Proposal for NHARP - 2009

Project Summary

Proposal Number	Principal Investigator(s)	Institution
003658-0234-2009	**Jogee, Shardha** **Evans, Neal**	**The University of Texas at Austin**
Title		Program/Area
Student Support for VENGA: Understanding Galaxy Evolution in the Nearby Universe		**NHARP-Physics and Astronomy**

This proposal requests student support for the VIRUS-P Exploration of Nearby Galaxies (VENGA), an unprecedented 2D spectroscopic survey of the inner and outer parts of a large sample of 32 nearby spiral galaxies, being conducted with the VIRUS-P Integral Field Unit (IFU) on the 2.7m telescope at McDonald Observatory.
A unique advantage of VENGA is that VIRUS-P has the largest field of view among contemporary IFUs. Consequently, VENGA is the largest and most efficient survey worldwide, currently acquiring 2D spectra of spiral galaxies out to large radii. VENGA will advance the field of astronomy by allowing us to explore many pivotal questions on how galaxies -- the building blocks of the Universe -- form and evolve. The VENGA data will allow breakthroughs in understanding how new stars form in galaxies, how stars and black holes shape galaxies, and ultimately on how galaxies assembled over cosmic time. VENGA data are already being used in the Ph.D.theses of 4 UT graduate students. Other projects are planned for new students and a public release of science products is expected in 2012.

A rare and remarkable feature of VENGA is that it is a project initiated and led by graduate students. While a faculty oversight committee (Gebhardt, Jogee, Evans) provides guidance, the inception and vision for VENGA stemmed entirely from the UT graduate students. VENGA is acting as an excellent training platform where graduate students learn all aspects of a large science program, from writing observing proposals, optimizing observing strategies, developing data reduction pipelines, leading cutting-edge science, and conducting a timely public data release, with accompanying documentation. The experience thus gained by the graduate students positions them to lead future large science programs. This is especially valuable as the field of astronomy is now increasingly driven by such large programs and collaborations.

The mentorship and involvement of UT undergrads in research is an integral part of VENGA. Undergrads accompany graduate students on observing runs to McDonald observatory when classes are not in session, and they are extremely enthusiastic about their hands-on learning experience. Undergrads also help with aspects of the data reduction. Among the 72 astronomy majors, we have a large number of undergrads who want to get involved with VENGA, but we need funds to support them.

The McDonald Observatory telescope allocation committee has strongly supported VENGA through the allocation of 60 nights to date. We expect a similar allocation over 2011-2012 to complete VENGA. To date, VENGA has received small seed funding from a mix of sources and made impressive progress. We now urgently need a large dedicated source of funding for graduate and undergraduate students involved in VENGA in order to ensure the long-range success of VENGA. As the first proposal with a main focus on VENGA submitted to an external funding agency, this NHARP proposal would provide the core student funding for VENGA. We expect to leverage the NHARP grant with funding proposals to the National Science Foundation, and with departmental support to fund undergraduates.

VENGA is poised to have a far-reaching impact: it provides the prototype for large IFU surveys of nearby galaxies, generates the largest and best comparison dataset for IFU studies of distant galaxies, and paves the way for next-generation IFU surveys. It behooves us to give it our full support.