**2021 Agenda Science and Engineering Division of the National Federation of the Blind**

**July 8, 2021**

Virtual Meeting

Zoom meeting ID: [968 1451 1786](https://zoom.us/j/96814511786)

You can open this link directly, or attach it to a Zoom phone number like this:

301-715-8592,,968 1451 1786#

3:00 P.M. EST Call to order – John Miller, President, Engineering tips and division goals

3:10 P.M. - Muscle Memory and The Microbiology Lab - Emily Schlenker

3:25 P.M. - Remote Learning in STEM for the Blind - Ashley Neybert **and Amelia Palmer**

3:40 P.M. - College and Graduate School Blindness Accessibility Review Project - Don Winiecki

3:55 P.M. - Being Blind in the Electronics Laboratory - Matthew Duffell-Hoffman

4:10 P.M. - Business meeting

4:15 P.M. - Panel Discussion: Methods of Teaching STEM to The Blind -

Emily Gibbs, Susan Osterhaus, and Natalie Shaheen

5:00 P.M. - Adjournment

After the meeting, there will be a social hour using this zoom link from 5 PM to 6 PM hosted by Nathanael Wales. All are invited.

For any questions, please contact John Miller at johnmillerphd@hotmail.com.

A summary of the presentations follows.

# Title - Muscle Memory and The Microbiology Lab: how being totally blind did not hinder me from learning the various techniques and aseptic procedures in what has always been portrayed as a very visual discipline.

**Speaker: Emily Schlenker**

Emily Schlenker has a bachelor's degree in Global studies and one in biology with a minor in chemistry from Wichita State University.  She will be attending a Doctor of Pharmacy program at the University of Kansas this fall.

**Presentation:**

As a biology major, one of the requirements was to complete a general microbiology lab. I was able to do this with a few basic modifications and a whole lot of practice. All though I spent a lot of time feeling awkward and uncomfortable, what people do not tell you is that almost all students who are faced with these new techniques feel the same way and are experiencing difficulties.

# Title - Remote Learning in STEM for the Blind

**Speaker: Ashley Neybert and Amelia Palmer**

Ashley Neybert is the Lead Curriculum Specialist at Independence Science, a company run by and for blind scientists. She graduated with a bachelor’s in chemistry from Rockhurst University in Missouri in 2015 and is currently in her final semester of her Masters in Curriculum and Instructional Design at Wichita State University in Kansas. Her goal is to always push the envelope on what is considered possible for blind students in STEM fields.

**Presentation:**

Covid-19 has made many things inaccessible for the blind as many teachers push for simulations and other inaccessible materials. This new technology will allow a student to still have some autonomy over their laboratory during remote learning and opens the door to collaborations with laboratories that had not been possible before outside of Covid and can even introduce students to the possibility of international collaborators. Amelia Palmer, a blind engineering student at Boise State University, will demonstrate how she can complete a simple experiment remotely with the use of JAWS Tandem and a Sci-Voice Talking LabQuest.

# Title - College and Graduate School Blindness Accessibility Review Project

**Speaker: Don Winiecki**

Don Winiecki is a faculty member in the Boise State University College of Engineering. He has a Doctor of Education degree in instructional technology, and a Doctor of Philosophy in sociology. He is the Treasurer of the Idaho Affiliate of NFB, a member of the Science & Engineering Division of NFB, and the NFB President's Committee for the Advancement and Promotion of Braille, moderator of the ""Ask an Expert"" forum for tactile graphics of the National Braille Association, and the BANA representative to the International Council on English Braille committee on Technical UEB.

**Presentation:**

Since 2017 the Science and Engineering Division has been progressing toward a nationwide survey of students' experiences in STEM-related higher education. The project began with interviews of nearly 75 students and professionals in STEM-related fields to learn about their experiences. These interviews allowed us to identify principal domains of positive and negative experiences, and the range of experience in those domains. This allowed development of a survey instrument that could be accessed online and completed by students as they progressed through their schooling. The survey was reviewed and refined by members of the NFB-SED Board, and approved for distribution by the Federation. This presentation will provide details about responses to the survey to date, and what we plan to do from here.

# Title - Being Blind in the Electronics Laboratory

**Speaker: Matthew Duffell-Hoffman**

**Matthew Duffell-Hoffman is**  a rising junior at the University of South Carolina Honors College studying Electrical Engineering and Computer Science. He plans to continue directly to grad-school for an Entrepreneurial Engineering program, and then pursue a career in the field of autonomous vehicles.

**Presentation:**

I will talk about my experience in the Introductory Electrical Engineering Laboratory and the projects completed during the course. I will discuss how I used equipment such as a multimeter, function generator, and oscilloscope. I will talk about the techniques I used to work with small electronic components, both with solderless protoboards and soldering to a printed circuit board. I will talk about working with and programming a microcontroller.

# Title - Panel Discussion: Methods of Teaching STEM to The Blind

**Speakers: Emily Gibbs, Susan Osterhaus, and Natalie Shaheen**

Emily Gibbs has been teaching blind students for the last 17 years. She has served as NFBTX lead NFB BELL Academy teacher and Coordinator since its inception in 2010. She is especially interested in tactile graphics and innovative methods of creating them. Currently, she is serving as President of the Texas Parents of Blind Children and working as the Director of Youth and Education Services for the National Federation of the Blind of Texas.

Susan A. Osterhaus taught secondary math for 29 years at the Texas School for the Blind and Visually Impaired before becoming the statewide mathematics consultant in their Outreach Program 13 years ago. She is a long-time member of the BANA Nemeth and Tactile Graphics Committees. She is a co-author of Nemeth briefly, a co-author of the Pearson Nemeth Curriculum, and a consultant for Project INSPIRE: Increasing the STEM Potential of Individuals Who Read Braille.

Dr. Natalie Shaheen is an assistant professor of blindness at Illinois State University and director of the NSF-funded Spatial Ability and Blind Engineering Research project. For over a decade, Dr. Shaheen has worked to increase blind people’s access to STEM learning opportunities in formal and informal environments. In her research, Dr. Shaheen uses interdisciplinary approaches to study equity and access for disabled students in technology-mediated learning environments to disrupt systemic ableism and to reimagine technology-mediated education as a place that values and actively makes space for disabled ways of knowing and being.

**Presentation:**

The Panel will discuss methods of teaching STEM to blind students.

A paper on this topic is:

Dismantling the Compulsory Sightedness of STEM Education and Empowering Blind Learners: by Natalie Shaheen "<https://nlshaheen.com/dare/>".

Natalie writes that she has identified 5 principles for empowering blind learners in STEM.  The principals are:

1. Embrace Nonvisual Ways of Knowing.
2. Create an Environment that Empowers Blind People to Participate Fully in All of the Learning.
3. Provide Opportunities for Blind People to Learn Nonvisual STEM Process Skills.
4. Use Equipment that is Non visually Accessible.
5. All Instructional Materials are Available in Non-visually Accessible formats at the Same Time and in the Same Place as Visual Formats.