The Science and Engineering Division of the National Federation of the Blind Annual Meeting Minutes for July 3, 2023

To become a registered member of the Science and Engineering division of the NFB visit "<http://www.nfb.org/divisiondues>". Dues are $5 a year.

No sound recording was made for this year's meeting.

A copy of the meeting minutes can be found at

'<https://tinyurl.com/NFB-Science-Engineering>" in the minutes folder.

The file name is "2023-07-03 Science and Engineering Division of the NFB Annual Meeting Minutes.docx".

A meeting of the Science and Engineering Division of the National Federation of the blind (SEDNFB) was held at the Hilton Americas Houston in Houston, Texas, on Monday, July 3, 2023.

The meeting was called to order by President John Miller at 7 p.m. Central Daylight Time (CDT).

The science presentations were made, after which President Miller called the business meeting to order at 9:05 P.M.

# Pledges

President Miller said that during the June 12, 2023, SEDNFB board meeting, the board agreed that the Science and Engineering division would donate $75 to each of the following three NFB funds:

The Jacobus tenBroek Memorial Fund which supports the NFB center in Baltimore;

The White Cane Fund: which sends money directly to the general treasury of the Federation; and

The Kenneth Jernigan Fund: which is used to bring a number of attendees to their first national convention.

# Minutes

The membership agreed that the minutes from the SEDNFB 2022 business meeting need not be read since the minutes had been distributed by e-mail. The minutes were approved.

# Treasury Report

In 2020, the SEDNFB moved its treasury to the NFB national organization. The NFB provided us a treasury report covering the time July 1, 2022, through June 30, 2023. On June 30, 2023, the SEDNFB general fund treasury balance was $1330.50.

The treasury report was approved.

Notes:

The NFB national organization asked all divisions to move their accounting year to January 1, of the current year, to December 31, of the current year. This would make the terms of all NFB members be the same for all chapters, affiliates, and divisions.

For this reason:

1. The SEDNFB will move its accounting year from July 1 of the current year through June 30 of the next year; to January 1 of the current year through December 31 of the current year.

2. The membership terms of all people who paid dues in 2023 would have their membership terms end on December 31, 2023.

# Elections

Since 2023 is an odd-numbered year, no elections were held.

# STEM Scholarship

The Science and Engineering Division and the Computer Science Division are raising funds for an annual $8,000 "Science Technology Engineering and Mathematics" (STEM) scholarship given by the NFB, to a worthy student at the NFB convention. As of June 20, 2023, the S&E STEM scholarship fund has $14,647.70.

Notes:

1. The 2023 STEM scholarship amount has not yet been subtracted from our scholarship balance.

Please consider donating to the NFB towards this scholarship.

To donate:

There are two ways to donate to the NFB STEM Scholarship: one method is online, and the second method is by mail.

If you wish to make an online donation: go to

"<https://www.nfb.org/>" and activate the "Donate" link (or go directly to

"<https://www.nfb.org/donate>". Fill out the required fields. On the "Contribution Note" field please enter "STEM Scholarship". Once your donation has been submitted, you will receive an automatic acknowledgment of your donation. Please forward this donation acknowledgement to John Miller (Johnmillerphd@hotmail.com) so that he can track our progress towards our funding goal.

To donate by mail: Please make a check payable to NFB.

On the memo line write STEM Scholarship.

Mail the check to

NFB accounting/scholarship

200 East Wells St. At Jernigan Place

Baltimore, MD 21230.

Please inform John Miller (Johnmillerphd@hotmail.com) about this donation so that he can track our progress towards our funding goal.

Please make your contributions by March 1, 2024, so that your contributions can count towards the 2024 STEM Scholarship.

**NOTE: Please do not use the NFB division membership form for STEM scholarship donations. It is difficult for the NFB to track scholarship money donated on the division registration form.**

# Presentations

Below is a list of talks that were given during the 2023 SEDNFB meeting. Available speaker introductions and abstracts are given after the Adjournment item.

John Miller - Graphics Using Braille Displays and Hard Copy

Venkatesh Chari - The Future of STEM Education with Interactive Multi-line Refreshable Braille and Dynamic Tactile Graphic Displays - the Orbit Slate and Graphiti Plus.

Caroline Karbowski - Making the Biochemistry Lab Experience More Accessible

John Gardner - Blind ViewPlus Printer Users Can Now Create Tactile Patterns to Replace Color Fill

Nathanael Wales - Overcoming Blindness Challenges Leading in STEM

Harry Staley - From Helpdesk to Principal Engineer: Stay Hungry and Enjoy the Ride

Sam Dooley - the Accessible Equation Editor - A Web Application for Online Accessible Braille Math

Gene Kim and Dan Fan - Bridging the Data Access Gap: Multimodal Approaches Towards Data Accessibility

# Joining the Science and Engineering Division and E-mail List

If you are interested in joining the NFB Science and Engineering division, please fill out the division registration form at "<http://www.nfb.org/divisiondues>". The dues are $5 a year.

Note that the "division registration form" has a field through which you can make donations. Please do not donate to the STEM scholarship through this form. Only use this form to pay dues and make non-STEM-scholarship donations.

If you wish to join the SEDNFB e-mail list, go to "nfbnet.org", open the list of NFB e-mail groups, and search for "NFB Science".

# SEDNFB Mentoring Project

The Science and Engineering division's STEM Mentorship Program Was developed by Newton Nguyen, Gene Kim, and Kennedy Stomberg to pair STEM students with mentors. One of the program's activities is to host a monthly STEM seminar where students and mentors can discuss STEM techniques.

The mentor program registration form is located at:

"<https://docs.google.com/forms/d/e/1FAIpQLSd0p63m3xhR_hX-r3lwEylLtFuipX3_TVOIRRH4fsTcYnUhyA/viewform>".

For questions about the program, write to "[systemicaccess@gmail.com](mailto:systemicaccess@gmail.com)".

# Adjournment

The division meeting adjourned at 9:45 PM.

Respectfully submitted,

Louis Maher, Secretary

Science and Engineering Division of the National Federation of the Blind

Phone: 713-444-7838

E-mail [ljmaher03@outlook.com](mailto:ljmaher03@outlook.com)

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

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# Biographies and Presentation Summaries (Note that what follows is a copy of the material that appeared in the meeting agenda.)

## Title: Graphics Using Braille Displays and Hard Copy

Speaker: John Miller

## Title: The Future of STEM Education with Interactive Multi-line Refreshable Braille and Dynamic Tactile Graphic Displays - the Orbit Slate and Graphiti

## Plus

Speaker: Venkatesh Chari

With a background in Electrical Engineering, Venkatesh Chari has worked for over 25 years in the development of technologies involved in mobile and assistive technology products, in roles spanning engineering, management and strategic marketing. At Orbit Research, his work has included the development of the Orbit Reader 20, the world’s first affordable refreshable braille display and the Graphiti Interactive Tactile Graphic Display.

Abstract: The Orbit Slate family of multi-line braille displays is the first and only product in the world to provide multiple lines of true real-time refreshable braille in a single, compact, tablet-sized device. It enables users to experience spatially seamlessly and intuitively arranged text and information such as spatial math problems involving fractions and mixed numbers, number line graphs, matrices and other spatially arranged information, braille music and tables in real time. With the Graphiti Plus, students can now simultaneously experience graphics and text. It is the first and only product in the world to bring interactive real-time refreshable multi-level tactile graphics and true braille together in a single device. It has 2400 pins arranged in forty rows and sixty columns to display graphics and a line of forty braille cells. It sets the bar for truly immersive and seamless access to all digital media - providing real-time refreshable graphics and text in braille. Its ability to simultaneously display graphics and braille text while allowing direct interaction with any digital content by touch offers limitless possibilities.

## Title: Making the Biochemistry Lab Experience More Accessible

Speaker: Caroline Karbowski

I currently work as a biochemist in a research lab at Ohio State University. I am really passionate about making science accessible for blind students, and I want to pursue certification in teaching blind students. I am not blind, but I am a tactile braille reader and a certified braille transcriber. I

recently received the Bolotin Award this year for work in my nonprofit, See3D: 3D printing for the blind.

Abstract: Caroline will share tips for increasing non-visual access to biochemistry. Learn about high- and low-tech options for labeling, observing, and recording data, measuring liquids, and learning biochemistry concepts.

## Title: Blind ViewPlus printer users can now create tactile patterns to replace color fill

Speaker: John Gardner

John Gardner is known as an expert in several fields of experimental solid-state physics as well as information accessibility. He lost his sight unexpectedly in mid-career as Professor of Physics and became interested in accessibility of complex information, including math and graphics. In 1996 he founded ViewPlus Technologies, which has grown into a multi-million-dollar company producing information-access hardware and software. ViewPlus is the leading manufacturer of tactile graphics and braille embossers in the world. He has received numerous awards and has given invited presentations on both physics and information accessibility on five continents.

Abstract: We are starting a project to develop a standard for relating patterns to color and would like some “favorite pattern set” entries. One can now easily print patterns instead of the default “tactile gray scale” for color regions. I have written up a paper on color and an instruction sheet on how to make pattern files. I will give out a packet with some pattern examples.

## Title: Overcoming Blindness Challenges Leading in STEM

Speaker: Nathanael Wales

Nathanael Wales has been blind from birth. He is a civil engineer working as a project manager for the U.S. Army Corps of Engineers on flood risk management and navigation improvement projects in New York City, Long Island, and northern New Jersey out of the Corps’ New York District office. He has also had 15 years' experience as a project planner for the Corps and began his civil engineering career with 5 years of experience planning dam and reservoir projects for the State of California, Department of Water Resources. Nathanael attended his first NFB National Convention in 1996 shortly after graduating from high school just as he was beginning his college engineering program. He has found the mentoring and networking within the Science and Engineering Division invaluable and enjoys the opportunity to give back what has been so generously shared with him over the years. He was an NFB National Scholarship winner in 1997 (which year he won what was then named the “computer science” scholarship) and was a second-time scholarship winner, a tenBroek Fellow, in 2000.

Abstract: Nathanael Wales, blind from birth and a civil engineer holding a professional engineer (P.E.) license, will describe his leadership journey and the experiences that brought him into a recognized STEM leadership position as a project manager for the U.S. Army Corps of Engineers. He will discuss the challenges that have met him, including blindness challenges, and how he has addressed and overcome them and the meaningful lessons he has learned.

## Title: From Helpdesk to Principal Engineer: Stay Hungry and Enjoy the ride

Speaker: Harry Staley

I currently work as a Principal Software Engineer/Data Scientist for Global Infotek Inc., a mid-size company specializing in research and development for the defense industry. I have a B.S. in Computer Science from Texas A&M University - San Antonio and am pursuing a M.S. in Computer Science from Georgia Tech.

## Title: The Accessible Equation Editor - A Web Application for Online Accessible Braille Math

Speaker: Sam Dooley

Sam Dooley is a Senior Consulting Software Engineer at Lake Pines Braille, LLC, and is the creator of the Accessible Equation Editor.

Abstract: The Accessible Equation Editor (AEE) allows braille users to create documents using UEB contracted text and Nemeth braille math. It supports file I/O, Google Drive access, clipboard cut/paste, and document export to HTML, PDF, and BRF formats. Its accessible user interface gives sighted and braille users equal access to create and interact with online math content.

## Title: Bridging the Data Access Gap: Multimodal Approaches Towards Data Accessibility

Speakers: Gene Kim and Dan Fan

Gene Kim and Danyang Fan are both student researchers at Stanford University whose works have been presented at premier academic journals and conferences (TACCESS, ASSETS, and CHI). Gene is a junior at Stanford University studying Symbolic Systems, with a focus in Human-Computer Interaction.

He is passionate about using technology for social good and accessibility efforts. His past research contributions include auto-generated screen reader accessible data visualization, haptic wearable gloves to support remote education of blind students, and auto-generation of machine-embroidered tactile graphics. He also serves as the Secretary of the NFB's national student division and co-director of the NFB Science and Engineering mentorship program.

In his free time, you can find Gene listening to and playing music, venturing outdoors on hikes and camping trips, and experimenting with new recipes.

Dan (he/him) is a fourth year Ph.D. student and a National Science Foundation Graduate Research Fellow whose research focuses on the accessibility of data and spatial digital information for people who are blind or have low vision. He has previously worked with Microsoft Research (as an intern) to improve the accessibility of screen-shared presentations, the Stanford School of Medicine to improve the access to diagnostic tools, and the Detroit Hispanic Development Center on improving STEM education for high school students.

Abstract: The rapid growth of data information during the digital age has marked a paradigm shift in the way we perceive and consume information. As we increasingly rely on visualizations to organize, communicate, and decision-make, improving the accessibility of data visualizations is essential to social inclusion and equity. This talk will introduce the ways researchers at Stanford are confronting the data access gap, from exploring novel audio and touch-based techniques for improving graph comprehension to designing accessible STEM tools and practices that enable more flexible and critical understandings of data concepts.

These projects explore the themes of contextualization, perception, spatial reasoning, and embodied cognition as they relate to data reasoning and education.