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UNH Scientist Vies for Role in NASA's 'Beyond Einstein' Probe of Black Holes

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DURHAM, N.H. -- The National Aeronautic and Space Administration (NASA) recently selected a proposal led by scientist Mark McConnell of the University of New Hampshire's Institute for the Study of Earth, Oceans, and Space (EOS) to develop an instrument that will perform the most sensitive survey of black holes yet done.

The Black Hole Finder Probe is part of NASA's "Beyond Einstein: From the Big Bang to Black Holes" initiative, which is at the forefront of the agency's roadmap for future space exploration. McConnell's team is tasked with defining how the probe will do its work.

The UNH concept for the Black Hole Finder Probe has been dubbed CASTER for Coded Aperture Survey Telescope for Energetic Radiation. CASTER will survey the local universe from Earth orbit and take a census of black holes. McConnell, a high-energy (X-rays, gamma and cosmic rays) astrophysicist with EOS's Space Science Center (SSC) and the UNH Department of Physics, was awarded \$100,000 for a two-year study to further develop the CASTER mission concept.

UNH is the lead institution for the project, with McConnell serving as the project's principle investigator. The study also involves the University of Alabama at Huntsville, Louisiana State University, the Los Alamos National Laboratory, the Southwest Research Institute, and the Centre d'Etude Spatiale des Rayonnements (CESR) in Toulouse, France.

The Beyond Einstein program seeks answers to three fundamental questions: What powered the Big Bang? What is the mysterious dark energy pulling the universe apart? What happens to space, time, and matter at the edge of a black hole? CASTER would help answer this last question by conducting a census of black holes in the local universe.

McConnell's group is one of two multi-institution teams working to develop a concept for the Black Hole Finder Probe mission, which will be launched in 2015.

This long-term, high-stakes, high-risk process is typical of competitive, peer-reviewed scientific proposals, which can sometimes involve colleagues within the same institution vying for the same project. Indeed, two other teams at SSC are at the moment jockeying for a part in another, big upcoming NASA mission.

Of this winner-take-all scientific method McConnell says matter-of-factly, “It is a long road, but if you're not there at the beginning you sure won't be there at the end.”

McConnell is part of a small high-energy astrophysics group at SSC whose research focus includes the realm of space outside our solar system (the bulk of EOS/SSC research concerns the Sun-Earth system). McConnell, James Ryan, and John Macri are currently funded by NASA for nearly \$2 million in multi-year projects.

The acronym-rich soup of NASA missions they are working on includes CASTER, GRAPE (for Gamma Ray Polarimeter Experiment), FNIT (Fast Neutron Imaging Telescope), and RHESSI (Ramaty High Energy Solar Spectroscopic Imager). Their work involves designing, building, and flying instruments aboard spacecraft, analyzing the data gathered and, says McConnell, “extracting the science.”