

• Upcoming Events

• IEEE Signal Processing Society Distinguished Lecturer Series



- Date: 11:45 AM Friday, March 14th, 2014
- Speaker: Dr. V. John Mathews of The University of Utah
- Location: Promega BioPharmaceutical Technology Center Room Number: 122 5445 E Cheryl Pkwy Fitchburg, Wisconsin

Note: Meeting is **FRIDAY**.

Topic: Restoration of Motor Skills in Patients with Disorders of the Central Nervous System

Recent technological innovations such as functional neural stimulation (FNS) offer considerable benefits to paralyzed individuals. FNS can produce movement in paralyzed muscles by the application of electrical stimuli to the nerves innervating the muscles. The first part of this talk will describe how smooth muscle movements can be evoked using Utah slanted electrode arrays (USEAs) inserted into the motor nerves of the peripheral nervous system. The standard 4 x 4 mm USEAs contain 100 electrodes of varying lengths. Implantation of a USEA in a peripheral nerve allows highly selective electrical access to individual and small groups of axons. We will review approaches for designing asynchronously interleaved stimulation signals applied via individual electrodes in the arrays to evoke smooth, fatigue-resistant force that closely resembles normal motor function. The second part of this talk will describe efforts to decode cortical surface potentials, recorded with dense grids of microelectrodes. Decoding human intent from neural signals is a critical component of brain-computer interfaces. This information can then be used to control the muscles in tasks involving restoration of motor skills or to control a robot that performs desired tasks. We will discuss recent work on decoding neural data collected from patients implanted with microelectrode arrays. The talk will conclude with a discussion of some of the current research challenges in this area.

Biography: Dr. V. John Mathews is a Professor of Electrical and Computer Engineering at the University of Utah. His research interests are in nonlinear and adaptive signal processing and application of signal processing techniques in audio and communication systems, biomedical engineering, and structural health management. He chaired the department of Electrical and Computer Engineering at the University of Utah during 1999-2003. Dr. Mathews is a Fellow of IEEE. He served as the Vice President (Finance) of the IEEE Signal Processing Society during 2003-2005 and the Vice President (Conferences) of the Society during 2009-2011. He is a past associate editor of the IEEE Transactions on Signal Processing, and the IEEE Signal Processing Letters and the IEEE Journal of Selected Topics in Signal Processing and currently serves on the editorial board of the IEEE Signal Processing Magazine. He was a recipient of the 2008-09 Distinguished Alumnus Award from the National Institute of Technology, Tiruchirappalli, India, and the Utah Engineers Council's Engineer of the Year Award in 2011. He serves now as a Distinguished Lecturer of the IEEE Signal Processing Society for 2013 and 2014.

• Section News

Chris Latimer Talk Review (Provided by Tom Kaminski):

Chris discussed his research on understanding how anthropogenic factors affect the behavior, energetics and survival of wildlife. He has installed RFID tracking devices on a number of bird feeders in both populated and unpopulated areas around the Madison area. He utilized tiny RFID devices that were attached to the legs of wintering birds in the area. The tiny devices had to be a small fraction of the weight of the birds, no small feat for chickadees weighing about 15 grams. Under the assumption that one RFID tag hit represented a single seed removed to a surrounding tree to eat, he could estimate the caloric intake for the bird and relate it to survival. He also reported on similar studies that identified social cliques among wintering birds. Chris's talk highlighted technology that is now commonly applied to wildlife studies and made it clear that the use of technology will increase in the future.

Distinguished Lecturer Visit

Dr. V. John Mathews' visit on March 14th is an opportunity for those Madison IEEE Section members interested in his research. His lecture in Madison is the last stop on a tour that includes Minneapolis and Rochester, Minnesota and Ames and Iowa City, Iowa. Because of his travel schedule, the meeting is the second **FRIDAY**, not our usual third-Thursday of the month. Dr. Mathews' lecture series is in part sponsored by the IEEE Signal Processing Society through its Distinguished Lecturer Series. His visit also coincides with a visit from Alkesh Patel, IEEE Region 4 Central Area Chair. Alkesh will be joining us at the meeting to learn about the IEEE Madison Section and to help us with IEEE Section management. Alkesh has been an active member and officer for the IEEE Rock River Section adjacent to our southern border.

IEEE-Madison Section Connections

The IEEE-Madison Section has been approached by INCOSE ([Link Here](#)), the International Council on Systems Engineering, Chicagoland Chapter to participate in joint activities. According to the web site, their mission is "to share, promote and advance the best of systems engineering from across the globe for the benefit of humanity and the planet". According to INCOSE members, the potential IEEE Societies of common interest are Aerospace and Electronic Systems, Circuits and Systems, Control Systems,

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• Regular Meetings

◦ Section Meetings

The third Thursday of January through May and September through December is reserved for a meeting to provide recent research, developments, trends and/or innovations in one of our membership's technical areas.

◦ IEEE-MSN-ECN Networking Meetings

- Purpose: Presentations, Discussions, networking
- Date: First Thursday of even-numbered months
- Time: 11:45 AM to 1:00 PM
- Location: Sector67, 2100 Winnebago Street (East Side of Madison)
- Parking: Park in lot or on Winnebago Street.
- Process: Members are encouraged to make introductions, describe endeavors, and make request for: contacts in target companies, needs, resources.
- Contact: For assistance, call Tim Chapman 2 0 6 - 2 5 7 0

• Membership Upgrades

Those interested in upgrading their IEEE membership level should send their resumes or other information showing five years of significant performance in an IEEE-designated field to Charles J Gervasi (cj@cervasi.com). Madison Section Board will attempt to find Senior IEEE members knowledgeable in the applicants area of practice who may be able to provide references. You are invited to attend the informal networking portion of the monthly Section meetings (starting at 11:30am) to meet the Section Board members and discuss intentions.

• About IEEE

The Institute of Electrical and Electronics Engineers or IEEE (read I-Triple-E) is an international non-profit, professional organization dedicated to advancing technology innovation and excellence for the betterment of humanity. IEEE and its members inspire a global community through IEEE's highly cited publications, conferences, technology standards, and professional and educational activities. It has the most members of any technical professional organization in the world, with more than 300,000 members in around 150 countries. The IEEE consists of 38 societies, organized around specialized technical fields, with more than 300 local organizations that hold regular meetings. For more information, please visit: IEEE.ORG

• Madison IEEE Section

The IEEE-Madison Section of the IEEE is a section in Region 4 of the IEEE-USA organized to serve IEEE members in the Madison, WI area with over 600 members. The 2014 Officers and Board Members are Tom Kaminski - Chair, Steve Shultheis, Vice Chair, Charles Gervasi - Treasurer, Brandon Zemlo - Secretary, Timothy Chapman - Webmaster, Tom Kaminski - ECN Chair, Members at Large: Mitch Bradt, Clark Johnson, Dennis Bahr, Craig Heilman, Sandy Rotter.

• Job Openings

Check out WIEES.com for electrical engineering jobs in Madison and the surrounding region. This site is maintained as a service for electrical engineers. Jobs are displayed starting with the most recent postings first. You can filter results by location and job type. If you are hiring an electrical engineer in our area, for full-time or contract work, you can post the job in the *Contact Us* section on the WIEES.com site. Here is a sampling of the new job listings:

- Embedded Hardware Engineer in Neenah
- Senior Software Engineer and Electrical Project Engineer in the Chicago area
- A Hardware EE and Embedded Engineer in Madison
- RF Engineer in the Chicago Area

• Contact Us

The IEEE-Madison Section has a number of volunteer positions open if you are interested in helping out. Please direct any questions or comments to Tom Kaminski via email to tjkaminski-at-ieee.org.

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