Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

**Rise of the Colloidal Machines** SHARON C. GLOTZER, University of Michigan — Digital matter is a new approach in science, engineering, and medicine that uses powerful algorithms and fast computers to discover and design the materials of the future. The idea is to identify and program atoms, molecules, nanoparticles, and microparticles with the optimal shapes and interactions for forming new materials with unprecedented properties. In this talk, I'll discuss the exciting possibilities of using nano- and micron-sized colloidal particles in the design and fabrication of functional elements for robot-like machines, such as colloidal muscles, digital colloidal bits, bionic colloidal assemblies, and colloidal swarms. These functional colloidal elements could allow researchers to make smart, shape-shifting materials, like those comprising the Terminator T-1000. I'll also outline the fundamental physics challenges to realizing smart colloidal materials and machines.

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Date submitted: 08 Jan 2015 Electronic form version 1.4