

The



IEEE Newsletter

PUBLICATION OF THE NORTH JERSEY SECTION OF THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

NORTH JERSEY SECTION CELEBRATES 50 YEARS!

NJ MTT/AP Chapter:

Fundamentals of Electrical Noise

On April 22nd, 2004, the IEEE NJ MTT/S/AP-S Chapter together with the New Jersey Institute of Technology will host a talk on "Fundamentals of Electrical Noise." The speaker will be Kurt Stern.

About the Talk

This talk will take you from the basic definition of electrical noise to some of the common applications. It will be limited to Gaussian white noise.

Relationships between electrical noise and power will be defined. Various measurements performed with electrical noise will be described. Some included items are: Nyquist's Theorem, noise measurements and the switching Radiometer, how to devise a fundamental noise standard and use it to calibrate working noise standards. Common errors in noise measurements will be discussed.

Noise Figure Measurements will be discussed. Included will be fundamentals of these measurements, Y factor measurements, and twice power measurements.

Noise amplification will be discussed. Concerns in maintaining noise quality when amplifying will be explored.

About the Speaker

Kurt Stern (LM'1996 - LSM2003) received a BEE degree from the City College of New York. Kurt did graduate work at George Washington University and the Brooklyn Polytechnic Institute.

He provided technology to three successful new companies and was a founder of Noise Com Inc. He is founding Chief Engineer of Micronetics Inc. and is currently Chief Engineer of Advanced Technical Materials Inc.

His previous activities include:

- Developing a product line of noise generators to 110 GHz. These were used for noise measurements, self test, and countermeasures
- At Airtron Kurt won a substantial

contract with a state of the art microwave detector

- Manager of a microwave filter department at AEL.
- Developing a large diplexer detector program
- Manager of a microwave department at Amphenol
- Designing the APC-7 precision connector in coordination with Hewlett Packard
- At Polarad, Kurt was manager of an engineering group that designed a 50 GHz - 100 GHz spectrum analyzer and developed the mixer diode for this program.
- Winning two SBIR programs phase one and phase two for each.

All Welcome!

You do not have to be a member of the IEEE to attend.

Time: 7:00 PM, Thursday, April 22, 2004. Free buffet will be starting at 6:00 PM.

Place: New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Directions are available at <http://www.njit.edu>.

Information: Dr. Edip Niver (973) 596-3542 (NJIT), Kirit Dixit (201) 400-2313, or Har Dayal (973) 633-4618.

Interested in Being a North Jersey Section Officer?

The North Jersey Section Nominating Committee will soon begin to consider candidates for section officers for next year. We request that those who are interested in a section office submit their name, office sought, and qualifications to the Committee Chair, Dr. Fred Chichester, by mail at

56 Gordonhurst Ave
Upper Montclair, NJ 07043

For further information, you may telephone him at (973) 744-7340 between the hours of 8:00 AM and 9:00 PM.

APRIL 2004

April 2004

Volume 50, Number 10

Publication No: USPS 580-500

"The IEEE Newsletter" (North Jersey Section), is published monthly except June and July by The Institute of Electrical and Electronics Engineers, Inc. Headquarters: 3 Park Avenue, 17th Floor, New York, NY 10016-5997. \$1.00 per member per year (included in annual dues) for each member of the North Jersey Section. Periodicals-class postage paid at New York, NY and at additional mailing offices. Postmaster send address changes to: "The IEEE Newsletter", 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. USPS 580-500 (ISSN 1076-3732).

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Deadline for receipt of material is the 1st of the month preceding the month of publication. All communications concerning editorial and business matters, including advertising, should be sent to the Business Manager via e-mail at k.saracinello@ieee.org or to *The IEEE Newsletter*, c/o Keith Saracinello, 25 Messenger Ln, Ringoes, NJ 08551, (908) 791-4067.

IEEE NJ SECTION HOME PAGE

<http://web.njit.edu/~ieeenj/>

IEEE NJ SECTION NEWSLETTER HOME PAGE

<http://web.njit.edu/~ieeenj/NEWSLETTER.html>

REPORT ADDRESS CHANGES TO:

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The North Jersey Section Executive Committee usually meets the first Wednesday (except holidays and December) of each month at 7:00 PM. Meetings are open to all members. For information on meeting agenda contact Secretary Dr. Sanghoon Shin at (973) 492-1207 Ext. 22, s.shin@ieee.org.

NJ Communications Society:

Pico Radios - What Does it Take to Design a Link Between Them?

On April 1, 2004, the IEEE North Jersey Section Communications Society Chapter along with NJIT will host a presentation on "Pico Radios - What Does it Take to Design a Link Between Them?" The speaker will be Lizhi Charlie Zhong.

About the Talk

Wireless sensor networks change the way we live: in building environments, these tiny radios can work together to create a personalized micro-climate; in home health care, a doctor can monitor the health of his patients attributed to the networks of medical sensors in their homes; sensor networks can also be used to control traffic, mitigate disaster as well as improve the efficiency of the energy-generation, distribution, and consumption infrastructure.

To these pico radios, the power consumption is crucial. It might be OK to charge your cell phone every day, but it would be a nightmare to replace the batteries of hundreds of pico radios every day or even every month. If the power consumption of such a radio can be kept sufficiently low (e.g., < 100uW), power obtained through energy scavenging techniques will be enough to keep it self-powered. The outcome is very exciting: maintenance will be much easier and the network operation will be more robust, free from the impact of dead nodes. However, it is no easy task to bring the overall power consumption down to such a low level. Designers of sensor networks have attempted to optimize the power consumption of a component of a system in an isolated fashion, only to find that when the power consumption of a component is pushing down, the power consumption of another component goes up. It has become evident to the designers that how the overall power consumption depends on the design parameters of the components is the most important question in power-aware designs.

In this talk, a two-step approach to the above problem will be presented. In the first step, a system is divided into smaller subsystems based on functionality. For each component, an analytical model is developed. In the second step, the models of different components are integrated. This integration (often ignored by other designers) is essential to the disclosure of the overall power consumption's dependency on the design parameters. In this integration process, an interface is first defined for every model, after which the interactions between the components are modeled with mathematical equations.

The existence of the closed feedback loops makes the integration much harder. I will show that they can be solved using the fixed point theorems and an "optimization after integration" technique.

We can use the insights gained from the above modeling framework to obtain guidelines for power-efficient designs. In fact, the guidelines from our analysis have already had a real impact on the design of an actual sensor network. For examples, the speaker will introduce several emerging designs developed in the Berkeley Wireless Research Center, including a channel hopping scheme and an adaptive sleep discipline.

About the Speaker

Lizhi Charlie Zhong (BSEE 93, MSEE 95) is a PhD candidate in electrical engineering and computer science at the University of California at Berkeley. His dissertation is on the analysis and design of energy-aware data-link layer for wireless sensor networks. From June 2002 to present, he is with STMicroelectronics Central R&D Berkeley Research Laboratory. He is currently developing a MAC proposal to be submitted to the IEEE802.11n task group by June 2004. His research at ST also includes the MAC design for cognitive radios. From January 1995 to August 1998, he was with AT&T Bell Laboratories. His research interests were in the area of digital wireless communications systems. Mr. Zhong has three technical patents on CDMA. He also received two awards from Bell Laboratories in 1996, including a Most Valuable Player (MVP) Award for extraordinary achievements on the CDMA program.

All Welcome!

You do not have to be a member of the IEEE to attend. Bring your friends.

Time: 7:00 PM (refreshments start at 6:45 PM), Thursday, April 1, 2004.

Place: New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Directions are available at www.njit.edu.

Information: Dr. Nirwan Ansari (973) 596-3670 (nirwan.ansari@njit.edu) or check <http://web.njit.edu/~ieeenj> for the latest updates.



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IEEE North Jersey Section Activities

April 2004

Apr. 1 – “Pico Radios - What Does it Take to Design a Link Between Them?” - NJ Communications Chapter, 7:00 PM (refreshments at 6:45 PM), NJIT, 202 ECE Center, Newark, NJ. Dr. Nirwan Ansari (973) 596-3670 (nirwan.ansari@njit.edu) or check <http://web.njit.edu/~ieeenj> for the latest updates.

Apr. 1 – “Silicon-Germanium Three-dimensional Nanostructures: Against All Odds” - EDS/C&S and LEOS Chapters, 5:00PM (buffet at 4:45PM), NJIT, 202 ECE Center, Newark, NJ. Dr. H. Grebel (973) 596-3538 (grebel@njit.edu).

Apr. 6-8 – “2004 ASME/IEEE Joint Rail Conference” – IEEE VTS, Renaissance Harborplace Hotel, 202 East Pratt St, Baltimore, MD. See <http://www.asmeconferences.org/jrc04/> for details. Elio Manes (manese@asme.org)

Apr. 7 – “NJ Section Executive Committee Meeting” - 7:00 PM, ITT, 100 Kingsland Rd, Clifton, NJ. Dr. Sanghoon Shin at (973) 492-1207 Ext. 22 or s.shin@ieee.org.

Apr. 10 – “IPv6: The new and improved Internet Protocol” – NJ Coast & Consultants Network, 8:00 AM-12:00 PM, Clarion Hotel, Somerset, NJ. Dr. Amruthur Narasimhan (732) 957-0850 (anarasimhan@ieee.org) or see <http://mywebpages.comcast.net/anarasimhan3/seminar/seminar-main.htm>.

Apr. 14 – “PACE, GOLD Meet - Part 2, Trends Affecting Engineering Professionals, Plus: What we can do?” - NJ PACE, 6:30 – 9:00 PM, Clifton Memorial Library, 292 Piaget Ave, Clifton, NJ. Paul Ward (973) 790-1625 (PWARD1130@aol.com) or Richard F. Tax (201) 664-6954 (rtax@bellatlantic.net).

Apr. 16 – “Electrical Transients & Power Quality Seminar” - NJ IAS/PES Chapters, 9:00 AM - 3:00 PM, PSE&G Training Center, 234 Pierson Ave, Edison, NJ. Ronald W. Quade, PE, (212) 833-0268 or rwquade@ieee.org.

Apr. 21 – “Functional MRI Motor Mapping for Tumor Patients” - NJ Signal Processing Chapter, 4:45 PM (refreshments at 4:30 PM), NJIT, 202 ECE Center, Newark, NJ. Dr. Yun Shi (973) 596-3501 (shi@njit.edu), Dr. Alfredo Tan (201) 692-2347 (tan@mailbox.fdu.edu), Dr. Hong Man (201) 216-5038 (hman@stevens-tech.edu).

Apr. 22 – “Fundamentals of Electrical Noise” - MTT/S/AP-S, 7:00 PM (pre-meeting buffet at 6:00 PM), New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Dr. Edip Niver (973) 596-3542 (NJIT), Kirit Dixit (201) 400-2313, or Har Dayal (973) 633-4618.

Apr. 27 – “The Rational Unified Process Software Development Methodology” - NJ Computer Chapter, 7:00 PM (pre-meeting buffet at 6:00 PM), Public Meeting Room, Morris County Library, 30 E. Hanover Ave, Whippany, NJ. Seth Jakel (973) 731-1902 (sgjakel@comcast.net) or Vivek Shaiva (908) 221-6125 (vshaiva@computer.org).

Apr. 28 – “Evolution and Recent Advances in RF/Microwave Transistors” - EDS/C&S Chapters, 7:00 PM (buffet at 6:15 PM), NJIT, 202 ECE Center, Newark, NJ. Dr. Richard Snyder (973) 492-1207 (RS Microwave), Dr. Durga Misra (973) 596-5739 (dmisra@njit.edu) or Dr. Edip Niver (973) 596-3542 (NJIT).

Apr. 29 – “Lightning Protection” - NJ Consultants' Network, 7:30 PM, Aeroflex/KDI-Integrated Products, 60 S. Jefferson Rd, Whippany, NJ. Robert Walker (973) 728-0344 or www.TechnologyOnTap.org.

Upcoming Meetings

May 2 - “NJ Section Awards Reception” - 3:00 to 6:00 PM at the Birchwood Manor, 111 North Jefferson Rd, Whippany, NJ. Anne Giedlinski (973) 377-3175.

May 5 – “NJ Section Executive Committee Meeting” - 7:00 PM, ITT, 100 Kingsland Rd, Clifton, NJ. Dr. Sanghoon Shin at (973) 492-1207 Ext. 22 or s.shin@ieee.org.

May 12 – “Carbon Nanotubes” - EDS/C&S and LEOS Chapters, 7:00PM (buffet at 6:15 PM), NJIT, 202 ECE Center, Newark, NJ. Dr. H. Grebel (973) 596-3538 (grebel@njit.edu).

May 20 – “Power Management Control Systems” - NJ IAS/PES Chapters, 7:00PM, General Electric Atlantic Region Office, 1st Floor, Maple Plaza 1, 4 Campus Dr, Parsippany, NJ. Ken Oexle (973) 386-1156.

May 20 – “Collections: How to Get Paid” - NJ Consultants' Network, 7:30 PM, Aeroflex/KDI-Integrated Products, 60 S. Jefferson Rd, Whippany, NJ. Robert Walker (973) 728-0344 or www.TechnologyOnTap.org.

Oct. 19&20 – “IEEE Lightwave Technologies in Instrumentation & Measurement Conference” – IEEE METSAC, IBM Palisades Executive Conference Center in Palisades, NY. <http://www.ewh.ieee.org/r1/metsac/LTWV.htm>.

Members and Non-Members Welcome

PLEASE POST

2004 IEEE NORTH JERSEY FELLOWS

Atam P. Dhawan

“for contributions to optical imaging of skin-lesions and multi-modality medical image analysis.”



Atam P. Dhawan, PhD obtained his B.Eng. and M.Eng. degrees in Electrical Engineering from the University of Roorkee, Roorkee, India. He was a Canadian Commonwealth Fellow at the University of Manitoba where he completed his PhD in Electrical Engineering with specialization in medical imaging in 1985. In 1984, he won the first prize and the Martin Epstein Award in the Symposium of Computer Application in Medical Care Paper Competition at the Eighth SCAMC Annual Congress in Washington, DC, for his work on developing a three-dimensional (3D) imaging technique to detect early skin-cancer called melanoma. From 1985 to 1988, he was an Assistant Professor in the Department of Electrical Engineering at the University of Houston. Later, in 1988, he joined the University of Cincinnati as an Assistant Professor where he became Professor of Electrical and Computer Engineering and Computer Science, and Radiology (joint appointment). From 1990-96, he was the Director of Center for Intelligent Vision and Information System. From 1996-98, he was Professor of Electrical Engineering at the University of Texas at Arlington, and Adjunct Professor of Radiology at the University of Texas Southwestern Medical Center at Dallas. From 1998-2000, he was Professor of

Bioengineering at the University of Toledo and Director of Medical Imaging and Informatics Laboratory. Since 2000, he has been Professor of Electrical & Computer Engineering and Professor of Biomedical Engineering at the New Jersey Institute of Technology.

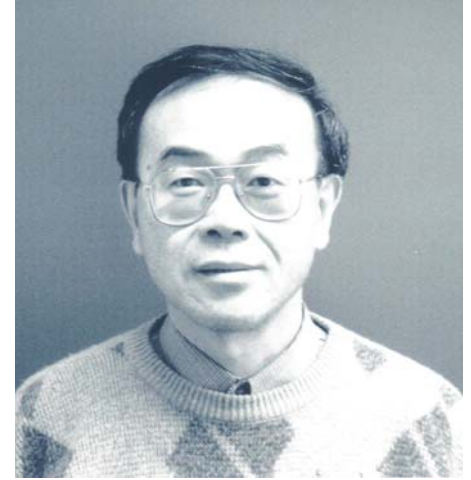
Dr. Dhawan has published more than 58 research articles in refereed journals, and edited books, and 100 research papers in refereed conference proceedings. Recently, he has authored a textbook, *Medical Image Analysis* published by John Wiley & Sons. Dr. Dhawan is a recipient of Martin Epstein Award (1984), National Institutes of Health FIRST Award (1988), Sigma-Xi Young Investigator Award (1992), University of Cincinnati Faculty Achievement Award (1994) and the prestigious IEEE Engineering in Medicine and Biology Early Career Achievement Award (1995) and University of Toledo Dorman Distinguished Lecture Award (1999). He is listed in *Who's Who in America*, *Who's Who in Engineering*, *Who's Who in Education* and *Who's Who in the World*. He served as an Associate Editor of *IEEE Transactions on Biomedical Engineering* (1996-2002) and Assistant Editor of *IEEE Transactions on Rehabilitation Engineering* (1995-2000). He is an Associate Editor of *International Journal of Pattern Recognition*. He also serves on the editorial board of the *International Journal of Computing Information and Technology*. He has served on many IEEE EMBS professional committees and has delivered workshops on *Intelligent Biomedical Image Analysis* in IEEE EMBS International Conferences (1996, 1997, 2000, 2003). He served as the Chair of the "New Frontiers in Biomedical Engineering" Symposium at the World Congress 2000 on Medical Physics and Biomedical Engineering. He is the Conference Chair of the 2006 IEEE Engineering in Medicine and Biology Society International Conference to be held on August 31-September 3, 2006 in New York.

Dr. Dhawan is a Fellow of the Institute of Electrical & Electronics Engineers (IEEE), and a member of SPIE, ASEE and Eta Kappa Nu Honor Society. His current research interests are medical imaging, multi-modality medical image analysis, multi-grid image reconstruction, wavelets, genetic algorithms, neural networks, adaptive learning and pattern recognition. Dr. Dhawan is listed in *Who's Who In the World* (2004), *Who's Who in America* (2000-2004), *Who's Who in Engineering* (2001, 2002, 2003), *Who's*

Who in Education (2002) and *Who's Who Among America's Teachers* (2002, 2004).

Spencer P. Kuo

“for contributions to the understanding of electromagnetic wave propagation in plasmas.”



Dr. Kuo received both of his BS and MS degrees from National Chiao-Tung University, Taiwan R.O.C. in 1970 and 1973, respectively. After he received his PhD Degree in 1977 from Polytechnic University, he received from Rensselaer Polytechnic Institute a Research Associate position, working at the Oak Ridge National Laboratory on the Elmo Bumpy Torus (EBT) fusion program. He returned to Polytechnic University in September 1978 as Research Assistant Professor in the Electrical Engineering Department and was promoted to full professor in 1986. He initiated and ran a "summer research program for college juniors" in the EE department from 1985 to 1991. A similar program has since then been adopted in many universities and national laboratories.

Dr. Kuo's research activities cover several areas including microwave plasma interactions, ionospheric and magnetospheric plasma physics, plasma sources, and plasma aerodynamic effects on shock waves. He conducted a novel experiment using rapidly created plasma to up-shift the electromagnetic wave frequency. He also showed analytically and experimentally that an added spatial-periodic distribution in plasma density could trap a wave by downshifting the wave frequency. He originated the instability idea to enhance the efficiency of a virtual ionospheric antenna to generate ELF/VLF waves for underwater communication and for the exploration of the magnetosphere. He has patented a

plasma torch module, which can be used to form an array of plasma torches as a large-volume atmospheric-pressure plasma source. This module was installed on a wind tunnel model for on-board plasma generation to study the plasma aerodynamics in a Mach 2.5 supersonic flow. The experiment showed that the shock wave appearing normally in front of the model, which resembled a supersonic vehicle, could be eliminated totally by the on-board generated plasma. The experimental discovery paves a new way for solving aeronautic problems of sonic booms and severe wave drag in supersonic flights.

Dr. Kuo has authored over 150 journal papers and 60 proceedings issued articles, and has one patent. He was an associate editor of Radio Science from 1993 to 1996. He received an outstanding research award from the New York Chapter of the Sigma Xi in 1990, and was a recipient of the 1997 Tamkang Chair from Tamkang University, R.O.C.

Wim Sweldens

“for contributions to multiresolution methods for image and 3D geometry compression.”



Wim Sweldens is the Computing Sciences Research Vice President at Bell Laboratories, Lucent Technologies. He received his PhD in Applied Mathematics in 1994 from the Katholieke Universiteit Leuven, Belgium, and has been with Lucent since 1995. His research is concerned with wavelets and multiscale analysis and its application in numerical analysis, signal processing, computer graphics, and wireless communications. He is the inventor of the lifting scheme, a

new design and implementation technique for wavelets, which now is part of the JPEG2000 standard.

MIT's "Technology Review" recently chose him as one of 100 most promising young innovators. More recently he has been leading the computer science and software research activities in Bell Labs, which focuses on security, software quality, systems, and scientific computing.

Wim Sweldens is the Computing Sciences Research Vice President at Bell Laboratories, Lucent Technologies. He heads the computer science and software research activities in Bell Labs with focus on security, software quality, systems, and scientific computing. He also manages the relationship between Bell Labs Research and the Lucent Worldwide Services business unit and is responsible for bringing Bell Labs innovations into services. Wim has been with Bell Labs since 1995.

Stuart K. Tewksbury

“for contributions to telecommunications and interconnections in high performance digital systems.”



Stuart Tewksbury received his BS and PhD degrees in Physics from the University of Rochester in 1964 and 1969, respectively. He was with the research division of AT&T Bell Laboratories from 1969 through 1990. Following retirement, he was on the faculty of the Department of Electrical and Computer Engineering at West Virginia from 1990 through 1998, when he joined Stevens Institute of Technology where he is Chair of the Department of Electrical and Computer Engineering.

His research at Bell Laboratories started in the area of the emerging topic of digital signal processing systems and extended to audio coding (delta modulation and higher order delta-sigma coding). His interests in the interplay between emerging/future technologies and systems architectures evolved as a

common thread underlying his research, which included studies related to high temperature semiconductor interconnects, optical interconnects, wafer-scale integration, hybrid wafer-scale packaging (MCMs), 3-D stacked IC microsystems, and related topics. He has also explored the topic of parallel processing architectures and their underlying network infrastructures for small-scale, highly parallel computational systems. Following his transition to an academic career, he developed an interest in the educational opportunities enabled by the rapidly evolving Internet technologies and in the delivery of educational material to a broad audience (beyond the traditional classroom).

NJ EDS, C&S & LEOS Chapters:

Carbon Nanotubes

On May 12, 2004, the IEEE NJ Section Electron Devices, and Circuits and Systems Chapter, Laser and Electro Optics Chapter, together with the New Jersey Institute of Technology will host a talk on "Carbon Nanotubes." The speaker will be Dr. Haim Grebel.

About the Talk

Carbon nanotubes have stimulated much attention in the last few years due to their extraordinary electrical, mechanical and chemical properties. These tiny tubes, with diameters on the order of 1 nanometer, portray extremely high electrical conductivity values and mechanical strength as good as diamond. Potential applications span from electronic circuitry, one-electron logic gates, sensor systems, special purpose coatings and ultra-fast optical switches. In this talk, Dr. Grebel will dwell on present and future status of carbon nanotubes in the general context of Nanotechnology.

About the Speaker

Haim Grebel received his PhD in Physics in 1985 from the Weizmann Institute of Science, Israel. He is currently a Professor of Electrical and Computer Engineering and a Director of the Imaging Center at NJIT.

All Welcome!

You do not have to be a member of the IEEE to attend.

Time: 7:00 PM, Wednesday, May 12, 2004. Free buffet will be starting at 6:15 PM.

Place: New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Directions are available at www.njit.edu.

Information: Dr. H. Grebel (973) 596-3538 (grebel@njit.edu).

NJ EDS, C&S & LEOS Chapters:

Silicon-Germanium Three-dimensional Nanostructures: Against All Odds

On April 1, 2004, the IEEE NJ Section Electron Devices, and Circuits and Systems Chapter, Laser and Electro Optics Chapter, together with the New Jersey Institute of Technology will host a talk on "Silicon-Germanium Three-dimensional Nanostructures: Against All Odds." The speaker will be Dr. Leonid Tsybeskov.

About the Talk

This presentation is mainly focused on two major problems with device quality SiGe nanostructures - lattice mismatch and type-two band alignment. Dr. Tsybeskov will discuss several possible solutions and new avenues in SiGe research and device development.

About the Speaker

Leonid Tsybeskov received his MS in Physics in 1978 and PhD in Applied Physics in 1986 from Odessa University, Odessa, Ukraine (former USSR). From 1986 to 1991 he was with Physics Research Institute in Odessa, Ukraine. From 1991 to 2001 he was a post-doctoral research associate, visiting scientist, visiting research professor, assistant research professor and director of Nanoscale Silicon Research Initiative at University of Rochester, Rochester, NY. In 1999 he was on leave with Technical University of Munich, Germany. In 2001 he moved to NJIT where he is an associate professor at ECE Department. He has received DAAD (German Academic Exchange Service) research fellowship in 1999. He is American Physical Society Fellow (elected in 2002).

His research is focused on group IV (Si, Ge, SiGe, SiCGe) semiconductor nanostructures. He is author and co-author of more than 100 papers, two books and many book chapters.

All Welcome!

You do not have to be a member of the IEEE to attend.

Time: 5:00 PM, Thursday, April 1, 2004. Free buffet will be starting at 4:45 PM.

Place: New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Directions are available at www.njit.edu.

Information: Dr. H. Grebel (973) 596-3538 (grebel@njit.edu).

NJ Computer Chapter:

The Rational Unified Process Software Development Methodology

On Tuesday, April 27, 2004, the IEEE North Jersey Section Computer Chapter will host a presentation on "The Rational Unified Process Software Development Methodology" by Vivek Shaiva.

About the Talk

The Rational Unified Process software development methodology captures many of the best practices in modern software development to ensure the development of high quality software within a predictable schedule and budget. The talk provides an overview of the process and its application in several real world projects. The shortcomings of traditional waterfall based software development methodologies that have been addressed by RUP are covered. The talk describes the use of the Unified Modeling Language (UML) and object oriented design in association with the methodology. Finally, the major pitfalls associated with the incorrect use of the RUP are described.

About the Speaker

Vivek Shaiva is currently a Software Architect with NBC in New York. Mr. Shaiva has architected technical application frameworks and best practices that have been used as the basis for design and implementation of many enterprise wide applications. He has a diverse range of business experience with a focus on media, finance and telecommunications. Vivek holds an MBA in Information Systems from the Indian Institute of Management. Vivek is also Programs Chairman for the IEEE North Jersey Section Computer Chapter.

All Welcome!

You do not have to be a member of the IEEE to attend. Bring your friends and network during the free pre-meeting buffet starting at 6:00 PM.

Time: 7:00 PM, Tuesday, April 27, 2004. Pre-meeting buffet starting at 6:00 PM.

Place: Public Meeting Room, Morris County Library, 30 E. Hanover Ave, Whippany, NJ, (973) 285-6930.

Information: Seth Jakel (973) 731-1902 (sgjakel@comcast.net), Vivek Shaiva (908) 229-6125 (vshaiva@computer.org).

NJ Consultants' Network:

Lightning Protection

On Thursday, April 29, 2004, the IEEE Consultants' Network of Northern NJ (C>NNJ) will host a talk on "Lightning Protection." The speaker will be Jacob K. Struck.

About the Talk

Lightning is a phenomenon that impacts our lives, not only in the realm of personal safety, but also the safety and reliability of technology. Mr. Struck will speak on the science of lightning, its history, and the present and emerging technologies of lightning protection. The presentation will address the following topics:

- History of lightning protection
- Existing lightning regulations
- Dynamics of a lightning strike
- Conventional lightning protection
- Unconventional lightning protection (Voodoo science)
- Emerging protection methods and technology
- Simple precautions to avoid lightning injury & damage

A question and answer period will follow.

About the Speaker

Jacob K. Struck, a world-renowned expert in the science of protecting munitions from lightning strikes, is the leader of the Lightning Technology Team at US Army Picatinny Arsenal. Mr. Struck has received numerous awards from the US government for his work. He graduated with an EE Degree from NJIT.

About the Consultants' Network

Founded in 1992, the IEEE Consultants Network of Northern NJ encourages and promotes the use of independent technical consultants by business and industry.

All Welcome!

Everyone welcome. No registration needed. Free admission.

Time: 7:30 PM, Thursday, April 29, 2004.

Place: Aeroflex/KDI-Integrated Products, 60 S. Jefferson Rd, Whippany, NJ. (Entrance at rear of building)

Information: For directions and up-to-date meeting status, call Robert Walker (973) 728-0344 or visit our website at www.TechnologyOnTap.org. To download a map to KDI, go to: <http://www.mcekdi-integrated.com/directions.htm>.

NJ Section PACE:

PACE, GOLD Meet - Part 2, Trends Affecting Engineering Professionals, Plus: What we can do?

On Wednesday, April 14, 2004 the North Jersey Section will host the second joint PACE, GOLD & Membership meetings. A panel of speakers from these committees will review previous March 10, 2004 meeting issues, focus on problems and develop current and future group activities to address these concerns.

About the Meeting

This second meeting will bring you face to face with active members of the North Jersey Section's Executive Committee. After a brief review from each committee chair, attendees will have an opportunity to voice their views and their concerns.

Last months topics included engineering specialties that are growing, shrinking, or remaining level regardless of the economic environment. Discussion emphasis was centered on national economic policy and general business climate influencing these trends. Now - our part in influencing these trends policy and climate

Our goal: ideas shared over our open discussion will help members develop activities and a career strategy for the immediate and long term.

You are encouraged to attend and bring your spouse and associates to this presentation

About the Speaker

Alfonso Crincoli, Chair of the North Jersey GOLD Committee, will discuss economic issues from a membership perspective and compare them to those faced by members of the engineering profession.

Gary Hojell, Chair of the North Jersey's Membership Committee, will address opportunities available through the IEEE to improve their current and future situation.

Richard F. Tax, Chair of the North Jersey PACE Committee and AEA VP, will review fluctuations in manpower demand/supply issues and how attendees can become more effective in the enhancement of their profession.

All Welcome!

This is an invitation and open meeting. Guests, members and students from other professional societies and engineering disciplines are always welcome. We now include members from IEEE, ASME and AEA. For more information about these groups see:

www.aea.org
www.asme.org/sections/northjersey
www.ieeeusa.org,
web.njit.edu/~ieeenj/

Time: 6:30 to 9:00 PM, Wednesday, April 14, 2004.

Place: Clifton Memorial Library, 292 Piaget Ave, Clifton, NJ, (973) 772-5500.

Information: Paul Ward, (973) 790-1625, PWARD1130@aol.com, Richard F. Tax, (201) 664-6954, rtax@AEA.org.

NJ Signal Processing Chapter: **Functional MRI Motor Mapping for Tumor Patients**

On April 21, 2004, the IEEE North Jersey Section Signal Processing Society Chapter along with NJIT will host a presentation on " Functional MRI Motor Mapping for Tumor Patients." The speaker will be Dr. Wen-Ching Liu.

About the Talk

Blood Oxygenation Level Dependent (BOLD) fMRI is a non-invasive technique to map the brain activation associated with stimulation. This technique has been demonstrated to be useful in many fields especially for neurosurgical treatment planning. Currently, BOLD fMRI has been employed in neurosurgical operations in our hospital for neurosurgery and radiosurgery to identify the eloquent cortex for tumor patients. Due to the influence of a tumor, the spatial pattern of BOLD motor maps may vary a lot in different patients. However, this variation caused by the tumor is still unclear yet. A new challenge of using different tools to better understand the variations and properly identify the functional tissue is critical in providing tumor patients a better chance in preserving vital function during the surgery. This talk will cover the following topics:

1. basic concepts of BOLD fMRI
2. implementation of BOLD fMRI in clinical aspects
3. BOLD signal and tumor

About the Speaker

Wen-Ching Liu, obtained his PhD in Medical Physics from University of Cincinnati, 1992. He pursued his postdoctoral training in MR imaging at Children's Hospital Medical Center, Cincinnati until 1995. Late 1995, Dr. Liu joined the Department of Radiology at

University of Medicine and Dentistry of New Jersey-New Jersey Medical School as an Instructor for functional imaging. He was one of the pioneers to establish the functional imaging laboratory in Radiology, UMDNJ-NJMS. He was promoted to an Assistant Professor in 1998.

Dr. Liu's research interest is to apply the functional MR imaging technology to various clinical applications. Currently, there are several on going studies including

1. fMRI for brain tumor patients in treatment planning. The purpose of this study is to properly identify the vital cortex (or called eloquent cortex) near the tumor using fMRI. Once the eloquent cortex of a tumor patient can be properly identified, this area may be better preserved during the neurosurgical or radiological procedures and hopefully to improve the patient's quality of life.
2. Functional imaging for vagal nerve stimulator implanted epilepsy patients. In this study, functional imaging will be used to detect the brain responses during the stimulation. The improving index for epilepsy patients will be identified from the brain responses and used for optimizing the treatment to epilepsy patients.
3. Brain responses induced by acupuncture stimulation. It is desired that the functional imaging can reveal the secrets of the ancient medical treatment and thus, its efficacy can be significantly improved.

Time: 4:45 PM (refreshments and pizza available at 4:30 PM), Wednesday, April 21, 2004.

Place: New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Directions are available at www.njit.edu.

Information: Dr. Yun Shi (973) 596-3501 (shi@njit.edu), Dr. Alfredo Tan (201) 692-2347 (tan@mailbox.fdu.edu), Dr. Hong Man (201) 216-5038 (hman@stevens-tech.edu).

NJ EDS, C&S Chapters:

Evolution and Recent Advances in RF/Microwave Transistors

On April 28th, 2004, the IEEE NJ Section Electron Devices, Circuits and Systems Chapters together with the New Jersey Institute of Technology will host a talk on "Evolution and Recent Advances in RF/Microwave Transistors." The speaker will be Distinguished Lecturer, Dr. Juin J. Liou.

About the Talk

The development of RF/microwave transistors went almost unnoticed until early 1980's because, unlike Si VLSI, there were no mass consumer markets for such devices. Most applications for RF/microwave transistors had been military or exotic scientific projects. Recently, this has been changed drastically due to the explosive growth in the civil wireless communications and internets. This talk covers the evolution and current status of semiconductor devices for RF/microwave electronics systems. Important background, development and major milestones leading to modern RF/microwave transistors are first presented. This is followed by the discussions of the concept of heterostructure, a feature used frequently in RF/microwave devices. Different transistor types, including Si-, III-V-, and wide bandgap-based devices, and their figures of merit are then addressed. Finally the outlooks of RF/microwave semiconductor devices and their future applications are given.

About the Speaker

Juin J. Liou received the BS (honors), MS, and PhD degrees in Electrical Engineering from the University of Florida, Gainesville, in 1982, 1983, and 1987, respectively. In 1987, he joined the Department of Electrical and Computer Engineering at the University of Central Florida, Orlando, where he is now a Professor. His current research interests are semiconductor device modeling/simulation, RF device/IC design, and semiconductor manufacturing.

Dr. Liou has published six textbooks (another in progress), more than 180 journal papers (including 12 invited articles), and more than 130 papers (including 35 keynote or invited papers) in international and national conference proceedings. He has been awarded more than \$4.5 million of research grants from federal agencies (i.e., NSF, DARPA, Navy, Air Force, Army, NIST), state government, and industry (i.e.,

Semiconductor Research Corp., Intersil Corp., Intel Corp., Lucent Technologies, Texas Instruments, Lockheed Martin), and has held consulting positions with research laboratories and companies in the United States, Japan, Taiwan, and Singapore. In addition, Dr. Liou serves as a technical reviewer for various journals and publishers, as well as a chair or member of the technical program committee for several international conferences. Currently, he is an associate editor for the Simulation Journal in the area of VLSI and circuit simulation, and a regional editor (in USA, Canada and South America) for the Microelectronics Reliability, an international journal published by Elsevier Science.

Dr. Liou received ten different awards on excellence in teaching and research from the University of Central Florida and five different awards from the IEEE Electron Device Society. In the summer of 1992, 1993, and 1994, Dr. Liou was selected as an Air Force Summer Research Fellow at the Air Force Research Laboratory, Dayton, Ohio, where he conducted research on modeling and reliability of AlGaAs/GaAs heterojunction bipolar transistors. In the Fall of 1997, Dr. Liou took a sabbatical leave and held a position as a Visiting Professor in the Electrical Engineering Department at National University of Singapore, Singapore.

Dr. Liou is an IEEE EDS Distinguished Lecturer, an IEEE EDS Administrative Committee member, an IEEE EDS Ex-Officio Administrative Committee member, a senior member of the IEEE, and a courtesy professor of Huazhong University of Science and Technology, China.

All Welcome!

You do not have to be a member of the IEEE to attend.

Time: 7:00 PM, Wednesday, April 28, 2004. Free buffet will be starting at 6:15 PM.

Place: New Jersey Institute of Technology (NJIT), Room 202, ECE Center, Newark, NJ. Directions are available at <http://www.njit.edu>.

Information: Dr. Richard Snyder (973) 492-1207 (RS Microwave), Dr. Durga Misra (973) 596-5739 (dmisra@njit.edu) or Dr. Edip Niver (973) 596-3542 (NJIT).

NJ PES/IAS Chapters:

Power Management Control Systems

The Power Engineering and Industrial Applications Chapters will present a program on Power Management Control Systems for industrial and commercial markets on Thursday evening May 20th. The speaker will be Randy Bouwense.

About the Talk

Lower energy costs, improved equipment performance, harmonic reduction, increased operating efficiencies, improved working environment and less equipment down time are some of the advantages associated with power management control systems.

Randy will discuss the hardware, software, monitoring devices and output intelligence generated by these Power Management Control Systems.

About the Speaker

Randy Bouwense is currently employed by General Electric Industrial Systems as Power Management Systems Engineer. He has over 14 years of experience with various assignments in Automation and Systems Integration.

Advance registration is required three days prior to the meeting. To RSVP, call Ken Oexle at (973) 386-1156.

Time: 7:00 PM, Thursday, May 20, 2004. A pre-meeting buffet will be available at 6:30 PM.

Place: General Electric Atlantic Region Office, 1st Floor, Maple Plaza 1, 4 Campus Dr, Parsippany, NJ. Directions: Route 287 to Route 10 West to Dryden Drive. Left on Campus Drive to building # 4.

Information/Map: Ken Oexle (973) 386-1156.

Conference Rooms Needed!

The North Jersey Section (Education Committee) is looking for conference room facilities to hold their training seminars. The seminars are being held on one weeknight from 6:30 PM to 9:00 PM. In lieu of providing the conference facility for free, the organization can get free registration up to three members in the course/seminar. Please contact Bhanu Chivakula, Education Committee Chairman, at b.chivakula@computer.org for suggestions or discussions, if interested.

Spring 2004 Student Presentation Contest a Success

The North Jersey Section student presentation contest for spring 2004 was held on Wednesday, February 25th at NJIT in Newark, NJ.

The contest was well attended and had a good number of participants. There were a total of 9 graduate and undergraduate student presenters covering a wide variety of topics. A group of four judges volunteered their time to grade each of the speakers. The purpose of the contest is to help students improve their communication and presentation skills. Each presenter received the judge's comment sheets for constructive feedback.

The contest started with dinner and then moved right into the graduate and undergraduate categories. Many different topics were covered and this year's students showed great expertise in using animated and concise slide presentations. Topics included everything from network congestion protocol analysis, microwave filter cavity designs, to applications of MOSFET device defect prevention.

The winners, titles, and short abstracts can be found below. Winners in both categories were awarded 1st/2nd/3rd place prizes and conference briefcases. The next round of competition will be the regional contest to be held at Stony Brook in Long Island, NY on April 10th. All the details of their program can be found off the SAC website http://ewh.ieee.org/r1/north_jersey/sac/ieee.html

The North Jersey Section Presentation contest will be again held next spring. Greater participation is hoped and the call for presentations will start early in November. All North Jersey GRAD/UGRADS are welcome to participate for prizes. Special thanks goes to our judges, M. Baker, S. Wilkowski, and S. Kalra for taking the time to support local students

*Vinit Bhansali – 1st Place Undergraduate
New Jersey Institute of Technology
“Organic Search and Recommend System”*

The idea behind an organic search and recommend system is to search through peer-data and intuitively calculate 'best recommendation'. I apply a pattern-matching algorithm to search through primary data and match multi-user homogeneous data and generate a 'recommended' list containing data found in common with other user data-sets that test positive for the primary data. This

logic will be applied in designing a pattern matching algorithm that uses data-sets containing multiple homogeneous entries and generates results by applying each entry as a part of the whole set. My algorithm is different in that the resultant set contains data that relates to the query or is organically similar to the query. This system aims to reduce and eventually remove the problem of junk/non-homogeneous data that comes up using common search algorithms. Junk data often crowds out the real information that should have surfaced in the first place.

*Kanquor Hsiao, Cecylia Wati, Pyung Choi
– 2nd Place Undergraduate
New Jersey Institute of Technology
“The Design, Simulation, Prototyping, and Testing of a Complete Microwave-Frequency Filter Assembly”*

Great interest in microwave frequencies has arisen for a variety of reasons. Leading among these is the ever-increasing need for more radio-frequency-spectrum space and the rather unique uses to which microwave frequency circuits can be applied. This growing industry has increased the demand for innovative filter designs that not only maximize performance, but also minimize size. Our advisor, Dr. Edip Niver, and his team have developed an exciting new filter conception. It makes use of cylindrical cavity resonators in order to minimize overall filter dimensions. Our team of students is exploring the theory for this particular filter and optimizing our own design application of this filter in order to fall within a set of specified parameters. The simulation of our design has been facilitated in Ansoft HFSS, a 3-D electromagnetic simulation software. Ultimately, this filter project will culminate in the construction of a working prototype that will be tested for real industry application.

*Yuanqiu Luo – 1st Place Graduate
New Jersey Institute of Technology
“Bandwidth Allocation over Ethernet PON”*

Ethernet Passive Optical Networks (EPONs) are being considered as a promising solution for the last mile access network. EPONs possess many attractive qualities such as low cost, simple maintenance, and ease of adding a new user. Our research investigates the bandwidth allocation issue in the upstream direction from the Optical Network Units (ONUs) to the Optical Line Terminal (OLT), purposing to effectively and efficiently allocation the time slots among the Optical Network Units (ONUs).

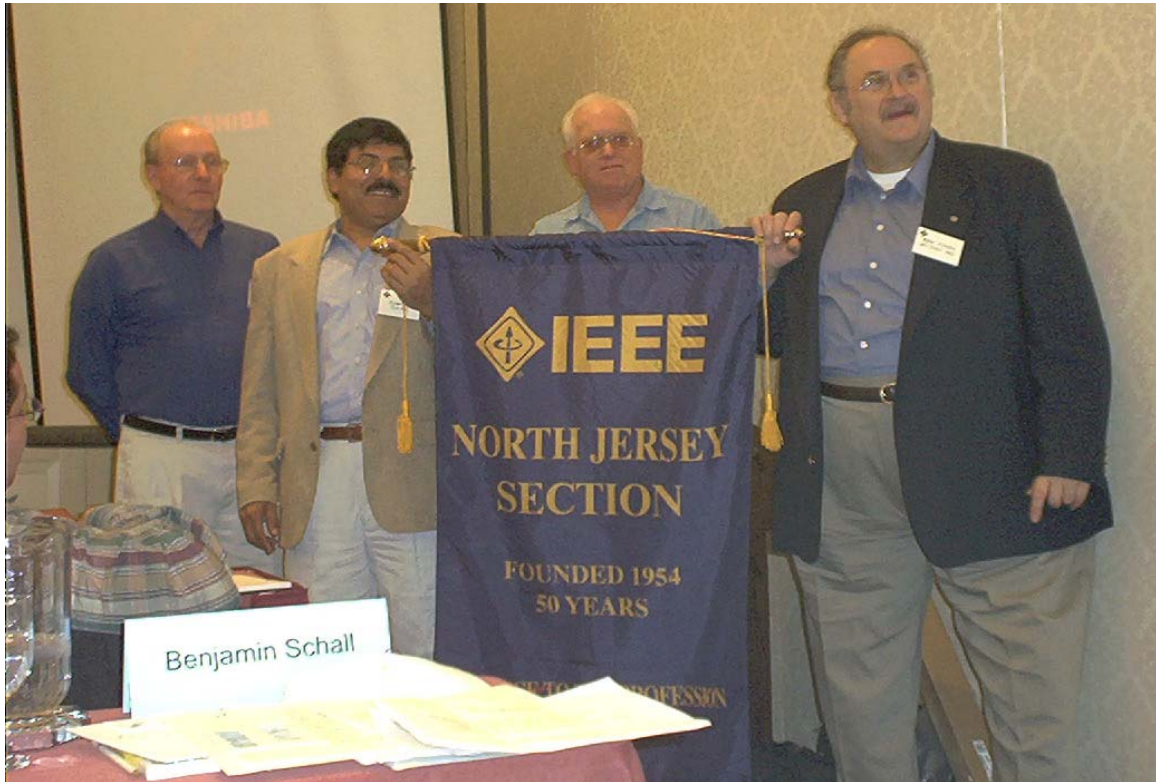
Our proposal dynamically allocates the upstream bandwidth based on the number of already buffered packets and the number of predicted incoming packets. The simulations verify that our proposal outperforms other bandwidth allocation proposals in terms of the packet delay and the queue length.

*Purushothaman Srinivasan – 2nd Place Graduate
New Jersey Institute of Technology
“Hot carrier reliability of MOSFETs”*

In this paper, I have investigated the screening of hot carrier stress degradation in n-channel MOSFETs when the devices were exposed to plasma processing. Devices with various antenna ratios were subjected to current stress (both gate injection and substrate injection) while the source and drain terminals were reverse biased by a screening potential followed by hot carrier stress. It was observed that screening of the drain edge was effective for both gate injection and substrate injection at different screening potentials. The hot carrier lifetime is directly related to interface state density (Dit), measured by charge pumping method. The results suggest that hot electron degradation could be severe or mild for devices affected by plasma damage depending on their exposure to the level of screening potential.

*Jin-Shyan Lee – 3rd Place Graduate
New Jersey Institute of Technology
A Multi-Paradigm Modeling Approach for Hybrid Dynamic Systems*

In the past years, modeling and simulation of hybrid dynamic systems (HDS) have attracted much attention. However, since simultaneously dealing with the discrete and continuous variables is very difficult, most of the models result in a unified, but more complicated and unnatural format. Moreover, design engineers cannot be allowed to use their preferred domain models. Based on the multi-paradigm modeling (MPaM) concept, this paper proposed a Petri net (PN) framework with associated state equations to model the HDS. In the presented approach, modeling schemes of the hybrid systems are separated, but combined in a hierarchical way through specified interfaces. Designers can still work in their familiar domain-specific modeling paradigms and the heterogeneity is hidden when composing large systems. An application to a rapid thermal process (RTP) in semiconductor manufacturing is provided to demonstrate the practicability of the developed approach.



IEEE North Jersey Section Turns 50

From left: North Jersey and METSAC PACE Chair, and past Section Chair, Richard Tax
Section Chair, Durga Misra
Region 1 Director, Roger Sullivan
Past METSAC and Section Chair, Alan Stolpen

Networking.....

is a contact sport!



IEEE membership (www.ieee.org/join)

IEEE AWARDS RECEPTION

*North Jersey Section
May 2, 2004
Birchwood Manor, Whippany NJ*

*A time to relax, unwind and enjoy --
A time to pay tribute to our new Fellows --
A time to honor our Award Winners --
YES it's time for the Annual Section Reception*

The Annual Section IEEE Awards Reception will be held at the Birchwood Manor, 111 North Jefferson Road, Whippany again this year. The affair is scheduled for **Sunday, May 2, 2004** from 3 to 6 PM. Tickets are \$35.00 each. Spouses and guests are welcome. We are limited to 90 attendees, so please make your reservations early.

Reservations are required by April 23, 2004. Complete the reservation form and return it with your payment. If you would like tickets mailed back to you, please enclose a self-addressed **stamped** envelope. Otherwise, your tickets will be held at the door for you. If any additional information is required concerning the reception, contact Anne Giedlinski at (973) 377-3175.

Use this form for Reception reservations. **ENCLOSE A SELF-ADDRESSED STAMPED ENVELOPE to receive tickets in advance. Reservations are required by April 23, 2004.**
Mail reservation request to:

Anne Giedlinski
299 Brooklake Road
Florham Park, NJ 07932

Enclosed is _____ for _____ ticket(s) at \$35.00 each (make check payable to **North Jersey Section IEEE**) for:

NAME: _____

ADDRESS: _____

NJ PES/IAS:

Electrical Transients & Power Quality Seminar

The PES and IAS Chapters will sponsor a one-day seminar covering Electrical Transients: Causes, Effects & Solutions and Understanding Power Quality. The session will be held on Friday, April 16, 2004 at the PSE&G Training Center, 234 Pierson Ave, Edison, NJ.

About the Seminar

First topic - **Electrical Transients: Causes, Effects, & Solutions**

Do you depend on electrical and electronic equipment? If so, you're probably familiar with these problems: scrambled and lost data, erratic equipment behavior, equipment failure, excessive repair and replacement costs, frequent downtime, lightning damage.

This dynamic seminar teaches you how to stop the damage today! Understand the transient environment, surge suppression design, proper application of surge suppression devices, the importance of system surveys. Understand how to compare product specifications, how to recognize what is important when writing bid specifications, how to evaluate let-through voltages. Comprehend industry standards and testing parameters. Witness on-site testing. Join members of the industry's leading engineering team as they perform on-site testing. Watch various surge protection devices undergo rigorous test procedures. Learn why test results can be affected by lead length, phase angle, voltage polarity and current. Review UL 1449, the standard for transient voltage surge protection testing and ratings, and ANSI/IEEE C62.41-1991, surge waveform standard.

The presenter will be Randall Raszick from Innovative Technologies.

Second topic - **Understanding Power Quality**

The terms power quality and power reliability have become front-page news across the United States. More importantly, we've learned how much power quality problems are costing this nation, especially facilities with power-sensitive equipment and computerized operations. The good news is that by understanding, monitoring and managing power quality, those costs can be controlled and power quality and reliability problems prevented. We will discuss how power quality and reliability impact business, and what can be done about it. Within our presentation, we will deliver a primer on how to identify power quality problems, typical power quality disturbances and their impact on operating costs and equipment performance. Planning and performing a power quality survey will be addressed, as we "travel" through a typical facility to identify common events and their characteristics. Power quality monitoring approaches and techniques will be covered, including guidance on how to characterize, analyze and report problems. Power monitoring is a preventive maintenance approach, and this program will include many case studies to support the information.

The presenter will be Thurman Bridgers from Dranetz-BMI.

There will be **no fee** for this seminar but space will be limited. Advanced registration is required by April 2nd.

Time: 9:00 AM to 3:00 PM, Friday, April 16, 2004
Place: PSE&G Training Center, 234 Pierson Ave, Edison, NJ
Directions: www.pseg.com/customer/business/small/facility/edison_directions.html
Information: Ronald W. Quade, PE, (212) 833-0268 or rwquade@ieee.org

Registration: Electrical Transients & Power Quality Seminar 4/16/2004

Register via US mail to: Ronald W. Quade, PE
Eaton Electrical
379 Thornall St
Edison, NJ 08837

Name _____

Address _____

Phone _____ Email _____

IEEE # _____ Student @ _____ Non IEEE _____ Life Member _____

Payment Enclosed \$ _____ Add \$25 late registration after April 2nd

Make Check payable to North Jersey Section IEEE