1 Introduction

Iron Man presented ILM with a unique opportunity to leverage the latest computer graphics technology in bringing Marvel's latest big-screen superhero to life. ILM's team built CG versions of Iron Man's Mark 2 and Mark 3 suits that looked as real as the practical suits but without physical mobility limitations. This, along with the inherent 'tweakability' of look and motion that CG provides resulted in the use of ILM's CG model almost every time Iron Man appears on screen in the silver or red and gold suit. ILM also created Iron Man's nemesis, Iron Monger, digital fighter planes, cars, industrial assembly robots, and several partially- or fully-digital environments to allow complete freedom of camera movement beyond what was filmed on location.

The presenters will discuss some of the technical and creative issues encountered during the shooting and production of Iron Man, including on-set environment capture, the use of on-set or off-set motion capture vs. traditional hand animation, the complexities of the various CG models, lighting and rendering technology, and other effects.

2 Abstract

Overview, On-Set Experiences and Virtual Backgrounds: Ben Snow
- Preproduction Preparation
- Stories From the Set
- On-set Environment Capture For Lighting and Virtual Backgrounds
- Using Tiled Backgrounds to Enhance or Replace Practical Camera Moves
- Creating Backgrounds From Scratch: the Suit Up Sequence

Sequence Development and Animation: Hal Hickel
- Developing the Story and Action Sequences
- Limitations of the Practical Suits
- Full and Partial Suit Replacements
- Mocap vs. ILM’s iMocap vs. Hand Animation
- Animating Realistic Flight Dynamics
- Rigging a Rigid Suit
- Smoke Trail Path Visualization During Animation

Technical Issues, Lighting and Rendering: Doug Smythe
- Complexity of the CG Suit, Internal Pieces and “Cool Mech”
- Lighting and Materials
- Smoke Trail Renders
- 3D Renders vs. 2D Comp Treatments
- Summary

3 Presenters

In 1994, Ben Snow left his native Australia to join ILM, where his first project was to help create the three-dimensional computer graphics image of the “Enterprise B” for Star Trek: Generations. In addition to his feature credits, Snow has been instrumental in the research and development required for the groundbreaking images seen in Twister, Deep Impact and Pearl Harbor. Snow has twice been honored with Academy Award nominations for best achievement in visual effects for his work on Pearl Harbor and Star Wars: Episode II “Attack of the Clones.”

Hal Hickel joined Industrial Light & Magic in 1996 as an animator for The Lost World: Jurassic Park. In 2000, Hickel was moved up to animation supervisor, on Steven Spielberg’s A.I. Artificial Intelligence. Hickel has since supervised the animation work on Star Wars: Episode II Attack of the Clones, Lawrence Kasdan’s Dreamcatcher and the Pirates of the Caribbean trilogy. In 2007, his work on Pirates of the Caribbean: Dead Man’s Chest was recognized with both an Academy Award® and a BAFTA for Best Achievement in Visual Effects.

Doug Smythe joined the Computer Graphics Department of ILM in June of 1987 after receiving his B.S. degree in Electrical Engineering and Computer Sciences from the University of California at Berkeley. He received an Oscar for Best Visual Effects for his work on Death Becomes Her, and three Scientific and Technical Achievement awards from the Academy of Motion Picture Arts and Sciences in the areas of Morphing, Digital Image Retouching and Digital Compositing.

Doug has worked on 29 feature film projects, including Willow, Indiana Jones and the Last Crusade, Back to the Future Parts 2 and 3, Terminator 2, Star Trek: Generations, Star Wars Episode 1, The Perfect Storm, Star Wars Episode 3, Pirates 2 and 3 and Iron Man.