PHILADELPHIA SECTION of the IEEE

Membership in these counties: Bucks, Chester, Delaware, Montgomery, Philadelphia, (PA)
Burlington, Camden, Gloucester (NJ)

Almanack

Vol. 59, No. 4 www.ieeephiladelphia.org **April 2014**

THE IEEE Philadelphia Section 2014 Awards Banquet & Gala (April 12) at the Union League

TEN REASONS FOR ATTENDING

1. This is one of the best ways to celebrate your engineering profession and to increase your contact and friendship with your peers in the Delaware Valley.
2. The Philadelphia Section is one of the largest and most influential sections in the IEEE. Become a part of its activities.
3. For management, this is an ideal way to reward your engineers and managers and increase your social contact with them and their families in a most pleasant atmosphere.
4. The Union League is one of the most prestigious locations for professional banquets in the Philadelphia area.
5. You will be present and participate when we recognize and reward our outstanding members (your peers) in a short ceremony. List of awardees is on page 6.
6. The Philadelphia Section partly subsidizes the banquet.
7. You will hear an interesting and provocative keynote address by Mark Allen, Ph.D., Scientific Director of the Singh Center for Nanotechnology, University of Pennsylvania. Biography is printed on page 3.
8. Organization and corporate sponsorship will be recognized at the Banquet, in the Awards Program Book, and in the Philadelphia Section E-Newsletter (the Almanack), which goes to 4,000 professionals and decision makers.
9. The evening will conclude with a gala that you can enjoy with your friends at your leisure. Ben Mauger's Speakeasy Six will provide the background music.
10. All in all, this is quite an opportunity. Don't miss it!

Be sure to reserve your seat! Call the IEEE Office at 484.270.5136. The reservation form is on the next page. It is now easy to use vtools to register.

The Philadelphia Section of the IEEE
Cordially Invites You to the Annual
Awards Banquet & Gala
At
The Union League of Philadelphia
Broad and Sansom Streets, Philadelphia, PA 19102

Saturday, April 12, 2014
Hosted Reception 5:30 PM | Dinner 6:30 PM

$850.00 Table of 10 | $85.00 pp by 3/7/14
$90.00 pp by 4/4/14 | $100.00 pp after 4/4/14
Dress is Business Attire

Final Registration Deadline: April 9, 2014. Please note: Cancellation must be made in writing by April 9, 2014 to receive a refund or not be liable for payment)

Registration: # _____ Persons at $_____ per person | # _____ Table (s) at $850

Enclosed is a check in the amount of $ _____ Payable to "IEEE-Phila", or charge $_____ to my
___ Visa ___ MasterCard ___Amex ___Discover Exp. Date_____ CSV #_____
Credit card # _____

Name on Card _____

Billing Address, City, State, Zip _____

Billing Telephone# _____

List attendee name(s) w/designation and company: (you may email the list of attendee to sec.philadelphia@ieee.org

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Contact name _____

Company _____

Tel _____ E-mail _____

E-mail/fax to: IEEE- Phila 610.664.5599, sec.Philadelphia@ieee.org;

IEEE Section Office, 11 Bala Avenue, Bala Cynwyd, PA 19004 1484.270.5136 | sec.philadelphia@ieee.org

Inside the Almanack

Events Calendar

April 2. Delaware Valley Science Fair, Oaks, PA.
April 4. Young Professionals, Philadelphia Art Museum
April 4-6. Region 2 Student Activities Conference, Rowan University
April 4–6. Vintage Computer Festival East, Wall NJ
April 8. Adcom, University City Sheraton Hotel
April 12. Awards Banquet, Union League
April 15. IEEE Night, University City Sheraton Hotel
April 14. Start of Passover (6 pm)
April 18. Good Friday
April 20. Easter Sunday
April 21: AP/MTT-S, Drexel Univ.
April 22. PES/IAS, 2301 Chestnut St., Philadelphia
April 22. Earth Day
April 23. Magnetic Recording Symposium, Villanova University
April 24. Employment Network, Great American Pub, Conshohocken, PA.
April 26, Tour of Hagley Museum, Wilmington, Del.
April 28. CS/CAS/SMC, Drexel University
April 28. CS/CAS/SMC, Villanova Univ.
May 3. Science Carnival, Benjamin Franklin Parkway
May 3. Entrepreneurs' Network, Temple University
May 6. CONET, Location to be announced
May 6. Societies Summit, 3100 Market St., Philadelphia
May 9. Mother's Day
May 17. Life Members excursion to Sarnoff Collection
May 26. Memorial Day
May 27. Lecture by Dr. Maria Greco, Drexel University
May 27. Senior Member Workshop, University City Sheraton Hotel

Electrical Insulation Conference Meeting in Philadelphia

Starting in 2014 the Dielectrics and Electrical Insulation Society (DEIS) is transitioning the Electrical Insulation Conference (EIC) from a biennial to an annual event. The 32nd edition of the EIC will take place in Philadelphia, PA, USA from June 8 to 11, 2014. This will officially mark the end of the International Symposium on Electrical Insulation (ISEI), which had previously alternated on a yearly basis with the EIC. The 2014 EIC will be held from June 8th to the 11th at the Sheraton Philadelphia Downtown Hotel, 201 North 17th Street, Philadelphia, Pennsylvania, USA.

IEEE NIGHT

Philadelphia Section Meeting

Joint with: Engineering Management/Social Implications of Technology (EM/SIT) and Power Engineering/Industry Applications (PE/IA)

Date: Tuesday, April 15, 2014
Time: Dinner is at 6 pm. Program starts at 7 pm, and 8 pm.
Location: Sheraton University City, 36th and Chestnut, Philadelphia
Cost of dinner is $25.00 (students $15.00); meeting only is free (Real cost of dinner is higher, which is mostly subsidized by section)
Reservations are needed, call 484.270.5136 or email the section office.
sec.philadelphia@ieee.org or use vtools in the web site
Indoor parking is at location and paid by section. Bring ticket to be stamped.
Note: In the event of bad weather please call the Sheraton after 1pm the day of the meeting at (215) 387-8000. Ask the front desk if the meeting has been canceled.

Mr. Michael A. Mayor, PE
Independent Consultant
Information Security, Cryptography and Cryptanalysis

The 21st Century has seen an explosion in the use of Digital Data where data containing personal identity, financial information, medical records, corporate business strategy proprietary technical data and national defense data is stored and retrieved in digital form and transmitted over wireline and wireless communications links. Data Collection activities that were once the province of States targeting other Countries are now conducted by States, private and criminal organizations (and even private individuals) targeting all sources of private data. Starting with key concept definitions, proceeding through a brief historical background the presentation gives a survey of overall Information Security, Cryptographic and Cryptanalysis approaches, including historical encryption methods and algorithms, recovery of erased data, wireline and wireless communications security, low signature RF Systems and future encryption trends and solutions like Quantum Cryptography.

Biography: Mr. Mayor has over thirty years of engineering experience and is currently an Independent Consultant providing Systems Engineering services in the area of Secure Communication and Low Signature (Low Interference) Communications Systems. His consulting services include Radio Frequency (RF) propagation modeling and analysis, Spectrum Surveillance and Spectrum Sharing, Digital Receiver Design and Digital Signal Processing algorithms. His area of expertise extends to the selection and deployment of RF and Micro- Electronics Digital Instrumentation and Test Equipment.

Formerly, he was Vice President, Advanced Technology Research and Chief Scientist in the ITT Corporation, Defense Electronics Group. In this capacity he conducted Research and Development (R&D) programs for secure Defense Communications and Communications Intelligence systems as well as Special Electronic Warfare Systems. This included RF Transceivers and Micro-Electronic components, Cognitive Radio Systems, Emitter Geolocation, Digital Signal Processing algorithms for Conventional as well as

Non-Linear and Non-Stationary Systems and Encryption methods and algorithms. He conducted key R&D programs with the Defense Advanced Research Projects Agency (DARPA) the US Department of Defense and several Agencies of the US Government.

Mr. Mayor authored six patents in the areas of Spread Spectrum Signaling systems and Digital Instrumentation to detect Electromagnetic Emissions. He received the ITT Corporation Engineered for Life Award for substantial technical contributions in the areas of Tactical Communications, Advanced Microelectronics and Emitter Location Systems.

Mr. Mayor is a Licensed Professional Engineer and holds a Master of Science in Engineering (MSE) degree from the Moore School of Electrical Engineering, University of Pennsylvania and a B.Sc. from Villanova University. He is a member of the National Society of Professional Engineers (NSPE), a Senior Member of the Institute of Electrical and Electronic Engineers (IEEE), a member of the Armed Forces Communications and Electronics Association (AFCEA) and a member of the Association of Old Crows (AOC – The Electronic Warfare Association).

Jack Nachamkin, Ph.D.
Can "Cold Fusion" Be Real?

Advances in physics are rarely made by purely theoretical concepts. Experiments that can continually resist explanation by known theory frequently can lead to new theoretical explanations outside the paradigm of extant knowledge. History bears this out from Archimedes to Einstein. (Einstein was not the first to propose relativity. The Nobel Committee awarded him the Prize for his work on the photoelectric effect.) From its first official public announcement, "Cold Fusion" has had a rocky reception. Is it fusion? Is it bad physics? Is there an explanation for what is becoming more and more evident that "something" is responsible for anomalous energy production, under the right conditions, when cold fusion experiments are performed? A simplified explanation of the mechanism of "hot fusion" will be given, which presumably occurs in thermonuclear weapons. The explanation rests as much on modern quantum theory as well as 19th century statistical physics. An alternate and speculative theory will be presented that replaces the 19th century physics with a quantum-electrodynamics model that assumes phenomena in cold fusion experiments that can alter the zero-point virtual photon exchange that is responsible for the forces of electrostatic repulsion, i.e., the coulomb barrier between charged ions.

Jack Nachamkin was with Boeing in Philadelphia since 1997, now retired, specializing in the study of electromagnetic phenomena affecting aircraft. He has a B.S. in Physics from Polytechnic University of New York and a Ph.D. in Physics from Rensselaer Polytechnic. At Los Alamos National Labs in 1968-1980, he worked on theoretical and computational aspects of weapons systems, laser fusion, plasma dynamics, wind-power systems, vacuum electronics, superconducting-magnet microscopy, and electric-vehicle technology. In 1980 he joined Exxon as a computational physicist and colloid chemist on a team designing a wet-chemistry electronic display. He was elected an Exxon Fellow in 1983. From 1984 to 1989 he worked at Lockheed's Palo Alto Labs as Principal Investigator on an Air Force project developing a large three-dimensional radar-scattering code. He continued his radar work at McDonnell-Douglas. In 1991-1992 he had an appointment with the University of Dayton, at EDWARDS AFB investigating "anomalous" phenomena. In 1992-1996 he worked on broadband ultrasound and sonar technology at Martin-Marietta/Lockheed-Martin in San Diego.

Jack Nachamkin has published papers in group theory, nuclear and electromagnetic scattering, and numerical analysis. For his codes and research on lightning interactions with aircraft he was awarded the IEEE Benjamin Franklin award. His patents deal with detection of defects in aircraft skins, remediation of RF interference, hybrid solar and diesel generators, and recovery of electromagnetic energy from background radiation, with a patent pending for an innovative solar tracker. Among other pursuits in retirement, Dr. Nachamkin manages a small farm near Philadelphia, raising chickens, turkeys, and organically grown vegetables.

2014 Annual Awards Gala Selected Winners

This is the list of those who will be honored at the Awards Banquet. The Awards Committee of Merrill Buckley, Don Dunn, Tom Fagan, and Victor Schutz did a first class job of selecting.

Past chair: Mark Soffa, Kulicke and Soffa Industries
Chapter of the Year: Control Systems/Circuits and Systems/Systems, Man and Cybernetics (CS//CAS/SMC). Recipient: Ziauddin Ahmad, Ph.D.
Alan Kirsch Student Award: Christopher Cullen, Rowan University
New Fellows: Weidong Mao, Ph.D., Comcast Cable;
Christos Davatzikos, Ph.D., University of Pennsylvania;
Ali Jadbabaie, Ph.D., University of Pennsylvania;
Daniel Lee, Ph.D., University of Pennsylvania;
Andrew Ott, PJM Interconnection, LLC
Section Award: Joseph Teti, Lambda Science, Inc.
Benjamin Franklin Key Award: Dennis Al Silage, Ph.D., Temple University
Benjamin Franklin Key Award: Rahul Mangharam, Ph.D., University of Pennsylvania
Benjamin Franklin Key Award: George Mathew, Ph.D., Drexel University
Corporate Innovation Award: The Boeing Company. Recipients: Bruce Harmon, Glann Matsanka, Joshua Neidich, and Ryan Olivo
Young Engineer of the Year Award: Arul Manickam, Lockheed Martin
Young Engineer of the Year Award: Terrell Felton, The Boeing Company
Young Engineer of the Year Award: Daniel McCann, Alstom Grid
Delaware Valley Electrical Engineer of the Year: William Pearson, Lockheed Martin

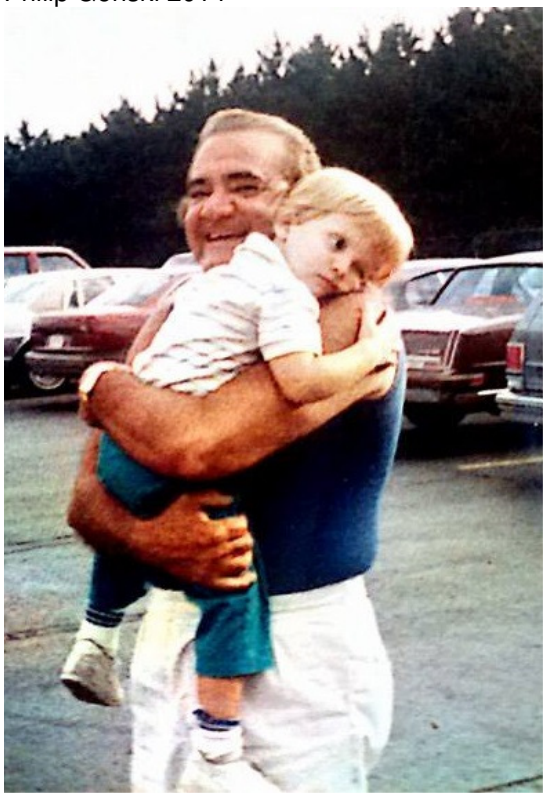
IEEE PHILADELPHIA SECTION CONGRATULATES OUR NEW SENIOR MEMBERS!

The first winter A&A Review Panel meeting was held on February 15 in Los Angeles Cal. Three members of our Section advanced. We congratulate them.

Andrew Cohen, also in Computer Society
William Goodman, also in Communications Society
Santosh Vankatesh, also in Information Theory Society.

Chair's Message
By Phil Gonski

Philip Gonski 2014



Philip Mole' and Author 1990

We all experience a loss of those that left an indelible impact on our lives. Regrettably, this month I mourn the loss of my grandfather, Philip Mole', who was truly an inspirational example of the "American Dream."

Phil was born into an immigrant Italian family in Chicago, at the start of the Great Depression. His father was a barber who struggled to provide for his family. As the youngest in the family, Phil was tasked with begging for money, shining shoes, and selling "sandwiches" that had nothing in them. Occasionally, he would get mugged and robbed of his earnings. Even more tragic, he witnessed his brother pass away at a young age. His stories of this time were a combination of humor and hardship.

To escape this scene, he enlisted at age 17 to serve in the US Navy during World War II. His assignment was a troop transport ship, where he was an Electrician, and manned anti-aircraft guns. Stories of the horrors of Okinawa, shooting down Kamikaze pilots, and time ashore on Iwo Jima kept me at the edge of my seat when I was a kid more than any movie, because I could see the excitement and sorrow in his eyes.

Taking advantage of the GI Bill, my grandfather was able to attend college, and graduate with an Electrical Engineering degree, all while working two jobs, with kids at home.

Degree in hand, he left used car sales behind, and worked for several private companies, concluding with his patent of the electrical hospital bed. Since his patent was owned by his employer, he decided it was time to go his own way.

His inventions started with the rotating barber pole, designed as a way to drum up business for his father. For the Christmas season, his "color wheel" turned everyone's living room into a more colorful place. Observing a need for improved police sirens and lights, his patented police signal was adopted by many of the mainland states. When

mosquitoes were being a big nuisance in the summertime, his electric bug light helped to curtail their population. He was the most ambitious entrepreneur I have ever met.

Always looking for a challenge, he completely changed course and went into environmental protection, eventually becoming the first head of the Cook County EPA. His expertise became widely known in both Illinois and the nation, and was appointed by four U.S. presidents to serve on committees. His last project was completed just this summer.

His best trait was his exemplary lust for life. Before and after his multiple heart surgeries, he joked with doctors and made everybody laugh. When getting a pig valve replacement, he asked the doctor with a straight face that his big concern was that he would start rolling in mud. When we were kids, he would tell us stories that made absolutely no sense at all, and followed by his bellicose laugh, left us all to ponder what we had missed. In his 80s, he started driving a red corvette go-kart, swerving all around his community and waving at everybody.

No matter what life threw at him, he always came back fighting and smiling, right up until the end. Phil would give anybody the shirt off his back, and he will always be my hero.

Section notes

IEEE PHILA. SECTION OFFICERS

Chair: Philip Gonski, P.E., pgnski@gmail.com
Vice Chair: Adam Fonteccio. Ph.D., sec.philadelphia@ieee.org
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Past Chair: Mark Soffa, msoffa@kns.com

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

Excom meets second Tuesday of the month (April 8) at the Sheraton University City. Members are welcome to attend. Reserve a seat by calling the office by the Friday before.

Almanack Staff

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Web site: www.ieeephiladelphia.org

Region 2 Student Activities Conference is at Rowan U. April 4-6

The Student Activities Conference (SAC) is the largest IEEE student event in the Northeastern United States. Engineering students participate in prize driven competitions ranging from robotics to brown bag events to ethics competitions. This year's SAC is being held at Rowan University on April 4-6, 2014 although the bulk of activity will be on Saturday. Student Branches from 70 universities are expected to attend.

IEEE Philadelphia - Young Professionals Meeting

By Philip Gonski and David Mino

Come join other Young IEEE Members to socialize and watch the world's largest video game of Tetris, being played on the Cira Center. The Tetris attempt is the starting event for Philly Tech Week, a nine-day festival of all things geek. There will be food trucks, games, and music at the Eakins Oval to witness the event. IEEE Members will be meeting at the Art Institute Steps at 6:30 pm in anticipation of the 7 pm Event

Location: Philadelphia Museum of Art STEPS
2600 Ben Franklin Parkway, Philadelphia, Pennsylvania 19130
Date: 04-April-2014
Time: 06:30PM to 09:00PM
Registration: https://meetings.vtools.ieee.org/meeting_view/list_meeting/24843

IEEE Philadelphia Employment Network Group

By George Butts

Date: Thursday, April 24, 2014
Time: 7:00 - 9:00 PM
Topic and Speaker: Spring IEEE Employment Network - Social Networking Event
Location: Great American Pub - Oak Room (Public Bar area near fireplace - Entrance on W 2nd Ave) 123 Fayette Street Conshohocken PA 19428 (Phone: 610.940.0540)
Cost: No Charge, snacks will be served, everyone is on their own for drinks.

The April 2014 Employment Network Event will be a social gathering sponsored by the Philadelphia Section of IEEE. Please join us for a Spring Social Networking Meeting to help individuals network towards career development and employment support.
Vtools to register for this event:
https://meetings.vtools.ieee.org/meeting_view/list_meeting/24739

Volunteer for Philadelphia Science Carnival

The Engineer's Club of Philadelphia will be sponsoring a booth at the Philadelphia Science Carnival again this year! The Carnival is a highly visible outdoor event that provides opportunity for exchange between children, teens, families and local scientists/engineers! This all-day affair will take place Saturday May 3rd, 2014. The goal is to provide family-oriented science entertainment with a hands-on activity or an interactive demonstration to get kids excited about all types of engineering! This is a great outreach opportunity to interact with kids and teens of all ages. We are looking for volunteers and activities. If you are interested in participating or have any questions feel free to contact Emily Scholl at eascholl@mccormicktaylor.com.

Standards

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

When I taught a course in Engineering Project Management at Wilkes College, many years ago, I asked the students to write a proposal in an area not covered by their engineering classes. That way, they had to think about all facets of a project; not just technology, but also schedules, costs, and staffing. In a like manner, I challenge local IEEE members to do some creative thinking. How should an electrical standard be set if there were no existing one, such as the hypothetical case of humans settling on a new planet? The challenge to the electrical engineering profession is not to come up with numbers, but to identify the factors that would be involved in setting such a standard. Most of us know that the frequency standard in North America is 60 Hertz, but it is 50 Hertz in Europe and the voltage also differs, while the island of Malta runs at 100 Hertz. Japan uses both 50 and 60 Hertz on different islands, while at one time part of Canada operated at 25 Hertz. Presumably all these choices were made by competent engineers. Send responses regarding how you would think about frequency, voltage and any other aspects of electrical systems to my email: ernest.cohen@ieee.org. Any entries received before the May IEEE section meeting will be rewarded with a free autographed copy of my novel, *RIF*.

We are all aware of another standard in our lives: the QWERTYUIOP keyboard, which derived from typewriters. The major concern was to minimize the chances of the keys being jammed. About a half century ago, a new ergonomic keyboard layout, the so-called Dvorak keyboard was suggested, but too many people had memorized the present one, so there wasn't sufficient interest to actually change the standard. Typewriters originally had just two characters on each key: a lower case and a capital letter, with a fourth row of keys for numbers and special characters. I grew up with an unusual typewriter, that our family dubbed the three-shift marvel. It had no fourth row for numbers. The letters were in the usual order, but there was a third character on each key, activated by a "number" shift key. These included the numbers and several more special characters than the standard typewriter. Now, computer keyboards have four functions for each key, activated by "Shift, Ctrl and Alt" buttons. But QWERTYUIOP remains.

Replacing an existing standard is difficult. One company, trying to market a financial information system to business executives, who did not usually type, tried a keyboard in alphabetical order. It went over like the proverbial "lead balloon."

Standards are meant to make things work better. For many decades, any plug would go into any outlet, at least in America, with a few exceptions for high power or grounded equipment. In England, the city of Birmingham had non-standard electrical outlets, as evidenced by instructions for some European built equipment, "Go to the ironmonger (hardware store), and have a plug attached to the cord." Over here, the change to polarized outlets was half convenient: old plugs would go into the new outlets, but the new polarized plugs would not go into existing outlets. This is a typical problem when standards are changed.

Some American and British screws have identical diameters and pitches, but differ in the shape of the threads, so they are not compatible.

Benjamin Franklin proposed a new standard in writing English, under which there would be a one-to-one correspondence between letters and sounds. This would involve dropping four letters: C, W, Y and J, and adding six new letters for sounds which presently require two letters, such as "sh" and "ch." A sample of his new spelling is: "Az to oz hu do nt spel uel, if i tu difikltiz er kmperd,..." That idea was never adopted, but it would have ended the

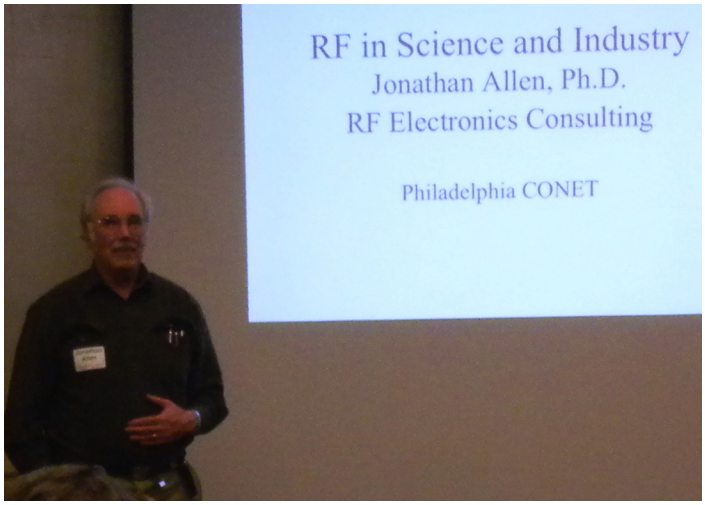
confusion between "polish" as an adjective and a verb. Also, my favorite example, of one spelling for two very different words: "periodic acid" does not belong at the end of a sentence!

I have seen proposals to build Maglev trains for America, but do not expect this to happen, in spite of possible technical advantages, because nobody is ready to face the hard questions: would this be done for the entire country (or continent), and would it include freight service. Building it for only the Bos-Wash corridor would preclude through-passenger rail service from this area to destinations outside the corridor.

CONET Meeting News

By Baw Ch'ng

The IEEE Philadelphia Consultants Network (CONET, **www.PhilaCONET.com**) held a meeting on Tuesday, March 4. The next CONET meeting shall be on **Tuesday, May 6**.



The March 4 meeting featured a presentation by Dr. Jonathan Allen on RF applications in science and industry besides communications. Dr. Allen specializes in RF technologies. Dr. Allen's presentation covered a broad range of RF applications as they relate to scientific instrumentation, food production, power & energy, construction, manufacturing, and other industries other than communications. Dr. Allen's presentation, and other past CONET presentations, may be accessed at **www.PhilaCONET.com**.

CONET was also delighted to welcome new members Mr. Ron Raymond, Mr. Bud Nelson, and Mr. Mark Goncharovsky. Mr. Ron Raymond specializes in semiconductor fabrication. Mr. Bud Nelson specializes in information technology. Mr. Mark Goncharovsky specializes in programmable logic and digital hardware design.

Kick-starting a new segment dedicated for CONET members to share consulting experiences, CONET Chair Dr. Robert Peruzzi gave a short presentation on the different consulting billing models and attendees discussed the relative merits and pitfalls of each.

Next Meeting: The next CONET meeting will be held on **Tuesday**, **May 6**.

Kindly visit **www.PhilaCONET.com** for information on membership, up-coming meetings, pass meeting presentations, and to learn more about the wide range of consulting services offered by CONET consultants from CONET's online Consultant Directory.

Maria S. Greco graduated in Electronic Engineering in 1993 and received the Ph.D. degree in Telecommunication Engineering in 1998, from University of Pisa, Italy. From December 1997 to May 1998 she joined the Georgia Tech Research Institute, Atlanta, USA as a visiting research scholar where she carried on research activity in the field of radar detection in non-Gaussian background.

In 1993 she joined the Department of Information Engineering of the University of Pisa, where she is Associate Professor since December 2011. She's IEEE fellow since January 2011 and she was co-recipient of the 2001 IEEE Aerospace and Electronic Systems Society's Barry Carlton Award for Best Paper and recipient of the 2008 Fred Nathanson Young Engineer of the Year award for contributions to signal processing, estimation, and detection theory. She has been co-general-chair of the 2007 International Waveform Diversity and Design Conference (WDD07), Pisa, Italy, in the Technical Committee of the 2006 EURASIP Signal and Image Processing Conference (EUSIPCO), Florence, Italy, in the Technical Committee of the 2008 IEEE Radar Conference, Rome, Italy, in the Organizing Committee of the CAMSAP09, Technical co-chair of CIP2010 (Elba Island, Italy) and General co-Chair of CAMSAP2011 (San Juan, Puerto Rico). She was guest co-editor of the special issue of *the Journal of the IEEE Signal Processing Society on Special Topics in Signal Processing* on "*Adaptive Waveform Design for Agile Sensing and Communication*," published in June 2007 and lead guest editor of the special issue of *International Journal of Navigation and Observation* on" *Modelling and Processing of Radar Signals for Earth Observation* published in August 2008. She's Associate Editor of IET Proceedings – Sonar, Radar and Navigation, of the IEEE Transactions on Signal Processing, Associate Editor-in-Chief of the IEEE Aerospace and Electronic Systems Magazine, member of the Editorial Board of the Springer Journal of Advances in Signal Processing (JASP), member of the IEEE Signal Processing Theory and Methods (SPTM) and Signal Array Processing (SAM) Technical Committees. She's also member of the IEEE AES Board of Governors and Vice-Chair of the IEEE AES Radar Panel.

She is a coauthor of the tutorials entitled "Radar Clutter Modeling", presented at the International Radar Conference (May 2005, Arlington), "Sea and Ground Radar Clutter Modeling" presented at 2008 IEEE Radar Conference (May 2008, Rome, Italy) and at 2012 IEEE Radar Conference (May 2012, Atlanta, USA), and coauthor of the tutorial "RF and digital components for highly-integrated low-power radar" presented at the same conference.

Her general interests are in the areas of statistical signal processing, estimation and detection theory. In particular, her research interests include clutter models, spectral analysis, coherent and incoherent detection in non-Gaussian clutter, CFAR techniques, radar waveform diversity and bistatic/mustistatic active and passive radar. She co-authored many book chapters and more than 140 journal and conference papers.

Distinguished Lecture
Professor Maria Greco is speaking May 27
"Advanced Techniques of Radar Detection in Non-Gaussian Background"

Date: May 27. 2014
Time: 11 am to 12 noon
Location: Drexel University
Hill Conference Room (Room 240)
LeBow Engineering Center
3141 Chestnut St.
Philadelphia, PA 19104
Parking: http://www.drexel.edu/dbs/parkingServices/Overview/
Admission: No charge
Lunch: Sandwiches will be served.

Abstract: The modeling of the clutter echoes is a central issue for the design and performance evaluation of radar systems. Aim of this lecture is to describe the state- of-the-art approaches to

the modeling and understanding of non-Gaussian radar clutter echoes and their implications on performance prediction and signal processors design.

After a short first part dedicated to modern statistical and spectral models for high-resolution sea and ground clutter and to the methods of experimental validation using recorded data sets, the lecture will focus on coherent radar detection in non-Gaussian background.

In high-resolution radar systems, the disturbance cannot be modeled as Gaussian distributed and the classical detectors suffer from high losses. Then, according to the adopted disturbance model, optimum and sub-optimum detectors are derived and their performance analyzed against a non-Gaussian background. Different interpretations of the various detectors are provided that highlight the relationships and the differences among them. Moreover, some discussion is dedicated to how to make adaptive the detectors, by incorporating a proper estimate of the disturbance covariance matrix, in order to guarantee the CFAR behavior of the detector.

A plethora of results with simulated and real recorded data will be shown.

Hagley Museum and Library Tour

Situated on 235 picturesque acres along the Brandywine River, Hagley is the birthplace of the DuPont Company. Among industrial ruins and restorations, today's park-like museum depicts home and work life in a nineteenth-century industrial community along the Brandywine.

The restored French-style garden cultivated by E. I. du Pont bursts with the color of hyacinths, crocuses, daffodils, and other spring flowers.

All ages are invited to investigate and experience the unfolding history of American business, technology, and innovation, and its impact on the world, from our home at the historic DuPont powder yards on the banks of the Brandywine.

Location: 200 Hagley Road, Wilmington, Delaware
Date: 26-April-2014
Time: 12:30PM to 02:30PM (2.00 hours)
Registration: Use vtools or contact Section office.
Cost: $10 per person

Dr. Mark Allen, *Awards Banquet Featured Speaker*

Mark Allen is a Penn alumnus, receiving a B.A. in chemistry and a B.S.E. in chemical engineering and electrical engineering. He received a Ph.D. in microelectronics from the Massachusetts Institute of Technology in 1989. Allen then joined the faculty of the School of Electrical and Computer Engineering at the Georgia Institute of Technology, where he is currently Regents' Professor and holds the J. M. Petit Professorship in Microelectronics, as well as a joint appointment in the school of Chemical and Bimolecular Engineering. From 2007 to 2010, he was senior vice provost for research and innovation. In 2011, he was named executive director of the Institute for Electronics and Nanotechnology, which supervises and coordinates Georgia Tech's research activities from nanotechnology to electronics and manages the university's nanotechnology infrastructure investments.

Mark has been named the inaugural scientific director of the University of Pennsylvania's Krishna P. Singh Center for Nanotechnology. The Singh Center, located on Walnut Street on the eastern edge of Penn's campus houses state-of-the-art nanotechnology facilities that will enable researchers in the Penn community and the surrounding area to make critical advances in this growing field.

Philadelphia Section

IEEE PHILADELPHIA CHAPTER OF CONTROL SYSTEMS SOCIETY
PRESENTS

PREDICTING EXTREME EVENTS IN FINANCE, INTERNET TRAFFIC, AND WEATHER: USE OF HEAVY-TAILED DISTRIBUTIONS

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THE UNIVERSITY OF TEXAS AT DALLAS

APRIL 28TH, 2014

- **Afternoon Session:** **1-2PM; 302 BOSSONE BUILDING, 32ND & MARKET STREET, Drexel University.** (In collaboration with Drexel IEEE Graduate Forum)
- **Evening Session:** **7-8PM; Tolentine Hall, Rm. 305, 800 Lancaster Ave., Villanova University.** (In collaboration with Mechanical Engineering Dept.)

Abstract: As far back as 1963, Beniot Mandelbrot (who sadly passed away recently) pointed out that asset price movements in the real world don't follow the Gaussian distribution. Instead they are "heavy-tailed" -- that is, they display a kind of self-similarity and scale-invariance. Since then, similar patterns have been observed in extreme weather such as rainfall, and more recently, in Internet traffic. Recent research in "pure" probability theory shows that heavy-tailed random variables have some very unusual properties. For instance, if we average many observations of such variables, the averages move in a few large bursts instead of moving smoothly. Such behavior has indeed been observed in the stock market. The pervasiveness of heavy-tailed distributions in so many diverse arenas has implications for modeling, and risk mitigation. How do we design Internet traffic networks and storage servers if the volume of traffic is heavy-tailed? How do we hedge our equity positions if asset prices move in a heavy-tailed manner? In this talk I will describe the issues involved through a combination of intuitive arguments, visualizations, and formal mathematics. My hope is to inspire practicing engineers to become familiar with this fascinating class of models, and theoretical researchers to study the many open problems that still remain.

Biography: Dr. Mathukumalli Vidyasagar received the B.S., M.S. and Ph.D. degrees in electrical engineering from the University of Wisconsin in Madison, in 1965, 1967 and 1969 respectively. Between 1969 and 1989, he was a Professor of Electrical Engineering at Marquette University, Milwaukee (1969-70), Concordia University, Montreal (1970-80), and the University of Waterloo, Waterloo, Canada (1980-89). From 1989 to 2000 he was the Director of the Centre for Artificial Intelligence and Robotics (CAIR) in Bangalore, India and from 2000 to 2009 he was the Executive Vice President of Tata Consultancy Services. In 2009 he joined the Erik Jonsson School of Engineering & Computer Science at the University of Texas at Dallas, as a Cecil & Ida Green Chair in Systems Biology Science. In March 2010 he was named the Founding Head of the newly created Bioengineering Department. His current research interests are in the application of stochastic processes and stochastic modeling to problems in computational biology, and control systems. Dr. Sagar has received a number of awards in recognition of his research contributions, including Fellowship in The Royal Society, the world's oldest scientific academy in continuous existence, the IEEE Control Systems (Field) Award, the Rufus Oldenburger Medal of ASME, and others. He is the author of eleven books and nearly 140 papers in peer-reviewed journals.

SENIOR MEMBERSHIP WORKSHOP

STEP UP TO SENIOR MEMBER — ELEVATE YOURSELF!

The Philadelphia Section wants to increase the number of Senior Members in our section. We are setting up a workshop for the purpose of signing up new Senior Members. We gain, and you gain by advancing.

When: Tuesday Evening, May 27, 2014 at 6 PM to 8:30 PM

Where: Sheraton University City; 36th and Chestnut; Philadelphia

Perks: Sandwiches will be served. Parking will be validated.

What does it mean to be a Senior Member of the IEEE? The Senior Member grade is a way for IEEE members to receive recognition for their professional experience and significant performance in Electrical and Electronics Engineering and related fields, including: Computer Science and Information Technology, Physical Sciences, Biological and Medical Sciences, Mathematics, Technical Communications, Education, Management, Law, and Policy.

If you meet the experience requirements, come to the workshop. If you have 10 plus years of relevant industry experience or educational accomplishments in IEEE designated areas, you can be eligible for an upgrade to Senior Member grade. We will help with the references, and the rest of the paperwork. Most of the Executive Committee, who are Senior Members or Fellows will be there and can serve as reference persons. We need also volunteers from the ranks of Senior Members and Fellows to be mentors.

Address your questions to Robert Lawson at rclawson@ieee.org

Senior Member advancement provides IEEE members with significant and distinct benefits:

1. **Recognition:** The professional recognition of your peers for technical and professional excellence.
2. **Senior Member Plaque**: Since January 1999, all newly elevated Senior Members have received an engraved Senior Member plaque to be proudly displayed for colleagues, clients and employers to see. The plaque, in an attractive fine wood with bronze engraving, is sent within six to eight weeks after elevation.
3. **US$25 Coupon**: IEEE will recognize all newly elevated Senior Members with a coupon worth up to US$25. This coupon can be used to join one new IEEE Society. The coupon expires on 31 December of the year in which it is received.
4. **Letter of Commendation**: If you indicate that you would like one, a letter of commendation will be sent to your employer on the achievement of Senior Member grade.
5. **Announcements**: Announcement of elevation can be made in Section/Society and/or local newsletters, newspapers and notices.
6. **Leadership Eligibility**: Senior Members are eligible to hold executive IEEE volunteer positions.
7. **Ability to Refer Other Candidates**: Senior Members can serve as a reference for other applicants for Senior Membership.
8. **Review Panel**: Senior Members are invited to be on the panel to review Senior Member applications.

Life Members to Tour Sarnoff Collection

By Bob Paglee

The IEEE Life Member group has scheduled a tour visit for 2:00 p.m. on Saturday, May 17 at TCNJ -- The College of New Jersey. This tour features the Sarnoff Collection of over 6000 historical items. They were originally exhibited at RCA's Sarnoff Labs in Princeton and were relocated to TCNJ in 2009. TCNJ adjoins NJ Rt. 31 roughly 8 miles south of Pennington, NJ and is easily accessed via Interstates 95 or 295. Here is a link to information about the exhibit:

<http/::davidsarnoff.pages.tcnj.edu:2013:08:31:innovations-that-changed-the-world-an-introduction-to-the-sarnoff-collection:>

Benjamin Gross, Ph.D. (Princeton), Consulting Curator of the Sarnoff Collection, will discuss the process through which these artifacts were transformed into an artistic long-term exhibition. He also worked to include the Sarnoff Collection within TCNJ's classroom curricula. His focus includes the history of science, the dynamics of corporate research, the consumer-electronics industry, and the development of LCD's. He is also a research fellow at the Chemical Heritage Foundation.

The discussion and tour of the Sarnoff Collection will be of about one hour's duration. Thereafter, members of the group will be free to stroll through a colorful campus in springtime, and as an option may visit the Art Gallery where works by graduating art students are displayed. Ms. Emily Croll, Director, TCNJ Art Gallery and Sarnoff Collection, will guide the group throughout its tour within the artistic TCNJ campus that dates from the 1930s. Ms. Croll has varied experience curating extensive collections while working in the past at Bryn Mawr College, the Smithsonian, the Museum of Modern Art, and as Acting Director of the Barnes Foundation.

The tour visit is not restricted to IEEE members, but to participate, visitors must register with the IEEE Office in Philadelphia, 484.270.5136. Wives or associates also may find two other items of interest besides the Sarnoff exhibit -- the attractive campus and the optional art gallery. So they too are invited, but must also be registered. When registering, also please indicate your interest, if any, for an optional visit to TCNJ's Art Gallery.

The Sarnoff Collection space is limited and group attendance is restricted to 25, so early registration is recommended, with May 10 the preferred end date. Additional requests beyond 25 may be placed on a telephone-numbered waiting list.

All visitors are requested to gather at Parking Lot 17 before 2 p.m. Promptly, at that time, they will proceed to the second floor of Roscoe West Hall where the Sarnoff Collection is exhibited.

Directions to College of NJ from Philadelphia or South New Jersey

From Philadelphia side of the Delaware River: Using I-95 North, travel north to New Jersey and take Exit 4, NJ Route 31 (Pennington Rd.). Bear to the right off the exit ramp onto Rt. 31 going southbound. At the third traffic light (about 1.5 miles), make a left turn into the College entrance, Metzger Drive. Take Metzger Drive's curve to the left, then circle to the right around the north side of the campus, then follow the curve on the East side, now turning south. Turn right at the first driveway immediately after this second curve, and park in Lot 17. The Education Building is before you; walk to the left before it, then turn right, and the next building is Roscoe West Hall. The Sarnoff Collection is located on its second floor.

From the New Jersey side of the river, use I-295 going north. Near NJ 31 it changes name to I-95 South, then take Exit 4, NJ Route 31 (Pennington Rd.), turning left at the intersection to travel Southbound on Pennington Rd. Then continue with the same directions as stated in the third sentence above.

Links to road maps are here: Print - Maps <http://www.bing.com/maps/print.aspx?mkt=en-us&z=15&s=r&cp=40.281475,-74.786006&poi=College%20of%20New%20Jersey%2C%20NJ&pp=qqbpy78s1886&pt=pb>
A link to a detailed map of the Campus is: <http://parking.pages.tcnj.edu/parking-map/>

Above: Humanities and Social Sciences Building

Loser Hall, the main visitor building, next to the Art Gallery building

Emily Croll Will Lead the Art Gallery Tour

Emily Croll has worked in museums and arts organizations for more than twenty-five years. She is currently the Director of TCNJ's Art Gallery and the Sarnoff Collection. Prior to her tenure at TCNJ, she was Curator and Academic Liaison for Art and Artifacts at Bryn Mawr College, where she curated exhibitions, managed the school's collection of more that 50,000

objects, and taught a graduate course in museums studies. Ms. Croll has also served as Senior Administrative Officer and Acting Director of the Barnes Foundation, and she has worked at the Museum of Modern Art and Smithsonian Institution. She holds undergraduate and graduate degrees in the history of art.

Greene Hall, (left) the main administration building, is in the background, seen from the colonnade on the Science Center.

VINTAGE COMPUTER FESTIVAL EAST

The ninth annual Vintage Computer Festival East will be held April 4-6, at the InfoAge Science Center, in Wall, New Jersey, USA. VCF East is a celebration of computer history from the 1940s-1980s. This year the IEEE History Center is serving as a technical co-sponsor. The schedule includes a hands-on exhibit hall, technical workshops, lectures, a marketplace, tours of the InfoAge museum complex, a dollar-per-pound book sale, prizes, and much more. This is one of the premier "swap meets" for computer and calculator collectors (A new feature on Friday 4 April, "VCF East University," will feature a full day of technical classes.)

The main show on Saturday – Sunday, 5 – 6 April, features family-friendly lectures/ workshops and dozens of exhibits. Keynote speakers include former IBM archivist Paul Lasewicz and IEEE 802 LAN/MAN committee founder Maris Graube.

Other lectures topics include software preservation and the history of Franklin Computer Corp. Registered exhibits so far cover everything from a real Apple 1 to the M.I.T.S. Altair to DEC mini- computers. In addition, the event's main sponsor MARCH (Mid- Atlantic Retro Computing Hobbyists) will debut its UNIVAC 1219-B military mainframe computer, circa 1965. Everything is hands-on!

Tickets for VCF East University are $20 and include a pizza lunch. Tickets for the main show are $15/day and $25/both days. Saturday/ Sunday tickets are free for ages 17 and younger. A three-day adult admission is $40. Proceeds benefit MARCH. Full details are online at <www.vintage.org/2014/east/ >or by contacting MARCH President Evan Koblentz at evan@snarc.net or +1 646 546 9999.

IEEE Philadelphia Entrepreneurs' Network

- Are you an aspiring entrepreneur?
- Are you a technologist interested in the technology commercialization process?
- Do you want to learn more about… building a technology venture team… developing a technology commercialization strategy… creating compelling value propositions… evaluating various go-to-market strategies… developing a business model?

Join your IEEE Section's Entrepreneurs' Network!

For more information, contact:

Tasos Malapetsas at 973-216-5707, t.malapetsas@ieee.org

or George Szekely at 215-346-6528, george.szekely@ieee.org

The Entrepreneurs' Network will help you meet and network with other IEEE members, entrepreneurs, and service providers for small businesses.

Stay tuned for an important program announcement for early May in collaboration with Temple University's Innovation and Entrepreneurship Institute!

Become part of Greater Philadelphia's rejuvenating entrepreneurial ecosystem!

IEEE Philadelphia Entrepreneurs' Network

We are pleased to announce our kick-off event, **TechConnect**, a one-day workshop designed to help build teams necessary to translate technological innovations to market success. Whether you are a technologist, aspiring entrepreneur, or anyone else interested in the technology commercialization process, you do not want to miss this workshop!

TechConnect is jointly organized by The Innovation & Entrepreneurship Institute (IEI) and Office of Technology Development & Commercialization (OTDC) both of Temple University as well as the Greater Philadelphia Senior Executive Group (GPSEG) and the IEEE Philadelphia Section.

Location: Temple University, MBA Commons, 7th Floor Alter Hall

Date: Saturday, May 3, 2014

Time: 9:30AM – 4:30PM

Register by: Friday, April 18, 2014

For more information and registering, visit:
http://iei.temple.edu/techconnect

Please make sure that you apply the appropriate IEEE discount code during the registration check-out, and that you complete all questions and fields – this will help the organizers establish preliminary teams.

Registration fee: **Member rate $50 (discount code IEEE Member)**

Student rate $35 (discount code IEEE Student)

Power & Energy Society®

Meeting of the Philadelphia Joint Chapter

IEEE Power & Energy and Industry Applications Societies

Topic: Different Types of UPS Systems

Speaker:	**Justin Mazur, P.E. Consulting Engineer Specialist, Schneider Electric**
Date and Time:	**Tuesday, April 22nd, 2014** **Lunch @ 11:45 a.m.; Presentation: 12:10 – 1:30 p.m.**
Cost:	**No Charge for Presentation** **$13 for buffet lunch ($10 for Full-Time Students)**
Location:	**KlingStubbins** **2301 Chestnut Street, Philadelphia, PA 19103**

Public Transportation: SEPTA (Rail to 30th Street Station and/or Trolley to 22nd & Market Street)

Reservations: Register by visiting: www.ieeephiladelphia.org and click on "Section Meetings and Events" to register on v-Tools. If you have problems or cannot register online, e-mail or call Jonathan Schimpf at jschimpf@burns-group.com or 215-979-7700, ext 7709, by 5:00 p.m., Monday, April 21st, 2014 **(Specify if you want lunch – We pay in advance)**

Abstract: There is much confusion in the marketplace about the different types of Uninterruptible Power Systems (UPS) and their characteristics. Each of these UPS types will be defined, practical applications of each will be discussed, and advantages and disadvantages listed. With this information, an educated decision can be made as to the appropriate UPS topology for a given need. Many newer UPS systems have an energy-saving operating mode known as "Eco-mode" or by some other descriptor.

Another topic will be alternatives to lead-acid batteries, which are attracting more attention as raw material and energy costs continue to increase and as governments become more vigilant regarding environmental and waste disposal issues. We will compare several popular classes of batteries, compare batteries to both flywheels and ultracapacitors, and briefly discuss fuel cells.

The Speaker: Justin Mazur, PE is the Consulting Engineer Specialist for Schneider Electric's IT Business of Critical Power and Cooling. He is a specialist with over 19 years of Mission Critical Experience and 7 years with Schneider Electric.

********** A Certificate of Attendance will be available upon request **********

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IEEE Philadelphia Section website: www.ieeephiladelphia.org

PERPENDICULAR MAGNETIC RECORDING

A SYMPOSIUM HONORING
DR. SHUNICHI IWASAKI
&
DR. MARK H. KRYDER

RECIPIENTS OF THE 2014 BENJAMIN FRANKLIN MEDAL IN ELECTRICAL ENGINEERING

CAC
Center for Advanced Communications
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Dr. Mark H. Kryder

CITATION:

FOR THE DEVELOPMENT AND REALIZATION OF THE SYSTEM OF PERPENDICULAR MAGNETIC RECORDING, WHICH HAS ENABLED A DRAMATIC INCREASE IN THE STORAGE CAPACITY OF COMPUTER-READABLE MEDIA.

The Franklin Institute Awards are presented by
THE FRANKLIN INSTITUTE

WEDNESDAY, APRIL 23, 2014
8:00 AM to 12:00 PM
Villanova University
East & West Lounges, Dougherty Hall

Registration and Breakfast: (West Lounge) 8:00 am to 8:30 am

Welcome: (East Lounge)

8:30 am Dr. Moeness G. Amin
Director, Center for Advanced Communications (VU)

Speakers:

9:00 am Dr. Randall H. Victora, University of Minnesota
Fighting Physics: The Transition from Longitudinal to Perpendicular Magnetic Recording

9:25 am Dr. Hisashi Takano, World Wide Research, HGST, a Western Digital Company
Perpendicular Magnetic Recording: From Research to Commercialization – Part I

9:50 am Dr. Yochiro Tanaka, Toshiba Corporation
Perpendicular Magnetic Recording: From Research to Commercialization – Part II

10:15 am COFFEE BREAK

10:35 am Dr. Jian-Gang Zhu, Carnegie Mellon University
Perpendicular Recording: New Heights for Data Storage Density

11:00 am Dr. Mark H. Kryder, Carnegie Mellon University
The Implementation and Future of Perpendicular Recording Technology

11:30 am Dr. Shunichi Iwasaki, Tohoku Institute of Technology
Perpendicular Magnetic Recording to New Civilization - From Science to Technology

12:00 pm Close

For 190 years, The Franklin Institute has honored the greatest minds in science, engineering, technology, and business. The Franklin Institute Awards are amongst the oldest and most prestigious comprehensive science awards in the world. Recognizing these brilliant men and women from around the world is one important way that the Institute preserves Benjamin Franklin's legacy. They are the Franklins of today; they will inspire the Franklins of tomorrow.

Philadelphia Section

IEEE PHILADELPHIA CHAPTER OF AP/MTT-S

PASSIVE INTERMODULATION IN WIRELESS SYSTEMS, ITS CAUSES, EFFECTS, AND MITIGATION

DR. MURAT ERON
VICE PRESIDENT OF ENGINEERING, WIRELESS TELECOM GROUP
PARSIPPANY, NJ 07054
WWW.WTCOM.COM

6:00- 7:30 PM, MONDAY, APRIL 21, 2014
BOSSONE 302, DREXEL UNIVERSITY
(LIGHT REFRESHMENTS ARE TO BE PROVIDED 15 MINUTES BEFORE START OF TALK)

Abstract: Passive intermodulation, PIM, continues to be a concern for high speed wireless networks. A good understanding of how it impacts the network operation and how to detect and avoid it has been rapidly developing. Since there are numerous causes for it and it can be a function of choice of material, electro-mechanical design, circuit process details and its assembly, therefore it has been difficult to identify a unique cause and thus providing a remedy for it. The fact that PIM signals can be extremely small and noise-like makes their study even more difficult. Nevertheless, impact of PIM on the performance of modern broadband high speed networks is very real and harmful. Consequently a lot of attention is paid to design and roll out Wireless Radio Access networks that are free of PIM issues and testing and certification for PIM performance has spawned its own side industry. We will in this talk try to explain root causes of PIM, how to identify and quantify it, what can be done at the component, subsystem and system design level to protect against it, measurement and test methods and how to specify it.

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Biography: Born in Istanbul, Turkey, received B.S. in Physics and Electrical Engineering in 1978 from Bogazici University, Istanbul. He also received M.S. and Ph.D. from Drexel University, Philadelphia, Pennsylvania. He has two patents and over 50 technical articles published in solid state electronics, active RF circuits, passive components and circuits, and high-frequency measurement systems.

Dr. Eron joined RCA David Sarnoff Research Center, Princeton, NJ in 1984 as a Member of Technical Staff working on GaAs transistors and MMICs. In 1988 he joined Compact Software and there involved in CAD tool development, active and passive component models, load-pull hardware and software development, and set up a microwave test and characterization laboratory. In 1991 he joined M/A-COM as an engineering manager responsible for development of high performance and wide-band GMIC and MMIC circuits for various military, commercial, and space qualified applications. Later as a Senior Principal Engineer in Corporate R&D Center, involved in technology transfer to product lines, COB/MCM, amplifiers, advanced manufacturing and technical lead on various programs. From 1997 to 2003, he was the Director of Engineering at Ericsson Amplifier Technologies (formerly Microwave Power Devices Inc.), Hauppauge NY, where he has been involved in development of high power linear amplifiers for Wireless infrastructure. From 2003 to 2004 he was with Powerwave Technologies, from 2005 to 2012 with Miteq where he led Amplifier group working on high performance microwave and millimeter amplifiers and he joined Wireless Telecom Group (www.wtcom.com) in 2012 as VP of Engineering.

He is also currently an Adjunct Prof. in NJIT EE Dept. and Assoc. Prof. in Energy Systems Engineering at Bilgi University of Istanbul. He has served IEEE and in particular MTT-S in a number of capacities and he is a founding member of IEEE MTT-17 committee on HF/VHF/UHF technologies.