



# Inventive Volunteer Group Develops Devices for Disabled

CanAssist harnesses university, community resources to solve problems

*The object of teaching a child is to enable him to get along without a teacher*  
—Elbert Hubbard

**D**r. Nigel Livingston's world expanded with the birth of his daughter. The plant physiologist at University of Victoria's biology department ultimately learned his daughter had Angelman Syndrome (AS), a broad spectrum disorder that, at its worst, leads to physical and mental impairment. He further learned that UVic was likely the best place he could be to help his daughter and many others limited by disabilities.

"It has nothing to do with plants," he said, explaining his work with CanAssist (formerly the University of Victoria Assisted Technology Team). He directs a group comprised of faculty, students, staff and community volunteers (including retired physicians, engineers, and seamstresses) who develop and personalize

devices to assist those with severe disabilities to communicate. "We harness all resources on campus and in the community. It's a multidisciplinary approach to solving problems."

It took some time to diagnose Livingston's daughter with AS. Livingston used to take her to Queen Alexander Centre for Children.

"Working with therapists, I began to interact with them and, at that time, they had in-patients and I began to interact with them. They needed technology to help them so I started with one little project."

That project involved a young boy who suffered a near-drowning accident when he was three. He was blind and could only move one finger on one hand. Livingston developed a specialized switch to turn on a tape recorder so the child could amuse himself without assistance from caregivers.

"His finger would get locked so we needed a ball that would inflate and push his finger back," said Livingston.

"This led to another project and I thought it would



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be nice to have a team, so I put a call out to the university through the newsletter. I got a huge number of volunteers to help. We have 105-106 projects now."

Some things, he said, are incredibly simple but some projects take years to complete. One relatively straightforward project was to build a bicycle for a child with dwarfism. The child needed to have his limbs measured, then a mechanical engineer modified a regular bike to suit this boy's needs. The result has to look good, too. Livingston learned that if these special devices stand out too much, kids won't use them.

"The first time we built a bike for a boy with dwarfism, he rode it with his elder brother. It was beautiful. It's sometimes very emotional; parents cry; caregivers

**More difficult projects use brainwaves to help people who are essentially locked in with no ability to control movements.**



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Above: Darcy Lane, a fourth year mechanical engineer delivers an adjustable keyboard stand to Dan Spelt. Left: Melissa Sephton using a laser pointer and detector to activate "Eeyore." Right: Jenn Bond, a UVATT volunteer, works with Janice Gunn, training her to use a EMG (electromyographic) based system to change channels on her TV.

cry; engineers cry," he said. The engineers not only help a child but get to use their training to maintain the structural integrity of the new bike.

More difficult projects use brainwaves to help people who are essentially locked in with no ability to control movements. Livingston explained that when a person thinks of a relaxing thought, the brain waves register a certain way. Then ask that person to perform some type of complex calculation and a different set of brainwave activity occurs.

"We can't tell what they are thinking but we can ask yes or no, do you want an apple? If no, they relax; if yes, they do a calculation. We see the change in thought pattern. All we want is two different states; we designate which is no or yes."

Livingston's team also helps people with advanced MS or ALS who cannot talk and who have limited mobility by tracking their eye movements and translating that movement into some type of communication.

"We need a computer program to do the typing; a mechanical engineer to track eye movement; a linguist to help with communications; a mathematician to figure out the most effective way to do things," said Livingston.

"The whole idea is people with disabilities become more empowered and less dependent on caregivers."

It's an idea that Livingston hopes will catch on across the country. His team gets about three to four requests a week from caregivers or families asking for help. Since they don't



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charge for their work or the end product, Livingston relies on both volunteers and donations of material.

"Our problem now is we are getting requests from all over the country and the world. We don't have the resources," he said. "Our long-term goal is to set up centres across the country. It's a fair amount of organization and we have to have someone do it. It's quite expensive."

But Livingston is always up for the challenge. He never knows what each week will bring.

"The most challenging requests," he said, "come out of nowhere."

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