Designing Real-Time 3D Graphics for Entertainment

SIGGRAPH '96 Course #33

Organizer:

James Helman
Silicon Graphics

Lecturers:

Andy Bigos
3Dlabs

Philippe Tarbouriech
Electronic Arts

Eric Johnston
LucasArts

Scott Watson
Walt Disney Imagineering

Steve Rotenberg
Angel Studios

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Abstract

This course covers the issues of creating real-time 3D games on platforms ranging from home game consoles up to high-performance image generators used in theme parks. Topics include the hardware architectures of various game platforms, visual simulation tricks, 3D modeling, real-time character animation, game prototyping and programming. The authors draw examples from the development of actual games, tools and game development environments.

The course has two components. The first part covers the graphics and programming techniques available to make the best use of graphics technology for high-quality, real-time renderings. The topics include hardware and software architectures, graphics optimization, database tuning and other tricks of the trade. The visual simulation roots of many of these hardware and software techniques is also covered.

In the second part, developers discuss the use of those techniques as one component in creating interactive 3D experiences, whether for home game consoles or for location-based entertainment or theme park installations. The topics covered include tools and methods for content generation, software frameworks, and animation systems.

Speakers

James Helman
Silicon Graphics

Jim Helman works in Silicon Graphics' Advanced Graphics Division as a member of the engineering team for IRIS Performer, SGI's real-time graphics toolkit. Before coming to SGI, he was a student in the Applied Physics department at Stanford University where he worked on his PhD in data visualization. His interests include virtual environments, game design, and keeping large green cars running.

Silicon Graphics	Email:	jimh@sgi.com
Advanced Graphics Division	Phone:	(415) 933-1151
2011 N. Shoreline Blvd. MS 8U-590	FAX:	(415) 965-2658
Mountain View, CA 94043 USA		

Andy Bigos
3Dlabs

Andy has been on the engineering staff at 3Dlabs (formally DuPont Pixel) for 5 years. As part of the GLINT & PERMEDIA core architecture teams he helped bring workstation class 3D graphics to the PC platform. As well as working on core architectures he's being closely involved with porting and optimizing OpenGL and Direct3D for 3Dlabs hardware. Andy is currently working with game developers to enable console class games on PC. He holds a Masters degree in Computer Graphics and a Bachelors degree in Engineering, his interests include real-time physically based modelling as well as play testing the latest and greatest games.

Andy Bigos	Email:	andy.bigos@3Dlabs.com
3Dlabs	Phone:	44 1784 476 636
Meadlake Place, Thorpe Lea Road	FAX:	44 1784 470 699
Egham, Surrey, TW20 8HE, UK		

Philippe Tarbouriech
Electronic Arts

Philippe Tarbouriech works in Electronic Arts as a member of the Advanced Technology Group. He manages the conversion of ShockWave to Playstation and PC while working on other projects. He was the software designer, aerial photographer and one of the game designers of the original ShockWave on 3DO. Prior to joining Electronic Arts, he worked in diverse unfit startup companies. His interests include evolution. He holds a M.S. in electrical engineering and computer science from ENSEA (France).

Electronic Arts	Email:	ptarbouriech@ea.com
1450 Fashion Island Blvd.Phone:	Phone:	(415) 513-7191
San Mateo, CA 94404	FAX:	(415) 571-1893

Eric Johnston
LucasArts

Eric Johnston is currently the technical lead for LucasArts Entertainment s 3D console development group. Previously at Spectrum HoloByte, as head of their VR group, he developed Onyx-based games for location-based entertainment applications. As a Macintosh games programmer, his credits include the Mac versions of Rebel Assault, Indiana Jones and the Fate of Atlantis, Monkey Island 1 and 2, Loom, Pipe Dream, and Putt-Putt Joins the Parade. Eric graduated from U.C. Berkeley, with a B.S. in EE and CS. A former windsurfing instructor, he currently spends too much of his spare time on the flying trapeze.

LucasArts	E-mail:	ej@lucasarts.com
1600 Los Gamos Drive	Phone:	(415) 444-8437
San Rafael, CA 94903	FAX:	(415) 444-8240

Scott Watson
Walt Disney

Scott Watson is Walt Disney Imagineering's VR Studio Technology Director. Scott started programming at 9 years of age. In 5th grade, IBM loaned him their first portable (75lbs) computer, the 5100 in exchange for writing games and demos to show it off. In his college days, when 8-bit machines where all the rage, Scott wrote multi-tasking OSes, device drivers, cross compilers and RF communications stacks as a day job. His free time was dedicated to his band "The Loved Ones" and Fanzine, "The Pig Paper."

Upon joining Disney's R&D department, his first assignment was to write the control software for the "Indiana Jones Ride Vehicle." An eclectic spectrum of projects has followed. Examples range from creating audio and image processing technology for theme-park films to helping design a computer keyboard for dolphins. For several years "Disney.com" was the machine on his desk. Since the beginning of Disney's exploration of Virtual Reality, Scott has been at the heart of the technology and is the principal designer of the "Disney*Vision Player." Disney*Vision is an interactive VR story development system that supports real-time Disney quality character animation and the SAL scripting language. Scott holds several patents and is an avid fan of The Monkees.

Walt Disney Imagineering
1401 Flower Street
Glendale, CA 91221

E-mail: scott@disney.com
Phone: (818) 544-6790
FAX: (818) 544-4544

Steve Rotenberg
Angel Studios

Steve Rotenberg joined Angel Studios in the fall of 1992 to redesign and expand Angel Studios' proprietary 3D animation software and is now Angel Studios' Director of Software Development. Having embarked on his programming career at the age of six, Steve has amassed extensive experience designing software for a variety of platforms. During the past two years, Steve's natural interest in problem solving and his object-oriented approach to software design has proven integral to Angel Studios' development of ANGEL ARTS(tm), advanced real-time software for both the location-based and home entertainment markets. Using his invaluable experience in such software development, Steve has lead teams in developing VR experiences such as Dr. Megow's Mad Cap Ornithon and F-1 Net Race and, more recently, Buggie Boogie for Nintendo's next generation home game platform, the Ultra 64.

Angel Studios
5962 La Place Courte, Suite 100
Carlsbad, CA 92008

Email: steve@angel.com
Phone: (619) 929-0700
FAX: (619) 929-0719

Additional Course Notes Contributors

Sharon Clay
Silicon Graphics

Sharon (Fischler) Clay is a member of the IRIS Performer engineering team in the Advanced Graphics Division at Silicon Graphics where she specializes in performance issues for system implementation and real-time graphics applications. She was a member of the original design team, and before that, was a member of the Graphics Software group where she worked on the development team for the VGX graphics platform. Her interests, besides a real need for speed, include user interfaces, plants and fish (simulated and real). She studied using natural language in graphical user interfaces at the University of California at Santa Cruz where she received her Masters degree in Computer Science. Her Bachelors degree is in Mathematics and Linguistics from the University of California at Berkeley.