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Novel Biomedical Signal Processing Techniques

Date/Time: Thursday, January 19, 2006, 11:45 AM - 1:00 PM

Speaker: Dennis Bahr, P.E., President and CEO, Bahr Management, Inc.

Location: Rocky Rococo's Pizza, 7952 Tree Lane (Madison Beltline Hwy. at Mineral Pt. Rd.), 608.829.1444

Menu: Pizza buffet, salad and soft drinks (cost \$10.00, free for student members)

RSVP: by January 16th to Les Schroeder via e-mail (l.schroeder@ieee.org) or call 608.444.9144

Non-member guests are always welcome!

Auscultatory blood pressure measurement uses the presence and absence of acoustic pulses generated by an artery (i.e., Korotkoff sound), detected with a stethoscope or a sensitive microphone, to non-invasively estimate systolic and diastolic pressures. Unfortunately, in high noise situations, such as ambulatory environments or when the patient moves moderately, the current auscultatory blood pressure method is unreliable, if at all possible. Empirical evidence suggests that the pulse beneath an artery occlusion travels relatively slow compared with the speed of sound. By placing two microphones along the bicep muscle near the brachial artery under the occlusion cuff, a similar blood pressure pulse appears in the two microphones with a relative time delay. The acoustic noise, on the other hand, appears in both microphones simultaneously. The contribution of this new technique is to utilize this phenomenon by filtering the microphone waveforms to create spatially narrowband information signals. With a narrowband signal, the microphone signal phasing information is adequate for distinguishing between acoustic noise and the blood pressure pulse. By choosing the microphone spacing correctly, processing of the two signals will enhance the information signal and cancel the noise signal.

The photoplethysmographic signals acquired during pulse oximetry can be compromised in many ways. Intrapartum fetal pulse oximetry in particular presents challenges to signal processing. Period domain analysis can overcome the low pulsatile amplitudes, noise, and maternal modulation found in these signals. The efficiency of an incremental algorithm reduces the processing requirements for period domain analysis, facilitating use in low-power and portable devices.

Mr. Dennis Bahr, PE was instrumental in starting nine companies in the Madison and Milwaukee area. During his tenure with these companies he was involved in corporate management, team management, technology transfer, and raising capital. He is presently active in one of these companies (Bahr Management, Inc.) as it's President and CEO. Bahr Management owns portions of the other companies that Mr. Bahr is still involved with.

Mr. Bahr holds a BS degree in Electrical Engineering and an MS degree in Electrical and Biomedical Engineering from the University of Wisconsin and is an Licensed Professional Engineer in the State of Wisconsin. He was an Adjunct Professor in the Electrical and Computer Engineering Department at the University of Wisconsin in Madison where he taught courses in logic design and advanced digital design.

Mr. Bahr is an Associate Fellow of the American Institute of Aeronautics and Astronautics and the past Chairperson of the Wisconsin Section. He is a Senior Member of the Institute of Electrical and Electronics Engineers and is the past Chairperson of the Madison Section. He is also a member of Sigma XI, the scientific research society. Mr. Bahr has written twenty (20) papers, a chapter for a book on biomedical instrumentation, and holds ten (10) US patents with one (1) additional US patent pending.

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21st Century Electric Transmission Infrastructure Analyzed in IEEE-USA eBook

WASHINGTON (15 December 2005) -- The "vital American energy infrastructure" will "deteriorate before our eyes" unless economists, engineers and policy specialists resolve "a raging battle" among market pressures, technical necessities and policy priorities, according to Patrick E. Meyer, author of a new IEEE-USA eBook. Titled "The Reliability of the Electric Transmission Infrastructure in the 21st Century, An Analysis of "The Energy Policy Act of 2005,"" the eBook provides a detailed discussion of the key provisions of the first comprehensive U.S. energy bill signed into law since 1992.

The 60-page document analyzes the legislation as it addresses tax benefits for traditional and alternative fuel sources, offshore drilling and Alaska development, nuclear energy, Daylight Savings, alternative fuels, energy efficiency, and electricity market reform. The eBook also provides a detailed summary of Title XII of the legislation, which covers the American electricity sector. In multiple tables, the publication summarizes important electricity sector-related action dates.

In addition, the eBook provides background on which U.S. congressional body supported each of the contending issues in the Electricity Title XII, including sections covering electric reliability standards, siting of interstate electric transmission facilities, third-party finance, advanced transmission technologies, funding new interconnection and transmission upgrades, market transparency rules, sanctity of contract and electric utility mergers.

The "vital American energy infrastructure" will "deteriorate before our eyes"...

Finally, the publication identifies IEEE-USA priority issues on current and future energy policy affecting advanced transmission technologies, development of advanced nuclear power, hybrid-electric vehicles and electric transportation, and renewable energy technologies. According to Meyer, the eBook author, further input from professional societies, including the IEEE, and others, will be crucial as the legislation is implemented.

Still pending are final rules on Electric Reliability Organization implementation and reliability standards, an inventory report on renewable energy resources, a study on the future location of national interest electric transmission corridors, and a report on demand-response resources and advanced electricity metering.

Patrick Meyer is a graduate student in public policy at the Rochester Institute of Technology and was an energy intern at IEEE-USA in Washington during the summer of 2005.

To order the new eBook: IEEE members pay a special discounted price of \$4.95; non-members pay \$19.95.

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world bytes: Thoughts That Inspire

by Terrance Malkinson

A Thought to Chew On

One of the unique features of writing is that the words and images endure forever; outliving the author and carried forward to generations unborn. The two-volume book *Thoughts That Inspire* by George H. Knox and published in 1912 provides a collection of inspiring thoughts from, as stated in the introduction, "the grandest men and women who ever lived." Reprinted below is one of the many gems, as published on page 148 in Volume 1.

Success

"What is the secret of Success?" asked the Sphinx.

Push, said the button.

Take pains, said the window.

Never be led, said the pencil.

Always keep cool, said the ice.

Be up-to-date, said the calendar.

Do business on tick, said the clock.

Never lose your head, said the barrel.

Do a driving business, said the hammer.

Aspire to greater things, said the nutmeg.

Never do anything offhand, said the glove.

Be sharp in all your dealings, said the knife.

Trust to your stars for success, said the night.

Find a good thing and stick to it, said the glue.

Spend much time in reflection, said the mirror.

Strive to make a good impression, said the seal.

Turn all things to your advantage, said the lathe.

Make much of small things, said the microscope.

Get a good pull with the ring, said the door-bell.

Never take sides, but be round when you're wanted, said the bell.

Make the most of your good points, said the compass.

— The Segnogram

Best wishes for the festive season from World Bytes.

Terrance Malkinson is a proposal manager/documentation specialist; an elected Senator of the University of Calgary; an elected Governor of the Engineering Management Society; international correspondent for IEEE-USA Today's Engineer Online; editor-in-chief of IEEE-USA Today's Engineer Digest; editor of the IEEE Engineering Management Society Newsletter; and editor of IEEE Canadian Review. He can be reached at todaysengineer@ieee.org.

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Proprietary Computer Programs to Solve the Most Complex EMC Issues

As part of the curriculum in Donald Sweeney and Roger Swanberg's EMC Practical Applications Seminar/Workshop students will use, and then take home, a copy of the computer program designed by the instructors. It addresses design considerations from component level,

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Submitted by Marilyn Sweeney D.L.S. Electronic Systems, Inc. 1250 Peterson Drive Wheeling, IL 60090 847-537-6400



IEEE Madison Section Election Results

The annual officer elections for the IEEE Madison Section were held at the December 15th, 2005 monthly meeting. The slate of candidates was elected unanimously. Congratulations to the new officers for 2006:

Chair: Mitchell Bradt
 Vice-Chair: Ken Hartman
 Secretary: Les Schroeder
 Treasurer: John Hicks
 Mem. at Large: Tom Yager
 Mem. at Large: Clark Johnson



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*IEEE Madison Section
 Election Results*

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