

Update on RESNA/NCART 2016 Conference

...Seth Hills, AT Rehab Engineer



The man "driving", Steve Ma-

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Assistive
Technology
AT

RESNA/NCART is a collaborative event organized by two of North America's rehabilitation and assistive technology associations. The conference was hosted in Arlington, VA. Four members of the McGuire AT team were in attendance including Director, Melissa Oliver, Rehab Engineers, Brian Burkhardt and Seth Hills, and Trainee, Simone Gregor. The venue provided ample opportunity to mix with like-minded individuals from various backgrounds, see new technology, and be made aware of existing products and uses. Each day included a plenary session where various topics were discussed. Tuesday's session included a discussion on the role of technology in improving transportation and mobility and highlighted efforts by Google (self-driving car) and Ohio State University (Smart Mobility/Smart City Challenge) to promote cooperative development of interconnected infrastructure (http://www.leannetwork.com/e107_files/downloads/Smart%20mobility%20-%20Carla%20Bailo%20-%20OSU.pdf).

The conference aimed to "leverage proximity to the nation's capital to engage policymakers on assistive technology issues, and included interactive exhibits by manufacturers and industry practitioners." While I did not participate in the Capitol Hill visits, there was good turnout and representation by our Rehabilitation and Assistive Technology peers.

Favorite manufacturer exhibits: Mealtime Partner (hands free self-feeding, nice hydration systems), Jaco robot arm (just neat), Mount'n Mover (cool app development and application to remote servo ctrl), Braze (Sorry Brian for stealing your idea), Whill (fun test ride), Quantum (nice free stuff)

Wednesday's Plenary Session included government officials and an Advocate that provided

information useful to consumers and clinicians. Two of the four presenters were John Tschida and Peter Thomas. The NIDILRR (National Institute on Disability, Independent Living, and Rehabilitation Research) although a small and rather underfunded organization is making some inroads into ensuring that research dollars actually end up producing usable products. Several presenters, funded by NIDILRR, developed processes that outline efficient product development and ensure translation of viable ideas to devices available to end users (Need to Knowledge-NtK, Knowledge Translation for Technology Transfer-KT4TT). They have made this process available to researchers/developers via an online tool (<http://sphhp.buffalo.edu/cat/kt4tt/best-practices/need-to-knowledge-ntk-model/ntk-commercial-devices.html>) that walks through the many steps of product development from problem definition to production. These tools are useful for anyone interested in inventing.

Thursday's Plenary session was a breakout session where attendees were organized into groups to discuss how an organization (RESNA/NCART or other Governmental Organization) should collect follow-up data on AT device users. Key issues discussed were privacy (patients may have more going on in their life than they are comfortable sharing with their care team), incentivization (how can patients and providers be encouraged to gather and submit meaningful information), dynamic (technology and socioeconomics change and as they do the tracking system needs to be able to change as well), comprehensive (covering devices as simple as a mouth-stick for example through more complex rehabilitation technology like seating/communication/power mobility).

(cont., pg 2)

RESNA/NCART, CONT.



Cross Compatible Gaming Device- CCGD- cronusmax.com



Quadstick- A Gaming Controller for Quadriplegics -www.quadstick.com

There were several sessions on adaptive gaming (video gaming) of interest. Sangeetha Padalabalanarayanan and Mohanraj Thirumalai with the RecTech RERC discussed Active Video Games (AVGs). Adaptations that their group developed included a balance platform (e.g. for use with Wii-fit games), and a controller mat with buttons that can be configured (re-positioned) for individual patient needs. Patrick Wagner and Erin Muston-Firsch from The Denver Craig Rehabilitation Hospital demonstrated the use of a Cross Compatible Gaming Device (CCGD), the Quadstick remote, and Lick-it Mode switch. The CCGD allows the use of various controllers/keyboards/input devices across many different platforms (i.e. gives the user the ability to use a PS4 controller on a PC, an XBOX controller with a Playstation, or any number of different configurations). The Quadstick has 3 sip-and-puff switches. The monkey tail can be draped around the user's neck to hold a tablet or phone.



Monkey Tail Tablet Holder by Octa- <https://www.octa.com/>



WHILL 4wheel drive W/C -<http://>

Meet McGuire's AT Team ...John Miller



John Miller
Rehabilitation Technician

John Miller joined the Assistive Technology Team on July 11, 2016 as our Rehabilitation Technician. He is a recent graduate from the University of Virginia, with a Master's of Science in Biomedical Engineering (May 2016). His master's thesis was on utilizing recreational climbing as a therapeutic tool for youth with cerebral palsy. He earned his undergraduate degree at North Carolina State University in Raleigh, NC, where he majored in biomedical engineering.

In his own words, here is some information about him.

Additional Background Information:

Along the way I had my first experiences in rehabilitation engineering and assistive technology via summer internships: studying pain management for wheelchair users at the University of Pittsburgh, creating computational models and leading gait lab studies at NCSU/UNC-Chapel Hill, and

helping with data collection and management for a military soft exoskeleton study at the Wyss Institute with the Harvard Biodesign Laboratory.

What do you like about working at the VA?

In the short time I have been here, I've really noticed how uplifting and friendly the VA staff and clinicians are.

What areas of AT are you interested in and like working with? And Why?

I'm quite interested in finding ways to deliver individualized health care. We have the capability to deliver more specific, customized devices and services, which could be more effective than the "one-size-fits-all" approach of the past. As a result, I'm eager to hone my 3D-printing and fabrication skills, which will require more innovation on my part and should lead to better patient results.

Why are you passionate about AT?

As a deaf individual, I benefit from biomedical technology on a daily basis, and I've found that even small tweaks in technology can have a huge impact on my life, e.g., I can enjoy going to the movie theater, or keep up with a conversation among a group of friends, or listen to my favorite 80s bands. In the same spirit, my goal is to use AT to cultivate small changes that make patients' lives better.

Tell us about other interests outside of the VA.

In my spare time, I'm an avid runner (who will race anything from a 5k to a half marathon), an experienced albeit mentally fragile tennis player, an NBA basketball junkie, a pie-baking and eating fanatic, and an Apollo space program enthusiast.

Veteran's StorySteve Kemper

Steve Kemper is an Army Veteran who was injured by falling off a ladder resulting in a T11 ASIA A SCI. Mr. Kemper works on his farm and enjoys fishing and hunting.

Tell us about your experience with the Assistive Technology Program (Speech, driving rehab, OT/PT/RT).

I have had a very positive experience. While it often takes longer than I would like it to get the equipment I need, (I can be impatient, but don't we always want everything "tomorrow") I believe they do their very best to take care of veterans; and I understand that there is an approval process that must be followed to protect the VA and me for that matter. They have always listened to my needs, made recommendations, worked with me, and helped me to determine what equipment would be appropriate for me.

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

I am a complete paraplegic. I use a wheelchair 100% of the time to get around. However, I live in West Virginia where there is no flat ground. Prior to my injury, I was very active in extreme outdoor sports (whitewater rafting, rock climbing, caving, etc), as well as hunting, fishing, hiking, and other outdoor pursuits. The terrain here is extremely challenging; not just in the woods and on the trout streams I like to frequent, but even in my own yard and in public places around town. A standard wheelchair is VERY ill-equipped to meet my mobility needs to pursue the activities I enjoy. I also have a small farm and could not even begin to complete my chores, especially in winter.

Who did you see?

In OT – Heather Kloeping; In Assistive Tech. - Nichole Schuman & Mellissa Oliver

What device/program did you get?

I have received a manual stand-up wheel chair, a manual all-terrain wheelchair, and an X8 4x4 power chair. While that may seem like an overabundance of equipment, they each gain me very specific abilities to live my life and maintain a level of self-sufficiency, quality of life, and ability. You wouldn't wear the same shoes to hike through the woods, muck out the

barn, go to church or the mall, or trudge through deep snow. Different equipment is necessary for different activities. That fact is even more evident when you are paralyzed and your arms must also serve as your legs.

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

The X8 really allows me to get around on my property on a daily basis and tend to my cows, I would not be able to get to all areas of my property without it, and I certainly would not be able to feed them in the winter, especially when it snows, or the fields and barn area is consumed in deep mud. I can use it at times for hunting or fishing, but only if I stick to the valleys and hollows and relatively flat terrain.

My stand-up wheel chair allows me to work on projects around the house; complete the remodeling of my house; reach things in the tops of cabinets and in my garage; continue to use my power tools for wood working projects, dig fence post holes; spend time in a vertical po-



eye ac- sition; stand at level with others; dance with my wife and daughters; and do a whole host of other activities that just can't be done from a sitting position.

My newest chair, my manual all-terrain chair, allows me to fish, hunt, and hike under my own power in ways and places I could not otherwise, since becoming paralyzed. I can use an ATV to get to remote locations and then transfer to this chair to participate in the activities I most enjoy. I tried this with my every day chair in the past and was always tipping over, falling out of it, getting stuck, or just completely unable to do the things I used to do. I was injuring myself, sometimes significantly, or would end up dragging myself and my ill-adapted chair across the ground to get back to my ATV. One time, I was only 10 feet away, but my every day chair just couldn't handle the terrain (at least it was a short crawl). I had



pretty much resigned myself to just driving around in the woods or along the creeks and staying on my ATV. My all terrain chair provides me with so much more stability and freedom to pursue the things I love to do. Now I can be much more independent and can feel like I am really participating, rather than just sitting on the outside looking in; and I can do it without causing further injury to myself.

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

Hunting, moving through the woods quietly and safely; I can go hiking with my daughters again; I can get to the water, even in the water, and fish (impossible to do with a fly rod otherwise). I can get around my yard, even if it is muddy or there is snow on the ground; I can get to my barn, in and out of my barn, and to remote areas of my farm to care for my animals; I can do a whole host of chores and activities that just were not possible from a standard wheelchair.

Would you say your quality of life has improved?

ABSOLUTELY!!! Without a doubt. I struggled to just get off my porch with my standard wheelchair and I spent most of the winter indoors just staring out the window wishing I could get outside and something, anything. I had to sell my cows the first winter because I couldn't care for them; now I am back in business on my farm. I do the things I need and want to do, when I want to do them and don't hesitate to try anything; the weather and the terrain only matter when it comes to deciding which wheelchair to use that is best suited to the conditions



Innovation Creation Series...Make-A-Thon Follow-Up

What impact did hosting the Make-A-Thon at the Richmond VAMC have on some of the attendees:

Ty Sayman of Team Spline:

How did participating in the VA Innovation Creation Series- Prosthetics and Assistive Technology Challenge impact your life overall?

It was a fantastic event that was very positive in many ways. The students that I mentor had an opportunity to take their interest in technology and apply it directly to an existing real-world problem.

What opportunities did this event provide you?

We were able to meet many like-minded people who are interested in collaboration on solving problems for other people. The design was pushed forward by one of the other team members. Our students (Ausvin, Jason, and Mihir)

What did you learn from this event that you did not already know prior to coming?

How well groups can be formed in a short period of time to solve problems. The way the event was run was very informative.

What have you done with the design you and your team created? (provide as many details as possible)

Not as much as we would have liked. Other than talking about it with anyone who would listen, and printing out the versions on our 3-D printer.

Anything else you would like to share about your experience, please do so.

It was very positive and motivational for both me as a mentor, and for the students that I brought to the event. Its hard to see, but the upper right side shelf has a display case with a 3-D printed version of the coupling. It was featured prominently in our team's award for engineering inspiration this year as well.

This event really helped me take a deeper look at how my maker space's technologies and tools could be used to promote greater civic and social engagement. It has directly influenced programming ideas and projects we work on with the teens members of The MiX. Currently, we are working on a couple of weeks of projects based on creating/ improving upon assistive devices. Again, really trying to get our teens to think about using 3D printers, laser cutters, etc. . . For more than just creating fun little trinkets.

What opportunities did this event provide you?

The Innovation Creation Series helped garner attention for The MiX since I was on the grand prize winning team. It also served as a great example to our teen members, who saw a real world application of 3D printing and prototyping.

What did you learn from this event that you did not already know prior to coming?

I learned that there is a much bigger group of "makers" out there who are really trying to make a positive impact on society. I was impressed by the diversity of professions and ages represented.

What have you done with the design you and your team created? (provide as many details as possible)

I'm actually not sure exactly where our design has gone but I'm pretty sure Lisa Marie Wiley has continued to champion and push forward Team Spline's prosthetic coupler design.

Anything else you would like to share about your experience, please do so.

I had a great time at this event. I really appreciated the opportunity to directly interact with the Veterans in order to best solve their problem/ issue. I'm was also pleased at the focus on keeping everything open sourced and completely accessible. I would love to participate in another event like this should it happen again.

Iris Lin:

How did participating in the VA Innovation Creation Series- Prosthetics and Assistive Technology Challenge impact your life overall?

It was a great experience, it was the first hack-a-thon type event I have attended. The event prompted me to think about challenges that veterans face that I had not considered before.

What opportunities did this event provide you?

For me, since I was working a summer internship, it was one of the projects I ended up working on. It was a challenging and interesting goal to work towards, and the time limit meant that we

had to think about things pretty emergently as opposed to procrastinating. Also, the actual event was great in terms of getting to meet people with expertise in both medical and engineering fields.

What did you learn from this event that you did not already know prior to coming?

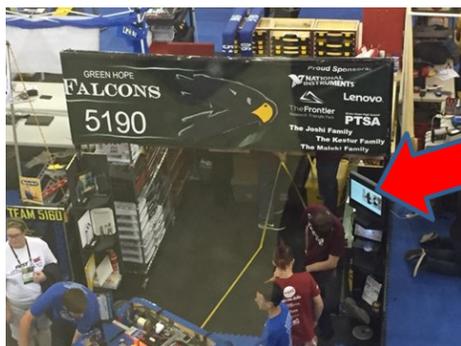
One of the things I learned that I had not been aware of is how difficult it is to create assistive devices for small, specialized patient populations. Even if good designs are created by innovators, often it seems that it's nearly impossible to bring the device to market. For example, my project was geared towards a very specific and small patient population, and we later discovered how difficult it is to further develop it as a product, simply because there is not a large enough market who would benefit.

What have you done with the design you and your team created? (provide as many details as possible)

Following the event, we worked for some time with Spark Engineering, a small company that does work to bring ideas from innovators to market. However, it was very difficult to really get anywhere with it, for the reasons that I mention above. The population of people who might benefit from the creation of the device is very small. While doing research into assistive devices for diabetics, I spoke with a few diabetes educators who would tell me things like "We used to have this great device available that would do this and this, but later was discontinued because there just weren't enough people who needed it." Following the completion of my internship that summer, I started back in my second year of medical school, and other students subsequently took over further project development, so I am not sure what has since happened with it.

Anything else you would like to share about your experience, please do so.

One of the prompts was to create devices for female veterans suffering from tremors who wished to apply makeup. While this was not a prompt I worked on, it did pique my interest. Now that I am in my third year of med school and have spent time with many patients in Neurology, I am thinking about doing some research into assistive devices that are available for people with essential tremor, as I have seen the effects that this condition can have on people.



Matt Baker of Team The MiX

How did participating in the VA Innovation Creation Series- Prosthetics and Assistive Technology Challenge impact your life overall?