Western University
Department of Physics and Astronomy

PHYSICS & ASTRONOMY COLLOQUIUM

Date: **THURSDAY, 8th March 2018**
Time: **1:30 p.m.**
Location: **Physics & Astronomy Seminar Room 100**

Dr. Arnd Pralle
Department of Physics
University at Buffalo

"Magnetothermal Deep-Brain Neuromodulation in Freely Behaving Mice"

ABSTRACT

Establishing how neurocircuit activation causes particular behaviors requires modulating the activity of specific neurons. I will demonstrate that magnetothermal genetic stimulation provides tetherless deep brain activation sufficient to evoke motor behavior in awake mice. The approach uses alternating magnetic fields to heat superparamagnetic nanoparticles on the neuronal membrane. Neurons, heat-sensitized by expressing TRPV1 are activated with magnetic field application. Magnetothermal genetic stimulation in the motor cortex evoked ambulation, deep brain stimulation in the striatum caused rotation around the body-axis, and stimulation near the ridge between ventral and dorsal striatum caused freezing-of-gait. The duration of the behavior correlated tightly with field application. This approach provides genetically and spatially targetable, repeatable and temporarily precise activation of deep-brain circuits without the need for surgical implantation of any device.

COFFEE + light snacks will be available in the Atrium, 2nd floor, at 1:15 p.m.