

Project Summary

Overview: • *Type of REU Site:* New. • *Title:* ‘REU Site: Frontier Research and Training in Astronomy for the 21st Century’. • *P. I.:* Shardha Jogee. • *Submitting organization:* Department of Astronomy, University of Texas (UT) at Austin. • *Other organizations involved:* UT Summer Research Scholars (SRS) office, McDonald Observatory, Texas Advanced Computing Center (TACC), and Texas Institute for Discovery Education in Science (TIDES). • *Location for research:* University of Texas at Austin, except for a six-day trip to McDonald Observatory. • *Main field(s) and sub-field(s) of research:* Astronomy with sub-fields of stellar astrophysics, exoplanets, star formation, galaxy evolution, and cosmology. • *No. of undergraduate participants per year:* 8 • *Type of REU site:* Summer. • *No. of weeks per year that the students will participate:* 10 summer weeks at UT and 3 days participation at a January American Astronomical Society (AAS) meeting. • *Does the project include an international component or an RET component?:* No. • *Point-of-contact for student applicants:* Sandra Catlett (Astronomy Program coordinator), (512) 471-0481, utastroreu@astro.as.texas.edu. • *REU Site Web address (if known):* To be set.

Intellectual Merit: Growing our nation’s STEM force requires us to engage the full pool of excellence in our diverse population and equip students with STEM skills to succeed in the 21st century. Through a synergistic collaboration between the Astronomy Department, McDonald Observatory, TACC, and TIDES at UT Austin, our REU program strives toward these goals through the following components: (i) All eight REU participants will be external. At least 50% will be female and at least 50% will be under-represented minorities (URMs). (ii) REU students will engage in research projects in frontier areas of astronomy, including stellar astrophysics, exoplanets, star formation, galaxy evolution, and cosmology. They will benefit from a diverse, committed, and trained pool of astronomy mentors (11 faculty, research staff, postdocs, and five graduate students). (iii) TACC will introduce participants to modern computing techniques, which drive cutting-edge data and simulation-based analyses, and provide them with a technical consultant and full access to TACC systems for their research projects. (iv) Our observational astronomy module will provide preparatory lectures on campus and culminate into a five-day observing trip to McDonald Observatory where REU students will observe using dedicated time and reduce data. (v) Students will benefit from professional development workshops, empowerment activities on socio-dynamical issues (e.g., growth mindset, imposter syndrome), a summer research poster symposium, and a strong sense of peer community. (vi) Mentorship will be sustained through regular teleconferences, funding all students and select mentors to attend a future AAS (or other professional) meeting to present their results, and a Linked-In networking group of UT Astronomy REU alumni and mentors.

Broader Impact: The program will produce blogs, short videos, and StarDate Radio programs, which will feature the research of REU students and allow high caliber students, especially women, URMs, and members of inter-sectional groups, to share their inspiring stories with the next generation of scientists. Through UT Astronomy and McDonald Observatory’s teacher professional development workshops, these products will be shared annually with over 375 K-12 teachers. Each teacher will in turn share them with ~ 100 students per year across Texas, where Hispanics and African Americans make up 52% and 13% of public school students, respectively. The two-minute StarDate radio program produced each year will highlight the research of REU students and their mentors, and include a 12-second credit for the National Science Foundation. StarDate radio programs are broadcast over 400 radio stations and reach a weekly audience of 2.3 million listeners. The programs reach under-served groups, including over 50,000 American Indians, tens of thousands of Pacific Islanders, and millions of people on the Armed Forces Radio and Television Services.