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**DEPARTMENT OF COMPUTER SCIENCE**  
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**“DYNAMIC POINTS: WHEN GEOMETRY MEETS PHYSICS”**

**HONG QIN**

Professor, Department of Computer Science  
SUNY Stony Brook (Stony Brook University)

**ABSTRACT**

With the rapid technical advancement of modern 3D scanning devices in recent years, large-scale point-sampled geometry with complicated topology is becoming ubiquitous in graphics, visualization, and geometric information processing. In this talk, I will present a novel and unified modeling, simulation, and processing paradigm for point-sampled geometry and its physical interaction. At the geometric level, my talk will focus on the global conformal parameterization of the point-set surfaces. Upon global parameterization, at the physics level, I will demonstrate how physics can be integrated with point geometry for interactive simulation and animation in graphics. Key applications include shape deformation based on the thin-shell finite element formulation, crack generation and propagation. Other applications in physics-based shape morphing, real-time free-form deformation, dynamic surface editing, haptic sculpting and painting, interactive sketching, and surface completion will also be presented. Besides mathematical formulations for both point geometry and physical laws, many experimental video clips will be shown to demonstrate the efficacy of our prototype point-based system throughout my talk. Time permitting, I will briefly talk about our current and on-going research work in visual computing, especially in point-based graphics.

**Speaker's brief bio:**

Dr. Hong Qin is a full professor of Computer Science in Department of Computer Science at Stony Brook University (SUNY Stony Brook). He received his B.S. degree and his M.S. degree in Computer Science from Peking University, China. He received his Ph.D. (1995) degree in Computer Science from the University of Toronto. In 1997, Professor Qin was awarded NSF CAREER Award from National Science Foundation. In December 2000, Professor Qin received Honda Initiation Award. In February 2001, Professor Qin was selected as an Alfred P. Sloan Research Fellow by the Sloan Foundation. In June 2005, Professor Qin served as the general Co-Chair for Computer Graphics International 2005 (CGI'2005), and he was also the organizing committee chair for Stony Brook Graphics Week which includes Computer Graphics International 2005 (CGI'2005), Point-Based Graphics 2005 (PBG'2005), and Volume Graphics 2005 (VG'2005), held on June 20-24, 2005 in SUNY Stony Brook. At present, he is an associate editor for IEEE Transactions on Visualization and Computer Graphics (IEEE TVCG), and he is also on the editorial board of The Visual Computer (International Journal of Computer Graphics). He is the Conference Co-Chair for ACM Solid and Physical Modeling Symposium 2007.