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Eftychios Sifakis* (sifakis@math.ucla.edu), University of California Los Angeles. *Dynamic digital faces and bodies: Challenges, applications and broader impact of biomechanical modeling and simulation technology.*

Digital doubles have not only evolved into prevalent elements of motion pictures and entertainment-oriented computing, but are also finding an ever growing application base including medical diagnostics, surgical planning and design of vehicles and crafts. At the same time, current and developing applications demand improved photorealism, enhanced biomechanical accuracy, better subject-specificity and faster simulation algorithms. As these demands often outgrow the evolution of computer hardware, new algorithms for biomechanical modeling and simulation are necessary to ensure that upcoming computational platforms are utilized to the best of their capacity. Additionally, biomechanical simulation has provided a great opportunity for transformative advances in medical practice using virtual models of the human body for disease prevention and treatment. These emerging applications mandate an increased level of attention to the unique demands of subject-specificity and anatomical accuracy for clinical uses of biomechanical modeling and simulation. This talk will outline a number of numerical algorithms and computational techniques that were designed to facilitate modeling and simulation of digital doubles with high fidelity and efficiency. Finally, I will discuss the cross-cutting impact of such advances on character animation, scientific computing and virtual surgery. (Received August 18, 2010)