

2010 ACM SIGGRAPH Awards

Computer Graphics Achievement Award

Jessica K. Hodgins



ACM SIGGRAPH recognizes Jessica Hodgins for her contributions in the field of physically based animation. Her research has had a significant impact on our understanding, simulation, and animation of how people and other creatures move. She, together with her students and postdocs, has achieved this understanding by developing new techniques in simulation, control systems, and motion capture. She has also led efforts in helping us understand how people perceive motion of both simulated characters and real humans.

Hodgins is best known for her work on animating humans, particularly those performing dynamic and athletic activities. Her approach to using physics as the underlying model grew from graduate work in robotics where she developed some of the earliest agile legged robots. In computer graphics, her papers from the early 1990s on legged motion and human athletics laid the groundwork for research in using dynamics to simulate complex characters such as humans.

Hodgins once again applied ideas from physics to create realistic animations of inanimate objects, including the animation of brittle fracture, explosions, and the motion of complex media like sand, mud, and snow. This work inspired whole new lines of research, both in her lab and others; her group's recent work on viscoelastic and incompressible flow is an example.

Her work has also resulted in improved techniques for capturing and modeling the deformable elements of human motion, including not just the motion of rigid elements such as bones, but also those of soft elements like skin and muscle, and the simulation of the resulting motion of clothing.

Captured data can perfectly represent any single motion, but allowing a user to build up new motions from fragments of other captured motions – i.e., the introduction of user control – presents substantial challenges. Hodgins has made major contributions in this area; her group produced one of the original papers on motion graphs in 2002; in 2005, they developed performance interfaces that used a small number of markers to drive complex synthesized motions; they then went on to further explore markerless and accelerometer-based systems for reconstructing human motion. She has also developed algorithms for efficiently leveraging motion data by combining it with dynamics and by interpolating trajectories.

One theme throughout Hodgins' work has been careful evaluation. With her human simulations, she has compared the motion trajectories and force patterns to those captured from human subjects. In her work on passive simulations, she has compared high speed foot-

age of the phenomena being modeled to that produced by the simulations. More recently, she and her students have used user studies and perceptual studies to validate the efficacy of their approaches.

In addition to Hodgins' breadth of research, she has been a significant positive force in the graphics community, mentoring eleven Ph.D. students and postdocs who are now faculty in graphics, animation, and robotics. From her role as editor-in-chief of ACM Transactions on Graphics, to chairing the SIGGRAPH papers committee, to co-founding the Symposium on Computer Animation, her efforts have supported a wide range of educational and scientific efforts. We are proud to name her this year's Computer Graphics Achievement Award winner.

Biographical Sketch

Jessica Hodgins is currently a Professor in the Robotics Institute and Computer Science Department at Carnegie Mellon University and part-time Director of Disney Research, Pittsburgh. She earned her Ph.D. in legged locomotion with Marc Raibert at the CMU and MIT Leglab.

Prior to moving to Carnegie Mellon in 2000, she was on the faculty in the College of Computing at Georgia Institute of Technology where she received a NSF Young Investigator award, a Sloan Fellowship, and a Packard Fellowship.

Previous Award Recipients

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| 2009 Michael Kass | 1990 Richard Shoup |
| 2008 Ken Perlin | and Alvy Ray Smith |
| 2007 Greg Ward | 1989 John Warnock |
| 2006 Thomas W. Sederberg | 1988 Alan H. Barr |
| 2005 Jos Stam | 1987 Robert Cook |
| 2004 Hugues Hoppe | 1986 Turner Whitted |
| 2003 Peter Schröder | 1985 Loren Carpenter |
| 2002 David Kirk | 1984 James H. Clark |
| 2001 Andrew Witkin | 1983 James F. Blinn |
| 2000 David H. Salesin | |
| 1999 Tony DeRose | |
| 1998 Michael F. Cohen | |
| 1997 Przemyslaw Prusinkiewicz | |
| 1996 Marc Levoy | |
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| 1994 Kenneth E. Torrance | |
| 1993 Pat Hanrahan | |
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