BOSTON UNIVERSITY

ASTROPHYSICS SEMINAR SERIES

"What can Large Samples of Low-Mass Stars tell us about the Galaxy, the Habitability of Exoplanets and the evolution of Stellar Dynamos?"

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Monday, January 28, 2013
Refreshments at 3:30pm in CAS 500
Talk begins at 4:00pm in CAS 502

Abstract:
My primary goal of this seminar is to demonstrate that we can do big science with little stars. M and L dwarfs are the smallest, coolest and least massive stars in the Galaxy. Yet despite their diminutive physical properties, low-mass stars make up ~70% of all of the stars in the Milky Way galaxy and have lifetimes that exceed trillions of years. Their dominance in the Galaxy make low-mass stars excellent tracers of both the structure and evolution of the local Milky Way. In addition, low-mass stars have intense stellar flares and strong magnetic fields that allow us to probe their interiors and may have important consequences for their space weather environments and the habitability of planets that orbit them. I will present results from the largest samples of low-mass stars ever assembled. The advent of large surveys such as the Sloan Digital Sky Survey (SDSS) has yielded photometric and spectroscopic catalogs of more than 100 million and 70,000 stars respectively. Specifically, I will highlight work that has used the unprecedented statistical power of the SDSS to examine the structure and kinematics of low-mass stars in the Milky Way, as well as the nature of their magnetic fields (and subsequent "magnetic activity") and what this may tell us about the ages of stars.

In addition, I will share some resent results from follow-up observations at Lowell, Magellan, KPNO and the Fred Whipple observatories to calibrate and confirm findings from our survey data. In particular, I will highlight the confirmation of an age-rotation-activity relation that has come from a collaboration with the MEarth planet hunting team, results from follow-up observations of some of the widest binaries in the Milky Way and demonstrate how a large sample of M dwarfs has helped us map the three-dimensional distribution of dust in the local Galaxy.