The Science and Engineering Division of the National Federation of the Blind Annual Meeting Minutes for July 7, 2022

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.

A sound recording of this meeting (in mp3 format) can be found at

https://tinyurl.com/NFB-Science-Engineering

In the recordings folder.

The file name is "2022-07-07 SEDNFB Annual Division Meeting.MP3".

A copy of the meeting minutes can be found at the same link in the minutes folder.

The file name is

"2022-07-07 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 New Orleans Marriott in New Orleans, LA, on Thursday, July 7, 2022.

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 9:35 P.M.

# Minutes

The membership agreed that the minutes from the SEDNFB 2021 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, 2021, through June 30, 2022. On July 1, 2022, the SEDNFB general fund treasury balance was $1,095.50. We collected $105 during the annual meeting. Our July 7, 2022 balance was $1200.50. 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 2022 would have their membership terms end on December 31, 2022.

# Elections

Since 2022 is an even-numbered year, elections were held. There are four officers and two Board members. Reelected were: John Miller, President; Ashley Neybert, Vice-president; Louis Maher, Secretary; Harry Staley, Treasurer; Nathanael Wales, Board position one; and Jamie Principato-Crane, Board position two.

# STEM Scholarship

The Science and Engineering Division and the Computer Science Division are raising funds for a $8,000 "Science Technology Engineering and Mathematics" (STEM) scholarship given by the NFB, to a worthy student at the NFB convention. On June 30, 2022, the scholarship balance was $14,247.70.

Notes:

1. The 2021 scholarship winner became ill and was unable to use the 2021 STEM scholarship. He returned the $5,000 scholarship to the NFB.
2. The 2022 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, 2023, so that your contributions can count towards the 2022 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.**

**During the meeting, the following people Made the following pledges:**

**Justin** Champagne **$25**

**Carolyn and John Gardner $500**

**Louis Maher $200**

**John Miller $500**

**Nathanael Wales $200**

# Presentations

Below is a list of talks that were given during the 2022 SEDNFB meeting. Available speaker introductions and abstracts are given after the Adjournment item.

Building from the Ground Up - Jamie Principato-Crane

Engineering tips and division goals - John Miller President

the use of the Graphiti Tactile Graphic Display for the study of STEM subjects – Venkatesh Chari

Youth Engineers- The NFB EQ Experience! – Natalie Shaheen and NFB Engineering quotient program students

Multiline braille displays costing a buck-a-cell, using microliter combustion in rubber – Ronald Heisser

Interactive digital graphics for science and math content - Dave Schleppenbach

Lower Dots - Aaron Cannon

The Pearson Nemeth Code Curriculum for Students of All Ages - Tina Herzberg, Susan Osterhaus, and Sara Larkin

Learning to be a Blind Scientist – Annalise Diadato

NFB Science and Engineering STEM Mentoring Program - Nathanael Wales and Natasha Ishaq

# 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

## Title – Building from The Ground Up

**Speaker:** Jamie Principato-Crane

I am an inventor and founder of Blue Crane LLC. I was formerly an engineering program manager at Google and a project manager with NASA Space Grant programs. I am still active in the Physics and Astrophysics communities and facilitate Diversity, Equity, and Inclusion programs for the American Physical Society.

**Presentation:**

A short discussion of what engineering looks like when you decide to leave industry employment and strike out on your own as an inventor, startup founder, and first-time mom.

## Title - Engineering tips and division goals

Speaker: John Miller, President, Science and Engineering division

Presentation

Some of the division goals John mentioned were:

* Giving a joint STEM seminar with the National Association of Blind Students in February 2023.
* Promote networking among the blind interested in STEM.
* Continuing to finance the NFB STEM scholarship; and
* Encouraging division members to write solutions for, and give talks on, STEM problems they have been able to solve.

John has a sighted intern. He also has two Braille displays, one is provided by his company, and the other he purchased. His personal Braille display can be used when his company display must be sent in for maintenance.

He uses Microsoft Teams and MATLAB.

He has been advised that MATLAB Online "<https://matlab.mathworks.com/>"

is a lot more accessible these days and could be a better alternative to using the nodesktop option with the regular MATLAB.

John encourages people to share their workplace solutions.

## Title - The Use of The Graphiti Tactile Graphic Display for The Study Of

STEM Subjects

**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.

**Presentation:**

The Graphiti represents a breakthrough in non-visual access to dynamic graphical information such as charts, drawings, flowcharts, floorplans, images, and photographs, through an array of moving pins without the need for specialized software. A blind user is now able to view and create graphics in digital form simply by drawing with her finger, store them into a computing device, review and edit them, and exchange such graphics with others. With its ability to interface with computers, phones, and equipment such as microscopes and telescopes, the Graphiti provides instant tactile access to all forms of graphical information. In the classroom, the Graphiti provides the ability to access textbooks with graphical material. It also enables blind students to actively participate in inclusive classrooms and for the first time, visualize the smartboards used in mainstream classrooms. Practical applications of the Graphiti in STEM education and scientific research will also be discussed.

## Title - Youth Engineers- The NFB EQ Experience!

**Speaker:** Natalie Shaheen and NFB Engineering Quotient program students

Dr. Natalie Shaheen is the SABER project director and an assistant professor of low vision and blindness at Illinois State University.

**Presentation:**

Learn all about how NFB is empowering future scientists and engineers through the NFB Engineering Quotient program. Find out more about how youth from across the country were challenged to become engineers, learn new skills, and gain confidence through working with positive blind role models. Hear from program participants about what they have learned and how their experience will shape their educational and career goals.

## Title - Multiline Braille Displays Costing a Buck-a-cell, Using Microliter Combustion in Rubber

**Speaker:** Ronald Heisser

Ronald Heisser is a 5th year PhD candidate at Cornell University in Ithaca, New York, studying Theoretical and Applied Mechanics in the Organic Robotics Laboratory under Robert Shepherd. He grew up in San Antonio, Texas, and went to MIT in Cambridge, Massachusetts for his undergraduate studies. He worked briefly as a mechanical engineer and product designer before graduate school. He enjoys playing soccer, Halo, and spending time with his friends.

**Presentation:**

In this talk I will discuss ongoing soft robotics research to develop a new high-density array mechanical actuation system. We have produced an initial prototype whereby fuel/oxygen mixtures are spark ignited inside microliter-volume, silicone rubber combustion chambers, producing rapid actuation pulses through rubber membranes. The high energy and power density of the fuel produces a pulse powerful enough to lift small pins and provide haptic feeling. The array is a thin, touch, conformable silicone sheet. The exceedingly simple manufacturing method allows for an arbitrarily large number of dots to be made at diminishing cell cost. Our current work suggests an initial pathway to obtain latching behavior with rubber membranes. Though our concept is unconventional, we believe that it deserves serious consideration for future multi-line and graphical tactile displays.

## Title - Interactive Digital Graphics for Science and Math Content

**Speaker:** Dave Schleppenbach

Dave Schleppenbach is an Accessibility Industry expert with over 25 years' experience working with and developing assistive technology. Dave began his career while at Purdue University, founding the VISIONS Lab which developed both cutting-edge STEM teaching tools for visually impaired college students and innovative media production processes.

In 2000, Dave founded GH, LLC to provide services for the print disabled – including visually impaired, learning disabled, and mobility impaired users.

As CEO, he led GH for almost two decades, driving software development, hardware design, large-scale Braille, and tactile graphics production, and strong

advocacy ties to disabilities organizations as well as industry and government entities.

In 2013, Dave founded Tactile Engineering, LLC to develop a full-page, graphical braille tablet computer for blind users.  As CEO, he continues to be involved

in software development, hardware design, the creation of a high-tech automated assembly factory to produce the product, and securing multiple rounds of

financing for the company.

**Presentation:**

One of the greatest barriers to STEM education and professional activity for blind individuals is the inefficiency of delivering graphical information, particularly for moving processes, e.g., a graph changing as an equation’s variables are altered, chromosomal positioning during mitosis, or current flow

in an electrical circuit. Tactile Engineering has developed a mass-producible refreshable dot array that allows a user to track, via touch, a moving and changing graphic. Accompanied by a live demonstration of the technology, we will present different ways that this new device can fundamentally change how complex graphical information can be conveyed and exchanged. We will also discuss the development of adaptive control schemes and new finger-and-palm techniques to effectively make use of the additional informational load.

## Title - Lower Dots

**Speaker:** Aaron Cannon

Aaron Cannon started writing software professionally in 1996 and has specialized in the field of accessibility since 2008. In college, he studied chiropractic medicine, accounting, and actuarial science, before finally settling on computer science. He is married with five children, and currently works for Ancestry as a Principal Accessibility Lead. In 2021, he was awarded the Holman Prize by the Lighthouse for the Blind in San Francisco, which is currently the primary funding source for Lower Dots.

**Presentation:**

Lower Dots is a project that aims to make blind accessible math tutorials available to anyone at no cost. In short, we hope to become for the blind what Khan Academy is for the sighted. Our goal is to eliminate the barriers to the STEM fields created by inadequate and inaccessible math instruction. In this talk, you will hear all the technological details of how we are tackling this problem, our plans, and how you can get involved.

## Title - The Pearson Nemeth Code Curriculum for Students of All Ages

**Speaker:** Tina Herzberg, Susan Osterhaus, and Sara Larkin

Dr. Tina Herzberg is Professor and Coordinator of the Visual Impairment Education Program at the University of South Carolina Upstate. She is a co-author of the “Pearson Nemeth Curriculum” and the principal investigator of Project INSPIRE: Increasing the STEM Potential of Individuals Who Read Braille. Prior to USC Upstate, she served as a general education math and English teacher, itinerant teacher of students with visual impairment, and specialist/team leader for a Texas regional service center.

Susan A Osterhaus taught secondary math for 29 years at the Texas School for the Blind and Visually Impaired before becoming the statewide math consultant in their Outreach Program in 2007. She is a long-time member of the BANA Nemeth and Tactile Graphics Committees. She is a co-author of “Nemeth at a Glance,” a co-author of the “Pearson Nemeth Curriculum,” and a consultant for Project INSPIRE: Increasing the STEM Potential of Individuals Who Read Braille.

Sara Larkin taught high school math for 18 years before becoming the statewide math consultant for the Iowa Educational Services for the Blind and Visually Impaired in 2007. She supports educators across Iowa and provides trainings on Nemeth Code, math technology, tactile graphics, abacus, and math teaching strategies for the blind. She is a co-author of the “Pearson Nemeth Curriculum” and a consultant for Project INSPIRE: Increasing the STEM Potential of Individuals Who Read Braille.

**Presentation:**

We are updating our Pearson Nemeth Curriculum Pre-K – Grade 2, Focused Lessons, and Nemeth Symbol Library to make it even more user-friendly and accessible. Pearson is recruiting for a fall 2022 Nemeth Curriculum field study. The purpose of the study is to explore the effectiveness and usability of the Pearson Nemeth Code Curriculum for students of all ages.

Pearson is seeking a diverse group of teachers of students with visual impairments who use Nemeth Code within UEB Contexts. We are also seeking a variety of students that are learning or using Nemeth Code within UEB Contexts.

Pearson 2022 Nemeth Field Study

https://accessibility.pearson.com/research/2022studies/nemeth/

## Title - Learning to Be a Blind Scientist

**Speaker:** Annalise Diadato

A graduate from The University of Scranton, I graduated in 2015 with my Bachelor of Science in Forensic Chemistry. I am a recent graduate of the Colorado Center for The Blind. I am currently a counsellor at the Colorado Center for The Blind teaching high school students the blindness skills I have recently acquired.

**Presentation:**

Wolfram syndrome is a rare genetic disorder that starts out with diabetes insipidus, diabetes millitus, and optic atrophy that progresses to legal blindness. This is the story of my journey with Wolfram syndrome, how I have always been inspired by science, got my degree in forensic chemistry , and was then worried this would change as my vision decreased. Learning to accept my blindness that I no longer had to hide my vision impairment, and how I learned to embrace myself as a blind scientist, will be shared.

## Title - NFB Science and Engineering STEM Mentoring Program

**Speaker:** Nathanael Wales and Natasha Ishaq

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 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.

Natasha Ishaq is a rising senior at The College of New Jersey with a major in Anthropology and a minor in Political Science. Natasha has been conducting original research in paleoanthropology since the spring of her sophomore year and is hoping to publish her work within the next year or two. Her research revolves around hominid evolution and stone tool production, with a specific focus on the biomechanics of tool knapping in early and modern human ancestors. This summer, she will be part of an

excavation team to gain further hands-on experience in the field of

archaeology. In 2019, Natasha received a NFB State Scholarship for

achievement in STEM and subsequently attended her first state convention.

Natasha joined the New Jersey Association of Blind Students and served on the board from 2019-2020. She joined the mentorship program in January 2022 and benefited from the insight she has gained as a result.

**Presentation:**

In 2020 the NFB Science and Engineering Division launched a mentoring program connecting blind students studying in or interested in STEM with blind professionals working in or studying at a higher level (graduate programs), in STEM. Because it was during the height of the COVID-19 pandemic, the program leveraged the many virtual networking and conferencing platforms that gained wide popularity and use such as Zoom and WhatsApp. Mentees meet regularly with their mentors, and the program holds formal and informal networking sessions at least monthly. This talk will briefly summarize the program and let division meeting attendees know how they can get involved as either a mentee or mentor.