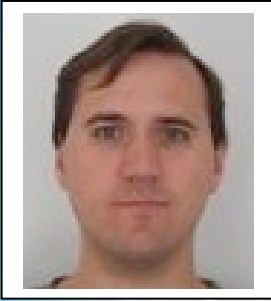# Physics Colloquium

## Michigan Technological University

Thursday, September 19, 2013
at 4:00 pm
Room 139 Fisher Hall

## Powering Soft Matter Self-assembly Simulations with GPUs

**Joshua A. Anderson**
**University of Michigan**

**Abstract:** Experimentalists can synthesize polymers with any desired configuration, build colloids and nanoparticles with any shape, and produce buckets of them. The challenge is in knowing which ones will self-assemble into interesting structures. Simulation can provide some direction. Computers are inexpensive, and it is easy to script exhaustive searches over parameter space. Even so, studies using traditional CPUs would require tens of thousands of cores to complete in a reasonable amount of time. GPUs provide an order of magnitude improvement in performance per dollar and enable routine research of this type. In this talk, I will discuss the self-assembly studies performed by our group and present details on HOOMD-blue, the GPU-accelerated particle simulation tool.

**Bio:** Joshua Anderson is a Research Area Specialist in the Laboratory for Computational Nanoscience & Soft Matter Simulation at the University of Michigan, where he is the lead developer of HOOMD-blue, a high performance particle simulation tool. Dr. Anderson graduated from MTU in 2005. He received his Ph.D. degree in Condensed Matter Physics from Iowa State University in 2009. His research interests include high performance computing using GPUs, nanoparticle self-assembly, and polymer physics.

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