



# Collaborative Graduate Specialization in Computational Science and Engineering

## WEEKLY COLLOQUIUM

Tuesday, 25 March 2008

2:30-3:30 in RM101, Jeffery Hall

**Speaker:** ROB THACKER  
Associate Professor and CRC in Computational Astrophysics  
St. Mary's University

**Title:** A New Technique to Understand the Impact of Black Holes on Galaxy Formation

**Abstract:** Many galaxies harbour a 'super-massive' black hole (SMBH), of a million solar masses or larger, at their centre. The accretion disk surrounding SMBHs can release enormous amounts of energy into the galactic environment through winds and jets. This heating, observed in active galactic nuclei (AGN), or more dramatically in extremely distant but fantastically luminous 'quasars', strongly impacts the evolution of the gas both within a given galaxy and also that surrounding it. The heating effect can be measured directly if we use a background source to 'shine' through the gas, which the cosmic microwave background (CMB) provides for us. Recent simulations have begun to shed light on how well we can measure the heating process through measurements of the CMB on very small scales. In this talk I will give a general outline of how we use parallel computing to simulate the growth of galaxies, including the impact of black hole evolution, and how we hope future measurements of the CMB will precisely constrain estimates of the energy output from jets and winds. The computing aspect of this research received the 2007 Orion Discovery Award of Merit.

**About the speaker:**

*Dr. Rob Thacker received his PhD from the University of Alberta under the supervision of Don Page and Hugh Couchman. Following NSF funded postdoctoral work at the University of California at Berkeley and later McMaster University, he was awarded a National Fellowship of the Canadian Institute for Theoretical Astrophysics (CITA) at Queen's University. He is also a core member of the "Virgo Consortium", a research collaboration that is widely acknowledged as being the world leader in simulations of cosmic structure formation. In the summer of 2007 he was appointed to the Canada Research Chair in Computational Astrophysics at St Mary's University. His current research focuses on the modelling of galaxy formation, using massively parallel computing and multi-scale simulation algorithms.*