



WPI

WPI Biomedical Engineer

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SPECIAL POINTS OF INTEREST:

- **WPI Receives \$6 Million Grant**
- **Applying an Engineering Education**
- **BME Faculty awarded tenure**
- **BME Professor Participates in Research Project**

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WPI Receives \$6 Million from George I. Alden Trust for New Center in Undergraduate Life Sciences

Worcester Polytechnic Institute (WPI) has recently received a \$6 million grant from the George I. Alden Trust for the renovation and integration of several undergraduate laboratories into a new Undergraduate Life Sciences Laboratory Center at WPI. The gift, the largest in the Alden Trust's 95-year history, is the second given to WPI by the Trust in recent years for the purpose of improving undergraduate academic facilities. In total, the Alden Trust

When completed, the Undergraduate Life Sciences Laboratory Center at WPI will bring together the laboratory instruction for four departments in a single location, promote cooperation and collaboration across the disciplines, and support increased enrollments in engineering and science programs. Specifically, the new center will become WPI's main facility for undergraduate teaching and research in biology and biotechnology, biomedical engineering,

chemistry and biochemistry, and chemical engineering.

Work on the renovation is slated to begin this July, with occupancy planned for February 2009.

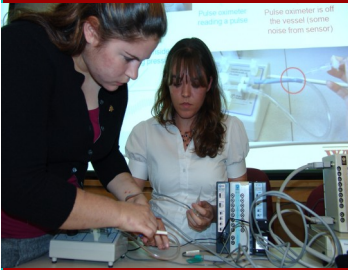
"Throughout WPI's history, George Alden and the George I. Alden Trust have been tremendous supporters and partners of the university, and for that we are deeply grateful," said WPI President, Dennis D. Berkey.

The Alden Trust's funds empower WPI to build even more momentum in its already impressive life sciences program; last year the university launched the new WPI life Sciences and Bioengineering Center at Gateway Park. The center at Gateway Park services as the school's focal point for graduate education and research in the life sciences and related bioengineering fields. In addition to the groundbreaking research taking place there, Gateway Park is also critical to the economic development of Central Massachusetts's biotech and life science industries.

Akin to the center at Gateway park, the creation of the Undergraduate

Life Sciences Laboratory Center at WPI calls for facilities that are state-of-the-future; teaching, research, and meeting spaces that will sustain WPI's undergraduate life sciences programs for decades to come. The renovation comprises of 21,300 square feet, and the new center, to be located at Goddard Hall, will feature vibrant, open, and technology-rich spaces that provide a host of new curricular opportunities. Building innovations will include laboratories for biosciences project work, organic chemistry, and interdisciplinary teaching. Other features will include shared computer space, a classroom, instrumentation, and a variety of spaces for project meetings and information interactions among students and faculty.

Applying an Engineering Education



“Here, let me give you a hand,” says WPI alumna Stephanie LeGare

“Here, let me give you a hand,” says BME alumna Stephanie LeGare as she passes around an example of a prosthetic arm. Recently, Stephanie returned to WPI to give a presentation to BME 1001 (Intro to Biomedical Engineering) about her profession in Prosthetics and Orthotics and demonstrated how she fabricates, designs and uses artificial arms, legs, and braces in her career.

Stephanie graduated from WPI in 2007, with Bachelors degrees in Biomedical Engineering and Technical Communications. She is currently attending Georgia Institute of Technology to complete a Masters degree in Prosthetics and Orthotics. The program trains students as allied health care practitioners, called prosthetist/orthotists, who treat patients who have amputations or musculoskeletal deficiencies. A prosthetist designs and fabri-

cates artificial limbs (prostheses) for patients with limb deficiencies. An orthotist makes and fits braces (orthoses) for patients who need stability in their legs, back, arms, or neck.

Stephanie is starting research at Georgia Tech to improve prosthetic socket design by using magnetic resonance imaging (MRI) and finite element modeling (FEM) to match areas of high pressure and shear in a prosthetic socket with the patient’s anatomy and modify socket design to



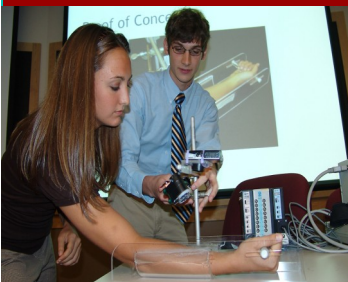
relieve those pressures and provide more comfort

to the prosthesis wearer.

Working with patients is another part of Stephanie’s daily routine. She devotes several hours each week to working at the Children’s Hospital and the

Veterans Affairs Medical Center to gain experience in her field. She is looking forward to this summer, when she will travel to Belize to assist with a prosthetics clinic because there are currently no permanent prosthetic services in the country.

Although her program at Georgia Tech has a clinical focus, Stephanie commented that she still uses a great deal of her engineering education to help her while problem solving for her patients on a daily basis. “A year ago while I was at WPI, I would have never imagined that I’d be treating my own patients, analyzing their biomechanics, performing gait analysis, assessing shear stresses and torsion, all while designing prosthetics and orthotics,” says Stephanie. “But I love every minute of it. It’s perfect for me – It’s a hands-on way to apply my engineering education to my future career.”



Kristen Billiar



Kristen Billiar has been promoted to associate professor of biomedical engineering and awarded tenure.

After receiving a PhD in bioengineering at the University of Pennsylvania in 1998, Billiar worked as a staff engineer at Organogenesis Inc. before joining the WPI faculty in 2002. His research in mech-

anobiology, tissue engineering, and bioengineered skin substitutes has been supported by the Whittaker Foundation and the American Heart Association and has resulted in seven journal articles. He received WPI's 2005 Romeo Moruzzi Young Faculty Award for Innovation in Undergraduate Education.

BME Professor Participates in Research Project

Christopher Sotak, professor of biomedical engineering, is a participant in a research project that recently received a one-year, \$100,000 award (the first installment of what will ultimately be a two-year, \$200,000 award) through the new UMass-WPI Collaborative Pilot Project Initiative. The initiative is a partnership between the two institutions aimed at aggressively expanding translational and clinical research by fostering collaborative, interdisciplinary projects conducted jointly by researchers at both universities. The administrators of the new initiative chose to award the initial \$200,000 in funding to a project led by Mitchell S. Al-

bert, professor of radiology and director of MRI research at the UMass Medical School; Sotak and Marc Fisher, professor of neurology and vice chairman of the Department of Neurology at UMass, are co-principal investigators. Albert is a pioneer in what is known as hyperpolarized MRI imaging. This relatively new technique uses polarized xenon gas to dramatically increase the signal strength of MRI imaging, and thus the resolution of the resulting images.

In particular, Albert, Sotak, and Fisher will compare the ability of hyperpolarized MRI and more traditional MRI techniques to image the effects of stroke on the brain. Blood clot dissolvers, such as TPA, are effective in

reversing the early effects of stroke, but the National Institutes of Health recommends that they not be administered more than three hours after stroke's onset to avoid triggering cerebral hemorrhage. Unfortunately, it is currently difficult to detect, even with MRI, how far



a stroke has progressed. Sotak says the significantly enhanced resolution of hyperpolarized MRI has the potential to detail the effects of reduced oxygen perfusion in brain tissue in a wide area surrounding the obstructed blood vessel. This data will help accurately pinpoint the amount of time that has elapsed since the stroke began and how much damage has occurred, enabling physicians make better decisions about which interventions will be most effective in treating stroke victims.

2008 Graduate Achievement Day

The third annual Graduate Research Achievement Day (GRAD 2008) was held on Wednesday, March 19, 2008 in the Campus Center Odeum. GRAD 2008 celebrated the research activities of graduate students with a poster-style symposium. The event provided graduate students the opportunity to present their research to peers, faculty, the WPI community and their guests.

The presentation of 179 posters was broken down into the following three categories: Engineering Division; Life Sciences & Bioengineering Divi-

sion; and, the Science Division.

Katie Ann Bush won first place in the Life Sciences & Bioengineering Division. Katie is a fifth year graduate student in the Bio-



medical Engineering and Medical Physics Joint Ph.D. Program between Worcester Polytechnic Institute and the Graduate School of Biomedical Sciences at the University of Massachusetts Medical School, Worces-

ter, MA. Currently she is working on completing her thesis project entitled "Designing Microfabricated Basal Lamina Analogs to Enhance Skin Regeneration" in Prof. George Pins' Laboratory at Worcester Polytechnic Institute. Katie received her Bachelors of Science degree in Biomedical Engineering with a concentration in Chemical Engineering in May 2003 from the University of Rochester, Rochester, NY.

Winning third place in the Life Sciences & Bioengineering Division was **Piyush Ramuka**.

Piyush, a second year graduate student working in Prof. Mendelson's laboratory on his Masters degree won third place. The title of Piyush's poster was



"Adaptive Noise Cancellation in Pulse Oximetry: Feasibility for Real-Time Applications."

Piyush received his Bachelors of Science degree in the Bio-medical Engineering at the Thadomal Shahani Engineering College, University of Mumbai, India.



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“Theory and Practice”

Spotlight on Awards & Presentations

BMES Society Wins Award

The WPI Chapter of the Biomedical Engineering Society was awarded the Commendable Achievement Award for 2007. This award is given to student chapters that enhance professional awareness and education. The WPI Chapter is known for its Mentor Program, a service provided to all BME undergraduates. Other recent events have included tours of Gateway Park, a society BBQ and ice cream social, and a graduate school informational session.

Presentations

Marsha Rolle presented a poster entitled "*Design and characterization of cell-derived tissue engineered blood vessels*" at "Regenerative Medicine: Advancing to Next Generation Therapies" in Hilton Head, S.C., March 12-16, 2008.

Christopher H. Sotak presented a poster (co-authored with Alan P. Koretsky) entitled "*Manganese Release and Transport in the Brain Following Convection-Enhanced Delivery (CED) of Manganese (III)-Transferrin*," at the 49th Experimental NMR Conference in Pacific Grove, California, March 9-14, 2008.

Glenn Gaudette presented a paper entitled "*A regenerative cardiac bioscaffold provides more mechanical deformation in vitro and in vivo than a commonly used non-regenerative scaffold*" at the 2008 International Conference on Computational & Experimental Engineering and Sciences, held in Honolulu, Hawaii on March 17, 2008. The paper was co-authored by WPI BME graduate students Dan Filipe, Jacques Guyette and Jeremy Skorinko.

Students in the News

Syed Ali '09

Congratulations to Syed Ali '09 who was recently elected as President of the Student Government Association for the 2008 calendar year. Syed, has been involved with the SGA since A-term of his freshman year. At WPI, Syed is majoring in Biomedical Engineering concentrating in biomechanics/tissue engineering/regenerative engineering and hopes to attend medical school upon graduation.



Sumedha Ahuja-Bahri '00

Sumedha Ahuja-Bahri has joined the intellectual property firm of Hamilton, Brook, Smith & Reynolds in Concord, MA as a patent attorney. She is now a third year associate there and focuses her practice on patent prosecution in the medical and mechanical device area.

In addition to her full time job, Sumedha has now also become a stand-up comic. Since September 2006, she has performed a few times at Nick's Comedy Stop and has opened up for Patrice O'Neal at the club Stand Up NY! In New York City. She has also gotten involved in using her comedy for charity organizations. She says her favorite audiences are GEEK audiences because they understand her geeky engineer/lawyer humor!



Amanda Kight Muller '01

Congratulations to Amanda Kight Muller '01, who was recently named the Distinguished New Woman Engineer of the year at the Society of Women Engineers Space Coast section's annual awards banquet. Amanda, who celebrates her one-year anniversary of service with Northrop Grumman in April, is working on the Enhanced Land-Maritime Mode/Affordable Moving Surface Target engagement/Advanced Radar Mode (ELMM/AMSTEI/ARM) upgrade to the joint STARS (surveillance Target Attack Radar System) aircraft.

The new engineer of the year award is based on criteria such as performance; activities in professional, technical, community, or social organizations; residence or work in the area, and fewer than seven years cumulative engineering experience.

