



BRIGHAM YOUNG
UNIVERSITY
CS Department Colloquium Series



Gus Hart

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1170 TMCB, 11:00 AM

Simulation Physics: Simple Fantasies, Complex Realities

Originally, science consisted exclusively of two modes of discovery: experimental and theoretical. This changed in 1954 when the first “numerical experiment” was performed by Fermi, Pasta, and Ulam (FPU) on the MANIAC I computer at Los Alamos National Laboratory. This singular event marked the beginning of a new approach to scientific inquiry. As a result of rapid advances in computing power and algorithms, simulation/computation has now become the third branch of science. In the short span of 50 years, following the original FPU numerical experiment, simulation has led to landmark discoveries in all branches of science. I will discuss the history of the FPU experiment and several other surprising physics discoveries in the last 50 years and demonstrate how simulation played a central role in those discoveries. In materials physics, simulation is leading the way at every length scale---from atomistic simulations, through meso-scale behavior, to the macroscopic behavior. Using specific examples from my research group, I will show how simulations are leading the way in the understanding and design of materials.

Biography

Gus Hart received a B.S. in Japanese and Physics from BYU in 1994 and a PhD in computational solid state physics from Univ. California Davis in 1999. During his graduate work he also worked at Lawrence Livermore National Laboratory. From 1999-2001 he worked in the solid state theory group at the National Renewable Energy Laboratory focusing on computational materials science aimed at improving renewable energy technologies. After five years at Northern Arizona University, Gus joined the faculty at BYU in the summer of 2006. His research interests include computational materials science and chaos/complexity.

Donuts will be provided