

Appendix B
Seed/Assistance Fund Application
Application for Summer 2008 Grants

Applicant Name: <u>Dr. Harold R. Underwood</u> <input type="checkbox"/> Faculty/Staff/Student (circle one)
Title: <u>Associate Professor of Engineering</u>
Higher Education Institution: <u>Messiah College</u>
Address: <u>Box 3034, One College Avenue, Grantham, PA 17027</u>
Phone: <u>(717)796-1800 ext 7125</u> Fax: <u>(717) 796-5222</u> E-mail: <u>HUnderw@messiah.edu</u>
Project Title: <u>Prototype Development of a Wireless Enabled Remote Co-presence (WERC) for the Cognitively and Behaviorally Challenged</u>
Amount of Grant Request (Maximum of \$10,000): <u>\$10,000</u>

Which industry does the project relate to:

- | | |
|------------------------------------------------------------|--------------------------------------------------------------------------|
| <input type="checkbox"/> Advanced Materials | <input checked="" type="checkbox"/> Medical Devices/Healthcare (primary) |
| <input type="checkbox"/> Agriculture/Food Services | <input type="checkbox"/> Nanotechnology |
| <input type="checkbox"/> Biotechnology/Life Sciences | <input checked="" type="checkbox"/> Telecommunications |
| <input checked="" type="checkbox"/> Information Technology | <input type="checkbox"/> Other: _____ |

Does the project involve a private sector partner? Yes No

Is the company a KIZ designated company? Yes No

Business Name: SymBionyx

Contact Name/Position: Albert Glenn/Principal

Email: aglenn@symbionyx.com

Address: P.O. Box 1374, Mechanicsburg, PA 17055

Age of Company/Year Founded: startup Type of Business: LLC

*Please include a letter of support from the company (on company letterhead).

Does the project involve any other faculty, staff or students at your institution? Yes No

Name/Position/Institution: two students to be recruited to work on this project during summer 2008

Name/Position/Institution: Dr. David Gray, Assistant Professor of Engineering, Messiah College

Name/Position/Institution: _____

Does the project involve a partner institution of higher education? Yes _____ No X

Name/Position/Institution: _____

Name/Position/Institution: _____

Name/Position/Institution: _____

Which stage along the process of commercialization is the research/project?

(Please see Attachment C for details of the Process of Commercialization)

<input type="checkbox"/> Applied Research	<input type="checkbox"/> Proof of Concept Study
<input type="checkbox"/> Preliminary Market Assessment	<input checked="" type="checkbox"/> Prototype Development and Testing
<input type="checkbox"/> Preliminary Technical Assessment	<input type="checkbox"/> Production Feasibility Analysis

What needs to be done in order to commercialize the product? Upon completion of the prototype and concept testing, the next steps in commercializing WERCware products include: 1) Establish Intellectual Property Protection, 2) Evaluate Production Issues, 3) Define Market, 4) Launch Pilot Project

How will the next step be completed? With reference to the steps identified above: 1 a) search and file for patent, b) file for trademark; 2 a) specify final product form-factor, b) estimate volume production costs, c) identify pre-mass production implementation project, d) evaluate product manufacturing options; 3 a) identify first target vertical(s), b) identify end user purchaser/licensee profiles, c) identify size of potential market within first target vertical, d) justify market share projections by varying initial operating assumptions; 4 Identify a) potential pilot projects, b) demonstration & implementation partners, c) first licensee candidates.

If this application is approved, who is the contact person responsible for grant disbursement at your institution?

Contact Name: Dr. Harold R. Underwood

Department: Engineering

Phone: (717)796-1800 x7125

Email: HUnderw@messiah.edu

Does the project include any matching funds? Yes X No _____

Organization providing funding: Messiah College Collaboratory

*Please include a Letter of Support for Match

How did you hear about this program? Brian Reilly Encouraged us to apply

Other Required Information:

For detailed descriptions, refer to Application Instructions in the guidelines.

- Abstract

- Narrative
- Curriculum Vitae
- Budget
- IP Arrangements
- Letter of Support for Match (If applicable)
- Letter of Support from Company (if applicable)

Submitted by:

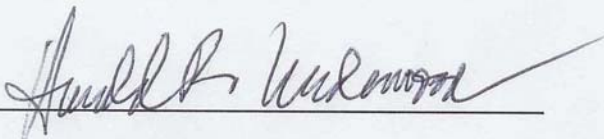
Applicant:

Signature: _____

Name: _____

Title: _____

Date: _____



Dr. Harold R. Underwood

Associate Professor of Engineering

3/1/08

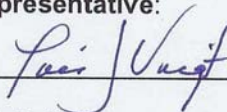
Authorized University Representative:

Signature: _____

Name: _____

Title: _____

Date: _____



Lois Voigt

Vice President for Finance

2/29/08

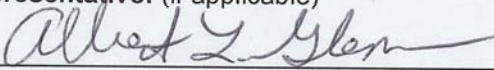
Authorized Company Representative: (if applicable)

Signature: _____

Name: _____

Title: _____

Date: _____



Albert Glenn

Principal

2/29/08

For use by the ITN: Received: _____

Date: _____

Prototype Development of a Wireless Enabled Remote Co-presence (WERC) for the Cognitively and Behaviorally Challenged

Abstract: 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. A company known as 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.

Prototype Development of a Wireless Enabled Remote Co-presence (WERC) for the Cognitively and Behaviorally Challenged

Narrative:

Background on Symbionyx: Symbionyx develops innovative tools and solutions to assist late adolescents and young adults who have high functioning Autism or Asperger's Disorder. Symbionyx tools and solutions consist of diagnostics, job and life skills coaching services, and applications of new technology designed to facilitate unlocking the potential of these individuals as they transition into the workforce and independent living. The diverse group of Symbionyx's founding team includes medical and mental health practitioners who currently work with Autism Spectrum patients/clients, as well as business people with expertise in technology, operations, and finance whom have a history of success in building and managing organizations of all sizes. Members of this diverse Symbionyx team share a common passion for applying business and technological innovation to solve pressing social problems. In other words: Helping people who help people do a better job.

Background on the Social Need (Asperger's Disorder): Currently, as many as 1 in 150 children are diagnosed with some form of autism¹, with degrees of impairment ranging across what is called the Autism Spectrum. Although autistic individuals at the lower functioning end of the spectrum may never become capable of competitive employment or independent living, those diagnosed with Pervasive Development Disorder or Asperger's Disorder² have a higher functioning form of autism.

Symptoms of those with Asperger's Disorder typically include:

- An apparent lack of empathy and an inability to show affection
- An inability to pick up on social cues
- Unusual facial behaviors and facial expressions
- An apparent lack of restraint in stating their opinions or point of view
- An obsession with one or several topics or areas of interest
- Becoming easily overwhelmed by sensory over stimulation

While those with Asperger's Disorder commonly experience deficits in social functioning, such a challenge need not preclude either employability or independent living, their potential employability and full capacities for independent living may be realized with the remedial training and life skills coaching oriented to Asperger's-specific deficits. Symbionyx exists to uniquely serve this employable-but-for-remediation subset of the Autism Spectrum population. The significant increase in the number of children diagnosed with Autism Spectrum Disorders has already overwhelmed educators' and caseworkers' limited resources. Furthermore, providers of social services struggle to accommodate the scale of the remediation training challenge posed by the unique mix of skill deficits typical of those with Asperger's Disorder. Nowhere is the gap

¹ "CDC Releases New Data on Autism Spectrum Disorders (ASDs) from Multiple Communities in the United States"
<http://www.cdc.gov/od/oc/media/pressrel/2007/r070208.htm>

² Referred to as "Asperger's Disorder" hereafter.

in effective service for those with Asperger's Disorder more acute than in the handoff between the school systems' specialized support services and the Office of Vocational Rehabilitation, the only agency mandated to assess and train people with disabilities for competitive employment. The Office of Vocational Rehabilitation (OVR), already taxed to fulfill its mandate with the Mental Health/Mental Retardation (MH/MR) population it has traditionally served well, has yet to fully adapt to Asperger's Disorder. A growing need now exists to adequately meet the unique employability assessment and training challenges posed by tens of thousands of students diagnosed with Asperger's Disorder already within the educational system who will graduate over the next decade.

Background on the innovative technology being researched, and its potential for commercialization by SymBionyx: SymBionyx addresses the gap in service capacity described above by developing a comprehensive solution known as SocialWERC. SocialWERC combines one-on-one job coaching with a skills-training process supported by proprietary wireless communications technology. The technology aspect³ of the SymBionyx's SocialWERC solution relies on a proprietary concept called Wireless Enabled Remote Co-presence (WERC). WERC reconfigures existing wireless communications hardware into a multi-component device involving associated technologies and services hereafter referred to as WERCware. WERCware enables new forms of training and support for behaviorally, socially and/or cognitively challenged children and adults. With one important qualification⁴, the multi-component WERCware device acts as a training-specific adaptation of current generation multifunction cell phones including separate wireless Bluetooth™ headsets, and additional discrete wirelessly-connected components. These additional components include a voice headset and a cell phone-type micro-video camera unobtrusively attached to a trainee's eyeglasses, nametag, or placed almost anywhere else. Most significantly, WERC permits a remote coach or trainer, located virtually anywhere else, 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 WERCware-based support service — as a sort of job crisis Onstar™ for Asperger's Disorder — where a WERCware 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 avert the crisis, a WERCware remote coach could 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.

³ It must be stressed that device-specific job training is only one component of the total SymBionyx program.

⁴The important qualification is WERCware's conceptual independence from any specific mode of wireless technology.

WERCware's mostly likely first instantiation may well use Bluetooth for intra-device communication, wireless LAN (WLAN) for intra-facility networking and link the WERCware-equipped trainee with his remote trainer/coach via landline using TCP/IP and/or VOIP

SymBionyx is currently developing a pilot program to provide job coaching and training services, along with a device prototype. Higher-level program development efforts include furthering research and establishing partnerships. Research focuses on diagnostic profiles of that subset of the Asperger's Disorder population who can most benefit from access to SocialWERC-enhanced job coaching and life skills training. Partnerships are being sought with funding sources as well as existing job training and Autism Spectrum service provider organizations. Once the pilot project documents the efficacy and cost-effectiveness of SocialWERC-enhanced job training, SymBionyx's business model will enable its replication in a rapidly growing number of regions and implementation contexts.

Background on the Relationship between Messiah College and SymBionyx: SymBionyx has approached the Collaboratory for Strategic Partnerships and Applied Research at Messiah College for assistance from faculty and students to develop and test the WERC prototype. The Director of the Messiah College Collaboratory, Dr. David Vader, has recommended the project to the Collaboratory's Communications Group advisor, Dr. Harold Underwood, who is the author and Principle Investigator (PI) of this proposed project. The PI has in turn sought grant funding through the Keystone Innovation Zone Seed Assistance Grant, and a match through the Collaboratory's Keck Foundation funds. In the immediate future, the funding is intended to provide a stipend and the necessary resources for two students during the summer months working full time for 10 weeks on researching, developing and testing the WERC prototype.

Project Objectives:

1. Student, faculty and SymBionyx team members will identify a schedule for managing research and project work during summer months, by differentiating specific tasks, and planning to meet certain milestones by agreeing on a detailed Gantt Chart.
2. Students and faculty will agree on the best means and frequency to communicate with SymBionyx staff, for advice and feedback at key points in the process.
3. The team will determine state-of-the-art for related technical applications, by completing a literature search, summarizing the results with implications for the WERC prototype.
4. The team will select and test alternative choices for the client and the monitor, so as to develop the WERC prototype. This includes configuring and testing multifunction cell phones with Bluetooth headsets including voice and camera capabilities. Since certain work-site structures may block the cell phone signal, an alternative Wi-Fi configuration will be compared for feasibility, using on-site wireless internet access.
5. The team will use a log book to record daily activities, and compile a final documented report on results of their economic analysis, comparison of alternatives, design, testing and evaluation of effectiveness.
6. The team will share their results in an oral presentation for SymBionyx staff.

Curriculum Vitae:

HAROLD R. UNDERWOOD **Associate Professor of Engineering**

Work Address

P.O. Box 3034, Messiah College
Grantham, PA 17027 USA
(717) 766-2511 ext 7125
HUnderw@messiah.edu

Home Address

2621 North Rosegarden Boulevard
Mechanicsburg, PA 17055 USA
(717) 697-9709
hbb.und@verizon.net

Teaching Experience

- 2006-present **Associate Professor of Engineering**, Messiah College,
Courses Taught: Circuit Analysis Lecture and Lab, Linear Systems, Electromagnetics,
Exploring Electrical Technology, Communications Group Orientation.
- 2005 (Jun-Oct) **Visiting Professor of Engineering**, Chiang Mai University, Thailand,
Guest Lectures: selected topics in Electromagnetics and a special presentation on Very Small
Aperture Antennas (VSATs) for internet connectivity in remote locations.
- 2003-2005 **Associate Professor of Engineering and Physics**, Messiah College.
Courses Taught: Please see 1994-2003 below.
- 1994-2003 **Assistant Professor of Engineering and Physics**, Messiah College.
Courses Taught: RF & Microwave Design, Linear Systems, Electromagnetics,
Communications Systems, General Physics, Circuit Analysis Lab, Exploring Electrical Tech.
- 2002 **Adjunct Faculty**, (Fall, part time) Penn State Harrisburg Capital College.
Course Taught: Linear Systems, a graduate level course in the School of Science,
Engineering and Technology.
- 1992-94 **Assistant Professor of Engineering**, Messiah College.
Courses Taught: Electronics, Electronic Devices, Linear Systems, Electromagnetics, Digital
Circuit Design, Communications Systems, and First Year Seminar.
- 1989-92 **Assistant Professor**, Physics Department, Wheaton College, IL.
Courses Taught: Classical Physics I (lecture/lab) & II (lab), Electronics, and Waves.
- 1988 **Graduate Teaching Assistant** (1/4 time, 2 semesters), Electrical and Computer
Engineering (ECE) Dept., University of Illinois at Urbana-Champaign (UIUC).
Course Taught: Radio-frequency Communication Circuits Lab (1 section).
- 1984-86 **Graduate Teaching Assistant** (1/4 time, 4 semesters), ECE Dept., UIUC.
Course Taught: Introductory Electrical Engineering Lab (1 section 3 time 4 semesters).

Education

- 1986, 1990, **M.S., Ph.D.**, Electrical Engineering, Univ. of Illinois at Urbana-Champaign (UIUC)
- 1984, **B.S. with Honors**, Electrical Engineering, UIUC
- 1984, **B.A. with High Honors**, Liberal Arts-Engineering, Wheaton College, Wheaton, Illinois
(dual degree 3-2 program)

Research & Related Experience

- 2007-present **Collaboratory Communications Group Faculty Advisor**, Messiah College, PA,
Grants received: Growing the Communications Group (\$7000)
http://collaboratory.messiah.edu/wiki/index.php/CO:Growing_the_Communications_Group
- 1991-present **Project Advisor**, Engineering Dept., Messiah College, PA.
Undergraduate Design Projects: **Alternative Aviation Solutions** by J. Eng, N. Horst, J. Patrick (2007-08), J. Bryson, T. Stello, R. Stoner (2006-07), **Digital Bible Development** by J. Stueckle and K. Fitting, **Ortho-Tweezers Jr.** by L. Sverduk and John Meyers, **Artificial Landmine Field** by B. Bosley, S. MacDonald and J. Blake (2003-04); **Scoreboard** by J. Barley, A. Hall, T. Hillner, and A. Vogel, **Biogeneration (INREN)** by L. Brostek, A. Dahlstrom and D. Wagner (2002-03); **Micro-Hydro** by J. Ross, J. Hauser and C. Forry (2001-02), **Voice Activated Reclining Wheelchair** by J. Widman and B. Garcia (2000-01), and by M. Brown, D. Gomez and A. Peters (1999-2000); **Telephony Data Collection** by B. Wenger (1998-99); **Continuously Matched-Impedance Telescoping Antenna** by E. O=Mara and C. Young, **Detection of Land Mines** by K. Pierce and P. Fox, **Digital Noise Suppression** by D. Atchina (1997-98); **Active Noise Cancellation** by K. Krasinski, **Automatic Seat Belt Release System for School Buses** by L. Bert and S. Engle (1996-97), **Real-Time Digital Signal Processing (DSP) Filter Applications using the Motorola DSP 56002EVM** by D. Lehman (1995-96), **Implantable Radio Telemetry Thermometer** by J. Daniel and B. Forejt, **Motor Break-in with Computer Interface for the Artificial Heart** by C. Eyster and K. Yannitell (1994-95).
- 2000, 2001 **NASA/ASEE Faculty Fellow** (ten-week summer term, full time), Goddard Space Flight Center, Greenbelt, MD. *Projects:* Antenna Pattern Model for a High Rate User Phased Array Using Ansoft Ensemble (summer 2001), Design of a Reduced Surface Wave Shorted Annular Ring Antenna by David Watson (supervised 8-week undergraduate research project, summer 2001), Design and Modeling of an Electronically De-spun Phased Array Antenna for Spinning Spacecraft (summer 2000).
- 1989-92 **Physics Lab Technician** (part time), Physics Department, Wheaton College, IL.
Projects: repaired physics lab equipment
- 1986-1989 **Graduate Research Assistant** (3-2 time, 6 semesters), Bioacoustics Research Lab (BRL) in collaboration with the Antenna Lab of the ECE Department at UIUC.
Project: design and testing of a microwave microstrip antenna array applicator for hyperthermia therapy (sponsored in part by a Predoctoral Traineeship awarded by the National Cancer Institute of the United States Department of Health and Human Services).
- 1984-1986 **Graduate Research Assistant** (3 time, 4 semesters), BRL at UIUC.
Project: characterization of an ultrasonic transducer array applicator for hyperthermia therapy.
- 1984 **Product Engineer**, (summer, full time) Labthermics Technologies, Champaign, IL.
Projects: Product Development and Testing of a radio frequency (RF) ultrasonic transducer applicator and thermocouple thermometry for a hyperthermia system designed for cancer therapy.

Professional Society Memberships

- 1997-present American Radio Relay League (ARRL)
1992-present American Society of Engineering Educators (ASEE)
1981-present Institute of Electrical and Electronics Engineers (IEEE)

License, Awards & Certificates

- 2007-present Amateur Radio Extra Class License (call sign KB3OOM)
1986 Predoctoral Traineeship awarded by the National Cancer Institute of USDHHS
1979 Bausch & Lomb All Science Award

Refereed Publications

- H.R. Underwood, "Thailand: Tradition and Technology," *Proceedings of the 2006 Christian Engineering Educators Conference*, Olivet Nazarene University, Bourbonnais, IL, June 2006.
- H.R. Underwood, "Educational Benefits of Antenna Design Experience on a NASA/ASEE Fellowship Program," *Proc. of the 2002 ASEE Annual Conference & Exposition*, Montreal, Quebec, June 2002.
- H.R. Underwood, A.F. Peterson, and R.L. Magin, "Electric-field distribution near rectangular microstrip radiators for hyperthermia heating: theory versus experiment in water," *IEEE Transactions on Biomedical Engineering*, vol. 39, no. 2, February 1992, pp. 146-153.
- H.R. Underwood, E.C. Burdette, K.B. Ocheltree and R.L. Magin, "A multi-element ultrasonic hyperthermia applicator with independent element control," *International Journal of Hyperthermia*, vol. 3, no. 3, 1987, pp. 257-267.

Conference Presentations and Publications

- H.R. Underwood, "Thailand: Tradition and Technology," *Proc. 2006 CEEC* (see full ref. above).
- H.R. Underwood and L.M. Eby, "Assessing Concepts in Second Semester Physics," *Proceedings Mid-Atlantic Section Conference of the ASEE*, Raritan Valley Community College, NJ, April, 2004.
- H.R. Underwood, "Electronically despun phased array antenna for spinning spacecraft," *2001 IEEE Antennas & Propagation Society International Symposium Digest*, Boston, MA, July, 2001.
- H.R. Underwood, "How well do students grasp basic mechanics concepts?" Presented at the 1999 Fall Regional Conf. of the Mid-Atlantic Section of the ASEE, Penn State Capital College, PA, November, 1999.
- H.R. Underwood, "Active group learning in Physics and Engineering courses," *Proceedings of the 1999 Spring Regional Conf. of the Mid-Atlantic Section of the ASEE*, Monmouth University, NJ, April, 1999.
- H.R. Underwood, "Physics in the 21st Century Engineering Curriculum," *Proceedings of ASEE Mid-Atlantic Conference*, Wilkes-Barre, PA, November, 1996, pp. 57-60.
- H.R. Underwood, "Rectangular microstrip radiator for a multielement local hyperthermia applicator," **Ph.D. dissertation**, ECE Department, University of Illinois, Urbana-Champaign, 1990.
- H.R. Underwood, A.F. Peterson and R.L. Magin, "Analysis and measurement of a microstrip array for hyperthermia application," *Proceedings of the 11th Annual Conference of the IEEE Engineering in Medicine and Biology Society*, Seattle, WA, November, 1989.
- H.R. Underwood and R.L. Magin, "Rectangular microstrip radiator for a multielement local hyperthermia applicator," *Proceedings of the 10th Annual Conference of the IEEE Engineering in Medicine and Biology Society*, pp. 864-65, New Orleans, LA, November, 1988.
- H.R. Underwood, "Field characteristics of a multielement ultrasonic transducer applicator for hyperthermia therapy," **M.S. Thesis**, ECE Department, University of Illinois (UIUC), 1986.

Professional Meetings Attended

- ASEE** **National Conferences of the American Society of Engineering Educators**
Nashville, TN (2003), Montreal, QC (2002), Charlotte, NC (1999).
- Regional Conferences of the Middle Atlantic Section**
Raritan Valley Community College, NJ (April 2004), Penn State Capitol College (April 1999).
- CEEC** **Christian Engineering Educators Conference**
Bourbonnais, IL (2006), Montreal QC (2002).
- IEEE** **International Conferences and Symposiums**
AP-S, Boston, MA (2001), Phased Array Systems and Technology, Dana Point, CA (2000)
- Susquehanna Section of the Institute of Electrical and Electronics Engineers**
Selected monthly meetings (1992-present).

Workshops Attended

Radio View of the Universe and Teaching Introductory Astronomy
(Chautauqua Short Courses, NRAO, Green Bank, WV, June 2007)
Promoting Active Learning in Introductory Physics Courses
(Chautauqua Short Course, Dickinson College, Carlisle, PA, May 2002)
Changing Fundamentals of Electromagnetic Teaching (ASEE workshop, June 1999).
Tutorial on Real-Time DSP with \$99 DSK (ASEE workshop, June 1999).
Tutorial session on DSP and communications system design by Tom Bryan of the
MATHWORKS (World Spring Design Conference, Washington, DC, March 25, 1997).
Experiential Learning Workshop (Messiah College, May 21, 1996).
Interdisciplinary Lively Applications Projects (ILAP Workshop, Messiah College, June 1995).
Workshop on Real-Time Digital Signal Processing (Roger Williams University, August, 1994).
Selected Technology training (IT workshops, Messiah College, 1993-present).

Church Affiliation

Maintain Active Membership at
West Shore Evangelical Free Church (WSEFC), Mechanicsburg, PA

Leisure Activities

Sports: tennis, softball, windsurfing, etc.
Other interests: music, chess, Scrabble, word puzzles, reading, crafts and repair-work.

Personal & Family Data

Birthdate/place: January 22, 1961, Evanston, Illinois, USA
Anniversary: January 4, 1992 (Wife's name: Beth)
Child (1): September 18, 1997 (Son's name: Ben)

Professional References

Dr. David Vader	Collaboratory Director, Messiah College, (717) 766-2511 ext 2630
Carl Erikson	Engineering Department Chair, Messiah College, (717) 766-2511 ext 3300
Cary Cupka	Res. & Dev. Coord., Mission Safety International, ccupka@msisafety.org
Tim Dyk	Avionics Coord., Mission Aviation Fellowship, TDyk@maf.org

Prototype Development of a Wireless Enabled Remote Co-presence (WERC) for
the Cognitively and Behaviorally Challenged

Budget:

Sources

1. Seed/Assistance Funding from Innovation Transfer Network	\$10,000
2. Matching Funds from the Messiah College Collaboratory	5,000
Total for Summer Project Work (June through August 2008)	\$15,000

Expenses

1. Student stipends (2 students @ \$10/hour x 40 hours/week x 10 weeks)	\$ 8,000
2. Room & Board (2 students @ \$205/week x 10 weeks)	4,100
3. Equipment, supplies, travel, shipping, etc.	2,200
4. Collaboratory Overhead (from Collaboratory Funds only)	700
Total for Summer Project Work (June through August 2008)	\$15,000

Revised as of 4/7/08 to includes room & board expenses

Prototype Development of a Wireless Enabled Remote Co-presence (WERC) for the Cognitively and Behaviorally Challenged

Intellectual Property Arrangements:

The Messiah College Collaboratory has been offered a 5%, non voting partnership in SymBionyx LLC for its part in working with them at this time, while SymBionyx will retain Intellectual Property rights to the WERC prototype. These arrangements will be formalized later.



COLLABORATORY FOR
STRATEGIC PARTNERSHIPS AND APPLIED RESEARCH

Friday February 29, 2008

Lisa Riggs
Executive Director
James Street Improvement District
206 West James Street
Lancaster, PA 17601

Dear Ms. Riggs:

The Messiah College Collaboratory for Strategic Partnerships and Applied Research is pleased to offer financial match for the Messiah College seed grant application related to Prototype Development of a Wireless Enabled Remote Co-presence (WERC) for the Cognitively and Behaviorally Challenged. The applicant, Dr. Harold R. Underwood, Associate Professor of Engineering at Messiah College, serves as faculty advisor to the Collaboratory Communications Group that will host the research and development work on this project. The Messiah College Collaboratory for Strategic Partnerships and Applied Research will contribute \$5000 in match for the Prototype Development of a Wireless Enabled Remote Co-presence (WERC) for the Cognitively and Behaviorally Challenged, provided the seed grant application is successful, and pending approval of the matching funds through the established process of the Collaboratory.

The mission of the Collaboratory is to partner with organizations, businesses and communities in our region and around the world for projects in mathematical and information sciences, engineering, and business that serve disadvantaged people and care for the earth; and to develop our members' abilities and vocational vision for lifelong servant-leadership, and the courage to act on convictions.

We thank you for your consideration of this proposal.

Sincerely,

Dr. David Vader, Director

INTELLECT · CHARACTER · CHRISTIAN FAITH

P.O. Box 3056 • One College Avenue • Grant ham, Pennsylvania 17027 • 717.796.1800 ext. 2630 Phone
717.796.5307 Fax • dvader@messiah.edu e-mail • www.messiah.edu

SYMBIONYX, LLC.

P.O.Box 1374
MECHANICSBURG, PA 17055
717-620-2376

February 27, 2008

Lisa Riggs
Executive Director
James Street Improvement District
206 West James Street
Lancaster, PA 17601

Dear Ms. Riggs:

SymBionyx LLC is pleased to partner with Messiah College's Collaboratory for the application of "Prototype Development of a Wireless Enabled Remote Co-presence (WERC device) for those with Cognitive and Behavioral Disabilities." (The WERC Project.)

SymBionyx develops innovative tools and solutions to initially assist late adolescents and young adults who have high functioning Autism or Asperger's Disorder. SymBionyx's tools and solutions consist of diagnostics, job and life skills coaching services, and applications of new technology that are designed to facilitate unlocking the potential of these individuals as they transition into the workforce and independent living.

SymBionyx will actively be involved in Project Management of the WERC Project. This involvement will include professional Engineering (Project Development) Oversight, consulting from a practicing Autism Spectrum therapist, and professional IT consulting. In addition, SymBionyx will offer equipment including: a video camera, a webcam, a PC computer and a server.

We thank you for your consideration of this proposal.

Sincerely,



Al Glenn
Principal
SymBionyx LLC
alglenn@symbionyx.com