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Editor: Philip Cox, p.e.cox@ieee.org; Contributors: Joe Kalasky, Heung-No Lee, Bill Pruss, Kal Sen, Ralph Sprang, and Matthew Valenti.

All announcements for publication in a particular month’s bulletin are due to the Editor by the 20th of the previous month. The accuracy of the published material is not guaranteed. If there is any error, please bring it to the Editor’s attention. The Section’s web site www.ewh.ieee.org/r2/pittsburgh has past issues of the bulletin and lots of other useful information.
Greetings, friends. I trust you are all doing well.

We are still seeking a candidate for Secretary of the Section for 2009. Serving on the executive committee is a great way to get more involved in the Section. It’s a one year commitment, so why not give it a try? Contact Nominations chair Tom Dionise if you are interested.

Joe Kalasky and I attended Sections Congress in September. This is a gathering of IEEE Sections around the world that is held every three years. The purpose of the event is to exchange ideas and information to help all of the Sections to better serve their members.

I found Sections Congress to be an informative event. It turns out that IEEE has many resources we have not been utilizing. We will be tapping these resources over the coming months. These resources include training and meeting support programs and services, funding for programs, and educational resources. Watch your bulletin for further information.

As always, I welcome comments, concerns, or feedback. Please let me know what is on your mind. Email is the best way to contact me.

Ralph Sprang
Pittsburgh Section Chair
rsprang@ieee.org

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**Impedance Biosensors that Utilize Nanomaterials**

Speaker: Dr. Lisa Pattison  
Date: Monday Nov. 10, 2008  
Time: 5:00 PM  
Place: G102 Engineering Sciences Building, West Virginia University, Morgantown, WV  
Cost: None  
Sponsor: Upper Mon Subsection  
Contact: Matt Valenti valenti@ieee.org  

**Abstract:** Organic semiconductors are increasingly being developed as functional materials for various devices including organic thin film transistors, photovoltaics, and organic light emitting diodes. The importance of alignment of the conjugated backbone for enhancing specific electronic properties of these devices is widely recognized. We have shown that we can improve the structural ordering in solution-processed organic semiconductors of liquid crystals (polyfluorene-bithiophene) and small molecules (metallated and metal-free tetrabenzoporphyrins). In addition, we have developed methods of orienting the (liquid) crystal domains in a preferred direction. The self-assembly methods we have demonstrated are the use of (1) surface alignment layers for orienting liquid crystal polymers and (2) surface topography to promote the oriented growth of crystals on amorphous substrates. In addition to studying the effects that self-assembly has on the structure of thin films, we probe the effects of increased order on the electronic properties by the fabrication and characterization of organic thin film transistors. Most notably, we find that the charge carrier mobility is increased by a factor of 4-6 for aligned, liquid crystalline polymeric semiconductors and by a factor of 8-10 for small molecules oriented by graphoepitaxy.

**Speaker Bio:** Lisa Pattison received holds three degrees in Materials Science and Engineering: a B.S. from MIT awarded in 1999, a M.S. from Stanford awarded in 2001, and a Ph.D. from the University of California, Santa Barbara awarded in 2006. The title of her dissertation was “Morphological and Transistor Property Relationships”. Since 2006 she has been a consultant and contractor for Research Development Solutions developing fuel cell cathodes for coal power plant applications.

**Ultrasound-based multimodal functional imaging: from whole-organ to molecular scale**

Place: Benedum Hall 360, University of Pittsburgh  
Time: Friday, Nov. 14th, 4:00pm – 5:15pm (4:00pm – 4:15pm, Pizza time)  
Speaker: Kang Kim, Ph.D., Assistant Professor of Medicine, Cardiovascular Institute, University of Pittsburgh.  
Sponsor: IEEE Signal Processing Society, Pittsburgh Section
**Abstract:** Three novel noninvasive ultrasound imaging techniques will be introduced. The preliminary study focused on cardiovascular applications, especially inflammatory responses is presented. Ultrasound elasticity imaging (UEI) based on 2D speckle-tracking estimates strain developed inside a blood vessel wall with a high spatial resolution. To detect subtle local changes in arterial mechanical properties in humans, a simple elastic modulus reconstruction procedure combined with pressure equalization has been developed. This allows for an estimate of the elastic moduli at different physiologic conditions by compensating for the mean arterial pressure. Ultrasound-based thermal strain imaging (TSI) has also been developed to noninvasively image vessel composition and identify rupture-prone plaque consisting of a vulnerable lipid-rich core. TSI enhances contrast between water and lipid-bearing tissue by measuring temporal strain immediately after an induced temperature change of ~1°C with 0.1% strain sensitivity. Finally, for early detection of inflammation and atherosclerosis, photoacoustic molecular imaging (PMI) using bioconjugated nanoparticles as contrast agents has been devised. The feasibility of this technique has been demonstrated in vitro and in vivo animal model. In combination with a commercial ultrasound platform, PMI using gold nanorods as contrast agents could potentially detect early stages of inflammatory disease in humans.

Kang Kim received his B.S. degree in Educational Physics from Seoul National University, Seoul, South Korea, in 1986, and M.S. degree in Physics from University of Paris VI (Universite de Pierre et Marie Curie), Paris, France, in 1989. PhD degree in Acoustics from the Pennsylvania State University, PA, USA, in 2002. Following his MS degree, he moved to Agency for Defense Development (ADD), Chinhae, South Korea as a Research Associate. He later held an appointment as a Senior Research Associate leading a SONAR development team since 1995. Following his PhD degree in Acoustics, Dr. Kim joined Biomedical Engineering Department in University of Michigan as a postdoctoral research fellow mainly working on ultrasound tissue elasticity imaging in medical applications and later held a faculty appointment in the same department as an Assistant Research Scientist. Currently, he is Assistant Professor of Medicine, Cardiovascular Institute, School of Medicine and Assistant Professor of Bioengineering, Department of Bioengineering, Swanson School of Engineering, University of Pittsburgh. His recent research interests include non-invasive ultrasound-based multimodal imaging techniques such as nonlinear tissue elasticity imaging, 3D elasticity imaging, thermal strain imaging, photoacoustic molecular imaging, and engineered tissue characterization.

**Performance Analysis of 802.11 DCF with Multiuser Detection Support**

Place: Benedum Hall 360, University of Pittsburgh

Time: Friday, Nov. 21th, 4:00pm – 5:15pm (4:00pm – 4:15pm, Pizza time)

Speaker: Mir Hamza Mahmood, ECE Department, University of Pittsburgh.

Sponsor: IEEE Signal Processing Society, Pittsburgh Section

**Abstract:** Conventional IEEE 802.11 Medium Access Control (MAC) protocol does not allow simultaneous transmissions from stations at any moment, to avoid collisions. Namely, it employs measures such as carrier sense multiple access, collision avoidance, and distributed coordination function which are designed to discourage simultaneous transmissions. With the advent of
sophisticated physical layer technologies, multi-user detection capable receivers become available. In this paper, therefore, we aim to investigate if the popular 802.11 MAC can be modified to exploit this innovation in the physical layer. We accomplish this by deriving a new throughput expression. Modern WLANs support multiple data rate transmissions via link adaptation for higher spectral efficiency. Thus, we include multi rate link adaptation in the analysis. We find that 802.11 can be modified slightly to support simultaneous transmissions and to obtain significant benefit from multi-user detection capable receivers.

Bio: Mr. Mir Hamza Mahmood is an MS student at the Electrical Engineering from the University of Pittsburgh, PA. He received his BSc (Hons) Computer Engineering from Lahore University of Management Sciences (LUMS), Pakistan in 2007. His area of interest is Wireless Communications and is currently working on cross layer design of wireless networks.

Directions to Benedum Hall

Pitt Campus Map

- Fusion power - the other side of the nuclear coin

Speaker: Keith H. Sueker, P.E., Curtiss Wright Electro-Mechanical Corporation
Date: Thursday, December 11, 2008
Time: Social 6:30 PM, Program 7:00 PM
Place: Westinghouse Energy Center
RSVP: Dr. Kal Sen, P.E., senkk@ieee.org or 724-696-1611 by December 4, 2008

Abstract: The fascinating prospect of using sea water as a fuel for power generation has scientists scurrying all over the world hunting for ways to create sustainable nuclear fusion - the process that takes place in the interior of the sun. Light atoms are fused together under unimaginable pressure and temperature to make heavier elements. The process is accompanied by the release of large amounts of energy that can be extracted to make electric power.

The work of creating plasmas suitable for fusion has been underway for some 40 years and may continue for another 40 years before commercial plants can be made. But the reward is electric power from sea water, a truly unlimited fuel, with almost no radioactive byproducts. Mr. Sueker will discuss the fundamentals of fusion, the progress to date, and the continuing research programs around the world.

Speaker: Mr. Sueker is a graduate of the University of Minnesota with a BEE degree and of the Illinois Institute of Technology with an MSEE. He was employed by Westinghouse for 19 years and then for 24 years by Robicon Corporation as engineering manager of the power systems group. In that position, he was responsible for large pulsed power supplies and many specialized applications of
power electronics. Mr. Sueker is currently employed by Curtiss-Wright Electro-Mechanical Corporation. He is a Life Senior Member of the IEEE and a registered professional engineer in the Commonwealth of Pennsylvania.

DIRECTIONS TO WESTINGHOUSE ENERGY CENTER

From Pittsburgh take Interstate 376 East (Parkway East). Take Exit 14A to Monroeville. Cross Business Rt 22 at the traffic light and proceed on Rt 48 South (Moss Side Blvd) approx ½ mile (two traffic lights). The 2nd traffic light is at a 4-way intersection with an Exxon station on the right. Turn left onto Northern Pike. Proceed approx 0.2 miles and turn right at the 1st traffic light onto Westinghouse Dr. Travel 0.7 miles (past the guard stand) to the 3 flags where the building’s main entrance is located. Parking in the evening will be plentiful. Use the main entrance and check with the security guards inside. You will be directed to the proper room for your meeting.

From the PA Turnpike, take Exit 57 (Monroeville). After the toll plaza, get in the left lane to get on Business Rt 22 West. At the first light, turn left onto Rt 48 South (Moss Side Blvd) and follow the above directions.

Quebec Sections Congress -- Toronto and Pittsburgh, Sister Sections

A major highlight of the IEEE Section’s Congress in Quebec City was the signing of a Sister Section Agreement between the Pittsburgh and Toronto Sections. This agreement was announced to all 1200 attendees en masse at a banquet. Joe Kalasky initiated this effort in his role as Professional Activities Chair. Over a period of two years Joe and others screened every section worldwide and selected Toronto as the best fit for many reasons. While the Toronto Section is demographically similar to Pittsburgh and its members have similar interest in Societies, Toronto is in a different IEEE Region and of course a different country. Fortunately Toronto is also geographically close enough to make mutual visits possible.

Below is part of the Memorandum of Understanding.

Sister Section Agreement between
IEEE Toronto (Canada) and Pittsburgh (USA) Sections

1. Toronto and Pittsburgh Sections by mutual consent have entered into a long term, voluntary relationship for the purpose of exchanging ideas and experiences on how to benefit from each others’ operations.

2. This agreement is for a three-year term and does not imply a financial or legal relationship. It will take effect on November 1, 2008. The agreement can be renewed for subsequent three terms upon approval by the respective Sections and Regional Directors.
3. The desire and basis for a Sister Section Agreement between two Sections has been approved by the Section Executive Committees of the two Sections and is submitted here for the approval by Directors of Region 2 and Region 7. The interface between Sister Sections shall be primarily by email, and may involve frequent communications between officers with similar responsibilities.

4. Initial activities will be established by the prime contacts of Pittsburgh Section (Joseph A. Kalasky, Past Section Chair) and Toronto Section (Marcelo Mota, Section Secretary). As interest develops in particular, other officer/s may communicate directly as sub committee, reporting summary topics, to the prime contacts. The prime contacts plan to submit a summary report on their activities/progress to their respective Executive Committees and Regional Directors every six months.

The MOU was signed by Ralph Sprang, the Pittsburgh Chair, Alex Bot, the Toronto Section Chair, John Dentler, the Region 2 Chair (Eastern USA) and Ferial El-Hawary, the Region 7 Chair (Canada).

Future editions of the Bulletin will give insights to the exciting Toronto Section.
Signing the agreement is our Ralph Sprang and Alexei Botchkarev, the Toronto Section Chair

- **Local Job Opportunities**

**TRC**

TRC has two openings for Electrical Engineers in Pittsburgh. Substation Electrical Design Engineer and Senior Transmission Engineer. See the Pittsburgh IEEE website job opportunities or contact Ed Neal at eneal@trcsolutions.com.

**SIEMENS**

Today’s innovations are shaping the metals industry of tomorrow. That’s why we’re constantly evolving technologies and solutions. Want to join us? We’re looking forward to working with smart minds – while you can look forward to joining an attractive employer and one of the world’s leading solution providers for the metals industry.

See us at: [www.sea.siemens.com/Metals](http://www.sea.siemens.com/Metals)
The Pittsburgh Region is beginning its ninth year in the National Future City Competition. The number of middle schools that have registered in the Pittsburgh Regional Competition has grown each year. The Competition's growth is testimony to the program's unique capacity to challenge students to learn and test new concepts related to engineering and city planning, to apply the mathematics and science they have already learned, to explore their imaginations about what our Cities will be like in the future, and to build an example of the result using ingenuity and their own hands. It has proven to be an excellent introduction of the engineering profession to middle school students.

Another important facet of the Pittsburgh Regional Future City Competition that has allowed it to expand is the associated growth of a cadre of dedicated volunteers. Without volunteers, there would be no competition. Please, volunteer as a Presentation Aide or Judge. During November and December, judges will review the SimCity files, abstracts, and essays. On Saturday, January 24, 2009 the Pittsburgh Regional Competition will be held at the Carnegie Music Hall in Oakland. Based on past experience we anticipate that we will need more than 120 volunteers to fill the positions of Essay Judges, Disk Judges, Registrars, Model Movers, Room Manager/Timers, Score Keepers, Special Awards Judges, Presentation Judges, Exhibit Area Control Volunteers, Still and Video Camera Operators, and Public Relations Coordinators. Orientation Meetings for Presentation Aides and Judges will be held as needed in early January, with the goal of identifying all volunteers and making assignments by January 2, 2009.

Please add Your Name to Our 2008-2009 Volunteers List. We welcome the help of anyone who is interested in volunteering his or her time. To qualify as a Presentation Judge, you must have judged before or have attended a Judge Orientation Meeting. If you are interested in registering as a volunteer for the 2009 Future City Competition please take a minute and fill out the

VOLUNTEER REGISTRATION FORM at:

http://www.futurecitypittsburgh.org/futcityvolunteer_form.htm

Volunteers will be contacted in November for SimCity judging, mid-December for essay judging, and early January for competition day. If you have any questions, call Bill Pruss at (412) 651-5304.

If you wish to learn more about the program and roles of volunteers, take a look at our website’s homepage,

http://www.futurecitypittsburgh.org/
## 2008 Calendar – Meetings of IEEE Pittsburgh Section

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<td>Executive Committee</td>
<td>17 - 7pm Panera Bread Oakland</td>
<td>21 - 7pm Panera Bread Oakland</td>
<td>28 - 5:30pm UP Greensburg</td>
<td>17 - 7pm Panera Bread Oakland</td>
<td>22 - 7pm Panera Bread Oakland</td>
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<td>Section</td>
<td>16 Engineers Week table</td>
<td>24 History Dinner</td>
<td>8 VoIP</td>
<td>6 Picnic</td>
<td>7 RFID</td>
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<td>23 - Photonic Switching</td>
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<td>Communications</td>
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<td>Computer</td>
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