IEEE

Madison Section Newsletter

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Upcoming Events

November LMAG Meeting “Software Defined Radio”

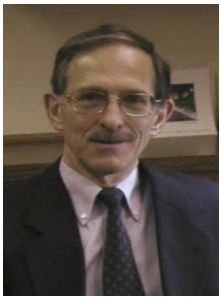
- Thursday November 5th, 2015, **11:30 AM**
- Lecturer: Tom Kaminski
- Location:Madison Central Library,
  1st Floor Conference Room (104)
  201 W Mifflin St Madison, WI
  Madison, WI 53703
- Time: 11:30 AM to 12:55 PM
- Bring your own lunch. Free beverages and cookies will be available.
- Please Register at the IEEE Madison Section event page

Talk: Software Defined Radio (SDR) technology replaces the traditional radio hardware systems with hardware and software that uses Digital Signal Processing techniques to both transmit and receive radio signals. In the past, SDR technology was primarily used for complex military radio and radar systems, but with the advent of cellular phones and the high-volume RF components used in them, the technique is now in widespread use. Today, inexpensive ($20) USB dongles, designed to receive the DVB digital TV video broadcast signals, incorporate a front end receiver and an In-Phase and Quadrature Analog to digital converter. When used with a laptop, DVB-USB dongles utilize SDR to implement a wide range of products. Tom will discuss some of the theory and will demonstrate available open-source software that runs on laptops, phones, and even small-systems like the RaspberryPi allowing you to experiment with SDR. He will show how you can develop your own radio receivers using Gnu Radio Companion — a graphical drag-and-drop front end to SDR systems. Also radio direction finding work being done with UW students will be presented. Are you using SDR in your systems today? Bring them for show-and-tell!

Bio: Tom is a retired instructor of Automation and Robotics at Madison College and is currently Treasurer of the IEEE Madison Section. He has a BSEE From Worcester Polytechnic Institute, a MSEE from the University of Michigan, and additional graduate education toward a PhD at the University of Wisconsin, Madison. Tom is also an Extra Class ham, WT9E.

November EMB018 Meeting “OSTEOPROSIS: The Road To Discovery”

- Wednesday, November 11th, 11:45 AM
- Speaker: Dr. Everett Smith, PhD, Associate Professor Emeritus, UW-Madison
- Details: Lecture and Pizza and Beverage
- Fee: Free
- Joint meeting of IEEE-Madison Section and EMB018 Society



- Location:
  Tong Auditorium
  Engineering Centers
  Building
  1550 Engineering Drive
  Madison, WI 53706
- Please Register at the IEEE-Madison event page.

Talk:
Osteoporosis is a major public health problem in the elderly, manifested by the presence of low bone mineral density, lessened skeletal integrity and an increased risk of fractures. Loss of skeletal integrity is multifactorial. These factors include human genetics, diet, exercise, bed rest, weightlessness, cellular sensation of internal and external environmental forces, disease, and the aging process. The skeleton has two major functions in the body: it provides structural support and serves as a mineral reservoir. The strength of the structural support is dependent on a homeostatic balance of the systemic and local bone modulators, mechanical loading and nutrition. Changes in any one of these components, common in the elderly, can influence the modulation of systemic and local factors in bone turnover or cause a modulation in the sensitivity (set point) of bone to mechanical loading. The road to discovery in our research is to investigate ex vivo bone core response to induced mechanical loads and known biochemical modulators of bone turnover. We have developed the Perfusion Loading System to apply consistent, measurable loads to trabecular bone cores. The techniques for bone core collection have been standardized for orientation, size +/- 2um, and for sterility. The perfusion media flow rate, and flow pattern have been shown to be adequate to maintain cell viability for at least 31 days. In studies up to 60 days in length we have observed active osteoblasts, osteoid, and multiple osteoclasts in Howships lacunae. In preliminary studies, we have shown similar bone mineralization patterns in human cores through 35 days and bovine cores at 4 days, and have chosen to use bovine bone samples because healthy tissue is more readily available. Further we have seen evidence to suggest that PGE2 levels transiently increase in response to loading and that the magnitude of the response increases with days loaded.

Bio: Dr. Smith is an Associate Professor Emeritus at the UW-Madison Department of Preventative Medicine. He has been a Fellow, American College of Sports Medicine since 1978, was elected Associate Fellow, American Academy of Physical Educators in 1986. In 1985, he was given an award from the Association of American Publishers, Professional and Scholarly Publishing Division, for the 1985 Best Single Issue, for Topics in Geriatric Rehabilitation as issue editor. He was a member of the FICSIT trial Monitoring Board from 1991-1993. In addition, he is or was on the Editorial Board of Topics in Geriatric Rehabilitation, Calcified Tissue International, and Journal of Aging and Physical Activity. He has been a referee for Medicine and Science in Sports and Exercise, Journal of Bone Mineral Research, Bone, Osteoporosis International, Journal of Applied Physiology, Journal of Gerontology, Physician and Sports medicine. His activities include President, National Institute of Biogerontology 1980-2007 and Director Biogerontology Laboratory University of Wisconsin 1975-present. In addition to his extensive research, Dr. Smith is President/CEO of Regin B&C Bioengineering from 2008-present.

Section News

Review of September and October Events

IEEE

Madison Life Member Affinity Group Tours Epic Systems: On September 26, the Life Members Affinity Group, Madison Section members and guests toured Epic Systems in Verona, Wisconsin. Before the tour, everyone socialized in the reception area of the Andromeda building. Chuck Kime presented an introduction including facts about Epic, tour guidelines and particularly interesting features of the upcoming tour. There were brief comments on the election of Life Member Affinity Group officers for 2016 (See “Elections” below for more details). ??Chuck Cowie led the one and-a-half tour through the Central Park campus, consisting of four buildings connected by tunnels and skyways, and the outdoor Central Park. The tour featured the themes of each of the buildings and the park including architecture, art and unusual fun features, such as a slide and swings, supporting the themes. The tour route was planned to include views to the outside of much of the rest of the Epic Campus including a two megawatt solar PV array and construction of two additional new themed campuses plus a large new cafeteria.

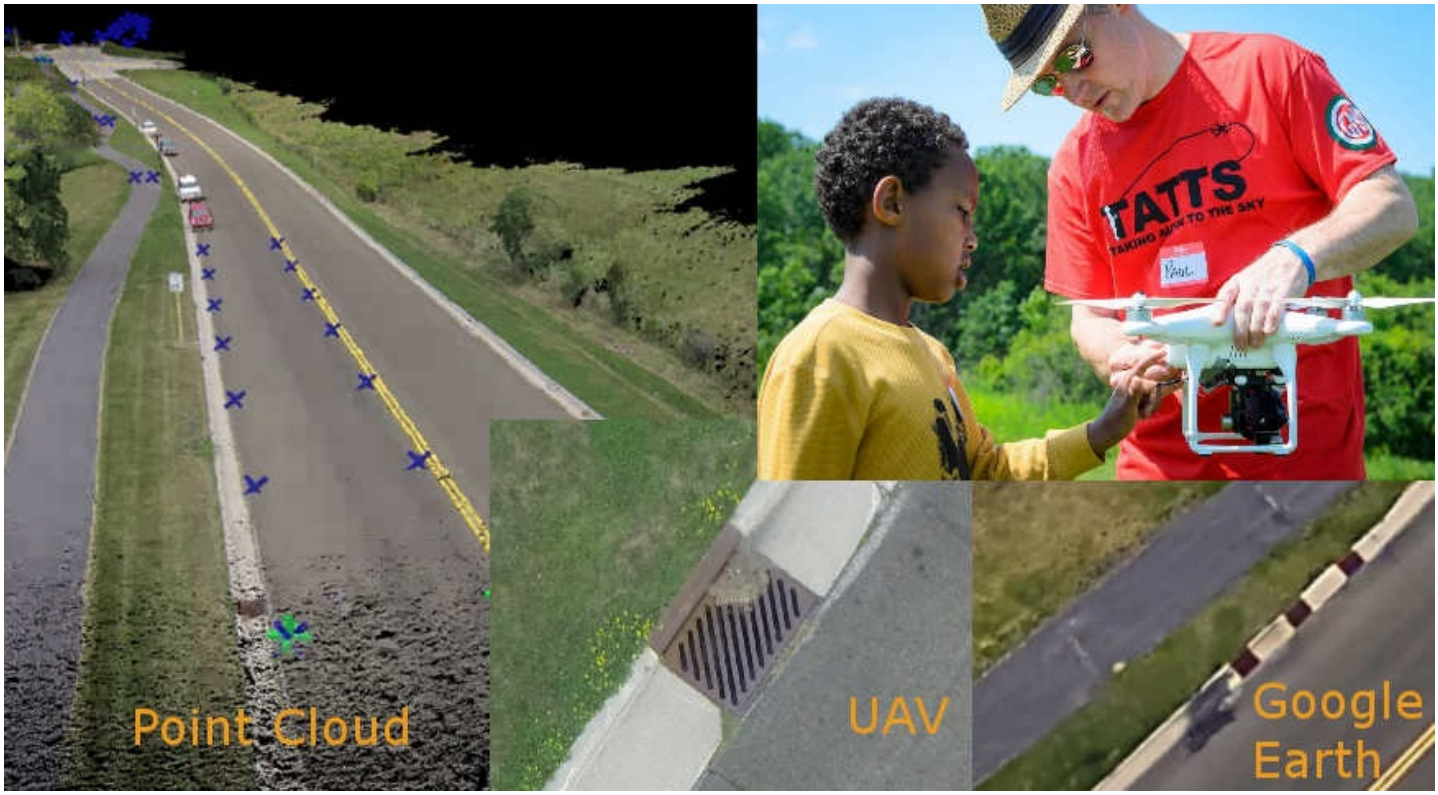
Photo: LMAG Epic Tour group gathering in the Andromeda Sunroom

October ECN Meeting: Patrick Steinnon of Stiennon & Stiennon presented a wealth of material about intellectual property and patent issues from the perspective of both a patent attorney and an engineer with patents. He also touched on the rising incidence of patent trolls or “non-practicing entities”. Is WARF a patent Troll? Not in most people’s interpretation. He also included a large number of on-line references for us to use. You can access those Patent Links online HERE.

October Section Meeting: The Challenges and Opportunities Using UAS Imagery: Paul Braun’s talk to our section on Oct 15 focused on practical aspects of geospatial mapping using unmanned aerial systems (UASs). Image resolution from UAS photography is much better than satellite image resolution. Recording images from a camera mounted on a UAS is not trivial because the wind changes the orientation of the UAS. Image processing software cannot compensate for the camera changing orientation with the wind. High-end UASs have gimbals to keep the camera pointed straight down. A UAS can be fitted with a laser imaging device that produces a “point cloud” of locations. It sends short duration laser pulses and works out the distances by the time of the returns. If the width of the beam is larger than the object it hits, there can be several returns at different times. The resolution is in the tenth of a foot range. The composite picture below shows the difference in resolution that a UAV can produce compared to a UAV at low altitude and shows the “point cloud” 3D model with overlaid color that can be produced with UAVs. Typical flights are ten minutes long, limited by battery capacity. 2GB of data per minute is typically saved. The desire for longer flight times may drive battery development. One of our members asked if this technology will make airplane-based photography obsolete. Braun says it may one day in the future but no time soon.

Braun showed us a photograph of a partially collapsed bridge. A UAS was able to fly right beside the failure point and photograph it at close range, something that would be impossible or very risky without a UAS. For one application they modify a camera to display near IR. The images can be used for agriculture / vegetation analysis. Subtle changes in the type or health of crops appear clearly in the near-IR image. Having this information allows for more surgical use of pesticides and fertilizer. Clients usually request high-resolution imaging and later select lower resolution to save money. One client specifically asked for lower resolution because they didn’t time to review all the images and didn’t want someone to discover after a failure that there were high resolution images that showed the problem if only someone had reviewed them. As this technology becomes more common, not having access to high-resolution images will no longer be an excuse for missing safety hazards.

At the end of the talk Braun showed us pictures of a non-profit organization called Taking Autism to the Sky (TATTS). It does projects with autistic children, in which they build and use UAS. Often people on the autism spectrum enjoy the detail-oriented technical work of working with UASs. The detached perspective of seeing the world in a virtual reality headset from the point of view of a camera on a drone can be helpful for them. Children who are overwhelmed by contact with people can enjoy the detached perspective of operating a drone.



- ## Upcoming Meetings

Madison Section Meeting: We are planning to have Greg Taylor, a local musician who composes music with electronics instruments talk about the current trends in electronic music. We are also looking into a meeting on Professional Ethics that would also be suitable for P.E. certification requirements for the State of Wisconsin.

December ECN Meeting: No plans yet — do you have any ideas? Contact Tom Kaminski (tjkaminsk (at) ieee.org).

- ## IEEE Madison Elections

LMAG:
Selection of 2016 officers for the IEEE Madison Life Member Affinity Group will occur at the November 5, 2015 meeting. Current candidates are Chuck Cowie for Chair and Chuck Kime for Vice-Chair. Additional positions to be filled include Secretary (primarily handling meeting minutes), Treasurer (primarily handling expenditures) and Meeting Planner (assisting in generating ideas and planning for presentations and events). Interested candidates for any position should contact Chuck Kime, Chair at 274-1402 or crkime@charter.net or Chuck Cowie, Vice Chair at (608) 412-4412 or cjc1ecom@gmail.com by November 3, 2015.

Madison Section Officer Nominations: You will be receiving an e-mail ballot in November or December for Section Officer Elections. If you are interested in running for office, please let Steve Shultheis know (email: ss (at) ieee.org).

- ## Volunteers Needed

Micro Volunteers: Do you have some time to spare to help IEEE-Madison Section? Perhaps you have a meeting topic that you would like to see us host and could find a speaker. Maybe you have time to call a few members who might have forgotten to renew their membership.

Antenna Modeler: Do you have experience with designing and modeling antennas? The

UW-Madison IEEE Student Branch project team would love to have you help them model the RDF antennas they have built.

Please consider sending some time helping with the Section activities. Let me know (tjkaminski (at) ieee.org).

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 via email at cj(at)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 Eye-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. Discover what IEEE Member Discounts can offer you. The Member Discounts portfolio consists of insurance products and programs for the home, office and travel, all at excellent group rates and reduced pricing. Visit IEEE Member Discounts to see what's available in your location and enjoy the savings. 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 2015 Officers and Board Members are Charles Gervasi – Chair, Steve Schultheis, Vice Chair, Tom Kaminski – Treasurer, Matthew Bartlett – Secretary, Timothy Chapman – Webmaster, Tom Kaminski – ECN Chair, Dennis Bahr – Engineering in Medicine and Biology Chapter Chair, Ann E. Thompson – Educational Activities Chair, Scott Olsen – Industrial Outreach Chair, Members at Large: Mitch Bradt, Clark Johnson, 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:

- Senior Application and Configuration Engineer, Watertown
- Software Engineer, Madison Area

Sponsored Content

- ## 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 (Newsletter Editor) 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>.