

The Motion in Motion Pictures

Jurassic Park came out in 1993. The movie takes place on an island where a scientist has found a way to clone dinosaurs. Things don't go well. To make the movie, director Steven Spielberg consulted with Jack Horner, a paleontologist. Horner helped the filmmakers design real-looking dinosaurs for the screen. He even inspired one of the characters. The film wasn't entirely accurate — dinosaurs are still extinct — but the illusion worked. The movie was a spectacular success, in large part because it looked so real, says Kirby.

Since then, Kirby says, scientific accuracy has become even more important. "The development of special effects now means that audiences expect realism in everything," he says.

Teran says part of that is getting the physics right. Physicists study matter and energy. They also study mechanics. Mechanics refers to motion and the forces that produce it. And if something doesn't move right on the screen, Teran says, an audience can tell. "If the physics is wrong, the movie looks less real."

Take snow: In the past, films didn't pay much attention to the white stuff, says Teran. That changed with *Frozen*. To get the snow to look realistic, he and his team borrowed a mathematical approach called the "material point method." Using this method meant the mathematicians treated big blobs of snow as being made of lots of little particles. Sometimes the particles stuck together and sometimes they fell apart — like when a packed snowball smashes against a wall.

The researchers spent months creating a computer program that would simulate snow in such a way that it behaved like real snow. And that was a challenge: In the movie, characters dig in snow, walk through snow and fall in the snow. Snowballs stick together like a solid, but disintegrate under stress. Tweaking their program to cover all these behaviors required some creative programming. The scientists couldn't make the computer program too complicated — it had to be able to compute real snow in a short amount of time. To make matters worse, at a certain point Teran became convinced that his team was missing the mark.

The researchers spent months creating a computer program that would simulate snow in such a way that it behaved like real snow. And that was a challenge: In the movie, characters dig in snow, walk through snow and fall in the snow. Snowballs stick together like a solid, but disintegrate under stress. Tweaking their program to cover all these behaviors required some creative programming. The scientists couldn't make the computer program too complicated — it had to be able to compute real snow in a short amount of time. To make matters worse, at a certain point Teran became convinced that his team was missing the mark.

For Original Article, Click [Here](#). [1]

Article Publish April 2015

Source URL: <http://dodstarbase.org/articles/motion-motion-pictures>

Links:

[1] <https://student.societyforscience.org/article/science-hollywood?mode=topic&context=104>