IsLAND
2017

**8th Annual Independence Science
Learning a New Direction
Conference on Disability**

Kurz Purdue Technology Center
Friday, September 15, 2017

1281 Win Hentschel Blvd.
West Lafayette, IN 47906
Conference Rooms A-B

Sponsored by:
GH LLC
Independence Science, LLC

Conference Mission

The IsLAND conference on Disability serves to inform and connect educators and future educators to the latest assistive technology, while exploring alternative teaching methods and simple access solutions for learning. Multi-sensory and hands-on approaches are emphasized during this conference in order to generate elevated student interest in classroom material and, thus, improve concept development. Symposium topics also include factors that contribute to Science, Technology, Engineering, and Mathematics (STEM) underrepresentation and strategies for increasing representation among students with disabilities.

Schedule of Presentations
-Friday, September 15-

The following presentations are scheduled for the 2017 ISLAND Conference Program.

Presenter: Isaac Beavers
Abstract Title: STEM Wars: The Career Force Awakens/ STEM Project for Deaf through NTID AND AIDB
Title/ Affiliation: Director of Field Services for the Alabama Institute for the Deaf & Blind

Presenter: Rosanne Hoffmann
Abstract Title: SALS Redux: A Submersible Audible Light Sensor that Connects to Smart Devices with a Downloadable App
Title/ Affiliation: STEM Project Leader, American Printing House for the Blind,

Presenter: Ken Perry
Abstract: Touching Science with the Graffiti Tablet
Title/Affiliation: Software Engineer/ Project Lead at American Printing House for the Blind

Presenter: Bradley Duerstock
Abstract: Greater Inclusion of Persons with Low Vision in Veterinary Medicine
Title/ Affiliation: Associate Professor of Engineering Practice

Presenter: Jason White
Abstract: Achieving Greater Mathematics and Science Accessibility through Development of Technological Standards
Title/ Affiliation: Associate Research Scientist at Education Testing Services

Presenter: Mike Kolitsky
Abstract: 3d Printer and Swell Paper Audio-Enriched Tactile Templates Expand Access to Images from Microscopes and Human Anatomy Sections
Title / Affiliation: CEO of nextgenEmedia

Presenter: Dave Schleppenback
Abstract: Access Technologies in Stem Education for the Twenty-First Century
Title/ Affiliation: Vice President of Research for Development for SeeWriteHear

8:30 a.m.	Breakfast	
9:05 a.m.	Cary Supalo:	*Welcoming and Introductions*
9:15 a.m.	Bharat Bhargava:	*Future Directions of AT Applications for the Blind*
9:55 a.m.	Isaac Beavers:	*STEM Wars: The Career Workforce Awakens*
10:35 a.m.	Morning Tea and Coffee	
10:50a.m.	Roseanne Hoffmann:	*SALS Redux: A Submersible Audible Light Sensor That Connects to Smart Devices with a Downloadable App*
11:30 a.m.	Ken Perry:	*Touching Science with the Graffiti Tablet*
12:10 p.m.	Lunch	
1:30 p.m.	Bradley Duerstock:	*Greater Inclusion of Persons with Low Vision in Veterinary Medicine*
2:10 p.m.	Jason White :	*Achieving Greater Mathematics and Science Accessibility through the Development of Technological Standards*
2:50 p.m.	Afternoon Tea and Coffee	
3:05 p.m.	Mike Kolitsky:	*3D Printed and Swell Paper Audio-Enriched Tactile Templates Expand Access to Images from Microscopes and Human Anatomy Sections*
3:45 p.m.	Isaac Beavers :	*Rising Tide: STEM Opportunities for Students with Disabilities in Alabama*
4:20 p.m.	Dave Schleppenbach:	*Access Technologies in STEM Education for the Twenty-First Century*
4:55p.m.	Cary Supalo	*Discussion and Concluding Remarks*

The ISLAND 2017 organizers thank all presenters and participants for making this year's conference a successful event. Your passion for the full inclusion of all in the STEM (Science, Technology, Engineering and Mathematics) professions advances equitable spaces which foster the authentic integration of disabled populations in the Fourth Industrial Revolution. Your work helps humanity achieve the vision of the Sustainable Development Goals of a more dignified future for all. We also thank Purdue Research Park for hosting this year's conference and the Purdue Research Park support staff for smooth operations and logistics. ISLAND 2018 will be held at Princeton University with an opening reception on Friday, September 14th and an all-day symposium on Saturday, September 15th. For abstract submissions and logistics information, we invite you to check the ISLAND conference website in Spring 2018.

Presenter: **Bharat Bhargava**
Title/Affiliation: Professor, Computer Science, Purdue University
E-mail: bbshail@purdue.edu

Abstract Title: **Future Directions of AT Applications for the Blind**

A discussion on how researchers in the Computer Science department at Purdue are collaborating with students to develop new innovative solutions in access technology applications. We will discuss some of these current projects along with descriptions of their specific applications. Feedback from the audience to help identify future directions for this work is welcome.

Presenter: **Isaac Beavers**
Title/Affiliation: Director for Field Services, Alabama Institute for the
                        Blind
E-mail: beavers.isaac@aidb.org

Abstract Title: STEM Wars: The Career Workforce Awakens

STEM Wars is the 2017 Alabama Transition program for 8th-12th grade students who are blind or visually impaired, as well as their parents and teachers. The Bureau of Labor and Statistics projects STEM job growth to 9 million by 2022, meanwhile the unemployment rate among legally blind people is estimated at 62%. Students choosing STEM careers may increase their chances for employment. STEM Wars creator hypothesizes that students, parents and teachers are unaware that STEM careers are a viable option for people who are blind or visually impaired. STEM Wars' purpose is to increase knowledge and interest in STEM careers through exposure to role models, resources, and experiential activities.
.

Presenter: **Rosanne Hoffmann**
Title/Affiliation: STEM Project Leader, American Printing House for the Blind, Louisville, KY 40206
Email: rhoffman@aph.org

Abstract Title: **SALS Redux: A submersible Audible Light Sensor That Connects to Smart Devices with a Downloadable App**

SALS has been redesigned to exploit the ready availability of iPhones, iPads and similar Android smart devices. Once the SALS app is downloaded to a particular device, the redesigned light probe connects wirelessly via BLE. Detected light, which is converted to a tone, becomes audible via the device speaker. The sensor located at the tip of the 10-inch probe detects varying light levels in air as well as changes in light when immersed in liquids. SALS is suitable for a wide range of science activities such as detecting when a chemical reaction has taken place in a test tube or using a pH indicator in a beaker. All features of the original standalone device (demonstrated at the 2014 ISLAND Conference) remain, including conversion of tones to quantifiable units (Hertz), tone storage, toggling between current and stored tones, and shifting the tone range to higher or lower registers.

Presenter: **Ken Perry**
Title/Affiliation: Software Engineer/ Project Lead at American Printing House for the Blind
Email: kperry@aph.org

Abstract Title: Touching Science with the Graffiti Tablet

Access to graphical information is a significant challenge for people who are blind or visually impaired. With the increased dependency on technology in schools, the lack of access to on-screen graphics can be an impediment to learning STEM and other subjects for students with visual impairments. Graphiti is a dynamic multilevel tactile touch display developed by Orbit Research in partnership with the American Printing House for the Blind. Graphiti's breakthrough technology allows graphics to be depicted by means of an array of variable-height pins. To change to the next graphic, the pins on the refreshable display move up and down to create a tactile representation of the graphic. Graphiti allows students and adults to access a wide variety of on-screen graphics by touch. This includes pie charts, bar graphs, geometric forms, topographical maps, floor-plans, flow-charts, line drawings, and dynamic graphical content.

Presenter: **Bradley Duerstock**
Title/Affiliation: Associate Professor of Engineering Practice, Purdue University
Email: bsd@purdue.edu

Abstract Title: **Greater Inclusion of Persons with Low Vision in Veterinary Medicine**

There is historically low participation of persons with disabilities in veterinary medical practice. The following case study presents matriculation to graduation of a legally blind student with a bachelor's degree in veterinary technology from Purdue University College of Veterinary Medicine. Over the course of this program, our team helped the student with practice-based laboratory and clinical activities by providing technological expertise and accommodations. The physical challenges encountered by the student during the program will be discussed, along with the interventions that were performed. A post-graduation interview was performed to assess the student's experience and determine useful best practices with an aim to encourage future enrollment of students with disabilities in professional fields of study.

ISLAND Conference 2017, West Lafayette IN

Presenter: **Jason White**
Title/Affiliation: Associate Research Scientist at Education Testing Services
Email: jjwhite@ets.org

Abstract Title: **Achieving Greater Mathematics and Science Accessibility through Development of Technological Standards**

The representation of mathematics on the World Wide Web and in digitally published documents, the growing educational significance of interactive simulations and virtual reality, and the potential of Web-based vector graphics as a vehicle for non-visual access to diagrams and to statistical data are among the issues that have arisen in recent years in the deliberations of groups responsible for developing technical accessibility standards. This presentation offers an overview of recent and current activities by standards groups associated with the World Wide Web Consortium, the IMS Global Learning Consortium, and the digital publishing community, that pertain to the accessibility of mathematics and science content. The potential for additional work that would further enhance the accessibility of web-based content and applications in scientific and technical fields is also explored, and open research questions raised by standards efforts are identified.

Presenter: **Mike Kolitsky**
Title/Affiliation: Chief Executive Officer at nextgenEmedia
Email: makolitsky@utep.edu

Abstract Title: **3D Printer and Swell Paper Audio-Enriched Tactile Templates Expand Access to Images from Microscopes and Human Anatomy Sections**

Audio-enriched tactile templates made from microscope images and anatomic sections were 3D printed or made using swell paper and then laid atop an iPad or iPad Pro so that a touch now generates an audio response providing information about the region being touched for the blind learner. 3D print files were made using PhotoToMesh with some 3D prints employing conductive filament and other 3D prints made to accentuate the edges of muscles and bones for easier determination of their location. Swell paper can also be employed in construction of audio-enriched tactile templates since it was determined that non-swollen regions on swell paper tactile graphics permit the passage of a finger electrical charge to the iPad or iPad surface whereas a black swollen region does not. How iPad and iPad Pro audio buttons were made will be demonstrated and hand-outs will include a functional swell paper audio-enriched tactile template.

Presenter: **Isaac Beavers**
Title/Affiliation: Director of Field Services for the Alabama Institute for
                      Deaf and Blind
E-mail: beavers.isaac@aidb.org

**Abstract Title: Rising Tide: STEM Opportunities for Students with
                    Disabilities in Alabama**

Presentation details STEM resources for students with disabilities in Alabama. Opportunities to establish and improve STEM education for students with disabilities have increased over the last two years in Alabama. This growth is fueled by partnerships between various state and federal entities. The proliferation of these programs will position students with disabilities in Alabama for high demand STEM careers. This presentation will provide an overview of programs for students and for educators. The presenter desires to increase knowledge and participation in STEM education programs by encouraging other educators to create STEM Resource Guides for their states. The dissemination of these guides will provide a clear path for students and educators to prepare for the jobs of tomorrow.

Presenter: **Dave Schleppenbach**
Title/Affiliation: Vice President of Research for Development for
                         SeeWriteHear
Email   dave.schleppenbach@gmail.com

Abstract Title: Access Technologies in STEM Education for the Twenty-First Century

The current and future trends in the access technology industry as it pertains to Science, Technology, Engineering, and Mathematics (STEM). The importance of Braille tactile graphics, and other dynamic tactile representation technologies will be illustrated. What are some of the technological limitations and how are these challenges being addressed. How can innovation in this niche market lead to new opportunities for persons with disabilities? It is these current trends in the access technology field that are guiding the industry to open new doors of opportunity for students with disabilities. The challenges STEM education presents are unique and dynamic based on the nature of the disability. An important discussion will be held to describe where we are as a community and where we are going.