Electrical and Computer Engineering Newsletter – December 2010

Happy Holidays

Dr. Lawrence L. Kazmerski receives 2010 Edward T. Bryand Distinguished EngineeringAward

L-R: John Vetelino, Larry Kazmerski, Dean Dana Humphrey

Dr. Lawrence L. Kazmerski (Kaz) has received the 2010 Edward T. Bryand Distinguished Engineering Award. Dr. Kazmerski is the Executive Director of the Science and Technology Partnerships at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. He received his BS (1967), MS (1968), and PhD (1970) degrees in electrical engineering from the University of Notre Dame (ND). He served in a postdoctoral position at the ND Radiation Research Laboratory from January to August 1971. He then joined the

electrical engineering faculty of the University of Maine (UMaine) where he performed pioneering research on the first thin-film copper-indium-dieselenide (CIS) solar cell. He left UMaine in 1977 and joined NREL where he served as the Director of the Center of Photovoltaics from 1999 to 2008.

Dr. Kazmerski has held adjunct professorships at the University of Colorado, Colorado School of Mines, and the University of Denver and has published over 320 refereed journal papers in the general area of solar cells. In addition, he has authored or edited four books, serves on the editorial board of several journals, and has more than 160 invited presentations at international conferences, workshops, and seminars. He was co-founder and editor of the journal *SOLAR CELLS*, published by Elsevier-Sequoia (1979-1991) and is currently Editor-in-Chief of the Elsevier Journal, *Renewable and Sustainable Energy Reviews*.

For his contributions to science and leadership in technology development, Dr. Kazmerski has received several prestigious awards and has been featured in many newspapers, magazines, and a NOVA TV series. He is a member of the National Academy of Engineering, a Fellow of IEEE and three other organizations. His awards include four R&D 100, Peter Mark Memorial, William R. Cherry, Karl W. Böer Medalist, Nelson W. Taylor, and Charles Greeley Abbot award. He has contributes annually to a fund to build quality academic and research programs in solid state and semiconductors at UMaine. In April 2009, he gave the keynote speech on solar and renewable energy at the Haskell Energy Conference.

Dr. Rosemary Smith - 2010 Ashley S. Campbell Award

Dr. Rosemary Smith, Professor of Electrical and Computer Engineering (ECE) and a member of the Laboratory for Surface Science and Technology (LASST) has received the 2010 Ashley S. Campbell Award. Over the course of her career, Dr. Smith has established herself as a leading researcher and transformed the lives of hundreds of undergraduate and graduate students through her teaching and mentoring.

Rosemary Smith with Dean Humphrey

Dr. Smith has an international reputation and is a world leader in the areas of microsystems engineering, biosensors, and biomedical microdevices. She has been recognized as a Senior Member of the world's largest professional society, the Institute of Electrical and Electronics Engineers (IEEE). The magnitude of her accomplishments in research funding, publications, student advising and scholarship is outstanding. Her recent accomplishments include the design, fabrication, assembly and testing of a microfabricated

instrument which employs silicon microneedles to painlessly extract minute quantities of interstitial fluid from within the skin for biochemical analysis. This technology, which was patented this year, has applications to diabetic glucose monitoring and drug delivery.

Dr. Smith's research covers a wide range of multidisciplinary topics ranging from the development of a microfabricated instrument for high throughput gene sequencing to basic nanomaterials science and technology. She is currently serving as co-PI on the first Ireland-US Partnership grant funded by the NSF to investigate and develop a field-deployable means for the detection of toxin producing algae. With funding from the NSF Nanotechnology in Undergraduate Education (NUE) program, she developed an undergraduate nanotechnology course that includes weekly hands-on laboratory experiences. As part of that project, she established a Micro/Nano Technology Laboratory for the training and education of undergraduate students. Laboratory equipment and facilities were obtained through the combined support of the NSF, industrial donors, the College of Engineering, and the ECE Department.

In addition to her teaching and scholarship, Dr. Smith has made significant contributions to the missions and goals of the University, College of Engineering, and ECE Department. She is currently serving as the Co-Director of the UMaine Institute of Molecular Biophysics, a member of the ECE Graduate Policy Advisory Committee, a member of the executive committee for the NSF SSEI IGERT program and track leader for the Biomedical Engineering track in the Graduate School of Biomedical Sciences. In addition, Dr. Smith frequently participates in recruitment and public relations activities including visiting Maine schools, giving presentations and tours to visitors, and provides student activities for the Expanding Your Horizons, Consider Engineering and Girls Engineer Maine programs.

Distinguished Alumni Inducted into Francis Crowe Society

William G. Stoy (center) was inducted as the Francis Crowe Distinguished Engineer for 2010. Bill graduated in 1967 with an A.S. in Electrical Engineering Technology and in 1971 with a B.S. in Electrical Engineering from the University of Maine. After graduation, he worked at Navy Headquarters in Washington D.C. for 11 years as a Project Manager (PM) developing and deploying Inertial Navigation Systems for Attack Class Submarines. He earned his MSEE in 1977 from Catholic University and pursued advanced studies at George Washington University. For 25 years he was a PM for the National Security Agency (NSA) developing and deploying Intelligence Systems. In his last six years with NSA, Bill served as a PM in England developing the design and construction contacts for buildings with high performance Intelligence Processing Networks and Systems. Bill has also served on the Adjunct

Faculty staff at NSA's National Cryptologic School teaching "Telecommunications Multiplexing and Multimedia Technologies."

In 2009 the William G. Stoy and Judith Kenoyer Stoy Scholarship Fund was set up to provide scholarship assistance to junior or senior students enrolled in Electrical and Computer Engineering with first preference given to students with financial need from Maine with the personal characteristics of persistence, hard work and perseverance.

Graduate Assistant Research Award

Peter Davulis with Dean Humphrey

Peter Davulis, a doctoral student in the Department of Electrical and Computer Engineering has been awarded the 2010 Graduate Assistant Research Award. Peter received his B.S. in Electrical Engineering from the University of Maine, Summa Cum Laude. He received a University of Maine Provost Fellowship in 2006 and a Summer Graduate Research Fellowship in 2008. He also achieved second place in the *Commercialization Potential Contest* of the 2009 Graduate Student Research Exposition.

Under the supervision of Mauricio Pereira da Cunha's, Peter's PhD research has been involved with an extremely interesting and complex research topic of characterization of langatate (LGT) crystals for operation as sensors at very high temperatures (up to 1200^{o}C). The topic constitutes fundamental work of relevance for modern sensor and wireless applications to the automotive, aerospace, energy generation, and petroleum industries. Peter has outstanding skills with hands on work as with academically challenging tasks. He interacted with Oak Ridge National Laboratory researchers, developed software, hardware, and resonant ultrasound spectroscopy test equipment for the extraction of material property constants up to 1100^{o}C, significantly expanding the UMaine capabilities in this area.

Peter is a valuable member of the team working on ECE/LASST US Air Force Research Laboratory project, "Surface Acoustic Wave Sensors for Turbine Engines," for the development of a wireless multi-sensor system for operation in the harsh environment of a jet engine. He has helped to test and characterize the surface acoustic wave temperature sensors, develop the wireless interrogation, and integrate the components into a working sensor system.

Peter has published 3 peer-reviewed journal publications, 9 international conference papers, and is in the process of submitting 3 additional peer-reviewed manuscripts. He has also contributed significantly to the research work that led to a UMaine patent application. In addition to all these activities, Peter has been a teaching assistant for the demanding Fields and Waves course (ECE351) for the last 4 years.

Crash Test Dummies to Aid UM Research

Crash test dummies are coming to the University of Maine to assist in the testing of products designed to reduce head injuries. A $533,000 grant from the Maine Technology Asset Fund through the Maine Technology Institute will allow UMaine over the next year to create a Biomechanics Laboratory for Injury Reduction and Rehabilitation within the College of Engineering's Mechanical Engineering Department.

The Advanced Manufacturing Center on campus will undergo minor renovation to accommodate the lab, which will help test and evaluate injury-reduction, repair and rehabilitation equipment under development by several small Maine companies. State-of-the-art crash test dummies will be used for impact and vibrations tests to determine which new protective materials work best in reducing head trauma. In addition, the design, development and commercialization of a robotic exoskeletal rowing machine for people with disabilities or in rehabilitation is another objective planned (full story).

UMaine co-researchers include Vincent Caccese, Ashish Deshpande and Mohsen Shahinpoor of the Mechanical Engineering Department, Elizabeth Depoy and Stephen Gilson of the Center for Community Inclusion and Disability Studies, and Richard Eason of the Electrical and Computer Engineering Department.

Girls Scouts Explore UMaine Engineering

On Saturday, Nov. 6 over 90 girl scouts from around the state participated in workshops to get some engineering experience and to learn more about a career in engineering. Dr. Rosemary Smith helped a group of young girls assemble blinking LED lamps in the Electrical Engineering laboratory. The girls toured the engineering facilities at UMaine and took part in projects, learning more about the different disciplines that come under the broad umbrella of this male-dominated profession (story)

Publications

Peer Reviewed Publications

P. Spinney, D. Howitt, **R. Smith**, "Nanopore Formation by Low-energy Focused Electron Beam Machining," Nanotechnology, Vol. 21, Issue 37 Art. Num. 375301, Sept. 2010.

J. Duy, L. Connell, W. Eck, **R. Smith**, “Preparation of Surfactant-Stabilized Gold Nanoparticle-Peptide Nucleic Acid Conjugates,” Journal of Nanoparticle Research, Vol. 12, Issue 7, pgs. 2363-2369, Sept. 2010.

R. Smith, C. Demers, S. Collins, “Microfluidic Device for the Combinatorial Application and Maintenance of Dynamically Imposed Diffusional Gradients,” Microfluidics and Nanofluidics, Vol. 9, Issue 4-5, pgs. 613-622, Oct. 2010.

Peer Reviewed Conference Proceedings

J. Vetelino, "Liquid Level Torsional Waveguide Sensor," 2010 IEEE Ultrasonics Symposium, San Diego, CA, Oct. 11-14, 2010 (in press) (Co-authored with W. Spratt and L. Lynnworth).

J. Vetelino, "A Lateral Field Excited Sensor," 2010 IEEE Ultrasonics Symposium, San Diego, CA, Oct. 11-14, 2010 (Invited Paper) (in press).

J. Vetelino, "Detection of Peroxide Based Explosives Utilizing a Lateral Field Excited Acoustic Wave Sensor," 2010 IEEE Ultrasonics Symposium, San Diego, CA, Oct. 11-14, 2010 (in press) (Co-authored with W. Duy, T. Mlsna, B. Hackett, and D. Neivandt).

J. Vetelino, "Lateral Field Excited LiTaO3 Acoustic Wave Sensing Platform," 2010 IEEE Ultrasonics Symposium, San Diego, CA, Oct. 11-14, 2010, (in press) (Co-authored with D. McCann and J. McGann).

J. Vetelino, "A Lateral Field Excited Acoustic Sensor Array," 2010 IEEE Ultrasonics Symposium, San Diego, CA, Oct. 11-14, 2010 (in press) (Co-authored with S. Winters and G. Bernhardt).

J. Chen, **A. Abedi**, “A Hybrid Framework for Radio Localization in Broadband Wireless Systems,” Proceedings of the IEEE Global Communications Conference (Globecom’10), Dec. 2010, Miami, FL.

Gifts/Donations

Raymond Spooner $500 to Allison Whitney Fund, August 31
Raymond and Hannah Whitney, $11,000 to Allison Whitney Fund, August 3
Richard and Mary Anne Eason, $200 to Allison Whitney Fund, Sept. 16
Maurice P. Kenney, $100, Oct. 5
Christopher Foran, $150, Oct. 8
Ronald Gould, $50, Oct. 8
GE Matching Gift Center, (Gladys M. & Lloyd Palmer Fund) $1,500, Oct. 13
Kepware, $5,500 for scholarhips, Oct. 14
Glen Riley, $100, Oct. 18
Fred and Sally Irons, $1,000, Oct. 20

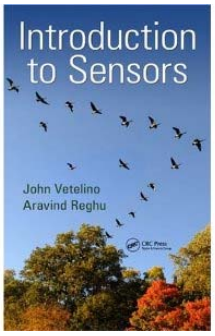
Michael J. Regan, $50, Oct. 25
Analog Devices $26,500.00 for 2010-11 scholarships, Nov. 4
Martin and Cynthia Troy $100.00, Nov. 19
William & Judy Stoy, $500, November 26
Maine Community Foundation, $75,000 for Smart Grid Laboratory, Nov. 29
Bill Lambert, $15,000, Dec. 1

Job Openings

We are including a new section in our newsletter to link our readers to job announcements for those who already have experience. When these opportunities come our way we will post them here. Please see the link below for a recent job opening.

https://jobs-woodardcurran.icims.com/jobs/1637/job

Other



"Introduction to Sensors," book written by John Vetelino and co-authored by Aravind Reghu, was published by Taylor & Francis/CRC Press, Boca Raton, Florida (Aug. 2010). The book is being sold worldwide.

John Vetelino and Mauricio Pereira da Cunha attended the 2010 IEEE Ultrasonics Symposium in San Diego, California from October 11-14. Dr. Vetelino presented five papers (one invited). At this conference, Dr. Vetelino was formally recognized as an IEEE Fellow.

Since October the faculty have submitted two proposals for a total of about $1, 176,000.

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