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COURSE NOTES 20

Computer Graphics In Visual Effects

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Charlie Gibson
Rhythm & Hues
Richard Hollander
Video Image
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Computer Graphics in Visual Effects

Course #20 – SIGGRAPH 1993

*Lincoln Hu
Douglas S Kay*

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Course Introduction

Special visual effects have been a part of the filmmaking process since its inception. In some of the earliest motion pictures, trick photography was used to create imagery that could not be easily obtained on location or with props and sets. Techniques that utilized matte paintings, miniatures, multiple exposures, etc. were developed in the early part of this century and continued to be used virtually unchanged for 50 years. In the seventies, computers were introduced to the processes, adding a precision of control to the cameras and model movement systems that allowed a new level of quality to be obtained.

Today, the field is going through a transformation that is unparalleled in its history. Digital technology is not just allowing incremental improvements to existing techniques, but is providing totally new and innovative ways to create imagery. Quality concerns inherent with optical, mechanical, and photo-chemical processes are being eliminated. The ability to create completely realistic synthetic creatures and environments allows the telling of stories that would have been impossible only a year or two ago. The collapsing of all of the visual effects tools into a single workstation changes the paradigm for filmmaking.

This course will explore the visual effects industry. Where it has been, where it is now, and where it is going. First, we will examine how traditional techniques have been used over the years and how computers have influenced a change. Then, we will explore how digital technology is being specifically used to create imagery in a wide variety of visual effects applications. We will look at both spectacular eye-catching applications and those that are meant to be truly invisible. Finally, we will discuss the state-of-the-art in the creation of visual effects and where we predict the industry is headed in the next few years.

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Speakers Biographies

Charles Gibson is a co-founder and a Director/Visual Effects Supervisor at Rhythm & Hues inc in Hollywood California. Rhythm & Hues is a six-year old studio devoted to creating digital visual effects, animation and graphics for TV advertising, Features and Theme Parks

Prior to starting Rhythm & Hues, Charles Gibson was a senior computer animator and software designer at Robert Abel and Associates in Hollywood. Before that, he was head of Research and Development for MCA's in-house computer graphics facility. Gibson attended Concordia University in Montreal, Quebec where he placed equal emphasis on computer science and cinema.

Gibson's credits include *Flight of the Intruder*, *Stay Tuned* and the animated feature *Rover Dangerfield*. He has also directed visual effects for several award-winning television commercials.

Richard Hollander's background mixes art and science, after studying design at Cal Arts he graduated with a degree in Electrical Engineering and Computer Science at University of California at Berkeley. A pioneer in the fields of computer graphics and motion control he was the Technical Director for the landmark animation Panasonic Glider at Robert Abel and Assoc. and designed the motion control system at Doug Trumbel's studio EEG for *Star Trek the Motion Picture*, *Blade Runner* and *Brainstorm*. Founder and partner of VIFX Inc., he continues to work in effects with work most recently on *Bill and Ted's Excellent Adventure*, *Nightmare on Elm Street 6*, *Aliens 3*, *Patriot Games*, *Terminator 2*, *Ghost in the Machine* and *Cliffhanger*. Video Image broke new ground utilizing new behavioral animation to create *Batman Returns*.

Lincoln Hu is a Senior Technical Director at Industrial Light & Magic and has been with ILM's Computer Graphics Department since its formation. He is actively involved in the research, design and development of new techniques and equipment at ILM and has worked on several feature films including *Star Trek IV*, *Empire of the Sun*, *Willow*, *The Abyss*, *Ghost*, *Terminator 2*, *Judgment Day* and *Death Becomes Her*. Lincoln graduated from Columbia University with a B.S. and M.S. in Computer Science.

Douglas S. Kay is the Senior Manager of the Computer Graphics/Digital Department at Industrial Light & Magic. Since joining ILM in 1985, he has been involved in the production of a variety of films including *Willow*, *Young Sherlock Holmes*, *Star Trek IV*, *The Voyage Home*, *Indiana Jones and the Last Crusade* and the Academy Award winning *The Abyss* and *Terminator 2*, as well as the *Star Tours* and *Body Wars* rides for Disneyland and Epcot Center. He has also contributed to a number of award winning television commercials. He received a B.S. in Computer Science and a M.S. in Computer Graphics from Cornell University.

Dennis Muren is a Senior Visual Effects Supervisor at Industrial Light & Magic. He is actively involved in the evolution of the company design and development of new techniques, and is a major user of computer graphics in visual effects. Muren has received Academy Awards for his work on *Terminator 2*, *Judgment Day*, *The Abyss*, *Innerspace*, *Indiana Jones and the Temple of Doom*, *Return of the Jedi*, *ET*, *The Extraterrestrial* and *The Empire Strikes Back*. His most recent project is *Jurassic Park*. He is a member of the American Society of Cinematographers and the Academy of Motion Pictures Arts and Sciences.

Doug Smythe joined the Computer Graphics Dept. of Industrial Light & Magic in the Summer of 1987 after receiving his B S degree in Electrical Engineering and Computer Science from the University of California at Berkeley. In March of 1993, he received a Technical Achievement Award from the Academy of Motion Picture Arts and Sciences for the invention of the 'morph' process, which transforms images of any one object, person or creature into another.

Doug recently received an Academy Award for his visual effects work on *Death Becomes Her*. His other feature film credits include *Meteor Man*, *Memoirs of an Invisible Man*, *Terminator 2*, *Die Hard II*, *The Hunt for Red October*, *Back to the Future* parts 2 and 3, *The Abyss*, *Indiana Jones and the Last Crusade*, *Willow* and *Cocoon the Return*. He also worked on Epcot Center's simulator ride, *Body Wars* and on several commercials.

Course Schedule

8 30 – Course Chair

Introduction an overview of the day introducing the materials and speakers

8 45 – Doug Kay

An overview of the visual effects process How effects are planned and designed How computer graphics imagery (CGI) fits into the world of visual effects What's good and bad about CGI An overview of the system at ILM

9 45 – Break

10 00 – Charlie Gibson

Data flow of a "standard" CGI visual effect job Use examples from recent work done by Rhythm & Hues

11 00 – Lincoln Hu

Discuss specific examples of computer graphics images generated by ILM for *Terminator 2*

12 00 – Lunch

1 30 – Richard Hollander

Discuss cost-effective way of doing computer generated visual effects Use specific examples from work done at Video Image

2 30 – Doug Smythe

Discuss some of the 'invisible effects' such as wire removal split-screen composites, bodily and set mutilation and body parts replacement. Show examples from *Meteor Man* and *Death Becomes Her*

3 30 – Break

3 45 – Dennis Muren

Future of digital technology in visual effects

4 30 – All

Questions and the day's wrap-up