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SciAccess: Making Space for All

Anna Voelker, Caitlin O'Brien and Michaela Deming

Department of Astronomy, The Ohio State University
4055 McPherson Laboratory, 140 W 18th Ave, Columbus, OH, United States, 43210
emails: voelker.30@osu.edu, obrien.847@osu.edu, and deming.32@osu.edu

Abstract. The SciAccess Initiative ("SciAccess") is dedicated to advancing disability inclusion and diversity in STEM education, outreach, and research. In this paper, the authors present an overview of accessible STEM programs run by the SciAccess Initiative, including an annual conference, international working group, and space science mentorship program for blind youth. Recommendations for creating accessible mentorship programs and networking events, both virtually and in-person, are detailed so that these inclusion-focused efforts may be replicated by others.

Keywords. SciAccess, accessibility, disability, diversity, inclusion, astronomy outreach

1. Introduction

In 2018, the SciAccess Initiative was founded in response to an overwhelming need to address a lack of accessibility, diversity, and visibility for scientists with disabilities in the STEM community. Made possible due to The Ohio State University ("OSU") President's Prize, the SciAccess Initiative began as a one-time conference dedicated to promoting disability inclusion in STEM. From there, it grew into an international initiative that has since branched off into myriad programs working towards a more equitable future.

While it is estimated that 26% of Americans have disabilities Census (2012), people with disabilities represent only 8.3% of overall workers, with an estimated 1.6% employed in science and engineering in the U.S. NCSES (2019) Advancement in these fields is highly influenced by networking opportunities such as conferences, internships, career fairs, virtual seminars, and social events Mickey (2019). When these opportunities are inaccessible, disabled students and professionals are denied the same experiences as their nondisabled colleagues, which in turn can harm their employment prospects.

People with disabilities comprise the world's largest minority group U.S (0000), yet are severely underrepresented in the STEM fields. In response to these discrepancies in employment and education rates, SciAccess seeks to foster equitable STEM opportunities by providing a space in which disabled scientists, educators, students, and advocates can share their experiences with one another and with their nondisabled peers. SciAccess aims to advance the development and dissemination of best practices in accessible STEM research and education through a growing series of international programs, as outlined below.

2. Overview

A chronological overview of SciAccess Initiative projects is presented below.

SciAccess 2019 Conference. On June 28 and 29, 2019, OSU hosted SciAccess: The Science Accessibility Conference. This international event brought together 250 scientists, educators, students, and disability rights advocates to share best practices for

STEM accessibility. The SciAccess 2019 Conference featured over sixty speakers, including keynote presentations from Dr. Temple Grandin, professor of animal science and renowned autism advocate, and Anousheh Ansari, the first female private space explorer.

Making Space for All Webinar Series. Making Space for All was an educational webinar series hosted by the OSU Department of Astronomy and Center for Cosmology and AstroParticle Physics. It featured underrepresented researchers in space science and focused on providing accessible astronomy outreach content during the COVID-19 pandemic. This series culminated in the SciAccess 2020 Conference.

SciAccess 2020 Conference. On June 29, 2020, OSU hosted SciAccess 2020: The Virtual Science Accessibility Conference. With the worldwide transition to online learning, this event took place virtually and brought together speakers and attendees from around the world who share a dedication to inclusive science. The SciAccess 2020 Conference had over one thousand total registrants and 555 participants on the day of the event, with attendees joining from 46 nations and all seven continents, reaching as far as the South Pole. The conference culminated with a keynote presentation by Dr. Soyeon Yi, who shared her experiences as the first and only South Korean astronaut.

SciAccess Working Group. The SciAccess Working Group is a collective of professionals that meets virtually each month to discuss the latest developments in accessible STEM. The group publicizes STEM accessibility projects for use worldwide and primarily consists of researchers and educators working in the STEM fields, as well as professionals with disability and accessibility backgrounds. Individuals interested in joining can do so by filling out the form at go.osu.edu/wg.

SciAccess Zenith Mentorship Program. The SciAccess Zenith Mentorship Program ("Zenith") is a virtual program for blind and low vision (BLV) students interested in astronomy. Established in August 2020 in partnership with OSU and the Ohio State School for the Blind, Zenith connects 8-12th grade BLV students ("Zenith scholars") with OSU student mentors. Using multi-sensory resources such as 3D-printed astronomical models, provided by the nonprofit See3D (See3D.org), and data sonification, Zenith provides an accessible entry point into astronomy and scientific research. After a successful pilot program in autumn 2020, Zenith became a registered student organization at OSU and will continue hosting a new cohort of Zenith scholars from around the world each semester.

3. Implications

Best Practices for an Accessible In-Person Conference. SciAccess has employed a wide variety of methods for ensuring conference accessibility. Based on this experience and the corresponding attendee feedback, the following is recommended for in-person events:

- **Quiet room:** A quiet room, or sensory friendly room, provides attendees with a designated space for taking a break from socializing and from conference commotion. The SciAccess 2019 quiet room included service dogs, art supplies, and playdough. The benefits of quiet rooms have also recently been seen at select commuter airports David (2019).
- **Color communication badges:** Introduced by Autism Network International, color communication badges allow conference attendees to share their communication preferences nonverbally Autistic Self (2014). Red, yellow, and green slips of paper are inserted into the nametags of the attendees, who choose which color they wish to display at any given time. Green means an individual is looking to socialize and meet new people, yellow means they would only like to be approached by those they already know, and red means that they would not like anyone to initiate a conversation with them at this time. This system allows attendees to clearly communicate their preferences and eases

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the anxiety of networking for all participants. BLV SciAccess attendees were provided with braille color badges.

• **Pronouns on nametags as the default:** Displaying pronouns (such as he/him, they/them) on attendee name tags normalizes the practice of not assuming someone's gender. On the SciAccess 2019 registration page, attendees were asked to specify their pronouns and were informed that this selection would be displayed on their nametag. They were also given the option to skip this question, but by making it the default, nearly all conference attendees chose to display their pronouns on their nametag, creating a more inclusive environment. Because of the precedent set by SciAccess 2019, this practice was then adopted by the IAU 358 Symposium in Tokyo in November 2019.

• **Braille and large print materials:** During registration, ask attendees for their accommodation requests. Offer braille and large print event programs for BLV participants.

• **Tactile map:** SciAccess 2019 used a tactile, thermoform map of the conference venue in order to help BLV attendees navigate the building.

• **Guide volunteers:** Conference volunteers were on-call at all times at the central information desk. If a BLV attendee requested assistance locating a specific room, volunteers were trained to guide the attendee to their destination.

• **Making food accessible:** If offering a buffet, braille descriptions can be taped to the table to identify food. SciAccess 2019 also provided attendees with a list of nearby restaurants that were wheelchair-accessible. To help with food navigation, have additional guide volunteers available during meal breaks.

• **Sign language interpreting:** Sign language interpreting is essential for the inclusion of Deaf attendees. If a conference has concurrent sessions, organizers should provide sign language interpreters for each individual Deaf attendee so that they can go to the session of their choice, instead of being restricted to a single conference strand.

• **CART captioning:** Communication Access Real-time Translation (CART) uses a human captioner to provide a word-for-word transcription of an event. Captioning not only benefits Deaf and hard-of-hearing attendees, but also supports accessibility for second language learners Gernsbacher (2015). For the best quality, use human-transcribed CART captions instead of auto-generated captioning services.

• **Accessible seating:** In each conference room, comfortable armchairs were available for those with chronic pain and for anyone unable to sit in a rigid chair for long periods of time. Ensure that armchair placement does not impede wheelchair access. For social events, avoid high-top cocktail tables, which are inaccessible for people using wheelchairs and anyone who is unable to stand for long periods of time. Instead, use standard round tables for networking events.

• **Slide descriptions:** Train all speakers to describe their presentation slides. This means verbally describing all visual content so that BLV audience members are included.

Fostering Accessibility During Online Events. As virtual events increase in popularity in the wake of COVID-19, it is essential that accessibility remains at the forefront of program design. Based on the work of SciAccess 2020 and the Making Space for All webinar series, the following is recommended for ensuring the accessibility of online programs:

• **Pronouns:** While most online events do not have nametags, organizers can still encourage attendees to share their pronouns by adding them to their display name.

• **Increased breaks:** Increase the frequency of breaks in order to relieve "Zoom fatigue."

• **Sign language interpreting and CART Captioning:** Organizers using Zoom can follow these guidelines in order to successfully incorporate sign language interpreting and CART captioning within their virtual event: go.osu.edu/zoomaccess.

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Developing an Accessible Mentorship Program. Zenith aims to model and propagate best practices for accessible mentorship programs. The first step to creating such a program is to build connections with the local community. If an organization is looking to work with blind students, they could begin by contacting their local school for BLV students (in the U.S., there is generally one per state). The next step is to reach out to their science teachers and see if the school would be interested in partnering on a science mentorship program. Such a partnership combines the organization's STEM expertise with the school's knowledge of student needs and accessibility. Organizations should also consider partnering with local universities to recruit student mentors and seek expert guidance from faculty advisors.

Zenith holds regular guest lectures with space scientists, including BLV astronomers, allowing the students to meet role models with similar life experiences. Each semester, Zenith scholars select a topic that they are passionate about and work with their mentors to develop a professional presentation on their subject. The students then present their work for family, friends, and university professors at a research symposium, the program's culminating event. Organizations interested in furthering this work by creating their own Zenith chapter can connect with the SciAccess Initiative to receive further guidance. Additional resources can be accessed at sciaccess.org.†

4. Conclusion

These accessibility initiatives, whether in-person or virtual, serve an essential function in connecting people who have been historically excluded from the STEM fields. In addition to fostering an exchange of ideas, resources, and best practices, they also serve as eye-opening experiences for younger generations of students with disabilities who are faced with a severe lack of representation in STEM. Accessibility is an active, ongoing, and intentional commitment to creating inclusive engagement opportunities. When the talents and perspectives of people with disabilities are neglected, science as a whole suffers. By creating accessible programs and events, organizations prove to disabled students and future scientists that not only is there space for them in STEM, but a profound need.

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† Similar content to that contained within this paper will be published in other conference proceedings as work regarding the SciAccess Initiative has been presented at multiple events.

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