

Aaron M. Knoll

Address: SCI Institute, University of Utah. 72 S Central Campus Dr, Salt Lake City, UT 84112

Phone: (801) 455-2809 **Email:** knolla@sci.utah.edu **Web:** <http://www.sci.utah.edu/~knolla/>

Education:

University of Utah, Salt Lake City, UT (October 2004-December 2008)

PhD in Computer Science. Advisor: Charles D. Hansen.

Dissertation: “Ray Tracing Implicit Surfaces for Interactive Visualization”

University of Essex, Colchester, United Kingdom (September 2001- July 2002)

MSc, Electronic Systems Engineering. Thesis: “Primates: an Interactive Agents Simulation.”

Washington and Lee University, Lexington, VA, (1997-2001)

Bachelor of Science, Double-major in Mathematics and Computer Science.

Work Experience:

Scientific Computing and Imaging Institute, University of Utah, Salt Lake City, UT

Research Computer Scientist (April 2014 – current)

Member of Center for Extreme Data Management, Analysis and Visualization (CEDMAV), Valerio Pascucci.

Intel Parallel Computing Center for Data Analysis and Visualization (I4DAV) – PI

Guest Faculty Researcher, Argonne National Laboratory

Current Projects: Intel IPCC (PI), Argonne Nanoview (co-PI), DOD PETTT (Neptune)

Texas Advanced Computing Center, the University of Texas at Austin, Austin, TX

Research Associate, Scalable Visualization Technologies (July 2012 – March 2014)

Argonne National Laboratory, Chicago, IL

Computational Postdoctoral Fellow, Mathematics and Computer Science (MCS), (July 2010 – July 2012)

University of Kaiserslautern, Rheinland-Pfalz, Germany

Postdoctoral Fellow (January 2009 – July 2010)

Intel Corporation, Santa Clara, CA

Intern, Graphics group, CTG/Intel Labs (September-December 2007)

Grants, Contracts and Gifts:

Intel Parallel Computing Center (“Applied Visualization, Computing and Analysis”)

\$300K gift, (10/2016 – 10/2018), PI

Intel Parallel Computing Center (“IPCC for Data Analysis and Visualization”)

\$300K gift, (10/2014 – 10/2016), PI

Nanoview Project with Argonne National Laboratory. \$240K subcontract, (5/2013 – 5/2016), co-PI.

(PI: Valerio Pascucci, University of Utah)

Selected Publications:

1. Kui Wu, **Aaron Knoll**, Ben Isaac, Hamish Carr, and Valerio Pascucci. Direct Multifield Volume Ray Casting of Fiber Surfaces. *IEEE Visualization (SciVis) 2016*.
2. Ingo Wald, Greg P. Johnson, Jefferson Amstutz, Carson Brownlee, **Aaron Knoll**, James Jeffers, Johannes Guenther, and Paul Navratil. OSPRay: A CPU Ray Tracing Framework for Scientific Visualization. *IEEE Visualization (SciVis) 2016*.
3. A.V. Pascal Grosset, Manasa Prasad, Cameron Christensen, **Aaron Knoll**, Charles D. Hansen. TOD-Tree: Task-Overlapped Direct send Tree Image Compositing for Hybrid MPI Parallelism and GPUs. *IEEE Transactions on Visualization & Computer Graphics, 2016*
4. Ingo Wald, **Aaron Knoll**, Gregory P. Johnson, Will Usher, Valerio Pascucci and Michael E. Papka. CPU Ray Tracing Large Particle Data with Balanced P-k-d Trees. *IEEE Visualization (SciVis) 2015*.
5. Attila Gyulassy, **Aaron Knoll**, Kah Chun Lau, Bei Wang, Peer-Timo Bremer, Valerio Pasucci, Michael E. Papka and Larry Curtiss. Interstitial and Interlayer Ion Diffusion Geometry Extraction in Graphitic Nanosphere Battery Materials. *IEEE Visualization (SciVis) 2015*.
6. Hamish Carr, Zhao Geng, Julien Tierny, Amit Chattopadhyay, and **Aaron Knoll**. Fiber Surfaces: Generalizing Isosurfaces to Bivariate Data. *Computer Graphics Forum 34(3), p 241–250, 2015. (Proceedings of Eurovis 2015)*
7. Sidharth Kumar, John Edwards, Peer-Timo Bremer, **Aaron Knoll**, Cameron Christensen, Venkatram Vishwanath, Phil Carns, John Schmidt, Valerio Pascucci. Efficient I/O and storage of adaptive-resolution data, *ACM Supercomputing 2014*.
8. **Aaron Knoll**, Ingo Wald, Paul Navratil, Anne Bowen, Khairi Reda, Michael E. Papka, Kelly Gaither. RBF Volume Ray Casting on Multicore and Manycore CPUs. *Computer Graphics Forum (proc. Eurovis), 2014*.
9. Khairi Reda, Alessandro Febretti, **Aaron Knoll**, Jillian Aurisano, Jason Leigh, Andrew E. Johnson, Michael E. Papka, Mark Hereld. Visualizing Large, Heterogeneous Data in Hybrid-Reality Environments. *IEEE Computer Graphics and Applications 33(4), pp 38-48, 2013*.
10. David Duke, Hamish Carr, **Aaron Knoll**, Nicholas Schunck, Hai Ah Nam, and Andrzej Staszczak. Visualizing Nuclear Scission Through a Multifield Extension of Topological Analysis. *IEEE TVCG (IEEE Visualization 2012)*

11. **Aaron Knoll**, Sebastian Thelen, Ingo Wald, Charles Hansen, Hans Hagen, Michael Papka. Full-Resolution Interactive CPU Volume Rendering with Coherent BVH Traversal. *IEEE Pacific Vis 2011*
12. **Aaron Knoll**, Younis Hijazi, Rolf Westerteiger, Mathias Schott, Charles Hansen, and Hans Hagen. Volume Ray Casting with Peak Finding and Differential Sampling. *IEEE TVCG (proc. IEEE Visualization 2009)*
13. **Aaron Knoll**, Younis Hijazi, Andrew Kensler, Mathias Schott, Charles Hansen and Hans Hagen. Fast Ray Tracing of Implicit Surfaces with Interval and Affine Arithmetic. *Computer Graphics Forum, 2009.*
14. **Aaron Knoll**, Ingo Wald, Steven Parker, and Charles Hansen. Interactive Isosurface Ray Tracing of Large Octree Volumes. In *Proc. IEEE Symposium on Interactive Ray Tracing, 2006.*
15. Ingo Wald, Thiago Ize, Andrew Kensler, **Aaron Knoll**, and Steven G. Parker. Ray Tracing Animated Scenes with Coherent Grid Traversal. *ACM TOG, (proc. SIGGRAPH 2006.)*

Service:

PC member:

Eurovis 2013, 2014, 2015, 2016
IEEE Large Scale Data Analysis and Visualization (LDAV) 2014, 2015, 2016
Eurographics Symposium on Parallel Graphics and Visualization 2015, 2016

Reviewer:

IEEE Visualization (Visweek)
IEEE Pacific Visualization
IEEE Transactions on Visualization and Computer Graphics (TVCG)
The Visual Computer
Computer Graphics Forum
IEEE Transactions on Medical Imaging (TMI)

Teaching:

CS5630/CS6630: Data Visualization, Fall 2016, University of Utah, Alexander Lex – guest lecturer
(Fall 2015, Fall 2016)
SCI Visualization seminar -- organizer (Spring 2015, Fall 2016, Spring 2017)
Visualization in Practice course, Spring 2010, University of Kaiserslautern.
Algorithmic Geometry, Fall 2009. University of Kaiserslautern.

Patents:

Ray Tracing a Three Dimensional Scene Using a Grid. US 20100194751 A1

PhD Students mentored:

Will Usher, Pavol Klacansky, Duong Thai Hoang (Valerio Pascucci, University of Utah).
Kui Wu (Cem Yuksel, University of Utah)
Qi Wu, Pascal Grosset (Chuck Hansen, University of Utah)
T.A. Judicael Ouermi, John Holmen (Martin Berzins, University of Utah)

Graduated PhD students mentored:

Khairi Reda – Indiana University Indianapolis (Jason Leigh, University of Illinois Chicago)
Natallia Kotava, Rolf Westerteiger, Sebastian Thelen (Hans Hagen, University of Kaiserslautern)

Selected Collaborators:

Michael E. Papka (Argonne National Laboratory); Ingo Wald (Intel Corporation); Hamish Carr (University of Leeds);
Khairi Reda (Indiana University Indianapolis); Valerio Pascucci (University of Utah); Charles D. Hansen (University of Utah); Martin Berzins (University of Utah).

Honors and Awards:

International Game Developers Association (IGDA) Scholarship, Game Developers Conference 2006
Pi Mu Epsilon, National Mathematical Honors Society, 2001