

MATERIALS SCIENCE COLLOQUIUM

SPEAKER: PROF. MARC DE GRAEF
Carnegie Mellon University

TITLE: Practical Shapes and Magnetism: Beyond the Spherical Cow

DATE: Thursday, May 31, 2007

TIME: 11:00 a.m.

PLACE: Building 212, Room A-157

HOST: Amanda Petford-Long

Refreshments will be available at 10:45 a.m.

Abstract:

Nearly all textbooks on magnetism state that the demagnetization field around a uniformly magnetized object can only be computed analytically for the ellipsoid shape; most other shapes are too complicated. In this talk, we will present a formalism that allows us to compute demagnetization factors for arbitrary shapes, using a Fourier space approach. While the bulk of the talk will focus on magnetism, we will on occasion stray into the fields of electrostatics, elasticity, gravitation, moment-of-inertia, and a few others, to show how shapes can be treated in a unified way across many fields of science. We will also consider how vector field electron tomography and Lorentz microscopy can provide us with a direct experimental route to the acquisition of shape-sensitive information. It is hoped that this presentation will show that one does not always have to assume that the object under study is a sphere; progress can be made for more complex shapes as well.