



## Integrating Special Effects with Live Action Film - Computer Vision Techniques and Challenges

In the Eighties, it was always easy to spot the "effects shots" in a film. Typically, the camera would stop moving and the actors would be on one side of the image and the effects would be on the other.

Now that computer graphics are so prevalent, directors want the camera to be constantly moving and the special effects to interact with the actors in the scene.

This presents considerable challenges to the digital artist. If a creature or effect is supposed to look like it is in the scene, a considerable amount of information is needed about the set and the camera: an extremely accurate model of the set and complete model of the camera and its position and orientation is an absolute must.

At Digital Domain, we use some Computer Vision techniques to acquire this information from the film. We combine techniques such as physical survey of the set, photogrammetry, camera correlation, image segmentation and pattern tracking.

This talk will center on what techniques work and which ones don't and why. The set is a very hostile environment for automatic techniques. Actors are always running in front of your reference points, sometimes they catch on fire or blow up (the reference points and the actors!), the lighting changes all the time and there is a ton of motion blur and grain. How we deal with these problems and the accuracy we require will be discussed. The talk will also address a wish-list of things that the effects community would like to see out of computer vision.

### SPEAKER BIOGRAPHY

While working at Digital Domain, Doug has written the 2D tracking program, the wire removal program, the 3D tracking program, the in-house particle system, and a program for manipulating motion capture data. Doug is currently interested in computational fluid dynamics and clothing simulation. He received a Ph.D. in computer science from The Ohio State University in 1993 with a dissertation on extracting three dimensional information from photographs.

COMPUTER SCIENCE DEPARTMENT

## Computer Graphics Seminar Series

**Doug Roble**

*Software Developer*  
DIGITAL DOMAIN

Caltech

74 Jorgensen

Wednesday October 15th - 4pm



HOSTED BY: MULTI-RES MODELING GROUP