Madison Section Newsletter

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Upcoming Events

RFIDs for the Birds

- Date: 11:45 AM Tuesday, February 20th, 2014
- Speaker: Chris Latimer
- Location: Promega Bio Pharmaceutical Technology Center
  Room Number: 122
  5445 E Cheryl Pkwy
  Fitchburg, Wisconsin
- To sign up for this meeting, click here.

Topic: Radio-frequency identification technologies in ecological studies.

Radio frequency identification (RFID) technologies were first developed in the mid-to late 1930's for specific military applications. Advances in engineering and manufacturing throughout the years have lowered the cost and size of RFID transmitters, making them available to an array of applications in a variety of industries. Today, RFID is commonly used in pharmaceutical, automobile and shopping industries, with increasing applications in environmental monitoring and ecological studies. Mr. Latimer will present a brief history of RFID and how it works, followed by a discussion about RFID use in ecological studies. Then he will present a case study of ongoing research using RFID to monitor behavior and survival of wintering birds in Wisconsin, and finally, provide some insight into future directions for RFID applications in ecological research.

Chris Latimer is a Ph.D. student in the wildlife ecology program and the University of Wisconsin-Madison. His research interests include: understanding how anthropogenic factors affect the behavior, energetics and survival of wildlife, and technological applications in tracking and monitoring wildlife populations. His dissertation work involves using RFID technologies to determine how the interaction between land-cover and weather influence the foraging behaviors and survival of wintering birds in Wisconsin.

IEEE Signal Processing Society Distinguished Lecturer Series

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

Note: *Day 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 Fe llow 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

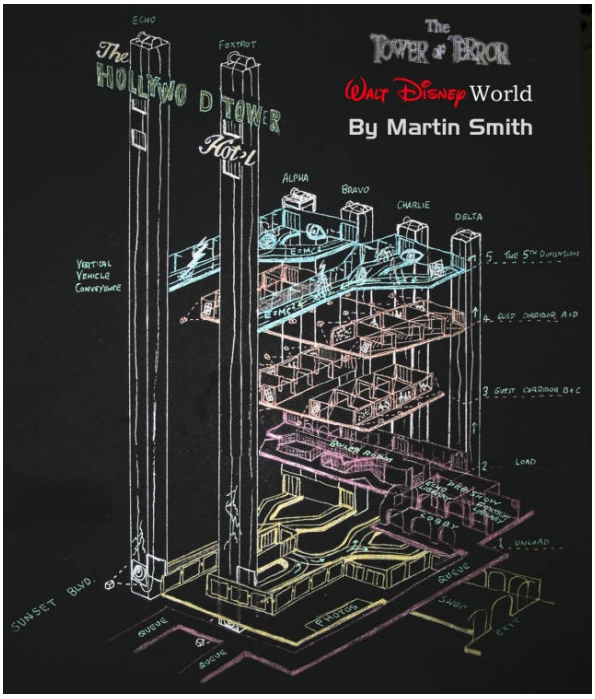
associate editor of the IEEE Transactions on Signal Processing, and the IEEE Signal Processing Letters and the IEEE Journal of Selected Topics in Signal Processing and currently serves on the editorial board of the IEEE Signal Processing Magazine. He was a recipient of the 2008-09 Distinguished Alumnus 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

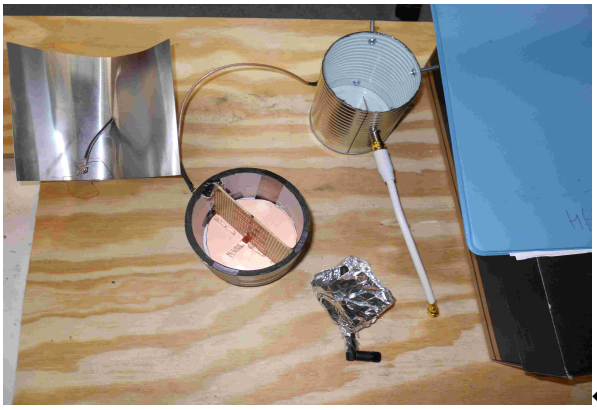
Eric Rosenthal Talk Review (Provided by Charles Gervasi):

This excellent talk informed the attendees about the "Magic" of Disney Engineering. He explained how Disney attractions begin with storyboard drawings posted around a room. The creative team collaboratively identifies which ideas are the best. People whose ideas were abandoned would enthusiastically work on the ideas that were adopted.   The work on the attractions involved creative custom solutions that resulted in a series of funny engineering anecdotes which he shared with us. When he worked on the Alien Encounter attraction, his first task was to make the attraction less scary because people could not follow the story over the audience screaming. They got rid of a large electrical arcing display and installed “butt thumpers” and moving whiskers to brush against the audiences legs. They configured speakers to give the audience the impression the alien was walking nearby. They designed a device to emit an “alien smell” when the the alien sounded like it was nearby. The device emitted a freshener that eliminated the smell as soon as the alien walked away. He worked on an Indiana Jones ride that used 600W subwoofers to give the audience the impression of a huge rolling ball. People were reporting vibrations in homes miles away. They had to reduce the power by 10dB.

In another project, he worked on a ride with a large power requirement. The design involved 11kV lines going to a transformer on the roof to step it down to 480V. Noise was coupling from the power lines to the communication system, which as a fail-safe shuts down the entire attraction if communication is interrupted. The shielding on the power lines was ineffective because the electrical conduit that appeared as steel on the drawing was actually PVC to accommodate Florida’s high water table. Reinstalling power through steel conduit solved the problem. When he was working on a 42nd Street New York ABC TV studio, contractors installed soundproofing over electrical outlets. He believes they did this on purpose, hoping to get paid to remove it, find the outlets, and re-install it. To find the outlet locations, he got a helium tank from a party store and connected it to the electrical conduit, forcing the gas out the electrical boxes. Then he went around with an in expensive helium detector to find the locations of the outlets. The idea we came away with is that show business engineering projects are unique in that they have a very large budgets, strict schedules, and subjective design requirements that are evaluated by executives with a creative non-technical mindset. For a copy of the talk slides, click here (Warning: 12MBytes!)

- **Badger Science Olympiad Event:** (Reviewed by Tom Kaminski) On January 17th and 18th, members of the IEEE-Madison Chapter helped with several Badger Invitational Science Olympiad events.   The Invitational provides an opportunity for middle and high-school teams to test their Science mettle and practice for sanctioned events of the national Science Olympiad. The event was hosted on the UW-Madison campus, mostly at Union South and on the College of Engineering campus. For one event, the RadioLab, students attended a lecture on Friday and took an exam on Saturday. Also the students had to build anten nas for the 2.4GHz radio band.   IEEE-Madison members Charles Gervasi, Craig Heilman, Robb Peebles and San Rotter helped organize and run the event. RadioLaB is a Wisconsin-only event, but it is proposed to be nationally sanctioned.   This represents an excellent opportunity to make the IEEE known nationally. Another event, CircuitLab, was organized at the last minute by IEEE-Madison members when the event coordinator had a family emergency. Tom Kaminski and John Lombardo developed, printed and graded a pretty tough test covering basic circuit and electrical theory. They were surprised when one team got a perfect score on the test.

- ## Regular Meetings

  - ### Section Meetings

    The third Thursday of Jan - May and Sep - Dec. 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@cgervasi.com). Madison Section Board will attempt to find Senior IEEE members knowledgeable in the applicant's 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 2013 Officers and Board Members are Tom Kaminski - Chair, Charles Gervasi - Treasurer, Kevin Schoeneck - Secretary, Timothy Chapman - Webmaster, Tom Kaminski - ECN Chair, Members at Large: Mitch Bradt, Clark Johnson, Dennis Bahr, Craig Heilman, Sandy Rotter, Steve Schultheis.

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.

Contact Us

Please direct any questions or comments to Tom Kaminski via email to tjkaminski-at-ieee.org.

The IEEE Madison Section Newsletter Published 9 times per year (Jan-May, Sep-Dec) by the Madison, Wisconsin Section of the Institute of Electrical and Electronic Engineers (IEEE), for its members in South-Central Wisconsin. Online at http://ieee-msn.truenym.net/ For address changes: notify IEEE headquarters at: http://www.ieee.org/ or address-change@ieee.org . Editorial or comments contact: Tom Kaminski <tjkaminski at ieee.org>.