TECHNISCHE UNIVERSITÄT WIEN
Institut für Computergraphik und Algorithmen
Arbeitsbereich für Computergraphik

OESTERREICHISCHE COMPUTER GESELLSCHAFT
AUSTRIAN COMPUTER SOCIETY

laden gemeinsam zum

GASTVORTRAG

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(IST Austria)

"Deformable Surfaces with Topology Changes for Physics-Based Animation "

Abstract:

Accurate computational representations of highly deformable surfaces are indispensable in the fields of computer animation, medical simulation, computer vision, digital modeling, and computational physics. After reviewing common representations of deformable surfaces, I will present some of my recent contributions to the field of computer graphics.

I will first present results from an algorithm that generates highly detailed continuum mechanics animations by combining a finite element method with a tetrahedral mesh generator and a high resolution surface mesh. Next, I will present an efficient solution for the challenging problem of computing topological changes between detailed surface meshes, allowing us to track surfaces in computational fluid dynamics applications with unprecedented levels of accuracy and detail. This surface tracking technique also opens the door for a unique coupling between surficial finite element methods and volumetric finite difference methods, in order to simulate liquid surface tension phenomena more efficiently than any previous method. Due to its dramatic increase in computational resolution and efficiency, this method yielded the first computer simulations of a fully developed crown splash with droplet pinch off.

Biography:

Dr. Chris Wojtan is an assistant professor at the Institute of Science of Technology Austria (IST Austria), where he is establishing a computer graphics lab with a research focus on physically-based animation, geometric modelling, and numerical techniques. His computer graphics contributions include methods for animating detailed viscoplastic materials, several techniques for controlling physics simulations, and an algorithm for efficiently computing topological changes in deforming triangle meshes. His research into mesh-based fluid surface tracking has helped produce extremely detailed liquid surface animations, allowing arbitrarily thin features and detailed crown splashes. Prior to his work at IST Austria, Chris received his Ph.D. in Computer Science from the Georgia Institute of Technology in 2010, and he worked as a visiting scientist at Carnegie Mellon University and ETH Zurich.

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