The Science and Engineering Division and National Association of Blind Students Joint Science Technology Engineering and Math Phone Conference Minutes for February 12, 2018

The National Federation of the Blind's Science and Engineering Division (SED) and the National Association of Blind Students (nabs) held a joint phone conference on Science Technology Engineering and Math (STEM) on Monday, February 12, 2018.

The meeting was called to order by SED President John Miller at 9 p.m. Eastern Standard Time (EST).

John thanked the student division, and specifically the NABS president Kathryn Webster, for allowing the joint conference to use the NABS conference line.

John asked that any questions to the speakers be sent through him at "Johnmillerphd@hotmail.com". He also invited all the listeners to write to him so that He will know who attended the phone conference.

John then invited the listeners to subscribe to the SED e-mail list at "Nfbnet.org".

A summary of the presentations follows.

**Kartik Sawhney Computers**

In December 2017, Kartik Sawhney graduated from Stanford University with a master's in computer science. He joined Microsoft to work on their Cortana artificial intelligence agent.

Kartik discussed the following topics:

1. Integrated Development Environments (IDEs);
2. How to browse large amounts of code;
3. How to study (visualize) large datasets; and
4. How to access Math.

Integrated development environments provide a graphical user interface (GUI) driven system which allows the user to plan, write, compile, test, and debug code. Kartik used Microsoft's Visual Studio for this purpose. He also used character-based editors, such as notepad, and Stand-alone compilers to do his work. He also used "Command Line Interfaces (CLIs) to accomplish these tasks. He used shortcuts provided by the IDES and by the CLIs. He made use of JAWS scripts when needed.

In Linux, he used CLIs and the Linux screen readers "Orca" and "EMax Speaks".

Kartik then discussed how to deal with large programs. He used "Microsoft's CodeTalk" which is an extension to make IDEs more accessible for blind and low vision developers. CodeTalk can show programs in a tree structure format. It can show classes and the functions inside those classes. It is screen reader accessible.

Kartik recommends trying to understand the overall logic of large codes by decomposing a program into its functions and comment statements.

Kartik said that his work involved a lot of math, and that he used the add-ons "MathType" and "MathPlayer" tools from Design Science. He also used the Nonvisual Desktop Environment (NVDA) screen reader.

Kartik examined large datasets by sonification (describing a graph by varying the frequency of tones as the graph is traversed), by making graphs (embossing), or by using scripts that would parse his datasets to find key facts about the datasets.

**Ashley Neybert Chemistry**

Ashley is in the chemistry doctoral program of the University of Northern Colorado.

She discussed the following points.

1. The American Printing house for the blind (APH) is an excellent source of accessible scientific material.
2. In the lab, use Braille for your labels. If you use large print, you might block your face with large-print material, thus causing you not to pay attention to your experiment. Never cover your eyes with paper.
3. Do math with Braille. It is extremely difficult to do math with audio only.
4. Even if you are blind, always ware goggles in the lab.
5. She described how to use a Bunsen burner.
6. Make sure your lab is set up properly before you begin an experiment.
7. Use something like a pie pan to contain your experiment. This will keep spills inside the containing plate.
8. Use a notched syringe to measure fluids.
9. You can use an exacto knife to mark syringes used for measurement.
10. Use the Independence Science Sci-Voice Talking LabQuest to collect date data for your experiments. It can record your experimental data and output the data in various formats for your instructors. It is accessible for the blind.
11. Use a Sensational Blackboard, from Sensational Books. This 8.5 X 11 inch soft-sided clipboard allows a user to draw with a ball-point pin. This drawing can be seen by a sighted person and can be felt by the blind. Your instructor or classmate can make drawings to explain class lectures and other scientific concepts that are best taught with drawings.
12. Try to get the professor to describe what the professor writes on the board. If this is not possible, schedule office visits to get these concepts.
13. Find a mentor who can help you.
14. Keep communications open with your professors.

**Katherine Brafford Plant Biology**

Katherine studies plant science at the University of California Davis.

Her discussion points were:

1. Get your class materials ahead of time.
2. Register ahead of time with the school, and the disabled student office.
3. Work with professors and readers ahead of time.
4. Use the Sensational Blackboard to learn concepts through drawings.
5. You can use metal sheets with magnets to show plant processes.
6. You can also use wiki sticks for drawings, and playdough for three-dimensional figures.
7. If you deal with plants, get out into the field with the plants instead of reading descriptions of them.
8. When in the field, know where you are. Be able to move around without continuous assistance.
9. Be fluent with computers. Know screen readers, Word, and Excel.
10. Be able to work with hard-copy Braille, electronic books, and audio formatted material.
11. When in the lab, know the lab in advance. Show your fellow students and professors that you are serious, and you are prepared to work.
12. Ask for help when you need it.
13. Sometimes you will need lab partners. When you work with lab partners, make sure they are serious students, and that they want to be there.
14. In the field, you use hard-copy Braille writing equipment, such as slates, and audio recorders. Do not take a Braille display into the field. The mud will destroy Braille displays.

**Kennedy Stomberg molecular biology**

Kennedy's discussion points were:

1. Be proactive. Look for problems in advance.
2. Be prepared for each class and lab. Show those around you that you are serious.
3. Get sighted assistance in the lab, especially with microscopes.
4. Pipets can be used to measure fluids.
5. Find accessible statistical software (Listen to Jonathan Godfrey's STEM statistics presentation at "http://access2science.com/indexAccessibility.html". He recommends R.).
6. Be familiar with blindness related drawing tools to help you learn concepts. You can also use these tools to show your professors that you know the concepts behind the science you our studying.
7. Success is possible.

**Newton Nguyen physics**

Newton is studying environmental engineering at Caltech.

His discussion points were:

1. Understand the theory behind your science.
2. Learn how to use diagrams. Use the Sensational blackboard and other drawing and graphic tools.
3. You will need to learn to write programs for computers.
4. Learn program data structures. Most computer languages use the same data structure concepts.
5. Newton uses the Mac. He praised Voiceover's accessibility.
6. He prefers the Mac because it has Linux as its operating system.
7. Work out your course logistics before the course starts.
8. If you need an accommodation, contact your professor directly and explain the issue. Do not let the first communication about your disability come from the disabled student services office.
9. Interact with your professors. Sit in the front row and ask questions.
10. Learn braille including the Nemeth code for dealing with math.
11. Learn your tools such as LaTeX. LaTeX is a way to write math equations in a character-based format. (Listen to Jonathan Godfrey's STEM Markdown presentation at "http://access2science.com/indexAccessibility.html". Markdown is a simplified LaTeX). LaTeX and Markdown can generate MathML equations which can be read by the sighted.

**Miscellaneous**

Various conference attendees made the following points.

1. Bookshare.org is an excellent source for computer manuals.
2. Dave Faiman reports that he is developing iOS-based graphics tools at "http://www.g4ee.com/".
3. APH has some life-science tactical models.
4. Get copies of your textbooks in Word or PDF or in some electronic accessible form.
5. Always keep your old textbooks. You will need them later.
6. You can do your mathematics with a Perkins Brailler.
7. Electronic Braille displays are a necessity.
8. The publications Scientific American and Science Daily have been added to Newsline.
9. John Miller asked, "what time of year would be best for this kind of conference?". One speaker answered, "summer or fall before students get deeply involved in their classes".

**Conclusions**

**Organization, advanced preparation, and hard work are the keys to success.**

Adjournment

**The conference ended at 10:13 PM EST.**

**Note that more accessible STEM information can be found at "**[**http://access2science.com/indexAccessibility.html**](http://access2science.com/indexAccessibility.html)**".**

**Questions and Corrections**

If there are any questions concerning the Science and Engineering Division, please contact John Miller (Phone: 858-774-9286, Johnmillerphd@hotmail.com).

If there are any corrections for the minutes, please contact Louis Maher (713-444-7838, ljmaher03@outlook.com).

Minutes submitted by Louis Maher