



The IEEE

Newsletter

PUBLICATION OF THE NORTH JERSEY SECTION OF THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
IEEE LEO Chapter:

Conducting Polymer Actuators

On October 12, 1995, the IEEE Laser and Electro Optics Chapter will present a talk on "Conducting Polymer Actuators." The speaker will be R.H. Baughman, AlliedSignal, Research & Technology, Morristown, NJ.

About The Talk

An early proposal that solid conducting polymers could be used for the direct conversion of electrical energy to mechanical energy has led to research effort here and abroad that focus on the development of practical electromechanical devices based on electrochemical doping and dedoping. This overview updates the status of this embryonic applications area. First, the major predicted performance advantages of conducting polymer actuators (compared with piezoelectric, magnetostrictive, or polymer gel actuators) are described, along with disadvantages that might limit applicability. Second, device designs and fabrication methods are proposed for the construction of high performance devices. Third, initial successes in device demonstrations are described. Finally, various applications possibilities are described for both microscopic and macroscopic conducting polymer actuators, with emphasis on optical devices.

About The Speaker

Ray Baughman has authored or coauthored over 130 publications and has 43 US patents. His present R&D activities are on conducting polymers, piezoelectric and optical materials and devices, new polymer fiber technologies, artificial muscles, novel carbon phases, and structure-properties modeling. He received AlliedSignal Technical Achievement Awards in 1988 and 1994 for outstanding contributions leading to the commercialization of time-temperature indicators and the Versicon™ conducting polymer. He is a Fellow of the American Physical Society and the American Institute of Chemists and has served on the editorial board of *Synthetic Metals* since it began in 1978. Baughman

Time: 5:00 PM, Thursday, October 12, 1995. Pizza & Soda will be served free of charge at 6:45 PM.

Place: NJIT, Room 202, ECE Bldg., Newark, N.J.

Information:

Haim Grebel (201) 596-3533.

Advance To Senior Member Grade

You may be qualified if you have ten years of active professional practice.

A Bachelor degree counts for three of those years and Masters and Doctorate degrees each count for one more year.

Get information on becoming a Senior Member by contacting Don Weinstein, Kulite Semiconductor, One Willow Tree Rd., Leonia, N.J. 07605-2239, (201) 461-0900, ext. 3113 mornings or Amy Bissmeyer, Videx Equipment Corp., 170 Railroad Avenue, Paterson, NJ 07501, (201) 742-2381, ext. 24.

NJ Section PACE:

Alternative Energy Systems

The topic at the October 12, 1995 meeting of the NJ Section's Professional Activities Committee for Engineers will be "Alternative Energy Systems." The speaker will be Dennis Lee, President of Better World Technologies, Sussex, NJ.

Time: 7:30 PM, Thursday, October 12, 1995.

Place: JCP&L Co., 300 Madison Avenue and Punch Bowl Road, Morristown, N.J.

Information: Rodney Cole (201) 299-9022, ext. 2257.

NJ Vehicular Technology Soc.: **Wireless Communication Mini-Symposium**

The Vehicular Technology Society is holding a one day "Wireless Communication" mini-symposium on Saturday, November 4 at the Meadowlands Hilton Hotel in Secaucus. There is no registration fee and the symposium is open to all.

For further information or directions call Art Greenberg at (201) 492-1207 or Mel Lewis at (914) 968-2500, ext. 2304.

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0 TO 9600 baud, 8 bits, no parity, 1 stop bit, BBS phone number 201 669-8268, or call 908 782-3522.

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It is not necessary to inform the North Jersey Section when you change your mailing address. "The IEEE Newsletter" and other section mailings use a list provided by IEEE's national headquarters in New York. This means the Section has no need to maintain a mailing list or addressing plates. Section membership records are changed when Headquarters notifies us.

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The North Jersey Section Executive Committee usually meets the first Wednesday (except holidays and December) of each month at 7 PM. These meetings are open to all members. Information on meeting agenda is available from Dr. Fred Chichester (201) 744-7340.

NY/NJ/LI EMBS: Study Of Mind/Matter Interactions

On October 19, 1995, the Metropolitan Section Engineering in Medicine and Biology Society will present a talk on "Scientific Study Of Mind/Matter Interactions-Princeton Engineering Anomalies Research" The speakers will be Prof. Robert G. Jahn and Brenda Dunne.

About The Talk

The Princeton Engineering Anomalies Research (PEAR) program was established at Princeton University in 1979 by Robert G. Jahn, Dean of the School of Engineering and Applied Science, to pursue rigorous scientific study of the interaction of human consciousness with sensitive physical devices, systems, and processes common to contemporary engineering practice. Since that time, an interdisciplinary staff of engineers, physicists, psychologists, and humanists has been conducting a comprehensive agenda of experiments and developing complementary theoretical models to enable better understanding of the role of consciousness in the establishment of physical reality. This research concentrates on three interrelated projects which will be covered in the talk: 1. Human/Machine Anomalies; 2. Remote Perception; 3. Theoretical Models.

About The Speakers

Professor Robert G. Jahn is a professor of aerospace sciences and Dean Emeritus of the School of Engineering and Applied Sciences at Princeton University. He is also the founder and Director of the Princeton Engineering Anomalies Research (PEAR) laboratory at Princeton University. Brenda Dunne, a clinical psychologist, is a member of the Princeton University research staff, and Manager of the PEAR laboratory. She is also the Executive Vice-President of the Society for Scientific Exploration which publishes the *Journal of Scientific Exploration*. PEAR research up to 1988 was described in the book "Margins of Reality" by R. Jahn & B. Dunne published by Harcourt Brace.

Time: Registration (no charge) 7:15, Lecture 7:30 PM, Thursday, October 19, 1995.

Place: Rockefeller Univ., Room 305 Weiss (formerly known as Tower Bldg.), 1200 York Avenue, NYC.

Directions/Parking: Entrance gate at 66th Street. Free parking. By subway—68th on #6 (Lex). By bus—M15, M31, M58, or M66.

Further Information: Joel Levitt (718) 891-6460; or Susan Baxt (516) 678-6563.

NJ MTT/AP Chapter:

New Developments In Microwave CAD

On October 18, 1995, the IEEE NJ Section MTT/AP Chapter will present a talk on "Microwave CAD, Including EM Optimization And Modeling Of Arbitrary Geometries." The speaker will be John W. Bandler of Optimization Systems Associates Inc., Dundas, Ontario, Canada.

About The Talk

OSA90/hope offers simulation, flexible modeling, statistical analysis, and performance and yield optimization for linear and nonlinear circuits. HarPE is a powerful system dedicated to nonlinear device characterization including advanced statistical modeling and parameter extraction. Exciting new developments of Empipe, OSA's smart interface between OSA90/hope and Sonnet's electromagnetic simulator EM, will be unveiled. Space Mapping, a fundamental new theory linking empirical/course models with EM/fine models in the circuit design process will be highlighted. This breakthrough allows us to bring direct EM optimization within practical engineering time frames. Recent advances such as Geometry Capture and Aggressive Space Mapping will be described. Parallel computations and integrated EM/harmonic balance optimization will be indicated. A workstation demonstration is planned. Several applications of OSA90/hope, HarPE and Empipe will be illustrated.

About The Speaker

John Bandler is Professor of Electrical and Computer Engineering, McMaster University, and President of Optimization Systems Associates Inc. He is recognized for his work in optimization, sensitivity analysis, optimization, fault diagnosis of analog circuits, microwave filter and multiplexer design, device modeling and parameter extraction. He is author of more than 270 publications. A Fellow of the IEE, the IEEE and the Royal Society of Canada, he is also a Member of the Electromagnetics Academy. In 1994 he received the Automated Microwave Techniques Career Award from the ARFTG.

All Welcome

You do not need to be an IEEE member to attend. All are welcome. Free refreshments will be provided starting at 6:15 PM and the meeting will start at 7:00 PM.

Time: 7:00 PM, Wed., October 18, 1995

Place: NJIT, Engineering & Computer Center, ECE C202, 2nd Floor Conference Room. (Building located corner of Warren and Summer Streets, Newark, N.J.).

Information/Reservations:

Chandra Gupta (201) 633-4469 (GEC-Marconi); Edip Niver (201) 596-3542 (NJIT); Willie Schmidt (201) 492-0371.

Controller Design Approach For Dynamical Systems

The October 17, 1995 meeting of the NJ Section IEEE Control Systems Society will feature a talk on "Stability Analysis, Robustness And Controller Design For Matrix Second Order Dynamical Systems." The speaker will be Dr. Anjali M. Diwekar.

About The Talk

Until now, in time-domain approaches, control designers had to choose between first order state-space approaches and conservative Matrix Second Order (MSO) approaches, which are based on sufficiency conditions of stability. MSO approaches have many advantages over state-space approaches. However, available MSO approaches are applicable under tighter assumptions on system matrices. As most of the development in MSO approach took place with special applications to large spacecraft, it lacked generalized framework, constraining its applicability to small class of practical systems. In this talk, generalized, necessary and sufficient conditions of stability for MSO systems are provided. These conditions remove the conservatism in design and provide wider applicability of MSO approaches, thereby realizing full benefits of MSO approaches, including acceleration feedback, computational ease, and physical insight. The MSO design approach based on derived stability conditions is applied to Vibration Control of Piezoelectric Beam, Flutter Analysis of Aircraft Wing and Robust Controller Design for Parameter Varying Systems.

About The Speaker

Anjali M. Diwekar received her PhD from the Department of Aerospace Engineering at The Ohio State University. From 1991-1995, she was a Project Engineer at the Mechanical Engineering Department and a Research Associate at the Aerospace Engineering Department, Ohio State University. She also held Research Associate positions at the Indian Institute of Technology and the Indian Institute of Science. Her research area of interests are Vibration Control, Smart Structure Control, Robotics and Robust Control.

All Welcome

Members and guests interested in the meeting topic are invited.

Time: 6:30 PM, Tues., October 17, 1995.

Place: John Howard Room, Hazell Ctr., NJIT, 323 Dr. Martin Luther King, Jr. Blvd., Newark, N.J.

Information: Tim Chang (201) 596-3519 or tnc0766@tesla.njit.edu.

North Jersey Section Activities October

Oct. 4—"North Jersey Section Executive Committee Meeting"—7:00 PM, Plant 11, GEC-Marconi, 164 Totowa Road Totowa, NJ. Dr. Fred Chichester (201) 744-7340.

Oct. 12—"Alternative Energy Systems"—North Jersey Section PACE, 7:30 PM, JCP&L Co., 300 Madison Avenue & Punch Bowl Road, Morristown, NJ. Rodney Cole (201) 299-9022, ext. 2257.

Oct. 12—"Conducting Polymer Actuators"—IEEE Laser and Electro Optics Chapter, 5:00 PM, NJIT, Rm. 202, ECE Bldg., Newark, NJ. Haim Grebel (201) 5966-3533.

October 17—"Seminar: Stability Analysis, Robustness And Controller Design For Matrix Second Order Dynamical Systems."—NJ IEEE Control Systems Chapter, 6:30 PM, NJIT, John Howard Rm., Hazell Center, 323 Dr. Martin Luther King, Jr., Blvd., Newark, NJ. Tim Chang (201) 596-3519.

Oct. 18—"Microwave CAD, Including EM Optimization And Modeling Of Arbitrary Geometries"—IEEE North Jersey Section MTT/AP Chapter, 7:00 PM, NJIT, Newark, NJ. Chandra Gupta (201) 633-4469.

Oct. 19—"Scientific Study of Mind/Matter Interactions—Princeton Engineering Anomalies Research"—Metropolitan Section Engineering in Medicine and Biology Society, 7:30 PM, Rockefeller Univ., Rm. 305 Weiss, 1200 York Ave., NYC. Joel Levitt (718) 891-6460.

Oct. 21—"One-Day Seminar: Recent Trends In Adaptive Filtering"—IEEE Philadelphia Section Signal Processing Chapter, University of Pennsylvania, Phila., PA. For information call Prof. Moeness Amin (610) 519-7305.

Oct. 25—"Seminar: Getting The Most Out Of Your Electric Power System"—North Jersey Section IAS & PES Chapters, 9:00 AM - 3:00 PM, JCP&L Hq., 300 Madison Ave., Morristown, NJ. Vittal Rebbapragada (201) 804-2011.

Oct. 25—"Transmission On Data Grade Unshielded Twisted Pair Copper Cable"—IEEE Communications Society NJ Chapter with NJIT's Center for Communications And Signal Processing, 7:00 PM, NJIT, 202 ECE Center, Newark, NJ. Nirwan Ansari (201) 596-3570.

Oct. 26—"Avoiding Patent Infringement"—NJ Consultants' Network, 7:30 PM, AT&T Bell Labs., 67 Whippany Rd., Whippany, NJ. Robert Walker (201) 736-0771.

Upcoming Meetings

Nov. 1—"North Jersey Section Executive Committee Meeting"—7:00 PM, Plant 11, GEC-Marconi, 164 Totowa Road Totowa, NJ. Dr. Fred Chichester (201) 744-7340.

Nov. 4—"Mini-Symposium: Wireless Communication"—NJ Vehicular Technology Society, Meadowlands Hilton Hotel in Secaucus, NJ. For information call Art Greenberg (201) 492-1207 or Mel Lewis at (914) 968-2500, ext. 2304.

Nov. 16—"Flywheel Energy Storage In Electric Utility Applications"—North Jersey PES/IAS, 7:00 PM, JCP&L Co., 300 Madison Avenue, Morristown, NJ. Ken Oexle (JCP&L) (201) 455-8481.

Nov. 21—"One-Day Tutorial: Protection Of Synchronous Generators"—North Jersey PES/IAS, JCP&L Hq., 300 Madison Ave., Morristown, NJ. Vittal Rebbapragada (212) 839-1473.

**Members and Non-Members Welcome
PLEASE POST**

NJ Communications Soc: **Sending Data Over Unshielded Twisted Pair Copper Cable**

On October 25, 1995, the IEEE NJ Communications Society together with NJIT's Center for Communications and Signal Processing will present a talk on "155.52 Mb/s Data Transmission On Data Grade Unshielded Twisted Pair Copper Cable." The speaker will be William E. Stephens.

About The Talk

The speaker will demonstrate the feasibility of transmitting 155 Mb/s SONET/ATM signals using different line codes (Non-Return to Zero (NRZ), Multi-Level Transmit - 3 Levels (MLT3), Binary Partial Response - Class 1 (BPR1) and Binary Partial Response - Class 4 (BPR4)) over distances greater than 100 meters on data grade (EIA/TIA 568 Category 5 specification) unshielded twisted pair copper cable. The RF emission characteristics for each line code are measured and the effect of alternative termination schemes on radiative emissions examined.

Common mode terminations produce consistently lower radiated emissions than quad terminations or balun terminations. Emission levels are positively correlated with the spectrum of the transmitted signal. For a given transmit level at 155Mb/s, MLT3 had the lowest emissions between 30 to 50 MHz while BPR1 had the lowest emissions above 60 MHz. The emissions with BPR1 and MLT3 were 4 to 20 dB (13 dB typical) and 8 to 13 dB (10 dB typical) below NRZ levels, respectively.

The BER sensitivity to injected noise and pseudo-random data sequence length was also measured. The ISI penalty was greater than 2 dB with conventional "two-zero" forward equalization, while NRZ and BPR1 exhibited a 10-10 Bit Error Rate floor due to baseline wander associated with transformer coupling. Both effects could be removed with decision feedback equalization. MLT3, BPR1 and BPR4 offer 5 to 15 dB better radiated emission performance over NRZ at 155 Mb/s, although implementation complexity is greater.

About The Speaker

William E. Stephens, PhD is the Head of the Wireless and ATM Networking Group at the David Sarnoff Research Center in Princeton. His group is studying wireless access technologies along with interoperability of Asynchronous Transfer Mode (ATM) packet local area networks with the evolving broadband public network.

Prior to joining Sarnoff, Dr. Stephens was at Bellcore as the Director of the High-Speed Switching and Storage Technology Group, and was section head for a

TRW group researching transmission of microwave signals over analog fiberoptic links. He received the PhD degree from the University of Southern California. For his dissertation, he demonstrated one of the first hybrid optical-digital computers.

Dr. Stephens has over 40 publications and one patent in the field of communications and networking. He has served on several technical program committees, including IEEE GLOBECOM and IEEE Electronic Components and Technology Conference (ECTC) and has served as Guest Editor for two issues of the *IEEE Journal on Selected Areas in Communications*. He is a senior member of the IEEE, and a member of OSA, SPIE, Sigma Xi, Tau Beta Pi, and Eta Kappa Pi, and Eta Kappa Nu.

Time: 7:00 PM, Wednesday, October 25, 1995. Pizza and Pop, 6:45 PM.

Place: NJIT, 202 ECE Center, Newark.

Information: N. Ansari (201) 596-3670.

NJ Consultants' Network: **Avoiding Patent Infringement**

On October 26, 1995, the IEEE NJ Consultants' Network will present a talk on "Patents—How To Get Them And How To Avoid Infringement." Speaker Stewart Gitler will discuss the basics of patent search.

About The Topic

In the course of the design process, an engineer often encounters the issue of patents. In particular, an independent practitioner involved in a complete product development process will need to consider the matters of possible infringement on existing patents or may contemplate the possibilities of patenting the results of a current project.

This presentation will provide an introduction to the intricacies of patents. Addressing engineering concerns, guidelines for a patent search will be presented, both from the point of view of infringement avoidance and patentability of design. The speaker will discuss the patenting process, approximate costs and patent terms.

About The Speaker

Mr. Gitler is a patent attorney with Hoffman, Wasson & Gitler in Arlington, VA, a firm which handles intellectual property matters on both national and international level. Its attorneys serve also as associate counsel for out-of-town and foreign firms. The firm provides a wide spectrum of services in the area of patents, trademarks and copyrights.

Mr. Gitler has a degree in chemical engineering from Cooper Union and a law degree from Hofstra University. He is a member of District of Columbia, New York, and Virginia state Bar Associations and is registered to practice before the U.S. Patent and Trademark office.

Featured Consultants

Ted Byrne began his consulting business, Flatland Computer Specialties, Inc., while working for AT&T Bell Labs in Illinois. Now located in Madison, N.J. he specializes in assisting clients with software project definition, control, documentation and training. A fifteen year member of the IEEE Software Engineering Standards organization, Mr. Byrne presents seminars on the proper usage of software standards for the IEEE as well as teaching courses in programming for the IEEE NNJ Section. He is an expert in C and C++ programming, with object orientation and programming for Windows.

Time: 7:30 PM, Thurs., October 26, 1995.

Place: AT&T Bell Laboratories, 67 Whippany Rd., Whippany, N.J.

Information: For directions or up-to-date meeting status call Robert Walker at (201) 736-0771.

Attendance: Non-Network attendees and member guests must pre-register by 5 PM Wednesday, Oct. 25th. Contact David Greenspan at (201) 882-8562 (answering machine). Leave your name and citizenship information. Calls will not be returned.

NJ PES/IAS:

Flywheel Energy Storage In Electric Utility Applications

On November 16, 1995, the NJ Power Engineering/Industrial Application Society Chapters will present a talk on "Flywheel Energy Storage In Electric Utility Applications." The speaker will be John Price.

About The Talk

Flywheel battery technology is poised to play a revolutionary role in both electric vehicles and utility infrastructure development. The evolving technology will allow power generation combustion processes to be operated at optimum efficiency, enable effective exploitation of renewable energy sources, and provide point of service solutions to power quality problems experienced by utility customers with increasingly sensitive loads.

About The Speaker

John Price is a member of the University of Texas Center for Electromechanics Senior Engineering Staff. He is Co-Principal Investigator on a recently awarded contract to develop a flywheel-battery-based advanced locomotive propulsion system for the Department of Transportation. He is also leading efforts to develop electric utility applications for flywheel energy storage systems.

Time: 7:00 PM, Thursday, Nov. 16, 1995.

Place: Jersey Central Power & Light Co., 300 Madison Ave., Morristown, N.J.

Information: Ken Oexle (201) 455-8481.



AN IEEE SEMINAR ON **GETTING THE MOST OUT OF YOUR ELECTRIC POWER SYSTEM:**

**HOW TO OBTAIN HIGHER PRODUCTIVITY, LOWER COSTS,
AND BETTER PROFITABILITY FROM YOUR EXISTING SYSTEM**

Presented by the IAS and PES Chapters, North Jersey Section

Wednesday, October 25, 1995, 9:00AM to 3:00PM

Jersey Central Power and Light HQ

300 Madison Ave., Morristown, NJ 07962

Topics

- Introduction
 - Seminar overview
 - Basic concepts
 - Costs of power problems
 - Factors that affect system productivity
 - Reliability, availability, maintainability
 - Preventive maintenance
 - Life extension
- System productivity evaluation
 - Single-line diagram
 - Walkdown inspection
 - Capacity and expandability evaluation
 - Power quality assessment
 - Energy efficiency evaluation
 - Reliability and availability assessment
 - Techniques and tools
 - FMEA and other hazards analyses
 - Reliability block diagrams
 - Fault trees
 - Computer tools
 - Reliability and availability data
 - Collecting and analyzing plant data
 - Generic data
- System productivity improvement
 - Identifying and upgrading critical items
 - Productivity-centered maintenance
 - The PCM concept
 - Benefits of PCM
 - Database development
 - Procedures review
 - "Smart" databases and AI resources
 - Maintenance tracking and closeout
 - Inspection and testing
 - Trending maintenance and test results
 - Managing a living PCM program
 - Improving energy efficiency
 - Improving power quality
 - System life extension
- Justifying investments in power system hardware or maintenance upgrades
 - Life-cycle costing
 - Investment analysis concepts
 - Probabilistic cost-benefit analysis
- Final overview and discussion

Seminar Leaders

Richard H. McFadden, P.E., Fellow, IEEE. Chief Electrical Engineer, Advanced Technology Division, Science Applications International Corp., New York, NY.

R. Vittal Rebbapragada, P.E., Senior Member, IEEE. Senior Consulting Engineer - Electrical Power Systems, Ebasco Services Division, Raytheon Engineers and Constructors, New York, NY.

Cost - including materials, morning refreshments, and luncheon:

IEEE members	\$150.00
Non-members	\$195.00
Students with valid ID	\$50.00

Reserve your place by mailing a check payable to "IEEE Jersey Section" to R.H. McFadden, SAIC, 7 West 36th St., New York, NY 10018 **by October 16, 1995. \$50.00 DISCOUNT ON FULL (NON-STUDENT) REGISTRATIONS RECEIVED BY OCT. 11**

**A One-Day IEEE Tutorial On
PROTECTION OF SYNCHRONOUS GENERATORS**
Presented by the IAS and PES Chapters, North Jersey Section
Tuesday November 21, 1995, 8:30 AM to 3:30 PM
Jersey Central Power and Light HQ, 300 Madison Ave., Morristown, NJ 07962

A recent survey conducted by the IEEE Power System Relay Committee indicated that the protection of generators is one of the most misunderstood areas of protective relaying. Despite the publications of a number of IEEE/ANSI C37 guides on the subject, there appears to be little understanding of generator protection concepts and new protection schemes. The protection of synchronous generators involves the consideration of more harmful abnormal operating conditions than the protection of any other power system element. Contrary to the belief of some, generators do fail. The cost of these failures for a major generator are substantial in terms of repair costs and the cost of purchasing/generating more expensive replacement power during the period the unit is being repaired/replaced. The analysis of many of these failures indicates they could have been prevented by proper protection. If you are involved in the electrical protection of generators, this tutorial provides an excellent opportunity to understand this important area of power system protection. The tutorial is divided into fourteen (14) sections which comprehensively covers the subject of the electrical protection of synchronous generators. These sections are:

TOPICS

- | | | |
|--|---|---|
| • Fundamentals | • Generator stator phase fault protection | • Field ground protection |
| • Stator winding ground fault protection | • Abnormal frequency protection | • Overexcitation & Overvoltage protection |
| • VT signal loss | • Loss of field protection | • Out-of-step protection |
| • Negative sequence protection | • System backup protection | • Inadvertent generator energizing |
| • Generator breaker failure | • Generator tripping | |

A 78 page tutorial text specifically written for the tutorial is included in the registration fee. The course will be presented by a two (2) instructor teaching team for its Power System Relaying Committee who prepared the document.

Seminar Leaders

Chuck Mozina, P.E., Member IEEE. Manager Relay Applications, Beckwith Electric Co., Inc., Largo, Florida.

R. Vittal Rebbapragada, P.E., Senior Member IEEE. Senior Consulting Engineer-Electrical Power Systems, Ebasco Services Division, Raytheon Engineers and Constructors, New York, NY.

Cost - including materials, morning refreshments, and luncheons:

IEEE Members.....\$150.00
Non-Members\$195.00
Students with valid ID....\$ 50.00

Reserve your place by mailing a check payable to "IEEE North Jersey Section" to Ken Oexle, Jersey Central Power & Light, 300 Madison Ave., Morristown, NJ 07962 Call-in reservations are welcome. \$50.00 DISCOUNT FOR FULL (NON-STUDENT) REGISTRATIONS POST-MARKED BY SEPT. 20!.

For information call Chuck Mozina, 813.544.2326, Vital Rebbapragada, 212.839.1473 or Ken Oexle, 201.455.8481