

October 2013

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Official newsletter of  
IEEE-Denver Section  
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Editor:

Submit articles for  
consideration to:  
[hasling@ieee.org](mailto:hasling@ieee.org)

Join us and attend the next

Denver IEEE ExCom meeting at:

**DeVry University 1870 West 122nd Ave Room 121**  
**Tuesday, November 12th 6:00 pm–8:30 pm**

## Fall Event: Guest Speaker Russ Harrison from IEEE-USA on Public Policy

Join the IEEE Denver Section on November 9th for a discussion on IEEE and public policy with one of IEEE-USA's top Washington Representatives, Russ Harrison. Russ is one of IEEE's most popular speakers, having addressed at over 180 local section meetings across the United States. We will talk about all the top issues of the day that affect you and your career.

IEEE members have a unique and important role to play in setting public policy. Come [join us](#) to learn how we, as a profession, can influence our elected leaders. (Lunch will be provided at the start of the event, followed by Russ' talk, Q&A, then free-time to explore the Wings Over the Rockies Museum)

How well do you know IEEE? Did you know :

- IEEE is one of the largest professional societies in the world.
- We have 400,000+ members world-wide.
- We are the world's largest standards-setting organization.
- We have the world's largest library of technical publications.



Even if you knew all of that, you probably didn't know that IEEE maintains a strong presence in Washington, DC. Our staff and volunteers in Washington, led by IEEE-USA, played a central role in creating the 401K retirement plan, in drafting the inter-connectivity standards that govern the electrical grid and in hundreds of other legislative initiatives over the years.

This year we are fighting aggressively to:

- Protect federal R&D spending in a tight budget
- Open up the patent system to small inventors
- Roll back restrictions of federal participation in technical conferences
- Protect American high-tech workers during the immigration reform debate

IEEE-USA is the leading voice for engineers and technology professionals in the United States. We regularly work with Congress, the media, Supreme Court and the White House to protect your interests and to ensure the technical feasibility of government programs.

- Jennifer Kramer

## We're Back! Electromagnetic Compatibility Chapter



After an almost two year hiatus, the Electromagnetic Compatibility (EMC) Chapter of the Denver section is in the process of revitalizing itself. On October 3, 2013, a joint meeting between the IEEE EMC chapter and [Bo-gatin Enterprises](#) was held at the Xilinx corporation's Retreat Building in Longmont, CO. Dr. Eric Bogatin graciously allowed us to combine an EMC Chapter meeting with his Front Range Signal Integrity Seminar Series. Approximately 25 individuals showed up, with 10 of them being EMC society members. The evening started with a networking opportunity, from 5:30 pm to 6:30pm, facilitated by a delicious buffet of Southwestern menu items. During this period, the attendees could also visit one or more of several tables featuring local Signal Integrity companies displaying their products for the working EMC/SI engineer. Among the companies present were CCN, Front Range Probe Stations LLC, Polar Instruments Inc., Simberian, and Teledyne LeCroy. A special thanks to Luis Bielich and Xilinx for allowing us to use their beautiful facility in which to hold the meeting.

After the networking opportunity, elections were held to try and fill a slate of officers for the local chapter. Randy J. Jost of Ball Aerospace was elected chapter chair and Bruce Crain, also of Ball, was elected treasurer. We are still looking for individuals to fill the vice-chair and secretary position, as well as anyone who wishes to volunteer to help move the chapter forward this coming year. We could use a web master and a meeting coordinator to help spread the opportunities to serve. Look for announcements in the near future for the next technical meeting, as well as a planning meeting for 2014's activities. We are actively seeking the input of the chapter members in the Denver section for speakers and meeting topics for the coming year.

Following the completion of IEEE business, Eric Bogatin introduced the evening's speaker, [Dr. Yuriy Shlepnev](#), of Simberian Inc. Yuriy's talk was titled "Design Insights from Electromagnetic Analysis of Interconnects." Dr. Shlepnev is President and Founder of Simberian, Inc., where he developed the Simbeor electromagnetic signal integrity software package. He received the M.S. degree in radio engineering from Novosibirsk State Technical University in 1983, and the Ph.D. degree in computational electromagnetics from Siberian State University of Telecommunications and Informatics in 1990. He was principal developer of an electromagnetic simulator for Eagleware Corporation and a leading developer of electromagnetic software for simulation of signal and power distribution networks at Mentor Graphics. The results of his research have been published in multiple papers and conference proceedings.

During his presentation, Yuriy explained that data links running at bit rates of 10-30 Gbps and beyond are becoming the mainstream in the communication and other electronic systems. Design of PCB and packaging interconnects for such systems is a challenging problem that requires electromagnetic analysis over extremely broad frequency bandwidth from DC to 20-50 GHz. Also, accurate prediction of interconnect behavior over such frequency bandwidth requires localization of all transitions or discontinuities and causal broadband dielectric and conductor roughness models that are usually not readily available.

Examples of proper and improper material models were provided in this presentation. Yuriy stated that the goal of interconnect design is to localize and minimize reflections from all possible transitions or discontinuities and at the same time to reduce skew and cross talk. A number of practical examples of optimized interconnect design using electromagnetic analysis and validation were discussed. The complete presentation is available for viewing on the [beTheSignal website](#). You have to register on the site to access the presentation, but there is no cost and there is a wealth of other useful information and presentations if you are involved in EMC and signal integrity.

The next (and final) meeting for the year is planned for Thursday, Dec 5, 2013. The speaker will be Mr. David C. Graef of Teledyne LeCroy and his topic will be "How to Achieve 240 GigaSamples per second at 8 bit Resolution and What to do with Them." The meeting will again be held in Longmont, CO at the Retreat Building at Xilinx Corporation. The evening will start off with appetizers and networking at 5:30 pm with the speaker's presentation to begin at 6:30 pm. For additional details on Mr. Graef's presentation, and to register (no cost) for the meeting, go to [www.beTheSignal.net](http://www.beTheSignal.net) and click on the link at the left-hand side of the page. We hope to see you there!

## New IEEE Society Mentor Program

Recently, the [Engineering in Medicine and Biology Society \(EMBS\)](#) rolled out a Mentor Program for IEEE members interested in Medicine and Biology. This can include students, recent graduates, grad students, and engineers thinking of changing fields or looking for other opportunities.

The EMBS Mentor program is an extension of the online IEEE MentorCentre started back in 2007, but offers services to connect EMB members with each other, and with undergraduate and graduate students. Other IEEE mentor programs exist, but they mainly connect members to students. There are certain responsibilities for Prospective Mentors and Mentees, but not too onerous for a program that can be quite rewarding. Prospective Mentors and Mentees should each be regular IEEE members and once an online match is found they should be willing to commit up to two hours a month for a year, if both parties agree to connect by email or phone conversations. Additional guidelines and suggestions are provided in a Mentor Handbook, also online (see below.)

I signed up to be a mentor, which you can also do by logging on with your email and IEEE Password, and filling out a profile. As of this date, there are 81 Mentors and 127 Mentees on the EMBS Mentor Program Home page, from all over the world, with about 50 Mentor/Mentees from the USA. Most are employed in academia or attend a university.

I welcome this program as a great way to help members with similar interests find each other and share advice and opportunities, both at the international and local levels. Additionally, as IEEE members, we have another resource to pass along to interested new members and colleagues in a still-tight job market. For further information or to sign up through [IEEE](#) or through [EMBS](#).

- Jim Harrer, IEEE, Sr Member and  
EMBS Officer

## IEEE Denver Section – New Website Launch

As part of a year-long effort to migrate the IEEE Denver Section to a Wordpress format using [standardized tools from IEEE HQs website development portal](#), the new section website has arrived.

At the upcoming [November 6<sup>th</sup> meeting of the IEEE Computer Society \(Denver Chapter\)](#) there will be training provided on use of the Wordpress toolkit that can be used by chapters and affiliate programs.

[Wordpress \(WP\)](#), started as an open source blogging system, and has now evolved into an open-source Content Management System (CMS). IEEE hosts a WP domain, provides a set of IEEE branded look'n'feel templates. They have templates for Conferences, Sections, Society and Student Chapters. Starting from these templates and the supported capabilities (IEEE has restricted them to a manageable few) it is easy to build nice web sites.

This presentation deals with how the presenters, with no prior knowledge of WP, were quickly able to build two websites with quite a few complex capabilities. The presentation will start with some of the basics of the IEEE WP instance and then build these to show some complex capabilities. WP does not require knowledge of HTML or CSS, but even rudimentary knowledge can help with the task of developing and maintaining web sites.

Some good examples of IEEE Region 5 websites migrated to Wordpress are listed here:

[IEEE Region 5 Portal](#)

[IEEE Dallas Section](#)

[IEEE St Louis Section](#)

[IEEE Baton Rouge Section](#)

Check out IEEE Denver Section at <http://www.ieee-denver.org/> or for more info, contact [webmaster@ieee-denver.org](mailto:webmaster@ieee-denver.org)

- Tim Well, IEEE Denver Section Chair

## How Tall is Your Antenna?

Do old Hams turn into pork? Sitting down, for long periods, is hazardous to your health.

My earliest recollection of amateur radio, was a tall metal tower, taller than any suburban house in our neighborhood. On top, a huge antenna changed directions occasionally, apparently to get better reception from the Pacific, Europe, Africa, or South America. I had noticed my distant neighbor's basement ham shack, with lights still on, even late at night. My young imagination filled that magical laboratory with complicated electronic equipment, warm during winter, from the heat of all the glowing vacuum tubes. Always wondered why I never met my neighbor, the ham. Was he retired, homebound by blindness, or perhaps disabled, confined to a wheelchair? Such curiosity, unanswered, grew into a long-term fascination with things electronic, resulted in service in the US NAVY, as an electronics technician (aboard an aircraft carrier), followed by a long career in electrical engineering.

Rare, tall antenna towers above suburban homes are visible indications of only a fraction of the many active radio amateurs. Many hams operate without any external signs, either through "[stealth antennas](#)," on HF bands, or using handheld or mobile transceivers, on shorter wavelength VHF / UHF bands.

The [Amateur Radio Relay League](#) has a long history of advancing technology, and improving communications. Not limited to making friends half a world away, [assistance](#) is available for people who are [blind](#), [deaf](#) or [disabled](#), to reach out, even if home-bound. Radio amateurs also reach out to help [educate](#) teachers, [boy scouts](#), and youngsters (of all ages), about wireless communications. At least two monthly magazines ([CQ](#) and [QST](#)) are devoted entirely to amateur radio (supported by advertisements for ham equipment: transceivers, antennas, etc.). During [emergencies](#), Amateur Radio Emergency Service (ARES) volunteers help to connect rescuers, emergency crews, victims and their worried relatives.

Anyone, with the right equipment, can listen to international conversations, on any of the amateur [bands](#). However, in order to transmit legally, a valid license is required. Classes and [examinations](#) are offered each month, in most cities, and require only a bit of study (mostly for the FCC regulations). Any degreed electrical engineer can easily pass the exam (35 questions) for the lowest, Technician class. Many engineers can pass (as I did) the middle level, General class exam (35 questions), also, on the same day (offered by Volunteer Examiners, for a nominal fee of \$15). The highest level, Extra class, requires extra study (50 questions).

Once the FCC has awarded you a license (with your own unique call sign), you might join a local ham club. There, get to know them, and request occasional guidance (as needed), from an experienced radio amateur, commonly called an "Elmer," who freely volunteers his / her time, first, to keep you out of trouble with the FCC.

New equipment can be pricey. Used amateur radio equipment can be cheap, perhaps purchased from amateur club members, or from a local annual ham-fest. Avoid consumer-band receivers. Most common radio receivers with "shortwave" bands, don't have the selectivity, needed to sort through crowded amateur bands calls, that might be only 5 kHz apart. Amplitude Modulated signals, AM, is NOT used by hams anymore. On HF bands, Single Side Band, SSB, is now standard, because it saves both bandwidth and transmitter power. SSB is unintelligible, sounding like Donald Duck, to any common, AM receiver.

Considerable knowledge is needed, and is widely available from many specialty books, especially from [ARRL](#). I can recommend an excellent first reference book: "[Ham Radio for Dummies](#)." Ignore the condescending title, because that comprehensive book was written by an experienced expert, in his field, Extra class, Ward Silver, N0AX. A common concern is about effort learning Morse Code. That code proficiency requirement had been dropped, years ago, along with the previously lowest level, Novice class.

How many of the 400,000 members of the IEEE, are also radio amateurs? Let me know. How many of the 155,000 radio amateurs are also electrical or electronics [engineers](#)? A significant percentage. Amateur radio once was pursued mostly by retired guys, with extra cash, knowledge and spare time, required just to tinker with their unreliable equipment. These days, partly because of more reliable equipment, astronauts, women, even cub scouts (with an older, licensed ham) can be found on some of the amateur bands. Your own cell phone is an outgrowth of technologies, pioneered by earlier amateur radio designers. If you have the correct phone number, in theory you can call anyone in the world with cell phone reception. However, in more than eighty percent of the world, there is no nearby cell phone tower, because gigahertz signals

[Continued on page 5...](#)

are “line-of-sight.” One very expensive alternative is the [iridium cell phone](#), using satellites as repeater towers.

More affordable, High Frequency band (and even longer wavelengths) transmissions often can reach suitable receivers located in barren deserts, jungles, polar snowfields, isolated islands, deep valleys, aircraft and ships at sea. HF propagation is variable, often requiring several bounces beneath layers of the ionosphere, which is more reliable in darkness, preferably if both ends of the HF transmission path are at night.

To keep your mind growing, give it more challenges. Learn a new language, learn to juggle, or to fly, or take up amateur radio. It provides plenty of challenges, from meeting new friends thousand of miles away, to using unique test equipment, to home-brewing your own electronic designs, with components cannibalized from discarded e-trash. Hope to connect with you again, this time on the air, in one of the popular ham bands. Signing-Off the air, abbreviated: “73.”

- Richard C. Rew, BSEE

found at KDOLZI (Kilo Delta Zero Lima Zulu India)

# SusTech 2014

## Students Attend IEEE USA Annual Meeting and SusTech Conference

The IEEE USA Annual Meeting and SusTech Conference were hosted in Portland Oregon for 2013. The Denver Section helped sponsor two students to attend the year’s events. Nicole Gruber and Erik Johnson, both students at Colorado School of Mines attended both the SusTech Conference and the annual meeting. The weekend started with the SusTech Conference which focused on new and developing technologies in the areas of energy, energy efficiency, electric vehicles (EV), smart grid, and much more! Each of these areas had several paper sessions. Nicole and Erik were able to attend a good handful of the sessions that included research in the EV industry, Ocean Wave Technology and Smart Grid Development. Portland was one of the best places to hold such a conference as it is a very innovative part of the country and many of these new technologies are becoming prevalent in the city. As the SusTech Conference was wrapping up, the IEEE USA Annual meeting kicked off.

The meeting is a very good way for students, like Nicole and Erik, to learn what IEEE USA has to offer and also persuade them to retain membership after they graduate. Both Nicole and Erik were asked to participate in a student panel with other students during one of the sessions at the meeting in Portland. While they were on the panel, questions from Scott Grayson (IEEE USA Staff) were asked and each student had the opportunity to respond. Questions were related to what IEEE has done for students, what students would like to see from IEEE, and how an IEEE membership can be more appealing after graduation. Other parts of the conference focused on the many programs that IEEE USA has for their members such as career and business tools, professional development and training, and standard creation. Some of the sessions also focused on how IEEE USA is reaching out to K-12 just as much as they are to our industry leaders.

“It was great getting to attend the conference and meeting because it allowed me to network and meet lots of other IEEE members and get their insight about the organization and its technologies. Additionally, the conference location was great and I am glad I could spend time in the city of Portland. One of my favorite parts was finally getting to have a donut from Voodoo Donuts!” said **Erik**.

“Portland is an amazing area and I would suggest everyone try to visit when they have a chance and try the food and/or beer, there is a lot to sample from.” **Nicole** stated “the SusTech conference was an enlightening view into the current and emerging technologies that are being researched to make things different in the industry. The alternative energy and smart grid technology that we saw was very exciting and as research continues I will be excited to

[Continued on next page...](#)



see what comes of some of these new ideas. The IEEE USA conference was a great look into what IEEE can do for me and my career and what the goals of IEEE USA are as we go forward. Overall, the conference was a great experience and a fantastic opportunity to network with other people in my industry and the other various industries involving Electrical Engineering.”

Additional info can be found at the [IEEE USA webpage](#) or feel free to contact [Erik Johnson](#) or [Nicole Gruber](#) with specific questions.

-Erik Johnson and Nicole Gruber



## Coming Soon: 2014 Elections for IEEE Denver Section

Dear IEEE Denver members,

First, I wish you all have a happy fall. Every year around this time, IEEE Denver section will have an ExCom officer election event. In 2013, IEEE Denver section has an eventful year. We brought in a Green Tech conference in April. We had a wonderful BBQ event in August. Without the support of its members, Denver section will not be able to run so many events every year. I would like to ask you to think about volunteering your time for the Denver section. Denver section has many officer positions in 2014 available for you to use your talents.

Please consider any of these positions and submit your name, email address and a brief description why you want to apply for the position to me by Nov 8, 2013. Below are the positions in 2014 and details of the job description can be found [online](#).

Vice Chair (2014 chair-elect)

Treasurer

Secretary

Webmaster

Newsletter Editor

Vice-chair, Professional and Career Activities

Vice-chair, Public Relations

Vice-chair, Electronic Communications

Vice chair, Award and Recognition

Vice-chair, Student Activities

Vice-chair, Government Affairs

Vice-chair, Membership Development

Vice-chair, Educational Activities

If you have any questions, please send an email to me. My email address is [Louis.k.tsai@hotmail.com](mailto:Louis.k.tsai@hotmail.com). Thank you!

- Louis Tsai

2014 ExCom officer election committee

## IEEE 2013 Election Results

Here are the names of the winning candidates in 3 of the most important IEEE positions affecting the Colorado IEEE and Region 5 programs in the coming years. Congratulations from the IEEE Denver Section.

- Tim Weil, Chair IEEE Denver

### Jim Jefferies - President-Elect IEEE-USA (2014)

James A. Jefferies worked at AT&T and Lucent Technologies for 33 years in engineering and executive positions including fiber optic cable development and manufacturing, Quality Assurance, and Supply Chain Management. He managed the engineering teams that delivered the first commercial fiber optic cables for the Bell System. He also worked in the entrepreneurial sector as COO for USBuild.com in San Francisco. Read Mr. Jefferies' campaign statement at <http://www.jamesajefferies.com>.

NOTE: Jim Jefferies, past Chair of the IEEE Denver Section is the [4<sup>th</sup> Colorado resident to be elected to the IEEE-USA President position](#). The distinguished list includes Dr. John Reinert (1998), John Meredith (2009) and Dr. Gordon Day (2009).

### Howard Michel - President-Elect IEEE (2014)

Howard Michel retired from the U.S. Air Force in 1994, having been a pilot, satellite launch director, and engi-

neer, including in the People's Republic of China where he served as a senior U.S. Government technical representative enforcing technology-transfer control plans and procedures during two satellite launches. Howard is a consultant for the U.S. DoD and private industry in the area of embedded systems, avionics, instrumentation. Howard is Associate Professor of Electrical and Computer Engineering at UMass-Dartmouth. He has secured research funding from U.S. NSF and NOAA. He holds two patents and has published a textbook, 15 refereed journal papers and 70 conference papers, posters or abstracts. He has graduated 3 PhD and 35 MS students. Read Mr. Michael's campaign statement at <http://howardmichel.net/>

### Francis Grosz - Director-Elect IEEE Region 5 (2014)

Francis Grosz received B.S. degrees in Physics and Engineering Sciences in 1970 and an M.S. in Engineering in 1973, all from the University of New Orleans. Francis has worked as a Broadcast Engineer at WWL-AM/FM/TV, as a Senior Engineer/Principal Engineer/Engineering Specialist at Litton Data Systems, as a Senior Electrical Engineer at the Naval Research Laboratory, and taught at the University of New Orleans and Tulane University. He is currently a principal and Electrical Engineer/Physicist at Omni Technologies, Inc. Read Mr. Grosz's campaign statement at <http://fbgnet.net/>

## IEEE Denver Section

### Mission Statement

Enrich the professional and personal lives of the Rocky Mountain Region members, developing them into valued contributors to society through quality programs, continuing education, career development and community service; in collaboration with IEEE, industry, government and academia.



The IEEE Denver Section is comprised of over 3600 engineers and technical professionals in the Denver - Boulder area.

<http://www.ieee-denver.org>