



IEEE/SEM Spring '97 Meeting - April 14, 1997

Guest Speaker: **Dr. Leo E. Hanifin, University of Detroit Mercy**
Topic: **Academia's Response to Industry Needs:
*Informed Agility or an Isolated Ivory Tower***



Dr. Hanifin will discuss national trends in engineering education, research and technology transfer. What are the vehicles for defining industrial needs and the actions that occur in national bodies to respond to those statements? A recent National Research Council report, "From Analysis to Action: Undergraduate Education in Science, Mathematics, Engineering Technology", will be summarized as a statement of national perspective and need. Dr. Hanifin will describe cases in the five areas of need/response: curriculum, research, community service, instructional technology and international programs. Examples discussed will include Michigan Virtual Automotive College, Greenfield Coalition, the Detroit Area Pre-College Engineering Program and the first High School Robotics Competition.

Dr. Hanifin is Dean of the College of Engineering and Science and Chrysler Professor of Engineering at the University of Detroit Mercy (UDM). He has focused his teaching and research in the areas of manufacturing efficiencies, processes and modeling. Dr. Hanifin has also held engineering and management positions in the automobile, aerospace and computer industries. He has received the LEAD and Outstanding Young Engineer Awards from SME and UDM's Engineering Alumnus of the Year Award. He holds BME, ME and Doctor of Engineering degrees from the University of Detroit. He is a member of the Ford Design Institute Board of Directors. Prior to joining UDM, Dr. Hanifin was Director of the Center for Manufacturing Productivity and Technology Transfer at Rensselaer Polytechnic Institute. The 300-person research center focused exclusively on industry needs in such areas as electronics manufacturing, powder metallurgy, CIM, and automation.

- Date:** Monday, April 14, 1997 *(A map is provided on Page 12)*
- Location:** Ford Fairlane Training & Development Center, 19000 Hubbard Drive, Dearborn, MI
- 5:45 p.m.** Concurrent technical society meetings in the Ford Training and Development facility. A description of the technical society meetings is on pages 8 & 9.
- 6:30 p.m.** Registration and social period with cash bar will take place at the Fairlane Club.
Note: The technical society meetings may end at different times during the social period.
- 7:30 p.m.** Dinner will take place in the Fairlane Club Ballroom. The menu is Chicken Picatta, Mixed Green Salad with Raspberry Vinaigrette dressing, dinner roll, potatoes, vegetable, and dessert. Coffee and tea will be served after dinner.
- 8:00 p.m.** Award presentations & recognition of new IEEE Fellows (See pages 6 & 7).
- 8:15 p.m.** Featured presentation. The meeting will end at approximately 9:30 p.m.
- Contact:** George Peters 519-966-1656, x4445#.
- Registration:** See Page 11 for prices & registration*

Dinners are only guaranteed to pre-registered attendees. There is no charge for attending technical sessions only.

* To receive the student rate, students must register & pay through their student branch. Student branch officers should contact George Peters, 519-966-1656 x4445#, to receive student registration forms. Students at schools without active student branches should call Moh Zohdy, 810-370-2234, to register.

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WAVELENGTHS



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- I Circuits & Signal Processing:** Acoustics, Speech & Signal Processing (ASSP-01), Circuits & Systems (CAS-04), Information Theory (IT-12) and Control Systems (CS-23)
- II Vehicular Technology:** Vehicular Technology (VT-06)
- III Comm. & Aero. Electronics:** Aerospace & Electronics Systems (AES-10) and Communications (COM-19)
- IV Trident:** Electron Devices (ED-15), Microwave Theory & Techniques (MTT-17) and Antennas & Propagation (AP-03)
- V Computer:** Computer (C-16)
- VI Geoscience & Remote Sensing:** Geoscience & Remote Sensing (GRS-29)
- VII Power Eng. & Ind. Apps.:** Power Engineering (PE-31) and Industrial Applications (IA-34)
- VIII EMC:** Electromagnetic Compatibility (EMC-27)
- IX Power & Ind. Electronics:** Power Electronics (PEL-35) and Industrial Electronics (IE-16)
- X Engineering Management:** Eng. Management (EM-14)

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Visit the following IEEE World Wide Web sites:

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- Computer Chapter:** www.egr.msu.edu/ieeesem/chapv/
- IEEE:** www.ieee.org
- IEEE Region 4:** www.ieee.org/regional/r4/



Calendar of Events

- | | | |
|----------|-----------|--|
| Thursday | Title: | Aerial Robotics Competition Video & Technical Talk on WAVELETS |
| April 3 | Speaker: | Dr. Mohamed Zohdy |
| | Location: | University of Michigan-Ann Arbor |
| | Sponsor: | UM-Ann Arbor IEEE Student Branch |
| | Contact: | Dr. Mohamed Zohdy, 810-370-2234, zohdyma@oakland.edu |
| Saturday | Title: | Region 4 Student Leadership Conference |
| April 5 | Location: | Wayne State University |
| | Comment: | The conference will provide current and future student branch leaders with information for developing successful programs. Speakers from the regional student directorate, section, & industry were invited. Several student branches will be represented by their faculty, undergraduate & graduate students. |
| | Sponsor: | IEEE/SEM and the Wayne State University Student Branch |
| | Contact: | Dr. Mohamed Zohdy, 810-370-2234, zohdyma@oakland.edu |
| Monday | Meeting: | Executive Committee |
| April 7 | Time: | Dinner at 6:00 p.m., meeting 6:30 p.m. |
| | Location: | Eaton Corporation, 26201 Northwestern Highway, Southfield |
| | Sponsor: | IEEE/SEM |
| | Contact: | Kimball Williams at 810-354-2845 |
| Friday | Title: | Micro-electro-mechanical Systems |
| April 11 | Speaker: | Dr. Kensall D. Wise, Professor of Electrical Engineering & Computer Science at University of Michigan, Ann Arbor |
| | Time: | 3 p.m. |
| | Location: | Oakland University, Dodge Hall, room 203 |
| | Sponsor: | Chapter I |
| | Contact: | Dr. Hoda S. Abdel-Aty-Zohdy, 810-370-2243, zohdyhas@oakland.edu |
| | Comment: | See Article on Page 4 |
| Friday | Title: | Realization of Automotive Engine Control & Diagnosis with Dynamic Neural Networks |
| April 11 | Speaker: | Dr. Gint Puskorius, Ford Motor Company |
| | Time: | 3 - 4 p.m. |
| | Location: | Michigan State University, Engineering Building, rm. 260 |
| | Sponsor: | Chapter I |
| | Contact: | Dr. Fathi Salam, 517-355-7695, salam@ee.msu.edu |
| Monday | Meeting: | IEEE/SEM Spring Section Meeting |
| April 14 | Time: | 5:45-9:30 p.m. |
| | Location: | Fairlane Training and Development Center, Dearborn |
| | Sponsor: | IEEE/SEM |
| | Comment: | See articles on pages 1, 6 & 7, registration form on page 11, map on page 12, and technical session descriptions on pages 8 & 9. |
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| May 5 | Time: | Dinner at 6:00 p.m., meeting 6:30 p.m. |
| | Location: | Eaton Corporation, 26201 Northwestern Highway, Southfield |
| | Sponsor: | IEEE/SEM |
| | Contact: | Kimball Williams at 810-354-2845 |

Power Engineering and Industrial Applications

by B. C. Harrington



It has become my turn to write an article for Wavelengths. Rather than presenting the obvious benefits of being a IEEE member, I will discuss some new technology. I attended a meeting last week where the subject of communication came up. This subject has been a real problem for both industrial and utility engineers and has been discussed for years with no real solution. The last ten years have seen an amazing growth in the use of communication in electrical equipment due to microprocessor technology. Electrical devices have been available that provide information and control to a remote site. This means an engineer in Detroit could turn on a large motor, say on a large gas pipeline, located in Chicago. They could not only turn the motor on, they could also monitor the result, such as increased current, lower voltage, etc. There are two main problems with this communication. First every manufacturer uses a different protocol to communicate, and second what is the communication link? Utilities were the first to become involved using radio and microwave for communication. These links are very expensive, and each manufacturer speaks a different language. The industrial market uses mostly hard wire links, but this is also expensive and has the same language limitation.

The new hope on the horizon is from existing technology — the cellular phone system. The cellular system is now in place in most of the country. This system has channels for voice communication, but it also has channels for control. These control channels are underutilized and could be used for other applications, such as electrical equipment communication. I think in the next few years we will see interfaces to the cellular system for both utility and industrial equipment communication. Who knows, you could get in on the beginning and be the next Bill Gates.

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Calendar of Events (Continued)

Saturday -Monday Event: **1997 International Ground Robotics Competition**
May 31 - June 2 Location: Oakland University, Rochester, Mi.
Sponsor: Association for Unmanned Vehicle Systems International (AUVSI)
Contact: Candy McLellan, 810-370-2233, mclellan@oakland.edu

Comments:

This is a student competition Details can be found at

www.secs.oakland.edu/SECS_prof_orgs/PROF_AUVSI/index.html

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Oakland University Student Branch

The Oakland University Student Branch has endured the challenges of cyclical student member enrollment and dynamic changes in yearly administration. Throughout these challenges the goal of the branch has remained the same: to bring about the learning and enhancement of our fellow peers and members of other professions through active participation in projects and seminars.

At the beginning of the 1996-1997 academic year, the OU Branch participated in a membership drive talk at Wayne State University on September 17. The membership drive was enhanced through examples of past OU projects, including the infamous Bucket O' Parts competition, unmanned vehicle projects that involved a small scale race car, and the Unmanned Aerial Robotics Competition sponsored by Georgia Tech and AUVS. Teamwork and putting "theory into practice" were the themes of preparing young engineers for tomorrow's world.

On October 30, the OU Branch participated in a Fuzzy Logic Workshop, which was sponsored by Dr. Zohdy from Oakland University and Dr. Salam from Michigan State University. The OU Branch also attended the IEEE/SEM Fall Section Meeting and will

by Jeffrey King, Past Chair, and Thomas King, Vice Chair

be attending the Spring Section Meeting in April. The OU Branch plans to participate in a Leadership Workshop to be held at Wayne State University. The focus will be on developing new student leaders.

To date, the OU Branch is still actively pursuing the title for the upcoming 1997 Aerial Robotics Competition with the help of the Aerial Robotics Society. In addition to this, an unmanned miniature vehicle competition was also planned for this year but had to be canceled due to lack of manpower. Plans for the future include holding a day long computer programming competition for metropolitan area high school students. The high school students' tasks will be to finish 10 to 12 progressively harder objectives in a day, interact with students from other communities, and take a plaque home.

Finally, there is always room for improvement and new ideas in this ever changing environment. Jacob Allen has taken the position of Chair for the OU Branch, and has some excellent ideas for the future. As the end of the academic year approaches, a new era of friendship and learning arises. Thank you for the support of the past and present projects of the Oakland University Student Branch.

Micro-electro-mechanical Systems

Chapter I, the Michigan Center for Automotive Research (MICAR), the Microelectronics System Design Lab (MSDL), and the Oakland University Association of Graduate Students are planning a seminar at Oakland University. The seminar will be held on Friday, April 11, at 3 p.m. in room 203 of Dodge Hall.

Dr. Kensall D. Wise will present "Micro-electro-mechanical Systems: Interfacing Electronics to a Non-Electronic World." Dr. Wise is the J. Reid and Polly Anderson Professor of Manufacturing Technology, Professor of Electrical Engineering and Computer Science, and Director of the Center for Integrated Sensors and Circuits (CISC) at the University of Michigan, Ann Arbor.

Many emerging applications for microelectronics involve interfaces with non-electronic systems. These interfaces, increasingly realized using integrated silicon sensors and microactuators, are rapidly growing in sophistication, sparking a worldwide revolution in

by Hoda S. Abdel-Aty-Zohdy, Chapter I Vice Chair

distributed sensing and control. Representative current devices include projection displays, IR/thermal imagers, print heads, microphones, accelerometers and gyros. Using embedded microprocessors, complete micro-instrumentation systems are now emerging, employing self-testing and digital compensation to achieve levels of reliability and accuracy previously impossible at low cost. Devices in development include implantable prostheses for the deaf and the blind, DNA analyzers, sensors for advanced semiconductor process tools, modules for distributed environmental monitoring, inertial-grade navigation aids, and advanced security systems. The complex design choices between bulk and surface micro-machining and hybrid or monolithic system implementation are reminiscent of those facing purely electronic system development in years past. Like microelectronics itself, this technology will be truly enabling and pervasive in its impact. Dr. Wise will examine the device structures, applications, and tradeoffs in this area along with future challenges.



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Notes on January 25-26, 1997 Region 4 Committee Meeting

by Dave Horvath, Section Chair

The Southeastern Michigan Section is part of IEEE Region 4, which also includes sections from Indiana, Illinois, Wisconsin, Minnesota, Nebraska, North Dakota, the rest of Michigan, and parts of Ohio. The Region is overseen by a Regional Committee consisting of a Director, Director-Elect, several appointed officers and Area Coordinators, and the Chairs of the various local sections. This Regional Committee meets once a year. A smaller Executive Committee, consisting of just the Director, Director-Elect, and appointed Officers and Area Coordinators, meets twice a year. The following is a compilation of my notes from the January 25-26, 1997 Regional Committee meeting in Chicago. Harry Bostic, Region 4 Director presided over the meeting.



Notable attendees at this meeting included Chuck Alexander, IEEE President, Ray Findlay, IEEE Vice President, Regional Activities, Pete Morley, IEEE Vice President Technical Activities, and Howie Wolfman, IEEE Treasurer.

The three attending IEEE officers provided the following statistics. IEEE is the world's largest technical professional organization with over 300,000 members. Region 4 has over 26,000 members. There are 10 regions, 294 sections, 1038 society chapters, 905 student branches, and 213 student branch chapters, for a total of approximately 2500 geographical units. IEEE is also the world's largest publisher with over 300,000 pages per year published. IEEE sponsors over 300 meetings with over 350,000 attendees per year. IEEE has over 30,000 volunteers, which is the highest volunteer to member ratio of all the other professional societies.

The various IEEE boards have been developing mission statements. For example, the Technical Activities Board's mission is "*to facilitate the advancement of the theory, practice, and understanding of electrical engineering and related science and technologies and their applications for the benefit of members worldwide and the general public.*"

Several issues were identified for consideration during the development of Region 4's plan.

- Not enough interaction between sections and the student branches within the sections,
- Younger members need to be taught to take responsibility for their careers,
- Need to promote more section support of student activities
- Employers no longer support long term employees,
- Industrial support for IEEE activities is decreasing,
- Societal perceptions of what is important have changed,
- IEEE publications do not sufficiently address member needs.

Don Bramlett, Past Chair of IEEE/SEM, has been named the Eastern Area Coordinator. The Eastern Area includes Calumet, Western Michigan, southeastern Michigan, Central Indiana, Fort Wayne, Michiana, northeastern Michigan, and the Toledo sections. Don led an exercise that encouraged a sharing of ideas and approaches among the various attendees from the Eastern Area Sections of Region 4.

It was recommended that the sections belong to the local area's Chamber of Commerce in order to stay better in tune with the state's political activities.

The PACE '97 Conference will be held August 29 through September 1 in St. Petersburg, Florida. It was recommended that the Section's Vice-Chair and Professional Activities Committee Chair attend. Funding is available from the Region to support attending this meeting

The IEEE Board of Directors will meet in Detroit at the Renaissance Center on June 23-29, 1997.

For assistance in planning a Student Professional Activities Conference (more commonly referred to as an S-PAC) and to obtain an S-PAC planning

package, contact Laura Durette, l.durette@ieee.org, or Ann Hartford, a.hartford@ieee.org. Funding is available from the region to support S-PACs.

More needs to be done to encourage and recognize faculty advisors to student branches. The Chicago Section gives Recognition Certificates to student branch advisors in its geographic area.

More efforts are needed to encourage students to stay on as IEEE members after graduation. One of the more successful activities at present is the Graduate of the Last Decade (GOLD) Program. Mark and Sandy Hunter are coordinating GOLD activities in our Section. Contact Mark Hunter at (810) 588-0355 or m.hunter@ieee.org. Additional information on the GOLD Program is available from d.kemp@ieee.org.

IEEE Press Books are available to student branches at a significant discount for resale at profit as a fund raising activity.

The Region 4 web site is being moved to the IEEE headquarters computer but still will remain under the cognizance of a Region 4 representative.

Martha Sloan, Past IEEE President, has agreed to be an advisor to Region 4.

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The executive committee of the IEEE Southeastern Michigan Section is proud to honor several section members with the 5th annual presentation of Section Awards. The awards will be presented at the IEEE/SEM Spring Section Meeting on Monday, April 14, at the Fairlane Club in Dearborn. The section awards are Outstanding Engineer, Outstanding Section Involvement, Outstanding Chapter Involvement, and Outstanding Student Branch Involvement.

IEEE/SEM Outstanding Engineer Award

Dr. Joseph W. Burns is recipient of the IEEE/SEM Outstanding Engineer Award. This award is presented annually in recognition of the recipient's outstanding engineering achievement, dedication and leadership in the field of Electrical, Electronics, or Computer Engineering.

Joseph W. Burns, Ph.D., is a Research Engineer with the Environmental Research Institute of Michigan in Ann Arbor. He received a bachelor's degree in electrical engineering, with high honor, from Michigan State University in 1982, and a master's and doctorate degrees in electrical engineering from the University of Michigan, in 1983 and 1987, respectively, while conducting electromagnetic research with the University of Michigan Radiation Laboratory. He won the 1985 URSI Student Prize Paper competition for a presentation on this research.



Since 1987, Dr. Burns has been with the Environmental Research Institute of Michigan (ERIM). He has conducted and lead research activities in the areas of radar remote sensing, synthetic aperture radar (SAR) simulation and data exploitation, radar cross section (RCS) measurement technology and electromagnetic scattering theory. These research efforts have contributed to the development of efficient algorithms for the prediction of far-field target RCS from near-field measurements, the advancement of numerical and analytical techniques for prediction of target signatures in polarimetric SAR imagery, the evaluation of detection and estimation algorithms for polarimetric target characterization, the understanding of the phenomenology of target-support interactions in RCS measurements, and the development of new processing concepts for SAR, RCS measurements, and other remote sensing technologies. This research has been described in over 30 presentations at various IEEE, AMTA and government technical conferences.

As part of an on-going ERIM effort to improve the state-of-the-art in RCS measurement technology, Dr. Burns has been the program manager and principal investigator of several basic and applied research programs to model, measure and mitigate interactions that occur between targets and supports during radar cross-section measurements. These programs consisted of a well-balanced combination of theoretical, numerical and experimental studies to formulate, evaluate and validate electromagnetic models for the interactions and to develop signal processing techniques for removing the interaction contamination. The activity has included the installation and operation of an advanced compact range measurement facility at ERIM.

Dr. Burns has served as an officer in several professional and academic societies, and is presently Chair of the IEEE/SEM Trident Chapter. The Trident Chapter functions as the local chapter of the IEEE Antennas and Propagation Society, the Microwave Theory and Techniques Society, and the Electron Devices Society.

IEEE/SEM Outstanding Section Involvement Award

Mark Hunter and Sandy Hunter, are both recipients of the IEEE/SEM Outstanding Section Involvement Award. This award is presented annually in recognition of the recipient's outstanding contribution to the operation, growth, promotion and success of the Southeastern Michigan Section of IEEE.

Mark Hunter received a bachelor's degree in Computer Science, a minor in Philosophy, and a bachelor's degree in applied science, Electrical Engineering, from Washington University in St. Louis. He is employed by Link Engineering, a manufacturer of large scale test equipment, as a software engineer. Recent projects have included real time control, data acquisition, and data processing systems with exposure to hardware and software interaction.



Mark has been an active IEEE/SEM volunteer for at least the past three years. His involvement started innocently enough as the custodian of the mailing list database for Wavelengths. He has advised IEEE Headquarters on ways to redesign the membership database to improve accuracy and ease of use and to provide more useful information to sections. He also researched postal regulations to reduce newsletter mailing costs. He is often called upon to share these findings with the IEEE Headquarters staff and other sections. Mark is currently the section's Director of Membership. He has also advised the IEEE Computer Society on issues involved in publishing a membership directory.



Sandy Hunter received a bachelor's degree in Electrical Engineering from Washington University in St. Louis. She works for Electronic Data Systems and is an Advanced Engineering Systems Engineer. Sandy's projects at EDS have included developing a new type of circuit analysis application, integrating electrical design applications, participating on proposal teams, leading a team of software developers, consulting on integrated product development (IPD) practices, and teaching EDS classes about applying IPD to electrical design.

Sandy participated on the IEEE/SEM program committee, which plans and executes the section meetings, for about two years. She has organized the registration process, taken registrations, coordinated audio visual equipment needs, and has been master of ceremonies at several past section meetings. She is currently a member of the newly formed Budget Subcommittee.

The Hunters have worked together in several volunteer capacities.

Mark and Sandy have created maps and signs, staffed the registration desk, and directed volunteers at past section meetings. They represented the section at the 1996 IEEE Professional Activities conference. They became editors of Wavelengths last August. Their newest project is starting a Graduates of the Last Decade (GOLD) program to retain and attract younger IEEE members.

IEEE/SEM Outstanding Chapter Involvement Award

Kimball Williams is recipient of the IEEE/SEM Outstanding Chapter Involvement Award. This award is presented annually in recognition of the recipient's outstanding contributions to the operations, growth, promotion and success of an IEEE technical society chapter within the Southeastern Michigan Section. Kimball Williams is a principal engineer with the Eaton Corporation at the Eaton Engineering and Research Center in Southfield. Kimball directs the technical operation of the Electromagnetic Environmental Effects Laboratory.



Kimball Williams is presently Secretary/Treasurer of the Electromagnetic Compatibility (EMC) Chapter. He has been one of the members instrumental in the success of the chapter since its formation in 1993. He has also been an invaluable aid to the section by providing a room and food service for the monthly Section Executive Committee Meetings at Eaton Corporation for the past couple years.

Kimball is actively involved with the IEEE EMC Society on the national level as well. He is a member of the IEEE EMC Society's Board of Directors, a member of the Standards Committee, a member of the Education Activities Committee, Chairman of the Education Committee, and Chairman of the Technical Advisory Committee. He is an active participant in an outreach program with high schools and colleges sponsored by the IEEE EMC Society.

Kimball is a certified EMC engineer with the National Association of Radio and Telecommunication Engineers (NARTE), a member of the US Technical Advisory Groups to CISPR and ISO, and a member of the SAE EMI and EMR Committees. When he is not going to meetings, Kimball spends his leisure time as an amateur radio operator, scuba diver and private pilot.

IEEE/SEM Student Branch Involvement Award

The St. Clair College Student Branch is the recipient of the IEEE/SEM Student Branch Involvement Award for the unprecedented second year in a row. The student branch is located in Windsor, Ontario. This award is presented annually in recognition of an IEEE/SEM student branch for the volunteerism and initiative involved in producing a successful technical, professional and social program for its members, and for its involvement with the section. The officers of the St. Clair College Student Branch, with the cooperation of the faculty and administration of the college, have provided an exemplary program for the benefit of their members.

The student branch provides a multitude of services to its members, including tutorials to strengthen students' understanding of the current semester's lecture material and previously studied fundamental principles. The student branch also provides access to resources in the McNaughton Centre, including four personal computers, with Internet access, and current publications. Another

service provided is workshops, such as a Job Search Workshop held to address resumes, cover letters, contacting potential employers and interview approaches. The student branch sponsored technical seminars on such subjects as networking systems, designing Websites and use of PLCs for process control. The student branch also publishes a newsletter, the Expositor.

The student branch helps members, potential members and those in need in a number of ways. To encourage members' interest in continuing education after graduation, they have set up tours of other institutions such as Wayne State University and Lawrence Technological University. In late August, the student branch organized an informational meeting for freshmen entering the Electrical/Electronics program. The student branch members also raised \$487 to aid a needy family at Christmas.

To expose members to prospective employers and different industries, the student branch organizes tours to local firms and plants and strongly encourages attendance at the IEEE/SEM Fall and Spring Section Meetings. In conjunction with the Student Placement Office, the IEEE Student Branch hosted the Second Annual Trade and Technology Career Fair, attended by representatives from 43 companies and over 2000 students. An annual IEEE



Student Branch Dinner in the fall and a Wine and Cheese Party in the winter are two other occasions that permit members to network with faculty, recent graduates and employers.

The student branch has also been quite aggressive in ensuring its viability by increasing membership and acquiring funding for programs. Since the fall, student branch membership has increased by 150%, from 30 to 75 members. Besides funding from IEEE, the student branch has received a grant for \$400 from the Student Representative Council at St. Clair College, generated \$483 in profits from raffles for products donated by local firms, and raised over \$225 in donations from chocolate and pop refreshments.

Article by D. Bramlett, IEEE/SEM Section Advisor

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Please Contact: Stephen W. Talbot, P.E. Vice President

Student Track

Power Electronics — Opportunities for Engineers Today to Design the Car of Tomorrow
by Dr. John M. Miller, Ford Research Laboratory, Vehicle Electronic Svstems

During the next ten years, we will witness a dramatic change in the composition of the automotive workforce. A recent news article regarding the aging workforce reported “*more than half of GM’s 247,000 hourly workers are expected to retire in the next ten years.*” Moreover, fully 33% of US workers at the Big Three automakers are predicted to be replaced before 2003. According to Prof. J. G. Kassakian at MIT, “*this represents an unprecedented opportunity for major change in the educational composition of the human resources of the industry.*”



This presentation will discuss opportunities for electrical, mechanical, and computer engineers and the cross functional discipline of mechatronic systems engineers in the automotive industry. As automotive design trends toward a more electric car, and ultimately hybrid electric, we will see an increased demand for the enabling technologies of today to meet the challenge of societal influences and customer wants of tomorrow. Illustrations of enabling technologies in simulation tools, electronics and power electronics will be given.

John M. Miller received his Ph.D. in electrical engineering in power electronics and control of electric machines from Michigan State University in 1983. He worked as an electrical engineer at Texas Instruments for several years before joining Ford Research, where he has worked on various electric vehicle programs, vehicle electric active suspension, charging system generation and control and energy management systems. He is active in various industrial consortia and is a member of the steering committee of the MIT/Industry consortium on advanced automotive components and systems. Dr. Miller is active in the IEEE as a member of the Southeast Michigan Section executive committee, chair of Power Electronics and Industrial Electronics societies, co-organizer of WPET, and a member of the Industry Applications Society’s Industrial Drives Committee. He is a senior member of the IEEE.

Chapter I: Circuits & Signal Processing Communications & Control Problems in Large Scale Systems

by Demosthenis Teneketz, U of M, Ann Arbor

Demosthenis Teneketz received a B.S. degree in electrical eng. from the University of Patras, Greece, in 1974 and MS EE, & Ph.D. degrees in electrical eng. from M.I.T., Cambridge, in 1976, 1977, & 1979, respectively.

In 1979 & 1980, he worked for Systems Control Inc., Palo Alto, CA, and from 1980 to 1984 he was with Alphatech Inc., Burlington, MA. Since September 1984, he has been with University of Michigan, Ann Arbor, where he is a Professor of Electrical Engineering and Computer Science. In 1992, he was a Visiting Professor at the Institute for Signal and Information Processing of the Swiss Federal Institute of Technology (ETH), Zurich, Switzerland. His current research interests include stochastic scheduling & resource allocation problems, and discrete-event systems.

Chapter II: Vehicular Technology

DOE-USCAR FutureCar Challenge
by Dr. Georgio Rizzoni, Ohio State University

The FutureCar Challenge is sponsored by the U.S. Department of Energy and the United States Council for Automotive Research (USCAR), a joint research effort of Chrysler, Ford and General Motors. It is the student version of the Partnership for a New Generation of Vehicles (PNGV), the national effort begun three years ago that combines the resources of the federal government, the domestic auto industry and academia to create highly fuel-efficient mid-size cars. Preparation for the second year of the FutureCar Challenge is well under way. The 1997 competition will be hosted by General Motors and will culminate in a road rally from Detroit to Washington, DC. This presentation will review the scope of the competition and some of the technical background related to the goals of PNGV.



Dr. Rizzoni received BS, MS, and Ph.D. degrees in Electrical Engineering from the University of Michigan. Dr. Rizzoni has been on the faculty of the Department of Mechanical Engineering at the Ohio State University for five years. He is currently an Associate Professor, and is responsible for teaching in the areas of systems dynamics, electromechanics, control systems, mechanical measurements, and signal processing. Prior to his appointment at OSU, Dr. Rizzoni served as the Assistant Director of the Vehicular Electronics Laboratory and Assistant Research Scientist and Lecturer with the EECS Department, both at the University of Michigan.

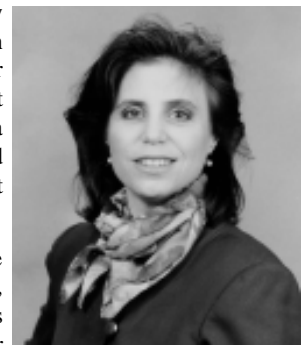
He is the Ohio State University SAE student section faculty advisor, and has led a team of undergraduate electrical and mechanical engineering students through the development of a high-performance electric vehicle, culminating in first-place finishes at the 1995 Electricore Inaugural Formula Lightning Competition held at Indianapolis Raceway Park in August of 1994 and in the 1995 Cleveland Electric Formula Classic.

Chapter III: Comm. & Aero. Electronics

“Slamming” and Other Costly Telecommunications Fraud Issues

by Angela Wylie, President of Wylie Communications, Inc.

Angela Wylie will discuss how telecommunications resellers are able to switch customers’ carriers without their knowledge or permission, how they get away with it, and what can be done about it. In addition, there will be a discussion of other telecommunications fraud issues and how session attendees can protect themselves & their companies.



Ms. Wylie is the President of Wylie Communications, Inc. of Brighton, Michigan, which specializes in telecommunications management and technical consulting for national and international organizations. She has more than 12 years of experience in the telecommunications industry, providing consulting services for designing, implementing and supporting high-end cost-control systems, such as call accounting, inventory management and trouble tracking, billing verification audits, electronic bill consolidation, as well as the development of software for telecommunication management. Her company’s growing list of clients includes some of the nation’s most prestigious insurance, banking, health care, government, and industrial organizations.

Chapter IV: Trident

Plasma-Aided Manufacturing of Electronic Materials and Devices

by Dr. Timothy Grotjohn, Michigan State University

Plasma discharges have become the standard tool for the fabrication of integrated circuits. Discharges are used in etching, cleaning, and deposition steps of the fabrication process. Dr. Grotjohn will first describe the historical and current reasons for the increasing use of plasma based processes. Currently, the decreasing feature sizes and the increase in the wafer size used in integrated circuit manufacturing is driving a change in the plasma processing machines used. This next generation of machines operates at lower pressures (milliTorr) and processes one wafer at a time. Various types of lower pressure plasma discharge machines have been developed including electron cyclotron resonance (ECR) plasma generators, inductively coupled plasma (ICP) generators, and helicon plasma generators. This talk will describe this next generation of plasma processing machines. Dr. Grotjohn will concentrate on some of the work that has been underway at Michigan State University over the past several years on ECR plasma generators. The talk will conclude with a description of current state-of-the-art plasma processing machines and current issues being studied by researchers and industry.

Timothy A. Grotjohn received the BEE and MS degrees in electrical engineering from the University of Minnesota in 1982 and 1984, respectively, and the Ph.D. degree in 1986 from Purdue University in electrical engineering. In 1987 he joined the Department of Electrical Engineering at Michigan State University as an Assistant Professor. He is currently an Associate Professor at Michigan State University. His current research interests include modeling, characterization and plasma processing of semiconductors, and plasma diagnostics and numerical simulation of plasmas used in materials processing and synthesis. He teaches courses in the areas of semiconductors, electro-optics, and plasma-aided manufacturing. He also serves as the IEEE Student Branch co-advisor at Michigan State University. He has authored or co-authored over 60 journal and conference papers.

Chapter V: Computer

Issues in Agent-Based Information Retrieval

by Charles Nicholas, Associate Professor UMBC

As part of the IEEE/SEM Spring Section Meeting, the Computer Chapter has a special treat! The Computer Chapter is hosting Professor Charles Nicholas, a well-known expert in information and knowledge management.

With the advent of the World-Wide Web and other Internet-based information systems, there has been a surge of interest in the problems of large-scale information retrieval. One promising approach involves using so-called intelligent agents to manage the information and access to it. However, agent-based information retrieval on a large scale requires new thinking in the areas of agent communication languages and the role of metadata. Nicholas will present an overview of these issues, with special emphasis on practical problems with existing systems and some ongoing research projects.

Charles Nicholas is an Associate Professor in the Computer Science Department at the University of Maryland Baltimore County (UMBC). Nicholas is currently on sabbatical with the Department of Defense in Fort Meade, Maryland. He served as General Chair of the ACM Conference on Information and Knowledge Management (CIKM) 1995-1997, and co-chaired the 1996 Workshop on Principles of Document Processing. His research interests include information retrieval, agent-based computing, and document processing.

We look forward to seeing you at the IEEE/SEM Computer Chapter session! *If you plan to attend the Computer Chapter session only, without registering for dinner, please RSVP to Sylvia Karmanoff at 810-753-7094 or lnstruk.wzh5wj@eds.com.*

Chapter VII: Power Eng. & Ind. Apps.

Deregulation from a Municipal Utility's Perspective

by Brian Cooper, Lansing Board of Water and Light

Brian Cooper is Assistant Manager for Special Projects at the Lansing Board of Water and Light. He has been employed by the Board of Water and Light for 25 years. Keeping current on the issues and politics of deregulation in the electric utility industry is part of Mr. Cooper's responsibilities.

Chapter VIII: EMC

New CW and Pulse Emission and Susceptibility Testing Method

by Dr. Andrew Podgorski, President ASR Technologies

Dr. Podgorski will discuss a new CW and pulse emission and susceptibility testing method. This method expands the scope of testing, extends the frequency range, shortens test time and lowers test cost. The concept is based on the use of a true dual polarization broadband Gigahertz field (BGF) simulator that meets the criteria of total field symmetry in the freq. range extending from DC to 40 GHz.

Dr. Podgorski will also cover the "Current & Future Requirements for Standards, Protection & Testing" in the area of EMC & EMP. The "Composite Threat Concept" that combines ambient field and ultimate threat, which is based on the propagating medium breakdown field for lightning, NEMP, and microwave threats, will be also be presented.

Dr. Podgorski is president of the independent research and engineering company, ASR Technologies. He is a recognized world authority in the area of Electromagnetic Compatibility and Electromagnetic Protection and has served on many international inter-governmental military and civilian panels of experts. Dr. Podgorski is conducting interdisciplinary theoretical (numerical modeling) and experimental technology related research in diverse areas including electromagnetics, high power microwaves, lightning, high voltage engineering, satellite communication, semiconductor technology, fiber and integrated optics, measurements and standards. He has published over eighty scientific papers and over twenty classified and unclassified reports. Dr. Podgorski holds numerous patents in the area of EMC. He is a member of the Board of Directors of the IEEE Electromagnetic Compatibility Society and is listed in the Canadian "Who's Who".

Chapter IX: Power & Ind. Electronics

Torque Control of Induction Motors with Minimal Number of Sensors

by Elias G. Strangas, Associate Professor MSU

Of all the sensors that are used to operate high-performance drives of induction motors, the rotor position sensor is the most desirable to eliminate. Its absence increases the difficulty of constructing a rotor or flux observer, and a variety of methods have been developed to deal with it. The methods used can be based on permanent machine modifications, temporary saturation, detection of cross coupling through injection of signals into the phases, and advanced control techniques. An overview of these techniques will be presented, along with details and experimental verification of a particular method based on nonlinear control. This drive can have a plethora of applications in automotive and industrial motion control.

Elias G. Strangas is an Associate Professor of Electrical Engineering at MSU. He holds a Dipl. Ing. Degree in Electrical Eng. from the National Technical University of Greece, and a Ph.D. in Electrical Eng. from the University of Pittsburgh. Before joining MSU in 1986 he worked in industry and held a position as an Assistant Professor at the Univ. of Missouri-Rolla.

His main area of research interest is Electrical Machines and Drives, and he is heading the Machines and Drives Laboratory at MSU. Some of the recent and current projects he supervises are: Time-Dependent Finite Element Methods for the electromagnetic field in Electrical Machines, and the calculation of iron losses from it, the design and control of Linear Induction Motors, Pulse Width Modulated and Matrix Converters, and Control of Induction and Permanent Magnet Motors with minimal number of sensors.

1997-1998 Official Election Results

by David G. McKendry

Here are the results of the 1997-98 officer elections for the Southeastern Michigan Section of the IEEE. No real surprises, but then it would probably be a surprise if there were some, surprises that is. I wish to thank those who participated in this process we are required to go through every year. The following statistics may be of interest to you: the elected section officers received a maximum of 47 votes (out of approximately 4,000 members in this section); some of the chapter officers were elected with as many as 21 and as few as 5 votes (not counting write-ins); 3 write-in candidates were elected with either 1 or 2 votes each; and 2 officers were appointed by the Executive Board for Chapter VI, Geoscience & Remote Sensing, which had no candidates or write-ins.

If you did not vote, please consider participating next year. Even for unopposed candidates (generally most or all of the cases), your vote is less of a selection than it is a vote of confidence in what these volunteers are doing with your section and chapters. If you have considered getting more active but did not feel like causing conflict by directly running against established officers, many of them would be happy to take a break (or a back seat) for a while and let someone with new ideas contribute. Most chapters can easily accommodate additional officers as well by simply listing them on the ballot. So as you glance through this list of officers for 1997-98, decide that next year you will send in your vote so that we will at least have the surprise of a record voter turn-out.

List of Newly Elected Officers for the 1997-1998 Program Year

Section Officers

Chair	George Peters
Vice Chair	K.C. Liu
Secretary	James R. Woodyard
Treasurer	John M. Miller
Director of Educational Activities	Ece Yaprak
Director of Student Activities	Mohamed Zohdy

Chapter I:

Acoustics, Speech, & Signal Processing (ASSP-01); Circuits & Systems (CAS-04); Information Theory (IT-12); Control Systems (CS-23)

Chair:	Fathi M. A. Salam
Vice Chair:	Hoda Abdel-Aty-Zohdy
Secretary/Treasurer:	Gregory M. Weirzba

Chapter II:

Vehicular Technology (VT-06)

Chair:	Ken N. Rao
Vice Chair:	Elias Strangas
Secretary/Treasurer:	Kyle Williams

Chapter III:

Aerospace & Electronic Systems (AES-10); Communications (COM-19)

Chair:	Robert Desoff
Vice Chair:	Bruce Block

Chapter IV:

Trident Chapter: Antennas & Propagation (AP-03); Electron Devices (ED-15); Microwave Theory & Techniques (MTT-17)

Chair:	Timothy Grotjohn
Vice Chair:	Lisa Anneberg
Secretary/Treasurer:	Joseph Burns

Chapter V:

Computers (C-16)

Chair:	Nizar Alholou
Vice Chair:	Sylvia Karmanoff

Chapter V: (Continued)

Vice Chair PROFESSIONAL:	Syed Mahmud
Vice Chair PUBLICITY:	Charles Severance
Vice Chair TECHNICAL:	Subramaniam Ganesan
Vice Chair ADMINISTRATION:	Paul Nelson
Vice Chair OPERATIONS:	Vipin Chaudhary (Write-in)
Vice Chair MEMBERSHIP:	No Write-in

Chapter VI:

Geoscience & Remote Sensing (GRS-29)

Chair:	Robert Onstead*
Vice Chair:	Leland G. Pierce*

* Appointed by IEEE/SEM Executive Committee

Chapter VII:

Power Engineering (PE-31); Industrial Applications (IA-34)

Chair:	Brian Harrington
Vice Chair:	Tim Rowden (Write-in)
Secretary/Treasurer:	Tom Powell (Write-in)

Chapter VIII:

Electromagnetic Compatibility (EMC-27)

Chair:	Dennis Barberi
Vice Chair:	Scott Lytle
Secretary/Treasurer:	Kimball Williams

Chapter IX:

Power Electronics (PE-35); Industrial Electronics (IE-16)

Chair:	Ka C. Cheok
Vice Chair:	Gamze Erten
Secretary:	John M. Miller

Chapter X:

Engineering Management (EMS)

Chair:	Prakash C. Shrivastava
Vice Chair:	Carl McGlashan
Secretary/Treasurer:	Stephen Kishok

IEEE/SEM Spring '97 Meeting Registration Form

Complete and mail form with an early registration fee of \$25 per person. The registration fee includes technical session attendance and dinner. Complete this form for each person attending. Please make check payable to IEEE/SEM and forward along with a completed registration form to: **Christin Clayborn, 4528 Rochester Road, #16, Royal Oak, Michigan 48073.**

Fee Type	Amount	Deadline
Early registration	\$25	Postmarked by 4/4/97 or received by 4/7/97
Regular registration	\$30	After 4/4/97, phone George Peters at 519-966-1656 x4445# Then pay at the meeting.
Student registration	\$12	Pre-register & pay through student branch.

Those pre-registering & pre-paying will have express check in.

Indicate which technical session you wish to attend:

- Student Track Session
- "Opportunities to Design the Car of Tomorrow"
- Chapter I: Circuits & Signal Processing
- "Communications & Control Problems in Large Systems"
- Chapter II: Vehicular Technology
- "DOE-USCAR FutureCar Challenge"
- Chapter III: Comm. & Aero. Electronics
- "Slamming & Other Costly Telecommunications Fraud Issues"
- Chapter IV: Trident
- "Semiconductor Research at MSU"
- Chapter V: Computer
- "Issues in Agent-Based Information Retrieval"
- Chapter VII: Power Eng. & Ind. Apps.
- "Deregulation from a Municipal Utility's Perspective"
- Chapter VIII: EMC
- "New CW & Pulse Emission & Susceptibility Testing Method"
- Chapter IX: Power & Ind. Electronics
- "Torque Control of Induction Motors w/ Minimal # of Sensors"

Please type or print:

Name: _____

Address: _____

City/State/ZIP: _____

Phone Number: _____ H W

Company: _____

Amount enclosed: \$_____ Early registration (\$25 per person)

Choice of meal: Regular Vegetarian, IEEE Member: Yes No

Students must register & pay through student branches. ALL tickets at the meeting will be \$30. There's no charge for attending technical sessions only.

Executive Committee Meeting Report

The IEEE/SEM Executive Committee met on March 3, 1997, at the Eaton Corporate Research and Development facility in Southfield, Michigan. Eighteen people attended the meeting, presided over by Section Chair David Horvath.

- V. Sinha, a Wayne State University student, reported the motivation, effort and purpose for conducting a Region 4 Student Branch Leadership Workshop. He sought support from the section. Discussion on related issues followed: holding the workshop soon after student branch officers are elected; making the workshop an annual event; and inviting student branches from the University of Toledo, GMI, and Western Michigan U. A motion was made and approved by EXCOM, that a subcommittee, consisting of D. Horvath, M. Zohdy, D. Silversmith, J. Woodyard and V. Sinha, be formed to provide better support for this workshop.
- J. Woodyard presented the treasurer's report for the combined months of January and February 1997 with some modified account items. D. Bramlett suggested to transfer \$400 from the \$1,700 Awards, Development, Nomination and Communications budget to the ESD Affiliation Contribution budget. The treasurer's report was approved with amendments. J. Woodyard then briefed EXCOM on the Budget Subcommittee meeting, and presented the proposals made by the subcommittee: 1) IEEE/SEM officers must get approval from the Section Treasurer before charging an IEEE Headquarters order to the section's account. 2) Transfer of \$5,000 into a savings account to be used solely as conference seed money.
- M. and S. Hunter reviewed the annual plan for Wavelengths. They also noted that section members turned in articles for the March issue up to 2 weeks late. The March issue was about \$1,000 under budget.
- G. Peters reported that the passage between the Fairlane Club and the Training and Development Center can not be used before the technical sessions since the catering staff will be using it to set up the banquet room. People attending the section meeting should park at the Training and Development Center, attend the technical sessions, then go through the passage to get to the banquet room.
- D. Silversmith reported that so far TACOM is the only corporate sponsor for student tables. He mentioned that with the space and time limitation in the Fairlane Club, he is unable to pursue more vendor tables. A discussion of ways to improve the corporate sponsorship for student tables and the relationship between IEEE and corporations ensued. J. Woodyard mentioned that one of the action items for the Budget Subcommittee addresses this issue.
- M. Hunter presented the statistics for 1996 membership as of February 1997. He also reported that G.O.L.D. will have its first meeting on March 22. A G.O.L.D. meeting is planned for April on early financial planning.
- M. Zohdy reported that Oakland University held activities for National Engineers Week. He also reported that the "Bucket O' Parts" competition will be postponed,

by K. C. Liu, IEEE/SEM Secretary

and instead a computer simulation competition for high school students was planned. A student-professional conference will be held on April 3 at the University of Michigan. More neuro-fuzzy logic workshops are planned with F. Salam. J. Woodyard suggested having open house for Detroit and suburban students during NEW, he also questioned the reason for the delay of the "Bucket O' Parts" competition.

- D. Bramlett reported that he will write an article about the Science and Engineering Fair for Wavelengths and is still looking for volunteers as judges and mentors. He also reported that IEEE Region 4 plans to hold a leadership workshop for section officers in a bi-area format in September. IEEE plans to hold the Board of Directors meeting in Dearborn this December; he will get more information about the event.
- F. Salam reported that he has been unable to attend EXCOM meetings because the conflict with his teaching schedule. Chapter I is planning to add more vice chair positions like Chapter V. Two more meetings have been arranged for Chapter I.
- K. Rao reported that Chapter II has plans to set up more speakers in addition to the two speakers that had been already arranged, one for the April section meeting, and the other for the March 19, 1997 meeting.
- R. Desoff reported that Chapter III has a speaker for its technical meeting at the section meeting. He will also give a talk at Wayne State University Student Chapter on March 17.
- N. Al-Holou reported that Chapter V has arranged the guest speaker for Spring Section Meeting. Chapter V also held a meeting at Michigan State University last month.
- D. Barberi reported that Chapter VIII has lined up the speakers for the Spring Section Meeting and meeting two weeks from now.
- J. Miller reported that Chapter IX has invited Prof. Strangas of Michigan State University as the speaker of technical meeting at Fall Section Meeting. He also mentioned that Dr. Power of Ford Company has indicated that he will be able to speak at Fall Section Meeting.
- P. Shrivastava reported that Chapter X will hold a technical meeting on March 26 at GM Management Center. The topic is "Lean Thinking in Product Development." The chapter has also planned for 3 more technical meetings for the year.
- D. McKendry presented the election results. He also asked EXCOM for approval of Robert Onstead and Leland G. Pierce as Chair and Vice Chair, respectfully, for Chapter VI, which had no candidates on the ballot. EXCOM approved the assignments for Chapter VI. He reported that 50 year members will be honored at the Spring Section Meeting.
- D. Horvath made a motion for EXCOM to write a letter of endorsement for a member's elevation to Fellow grade. The motion was approved. However, several EXCOM members felt that active section involvement was a necessary criterion for future section endorsement.

Graduates Of the Last Decade

If you graduated in the last ten years (or so) then you are already a GOLD member and we are planning some fun events as well as some informative sessions for you. Whether you are single or have a family, we want to make IEEE work for you. There aren't even any society fees, we just might ask you to chip in for pizza if you come to a meeting.

Send us your name so we can tell you about upcoming events. Send your name, address, phone and e-mail address to:

IEEE/SEM GOLD

Mark A. Hunter

412 Edmund Ave.

Royal Oak, MI 48073-2626

or via e-mail to m.hunter@ieee.org

*If you have any questions,
call Mark Hunter at (810) 588-0355.*

We are currently trying to set a date for a meeting this spring covering **Early Career Financial Planning**. The speaker will be a financial planner from American Express Financial Planners. (No sales pitch)

IEEE/SEM Spring '97 Meeting - April 14, 1997

