Next-Generation Sound Synthesis

Doug James
Full Professor, Computer ScienceAssociate Professor, Computer ScienceAssistant Professor, Computer Science & Robotics

CURRENT RESEARCH

Computing virtual sounds automatically

Natural and physical sounds are all around us: a piece of paper rubbing against the table or a glass of water being poured, the distant sound of a lawn mower or a jet plane tearing through the sky. Sound provides important auditory cues for perceiving and understanding our environment, the motions and interactions of objects, and their physical compositions. Dr. Doug James, Professor of Computer Science at Stanford University, develops computer simulations that can synthesize realistic sounds with complex physics-based animations such as splashing fluids or fracturing solids. Despite the importance of sound, most sounds generated in computer graphics and virtual environments unfortunately lack synchronization and predictive realism, and are usually pre-recorded "canned sounds" that do not match the underlying physical process. To this end, Dr. James hopes to make fundamental advances in physics-based audiovisual simulation so that humans can both see and hear simulated virtual models.

While realistic computer-animated imagery has revolutionized engineering insight and practice, the lack of realistic auditory feedback is a major impediment to the serious use of virtual reality for scientific and engineering applications. By enabling computer-simulated physical objects to make sound in virtual environments, Dr. James and his team will be able to synthesize sound and imagery all at once and improve the creative process in many areas, including architectural design and development, virtual prototyping in engineering design, models for acoustic remote sensing, and computational robotics. For example, we hope to devise methods which can improve future robots' perceptual models of sound around them, to build...

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AFFILIATION

Stanford University

EDUCATION

- Ph.D. in Applied Mathematics 2001,University of British Columbia

AWARDS

- Katayanagi Emerging Leadership Prize, 2013
- Technical Achievement Award for Wavelet Turbulence (Theodore Kim, Nils Thuerey, Doug James, Markus Gross), 2013
- Research Fellow, 2011
- Research Fellow, 2006
- NSF CAREER Award, 2004-2009

RESEARCH AREAS

Technology, Computational Sciences / Mathematics, Robotics

FUNDING REQUEST

Your contributions will support Dr. Doug James of Stanford University as he develops computer simulation methods that can synthesize realistic sounds with complex physics-based animations. Donations will help fund the education of Ph.D. students (about 80K/year) and postdoctoral researchers, and provide research opportunities for undergraduate students, for programs that may require a dozen student researchers. Help revolutionize the way we compute sound; fund Dr. Doug James.