= Ronald Fedkiw =

Ronald Paul " Ron " Fedkiw (/ ?f?dko? / ; born February 27 , 1968) is a full professor in the Stanford University department of computer science and a leading researcher in the field of computer graphics , focusing on topics relating to physically based simulation of natural phenomena and level sets . His techniques have been employed in over twenty motion pictures . He has earned recognition at the 80th Academy Awards as well as from the National Academy for Science .

His Oscar was awarded for developing techniques that enabled many technically sophisticated adaptations including the visual effects in 21st century movies in the Star Wars , Harry Potter , Terminator , and Pirates of the Caribbean franchises . Fedkiw has designed a platform that has been used to create many of the movie world 's most advanced special effects since it was first used on the T @-@ X character in Terminator 3 : Rise of the Machines . Although he has won an Oscar for his work , he does not design the visual effects that use his technique . Instead , he has developed a system that other award @-@ winning technicians and engineers have used to create visual effects for some of the world 's most expensive and highest @-@ grossing movies .

He is also a co @-@ founder of PIVOT , which stands for " Personal Improvement Via Omniscient Technology " . The stated mission of the company is to develop technology to help people achieve their personal goals of looking better , feeling better , and living better using omniscient technology .

= = Early life and family = =

Fedkiw , who was born in Buffalo , New York , earned his B.S. and M.A. from University at Buffalo , The State University of New York in mathematics in 1990 and 1991 respectively . Then , he received his Ph.D. in applied mathematics from UCLA in 1996 . His dissertation was chaired by Stanley Osher . He completed postdoctoral studies both at UCLA in Mathematics and at Caltech in Aeronautics before joining the Stanford Computer Science Department . Fedkiw has two daughters : Brittany was born in 2000 and Briana was born in 2003 .

= = Career = =

Fedkiw is now a full professor in the department of computer science . Fedkiw serves on the editorial boards of Journal of Computational Physics and the Journal of Scientific Computing . He has published Level Set Methods and Dynamic Implicit Surfaces (Springer 2002 , ISBN 0 @-@ 387 @-@ 95482 @-@ 1) along with Stanley Osher .

Since 2000 , Fedkiw has been a consultant with Industrial Light and Magic receiving screen credits for work on Terminator 3 : Rise of the Machines , Star Wars : Episode III ? Revenge of the Sith and Poseidon . In addition , he has worked on all three Pirates of the Caribbean and some Harry Potter movies . Fedkiw 's techniques have made possible the renderings of the sea in the Pirates movies and the dragon 's flaming breath in Harry Potter and the Goblet of Fire . They have also made possible the rushing floodwaters in Evan Almighty and were first used with T @-@ X in Terminator 3 . Fedkiw feels the best result of the use of his techniques was the sinking ship shots in Poseidon . Pirates of the Caribbean : Dead Man 's Chest won the Academy Award for Visual Effects at the 79th Academy Awards awarded on February 25 , 2007 and Poseidon was also nominated that year in that category . Among the applications that Fedkiw 's math engine is responsible for is the tentacles of Davy Jones (pictured left) in the Academy Award @-@ winning Dead Man 's Chest .

On February 9 , 2008 in the Academy Scientific and Technical Award ceremony at the Beverly Wilshire Hotel in Beverly Hills , California , Fedkiw was awarded an 80th Academy Award for Technical Achievement for the development of the Industrial Light & Magic (ILM) fluid simulation system . He shared the award with Nick Rasmussen and Frank Losasso Petterson . Fedkiw does physics @-@ based simulation that enable better water effects . Previous representations had varying levels of success . They often did well at surface representation , but were less efficient at smaller particles such as breaking waves . Fedkiw 's team 's innovative ? particle level set method ? allows both smooth surfaces and water breakdown renderings including water spray . Fedkiw has

worked with Industrial Light and Magic , Pixar Animation Studios , Intel Corporation , Honda and Sony Pictures Imageworks . Fedkiw commented that when he was informed that he would be presented his award by Jessica Alba he was quoted by the Associated Press as follows : " They said I got 60 seconds so I might just spend the last 15 realizing I 'm 10 feet away from the most beautiful woman on the planet . . . and no restraining order this time . "

Fedkiw and his colleagues have designed a C + + code library for Physics Based Modelling (PhysBAM http : / / physbam.stanford.edu) that facilitates the creation of better special effects for movies , including water , smoke , fire , cloth , rigid bodies and deformable bodies . Fedkiw often receives screen credit for consulting with special effects engineers , technicians and movie executives . His research has focused on the design of new computational algorithms that can be used for many purposes , including computational fluid dynamics and soft body dynamics , computer graphics , computer vision and computational biomechanics . In fact , the system can also be used for a range of applications from motion capture to rendering , but Fedkiw 's main emphasis is on physics @-@ based simulation .

Fedkiw has described his work as follows :

It is an exhaustive task to prescribe the motion of every degree of freedom in a piece of clothing or a crashing wave . . .Since these motions are governed by physical processes , it can be difficult to make these phenomena appear natural . Thus , physically based simulation has become quite popular in the special effects industry . The same class of tools useful for computational fluid dynamics is also useful for sinking a ship on the big screen .

= = Awards = =

Presidential Early Career Award for Scientists and Engineers
National Academy for Science : Award for Initiatives in Research
SIGGRAPH : Significant New Researcher Award (2005)

= = Book = =

S. Osher and R. Fedkiw , " Level Set Methods and Dynamic Implicit Surfaces " , Springer @-@ Verlag , New York (2002) .