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COURSE NOTES *C21*

THE RENDERMAN INTERFACE AND SHADING LANGUAGE

Chair
Tony Apodaca
Pixar

Lecturers
Phil Beffrey
Digital Arts
Pat Hanrahan
Princeton University
Darwyn Peachey
Pixar
Steve Upstill
Pixar

ABSTRACT

The RenderMan Interface is a 3-D scene description interface for realistic image synthesis. In this course, we will spend the morning exploring the geometric modeling interface, for describing the shapes and positions of the objects in a scene This part of the course should cover enough material that the student can integrate RenderMan into geometric modeling programs. In the afternoon, we will explore the Shading Language, for describing the appearance characteristics of objects.

Rendering algorithms and specific renderer implementations will not be discussed, rather, the we will concentrate on describing how to use of interface features to generate beautiful images. Many useful Shading Language techniques will be demonstrated, and several examples of successful images and animations which made extensive use of RenderMan and the Shading Language will be examined.

The book *The RenderMan Companion A Programmer's Guide to Realistic Computer Graphics*, written by Steve Upstill, is a significant portion of the notes for this course Any material which we cover too vaguely or too quickly in the course is probably presented in detail in this book.

Lecturers

Tony Apodaca

Tony Apodaca is a Senior Member of the Technical Staff in the RenderMan Division of Pixar Tony is a co-developer of the RenderMan Interface Specification and currently serves as the Chief Architect of the RenderMan Interface He is one of the Unknown Implementers of both of Pixar's image synthesis products. He received his Master's degree in computer and systems engineering from Rensselaer Polytechnic Institute in 1986 His screen credits include *Red's Dream* and *Tin Toy*

Pat Hanrahan

Pat Hanrahan is an assistant professor of computer science at Princeton University, where he teaches computer graphics His current research involves volume rendering, image synthesis and graphics systems and architectures Before joining Princeton, Pat was a Senior Scientist at Pixar in San Rafael, CA, where he developed volume rendering software and was the Chief Architect of the RenderMan Interface Previous to Pixar he directed the 3D computer graphics group in the Computer Graphics Laboratory at New York Institute of Technology

Phil Beffrey

Philip D Beffrey is the Vice-President of Research and Development at Digital Arts His specialties are the development of practical parallel rendering techniques and interactive 3D user interfaces. He has authored both modeling and rendering software the is RenderMan compatible Phil co-founded Digital Arts in 1986, and was previously the founder and president of Computer Graphic Images, a small animation company established in 1983 He is a member of the IEEE and the ACM and is a regular participant in RenderMan Advisory Council meetings

Steve Upstill

Steve Upstill has been with Pixar since its inception in early 1986 He obtained his PhD in Computer Science from the University of California at Berkeley after working in artificial intelligence, 3D modeling and rendering, human visual perception and image processing At Pixar he has been involved in system support software, graphic arts, creating synthetic imagery and, of course, documentation as the author of *The RenderMan Companion A Programmer's Guide to Realistic Computer Graphics* Steve is now Product Manager for RenderMan Applications at Pixar and lives in Berkeley with his wife Krys and twin daughters Kimberly and Andrea

Darwyn Peachey

Darwyn Peachey is a Senior Member of Technical Staff at Pixar Since 1988 he has been closely involved in the implementation and evolution of the RenderMan Interface and Pixar's rendering products. Darwyn received the M Sc and B Sc degrees in computer science from the University of Saskatchewan, Saskatoon, Canada. Prior to joining Pixar he spent three years developing UNIX operating system software at the Hospital Systems Study Group, and four years as a Research Associate in computer science at the University of Saskatchewan

Schedule

Welcome Tony Apodaca	8 30 AM
What is RenderMan? Pat Hanrahan Page 1	8 45
Screening of Motivating Animation Tony Apodaca	9 15
Geometric Models Phil Beffrey Page 9	9 30
Break	10·30
The Digital Camera Steve Upstill Page 45	10 45
Lighting and Shading Tony Apodaca Page 75	11:45
Lunch	12 15 PM
Shading Language Fundamentals Tony Apodaca Page 87	1 45
Break	2 45
Advanced Shading Language Darwyn Peachey Page 117	3·00
Case Studies with cameo appearances	4 00

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