

# Special effects and computer-generated imagery in film making

**Special effects**, often abbreviated **SFX**, **SPFX** or **FX**, are illusions or visual tricks used in film making to simulate imaginary events during the live-action shooting of the film. They are traditionally divided into two categories:

- **mechanical effects**, also called **practical** or **physical effects**. They may include the use of **props**, scale models, animatronics (i.e. the use of electronics to animate puppets or robots), atmospheric effects to create wind or rain, or **prosthetic** makeup to make an actor look like a non-human creature
- **optical effects**, or **photographic effects**, used to create images or film frames photographically, which are then added to a given background. These effects can also be used in post-production with an optical printer.

On the other hand, **visual effects**, a new category which emerged in the 1990s with digital filmmaking, refer to digital post-production effects and make use of **Computer Generated Imagery (CGI)**, which has gradually replaced the traditional special effects.

CGI can be defined as the application of the field of computer graphics or, more specifically, 3D computer graphics, to special effects. It allows for more control and creative freedom than optical composition and the image does not degrade as it does in optical processes with analogue images. The best results are achieved in the field of science fiction and fantasy characters, with the creation of photo-realistic images. The images are created using the same techniques used in animated cartoons and model animation.


The main types of computer generated images include:

- **static images and landscapes**, generated by computer algorithms
- **architectural animation**, which provides animated movies of buildings. It is also used in reverse engineering to recreate historical buildings, for example to recreate the buildings of ancient Rome
- **anatomical models**, used in skeletal animation; for example, a 3D model can be automatically produced from a single X-ray
- **cloth images**, i.e. making the clothing of a digital character
- **skin images**, i.e. rendering human skin realistic. This involves: photo realism, i.e. resembling real skin at a static level, for example shooting the face of a human-like creature; physical realism, i.e. resembling human movements, like simulating the movements of arms; and function realism, i.e. resembling the response to actions, like making the CG characters behave in a natural way
- **interactive simulation and visualisation**, i.e. the rendering of data which may vary dynamically and allowing the user to view the data from multiple perspectives or points of view, e.g. from above, inside, etc.
- **computer animation**, which applies to dynamic images that do not allow user interaction. It is very effective in constructing miniatures or adding extras for crowd scenes, for example. To create the illusion of movement, an image is displayed on the computer screen and repeatedly replaced by a new image which is similar to the previous one, but slightly advanced in time.

**blocky:** *squadrato*  
**box office:** *botteghino*  
**prop:** *oggetto di scena*  
**prosthetic:** *artificiale*  
**villain:** *cattivo*



CGI from the film Avatar

**1**  Read the text and put the sentences in the right place. Then, match the words with the correct definition.

- a. 50 to 70 people were on the technical team, working under technical director B. Reeves and animator J. Lasseter.
- b. 1982 saw the release of *Tron*, complete with real actors and the first fully computer-engineered 3D scenes.
- c. In many cases, it was easier to cheat.
- d. Other artists found that the technology available simply wasn't able to produce what they wanted.
- e. The latter marked the first use of natural human motion for a computer-sculpted character.



### The origins of CGI in live-action films

The history of CGI in live-action films hasn't always been simple. The earliest practical application of CGI is generally agreed to be the point-of-view sequences of Yul Brynner's robot in the 1973 futuristic western *Westworld*. The producers employed 2D computer-generated animation to simulate the robot's vision. For the 1976 follow-up, *Futureworld*, the producers went one stage further and introduced 3D elements via rendered polygonal models. Not all the effects of the time were so complicated. (1) .....

The TV version of Douglas Adams' *The Hitchhiker's Guide To The Galaxy* (1981) appeared to use computer graphics for the pages of the Guide, but in fact these were hand-drawn scenes created to mimic the style of contemporary computer animation.

(2) ..... The Japanese animated film *Golgo 13* (1983) was one of the first movies of its kind to introduce proper computer animation, leading to a hysterical scene where the cell-animated main character keeps cutting away to a **blocky**, untextured helicopter gunship. It's therefore not surprising that the first truly legendary CGI-heavy film was designed to play to the technology's weaknesses as well as its strengths.

(3) ..... "One of the difficult tasks on *Tron* was to create a unified look for both the real world and the electronic world," said producer Donald Kushner. "The difficult part was integrating both of them. We used computer simulation, we used backlit techniques and we used conventional live action. The challenge was to make it all look cohesive."

After *Tron*, a variety of watershed films employed ever-more impressive CGI advancements, from *Indiana Jones and the Last Crusade*, featuring the first all-composite scene, to *Terminator 2: Judgment Day's*, startling visuals. (4) ..... Its liquid metal effects, particularly in conjunction with the then-revolutionary morphing technology, was a particular eye-opener, giving us a **villain** that combined the best technology from both 1991 and a post-apocalyptic 2029.

It was *Toy Story*, though, that really cemented CGI's place in the industry. While producing the film, Pixar grew from just 10 people to 150. (5) ..... They were tasked with producing the software that would become Render Man. As for Lasseter, "Computer animation's an art form that grew out of a science."

*Adapted from: <http://www.techradar.com/news/world-of-tech/computing/how-special-effects-transformed-the-movies-590842/2>*

1. Rendered polygonal models <input type="checkbox"/>	a. All is made with a computer, there is nothing natural on the stage.
2. Backlit <input type="checkbox"/>	b. A technique which gradually transforms one object into another.
3. Watershed film <input type="checkbox"/>	c. A technique that uses light from behind the stage.
4. All-composite <input type="checkbox"/>	d. A film for adults that can be watched at night on TV.
5. Morphing <input type="checkbox"/>	e. A technique that produces geometric images from algorithms.