Rensselaer Astrophysicist Chairs New Scientific Survey of Milky Way Galaxy

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Heidi Newberg, associate professor of physics and astronomy at Rensselaer Polytechnic Institute, is chairing the science working group of a new project focused on mapping the Milky Way Galaxy's structure and stellar makeup and compiling data on its origins and evolution.

The recently announced Milky Way survey project, the Sloan Extension for Galactic Understanding and Exploration (SEGUE), is one of three new projects included in the Sloan Digital Sky Survey II (SDSS-II), a three-year extension of a scientific undertaking that will complete the largest survey of the universe.

Newberg will lead the scientific efforts of a collaborative group of researchers from 18 institutions around the world who are working on the SEGUE project.

"The SEGUE project will allow us for the first time to get a 'big picture' of the Milky Way Galaxy," said Newberg. "Even the basic stellar components of the Milky Way are not yet understood in depth. Our coordinated effort to study the ages, chemical composition, and distribution of stars in our galaxy will yield major clues in understanding how our own galaxy and other galaxies formed."

As part of SEGUE, researchers will record and analyze data from 4,000 square degrees of imaging by high-powered telescopes to yield positioning information on tens of millions of stars in the Milky Way Galaxy. More detailed information will be compiled on 240,000 stars in

the galaxy by using each star's spectra to identify properties such as age, velocity, and chemical composition. Data from completed SDSS projects also will be utilized to complement the SEGUE data.

The Andromeda Galaxy, imaged here by the Sloan Digital Sky Survey, is the closest galaxy of similar type to our own Milky Way. The individual stars visible in this image are stars in our galaxy that we look through to see out to Andromeda. Our goal is to map the stars in our galaxy so that we can imagine what our galaxy would look like as viewed from the outside. When we can do that, we will know much more about the structure of our own galaxy than we will ever be able to know about Andromeda. — Heidi Newberg, Rensselaer Polytechnic Institute

Photo Credit: Stephen Kent/Sloan Digital Sky Survey

Newberg said the SEGUE project will generate images, spectra, and associated data for use in follow-up work or as input data for space-based or large Earth-based telescopes. "SEGUE is the largest survey in operation that strives to map the large-scale distribution of stars in the Milky Way," she said. "We will use the information we obtain about the

stars to create a more accurate 3-D representation of our galaxy."

Newberg's current research is related to understanding the structure of the Milky Way Galaxy by using stars as tracers of the galactic halo and the debris from smaller galaxies from which it forms. She uses photometric and spectroscopic measurements of stars to determine distances and physical properties of large statistical samples to separate halo and disk components of the Milky Way.

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