

PHILADELPHIA SECTION of the IEEE

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Almanack

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Summer 2015

Spectrum Exploration and Exploitation: Joint Optimization of Identifying and Accessing Idle Spectrum

June 2, 2015

Bossone Building, Drexel University
3141 Chestnut St., Philadelphia

Adcom Meeting

June 9, 2015

Sheraton University City Hotel
Philadelphia PA

Life Member Tour

July 18, 2015

PATCO Shop in Lindenwold



Chair's Message

By Phil Gonski, P.E.

As you can probably surmise, it's that time of year again for IEEE Philadelphia Officer Nominations. I certainly hope you will consider running for a position, especially if you have some great ideas or suggestions for how the Section can improve our offerings.

I certainly understand many of our members concerns about the value of IEEE membership, which is why we have strived in our Section to produce and develop a wide range of offerings. Whether volunteer outreach is your preference, or gaining PDH

Inside the Almanack.

This issue covers June, July, and August

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or CEU credits for your license through seminars or courses, we have adapted to meet the needs of our industry professionals. We've organized networking events, career fairs, tours of Longwood Gardens, and a variety of other offerings

Through such conferences are our SPMB and BenMas, we have also assisted our academic members by providing means to publish peer reviewed paper sessions, as well as presentations by leading researchers.

Our Section Awards Banquet in April was the best attended in the last decade, which further is proof of our continued relevance in the community.

As is the case with any position, I have now served two years as your Section Chair, and must consider the appropriate time to 'turn over the reins'. Despite already serving two years, I still personally feel there is more to do in our Section. I enjoy our charitable efforts towards science fairs, local schools, funding efforts of our college students, and

planning fun and educational events for our members. It is my firm belief that we are the premier supporter of technical content and science philanthropy in the entire Delaware Valley. We've held more outreach programs and meetings than any other society in the Region.

It is for this reason that I intend to see our mission through and continue to serve you. As always, should anyone have any suggestions for future programs or outreach activities, please feel free to call or email.

Thank you again for your membership and support of our activities. If your dues have not produced the value you desire, please know that we have supported local science fairs, given college scholarships, funded science labs and after school programs, and truly made a difference in our community.

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Deadline for the September issue is August 11, 2015

New & improved web site: www.ieeephiladelphia.org

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The Philadelphia Section of the IEEE encourages placement of technical, professional, promotional and commercial advertisements in the Almanack. The Almanack is published ten times a year and is read by more than 4,000 members with an average annual salary of over \$70,000 in over 150 key industries. For more information, contact Peter Silverberg at 856.461.6615 or psilverberg3@comcast.net

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IEEE Life Member Tour of PATCO Equipment Shop

by Bob Paglee, P.E., IEEE Life Member

The IEEE Life Member Group has scheduled a tour of the PATCO Equipment Shop in Lindenwold, NJ for Saturday, July 18, at 10 a.m. There are many interesting passenger railcar support facilities to see, and the tour will feature the newly rebuilt railcars, which are now entering service.

Three years ago, PATCO separated 26 cars from their undercarriages and transported them by truck to Alstom Transport Inc. in Hornell, NY, where they were stripped down to their steel outer shells and rebuilt from the outside in. Several refurbished prototype cars have been in the PATCO Equipment Shop undergoing test and modifications to correct problems as discovered. *(Photo next line)*



The new interiors feature brighter colors, higher ceilings, slip resistant floors and new seats for greater passenger comfort. With thicker windows, better weather stripping and brand new heating and air conditioning systems, the refurbished cars will be cooler during the summer and warmer in the winter.

The cars also have a new wheelchair and bicycle parking area with flip-up seats.

For greater security, the new passenger alarm system includes an intercom that allows passengers to communicate with the train operator. The cars also are equipped with interior security cameras connected to an externally accessible DVR.

Brakes on the cars have been improved to allow for quicker stopping with more stability and to conserve power by returning breaking energy to the cars power systems. The wheel trucks, traction motors and gear units from the original cars built by Budd Co. in 1968 are refurbished, overhauled and re-used. New wheels are installed (as needed) by PATCO's fully equipped "Wheel and Axle Shop".



(Photo of New Interior)

The cars also include a number of new communications systems: A new public address system with automatic announcements, a noise-controlled microphone and external speakers on the cars so announcements made from the train can be heard on the platforms; scrolling exterior destination-and-route signs; and a video advertising and infotainment system.

However, a number of problems were encountered during the long testing phase that was completed in April. These included issues with communications, automatic train control, signaling, propulsion and braking systems. Hardware and software changes were required, and will be discussed during the tour

Signing Up

The tour is open to IEEE members and others, but it is necessary to phone the IEEE Office at 484.270.5136 to make a reservation, as space will be limited to 25 visitors. You must provide your name, employer's name (or "Retired"), and citizenship (if not U.S.A., country where you now reside).

Before entering the Equipment Shop, all visitors are required to sign "freely and voluntarily" a lengthy, complex PATCO/DRPA liability agreement form. Using the mailing address you provide when making your reservation, a copy of the liability agreement form will be sent to you so you can review it for acceptability before going to Lindenwold. Upon reading it, if for any reason you do not wish to sign it, please phone the IEEE office once again to request that your name promptly be removed from the PATCO Tour Visitor List. In any case, a visitor who owns a personal hard hat is encouraged to bring it and wear it during the visit.

The PATCO Equipment Shop is located at 1000 N. Carlton St., very nearby PATCO's Train Station in Lindenwold, NJ. The Shop is on the right side of an access road that begins at 800 N. Carlton St., Lindenwold, NJ. To enter the shop, visitors must park in the PATCO Employee Parking Lot and walk across the pedestrian walkway.

Climate Change

Ernest's Page, by Ernest Cohen, Ph.D

My daughter, Naomi, asked to borrow a book, so I scanned the book case shelves. I didn't find the book, but instead I found an autographed copy of "The Discovery of Global Warming" by Spencer Weart. Serious scientific study of global temperatures goes back somewhat over a century. There were two major questions: **First:** *Why is the Planet Earth so warm?* and **Second:** *What caused the so called "ice ages"?* The early work was hindered by lack of data: there were very few weather stations outside Europe and North America. In particular, temperature measurements near the poles and from the Central Pacific were lacking. Also, the technology for some of the other measurements was not well developed.

Scientific thinking on climate goes back over a century. In 1859, Tyndall discovered that some gases block infrared radiation. He suggested that changes in the concentration of the gases could bring climate change. In 1896, Arrhenius published the first calculation of global warming from human emissions of carbon dioxide.

There are other "green house" gases; for example methane. A friend, with a doctorate in chemical engineering, has studied atmospheric chemical reactions for the EPA, and told me that methane gets oxidized in a few weeks. Water vapor is another story. It is part of one of the positive feedback loops. Warmer air can hold more moisture, and this, in turn, increases global warming. There are other feedback loops. Does more carbon dioxide increase plant growth and how is this balanced by decay of plant material? (The growth-promoting effect seems to be rather slight.) How much greenhouse gas is absorbed by the Earth's oceans, and how long does it stay there? But the most important feedback loop seems to be ice cover. It results in two semi-stable states. When a significant portion of the Planet's surface is covered with ice, solar radiation is reflected, which tends to keep the Planet cool. When the ice cover melts, the Earth absorbs more solar radiation, which tends to keep it warm.

Somewhat over a century ago, the "year without a summer" occurred (1816). A volcanic eruption put so much dust into the atmosphere that crops failed in Europe and North America. There are other factors which influence the Earth's climate: A Serbian engineer, Milutin Milankovitch, in the 1920s had calculated some fine details of the Earth's orbit, the "precession of the equinoxes" which might plausibly account for the ice ages.

While there are human accounts of warm and cold periods for the last few centuries, earlier climate must be deduced from geological evidence. The best is from long ice cores retrieved from Greenland and the Antarctic. Not only do these ice records show thousands of annual deposits, but trapped air bubbles indicate the carbon dioxide levels in past ages. Since the industrial revolution, marked by humans burning coal and other fossil fuels, the carbon dioxide level in the atmosphere has risen dramatically, and temperatures have generally kept pace. Mild cooling in the middle of the last century, had some scientists concerned about a potential ice age, but significant warming near the end of the century, and in the present century, has reversed this. Only with the advent of super computers has it been possible to model climate changes. As electrical engineers, we are responsible for these computers, as well as the power plants that burn large quantities of fossil fuels.

From my sister, Julie, who lives in France: A climate change believer and a climate change denier walk into a bar. The denier asks the bartender, "What's the strongest whiskey you have?" The bartender takes out a bottle and shows him. "If you want the strongest, this is the one. Look at the label. You can see that it's nearly 100% alcohol (or 200 proof)." Immediately the customer turns on his heels and stomps out of the bar. His friend explains to the bartender, "I'm so

sorry, but climate change deniers are like that. Even when you show them the proof, they won't buy it.”

IEEE PHILADELPHIA SECTION CONGRATULATES OUR NEW SENIOR MEMBER!

The last spring A&A Review Panel meeting was held on April 25 in Taipei, Taiwan. One Member of the Section advanced to Senior Member. We congratulate Mikhail Golokov who is a member of the Dielectrics and Insulation Society and Industrial Applications Society. The next Senior Member Review Panel Meeting is planned for 23 May in Alexandria, VA.

MATE PA ROV CHALLENGE

The MATE PA ROV Challenge was held in Bartley Hall of Villanova University May 9. Peter Silverberg represented the Section as a Ranger Sales Presentation Judge. Final result below. There were 28 teams in the competition. This is a repeating activity and there will be a call for help with the 2016 challenge next fall.

The Marine Advanced Technology Education (MATE) Center is a national partnership of organizations working to improve marine technical education and in this way help to prepare America's future workforce for ocean occupations. Headquartered at Monterey Peninsula College (MPC) in Monterey, California, the MATE Center has been funded as a National Science Foundation (NSF) Advanced Technological Education (ATE) Center of Excellence since 1997.

ROV is a remotely operated vehicle. The task was to build one that could simulate exploring under the ice of the Arctic Ocean. The builders are mostly middle school and high school. The vehicle models they build are quite amazing.

Overall Winners representing the region and moving onto MATE International in St. John's, Newfoundland & Labrador, Canada on June 26-27 are the following two teams: *Pennsylvania ROV Engineers, Allentown, PA and High Technology High School, Lincroft, NJ.*

If your company would like to sponsor a \$50-\$500 award next year please contact V. V. Morris at vmvrobot@gmail.com.

Tour of Longwood Gardens

By Phil Gonski, P.E.

Over 40 IEEE Philadelphia members were given a rare, behind the scenes tour of Longwood Gardens April 29. Staff discussed the overview of the power and control systems, and brought the group to see the systems in action. Members were able to view the organizations, PLC based control, and learn first hand how the gardens are maintained. Thank you to all the Longwood staff for accommodating the tour

Photo was taken in the corridor





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Philadelphia Section

2015 Call for Nominations

The IEEE Philadelphia Section Nominating Committee is asking for your help in identifying Philadelphia Section members who may be interested in, and well qualified for, serving in the following Philadelphia Section board positions: Chair, Vice-Chair, Secretary and

Treasurer. Descriptions of each position are summarized below.

Maintaining a vital and active section is an important part of what makes the Philadelphia Section successful, with a history dating back to 1903. Self-nominations are acceptable.

To nominate candidates, please send an email by June 9, 2015 to sec.philadelphia@ieee.org that includes the title of the position for which you are nominating, along with the following information:

- Nominee name**
- Mailing address**
- Telephone**
- Email**
- Reason for nomination**
- Biographical Sketch**

The Nominating Committee will contact the nominee and help guide them through the election process. Elections shall occur in November.

Your nomination must be received by June 9, 2015.

Sincerely,
Margaret Goodman, Chair
2015 IEEE Philadelphia Section Nominating Committee

IEEE Philadelphia Section Executive Board Positions:

CHAIR:

The Section Chair shall serve as Chair for all meetings of the Section, the Section Administrative Committee, and Section Committees.

VICE-CHAIR:

The Section Vice Chair shall assist the Chair in the coordination of all Section activities. At the request of the Section Chair or in the absence of the Section Chair, the Section Vice Chair shall chair meetings of the Section, Section Committees and Section Administrative Committee.

SECRETARY:

The duties of the Section Secretary shall include correspondence, the keeping of the minutes of the Committee meetings, mailing notices, and submission of meeting and officer reports to the Member and Geographic Activities Department at the end of each year and such other duties as are assigned to him/her by the Chair.

TREASURER:

The duties of the Section Treasurer shall include the development of a Section budget for approval by the Section, accounting of all Section funds, keeping descriptive financial records, and submitting the Financial Operations Report of the Section to the IEEE Staff Director, Financial Services.

For detailed descriptions of IEEE positions, expected duties, and operating procedures, please refer to the MGA Operations Manual.

Spectrum Exploration and Exploitation: Joint Optimization of Identifying and Accessing Idle Spectrum

Presented by: Prof. Visa Koivunen (F), D.Sc. (EE)

Sponsors: *IEEE Philadelphia Section Signal Processing Society (SP) and the Aerospace Electronics Systems (AES) Joint Chapter.*

MEETING DETAILS

Date: Tuesday, June 2, 2015

Time: 5:30 P.M. - 7:00 P.M. Light refreshments will be provided.

Location: Drexel University, Bossone Building, Hill Conference Room, 3141 Chestnut St. Philadelphia, PA, 19104

Cost: No Admission Charge. We ask that you register by vTools or email

Biography: Visa Koivunen (F) received his D.Sc. (EE) degree with honors from the University of Oulu, Dept. of Electrical Engineering. He received the Primus Doctor (best graduate) Award among the doctoral graduates in years 1989-1994. He is a member of Eta Kappa Nu. He was a visiting researcher at the University of Pennsylvania, USA, from 1992 to 1995; Faculty, Tampere University of Technology, Finland, from 1997 to 1999; and Full Professor of Signal Processing, Aalto University (formerly known as Helsinki University of Technology), Finland, since 1999. He holds the Academy Professor position (distinguished professor nominated by the Academy of Finland). He was a Principal Investigator in SMARAD Center of Excellence in Research nominated by the Academy of Finland in 2002-2013. He was also Adjunct Full Professor, University of Pennsylvania, USA (2003-2006); Visiting Fellow, Princeton University, NJ, USA (2007, 2013-2014); and part-time Visiting Fellow, Nokia Research Center (2006-2012).

Questions about this meeting can be directed to Michael Mayor 484.524.3264 or email michael.mayor.pe@ieee.org.

"Section organization notes – as of May 20.

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Adcom meets second Tuesday of the month (June 9) at the Sheraton University City. Members are welcome to attend. Reserve a seat by calling the office by the Friday before.

Our most helpful people are at the Main Office:

11 Bala Avenue, Bala Cynwyd PA 19004, 484.270.5136 sec.philadelphia@ieee.org

SAVE THE DATE: Bus Trip to New York to Attend the 2015 World Maker Faire

By John Ianuzzi

Maker Faire is the Greatest Show (and Tell) on Earth—a family-friendly festival of invention, creativity and resourcefulness, and a celebration of the Maker movement. Bring the entire family and enjoy a fun-filled day! <http://makerfaire.com>

MEETING DETAILS

Date: Saturday, September 26, 2015

Time: 7:30 A.M. - 6:30 P.M.

Location: New York Hall of Science, Queens NY

Registration & Information:

Saturday, September 26, 2015

Bus departure: 7:30 A.M.

Departing from: Old Pathmark, Church Road and Lenape Road in Cherry Hill, NJ

Bus departure to return home: 4:00 P.M.

Departing from: New York Hall of Science, Queens, NY

Note: The Group will travel by a Charter Coach Bus to attend the Maker Faire.

Pricing reflects a 15% discount on all tickets. Price includes bus accommodations and admission to the Maker Faire. Additional information will be provided prior to trip.

For pricing information go to: www.ieeephiladelphia.org.

OTHER PAYMENT METHODS: You may pay with a personal check or money order payable to IEEE-Phila. Mail payment to: IEEE Philadelphia Section 11 Bala Avenue Bala Cynwyd, PA 19004

Maker Faire is an exposition/celebration for do-it-yourselfers (DIYs) driven to build or "make" things...anything. Over 60,000 (tons of families) attended the event featuring literally hundreds of tables and booths (600 +) where DIYs can exhibit their projects, share and exchange ideas in an open, family friendly environment.

In addition to the projects and demonstrations, there were walk-in workshops for soldering, woodworking, building and launching air-propelled rockets and paper airplanes. These workshops enabled new DIYs (a lot of them kids) to pick up some helpful hints and allowed more experienced DIYs to share their skills. Short technology seminars were also held every couple of hours or so, describing technologies and applications.

Makers are kids, students, teachers, entrepreneurs, moms and dads, virtually all DIYs that have a strong desire to bring a vision or idea to life. Entire families share experience and knowledge with parents and kids working together for a common goal.

For questions and more information, please contact the Philadelphia Section office at sec.philadelphia@ieee.org or 484.270.5136.

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