Oscar-worthy smoke signals: Researchers awarded for special effect software

January 9 2013

Top honour for ETH Zurich professor and Disney director Markus Gross: he is to receive a "Tech Oscar" from the Academy of Motion and Picture Arts and Sciences (AMPAS) along with three other computer scientists.

In 2008 the researchers from ETH Zurich and Cornell University developed software that can calculate smoke and explosions in films swiftly and recreate them in lots of detail. The four scientists' primary aim was to publish their work and showcase it at the ACM SIGGRAPH, the leading conference for computer graphics. Little did they know that it would blossom into so much more: at the upcoming award ceremony of the "Tech Oscars", which precedes the film Oscars, professor of computer graphics and Director of Disney Research Zurich Markus Gross, his former post-doc Nils Thuerey, Cornell professor Doug James and his former researcher Theodore Kim are to receive the Technical Achievement Award from the "Academy" (AMPAS) for their Wavelet Turbulence software.

Enormous practical importance

The prize came as a real surprise, explains Markus Gross. "I was aware that our technology was being used in many Hollywood productions but never expected this award," says the ETH Zurich professor. The software enables the turbulences in smoke and explosions that are so important for visual effects to be calculated much more quickly than

with conventional applications. In the past, it would take special effects artists many hours or even days to create effects such as fireballs or volcanic eruptions.

The prize serves as confirmation, "that we are able to develop cutting-edge mathematical and physical simulation methods that are of enormous practical importance for the film and entertainment industry," says Gross. And this ultimately prompted Disney to select ETH Zurich as a location for one of its two large-scale research labs.

Hollywood blockbusters with special software

The "Wavelet Turbulence" software rapidly became popular among studios that produce special effects for the film industry. So far, it has been used in about twenty major Hollywood productions, including Avatar, Kung Fu Panda, Monsters vs. Aliens, Sherlock Holmes and Battleship. The upcoming action films Iron Man 3 and Man of Steel also draw upon this technology. The special software has thus established itself as an industry standard in the space of a few years.

The researchers deliberately opted for the publication path to put their software on the map and declined to patent it. As many special effects studios have tight budgets and only small margins, royalty-free methods are especially attractive. If the studios had had to pay fees, however, they would have been disinclined to use the software, Gross is convinced. "This award just goes to show how important scientific publications are when it comes to propagating innovations in industrial applications."

Major goal for Disney Research Zurich

"I hope we can manage to win more major prizes from the film industry for ETH Zurich and Disney Research in the future." A lot of outstanding

technology has emerged from the Disney Research Lab in recent years that is currently making its way to Hollywood. "Apart from purely scientific awards, the Tech Oscar is also a major goal for the Disney Lab," the computer science professor adds. The Wavelet Turbulence software was developed before Disney Research Zurich was even established at ETH Zurich.

The award-winning researchers from the USA and ETH Zurich will have the opportunity to collect their prize at a Gala in Beverly Hills, California, on 9 February. Certain film scenes that were generated using the award-winning software will also be screened at the Academy Awards Ceremony on 24 February.

More information: The honours for scientific and technical achievements were first awarded in 1931 as party of the fourth Academy Awards Ceremony. The "Tech Oscars" recognise original developments that make a significant contribution towards the advancement of film production and playback.

Provided by ETH Zurich