

SIGGRAPH 93
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COURSE NOTES 03

Developing Large-Scale Graphics Software Toolkits

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Developing Large-Graphics Software Toolkits

SIGGRAPH '93 Course 3

Sunday, August 1, 1993

Ben Trumbore, Paul S. Strauss

Course Organizers

Course Abstract

This course presents case studies in the development of large-scale software systems for computer graphics. These toolkits and testbeds are designed both to facilitate the implementation of popular algorithms and to support research into new methods. The presented systems deal with modeling, rendering, animation, and interaction. Design goals, successes, failures, and modifications are discussed.

Speaker Biographies

Andrew Glassner is a Member of the Research Staff at the Xerox Palo Alto Research Center (PARC). He received his B.S. in Computer Engineering from Case Western Reserve University, and his M.S. and Ph.D. in Computer Science from the University of North Carolina at Chapel Hill. Dr. Glassner's research interests are directed towards efficiently creating realistic and expressive three-dimensional images, models, and animation. His technical publications include papers on creative modeling, texture mapping, and ray tracing, as well as techniques for color manipulation and digital sound editing. He also edited *An Introduction to Ray Tracing* and is the creator and editor of the *Graphics Gems* series.

Eben Ostby is an Animation Scientist in Pixar's Animation Group. He is a principal architect of Menv, Pixar's 3D animation and modelling system, and has been a technical director on several of Pixar's short films. He has an A.B. from Vassar College and an Sc.M. from Brown University in Computer Science. Much of his current work is related to film production.

Paul S. Strauss is a Member of Technical Staff in the Visual Magic Division of Silicon Graphics. He is one of the principal architects of the IRIS Inventor 3D Graphics Toolkit. He received an Sc.B. from Brown University, an M.S. from the University of California, Berkeley, and a Ph.D. from Brown, all in Computer Science. His research interests include graphics application development environments, lighting models, and ray tracing.

Ben Trumbore is on the research staff of the Cornell University Program of Computer Graphics. His primary responsibility there has been to coordinate the construction of a Testbed for Image Synthesis, which supports rendering research and image/animation production. His research interests include realistic image synthesis, efficient algorithms, and rendering extremely complex environments.

Bob Zeleznik is currently a Research Scientist at Brown University. He graduated from Brown in 1989 with an M.S. in computer science, and for the past three years he has worked in the Brown Computer Graphics Group headed by Andy Van Dam and John Hughes. During that time he led the animation and user-interaction design project which resulted in the Unified Graphics Architecture (UGA) presented at Siggraph '91. His current research focuses on language-level and distributed system extensions to UGA, and on visual programming paradigms for specifying interactive 3D models.

Schedule

Speaker	Topic	Time
Paul Strauss	Introduction	0 10
Andrew Glassner	The Spectrum Rendering System	1 15
Eben Ostby	The MENV Modeling and Animation System	1 00
Paul Strauss	The IRIS Inventor Interactive 3D Graphics Toolkit	1 00
Ben Trumbore	The Cornell University Testbed for Image Synthesis	1 15
Bob Zeleznik	Brown University's UGA system	1 00
All	Conclusions, Questions, and Answers	0 50

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1	The <i>Spectrum</i> Architecture	1-1 to 1-13
	<i>Spectrum</i> An Architecture for Image Synthesis Research, Education, and Practice	1-14 to 1-44
2	Implementation of MENV	2-1 to 2-13
	The Menv Modelling and Animation Environment (reprint)	2-14 to 2-21
3	Some IRIS Inventor Design Decisions	3-1 to 3-10
	An Object-Oriented 3D Toolkit (reprint)	3-11 to 3-19
	IRIS Inventor Nodes Quick Reference	3-20 to 3-36
4	The Cornell University Testbed for Image Synthesis	4-1 to 4-6
	A Testbed for Image Synthesis (reprint)	4-7 to 4-19
	The MID File Format	4-20 to 4-31
	The C++ Testbed Directory Structure	4-32 to 4-35
5	An Object-Oriented Framework for the Integration of Interactive Animation Techniques (slides)	5-1 to 5-11
	An Object-Oriented Framework for the Integration of Interactive Animation Techniques (reprint)	5-12 to 5-19