

rt08

IEEE/ EG Symposium on Interactive Ray Tracing 2008

Los Angeles, California, USA

August 9 - 10, 2008

Proceedings



SPONSORED BY IEEE COMPUTER SOCIETY VISUALIZATION AND GRAPHICS TECHNICAL COMMITTEE
AND EUROGRAPHICS ASSOCIATION IN COOPERATION WITH THE ASSOCIATION FOR COMPUTING
MACHINERY

Contents

Corporate Supporters.....	vi
Message from the Chairs.....	vii
IEEE Computer Society Visualization and Graphics Technical Committee.....	viii
Conference Committee.....	ix
International Program Committee.....	ix
External Reviewers.....	ix
Keynote Address: Portable Software Development for Multi-core Processors, Many-core Accelerators, and Heterogeneous Architectures..... Michael McCool (University of Waterloo)	x
Keynote Address: Ray Tracing: Strengths and Opportunities..... Eric Haines (Autodesk)	xi

Papers

Session 1: Novel Acceleration Structures

Ray-Specialized Acceleration Structures for Ray Tracing..... Warren Hunt, William R. Mark	3
Adaptive Acceleration Structures in Perspective Space..... Warren Hunt, William R. Mark	11
Raytracing Prefiltered Occlusion for Aggregate Geometry..... Dylan Lacewell, Brent Burley, Solomon Boulos, Peter Shirley	19
Row Tracing using Hierarchical Occlusion Maps..... Ravi P. Kammaje, Benjamin Mora	27

Session 2: Bigger Wider Better

Multi Bounding Volume Hierarchies..... Manfred Ernst, Günther Greiner	35
Large Ray Packets for Real-time Whittted Ray Tracing..... Ryan Overbeck, Ravi Ramamoorthi, William R. Mark	41
Getting Rid of Packets – Efficient SIMD Single-Ray Traversal using Multi-branching BVHs..... Ingo Wald, Carsten Benthin, Solomon Boulos	49
Coherent Ray Tracing via Stream Filtering..... Christiaan P. Gribble, Karthik Ramani	59

Session 3: Improving Traditional Acceleration Structures

Improving Kd-tree Quality at a Reasonable Construction Cost..... Alexei Soupikov, Maxim Shevtsov, Alexander Kapustin	67
Tree Rotations for Improving Bounding Volume Hierarchies..... Andrew Kensler	73
Corrections to the Surface Area Metric with Respect to Mail-Boxing..... Warren A. Hunt	77

Fast Agglomerative Clustering for Rendering.....	81
Bruce Walter, Kavita Bala, Milind Kulkarni, Keshav Pingali	

Session 4: Complex Effects

Interactive Volumetric Shadows in Participating Media with Single-Scattering.....	87
Chris Wyman, Shaun Ramsey	
Simulation of Fluorescent Concentrators	93
Marion Bendig, Johannes Hanika, Holger Dammertz, Jan Christoph Goldschmidt, Marius Peters, Michael Weber	
A Lighting Model for Fast Rendering of Forest Ecosystems	99
Robert Geist, Jay Steele	
Towards Interactive Global Illumination Effects via Sequential Monte Carlo Adaptation	107
Vincent Pegoraro, Carson Brownlee, Peter S. Shirley, Steven G. Parker	

Session 5: New Traversal/Update Algorithms

RTfact: Generic Concepts for Flexible and High Performance Ray Tracing	115
Iliyan Georgiev, Philipp Slusallek	
Efficient Clustered BVH Update Algorithm for Highly-Dynamic Models	123
Kirill Garanzha	
Adaptive Ray Packet Reordering.....	131
Solomon Boulos, Ingo Wald, Carsten Benthin	
Interactive Particle Tracing in Dynamic Scenes consisting of NURBS Surfaces	139
Jakob Bärz, Oliver Abert, Stefan Müller	

Session 6: Modifications of Traditional Acceleration Structures

Interactive SIMD Ray Tracing for Large Deformable Tetrahedral Meshes	147
Matthias Groß, Hans Hagen, Franz-Josef Pfreundt	
The Edge Volume Heuristic - Robust Triangle Subdivision for Improved BVH Performance.....	155
Holger Dammertz, Alexander Keller	
Ray Tracing with the BSP Tree.....	159
Thiago Ize, Ingo Wald, Steven G. Parker	
Accelerated Building and Ray Tracing of Restricted BSP Trees.....	167
Brian C. Budge, Daniel Coming, Derek Norpchen, Kenneth I. Joy	

Poster Abstracts

Augenblick: A user-friendly and extensible Realtime Ray Tracing Architecture.....	177
Oliver Abert	
A straightforward CUDA Implementation for Interactive Ray-Tracing	178
Brian C. Budge, John C. Anderson, Christoph Garth, Kenneth I. Joy	
Hardware Architecture Design and Implementation of Ray-Triangle Intersection with Bounding Volume Hierarchies.....	179
Chen-Haur Chang, Chuan-Yiu Lee, Shao-Yi Chien	
Ray Tracing NPR-Style Feature Lines	180
A.N.M. Choudhury, Steven Parker	
Ray Tracing on an Architecture Built From Reusable IP Components.....	181
Andrew Cox, Agis Theodoropoulos, Jacob Bramley, Robert Catheral, Richard Bruce	

Ray Traversal of Octree Point Clouds on the GPU.....	182
Aaron Knoll	
Comparing Incoherent Ray Performance of TRaX vs. Manta	183
Danny Kopta, Josef Spjut, Erik Brunvand, Steve Parker	
Accelerating Ray Tracing using Constrained Tetrahedralizations	184
Ares Lagae, Philip Dutré	
High-Speed Volume Ray Casting with CUDA.....	185
Lukáš Maršálek, Armin Hauber, Philipp Slusallek	
A Split Node Cache Scheme for Fast Ray Tracing	186
Jae-ho Nah, Jin-suk Heo, Woo-chan Park, Tack-don Han	
An FPGA Implementation of Whitted-style Ray Tracing Accelerator	187
Woo-Chan Park, Jae-ho Nah, Jeong-Su Park, Kyung-Ho Lee, Dong-Seok Kim, Sang-Duk Kim, Jin-Hong Park, Cheong-Ghil Kim, Yoon-Sig Kang, Sung-Bong Yang, Tack-Don Han	
Run-Time Code Generation for Materials	188
Stephan Reiter	
A Proposal for Terminology Related to Ray Tracing.....	189
Peter Shirley	
kd-Tree Traversal Techniques.....	190
John A. Tsakok, William Bishop, Andrew Kennings	
Author Index.....	Inside Back Cover