MONTANA STATE UNIVERSITY | College of LETTERS & SCIENCE

# Physics Colloquium

## Thursday, March 2, 2017
## 4:30 – 5:20 PM
## Barnard/EPS 103

# An Observational View of the Physical Processes on the Doorstep of Supermassive Black Holes


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### Abstract:

Accreting supermassive black holes, or active galactic nuclei (AGN), are among the most energetic sources of radiation in the Universe. In some cases, they produce more light than all of the stars in their host galaxy combined. Over the course of cosmic history, this radiation has played a key role in galaxy formation, affecting the chemical and dynamical properties of massive galaxies and clusters, as well as regulating their growth. Without it, today's Universe would look entirely different.

In my talk I will discuss how we can use this immense amount of radiation as a probe of the properties of the black hole itself, the extreme conditions in its immediate environment and the physical processes that take place there. I will present some of my recent work on measuring the angular momentum of supermassive black holes, and explore whether its rotational energy could provide the power source for the relativistic jets that are seen in some AGN. I will go on to describe how X-ray and UV observations can be used to learn about the temperature structure of the accretion disk, where matter accumulates before falling into the black hole. Finally, I will talk about the conditions in the black hole's `corona' - a region of highly energetic particles with a radiative energy density a million times that of its Solar analog. In this respect, as in many others, the vicinity of the black hole provides a unique laboratory for studying matter in extreme conditions.


**Host: Neil Cornish**

****** Refreshments served in the EPS second floor atrium at 3:45 ******

**Dr. Lohfink is a candidate for a Physics Faculty Position**