

PM&R Assistive Technology

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Takeaways from this Year's ISS: Conference at the Confluence

-John Moossa OTR/L, ATP

The 35th annual International Seating Symposium ISS www.seatingsymposium.us/general-information was held this year in Pittsburgh, PA March 20-22nd. The world's premium exhibition and conference on wheelchair seating, mobility and associated assistive technologies brought together more than 2,000 stakeholders from over 35 countries. The three-day event offered nearly 150 classes and discussion groups. Over 150 exhibitors displayed their wares in a 127,000 square foot exhibition hall that was open throughout the conference allowing participants a chance to get hands on with the latest mobility devices, seating systems, teaching tools, advocacy issues et alia.

Richmond's McGuire VAMC Assistive technology team was well represented. Six clinicians made the trip including three rehabilitation engineers and three occupational therapists. All of the rehab engineers were actively involved in memorable presentations. Energized by motivating spirits, and stimulated by the charge of innovation we returned to Richmond with a virtual cornucopia of fresh ideas. This article will highlight a few that might prove of great use to our AT program in general and the wheeled mobility and adaptive sports clinics in particular. These include but are not limited to: , a promising tool to improve wheeled mobility clinic, an innovative low and high tech simplified anatomical model, a super cool high tech interface and confirmed iBOT comeback , an update on telehealth, and how our rehab engineers approach to adaptive mounts embodies an embraceable philosophy to client centered intervention.

CLOUT for Wheeled Mobility Devices

A collaboration between the VA National Center for Patient Safety and the Human Engineering Research laboratory at the University of Pittsburgh, has developed a clinical limits of use tool for wheeled mobility devices; or simply CLOUT, <https://www.patientsafety.va.gov/docs/CLOUTWheeledMobilityDevicesv1.pdf>. Presented by VA Clinical Program Specialist Kendra Betz, MSPT, ATP, CLOUT has great potential as a very useful algorithm to help clinicians "Optimize wheeled mobility device recommendations". "The primary intended audience is clinicians within the VA who are providing or being trained to provide wheeled mobility devices to Veterans. A secondary

audience includes stakeholders within the VA involved in procurement and management of wheeled mobility devices (e.g., prosthetics agents, contracting personnel, biomedical engineers, and technicians). Another secondary audience includes stakeholders outside the VA such as wheelchair designers, manufacturers, and suppliers to help them better understand the factors that are used to provide the optimal wheeled mobility device for the Veteran." This tool has great potential for our wheeled mobility clinic. I look forward to digging into it and breaking it down with my colleagues.

Biggest "Wow Factor": Adaptive Sports Innovations...

The presentation on "Novel Human Machine Interfaces in Adaptive Sports and Simulations" by the University of Utah's Tetradapt foundation <https://www.tetradapt.us/tetraski-adaptive-skiing> was awe inspiring. John Miller and Seth Hills found it to be the "coolest takeaway from an engineering perspective." The Tetradapt foundation has produced "the world's first independent alpine sit-ski for any physical disability" as well as an "accessible, electric powered watercraft for sailing and kayaking" and a "powered, accessible floating platform to facilitate safe participant transfer in and out of watercraft and/or the water". The Tetradapt team has also created a computer simulation of the ski courses and waterways complete with wind speeds and other weather variables to allow users to familiarize themselves with the peculiarities of their route while learning the operation of the device in safe environment.

Also, the iBOT is back! The iBOT was introduced in the early 2000's as a revolutionary stair climbing wheelchair"..... a four-wheel-drive wheelchair that can climb up and down stairs and curbs, roll across varied terrain, raise a seated user to eye-level-standing height by rising up and balancing on two wheels, and travel in this mode — all while relying on sophisticated sensors and gyroscopes to maintain the chair's balance "...Originally categorized as an FDA class III medical device the iBOT was much loved by its users. It was taken off the market in 2009 by Johnson and Johnson due to slow sales as insurance companies were reluctant to cough up the \$24,000 price tag. The iBOT has a new Class II FDA ranking and new ownership by Mobius Mobility, <http://mobiusmobility.com>, with the backing of Toyota. The iBOT was super fun to trial at the exhibit hall and is slated for release later this year. VA clinicians can employ CLOUT to identify appropriate user candidates. Potentially, and eventually, it may serve as an option for veterans who qualify for all terrain power wheelchairs. <http://www.newmobility.com/2016/11/ibot-returns/>. (Cont. page 3)

Assistive
Technology
AT

ATIA Conference 2019 Summary



John Miller and Seth Hills, rehabilitation engineers in McGuire's Assistive Technology Program, attended the Assistive Technology Industry Association (ATIA) Annual Conference 2019. Attendees included education professionals, social workers, psychologists, rehabilitation engineers, and physicians, as well as speech, recreational, occupational, physical, and kinesiotherapists. Many AT trends, products, organizations, and practices were featured in presentations and the exhibitor booths.

For the deaf and hard-of-hearing, Live Transcribe is a new app developed by Google for Android phones. Live Transcribe takes real-world speech and automatically turns it into real-time captions using just the phone's microphone. This app has the potential to help people engage in social activities, communicate their needs more quickly, and make everyday living more accessible.

A teaching tool for autism spectrum disorder is the Milo, a humanoid robot who resembles a kid. It delivers an evidence-based curriculum without the use of negative reinforcement to teach social, emotional, behavioral and verbal skills. Milo's consistent repetition of realistic reactions to verbal cues helps people on the autism spectrum to learn facial expressions and what they mean. At 2.5 feet tall, Milo looks like a child, is facially expressive, and has moving arms and legs. Milo delivers 1500 lessons verbally, and as he speaks, symbols displayed on his chest screen help learners better understand what he's saying. Milo doesn't do all the work on his own. He teaches the lessons, along with an educator or therapist, and then collects the student learning data. Milo's a great friend and instructor who never gets frustrated or tired, and scaffolds learning to build skills and confidence.

At ATIA, Magic Wheelchair, a nonprofit organization that builds free costumes for children in wheelchairs, revealed a brand new build of a BumbleBee Transformer costume their local group had built. It was impressive and brought so much joy to the young man that received it. Magic Wheelchair relies on a network of volunteers and connects them with families and kids and build these costumes. Sign up at their website (<https://www.magicwheelchair.org/>) if you are interested in participating.

Makers Making Change, a non-profit based out of Canada presented a variety of open-source assistive technology solutions. Their mission statement is to "connect makers to people with disabilities who need assistive technologies." MMC has developed a sip/puff mouth joystick, various pencil holding devices, adaptive nail clipper, key grip adaptations, Xbox

controller adaptations, and several low-cost switch alternatives, all open source. They provide instructables on how to make these tools and adaptations yourself, with minimal design and manufacturing cost. Seth jumped into their conference makeathon by helping therapists and clinicians learn how to solder and assemble their own low-cost adaptive switches.

Two new products sure to make waves in the world of AT are the AMAneo BTI Assistive Mouse Adaptor for iOS and the Sidekick from Ablenet. Previously iPads and iPhones were only accessible via switch input, but coming this summer/fall, these two adapter products allow any USB mouse (including adaptive mice) to plug into Apple products. Being able to point and click will open up new access possibilities for social media, email and phone functions, communication apps, and/or much more.



The Tap was another interesting product showcased at ATIA. It's a finger-mounted gesture-based keyboard tool, allowing users to tap out letters with their fingers on any surface rather than typing physical or virtual keys. It connects to any Bluetooth-enabled device, and the battery lasts for up to eight hours of tapping. It could be advantageous for people with one-handed function, or for wheelchair users or those on bedrest who either do not want to or lack the ability to set up a keyboard. The downside is that in order to use it, one must learn the gesture corresponding to each letter and punctuation mark. During the demo, John was able to learn the five vowel gestures after only a few minutes of practice, but it would take some time to master all the gestures. Tap has an app to learn and practice these gestures. Additionally, Tap can be used for switch control or adaptive gaming.

There is much more that we could share if we had the space. ATIA is a fantastic conference for anyone interested in assistive technology!



Takeaways from this Year's ISS, cont...

Hammie: Live it, Love it! She's just a simple 3D printed Anatomical Model

I love Hammie! So yes, my biggest inspiration came from a poster presentation called "Hammie: Using 3D Printing to Build a Practical Tool." Hammie, <https://www.meethammie.com/>, the simplified anatomical model, is an ingenious way to communicate how multi joint muscles affect each other. The brain child of OT, Sammie Wakefield, caught the attention of Richmond Rehab Engineer, Brian Burkhardt, in 2016. Brian then collaborated with two awesome OTs to convert a wooden model into the present day carbon fiber 3D printed version of Hammie. This 3d printed model enables clinicians to surmount language barriers to demonstrate the effects of positioning on posture. As a teaching tool, it can be used by both novice and experienced clinician. Listening to the OTs talk about positioning was somewhat humbling and I was reminded of how much there always is to learn. I love Hammie for so many reasons: the collaboration between OT and Engineering, the merging of low and high tech, the knocking

down of language barriers, the sheer ingenuity of it all!

VA Telehealth for CRT Wheelchair Evaluations

The use of telehealth continues to grow within the VA system. The AT team at McGuire has been utilizing it in many different forms. Optimally telehealth is client-centered practice that can improve a veteran's experience by eliminating difficult travel and painful wait times. It was no surprise then to see the entire Richmond contingent at the "Telehealth Assessment for Complex Wheeled Mobility for Veterans". A joint endeavor by UPITT and the VA, this presentation demonstrated how a bit of planning can enable even complex wheeled mobility evaluations to be performed via telehealth. Success still depends on having a trustworthy clinician and/or ATP at the client's home and the kinks are still being worked out. Data collected from several outcome measures including the Functional Mobility Assessment FMA, the Quebec User Evaluation of Satisfaction with Assistive Technology QUEST and the Telerehabilitation Questionnaire TRQ shows positive veteran response to use of telehealth. Solutions for Mounting – Client Centered

Interventions

McGuire AT rehab engineers John Miller and Seth Hills presented "Solutions for Mounting Phones Tablets and More on Wheelchairs". This engaging slide show was extremely well received. Education was provided in depth on a variety of off the shelf mounting products and their pros and cons. The engineers then discussed at great length how to customize mounts by combining different products and/or creating new ones with 3d printing and makerspace technology. Guidance was offered to clinicians and stakeholders with limited funding on how to use affordable software and publicly available 3d printing resources to make their own mounts. My takeaway was that as clinicians we develop practice-based evidence (thank you Steve Mitchell OTR, Cleveland VA) on what works and what doesn't ...we mix and match existing products and if we still can't find the answer we collaborate with client and engineering and make a solution.

FYI, John, Seth, and Brian are based here at McGuire. They are top notch friendly AT rehab professionals. Their services can be consulted and are available via telehealth with any VA that has an inter-facility agreement with Richmond. The ISS will be back in Pittsburgh in 2021. See you there!

Veteran's Story...Joshua Blair

Tell us about your experience with the Assistive Technology Program

I was first introduced to Assistive Technology following an injury I sustained from a motor vehicle accident in August of 2018. The accident left me a quadriplegic and I was experiencing numerous limitations when attempting to do things I typically did pre-injury. I worked closely with Seth from AT and Dawn, and Tara from PT/OT at the McGuire VA located in Richmond Virginia.

What challenges were you having that had you referred to the program?

The primary challenges I faced were no function from the chest down and very limited function in my upper extremities. These limitations proved difficult when attempting to do things, such as playing video games, I normally did pre-injury. Seth, Don, and Tara worked tirelessly to find alternative ways for me to do the things I used to do before I experienced my accident.

What device/program did you get?

Seth order me the Axis 2 pro adaptive controller from Bluetip gaming, a bite switch

from GlassOuse, and recommended an environmental control unit by Control4 to assist in doing the things I was accustomed to doing before my injury. The gaming accessories assisted in playing video games with my daughter while the environmental control unit assisted with the day-to-day activities such as turning on lights, operating the fireplace, and regulating our thermostat.

How has the device changed your life or impacted your life?

The assistance from AT has allowed a sense of normalcy and aided in independent living by allowing me to perform simple tasks that I once was unable to do as a result of the injury.



What activities (things) are you doing now that you were not able to do before?

I am now able to move throughout the house working the light switches and heating and comfort devices, as well as enter and exit my house hands-free with the assistance of AT and the environmental control unit.

Would you say your quality of life has improved?

Overall, assistive technology has improved my quality of life and done an outstanding job in creating a sense of normalcy post injury. I am now able to do the vast majority of the things I was once able to do thanks to assistive technology.



Assistive Technology Celebrates 10 years at McGuire VA Medical Center

“It is about being able to do it for myself”

-Brenda Guevara

In 2009, the VA established four Assistive Technology Programs at the four Polytrauma Rehabilitation Centers, one being at McGuire VA Medical Center. Since 2009, the Assistive Technology Program has served over 4,000 veterans and active duty service members, actively participate in telehealth services, brought 3D printing into a clinical setting, grown the field of rehabilitation engineering and provided outreach to local, state and national organizations.

McGuire VA Medical Center’s AT Program provides services to Veterans and Active Duty Service Members in the areas of adaptive computer access, adaptive sports, alternative & augmentative communication, electronic aides to daily living, electronic cognitive devices, and complex powered mobility. The AT pro-

gram also provides customized solutions.

On April 17, 2019, the AT Program held an AT Open House to allow visitors hands on experience with different AT devices as well as learn about 3D printing capabilities. Two of our Veterans, Brenda Guevara and Brian Pierce, shared their experiences with the AT Program as well as how AT changed their lives for the better. The local media covered the event: Rich-



https://www.richmond.com/life/health/mcguire-va-medical-center-uses-technology-to-make-everyday-life/article_af69e349-d230-56a3-8a1c-53a7ec73062b.html



mond Magazine, Richmond Times Dispatch and CBC 6.

Below is the link to the article from Richmond Times Dispatch:



gram also provides recommendations for alternative access methods, mounting and integration of technology as well



Assistive Technology...McGuire VA Facebook Takeover

As part of the 10 year celebration of the Assistive Technology Programs, the AT team took to Social Media to share what services are available to our Veterans.

Richmond VA Medical Center
April 8 at 2:03 PM

McGuire VA Medical Center's Assistive Technology Program is celebrating 10 years of helping Veterans and Active Duty Service Members achieve their life goals using assistive technology. Areas of AT include: adaptive sports, adaptive computer access, alternative and augmentative communication, electronic cognitive devices, and electronic aides to daily living. McGuire's AT program offers customized AT solutions, using rapid prototyping such as 3D printing and electronics.



Richmond VA Medical Center
April 11 at 11:22 AM

Our Assistive Technology Team is working hard so our Veterans can have a better quality of life. Video gaming can help Veterans rediscover the joys of an active lifestyle, while strengthening problem solving skills, improving coordination and dexterity, and providing a sense of normalcy. The Assistive Technology Team keeps trying until they have a solution - no matter the disability.



Richmond VA Medical Center
April 12 at 11:23 AM

Electronic Aides to Daily Living (EADLS) provide limited functional mobility or dexterity to interact with the environment. EADLS can control lights, fans, outside doors and dexterity, and providing a sense of normalcy. Controlling one's environment includes improving independence and quality of life.



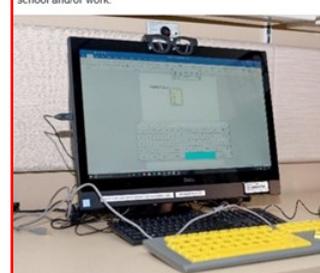
Richmond VA Medical Center
April 9 at 2:19 PM

The adaptive sports program at McGuire VA helps newly injured Veterans gain exposure to various adaptive sports and provides assistive technology for sports and recreation. The program also provides adaptive sports programming for Veterans with permanent life-altering physical and psychological disabilities as well as training for National Veterans Sports Programs, such as the National Veterans Wheelchair Games, among others. For participation in the program, or for an adaptive sports equipment evaluation, you need a qualifying diagnosis and consult from your provider.



Richmond VA Medical Center
April 14 at 1:25 PM

Adaptive computer access provides specialized group of hardware and software designed to enable individuals with a wide range of disabilities to use their personal computer. Options can include the use of a specialized mouse, a specialized keyboard, or the use of a switch to operate the operating system on one's personal computer through the Ease of Access Center in the Settings. Other adaptation can also include the use of a specialized mouse and/or switch access methods. The AT program's evaluation for adaptive computer access allows for increase in independence for the individual at school and/or work.



Richmond VA Medical Center
April 10 at 10:20 AM

Our assistive technology department here at the Richmond VA Medical Center provides access to a vast array of Augmentative and Alternative Communication (AAC) options. We are fortunate to be able to offer our Veterans the opportunity to maintain a voice long after THEIR voice has failed them. Technology is ever changing and evolving, providing endless options for access that allow our Veterans to use their hands, their head, or their eyes to communicate. When it comes to AAC the VA equips us as therapist with not only the devices but the knowledge and experience to best serve our Veterans.



Richmond VA Medical Center
April 13 at 4:24 PM

Have difficulty managing medications or remembering appointments? Cognitive impairment? Assistive Technology (AT) can help! The AT provides comprehensive evaluations and training for electronic devices (ECD). ECD devices can help improve everyday functioning with cognitive impairments. Contact your provider today for a



Richmond VA Medical Center
April 13 at 2:06 PM

Assistive technology refers to sophisticated tools such as 3D printers, electronics fabrication, all of which empower us to rapidly prototype new inventions. In the Assistive Technology Program, we use 3D printing to deliver fast, custom parts to our Veterans, who are involved in the design process. We have created thousands of parts such as: 3D scanned splints, a sip 'n puff air rifle trigger puller, custom makeup brush holders, switches designed for people with limited hand strength and dexterity, custom TV remotes, adaptive bed controllers, adaptive pool stick aids, and much more. We welcome new projects from clinicians and Veterans who want to invent something unique!




Assistive Technology Program Mission

- To enhance the ability of Veterans and Active Duty members with disabilities to fulfill life goals through the coordination and provision of appropriate interdisciplinary assistive technology services.
- To serve as an expert resource to support the application of assistive technology within the VA health care system.



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Creativity Corner

...where we highlight original and interesting innovations

-John Miller, AT Clinical Rehabilitation

Welcome to the inaugural column of Creativity Corner, where we'll be sharing some of our completed projects and ideas to help people understand how we work and what tools we use.



John Miller worked with a patient with ALS who requested an adaptive deodorant applicator to increase independence. The patient could cross his midline, but had difficulty raising his arm. Using 3D design and printing, John designed a slide-fit deodorant holder mounted onto a l u m i n u m tubing, which

had a double handle and rubber stops for adjustable height. The patient was able to apply deodorant quickly and independently by steadying the device on his knee, then holding it and passing it from hand to hand easily with the handle.



Brian Burkhardt designed a makeup brush holder for a female veteran with SCI. He designed the holders with 3D printed rubber inserts for various brush diameters and created a 3D printed, rotating "flower pot" stand that held more than 15 different makeup tools at a time for easy access. The veteran was pleased with the outcome and even created a YouTube video explaining her makeup routine and highlighting the role of the holders and stand.

For a patient with Parkinson's disease, Seth Hills created a laser sight cover to mount onto a walker. Those with Parkinson's disease sometimes experience freezing, a temporary inability to move the feet and walk typically, and a laser sight and/or a metronome can help alleviate this symptom. Seth designed and 3D printed a cover for the laser sight electronics, which mounted to the bottom of the walker seat. When the walker seat is flipped up for walking, the

laser sight points down at the floor and indicates where the patient should move his foot next.

