

## **Aaron M. Knoll**

Phone: (801) 542-9504

knolla “.@.” cs.utah.edu

<http://www.cs.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, computer game engineering.

Thesis: “Primates: an Interactive Agents Simulation with DirectX”

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

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

### **Work Experience:**

*Argonne National Laboratory, Chicago, IL*

Computational Postdoctoral Fellow, (September 2010 - )

Mathematics and Computer Science (MCS) division

Supervisor: Michael E. Papka.

Research in large-scale visualization in high performance computing environments.

Assist materials scientists with visualization and production needs.

*University of Kaiserslautern, Rheinland-Pfalz, Germany*

Postdoctoral Research Fellow (January 2009 – August 2010)

Research in GPU volume rendering and improved classification methods.

Instructor: Software Practice: Scientific Visualization (Fall 2009)

Alegbraic Geometry II (Spring 2010)

International Research Training Group (IRTG 1131) student affiliate (2006-2008)

Workshops and talks from Kaiserslautern-Utah collaboration:

Dagstuhl (June 2006), “Interactive Isosurface Ray Tracing with Octree Volumes”

University of Utah (November 2007), “Coherent Multiresolution Volume Ray Tracing”

University of Kaiserslautern (September 2008), “A Survey of Implicit Rendering Methods”

*Intel Corporation, Santa Clara, CA*

Graphics research assistant intern (October-December 2007)

Supervisor: Jim Hurley, Corporate Technology Group (CTG)

Projects: Ray tracing methods for arbitrary higher-order surfaces

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

Research Assistant for Charles Hansen (2005-2008)

Funded through NSF VACET, DOE VIEWS, and Los Alamos National Laboratory.

Projects: Interactive ray tracing of large structured volume data (2004-2005)

GPU-assisted visualization of large unstructured volumes (summer 2007)

CSAFE (summer 2008)

*School of Computing, University of Utah, Salt Lake City, UT*

Teaching Assistant, “Network Game Design” (Spring 2005)

## Work Experience (continued):

*Saffire Corporation, American Fork, UT*

Game Software Engineer (2002 – 2004)

Credits: *Van Helsing* (PS2, Xbox)

*The Hobbit* (GBA)

*Around the World in 80 Days* (GBA)

Audio engine, localized user interface, AI, and graphics on Xbox, PS2 and Gamecube platforms.  
Implemented production tools and scripts in Java and Perl.

*Washington and Lee University, Lexington, VA*

Computer Science Lab Assistant, Dept. of Computer Science (2000)

Tutor, Dept. of Mathematics (2000-2001)

Volunteered assistance for calculus students.

University Computing Helpdesk, Support Staff (1998-2000)

Technical support for faculty, staff and students.

Administered university computer labs with Novell Netware.

*Worldstyle, Inc. Paris, France.*

Web designer/editor (1998)

Developed web pages and Java applets, edited and translated articles.

## Selected Publications:

Aaron Knoll, Sebastian Thelen, Ingo Wald, Charles Hansen, Hans Hagen, Michael Papka. "Full-Resolution Interactive CPU Volume Rendering with Coherent BVH Traversal" (*proc. IEEE Pacific Vis 2011, to appear*)

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. Visualization 2009)*

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.*

Aaron Knoll, Ingo Wald and Charles Hansen. "Coherent Multiresolution Isosurface Ray Tracing", *The Visual Computer, 2009.*

Aaron Knoll, Younis Hijazi, Charles Hansen, Ingo Wald, and Hans Hagen. "Interactive Ray Tracing of Arbitrary Implicits with SIMD Interval Arithmetic." *proc. 2<sup>nd</sup> IEEE/EG Symposium on Interactive Ray Tracing, 2007*

Ingo Wald, Heiko Friedrich, Aaron Knoll, and Charles Hansen "Interactive Isosurface Ray Tracing of Time-Varying Tetrahedral Volumes" *IEEE TVCG (proc. Visualization 2007)*

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.*

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.)*

## Invited Talks:

"Volume Rendering with Peak Finding and Differential Sampling"  
Université Louis Pasteur, Strasbourg, France, May 2009

"Fast and Robust Ray Tracing of Arbitrary Implicits"  
Brown University, invited by David Laidlaw. November 2007

**Invited Talks (continued):**

“Various Methods for Ray Tracing Implicits”

University of Texas at Austin graphics group, invited by Bill Mark. March 2007

“Coherent Multiresolution Isosurface Ray Tracing: Lessons in Ray Tracing Level-of-Detail”

University of Texas at Austin graphics group (Bill Mark). November 2006

**Activities:**

Graduate School Advisory Committee (GradSAC), (2007 - 2008)

Assisted incoming graduate students with advice.

Organized events for graduate school students and faculty

Participated in hiring and RPT for incoming and existing faculty.

SIGDA, University of Utah

Student chapter of the International Game Development Association

President, (2004-2005) and Vice-President (2005-2006)

Organized invited talks

“AI and emergent behavior in Half-Life 2”, T. Leonard, Valve Software

“Photon Mapping for Realistic Baked Textures in Halo 2”, L. Timmins, Bungie Entertainment

**Honors and Awards:**

IRTG Scholarship, Game Developers Conference 2006

*Pi Mu Epsilon*, National Mathematical Honors Society, 2001

**Skills:**

Programming Languages: C++, C, Java, Perl, Python, ML

**Spoken Languages:**

English and French.

**References:**

- Charles Hansen, Associate Professor, University of Utah and Assoc. Director, SCI Institute
- Ingo Wald, Research Assistant Professor, University of Utah, and research staff Intel Corp.
- Steven G Parker, Assistant Professor, University of Utah
- Hans Hagen, Prof. Dr. and Director, Computer Science Dept, University of Kaiserslautern
- Brian Christensen, Manager, Saffire Corp.

Contact information available upon request.