

1086-AD-2202 **Rasmus Tamstorf***, 500 S. Buena Vista St., Burbank, CA 91521. *Plausibly unrealistic: Physical simulation in animated feature films.*

Animated feature films depend on simulating physical systems for cloth, hair, fluids, rigid objects and soft tissue. This talk will provide a brief overview of some of these and the set of mathematical challenges that they bring along. This includes the fact that all of it is purely imaginary, and therefore may not obey ordinary rules. A more practical challenge is that most of the simulations are usually so slow that they must be run offline. Especially when they involve hundreds of thousands of degrees of freedom. Yet, being able to simulate large systems interactively can improve the creative process for artists significantly. As an example of how this can be overcome we shall consider the simulation of soft tissue. For this problem we have developed a stabilized one point quadrature scheme on a hexahedral grid, which allows us to solve co-rotated linear elasticity equations using a multigrid solver in near real time for systems with up to half a million degrees of freedom. The choice of mathematical techniques here is influenced not only by the physics of the underlying problem, but also by current trends in computer architecture which demand massively parallel applications. (Received September 25, 2012)