SPRING 2008 | *Department of Engineering Newsletter*

ENGINEERING NEWS

Disability Resources Group works to improve water accessibility

by Barbara Ressler

Left: Messiah College students help pour the cement platform for our mock well system behind Frey Hall. The Collaboratory is grateful to Hempt Brothers, Inc. of Camp Hill, Pennsylvania, for donating the cement for our project. Right: A woman with a disability tests whether a seat will improve her ability to pump water.

The Disability Resources Group in the IPC/Collaboratory is working on a project to improve water accessibility and personal hygiene for disabled persons in West Africa. Access to clean water has improved dramatically in West Africa thanks to World Vision International's installation of numerous hand-operated well systems. However, the design of these well systems does not allow for easy access by disabled persons. And once the water has been pumped into its container, it is also extremely difficult for the disabled person to transport the water back to his or her home. Last January, students Emily Howell and Jim Davis traveled to Mali, Africa, with Ray Norman, dean of the School of Mathematics, Engineering, and Business, to observe how disabled persons use the well pumps and transport the water back to their homes. They also learned about personal hygiene needs and latrine construction. Emily was able to test some of our design modifications to the well pumping stations, and Jim was able to try different modifications to the water transport containers. Over the spring semester, World Vision employees will be constructing well and latrine test sites for our design modifications, which we will test on a return trip in June 2008. We also constructed a mock well system behind the parking lot of Frey Hall where we can experiment with different configurations before our return trip. Emily, Jim, and Prof. Norman made tremendous progress on their trip, and we are excited by how their work will make the lives of disabled persons less challenging.

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Communications group seeks funding for developing a Wireless Enabled Remote Co-presence (WERC) for cognitively and behaviorally challenged clients

by Harold Underwood and SymBionyx staff

The Communications Group of the Collaboratory is seeking grant funding from the Keystone Innovation Zone and the Keck Foundation to support two students working full time over the summer months, to develop and test the prototype of a system that will meet a special need. Currently, as many as 1 in 150 children are diagnosed with some form of autism, with degrees of impairment ranging across what is called the Autism Spectrum. Those diagnosed with Pervasive Development Disorder, also known as Asperger's Disorder, experience a higher functioning form of autism, typically characterized by deficits in social functioning. However, such challenges need not necessarily preclude their employability or independent living in adult life. Potential employability and full capacities for independent living can be achievable with remedial training and life skills coaching properly oriented to Asperger's-specific deficits. The company SymBionyx exists to serve this employable-but-for-remediation subset of the Autism Spectrum population. SymBionyx addresses a gap in social services by developing a comprehensive solution known as SocialWERC. SocialWERC combines one-on-one job coaching with a skills-training process, supported by a proprietary wireless communications technology known as Wireless Enabled Remote Co-presence (WERC). WERC reconfigures existing wireless communications hardware into a multi-component device that—in combination with its involving associated technologies and services—enables new forms of training and support for behaviorally, socially, and/or cognitively challenged children and adults. The project for students and the faculty advisor at Messiah College is to develop and test a prototype of WERC, as a training-specific adaptation of current generation multifunction cell phones including separate wireless Bluetooth™ headsets and several additional discrete wirelessly-connected components. These additional components include a voice headset and a cell phone-type micro-video camera that can be unobtrusively attached to a trainee's eyeglasses, nametag, or secured in other convenient locations. When successfully developed, WERC will permit a remote coach or trainer, to share his/her trainees' point of view — that is, to see and hear exactly what they are seeing and hearing, in real time or, retroactively by "instant replay." The coach can then discuss and advise them about what is happening, without the context-distorting effects of being physically present in their situation, the only way in-situ training can currently be done. Other WERC features permit further significant enhancements over existing onsite job training capabilities. To cite only one: long after formal job coaching is completed, clients or their employers may elect to continue subscribing to a WERC-based support service — as a sort of job crisis Onstar™ for Asperger's Disorder — where a WERC client who senses an impending crisis can request active monitoring and get counsel from a remote coach to avert a crisis. Or, if a situation developed too quickly to actually avert the crisis, a WERC remote coach could at least support a client soon enough after a crisis to permit damage control, and possibly facilitate recovery after reviewing "instant replay" audio and video of the event, from the client's point of view. Developing and testing the WERC prototype will advance SymBionyx's offer of its SocialWERC solution to the tools and resources required to equip the growing and underserved population of Asperger's Disorder clients to experience the fuller potential of employment and independent living.

If you are a student interested in helping develop the WERC prototype as a ten-week paid internship project this summer, please contact Dr. Underwood at HUnderw@messiah.edu.

Messiah faculty and students attend National Engineers Week banquet

From left to right: Sarah Jarnecki '11, Professor Don Pratt, Jonathan Shenk '08, Joshua Joyce '08, and Professor Carl Erikson attend the Engineers Week Banquet on February 21, 2008.

Five faculty and thirteen students from the Messiah College Engineering Department attended the National Engineers Week Banquet hosted by the Central Pennsylvania Engineers Week Council, on February 21, at the West Shore Country Club in Camp Hill, PA. Besides enjoying fine food and fellowship, the group was inspired by engineering award recipients and fascinated by a state-of-the-art presentation on Hybrid and Hydrogen Vehicle Research, given by Dr. Joel R. Angstrom, Director of the Hybrid and Hydrogen Vehicle Research Center of the Pennsylvania Transportation Institute.

A deja vu moment

by Bob Clancy

Recently at church we celebrated Sanctity of Life Sunday, and at one point, scores of little children were gently herded across the front and onto the platform steps. Once assembled, these precious little ones (some very little) joined with the congregation in singing that wonderful song we adults sang as children: "Jesus loves the little children, all the children of the world. Red and yellow black and white, they are precious in His sight. Jesus loves the little children of the world." It was a wonderful and memorable sight.

But it was an emotional deja vu as well. Just ten years earlier, possibly to the very Sunday, there was a quite different yet equally wonderful and memorable sight. It happened 7,000 miles away at a church in Ma'adaga, Burkina Faso, West Africa.

It wasn't Sanctity of Life Sunday at that church but there they were, the church's little children sitting on the platform steps. These were their normal seats at church every Sunday. Except for one crying little one whose sister carried her back to her mother, the children were nearly perfectly behaved. I wondered then, as they looked square into the faces of their singing families and neighbors, wasn't it a most entertaining sight for them?

And sing we did. The song was the same — "Jesus Loves the Little Children" — but with a major enhancement: The whole congregation was singing the song in full voice simultaneously in either the local Gourma language, French, or English (pick a language, then join in). The experience was powerful, both spiritually and emotionally. In that moment, it was easy to visualize the same group, together with the folks back home, one day singing the same song while gathered before the throne in heaven.

A Messiah College team of faculty and students was then in Ma'adaga (not the first trip) to install a solar power system for illumination and water pumping at a dispensary which had served medical and maternity patients for some 44 years. The team was also surveying that spot and others to identify additional Messiah projects.

Pictured here is the team the went to Mahadaga in 1998. Third row (l to r): Phil Sorensen '99, Ben Claggett '99, Matt Walsh '00. Second row: Mr. John Meyer, Jonathan Knight '99, Bryan Ondrasik '00, Delsi Atchina '98, Doug Wewer '99. First row: David Owen '97, Professor David Vader, and Mr. Bob Clancy.

Six months ago, two missionary couples with their young babies arrived to serve in the same town of Ma'adaga. All four of them are Messiah grads and one was a leader in the group ten years ago. The two couples will undertake leadership of the long established work plus see to its expansion. A recent plan by the new missionaries includes the acquisition of a 20-acre tract nearby on which to develop a commercial tree nursery.

Scores of faculty and students at Messiah College have "owned" the work at Ma'adaga since the beginning. The intervening 10 years have been filled with study, design, prototype development, and many trips to the field. Solar power, handicapped tricycles, water pumps, and mathematics teaching enhancement are representative projects.

The program for Ma'adaga is progressing, gathering momentum, and broadening in scope — in the best sense, things are changing. Yet God is wonderfully unchanging even while remaining the heart beat behind the motivations, direction, and success of the program as well as behind the spiritual and emotional development of each of the players. In one sense, this deja vu experience may be a small, passing moment, yet it illuminates the comprehensive and faithful way in which our God engages us.

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ENGINEERING NEWS • SPRING 2008

OUR MISSION

The mission of Messiah College is to educate men and women toward maturity of intellect, character, and Christian faith in preparation for lives of service, leadership, and reconciliation in church and society. Graduates of the engineering program will therefore be technically *competent* and broadly *educated*, prepared for interdisciplinary work in the global workplace. The character and conduct of Messiah engineering graduates will be *consistent* with Christian faith commitments. We accomplish this mission through engineering instruction and experiences, an education in the liberal arts tradition, and mentoring relationships with students.

Messiah hosts a special National Engineers Week event

The Department of Engineering hosted a special day for local high school students on February 21. Students in 10th to 12th grades from Cumberland Valley, Mechanicsburg, and Northern York High Schools as well as the local Home School Cooperative were invited to hear a presentation on the career of engineering. Professor Carl Erikson, chair of the Department of Engineering, gave a 30 to 35 minute talk on "What is Engineering?" The high school students were given tours of the engineering laboratories as well as the opportunity to hear Messiah engineering students talk about some of their projects, including the light sport aircraft, manual and electric tricycles, water purification systems, photovoltaic system design, and communications. The department treated each student to lunch at Lottie Nelson Dining Hall. Special prizes were awarded to the students.

Local high school students try the tricycles, while finding out more about the work of Collaboratory groups at Messiah College.