Introduction to Computer Graphics

Organizer
MIKE BAILEY
San Diego Supercomputer Center and
University of California at San Diego

Lecturers
ANDREW GLASSNER
Microsoft Corporation

PATRICIA WENNER
Bucknell University

Course 21 NOTES

Introduction to Computer Graphics

Course Notes for SIGGRAPH '95

Course Organizer

Michael Bailey
San Diego Supercomputer Center, and
University of California at San Diego

Course Speakers

Andrew Glassner
Microsoft Research

Patricia Wenner
Bucknell University

Computer graphics is an exciting field of endeavor, but it is often difficult for a newcomer to get started. This course is that opportunity. The topics being presented will address many areas within computer graphics and treat each from the point of view of "why-do-I-care" and "how-to." Those who take this course will emerge well-prepared to take on further study, including the taking of other SIGGRAPH courses. Attendees will also be ready to take on the vendor show and better appreciate the Electronic Theater. We hope you enjoy reading and using these notes as much as we enjoyed preparing them.

– Mike Bailey, Course Organizer

Take them, use them, bring them to the masses.
Shake them, lose them, sing them to your classes.
Tiles of tides, piles of slides.
Piles of slides that no-one derides.
Slides of knowledge, slides of power – slides that last a half an hour.
Small slides. Blue slides. Old-hat and what's-new slides.
Take a slide and project it wide.
Project it far and make it tall, a slide's a slide that's seen by all.
SIGGRAPH slides go into holders, printed pages go into folders.
We teach. We teach in courses. We teach whatever the market enforces.
You want pixels? You want rays?
We'll lead you through the graphics maze.

– Andrew Glassner, Course Poet

About the Speakers

Dr. Michael J. Bailey

Mike Bailey is a researcher at the San Diego Supercomputer Center and a faculty member in Applied Mechanics and Engineering Sciences at the University of California at San Diego. Mike received his Ph.D. in 1979 and has since worked at Sandia National Laboratories, Purdue University, Megatek, SDSC, and UCSD. Mike's areas of interest include scientific visualization, computer aided design, and rapid prototyping. He has authored numerous papers on the use of computer graphics in engineering and science. Mike has served on the SIGGRAPH Executive Committee and was SIGGRAPH conference co-chair in 1991. Mike has also served as SIGGRAPH Courses Chair in 1984, 1985, 1987, 1988, and 1994.

Dr. Andrew S. Glassner

Andrew Glassner is a researcher with Microsoft Research, where he invents new computer graphics. He has also worked at Xerox PARC, the IBM T.J. Watson Research Lab, Bell Communications Research, the Delft University of Technology, and the New York Institute of Technology (NYIT) Computer Graphics Lab. He has published numerous technical articles on rendering theory and practice, modeling, animation, and new media. Dr. Glassner authored *3D Computer Graphics: A Handbook for Artists and Designers*, edited *An Introduction to Ray Tracing*, and created the *Graphics Gems* series for programmers. He is on the editorial boards of ACM Transactions on Graphics, IEEE Computer Graphics Applications, and the Journal of Graphics Tools. He has served on papers committees for both the Eurographics and SIGGRAPH conferences, and he chaired the Papers Committee for SIGGRAPH '94. His most recent book, *Principles of Digital Image Synthesis*, is a two-volume text on the principles of rendering theory for computer graphics.

Dr. Patricia Wenner

Patricia Wenner is a professor of Computer Science at Bucknell University in Lewisburg, PA. She received her Ph.D. from George Washington University and has worked in several information systems positions, the Census Bureau, Walter Reed Army Institute of Research, and Bucknell. At George Washington University, she lead the effort to implement GWCORE. Pat served as the SIGGRAPH conference Student Volunteers Chair in 1987 and the Courses Chair in 1990. Pat's interests include scientific visualization, environmental modeling, and network-based graphics solutions.

SIGGRAPH '95
Introduction to Computer Graphics

Mike Bailey (M)
Andrew Glassner (A)
Patricia Wenner (P)

Course Schedule

8:30 - 8:35	Welcome .... M	
	Goals of this Course	
8:35 – 9:00	Display hardware .... P	
9:00 – 10:15	Geometry for computer graphics........................ M	
	Input devices	
10:15 – 10:30	Morning Break	
10:30 – 11:00	Understanding spec sheets................................ P	
11:00 – 11:15	Visible surface determination........................... P	
11:15 – 12:00	Modeling .... A	
12:00 – 1:30	Lunch	
1:30 – 2:15	Rendering... A	
2:15 – 2:45	Graphics in a networked environment................ P	
2:45 – 3:00	Afternoon Break	
3:00 – 3:45	Animation.. A	
3:45 – 4:15	Virtual reality .... M	
4:15 – 4:45	Entertainment.. P	
4:45 – 5:00	Finding further information.............................. P	

SIGGRAPH '95
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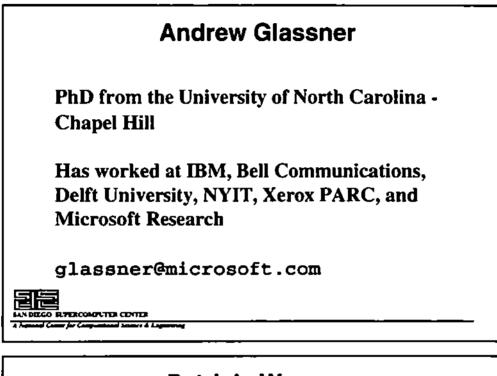## SIGGRAPH '95

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Andrew Glassner

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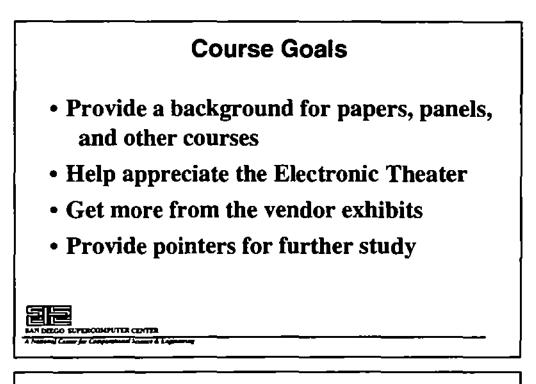
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Patricia Wenner

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Course Goals

- Provide a background for papers, panels, and other courses

- Help appreciate the Electronic Theater

- Get more from the vendor exhibits

- Provide pointers for further study

Topics

- Display Hardware (Pat)

- Geometry and Scene Creation (Mike)

- Input Devices (Mike)

- Reading Spec Sheets (Pat)

More Topics

- Visible surface determination (Pat)

- Modeling (Andrew)

- The synthesis of realistic scenes (Andrew)

- Graphics in a networked environment
   (Pat)

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And, Even More Topics !

- Animation (Andrew)

- Virtual Reality (Mike)

- Entertainment (Pat)

- References (Pat)

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