

Center for Research Computing Colloquium Series

# *The Cactus Framework for High Performance Computations in Physics*

David Rideout Ph.D.

Perimeter Institute for Theoretical Physics in Canada

Thursday October 29, 2009

3:00 pm

Hesburgh Library Auditorium

The Cactus framework was developed initially for large scale simulations of colliding black holes, when it was realized that the community needed a unifying framework to manage diverse research groups' codes and hardware. Through the ongoing development of this framework we have learned to write software abstractions for common features of physical theories such as coordinates, symmetries, boundaries, topology, and generic 'unstructured meshes'. This has led to an extremely general framework, which at the same time regards performance and portability as two of its central tenets. David will describe the Cactus framework, and present two very different applications which are enabled by it, one in coastal modeling, and the other in discrete Quantum Gravity (the attempt to unify Einstein's General Relativity with Quantum Theory).



David Rideout received his Ph.D. in Physics from Syracuse University in 2001. Upon completion he spent two years at the Max Planck Institute for Gravitational Physics in Potsdam, Germany, working with the gravitational wave group on the Cactus framework. After that experience he shifted his focus toward Quantum Gravity (the unification of General Relativity and Quantum Theory), and spent a total of six years at Hamilton College in New York State, Imperial College London (UK), and the Perimeter Institute for Theoretical Physics in Canada (where he is currently located).