



## Department of Physics and Astronomy Presents

# Exploring the Far-Infrared Universe, with a side order of Raspberry Pi



Dr. Locke Spencer  
University of Lethbridge

**Thursday January 26th, 2017**  
**1:40 pm, Room C640, U Hall**

***Lecture Abstract:***

Over half of the energy emitted by the Universe appears in the relatively unexplored Far-Infrared (FIR) spectral region, which is virtually opaque from the ground and must be observed by space-borne instrumentation. The future of FIR astrophysics requires space-based interferometry to overcome the imaging diffraction limit imposed by the size, volume, and mass restrictions of space-based optics and instrumentation. This lecture presents the development of a laboratory based Far-Infrared spatial/spectral interferometer testbed instrument, and the utility of this observational technique applied to experimental astrophysics. The testbed instrument presentation includes the evolution of a custom designed Arduino- and Raspberry Pi-based microprocessor data acquisition electronics system, with tedious attention to the synchronization of data collected from instrument sub-systems at acquisition rates in excess of 100 KHz. This system costs a fraction of the price of comparable off-the-shelf data acquisition systems, and provides great control and flexibility in its design and operation. This lecture also introduces the Far-Infrared Universe, and a sample of associated telescopes and scientific instrumentation, including future missions and mission concepts. This includes relatively nearby star formation, all the way out to the oldest photons available to us from the cosmic microwave background.

***Short Bio:***

Dr. Locke Spencer is a Canada Research Chair (Tier 2) in experimental astrophysics within the Astronomical Instrumentation Group (AIG) at the Department of Physics and Astronomy, University of Lethbridge. Prior to his current position at the U of L, he completed his graduate studies working on the imaging Fourier transform spectrometer on-board Herschel/SPIRE, and completed a 3.5 year post-doctoral fellowship in Cardiff University, Wales working primarily with the Planck telescope High Frequency Instrument (HFI). His research focus lies in instrumentation for Far-Infrared (FIR) astronomy and astrophysics, specializing in Fourier spectroscopy. He is currently supporting a number of FIR projects, including the Herschel and Planck missions, while working to contribute towards future FIR space instruments and observatories. He is a member of CAP, CASCA, and APEGA (P.Eng.).

**EVERYONE IS WELCOME**