GLAS Education Inc. – Our Mission is Clear
Make the world a better place through unprecedented engagement in astronomy and STEM

Project: Sloan Digital Sky Survey (SDSS) Accessible Spectroscopic Plug Plate - Redshift Dissemination Project (SDSS Internship)

Purpose: GLAS Education is a growing non-profit with a mission that reaches across STEM disciplines and diverse communities. The purpose of this project is to create a comprehensive suite of materials to accompany the Accessible SDSS Spectroscopic Plug Plate such that the project can be duplicated at other institutions for teaching SDSS science to diverse audiences and support blind or low vision undergraduate students' career exploration and advancement.

Introduction: SDSS Spectroscopic plug plates are scientific artifacts from the SDSS telescope in Apache Point, New Mexico. Each plate contains between 600 and 1000 holes designed to align fiber-optic cables with astronomical targets. Light captured from each target is fed to a spectrograph through an unique fiber-optic cable. Data from the spectrograph allows scientists to determine the objects' composition and distance from Earth. While thousands of these plates remain in storage, hundreds of them have been repurposed as educational tools and distributed to SDSS collaborating institutions around the world along with curricular support materials.

Until GLAS Education began designing the spectroscopic plug plate display in 2018, no effort had previously been made to make these resources accessible to blind and visually impaired (BVI) audiences.
The first pilot design was completed in 2018 and tested at the American Astronomical Society (AAS) in January of 2019. With the support from a 2021 Wisconsin Space Grant, a complete redesign of the project was implemented based on the feedback from the AAS meeting, and additional testing was done at GLAS Education in mid-2019

Internship Challenges: This project has progressed through an interative design process. Presently, approximately 10 targets or holes on the plate display are assigned a pull tab attached to a fishing line, the length of which is proportional to the object's redshift. As the tab is pulled, a small speaker plays a tone, which drops as the line reaches its maximum length. Lower tones therefore represent greater redshift. No construction documentation is available. No support materials for the use of the display for educational purposes are available.

The next steps for this project include:

1. Adding sonification pull tabs to an additional 30 or 40 objects
2. Producing construction documentation sufficient for the successful reproduction of the display by any institution with the proper equipment
3. Creating materials that can be used to orient users to the display with a focus on vision impairments. Focus groups revealed the need for support materials such as a tactile model of the Apache Point telescope, Braille explanations of what the user will encounter prior to exploring the display with their hands.
4. Creating the educational resources needed to teach the concept of redshift and SDSS science to any person with minimal knowledge of astronomy, regardless of visual acuity.

Internship Challenges are Team Challenges:
This internship will be tailored to fit the specific STEM interests of the candidate. They will work to varying degrees on each of the project goals with BVI professionals: Olivia Smithmeir, a BVI educational consultant with GLAS who has been recruited as project coordinator, and mentor Tia Bertz, BVI consultant in 3D printing, who will provide assistance with the creation of accessible resources. As early career professionals whose careers have been negatively impacted by COVID-19, both Smithmier and Bertz will have an opportunity with this project to add significantly to their portfolios. PI Kate

Meredith will act as the primary science consultant. Other interns and staff at GLAS will contribute to the success of this project as the summer progresses.

The SDSS intern will be part of the GLAS Summer Internship program with five other interns, some of whom will also be from groups that are underrepresented in STEM. All interns are provided with housing and work together collaboratively for 10 weeks. All interns at GLAS receive instruction in basic astronomy and participate in public outreach events and are encouraged to present their projects through conferences or publications. The SDSS Intern will present at the Wisconsin Space Grant Consortium Meeting and will have the opportunity to present at the American Astronomical Society Meeting the following January, in 2023. Additionally, the team offers to share their experiences creating opportunities for persons with disabilities with other Space Grant Awardees at the annual meeting.

Compensation: $4,000 for the 10 week internship. Housing costs will not exceed $1,000. Travel expenses and on-site cost are covered by GLAS Education. Interested candidates should send a cover letter and resume to Kate Meredith at kate@glaseducation.org This position will remain open until a successful candidate is identified.