagaris. GPU Computing Gems Vol. 2. Oct. 2011

Robust Classification of Curvilinear and Surface-Like Structures in 3d Point Cloud Data. M. Kamali, M. Stroila, J. Cho, E. Shaffer, J. C. Hart. ISVC 2011

CoMoTo - the Collaboration Modeling Toolkit. Charlie Meyer, C. Heeren, E. Shaffer, and J. Tedesco. ACM ITiCSE. June 2011.

A Toolkit for Parallel Overset Grid Assembly Targeting Large-Scale Moving Body Aerodynamic Simulations G. Zagaris, M.T. Campbell, D.J. Bodony, E. Shaffer and M. D. Brandyberry. Proceedings of the 19th International Meshing Roundtable. Oct. 2010.

Streaming Mesh Optimization for CAD. Tian Xia, Eric Shaffer. 4th International Symposium on Visual Computing. Dec. 2008.

Streaming Tetrahedral Mesh Optimization. T. Xia and E. Shaffer. Poster paper, ACM Solid and Physical Modeling Symposium Proceedings, June 2008.

Parallel Mesh Adaptation for Highly Evolving Geometries with Application to Solid Propellant Rockets. D. Guoy, T. Wilmarth, P. Alexander, X. Jiao, M. Campbell, E. Shaffer, R. Fiedler, W. Cochran, and P. Suriyamongkol. Proceedings 16th Int. Meshing Roundtable, October 2007.

A Multiresolution Representation for Massive Meshes. E. Shaffer and M. Garland. IEEE Transactions on Visualization and Computer Graphics, March-April 2005.

A Multiphase Approach to Efficient Surface Simplification. M. Garland and E. Shaffer. Proceedings of IEEE Visualization 2002, October 2002.

Efficient Adaptive Simplification of Massive Meshes. E. Shaffer and M. Garland. Proceedings of IEEE Visualization 2001, October 2001.

Virtue: Immersive Performance Visualization of Parallel and Distributed Applications. E. Shaffer, S. Whitmore, B. Schaeffer, and D. Reed. IEEE Computer, December 1999.

Eric Shaffer

PROFESSIONAL ACTIVITIES	Reviewer for the International Meshing Roundtable 2012, 2015, 2016 Reviewer for ACM SIGGRAPH 2003, 2010 Reviewer for IEEE Visualization 2004 – 2007 Reviewer for InfoVis 2004 – 2007 Reviewer for Elsevier journal Parallel Computing Reviewer for IEEE Computer Graphics and Applications Member of the IEEE Computer Society	
UNIVERSITY SERVICE	Undergraduate Study Committee (Department of Computer Science) Online Committee (Department of Computer Science) Instructional Designer Search Committee (Department of Computer Science) CS Department Head Search Committee (College of Engineering) NCSA Year of Cyberinfrastructure Working Group	2017-present 2018-present 2018 2018 2015