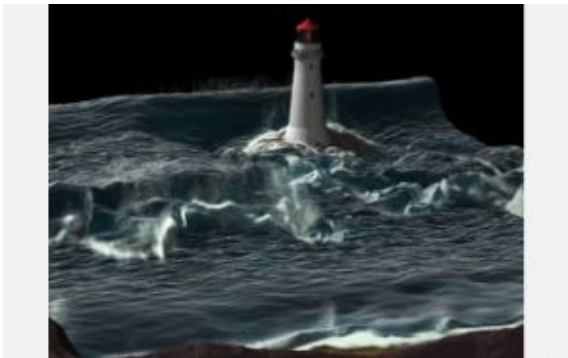


And the Oscar Goes To... a Professor?



Simulations created for research in computational physics by researchers such as Ron Fedkiw also have applications in entertainment. This image is part of a simulation created by Fedkiw and his colleagues Nick Rasmussen and Frank Losasso Petterson, and it is an example of the work with fluids that earned the team a technical Academy Award this month. Credit: Credit: Frank Losasso, Jerry Talton, Nipun Kwatra, Ron Fedkiw / courtesy of Stanford University

Daniel Day-Lewis, Tilda Swinton and the Coen brothers weren't the only ones honored at last night's Academy Awards. Ron Fedkiw, an associate professor of computer science at Stanford University also received a coveted gold statuette this year for his groundbreaking work in liquid simulations. While people don't usually associate computational scientists with movie stars, Fedkiw's honor shows the impact of computer science on Hollywood and the rest of our lives.

You've probably never heard of Fedkiw, but if you've seen the roaring oceans waves crashing around Johnny Depp in the "Pirates of the Caribbean" movies or the splattering lava flows in the final duel in "Star Wars: Revenge of the Sith," you've enjoyed his handiwork.

From his time as a graduate student at UCLA, Fedkiw has conducted cutting-edge research into computational physics, a field that uses computers to simulate physical phenomena. These complex models and simulations are highly valued because they allow researchers to observe theoretical events or to predict how objects might behave under certain conditions.

Fedkiw's models are so accurate, however, that they can also transport moviegoers into another world. "A lot of my work was on computational methods for fluids and solids for computational physics applications," Fedkiw said last week. "It turns out to be quite useful for movies as well."

For much of the past decade Fedkiw has been working in films while continuing his academic research. His big break came in 1998 when he began working for a company that was producing 3-D water simulations using algorithms known as Navier-Stokes equations for a number of different customers, including Hollywood studios. A few years later, he accepted an offer to work for Industrial Light and Magic (ILM), the legendary special effects company founded by George Lucas, creator of the "Star Wars" trilogies.

While at ILM, Fedkiw teamed up with Nick Rasmussen and Frank Losasso Petterson to create a system to realistically simulate low-viscosity liquids such as water. The system has been so successful that Fedkiw, Rasmussen and Losasso were awarded a Scientific and Technical Academy Award at a ceremony earlier this month hosted by Jessica Alba.

Fedkiw has worked on approximately 20 films, including some of the "Harry Potter" series, as well as "Terminator 3" and "Poseidon," two films he cites as among his best work. Despite the success and recognition his work has received, Fedkiw says he is his toughest critic. "Unfortunately I see all the problems with it, and I almost always want to do parts over again," he said. "There's a shot in "Poseidon" that makes me cringe, but other people really liked it."

Fedkiw is now working on simulating human motion, research that is supported by the National Science Foundation. "My main focus these days has been on virtual humans and solid fluid coupling," he explained.

"We'd like to do humans swimming, for example."

In addition to having many real-world applications, Fedkiw believes this work may end up on the silver screen someday as well. "If there was ever to be another Academy Award, I'd bet on the work funded [by NSF]," he said.

For now, Fedkiw and his colleagues can bask in the memory of their time in the Oscars spotlight. And despite his experience in the business, even he still gets star struck. "Getting an award from Jessica Alba was pretty cool," he said. "I've been a fan of hers for a long time."

More examples of Ron Fedkiw's work are available on his homepage at Stanford University:

<http://physbam.stanford.edu/~fedkiw/>

Source: NSF

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