Skynet Junior Scholars:
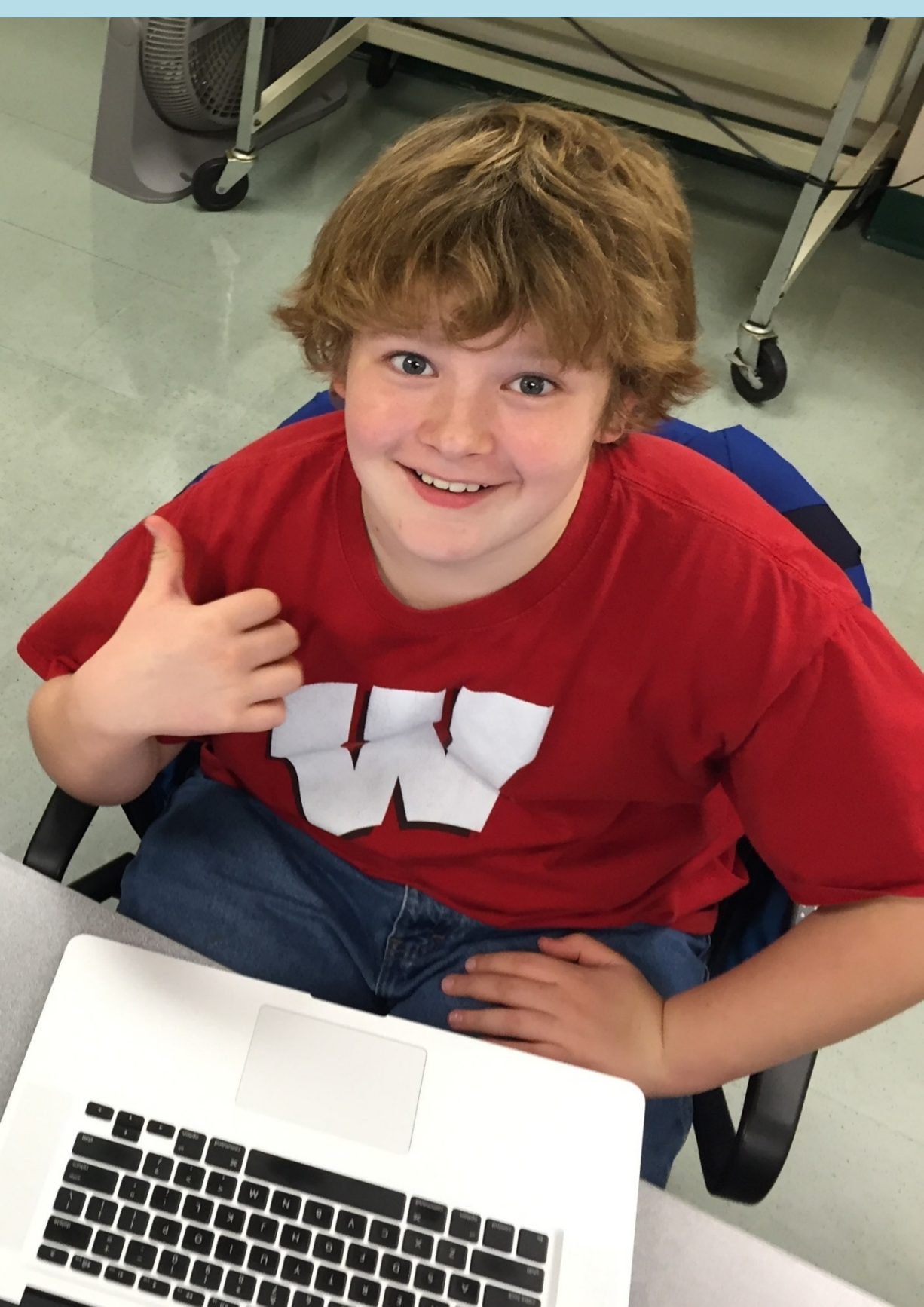## Bringing Astronomy to Deaf and Hard of Hearing Youth

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Abstract:

Deaf and Hard of Hearing (DHH) students have long been an underserved population within STEM fields, including astronomy. Two main barriers Include: (1) insufficient corpus of ASL signs for astronomy terminology, and (2) DHH education professionals who lack astronomy background. A suite of vocabulary, accessible hands-on activities, and interaction with trained professionals, are critical for enhancing the background experiences of DHH youth, as they may come to an astronomy lesson lacking the basic knowledge that is often taken for granted with hearing peers (for example, from astronomy in the media). Individuals with disabilities – specifically individuals who are deaf or hard of hearing (DHH) – are traditionally underrepresented in the STEM fields. Our goals for this project are three-fold; to engage DHH students with equal success as their hearing peers, to share our techniques in order to make astronomy more accessible to DHH youth, and to generate a life-long interest which will lead our students to STEM careers.

A collaboration between the Skynet Junior Scholars (SJS) project and the Wisconsin School for the Deaf is bringing astronomy to the DHH community in an accessible way for the first time. We follow a group of seven DHH youth over one semester as they interact with the SJS tools and curriculum to understand how they assimilate astronomy experiences and benefit from access to telescopes both directly (on school campus and at Yerkes Observatory) and through Skynet's robotic telescope network (optical and radio telescopes, inquiry-based modules, data analysis tools, and professional astronomers). We report on our first findings of resources and best practices for engaging DHH youth in astronomy in the future.
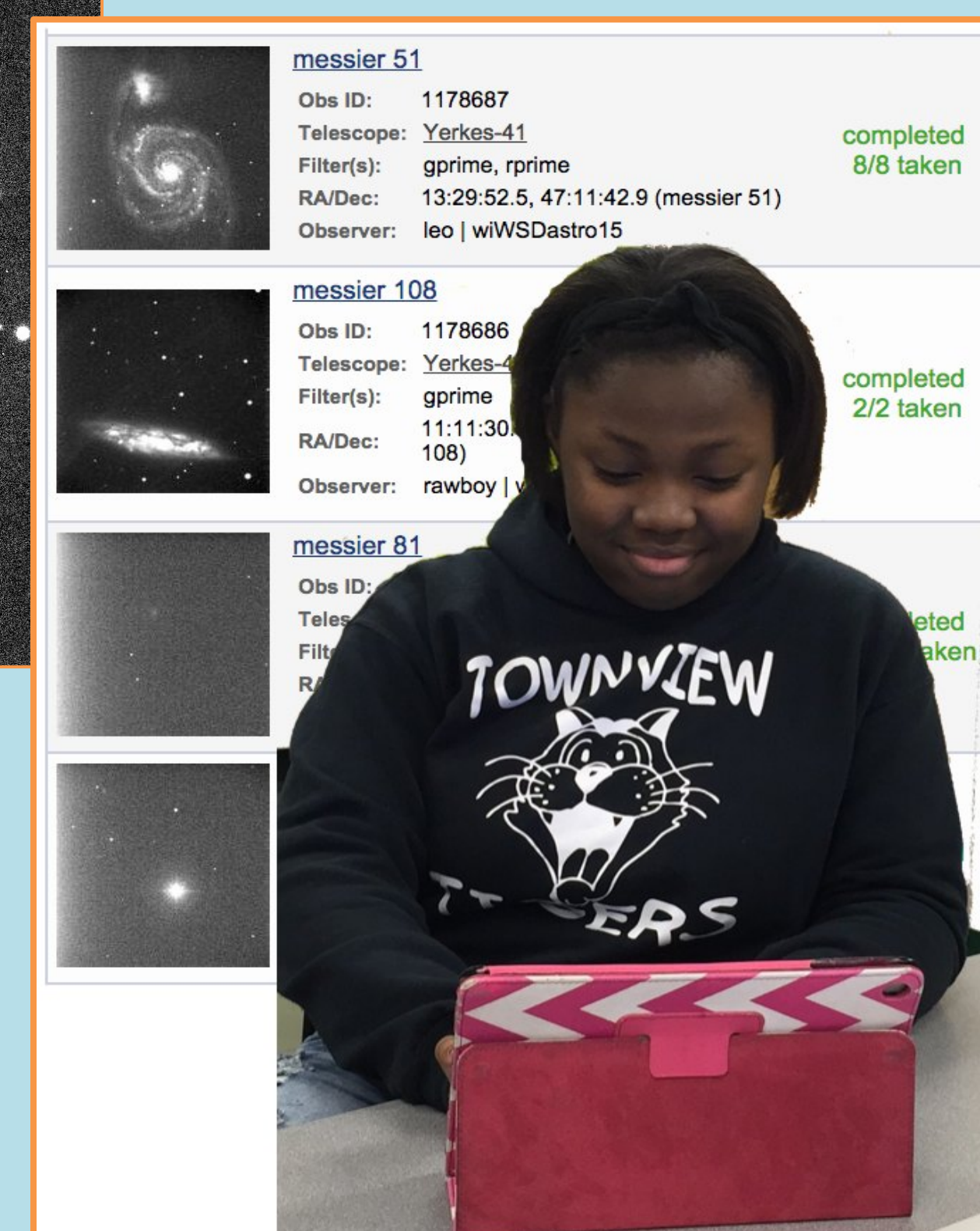
DHH youth can watch ASL-signed "How To" videos to learn how to navigate the SJS website, control the Skynet telescopes, and review observations.

Youth collect and analyze their own astronomical data images to learn about the types of objects in the Universe, how telescopes work, and how astronomical investigations are conducted.

Youth participants take ownership of their learning by expressing their understanding of concepts in ASL accessible "how to" videos for other DHH students in the future.

How can YOU help to involve DHH youth in astronomy?

- Establish strong partnerships with astronomy educators, deaf education professionals and American Sign Language interpreters. Leverage access to mentors and role models competent in ASL for content knowledge. It takes both communities working together toward a common goal to make it work!
- Use clear, narrowly-defined lesson plans and consistently reinforce vocabulary terms. Astronomy has its own set of terms that can be complex, and many words and concepts do not have broadly accepted signs. Fingerspell words that do not have formal signs in order to build understanding, and allow deaf users to coin new signs. Do not shy away from "dense" terminology.
- Use a variety of learning tools to adapt for learning styles and abilities: Create visualizations with images and/or movies. Create accessible "how to" videos for DHH students not involved in the formal SJS program.
- Empower students: Encourage students to express their understanding of concepts and to describe observations, directions, routines, and processes from their own unique perspective. Recognize expertise and promote leadership among students. Listen and discuss – have high expectations.