

Princeton University

Honors Faculty Members
Receiving Emeritus Status



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Faculty Members Receiving Emeritus Status

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Gillian R. Knapp



Jill Knapp has spent her career studying the life cycles of stars and the interstellar medium from which they are born, using a wide array of telescopes operating at optical, infrared, millimeter, and radio wavelengths. She is one of the most cited astronomers in the world, with well over 300 refereed publications to date.

Her thesis work at the University of Maryland studied the hydrogen content of dense clouds of gas in the Milky Way. Her measurement in the late 1970s of the distance from the sun to the Milky Way's center, and the speed at which the Milky Way rotates, changed the paradigm in the field and gave values very close to the community's consensus today.

After finishing her thesis, Jill joined the research staff at the Owens Valley Radio Observatory in California. Her research interests broadened to study the outflows of gas in stars nearing the end of their lives, and understanding the production of molecules and dust grains in the extended envelopes of red giant stars. In 1980, she and her husband, Jim Gunn, moved together to the Department of Astrophysical Sciences in Princeton. She became increasingly interested in the properties of the interstellar medium of other galaxies. One of the papers she is most proud of used infrared data to demonstrate that elliptical galaxies contain far more dust and gas than had previously been thought, with profound implications for the way in which such galaxies evolve.

In the 1990s and 2000s, Jill managed the development of the software to process data from the Sloan Digital Sky Survey (SDSS), a major imaging and spectroscopic survey of the sky using a dedicated telescope in southern New Mexico. Working with a team of faculty, research staff, postdocs, and students, Jill saw the SDSS through its turbulent early years, as it struggled with budget shortfalls, delays, and tensions between the partners. The survey

started gathering data in 1998, and is still going strong, with plans to continue operating at least through the year 2020. Jill and her colleagues' continual emphasis on doing things right, and squeezing the data to get all scientifically useful information out of it, are a large part of the legacy of SDSS, and the reason that it has been so scientifically productive, serving as the basis of literally hundreds of Ph.D. theses at Princeton and around the world. Jill used these data to go in new directions again, especially discovering large numbers of faint "brown dwarfs," stars whose masses are too low for them to ignite hydrogen fusion in their cores. Her interests are now turning to planets; she is developing the science program for a new spectrograph being built to study their properties by Princeton's Department of Mechanical and Aerospace Engineering and the National Astronomical Observatory of Japan.

When Jill first came to Princeton, there were no women among the University's tenured faculty in the physical sciences or engineering. She is enormously gratified by the progress that Princeton (and the scientific community overall) have made in this area, and is currently passionate to make similar progress in the involvement of under-represented minorities in math and science. For much of her time at Princeton, Jill has been director of graduate studies in the astrophysical sciences department, and she bears a huge share of the credit for making the department a welcoming and productive place for graduate students. In 2010, the department was ranked first in the nation by the National Academy of Sciences for its graduate program in astrophysics, a reflection of Jill's enormous imprint on the department's graduate students.

In 2005, Jill, together with then-postdoctoral fellows Mark Krumholz and (now Princeton professor) Jenny Greene started an initiative to teach mathematics to inmates in New Jersey prisons, giving them the education they need to succeed when they get out. Jill has continued and greatly expanded this program, realizing the tremendous loss of human potential and destruction of communities that the U.S. prison system imparts. As part of the Pace Center for Civic Engagement's Prison Teaching Initiative, she leads a group of

dozens of Princeton students, postdocs, and faculty, now teaching courses in mathematics, English, science, and humanities. We are all now used to her saying things like, “When I got out of prison last night...” The students get credit through Mercer County Community College, and many have gone on to get degrees at Rutgers and other universities after being released. “While I am always proud when one of our graduate students gets a top faculty job, there is nothing like the feeling when one of the students from the prison program succeeds,” says Jill. This program, together with her research into the nature of brown dwarfs, will continue to be the focus of her efforts as she retires.