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## Arkansas researchers hope to shed light on black holes

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University researchers say they have discovered a relationship between supermassive black holes and the spiraling arms of galaxies that could help understand how the universe evolved.

Researcher Daniel Kennefick heads a team in a three-year, \$1.4 million study at the University of Arkansas campuses in Fayetteville and Little Rock that is using this "relatively simple formula" based on a correlation between the size of a supermassive black hole and galaxy spirals. The team, whose formula was discussed in *The Astrophysical Journal* in May, is hoping to refine the story of how the universe unfolded.

"It's a big topic," Kennefick says flatly.

The researchers will study pictures taken by the Hubble and Chandra space telescopes, the Gemini telescope in Hawaii and the NASA IRTF telescope. Astronomer Julia Kennefick, an expert on quasars, also will spend time at the Kitt Peak National Observatory in Arizona.

Black holes occur when a single star collapses at the end of its life. They are thought to play an important part in the formation and evolution of galaxies. Supermassive black holes involve multiple stars crushed together by the force of their own gravity. They emit no light and cannot be seen.

"It still has all of the mass but the gravity has gotten so intense that it won't let light escape from it," Daniel Kennefick explains. "The mass is still there. You could fall into it or you could orbit it if you were a star."

Scientists believe supermassive black holes are at the center of galaxies, including Earth's home, the Milky Way, where they estimate the hole weighs about 3 million times more than the sun. In general, supermassive black holes range from 1 million to 1 billion times the sun's mass.

The Kenneficks, a husband-and-wife team, UAF astronomer Claud Lacy, an expert on binary stars, and UALR astronomer Marc Seigar, an expert on spiral arms, make up the Arkansas Galaxy Evolution Survey team. Graduate students and postdoctoral researchers will work with them.

NASA paid for half the research grant; the two universities provided the other half.

**For more information see Tuesday's *Arkansas Democrat-Gazette*.**

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