



The IEEE

Newsletter

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

MTT/AP-S Scholarships

The MTT-AP-S Chapter of the IEEE North Jersey Section awarded two scholarships at the September 6, 1989 Section meeting. The scholarships were awarded to Satheesh K. Karra of the New Jersey Institute of Technology and Michael J. Flanagan of the Stevens Institute of Technology. Chapter Chairman Dr. Richard V. Snyder and Section Chairman Howard Leach presented the awards.

The two students were winners of the scholarships based upon academic record, competitive submittal of an essay titled "My Concept of Microwave Engineering," and a description of their anticipated work in the field of microwave engineering for the next academic year.

Mr. Karra, a graduate student at NJIT, was awarded \$2,500. His work will concentrate on dielectric resonator oscillators and is supervised by Professor Tushar Bahttacharjee of the New Jersey Institute of Technology. His involvement with oscillator stabilization and optical tuning of such oscillators is work truly representative of state-of-the-art component development.

Mr. Flanagan, a Senior at Stevens Institute of Technology, was awarded \$1,500. His work at Stevens is supervised by Professor Harrison E. Rowe, and will involve development of a microwave radio link between the Stevens campus and the Rutgers-New Brunswick campus. Operating in K-band, the proposed link will start as an analog radio, but will end as a digital microwave radio link. Mr. Flanagan anticipates graduate work in the microwave engineering field, and was called "The best undergraduate student I've ever seen," by Professor Rowe.

The scholarships, awarded for the last three years, are generated from the Mini Show and Mini Symposium which the North Jersey MTT/AP puts on each year. The show is an exhibitor-supported event which features distinguished MTT or AP lecturers speaking to overflow crowds. The next such event is planned for November 2, 1989 at the ITT Avionics Tower and Clubhouse facility in Nutley, New Jersey. (See page 8.)

Information regarding the scholarships can be obtained from Dick Snyder at (201) 492-1207.



SCHOLARSHIPS AWARDED—At the September meeting of the North Jersey Section's Executive Committee, the MTT/AP Society Chapter scholarships were awarded. Shown above are (left to right): Dr. Richard Snyder, Chairman MTT/AP; Satheesh K. Karra, of NJIT; Michael J. Flanagan, Stevens Institute of Technology; and North Jersey Section Chairman Howard Leach.

OCTOBER, 1989

IEEE North Jersey Section Calendar

October 11--"The Professional Engineering License"--North Jersey Section Young Engineers Committee, 7:30 PM, ITT Auditorium, 500 Washington Ave., Nutley, N.J. **Reservations required for free pre-meeting buffet.** Tom DeNigris (201) 575-1300.

October 11--"Symposium: Genome Mapping"--Metropolitan Chapter of Engineering in Medicine and Biology Society, 7:00 PM, Rockefeller University, Caspary Auditorium, York Ave. at 66th St., NYC. Vijay Kowtha (201) 932-4803.

October 12--"PACE Meeting: Computer Networking For Engineers"--North Jersey Section's Professional Activities Committee for Engineers, 7:30 PM, ITT Auditorium, 500 Washington Ave., Nutley, N.J. Richard Tax (201) 664-0803.

October 17--"Workshop: Cost Effectiveness In Design"--North Jersey Section Reliability Society, 5:00 PM-9:30 PM, ITT Auditorium, Nutley, N.J. Hank Moss (201) 785-6458.

October 18--"Seminar: Network Synchronization"--IEEE Metropolitan Chapter Instrumentation & Measurement Society, 9:00 AM-4:00 PM, Radisson Hotel, Newark Airport. Jeannie Franklin (201) 964-6200.

October 19--"The System Error Budget"--North Jersey Section Control System Society, 7:30 PM, JCP&L Co., Route 24 and Punch Bowl Rd., Morristown, N.J. Dr. Bill Bigley (201) 757-1600, ext. 2334.

October 19--"Minimizing Downtime Of Electrical Distribution Systems"--North Jersey Section Industrial Applications Society, 6:00 PM, ITT Auditorium, 500 Washington Ave., Nutley, N.J. **Reservations required for pre-meeting dinner buffet.** David Perry (201) 325-8415.

October 24--"Computer Steered Microphone Arrays In Teleconferencing"--North Jersey IEEE Acoustics, Speech and Signal Processing Chapter, 7:30 PM, AT&T Bell Labs, Murray Hill Auditorium, 600 Mountain Ave., Murray Hill, N.J. John Burgess (201) 386-2736.

November 2--"Symposium & Mini-Show"--North Jersey Chapter MTT-S/AP-S, 1:30 to 9:30 PM, ITT-Avionics, Tower & Clubhouse, 417 River Rd., Nutley, N.J. Dick Snyder (201) 492-1207.

November 9--"Practical Aspects Of Career Development"--North Jersey Section IEEE Intersociety Committee, 8:00 PM, ITT Clubhouse, Nutley, N.J. David P. Perry (201) 325-8415.

November 11--"Symposium: Protection of Equipment And Systems In Utility/Industrial Facilities From Lightning, Switching Surges And EMI"--North Jersey Section, Industry Application Society, 9:00 AM-12:30 PM, Secaucus Hilton. **Reservation/Fee required.** Vittal Rebbapragada (212) 839-2210.

November 15--"Leadership In Management"--Joint NewYork/North Jersey Chapter Engineering Management Society. David P. Perry (201) 325-8415. (*Details in November issue .*)

December 7--Officer Elections followed by talk on "Energy Management And Conservation Program In Industrial Plants"--North Jersey Section Industrial Application Society, 7:00 PM, ITT Auditorium, 500 Washington Ave., Nutley, N.J. Vittal Rebbapragada (201) 568-5849.

December 7--"Making US Industry More Competitive"--North Jersey Section IEEE Intersociety Committee, 8:00 PM, ITT Clubhouse, Nutley, N.J. David P. Perry (201) 325-8415. (*Details in November issue.*)



PLEASE POST
Members and Non-Members Welcome

Professional Registration - Is It Worthwhile?

The IEEE North Jersey Section Young Engineers Committee will meet on October 11, 1989 to hear a talk on "The Professional Engineering License." The speaker will be Wayne Clements, P.E.

About The Talk

The presentation will cover some of the professional aspects of the Professional Engineering License by examining the needs, history and current trends in the Engineer-In-Training and Electrical Engineering Examinations for the P.E. License.

About The Speaker

Professor Clements has been registered as a P.E. in New Jersey since 1963. He received his BSEE and MSEE from the Newark College of Engineering. He also holds an MS degree in Biomedical Engineering from the University of Pennsylvania.

Currently Assistant Chairman for Laboratories at the Electrical and Computer Engineering Department of NJIT, Professor Clements was previously employed in design, development and field engineering by General Electric and ITT Labs before he began teaching in 1959. His consulting engineering practice started in 1965. Professor Clements received the Robert W. Van Houten Teaching Excellence Award in 1978 and is listed in *Who's Who in Engineering*. In 1988 he was named Teacher of the Year by the IEEE Student Branch at NJIT.

All Welcome

Members and guests are invited. A free buffet dinner for attendees will be provided at 6:30 PM. **Reservations are required.**

Time: 7:30 PM, Wednesday, October 11, 1989. (Buffet starts at 6:30 PM.)

Place: ITT Auditorium (at the Tower), 500 Washington Avenue, Nutley, N.J.

Further Information/Reservations: Tom DeNigris (201) 575-1300 or (201) 482-1876 after 6 PM.

PACE Meeting: COMPUTER NETWORKING FOR ENGINEERS

The North Jersey Section's Professional Activities Committee for Engineers will meet on Thursday, October 12, 1989. The subject will be "Computer Networking For Engineers." There will be two guest speakers.

Roman Zaputowycz will provide an elementary overview of Dial-up data communications concepts. He will address the techniques of computer data interchange utilizing modems at asynchronous and synchronous speeds.

Bert Juda will discuss computer networking using PC based bulletin boards and electronic mail technology. He will introduce you to "FIDONET" an amateur network of bulletin boards and demonstrate how engineers can use this technology to enhance communications. The discussion will be based on the Personal Computer, inexpensive modems, software and equipment costs.

Roman spent 16 years with the GE Space Division as manager of Remote Sensing and Advanced Systems Development Group. Later, he moved to Western Union Telegraph Company in Upper Saddle River where he was director of Westar Satellite Division.

Bert is presently employed at our IEEE Service Center in Piscataway and working on the Field Services BBS. Prior to this he was at AT&T in Plainfield as a customer support engineer.

All IEEE members and guests are invited to attend. Refreshments will be served.

Time: 7:30 PM, Thursday, October 12, 1989.

Place: ITT Auditorium, 500 Washington Avenue, Nutley, N.J.

Further Information: Richard Tax (201) 664-0803.

Transformers And Switchgear

On October 19, 1989 the IEEE North Jersey Section Industrial Applications Society will host a presentation on "Minimizing Downtime Of Electrical Distribution Systems." The speaker will be Edward R. Muchmore.

About The Talk

The presentation will pertain to Transformers and Switchgear. Areas to be covered will include upgrade of your equipment, retrofits to existing switchgear, or "when all else fails and you are down."

About The Speaker

Edward R. Muchmore is a Vice President of Emerson Power, Inc. For 35 years, he has solved problems for industrial and utilities, with regard to the distribution of electrical power, dealing with switchboards, switchgear, substations, and protective relays and controls.

Dinner Buffet

There will be a dinner buffet preceding the meeting. Reservations required (RSVP below).

Time: 6:00 PM, Thursday, October 19, 1989.

Place: ITT Auditorium (next to the tower, use rear door), 500 Washington Ave., Nutley, N.J.

Further Information/Reservations: David Perry (201) 325-8415.

System Designs Error Budget

On October 19, 1989 the North Jersey Section IEEE Control System Society will present a lecture entitled "The System Error Budget." The speaker will be Dr. Harris Rawicz, Chief Scientist at Lockheed Electronics Co. Inc., Plainfield, N.J. and Adjunct Professor at Kean College.

About The Lecture

The winning of a competitive program and the proper design of a system depends on the clarity and the comprehensiveness of the error budget. The error budget has to show the customer and your company's managers how to meet the system accuracy specifications with the least cost. The method presented here was developed several years ago and combines bias and random error propagation with sensitivity equations. It is performed using SuperCalc 4, although Lotus 123 and/or computerized spread sheet with graphing capability can be used. Examples of system designs and the resulting error propagation charts will show how systematic errors affect overall accuracy and how system tradeoffs can be made.

About The Speaker

Dr. Harris Rawicz received his BSEE and MSEE degrees from Newark College of Engineering, New Jersey Institute of Technology, in 1958 and 1961 respectively. In 1968 he received his DSc from Stevens Institute of Technology, majoring in automatic control theory and minoring in mathematics. In his engineering career at Lockheed, Dr. Rawicz developed the system architecture and design for the majority of the radar tracking and weapon pointing systems produced by Lockheed. His work encompasses a broad range of engineering disciplines from analog circuit design to multivariable control systems to conceptual systems analysis and design. His current research interests focus on advanced electro-optical tracking systems. Dr. Rawicz holds several patents and has published many papers.

Pre-Meeting Dinner

There will be a pre-meeting dinner at RODS, Madison Avenue, Morristown at 5:00 PM.

Time: 7:30 PM, Thursday, October 19, 1989.

Place: JCP&L Company, Route 24 and Punch Bowl Rd., Morristown, N.J.

Pre-Meeting Dinner: 5:00 PM, RODS, Madison Ave., Morristown, N.J.

Information: Dr. Bill Bigley (201) 757-1600, ext. 2334; Fred Schupan (201) 757-1600, ext. 2392.

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445 Hoes Lane, P.O. Box 1331
Piscataway, N.J. 08854-1331
(201) 981-0060

It is not necessary to inform the North Jersey Section when you change your mailing address. The 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.

SECTION OFFICERS

Chairman..... Howard Leach, Jr.
885-3530
Vice-Chairman-1..... Raymond Sears, Jr.
386-2259
Vice-Chairman-2..... George Graul
290-1128
Treasurer..... David Perry
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Secretary..... Richard Snyder
492-1207
Member-at-Large..... Thomas De Nigris
Member-At-Large..... David A. Dietsche
Member-At-Large..... George Pick
Jr. Past Chairman..... Robert Sinusas

The North Jersey Section Executive Committee meets the first Wednesday (except holidays and December) of each month at 7 PM. These meetings (held at ITT, 500 Washington Ave., Nutley, N.J.) are open to all members. Information on each meeting agenda is available from Richard Snyder, Section Secretary at (201) 492-1207.

Elected Section Officers are listed above.

EMBS Symposium: Genome Mapping

On October 11, 1989, the Metropolitan Chapter of the Engineering in Medicine and Biology Society will present a symposium on "Genome Mapping: Future Computational Challenges."

The symposium topics and their speakers are: "Computational Challenges In Understanding Genome Sequences", Dr. Jacob Maizel, Chief of the Laboratory of Mathematical Biology of the National Cancer Institute; "Building the Software Framework For Molecular Biology", Dr. James Ostell, Software Engineer with National Library of Medicine in Bethesda; "Models And Inference For Genomic Evolution," Dr. David Sankoff, Professor, Department of Mathematics and Statistics, University of Montreal.

The speakers are well versed in both

the theoretical and practical considerations of the problem, and this symposium approaches some aspects of molecular sequencing from the computational point of view.

The evening will consist of a short presentation by each of the speakers followed by a lively interactive discussion period.

Optional Pre-Lecture Get Together

There will be an informal pre-lecture get together 6:00 PM in the Tower cafeteria.

Time: 7:00 PM, Wednesday, October 11, 1989.

Place: Rockefeller University, Caspary Auditorium, York Ave. at 66th St., NYC. Free parking is available on site.

Further Information: Vijay Kowtha (201) 932-4803; Joe Bogovic (212) 241-8032; Robert Heyman (914) 357-1230; Edna Feher (212) 757-0610; Ben Caref (718) 270-1712.

CHAIRMAN'S CORNER

At the last Executive Committee meeting, Tom DeNigris, our Student Activities Chairman, introduced Caroline Chiu, the new Stevens Student Branch Chairperson. She outlined her plans for student activities at Steven's this year--for details see separate article in this issue. We were delighted to see her and hope that the other student branch chairpersons can attend at least one of our executive committee meetings.

Also, at our last executive committee meeting, two students were awarded scholarships under the MTT/AP student scholarship program sponsored by Dr. Richard Snyder. These scholarships are awarded from the surplus funds generated from the MTT/AP Mini-Show held each year. Congratulations to them--also see separate article in this issue.

Further, at our last executive meeting, Anne Giedlinski, Student Assistance Committee Chairperson, reported that checks for six Coulomb Scholarships had been sent to the respective schools for presentation to the scholarship winners. These funds were obtained from our Electro Show surplus. Congratulations to these scholarship winners. A separate article will be in the next issue.

On August 18th and 19th, attended a Region 1 meeting along with seven other members of the executive committee. A number of workshops were held for the new officers including sessions on field services, education, membership, PACE, student, and publication activities. This was the last Region 1 meeting to be chaired by Vic Zourides. I think he has done an excellent job of representing all 22 Sections within Region 1.

During the Region 1 meeting, I am pleased to announce that our Junior Past Chairman, Bob Sinusas, received an award of appreciation from Vic for his efforts as Chairman of the North Jersey Section during Vic's term of office. Also, I'm pleased to announce that a number of Region 1 awards were approved including those for three of our members: Anne Giedlinski, Past Chairman and Student Assistance Chairperson; Dick Tax, Past Chairman, PACE Chairman, and METSAC representative; and John Baka, Education Chairman for many years.

Finally, if you haven't voted your IEEE ballot yet, please do. In the past, less than 25 percent of eligible members returned their ballots. From my own point of view which does not represent the executive committee or the Section membership, Merrill Buckley will make an excellent President-Elect. His positions on portable pensions, salary compression, age discrimination, and other issues facing the Institute are what we need in the top leadership of our professional organization.

Likewise, Frank Schink, is my choice to lead us as the Region 1 Director. Frank is recently retired as Chief Electrical Engineer of the Port Authority of New York and New Jersey, has the background as a former New York and METSAC Chairman, and has the time to devote to IEEE activities.

Again these are my choices. Please make your choices and return those ballots today. They must be received by noon on November 1st.

HOWARD LEACH
North Jersey Section Chairman

IAS Officer Election And Talk On Energy Conservation

On December 7, 1989 the North Jersey Section Industrial Application Society will host a presentation on "Energy Management And Conservation Program In Industrial Plants." The speaker will be Mr. Bhawani P. Mukherjee, P.E., Lederle Labs of American Cyanamid, Pearl River, N.Y. There will be an election of officers prior to the start of the technical presentation.

About The Talk

The presentation covers the salient aspects of an energy program, planning energy conservation and implementation to reduce the operating costs of production in industrial plants. The presentation also covers aspects of needed management support and program format which play a crucial role in the successful implementation of the program. As an illustration Mr. Mukherjee will describe the energy management program at the Lederle Labs which has incorporated both steam and electricity conservation.

About The Speaker

Mr. Bhawani P. Mukherjee, has been with American Cyanamid for the past 15 years, and he is presently the Manager of Engineering at the Lederle Labs, Pearl River, New York. He has worked on several projects for American Cyanamid throughout the USA and headed as chairman, the task force on Energy Management. Mr. Mukherjee holds a MSEE from City University of NY and is a licensed professional engineer in the State of New York and New Jersey.

ELECTION

Prior to the technical presentation there will be an election of officers. The North Jersey Chapter of the Industrial Application Society has been in existence for many years. This is an interactive group with varied interests in power generation, in-plant electrical distribution, lightning protection, grounding, switching surges, alternative energy sources such as Co-Generation, wind and solar power, computers, fiber optics, SCADA, semiconductors, electric machines, industrial drives, etc. The aim of the Society is to keep members abreast of the developments in the aforementioned areas with quality speakers having detailed background in their respective areas. The North Jersey Chapter has scheduled seven technical sessions in 1989, and is planning even more vigorous programs for the year 1990. This requires active participation by all IEEE members in the Metropolitan area. With this end in view, an executive committee election is scheduled at this meeting. All members with interest in IAS/PES are invited to participate. Please join us and make our program an even greater success.

Pre-Meeting Dinner

The pre-meeting buffet dinner starts at 6:00 PM with the Election taking place prior to the technical presentation.

Time: 7:00 PM, Thursday, December 7, 1989. (6:00 PM, buffet dinner and Election.)

Place: ITT Auditorium, 500 Washington Ave., Nutley, N.J.

Further Information/Reservations: Vittal Rebbapragada, Chairman, IAS Chapter (201) 568-5849 or Max C. Schramm (201) 887-1120.

Computer Steered Microphone Arrays In Teleconferencing

On October 24, 1989 the North Jersey IEEE Acoustics, Speech and Signal Processing Chapter will continue its series of technical talks related to current topics in signal processing. Dr. Gary W. Elko of AT&T Bell Laboratories will be the featured speaker.

About The Talk

Many factors have contributed to historically unrealistic predictions for the growth of audio teleconferencing. Aside from the sociological issues, there exist many acoustic problems which can severely degrade the performance of present technology. These problems include: echo, reverberation, room noise, feedback, and undesired speakers. The detrimental effects of these problems can be reduced by proper location of highly directional microphone systems designed for use in teleconferencing.

The talk will review the development of directional microphones and their present use in audio teleconferencing, and describe some of the highly directional microphone arrays that the speaker has been working with at AT&T Bell Labs. Finally, a demonstration of a large two-dimensional planar-microphone installed in the Murray Hill auditorium will be given.

About The Speaker

Dr. Gary W. Elko received the BSEE degree from Cornell University, and the MS and PhD degrees from Pennsylvania

State University, where he studied acoustics. In 1984 he joined the Acoustics Research Department at AT&T Bell Laboratories where he has been working on microphone systems for teleconferencing. He is an associate editor of the *IEEE Transactions on Acoustics Speech and Signal Processing* and a member of the Acoustical Society of America.

Free Buffet

A free buffet will be provided on a first-come-first-served basis an hour prior to the scheduled talk.

Time: 7:30 PM, Tuesday, October 24, 1989. (Free buffet at 6:30 PM.)

Place: AT&T Bell Laboratories, Murray Hill Auditorium, 600 Mountain Ave., Murray Hill, NJ

Further Information: John Burgess (201) 386-2736; Steve Laico (201) 386-2031; Sunil Patel (201) 582-4923; Joe Rothweiler (201) 284-2722.

Student Branch Elects Officers

The IEEE Student Branch at Stevens Institute of Technology has elected officers for the 1989-1990 school year.

The new officers are:

President	Caroline Chiu
Vice-President	Evan Kass
Secretary	Danny Boyadjian
Treasurer	Daed Yamin
Professor Henry Zmuda is Faculty Advisor.	

The new officers wasted no time in "getting down to business." They have already come up with a complete list of activities. Below is the agenda for the coming year.

September 27, 1989 - Bellcore Information Session

October 4 - Tour of General Electric's North Bergen Manufacturing Facility.

October 11 - AT&T Information Session.

October 18 - G.E. Information Session

October 25 - Tour of G.E. Astrospace Division.

November 8 - Talk entitled "Road to Excellence Through Reliability, Quality, Affordability and Maintainability" by George P. Koshy of G.E.

February 21, 1990 - Talk entitled "Working in the Government and Consumer Products Business - A Comparison" by Peter J. Cohen of G.E.

April 4 - Talk entitled "Information Technology and Its Impact on the Engineering Process" by Joseph P. Cleveland of G.E.

Spring 1990 - "King of the Mountain" Competition.

We wish the students success and congratulate them on their hard work and determination.

IEEE
New York, North Jersey and Long Island
Joint Chapter
Instrumentation and Measurement Society
Presents a
NETWORK SYNCHRONIZATION
SEMINAR

Student Scholarship Awards for 1989-90

The Student Assistance Committee of the North Jersey Section has awarded six \$1,000 scholarships for the 1989-90 academic year.

Ms. Wei-Li Yang received a scholarship for her senior year at Fairleigh Dickinson University. Recipients at New Jersey Institute of Technology were seniors Robert M. Groschadl and Fu-Ho Lee. At Stevens Institute of Technology, seniors Michael J. Flanagan and Michael J. Tamkutonis were selected. Also Sanjay J. Jajal, who graduated from Hudson Community College last spring, was awarded a scholarship for his junior year at Stevens.

Scholarship applications for the 1990-91 academic year will be available in January to student members of IEEE enrolled at area colleges.

What Is A Senior Member?

Senior Member is the highest professional grade for which you may apply. Achieving Senior Member grade is an indication of a member's professional experience and maturity.

You may be qualified if you have been in active professional practice for at least ten years.

Degrees are credited as part of your experience:

Bachelors	3 years
Masters	1 year additional
Doctors	1 year additional

To get a Senior Member brochure with complete information on upgrading, contact Don Weinstein, Kulite Semiconductor, One Willow Tree Rd., Leonia, N.J. 07605. (201) 461-0900.

Wednesday, October 18, 1989 — 9:00 AM-4:00 PM
Radisson Hotel at Newark Airport

As private and public digital networks increase in size and complexity, the need for precise synchronization has become a critical requirement. The proliferation of T1, T3, DDS, and the approach of ISDN has created problems, not only for the carriers, but also the digital communication users and the equipment producers. This seminar will provide an overview of the problems, solutions, implementation and measurements for both the large and small networks.

Formal presentations of frequency and time synchronization in digital networks will be made. The program will cover such areas as clock distribution, typical field sync problems, slip concepts and testing, and analysis of performance.

The selection of proper equipment and synchronization techniques will be discussed, along with primary reference clock strategy.

A panel of industry experts will join with the speakers to respond to questions submitted by the attendees. Particular questions and topics can be submitted prior to the seminar.

Space will be limited and early registration is urged to guarantee attendance at this very important seminar.

Registration and Information Contact:

Jeannie Franklin, Friedman Associates, Inc.
(201) 964-6200 Fax: (201) 964-6204

Fee: IEEE Members: \$75.00; Non-Members: \$95.00. (Lunch is included.)

To Guarantee Registration:

Complete and return registration form with check made payable to:
IEEE NY, North Jersey & LI Joint Chapter.

Hotel Accommodations:

A limited number of rooms are available at the Radisson Hotel at a rate of \$110.00 per night for registrants.

Registration for "Network Synchronization Seminar"

To: Jeannie Franklin, Friedman Associates Inc., 2424 Morris Ave., Union, NJ 07083.

Name _____ **IEEE No.** _____

Company _____ **Phone No.** _____

Address _____

Please enclose required fee made payable to "IEEE NY, No. Jersey & LI Joint Chapter"

IAS Seminar On Equipment And Systems Protection

On November 11, 1989 the North Jersey Section Industrial Application Society will present a panel symposium consisting of four presentations covering the primary area of concerns to the electrical engineer. The chairman and moderator will be R.V. Rebbapragada, P.E., Chairman, IAS/North Jersey Chapter.

The presentation topics will be given by speakers with extensive design experience having worked on several utility and industrial installations.

1. Nature and source of lightning and switching surges. *Jim Harrison, L.E.A. Dynatech, Santa Fe Springs, California.*
2. Lightning protection design considerations. *Jim Harrison, L.E.A. Dynatech, Santa Fe Springs, California.*
3. Protection of control and instrumentation circuits from switching surges. *Vittal Rebbapragada.*
4. Shielding and grounding of sensitive instrumentation circuits from EMI/RFI. *(Speaker to be announced.)*

These in-depth talks will be presented on Saturday, November 11, 1989 starting at 9:00 AM and ending by 12:30 PM. The location is the Meadowlands Hilton Hotel in Secaucus, N.J.

Cost for this complete technical discussion, including the luncheon is as follows: \$90 Non-Members; \$60 Members; \$35 Students.

In order to provide the presentation at this price, reservations with a \$30 per person deposit should be made by October 10, 1989. The remainder will be accepted at the door. Check or money order for the deposit should be made payable to "IEEE North Jersey Section" and sent to Mr. David P. Perry, Treasurer, IEEE North Jersey Section, 57 Forest Hill Rd., West Orange, NJ 07052, (201) 325-8415.

Coffee and danish will be served before the talks commence and coffee will be available throughout the morning. A buffet luncheon will be served immediately following the seminar break to offer an opportunity for people to get together to discuss various side issues at length.

Time: 9:00 AM-12:30 PM, Saturday, November 11, 1989.

Place: Meadowlands Hilton Hotel, Secaucus, N.J.

Further Information: Vittal Rebbapragada (212) 839-2210.

Satellite Communications

by Timothy Pratt



An exploration of the complete system--from spacecraft to discussion of the atmosphere through which signals pass.

Program includes a study guide with solutions manual, final exam, and textbook, Satellite Communications, by Timothy Pratt and Charles Bostian, John Wiley and Sons, 1986.

For more information, call IEEE Educational Activities at (201) 562-5498, or write Educational Activities, IEEE, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331.

IEEE North Jersey Section Reliability Society Presents A WORKSHOP ON COST EFFECTIVENESS IN DESIGN

Tuesday, October 17, 1989 — 5:00 PM - 9:30 PM
ITT Auditorium, 500 Washington Avenue, Nutley, N.J.

The workshop will examine a representative developmental design for cost coupled with the constraints of various Design disciplines such as Electrical, Mechanical and Environmental, Reliability, Maintainability and Logistics. The panel discussion members will include:

Henry Moss
Dan Sackett
Charles Mertz
John Wronka
Fred Embuscado

Product Assurance Mgr.
Mechanical Engineering Mgr.
Systems Safety Mgr.
Reliability Engineer
Maintainability Engineer

Kearfott
Kearfott
NASA
AT&T-Bell Labs
Texas Instr.

FEE: \$25 for IEEE Members; \$35 for Non-Members. (Fee includes proceedings and dinner). For more program information, contact Hank Moss (201) 785-6458.

Specific details for directions, parking, lodging, dinner and final program agenda will be provided upon receipt of the registration form.

Registration "Workshop On Cost Effectiveness In Design"

To: Sergei Bogaenko, 32 Melissa Drive, Totowa, NJ 07512. Please make checks payable to: "North Jersey Reliability Society".

Name _____ Title _____

Affiliation _____ IEEE No. _____

Address _____

Phone No. _____

IEEE North Jersey Chapter

**MTT-S & AP-S
SYMPOSIUM AND MINI-SHOW**

TWO LECTURES & BOOTH EXHIBITS

**Thursday - NOVEMBER 2, 1989
1:30 PM to 9:30 PM**



**TOWER & CLUBHOUSE
ITT-AVIONICS
417 River Road
NUTLEY, NJ**

**DOOR PRIZE
WIN A CD PLAYER!**

DISTINGUISHED INTERNATIONAL LECTURERS

1:30-2:45 - Dr. U. Mishra and Dr. April Brown:

"Gallium Indium Arsenide Heterostructures For Low Noise Amplification, High Speed Logic Circuits, And Lightwave Detection"

7:30-9:30 - Dr. Kurt Weingarten:

"Testing of High Speed ICs With Ultrashort Optical Pulses"

**BOOTH EXHIBITS: 2:30 to 7:00 PM
BIGGER AND BETTER
FREE BUFFET 6:45 TO 7:45 PM**

ENGINEERS, TECHNICIANS, AND PURCHASING PEOPLE WELCOME!

For Details Call:

Dick Snyder (201) 492-1207—Willie Schmidt (201) 284-2255

MTT-S & AP-S SYMPOSIUM AND MINI-SHOW

GALLIUM INDIUM ARSENIDE HETEROSTRUCTURES FOR LOW NOISE APPLICATION, HIGH SPEED LOGIC CIRCUITS, AND LIGHTWAVE DETECTION

Speakers - Dr. April S. Brown and Dr. Umesh K. Mishra

Ga₄₇In₅₃As has long been recognized for its excellent electronic properties and its wavelength compatibility with low loss optical fibers. With the advent of advanced growth technologies such as MBE and MOCVD, heterostructures with InP and A₁₄₇In₅₃As layers are now possible. This has led to the development of devices such as the A₁InAs - GaInAs modulation doped field effect transistor (MODFET) and the heterojunction bipolar transistor (HBT) with A₁InAs or InP wide gap emitters. The A₁InAs - GaInAs MODFET has shown superior mm-wave noise performance compared to the GaAs based A₁GaAs - GaAs and A₁GaAs - InGaAs MODFETs. An extrinsic current gain cut-off frequency, f_t , of 170 GHz has been achieved for devices with a gate length of 0.1 μ m. Most of the work on InGaAs based HBTs was done with InP emitters. These MOCVD grown structures exhibited current gains of over 5000. In addition to high speed applications, HBTs are attractive as detectors and drivers for long wavelength optoelectronic circuits.

This talk will address the status of the materials, device properties, circuits and applications of heterostructures based on InGaAs.

About The Speakers

Dr. April S. Brown was born in Durham, NC in 1960. She obtained her BS degree in Electrical Engineering from North Carolina State University in 1981. She received both her MS and PhD degrees at Cornell University, Ithaca, New York in 1984 and 1985. Her graduate work was concerned with the understanding of substrate and kinetic effects on the growth of GaInAs and A₁InAs by MBE. She studied the impact of these parameters on the performance of GaInAs planar doped barrier diodes and A₁InAs-GaInAs HEMTs. On graduating from Cornell, she joined the faculty of Electrical Engineering at the University of Michigan, Ann Arbor. In 1986, she became a Member of the Technical Staff at Hughes Research Laboratories, Malibu, California. Her research has been primarily in the advancement of the A₁InAs-GaInAs materials system for high-speed devices. She is presently working in the Physics Division of the U.S. Army Research Office in Durham, North Carolina.

Dr. Umesh K. Mishra received his Bachelor of Technology (B.Tech) degree in Electrical Engineering in 1979, from the Institute of Technology, Kanpur, India. His thesis dealt with oxide semiconductor on silicon solar cells. He received his MS degree in 1980 from Lehigh University, Bethlehem, Pennsylvania where he worked on metal-insulator-silicon switching (MIS) devices. He obtained his PhD from Cornell University where his thesis addressed the fabrication and characterization of sub-micron vertical transistors in the A₁GaAs-GaAs materials system. He was at the Electronics Labs of General Electric in Syracuse, New York from 1983 to 1985, where, as Principal Staff Engineer, he was involved with the development of sub-micron A₁GaAs-GaAs HEMTs for mm-wave low noise and power applications. He joined the faculty of Electrical Engineering at the University of Michigan, Ann Arbor in 1985. In 1986, he became a Member of the Technical Staff at Hughes Research Laboratories in Malibu, California. He was manager of Advanced Devices where he was responsible for the development of the A₁InAs-GaInAs HEMT and HBT devices for mm-wave analog and digital applications. He is currently on the faculty at North Carolina State University in Raleigh.

TESTING OF HIGH SPEED ICs WITH ULTRASHORT OPTICAL PULSES

Speaker - Dr. Kurt J. Weingarten

Gallium arsenide and related compounds have been the "material of the future" for integrated circuits (IC) technology for the last decade. For microwave applications, such as broadband amplifiers, oscillators, diode switches, and mixers, compound semiconductor ICs and components clearly have outpaced competition from silicon ICs. For digital applications, such as fiber optic digital data transmission at gigahertz rates, high-speed data acquisition, and faster digital logic for computers and signal processors, these new ICs have a growing niche. New growth techniques promise much higher performance devices based on heterostructures and quantum-size effects, such as heterojunction bipolar transistors (HBTs) and high electron mobility transistors (HEMTs) or modulation-doped field effect transistors (MODFETs). These devices and ICs are creating new challenges for the high-speed test instrumentation used to characterize their electrical response.

The need is for increased time resolution or frequency bandwidth, with transistors showing a maximum frequency in oscillation, f_{max} , in excess of 100 GHz. Propagation delays and transition times of 1-10 ps, well below the resolution of conventional sampling oscilloscopes, are expected for switching circuits using these devices. In either the time or the frequency domain, the speed of the devices are exceeding that of the measurement instrument. A second need is for a non invasive probe of internal signals in the ICs. A test instrument with this feature would permit better characterization of complex high-speed ICs, improving models for devices at high frequencies and helping designers to optimize their circuit performance.

In the last decade, however, optical techniques for ultrashort pulse generation have outpaced electronic pulse generation techniques. Many research laboratories routinely generate picosecond pulses at a number of optical wavelengths, with the record of 6 fs (10⁻¹⁵ seconds). This lecture will describe several methods of using these short optical pulses to make high speed electrical measurements on ICs. One method in particular will be emphasized, electrooptic sampling, which uses the linear electrooptics effect to allow for the detection of voltage signals with light and a high-repetition rate laser to repetitively sample the electrical waveforms. This approach allows direct probing of signals on the IC to allow in situ testing, and synchronization of the pulsed laser system to a microwave signal generator to allow testing of the IC with representative drive signals. The implementation of electrooptic sampling for at-speed testing of high-performance microwave and digital ICs will be described, and a number of measurements performed on microwave and digital circuits will be presented.

About The Speaker

Dr. Kurt J. Weingarten was born in 1961 in St. Petersburg, Florida. He received the BS degree in Electrical Engineering from the Georgia Institute of Technology in 1983, his MS in 1985 and the PhD in 1987 in Electrical Engineering from Stanford University, where he worked as a research assistant in the Edward L. Ginzton Laboratory. His thesis was "Gallium Arsenide Integrated Circuit Testing Using Electrooptic Sampling." He has authored a number of papers on this topic and co-authored several papers on related topics such as the timing stabilization of modelocked lasers. In 1985, he received an IBM Predoctoral Fellowship and in 1986 and 1987 the Newport Research Award. He currently works for Lightwave Electronics developing a commercial version of an optical tester for GaAs ICs. His research interests are electrooptics sampling of GaAs ICs, high-speed electronic testing, and ultrafast optical pulse generation. He is a member of the IEEE and the Optical Society of America.

PACE NEWS

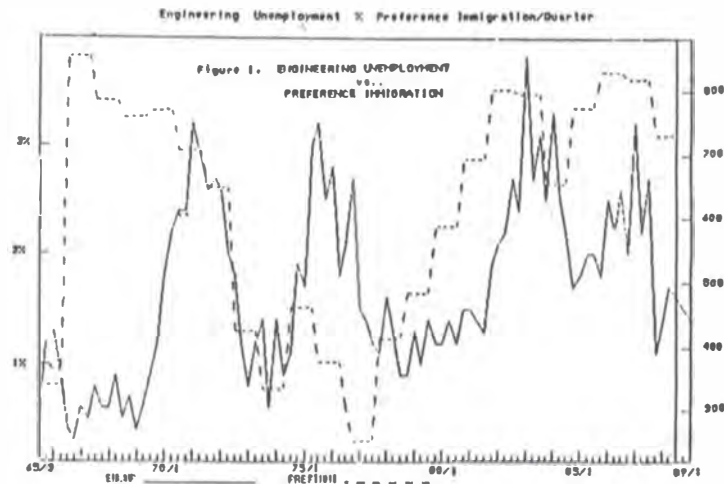
By R. Tax

The following article by Robert Rivers addresses the issue of unemployment of engineers and how it is effected by preferential immigration. Robert is a past member of the IEEE's Board of Directors and is presently serving on the IEEE-USAB Manpower Committee. He is also a Fellow of the IEEE.

ENGINEERING OCCUPATIONAL PREFERENCE IMMIGRATION EXACERBATES UNEMPLOYMENT PROBLEMS

Occupational preference immigration of Engineers significantly lags the demand. The result is to continue putting unneeded Engineers into the workforce after the demand has disappeared and unemployment is rapidly increasing.

Engineers immigrate into the United States as people through normal immigration and with occupational preference as Engineers. On a long term average, about 40% are by occupational preference. The business cycle variation becomes more obvious however when you separate out the occupational preference from the total Engineering immigration. This report is on the characteristics of only the occupational preference immigration and is compared to the U.S. Engineering unemployment in Figure



shown for the period from 1965 to 1989, (data missing for 1980 & 1981 is interpolated). The Engineering occupational preference group has varied in size from 1000 to 3400 per year. The peak year was 1966 with continued high but gradually reducing levels through the 1972 second quarter and then dropping precipitously. The difficulty however was that the period from 1970 to 1972 was a crisis level unemployment for Engineers such as had not been experienced since the close of WWII. The high demand due to the multiplicity of Engineering oriented programs of the late 60's induced the heavy immigration that continued essentially unabated through that recession.

An immigration low point was reached in 1974 even as we were experiencing low unemployment. As we came into 1975, another recession was starting, just as the immigration began resurging. The 1975 recession cut short the increase in immigration but again the low point in immigration did not occur until a year and a quarter after the peak in unemployment. Again the low point in immigration occurred during the start of a lower unemployment period.

Engineering preference immigration grew gradually from 1978 to 1983 when it encountered the recession of 1983. As a result, the 1984 immigration was down by somewhat less than 20%. Again, a smaller recession in 1987 resulting in a downturn of

immigration in 1988 approximately a year after the unemployment peak.

Several policy alternatives suggest themselves: 1, Do nothing and let nature take its course; 2, Eliminate preference immigration; 3, Modulate preference immigration by discontinuing as soon as unemployment reaches predetermined level such as 1% and 4, issue only temporary annually renewable work permits which would not be issued or reissued at unemployment levels above 1%. The do nothing approach would be good for the Federal Reserve because it suppresses wage inflation during high demand periods and deflates wages during low demand periods. Such a do-nothing approach would however be negative for the professionals we serve. Eliminating preference immigration would not serve the nation well because it would result in an average lower level educated immigrant. Modulating by discontinuing is a half way measure that would result in some improvement for the profession while cancellable work permits would achieve substantial control and still provide necessary skills during high demand periods even though price rationing could just as easily reallocate skills to high demand areas.

Robert A. Rivers (F) 6/22/89

ENGINEERING LAYOFFS

Please make copies of all articles on engineering layoffs and send to: Mike Alterman, 509 Green Pond Road, Rockaway, NJ 07866.

TEN RULES FOR LOSING

(Following are a few very good points to remember. North Jersey's Section Chairman, Howard Leach, distributed these at a Section meeting in August.) Excerpted from remarks by Donald R. Keough, President and Chief Operating Officer, The Coca-Cola Company (1989 IBM Senior Management Meeting).

1. Quit taking risks.
2. Be content.
3. Before you make any move, ask yourself what the "founder" would have done.
4. Be inflexible.
5. Rely totally on research and experts to make decisions for you.
6. Concentrate on your competitor, instead of on your customer.
7. Put yourself first.
8. Make sure administrative concerns take precedence over all others.
9. Look to someone else to do your thinking for you.
10. Memorize: TGE ("That's Good Enough")
TNMJ ("That's Not My Job")

ENGINEERING IS FOR PROFESSIONALS

In the defense of engineers and scientists against charges of fraud in *Spectrum's* editorial "We may be wrong" the author provides a naive description of what engineers do. The author writes "...we hypothesize a system to do a certain job. We test the system or parts of it. We find errors in our hypothesis; the system seldom works the way we hoped it would. We fix. Test. Redesign. Test again. Eventually, after many errors and blind alleys, we produce a useful system. Sometimes we don't".

Thankfully, nothing could be further from the truth and this is where we separate the cultured, seasoned professionals from the amateurish approach suggested above. "We fix. Test. Redesign. Test again" is pure donkey dust. We do very little guessing. We do make assumptions and decisions based on our knowledge and experience. We are careful, methodical and precise. We understand components and the tools of our business. What we do not know, we find out. We make very few errors. Our skill, cultured by years of experience, reduces dramatically the number of errors and blind alleys.

In cases where we are pushing the state of the art and blind alleys or questionable results are anticipated, we take a parallel approach to the solution of the problem. In most cases a timely

solution is mandated. This is why we stress continued practice of our professions and the effective utilization of engineers to increase our efficiency and enhance and enrich our engineering skills.

The United States Activities Board Entity Position Statement entitled "Enhancing U.S. Productivity Through Improved Utilization of Engineers" places emphasis on the value of engineering experience.

To get a copy of the Manpower Position Statement send a note to Vin O'Neill at IEEE-USA, 1111 19th St., N.W., Washington, DC 20036, or call Vin at (202) 785-0017 and tell him you read about it in our Newsletter. Spread copies around so the world doesn't believe engineers just blunder up blind alleys. Another point; by letting Vin and the Washington office know we are concerned, the more they are able to respond to our members' needs.

PACE Committee Meets Monthly

The PACE Committee meets on the second Thursday of every month at the ITT Auditorium, 500 Washington Avenue, Nutley, N.J. (near the ITT Tower) at 7:30 PM. Our Section Executive Committee meets there on the first Wednesday of every month (except in December) at 7:00 PM. Any questions or comments will be well received. Contact Richard Tax at (201) 664-0803 (after 7:00 PM) or write to R. Tax, 630 Montview Place, River Vale, N.J. 07675.

Intersociety News

by

Dave Perry

The North Jersey Section of the IEEE, Intersociety Committee with the cooperation of various society chapters is sponsoring a series of lectures on subjects of general interest to members of engineering and scientific societies and the public.

Our Calendar for 1989-1990:

November 9 - "Practical Aspects of Career Development"

Merrill Buckley, Candidate for IEEE President Elect
8:00 PM, ITT Clubhouse, Nutley, N.J.

December 7 - "Making US Industry More Competitive"

8:00 PM, ITT Clubhouse, Nutley, N.J.

January 11, 1990 - "Law Enforcement Science vs Money Laundering Networks"

Rich Harms, Chief, Financial Intelligence Branch, Customs, 8:00 PM, ITT Clubhouse, Nutley, N.J.

February 15 - "Industrial/Government Cooperation For Economic Growth"

Eric Sumner, Candidate for IEEE President Elect
8:00 PM, ITT Clubhouse, Nutley, N.J.

March 1 - "Radon In New Jersey"

8:00 PM, ITT Clubhouse, Nutley, N.J.

April 12 - "The Waste Management Crisis"

May 10 - "Industrial Dynamics, Modeling Industry"

Sept. 13 - "Input-Output Economics, Modeling Industry And National Economics"

Oct. 12 - "Skills Assessment And The Career Change"

Nov. 15 - "Engineering In Undeveloped Countries"

If you have questions about any of the above programs, please write or call David P. Perry, 57 Forest Hill Road, West Orange, NJ 07052, Phone (201) 325-8415.



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IEEE USA HOT LINES

IEEE-USA Hot Lines is designed to provide IEEE Sections and Societies with up-to-date information on United States Activities.

IEEE-USA Office, 1111 19th Street, N.W., Suite 608, Washington, DC 20036, USA, (202) 785-0017

Joseph A. Edminister, Editor—Catherine S. McGowan, Associate Editor

New Positions—The United States Activities Board approved the following IEEE-USA entity position statements at its August meeting in Pittsburgh:

- *National Medical Technology Institute* recommends establishing of a National Medical Technology Institute at the National Institutes of Health to promote the application of engineering and physical sciences to health research.
- *Federal Government Support for Technological Competitiveness* replaces IEEE-USA's 1983 position on a National Technology Foundation. The new position supplements IEEE-USA positions on Industrial Competitiveness and U.S. Engineering Research and Development.
- *Precollege Education in Mathematics, Science and Technology in the United States* calls for improvements in precollege math, science and technology education so that the United States will advance technologically and retain its leadership in scientific research and development.

Copies of the new positions are available from the IEEE-USA Office in Washington, D.C. The United States Activities Board withdrew a June 1983 position statement on a National Technology Foundation and a November 1984 position statement on Breeder Reactors in the United States.

New Brochure—IEEE-USA has released *How to Communicate With Members of Congress*, a brochure designed to help engineers make a difference in resolving issues affecting the profession by communicating their views to their Senators and Representatives. The brochure outlines who to contact; effective ways to voice your concerns; and when to use the different methods, which include meetings, mail, telegrams, and telephone calls. It also provides guidelines to help make your communications more effective.

Copies of this brochure are available from the IEEE-USA Office in Washington, D.C.

Electromagnetics—IEEE-USA Technology Activities Council Chairman William R. Tackaberry appeared recently on ABC television's "Good Morning America" to comment on recent press reports about the possible health effects of high-voltage transmission lines and other electromagnetic fields. "It's going to take time to get answers," Mr. Tackaberry said. "In the meantime, I don't see any real reason for people to overreact."

Mr. Tackaberry's comments supported IEEE-USA's recently approved position statement on "Biological Effects of Power-Frequency Electric and Magnetic Fields," which found insufficient information to define safe and unsafe field levels. "In general, there is not enough relevant scientific data to establish whether common exposure to power-frequency fields should be considered a health hazard," according to the position. It recommends that more research be conducted before safe limits of human exposure to these fields can be defined. Copies of the position are available from the IEEE-USA Office in Washington, D.C.

Defense Acquisition—USAB Chairman Edward C. Bertnolli attended a meeting with U.S. Secretary of Defense Dick Cheney and Assistant Secretary of Defense Donald Atwood in July to discuss the DoD Defense Management report Cheney submitted to President Bush. The report presents a plan to implement the Packard Commission recommendations, which would result in improved performance in the defense acquisition system. It would also provide for more effective management of the Department of Defense and our national defense resources.

The meeting indicated that Secretary Cheney is trying to build a broad constituency base for his plan by promoting an understanding of the plan's goals. Gloria Aukland, staff manager of IEEE-USA Communications, participated in a follow-up press briefing and question-and-answer session with Paul Stevens, Executive Assistant to Secretary Cheney. Stevens was the principal author of the report. This July 31 briefing brought together a small group of representatives of associations with a defense interest, as well as national military organization representatives.

Computer Viruses—John M. Richardson, Chairman of IEEE-USA's Committee on Communications and Information Policy (CCIP), sent a letter to Rep. Wally Herger (R-California) expressing interest in legislation "to reduce losses from harmful code in computing systems." Dr. Richardson's letter responded to Rep. Herger's invitation to IEEE to provide support for H.R. 55, the *Computer Virus Act of 1989*.

"IEEE-USA is not able to endorse H.R. 55 formally at this time," Richardson wrote, "but is happy to support your efforts toward the goals of the bill." He pointed out Committee observations for Rep. Herger's consideration. The so-called "viruses" that have attracted interest lately are only one of several types of computer code that can damage computer systems or databases. Others, he said, are known by such names as "worms" and "Trojan horses."

"We believe H.R. 55 is broad enough to cover harmful code other than that which is known as virus code," Richardson commented. "The bill is also clear in addressing harm to computer users. It may not be clear, however, that the provider of a computer facility should also be protected." He suggested that the bill be broadened to include providers of computer services as well as users.

IEEE-USA Office Move—On or about November 15, 1989, the IEEE United States Activities Office will relocate to 1828 L Street, N.W., Suite 1202, Washington, D.C., 20036-5104. The telephone numbers will remain the same: Office (202) 785-0017; Fax (202) 785-0835; and Information Line (202) 785-2180. Check with the office for the specific move date.