



WAVELENGTHS

## The Year in Review

by George Peters, Section Chair

The IEEE/SEM Section's 1997-1998 program year has been one filled with challenges and accomplishments. The section officers worked untiringly to strengthen the section, maximize its operational efficiency, and stay within the budget.

Many of the accomplishments have centered on the Fall and Spring Section Meetings. I appreciate both Ford Motor Company's and General Motors' sponsorship of these meetings. K. C. Liu put forth a tremendous effort in organizing the Fall Section Meeting. He headed tasks such as allocating the technical session rooms, arranging for A/V equipment, communicating with the main session speaker as well as all of the chapter chairs, coordinating with the caterer, and too many other duties to mention. Don Silversmith furthered his initiative of encouraging vendor and corporate support for these events. Over the last several years, vendors and educational institutions have shown a greater interest in this type of sponsorship. Students also took an active role at the section meetings by volunteering for many tasks and through university showcase booths. At the spring meeting, Dave Horvath, Chair of the Awards Committee, conducted a memorable awards ceremony. The awards presentation recognized IEEE/SEM members who have made significant contributions to the IEEE and to engineering sciences. I also wish to thank the section meeting keynote speakers: Dr. William Powers (Fall) and Dr. Mark Ehsani (Spring). The organizers of these meetings were fortunate to connect with these two gentlemen, who delivered such compelling presentations.

The Section Executive Committee members made significant contributions toward the management strategies for the section. For example, Jim Woodyard and John Miller fine-tuned the duties for the Section Secretary and Section Treasurer roles, allowing for a smoother transition for the incoming officers. Thanks to the efforts of John Miller the section will be co-sponsoring a technical conference this fall (WPET98). Conference co-sponsorships are one of the most significant sources of income for the section.

Don Bramlett continues to provide valuable support to the section. As a Section Advisor, he offers advice and



mentorship at each of the monthly EXCOM meetings. Don is also now East Area Chair for IEEE's Region 4. Don has been very active promoting National Engineers Week, Future City Competition, and the Detroit Science Fair. The section recognized Don's many contributions by honoring him with the Outstanding Section Involvement award for the 1997-1998 program year.

Sandy and Mark Hunter did an outstanding job publishing *Wavelengths* for the second consecutive year. They also spearheaded the

section's Graduates of the Last Decade (GOLD) program, which serves the needs of members within the first ten years of their college graduation.

Last summer, I cited two goals for my year as Section Chair: 1) increasing the involvement of student branches in section activities and 2) increasing the involvement of Windsor/Essex County IEEE members. I am pleased to report progress has occurred in both areas.

Student attendance at the section meetings has been unparalleled. At the meetings, several IEEE/SEM student branches set up display tables, showcasing the variety of activities organized by the branches. Students from various institutions had the opportunity to interact and discuss possible joint programs. Another successful student branch and section activity was the Bucket of Parts competition held at Oakland University. The Student Activities Director, Mohamed Zohdy, organized this event.

A new volunteer for IEEE/SEM is the University of Windsor's Tarek Lahdhiri, the incoming Professional Activities Director. Tarek has helped to raise Windsor's visibility by encouraging his peers to become active in section activities. I enjoyed meeting with new representatives from the University of Windsor at both section meetings. Tarek is also the new Student Branch Counselor at the University of Windsor.

I would like to thank the members for giving me the opportunity to serve as the IEEE/SEM Section Chair. Also I wish to thank my fellow officers who provided me with support through the few difficult periods. It has truly been a rewarding and challenging job. I look forward to many more years of volunteer work with the section and IEEE. Have a happy and safe summer.

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Volunteer Coordinator	Satyendra Basu	313-235-6523

### IEEE/SEM Chapters

- 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-13)
- X Engineering Management:** Eng. Management (EM-14)

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## Calendar of Events

- |                         |   |   |
|-------------------------|---|---|
| Tuesday<br>June 16      | Topic:<br>Speaker:<br>Time:<br>Location:<br>Sponsor:<br>Contact:<br>Comments:     | <b>Compliance with EMC directive 89/336/EEC</b><br>Stephen Clayton, MIRA<br>6 p.m.<br>MIRA North America, 47523 Clipper St., Plymouth<br>Chapter VII: EMC<br>Graheme Rogerson, 743-455-8200<br>See article on page 12.  |
| Monday<br>July 13       | Topic:<br>Speaker:<br>Time:<br>Location:<br>Sponsor:<br>Reservation:<br>Comments: | <b>Designing / Modeling an H-Bridge Driver ASIC</b><br>David Divins, Analogy Inc.<br>5:20 p.m.<br>University of Detroit Mercy, McNichols Campus,<br>Engineering Bldg., Room 260 (NW bldg. corner)<br>Chapter I: Circuits & Signal Processing,<br>Chapter V: Computer, University of Detroit Mercy<br>Nizar Al-Holou, 313-993-3384, alholou@udmercy.edu<br>Sandra A. Yost, 313-993-1748, yostsa@udmercy.edu<br>See description below calendar. |
| Monday<br>July 20       | Topic:<br>Speaker:<br>Time:<br>Location:<br>Sponsor:<br>Contact:<br>Comments:     | <b>EMC Concerns in Automotive Radar</b><br>James McDade, Eaton VORAD<br>6 p.m.<br>Eaton Corp., 26201 Northwestern Highway, Southfield<br>Chapter VIII: Electromagnetic Compatibility<br>Scott Lytle, 248-354-5245, s.lytle@ieee.org<br>See article on page 12.  |
| Monday<br>July 27       | Meeting:<br>Time:<br>Location:<br>Sponsor:<br>Contact:                            | <b>Executive Committee</b><br>Dinner at 6 p.m., meeting 6:30 p.m.<br>Eaton Corp., 26201 Northwestern Highway, Southfield<br>IEEE/SEM<br>Kimball Williams, 248-354-2845  |
| Monday<br>August 31     | Meeting:<br>Time:<br>Location:<br>Sponsor:<br>Contact:                            | <b>Executive Committee</b><br>Dinner at 6 p.m., meeting 6:30 p.m.<br>Eaton Corp., 26201 Northwestern Highway, Southfield<br>IEEE/SEM<br>Kimball Williams, 248-354-2845  |
| Wednesday<br>October 28 | Event:<br>Contact:<br>Comment:  | <b>IEEE/SEM Fall Section Meeting</b><br>Jim Woodyard, 313-577-3758,<br>woodyard@eng.wayne.edu<br>Mark your calendar.  |

### Chapter I: Circuits & Signal Processing and Chapter V: Computer

Chapters I & V present "Designing and Modeling an H-Bridge Driver ASIC" at a joint meeting on July 13, at 5:20 p.m. at the Univ. of Detroit Mercy, McNichols Campus, Eng. Bldg., Room 260 (NW bldg. corner). The speaker will be David Divins, Senior Applications Eng. from Analogy Inc.

As part of the methodology of designing a system, system components need to be modeled and characterized. Thus the model employed to design a component must be validated against a system model and both models must be verified against the real component. This presentation shows correlation results for the design and modeling of an H-Bridge Driver ASIC.

David Divins has bachelor's and master's degrees in electrical engineering. Additional work experience includes analog system design with GE Aerospace and analog ASIC application and reliability with Ford Electronics (Visteon).

**I want My Lights on NOW!**  
**Detroit Edison's Storm Response Plan**  
*by Tom Powell, Secretary/Treasurer*

From the "top ten" list of reasons for Detroit Edison having a storm plan to the catastrophic pictures from Montreal, Canada, winter storm, attendees were held in rapt attention to the presentation given by Leon Niebrzydowski and Eugene Suchyta.

Information is critical to good decisions. Whether it is Detroit Edison's response to the storm (using weather information) or it is a customer's response to an outage, the better the information, the better the individual (or the organization) can plan.

The process by which Detroit Edison gathers information and creates plans was discussed. The extent of the damage is gathered via telephone calls from customers. Using a sophisticated computer program, a limited number of calls can accurately predict the extent of an outage. Even before damage occurs, planning is underway. Did you know that when a storm is as far away as Grand Rapids, Detroit Edison is already activating their emergency response plan? All Detroit Edison employees are considered for storm response. Only a handful are exempt due to production requirements.

Detroit Edison has significantly improved their emergency response between the July 1995 and July 1997 storms. They have reduced the number of priority customers from 400,000 to 6,600, and established a procedure by which they isolate, restore, and repair for the circuit instead of individual repairs. They have a tremendous storm training program to keep their people (and customers) safe.

The information presented by Detroit Edison showed significant planning and dedication to serving the public. The expense and investment made by Detroit Edison to improving their emergency response demonstrates their commitment to this region.

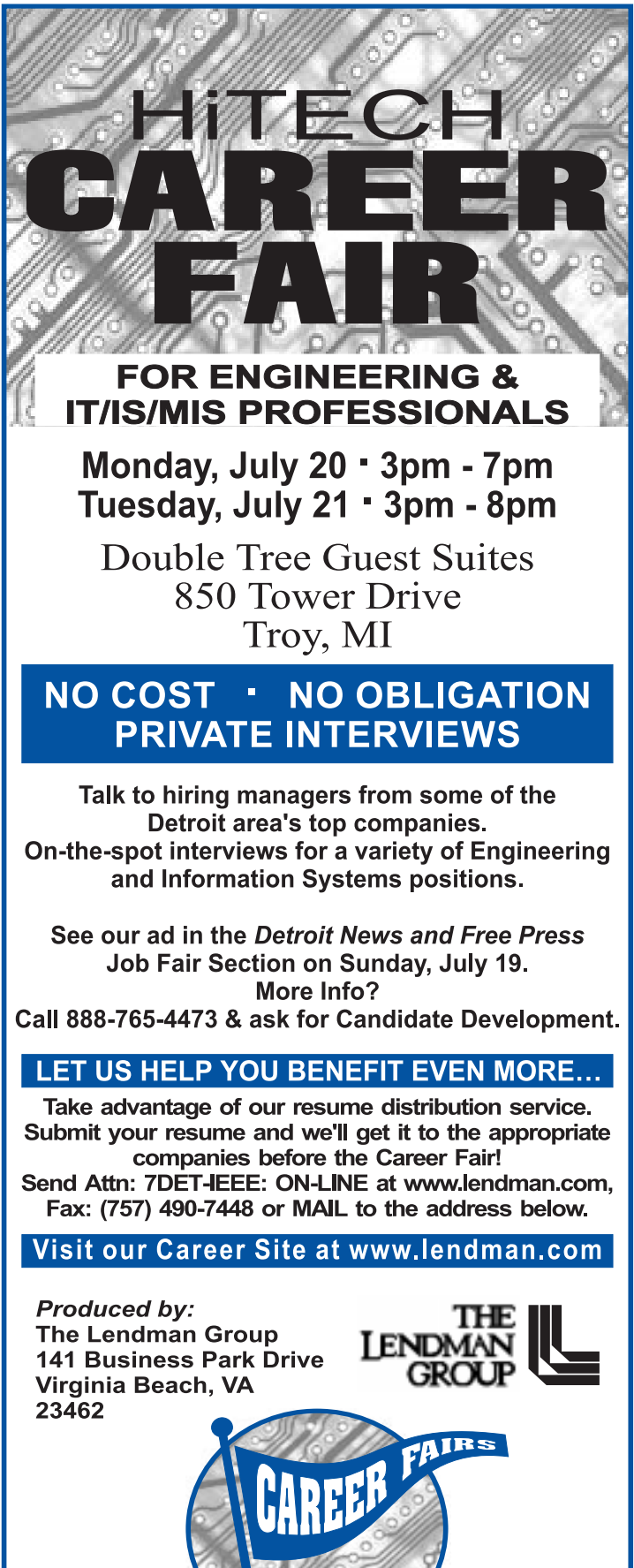
**Automotive Electronics & Mechatronics**  
**Meeting Report**  
*by Ka C. Cheok, Chair*

Chapter IX held a seminar on Trends in Automotive Electronics & Mechatronics on April 24 at the Automotive Mechatronics Lab at Oakland University. The objectives of the meeting were:

- Survey efforts at various auto companies, suppliers and military agencies
- Discuss industry techniques, approaches, emphasis and standards
- Exchange ideas
- Establish contacts and become aware of on-going R&D

John Miller from Ford Motor Company presented the trends in automotive electronics and future hybrid electric cars. Ka C. Cheok of Oakland University explained the systems engineering approach to and virtual prototyping of automotive mechatronics. Don Dibble of EDS demonstrated an experimental fuel injection system. Gamze Erten, from IC Tech, Inc., presented potential applications of computer vision systems in future cars.

There were 15 participants, including representatives from the University of Windsor, the University of Detroit, Hitachi-America, Alps Automotive, Seimens Automotive and Logic Consultants. Active participation, interaction and discussions from the attendees turned the meeting into a very informative and meaningful event. Many expressed willingness to organize or attend another such meeting in the near future.



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## Wavelengths Editors' Farewell

Mark Hunter and I are completing our two-year commitment as editors of *Wavelengths* with this issue. You will see us around in the year to come since we are moving on to other volunteer opportunities within the IEEE/SEM section. This article is our opportunity to reflect on *Wavelengths'* past and future.

*Wavelengths* plays an important role in keeping section members informed. The newsletter reaches approximately 4,000 members in the Detroit metropolitan area, Ann Arbor, Lansing, and Jackson in Michigan and Windsor in Ontario. It provides information about ten technical chapters, ten student branches, the Executive Committee, professional activities, and member accomplishments. It is a reminder that IEEE is more than the Spectrum magazine, standards boards, and conferences. The local face of IEEE includes informal networking opportunities, evening seminars, and opportunities to engage students' imagination in engineering.

We would like to recognize Jim Woodyard's outstanding organization as editor for the eight years prior to our tenure. He leveled the workload for the *Wavelengths* editors by creating a list of newsletter stories for every issue during the program year. Mark and I have continued to use the Annual Plan that Jim created to manage our work and communicate newsletter content needs to the section officers far before deadlines. Jim also gave us boxes of well-organized information detailing how to manage the newsletter.

As editors, we produce newsletters based on articles and calendar items written by section officers and volunteers. We thank all of the people who have contributed information for *Wavelengths* over the past two years. We especially appreciate those people who sent us their articles prior to the deadlines! The contributors' efforts made it possible for us to keep you informed of section's activities.

*Wavelengths* is the section's single largest budget expense. For 1997, expenses including printing, mailing labels, postage, and computer supplies totaled about \$20,000. Income from advertising was around \$3,000. Because the section has been deficit spending, reducing newsletter costs is a priority. Mark has worked closely with the Post Office to understand postal rates that affect newsletter postage costs. By implementing CASS certification, which qualifies the mailing for automation discounts, Mark has helped to reduce postage costs and minimize the impact of postage rate increases. Mark has also worked with the printers to reduced printing costs and decreased the printing lead-time. Mark has balanced the need for fiscal restraint with the objective of producing a timely, informative newsletter.

Over the past two years, the section has discussed ways to reduce newsletter costs more drastically. We have considered the merits of

by Sandy Hunter, Editor

using electronic publishing instead of hardcopy. Both web pages and e-mail have lower production costs than a paper newsletter and allow publication of virtually limitless amounts of information. However, the section has had a hard time gauging whether enough members will accept electronic news instead of paper. Producing timely articles and calendar notices in both paper and electronic formats increases the work for volunteers. Maintaining separate mailing lists for people who want electronic information only versus those who want hardcopy could take a full time effort. The hardcopy price per member also increases as volume decreases. Because of these issues, the section's Executive Committee has agreed that electronic publishing is not a replacement for a paper newsletter at this time.

The section is watching the Chicago Section's newsletter actions closely. That section, which is about twice the size of the Southeastern Michigan Section, contracted with a private company to edit and publish its newsletter earlier this year. Volunteers still contribute calendar items, meeting announcements, and articles. The publishing company expects to sell enough advertising space in the newsletter to cover the production costs for a four-color glossy newsletter and make a profit. The Chicago Section hopes that the venture becomes profitable during their test period. There are drawbacks to this system including longer lead times for articles, but soon that section will no longer have to spend money on their newsletter. Since the Chicago newsletter arrangement has only been in place for a few months, the balance between advantages and disadvantages is unclear.

One of my last duties as newsletter editor is to find editors for next year. I am discussing the responsibilities with people who responded to the calls for volunteers that were published in *Wavelengths* this spring. My goal is to have a team of two or more people identified by June so that the Executive Committee can approve their appointment. Look for the new editors in the September issue of *Wavelengths!*

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## 1998 IEEE-USA Professional Activities Conference

by Tarek Lahdhiri, PACE GOLD Volunteer

The 1998 IEEE-USA Professional Activities Conference will be held over Labor Day weekend, September 4-7, at The Pointe Hilton Resort at Squaw Peak in Phoenix, Arizona. The theme of the 1998 conference is "Preparing for the New Millennium." Six tracks of sessions will offer more than 50 workshops and plenaries designed to meet the career and professional skill development needs of today's engineers. Two of the tracks will target the needs and interests of engineers with ten years or less of professional experience. One will address the training and information needs of section and society professional activities representatives.

IEEE members and others interested in improving their non-technical, career-related skills will find this conference useful. Companies are strongly encouraged to send their technical professionals. Recent graduates will have an opportunity to develop essential professional skills not covered in their college courses. Engineers in the early years of their career will find a wealth of information to help them move ahead in a planned and orderly fashion.

Sessions will cover topics such as career planning and management techniques, managing change, transitioning from technical professional to manager, project management, team dynamics and leadership, entrepreneurship, stress management, performance evaluations, diversity, innovation, mentoring, and effective public speaking. Three day-long tutorials will be offered on September 4, prior to the official opening of the conference, on "Breakthrough Project Management" (sponsored by the IEEE Engineering Management Society), "Making Action-Getting Oral Presentations" (sponsored by the IEEE Professional Communication Society), and "HTML Training."

The registration fee for the conference is \$295 for IEEE members, \$375 for nonmembers, \$100 for IEEE Life Members, and \$50 for students. The fee for the all-day tutorials is \$150. Assistance with travel costs is available for PACE representatives and young professionals through their IEEE Sections. For registration materials, contact Ann Hartfiel at the IEEE-USA Office (a.hartfiel@ieee.org, phone: 202-785-0017).

## IEEE/SEM Science Fair Awards

The 41st Annual Science and Engineering Fair of Metropolitan Detroit (SEFMD) was held from March 31 through April 4 in the Michigan Hall of the Cobo Conference Exhibition Center in downtown Detroit. Judging of student projects was performed on April 1. For the fourth year, the IEEE/SEM Section has provided a team of volunteer judges to evaluate student projects associated with electrical, electronic and computer engineering related subjects. The section thanks the nine IEEE members, and their employers, for making the Science Fair a more meaningful experience for the middle and high school students who participated. The following volunteers comprised the IEEE/SEM judging team:

Scott Amman, Mike Blommer, & Matt Boesch of Ford Motor Co.  
Mitch Ochten of Medar  
Dr. Charles Cohen of the University of Michigan  
Dr. Shamala Chickamenahali of Wayne State University  
Ted Huff of General Dynamics  
Satyendra Basu and Don Bramlett of Detroit Edison

Judges had the opportunity to view and evaluate outstanding exhibits, especially some extraordinary projects in IEEE-related fields. The judges and students discussed in depth some of the principles, experimental results and applications pertinent to the projects.

The IEEE/SEM Section, based on the evaluations of the judges, awarded two First Place Grand Awards, each consisting of a check for \$100 and a tasteful, personalized framed certificate. These two awards were presented to:

**Ketan D. Vyas** for his project entitled, "Can Using a Neural Network Increase the Speed of a Central Processing Unit." Ketan's project also took the overall Grand Award at the Science Fair. Ketan is a junior at Renaissance High School in Detroit. Ketan and his parents were able to attend the Spring Section Meeting on April 2 at the Ford Fairlane Club. Ketan had been a previous recipient of a First Place Grand Award from the IEEE/SEM Section two years ago for a project entitled, "Computer Simulation of a Nuclear Fusion Reactor."

**Joseph P. Heremans** for his project entitled, "A Thermo-electric Relative Humidity Meter." Joseph is a sophomore at Detroit Country

Day Upper School. Also, Joseph had been a previous recipient of a First Place Grand Award from the IEEE/SEM Section last year for a project entitled, "Thermo-acoustic Refrigerator."

The judges also selected three other noteworthy projects for Honorable Mention Awards. These awards each consisted of a framed personalized certificate. These awards were presented to:

**Robert C. Vogt IV**, a sophomore at Ann Arbor Huron High School, for his project entitled, "Magnetohydrodynamic Power Generator."

**Ozie C. Cargile II**, a student at Renaissance High School in Detroit, for his project entitled, "The Electromagnetic Force."

**Daniel Ayoub**, a sophomore at Detroit Catholic Central, for his project entitled "What is a Micro-Processor? And What Can it Do."

The section plans to staff another panel of judges at the SEFMD in 1999, and also in subsequent years. In addition, the section intends to provide judges for the International Science and Engineering Fair (ISEF) when it is held in Detroit in the year 2000. Watch for articles in *Wavelengths* in early 1999, so you too can have the satisfying and fulfilling experience of being an IEEE/SEM judge.



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# 1998 IEEE Medalists & Fellows

by Sandy Hunter, Editor

Twelve IEEE/SEM members have been awarded with IEEE Medals or been elected IEEE Fellows this year. These awards honor outstanding academic, technical, scientific, leadership, and professional achievements. The section presents brief biographies of this year's award recipients in recognition of their accomplishments.

IEEE Medals are prestigious awards presented to just a handful of people each year. The selection criteria for some medals is so stringent that some years produce no worthy candidates. The article on page 10 presents two Southeastern Michigan Section members who were recently awarded medals.

IEEE Fellow candidates are evaluated on the basis of individual

contributions as engineer-scientist, technical leader or educator; evaluation by the Society selected by the nominator; evidence of technical accomplishment, such as publications (including internal company reports), patents and peer recognition; confidential opinions of references; service to IEEE and other professional engineering societies; and total years in the profession. Less than two percent of IEEE members are Fellows.

If you are inspired by the biographies of these award recipients, you can refer to the IEEE home page, [www.ieee.org](http://www.ieee.org), for award nomination information. The IEEE/SEM Executive Committee is willing to consider endorsing award nominations for members who have actively participated in section activities.

## 1998 IEEE/SEM Fellows Announced

### Ib Bentzen-Bilkvist

Holnam Inc.  
Dundee, Michigan

*For the implementation of advanced electrical technologies in the cement industry.*



Ib Bentzen-Bilkvist earned a bachelor's degree in electrical engineering in Denmark in 1956. He worked for the Iron Ore Company of Canada from 1956-1967. In 1967, he joined Holnam Inc. as Chief Electrical Engineer. He later became Manager of Corporate Engineering and has spent recent years as Senior Project Manager at Holnam Inc. In 1998, he became a consultant to the company.

In 1971, Ib was the first in the cement industry, and probably the first outside of the machine tool industry, to use programmable controllers. In the same year, he installed the first adjustable frequency drive (500 HP PWM) in the cement industry. Both applications were described at the 1972 IEEE cement industry conference in the paper "Updating the Interesting Features of Dundee's Michigan Cement Plant." Ib also experimented with sodium conductors. The 480 V power for Holnam's plant office in Dundee was supplied through a sodium cable for more than 20 years.

No unloading system was available in the early 1970's for common barges containing cement. Ib spearheaded the development of an unloading system using pneumatic principles and received six patents.

Ib has presented several papers, written several articles, and a book titled "Electrical Basics for Plant Personnel."

Ib has been very active in the IEEE IAS/Cement Industry Committee for many years. He served as chair in 1989-1990 and is a member of the executive and nominating committees.

### John R. Deller

Michigan State University  
East Lansing, Michigan

*For contributions to system identification and speech recognition.*



John (Jack) Deller has been a professor of Electrical Engineering at Michigan State University since 1991. He has also taught at the University of Notre Dame, Northeastern University in Boston, and the Illinois Institute of Technology in Chicago. His research interests include system identification and statistical signal processing, speech processing, and biomedical signal processing.

Jack received a bachelor's degree in electrical engineering from Ohio State University (Summa Cum Laude), master's degrees in biomedical engineering and electrical and computer engineering from the University of Michigan, and a doctorate from the University of Michigan.

He is a member of the IEEE Signal Processing and Circuits and Systems Societies. He is serving as Editor-in-Chief for the IEEE Signal Processing Magazine as he has for a number of years since 1990. He has written numerous textbooks and technical articles and presented short courses and conference tutorial workshops. He is a member of Eta Kappa Nu, Sigma Xi, and Tau Beta Pi. He was also the Ameritech Faculty Fellow in 1991-92.

During his career, he has been a consultant for a number of firms including Red Cedar Electronics, various publishing companies (Macmillan, McGraw-Hill, Wiley, Aksen), CTA Incorporated, Rehabilitative Engineering Research & Development Center, and the Detroit Symphony Orchestra.

### Alfred Oliver Hero III

University of Michigan  
Ann Arbor, Michigan

*For contributions to the theory and practice of statistical signal processing, particularly in estimation, detection, and imaging.*



Alfred O. Hero received a bachelor's degree (Summa Cum Laude) from Boston University in 1980 and a doctorate from Princeton University in 1984, both in electrical engineering. He held the honorary G.V.N. Lothrop Fellowship in Engineering at Princeton University.

Dr. Hero is Professor of Electrical Engineering and Computer Science and Director of the Communications and Signal Processing Laboratory at the University of Michigan, Ann Arbor. He has held positions of Visiting Scientist at the MIT Lincoln Laboratory from 1987 to 1989; Visiting Professor at l'Ecole Nationale de Techniques Avancees (ENSTA), Paris, France in 1991; and William Clay Ford Fellow at the Ford Motor Company, in 1993. He has served as consultant for US government agencies and private industry. His present research interests are in the areas of detection and estimation theory, statistical signal and image processing, pattern recognition, signal

(Continued on page 7)

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## 1998 IEEE/SEM Fellows Announced *(Continued from page 6)*

processing for communications, channel equalization and interference mitigation, spatio-temporal sonar and radar processing, and biomedical signal and image analysis.

Alfred Hero has been a member of Tau Beta Pi, the American Statistical Association, the New York Academy of Science, and Commission C of the International Union of Radio Science (URSI). He is associate editor for Signal Processing at the IEEE Transactions on Information Theory (1994-97); Chair of the IEEE SPS Statistical Signal and Array Processing Technical Committee (1996-98); and Treasurer of the IEEE SPS Conference Board (1997-2000). He is co-chair for the 1999 IEEE Information Theory Workshop and the 1999 IEEE Workshop on Higher Order Statistics. He served as publicity chair for the 1986 IEEE International Symposium on Information Theory and was general chair of the 1995 IEEE International Conference on Acoustics, Speech, and Signal Processing.

**Gérard Albert Mourou**  
University of Michigan  
Ann Arbor, Michigan

*For contributions to chirp pulse amplification of ultrashort optical pulses and electrooptic sampling techniques for high speed signal characterization.*

Gérard Mourou received a doctorate in physics from the University of Paris. He started the Ultrafast Science Group at ENSTA (FRANCE) in 1974. Three years later, he moved to the University of Rochester, becoming director of the Ultrafast Science Group at the Laboratory for Laser Energetic. In 1988, he became a professor in the



Electrical Engineering Department of the University of Michigan and founded the Ultrafast Science Laboratory. When the laboratory became the "National Science Foundation Science and Technology Center for Ultrafast Optical Science" in 1991, Dr. Mourou became its Director. He was named the A. D. Moore Distinguished University Professor of Electrical Engineering and Computer Science in 1995.

His research groups have made many significant contributions to the field of ultrafast science, introducing a variety of powerful techniques, such as the electro-optic sampling, timer-resolved electron diffraction, and particularly chirped pulse amplifications, which has revolutionized the field of laser-matter interaction with high-intensity ultrashort pulses.

Professor Mourou has received many awards, including the R. W. Wood Prize for outstanding discovery and inventions in the field of ultrafast optical science and the Harold E. Edgerton Award for the invention of the chirped pulse amplification technique.

### **William James Moylan**

Moylan Engineering Associates Inc.  
Dearborn, Michigan

*For leadership in the development of standards for electric power distribution for industrial plants.*

William (Bill) J. Moylan received a bachelor's degree in electrical engineering from the University of Detroit in 1962. His electrical education began eleven years earlier with an apprenticeship in industrial electricity. While completing the apprenticeship and, later, working off-hour



shifts as a construction and maintenance electrician at Ford Motor Company's River Rouge complex, he attended the University of Detroit. Upon graduating, he joined the Detroit Edison Company as assistant engineer in Underground Lines Planning and, later, project engineer in the Substation Group of its General Engineering Department. He became a specialist in the design and construction of substations serving the company's industrial customers. By 1971, he was principal engineer and work leader in Edison's Systems Engineering Department, supervising the planning, design, and oversight construction of transmission voltage substations.

In 1974, he established Moylan Engineering Associates Incorporated (MEA), a consulting firm in Dearborn, that provides electrical and mechanical consulting services nationally to the commercial, institutional, and industrial sectors. Under his direction, MEA performed several pilot studies and held workshops for the Michigan Energy Administration defining potential for energy conservation and cogeneration. Working for the Michigan Utility Commission, the company wrote the "Michigan Guidelines on Interconnection for Small Power Producers and Cogenerators." Bill traveled to the Peoples Republic of China in 1983 to assist Michigan's "sister" province in addressing electrical power problems. His firm later performed a study defining how the Sichuan Province Power Authority could utilize demand-controlling techniques to better manage its industrial loads.

Bill became active in I&CPS in 1974 and Secretary of its Red Book work group in 1975. He has served as chair of its Rainbow Book ad hoc committee, contributed to several of its color books, and chaired the

*(Continued on page 8)*

## 1998 IEEE/SEM Fellows Announced (Continued from page 7)

work group that wrote the present edition of the Red Book. He was an original member of IEEE's SCC 23, which produced the "IEEE Guide for Interfacing Dispersed Storage and Generation Facilities with Electric Utility Systems." Presently he is Secretary of the I&SPC Department, Chair of its Technical Books Coordinating Committee and the work group drafting the 8<sup>th</sup> edition of the Red Book. For this effort, he has received both the IEEE Standards Plaque and Medallion.

Other activities include participation in the Southeastern Michigan IAS/PES Joint Chapters, the Michigan and National Societies of Professional Engineers, and the National Fire Protection Association. Bill is a registered professional engineer in Michigan, Illinois, Indiana, Ohio, Georgia, and North Carolina.

### **James Paul Muccioli**

Chrysler Corporation  
Auburn Hills, Michigan

*For contributions to integrated circuit design practices to minimize electromagnetic interference.*

James P. Muccioli received his bachelor's and master's degrees in electrical engineering from the University of Michigan. Mr. Muccioli's background includes sixteen years of specialized EMC systems experience at Chrysler Corporation and United Technologies. Mr. Muccioli teaches EMC training courses through his own consulting firm, JASTECH (JASTECH-EMC.com). He taught an undergraduate course and a continuing education seminar



at Lawrence Technological University. He is the holder of fourteen patents and the author of numerous technical papers. Mr. Muccioli is a certified NARTE EMC engineer. He is an active member of SAE J-1113 and J-551 EMC committees and is chair of the SAE Integrated Circuit EMC Task Force. He is a member of the Board of Directors of the IEEE EMC Society.

### **Andrzej Marian Pawlak**

Generals Motors R&D Center  
Warren, Michigan

*For the development of novel yet cost-effective and highly-manufacturable electromechanical devices that have provided or enabled new features to be added to automotive products.*

No photo or biographical statement was available at press time.

### **Karem A. Sakallah**

University of Michigan  
Ann Arbor, Michigan

*For contributions to the modeling, analysis, and optimization of digital system timing.*

Karem Sakallah received a bachelor's degree in electrical engineering from American University of Beirut, Lebanon, in 1975. He earned a master's degree in electrical engineering and a doctorate in electrical and computer engineering from Carnegie Mellow University (CMU) in 1977 and 1981, respectively. He joined the Electrical Engineering Department at CMU in 1981 as a visiting professor. From 1982 to 1988, he worked for Digital Equipment



Corporation in Hudson, Massachusetts, where he headed the Analysis and Simulation Advanced Development team. Since 1988, he has been a professor of electrical engineering and computer science.

Dr. Sakallah pioneered a rigorous methodology for the modeling, simulation and optimization of integrated circuits. The methodology has yielded fundamental insights about the relationship between the complementary discrete and continuous representations of digital ICs and has led to major innovations in simulation and timing verification technology. These include the SAMSON mixed analog/digital event-driven simulator, the checkTc and minTc tools for verifying and optimizing the performance of level-clocked multiphase synchronous circuits, and the GRASP tool suite for functional timing analysis based on fast Boolean search. His most recent contribution has been the development of a symbolic functional logic waveform model centered on a continuous-time differential calculus. This "waveform calculus" allows the transient behavior of logic waveforms to be elegantly described in terms of appropriate time derivatives, and is amenable to precise functional and temporal abstractions that can be applied to generate compact high-level timing views with guaranteed accuracy bounds.

He was associate editor of the IEEE Transactions on CAD during 1995-1997 and has served on the program committees of ICCAD, DAC, ICCD, and numerous other workshops. He has published more than 90 papers and has presented seminars and tutorials at many professional meetings and various industrial sites. He is a member of ACM and Sigma Xi.

(Continued on page 9)

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## 1998 IEEE/SEM Fellows Announced *(Continued from page 8)*

### **Robert Anthony Schlueter**

Michigan State University  
East Lansing, Michigan

*For contributions to the theoretical and practical understanding of power system voltage instability.*

Dr. Schlueter's work on voltage instability in power systems was among the first funded research on the subject in the United States. His earliest work defined the algebraic and differential-algebraic models required for study of voltage instability and the load and generator bus controllability measures of proximity to voltage instability.



Dr. Schlueter developed a method for classifying the type of model; the kind of bifurcation experienced in the model (saddle mode, Hopf, singularity induced, and algebraic); and the subsystem that experiences and produces the particular kind of bifurcation. He also developed a precise method for identifying the differential subsystem, differential algebraic subsystem or algebraic subsystem that experiences and produces the full differential algebraic model bifurcation.

This bifurcation subsystem method was used to justify that sufficiently coherent bus groups in the algebraic submodel are bifurcation subsystem, where the bifurcation occurs, why it occurs, the equipment outage and operating change that produce bifurcation in each bifurcation subsystem, and the operating changes that would prevent or correct a voltage instability in a particular bifurcation subsystem. The bifurcation subsystem based procedure would be capable of providing these diagnostics even when the algebraic equation submodel has no solution for a particular equipment outage. This contingency ranking and diagnostic method may be able to identify every voltage instability problem; all of the probably equipment outage and operating change combinations that produce any particular voltage instability problem; and the corrective and protective control for each. It can be used in a control center due to its very minimum computational requirements and would correct each equipment outage and operating change induced stability problem without ever allowing a stability problem in a bifurcation subsystem that is experiencing instability. This corrective control promises to greatly expand transmission capabilities with the same or greater levels of reliability.

### **Wayne Eric Stark**

University of Michigan  
Ann Arbor, Michigan

*For contributions to the theory and practice of coding and modulation in spread-spectrum communication systems.*

Wayne Stark earned bachelor's (with highest honors), master's, and doctoral degrees in electrical engineering from the University of Illinois, Urbana in 1978, 1979, and 1982 respectively. Since September 1982, he has been a faculty member in the Department of Electrical Engineering and Computer Science at the University of Michigan, Ann Arbor. From 1984-1989, he served as Editor for Communication Theory of the IEEE Transactions on Communication in the area of spread-spectrum communications. He was involved in the planning and organization of the 1986 International Symposium on Information Theory, which was held in Ann Arbor. He was selected by the National Science Foundation as a 1985 Presidential Young Investigator. He is the principal investigator of an Army Research Office Multidisciplinary University Research Initiative project on low energy mobile communications. His research interests are in the areas of coding and communication theory, especially for spread-spectrum and wireless communication networks. Dr. Stark is a member of Eta Kappa Nu, Phi Kappa Phi and Tau Beta Pi.



## Hybrid Electric Vehicles Offer Technical & Social Solutions

*Review by Dave Horvath, Past Chair*

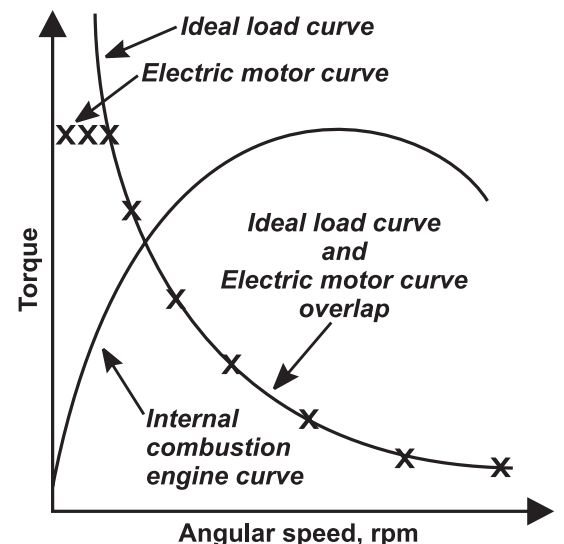
The keynote speaker at the Spring Section Meeting was Dr. Mark Ehsani, Director of the Power Electronics Laboratory at Texas A&M University. Dr. Ehsani spoke on an "Overview of Hybrid Electric Vehicles: Technical and Social Issues." Some of the important points and conclusions from his very interesting presentation are summarized below.

Although the auto industry in the US is mature, room still exists for improvement in the areas of air quality and vehicular power sources. Air pollution continues to be a health and social concern. In the Los Angeles area, children are born with 30% reduced lung capacity, possibly attributable to poor air quality in that area. In the energy use arena, automobiles in the US consume over 50% of the fossil fuels in the US each year, which is equivalent to the amount of oil imported

each year. The internal combustion engine (ICE), the favored power source at present, is not an ideal power source for the load presented by the automobile. *(The figure to the right graphically compares ICE torque and vehicle load versus speed.)* A transmission or transaxle is one method used to adjust for this incompatibility.

To date conventional solutions to these inefficiency and emission concerns have had many drawbacks. For example: further downsizing in an Internal Combustion Engine Vehicle (ICEV) leads to sacrifices in safety, room, and American market share. Use of an all electric vehicle (EV) leads to sacrifices in range and acceleration. Conventional approaches to date for a basic hybrid electric vehicle (HEV) have offered no unique American technical advantage and no

comprehensive improvement. However, with the addition of current and leading edge technology power electronics, major advantages are possible.



*(Continued on page 11)*

# IEEE Medals Awarded to Local Section Members

## IEEE Education Medal

*This medal is sponsored by the IEEE Foundation and is awarded to recognize a career of meritorious achievement in education as exemplified by inspirational and innovative teaching; publication of texts, course material and writing on education; creativity in curricula and teaching methodology; and other contributions to the teaching and engineering profession.*

The medal was awarded to Stephen W. Director, IEEE Fellow and Dean of Engineering, University of Michigan, Ann Arbor.



Citation:

*“For contributions to electrical engineering education through innovative textbooks, leadership in undergraduate curriculum reform, and inspired graduate teaching.”*

Stephen W. Director is the Robert J. Vlasic Dean of Engineering and Professor of Electrical Engineering and Computer Science at the University of Michigan. He received a bachelor’s degree from the State University of New York at Stony Brook in 1965 and master’s and doctoral degrees in electrical engineering from the University of California, Berkeley in 1967

and 1968, respectively. From 1968 until 1977, he was employed by the Department of Electrical Engineering at the University of Florida, Gainesville. He served as a visiting scientist in the Mathematical Sciences Department at IBM’s T.J. Watson Research Center from September 1974 to August 1975. He joined Carnegie Mellon University in 1977, where he was the U. A. and Helen Whitaker University Professor of Electrical and Computer Engineering. He served as Head of the Department of Electrical and Computer Engineering from 1982 to 1991 and as Dean of the College of Engineering until June of 1996. In 1982, he founded the SRC-CMU Research Center for Computer-Aided Design and served as its Director until 1989.

Dr. Director was elected Fellow by IEEE in 1978. He has served as President of the IEEE Circuits and Systems Society, as Chair of the CAS Technical Committee on Computer-Aided Network Design (CANDE) and as associated editor of the IEEE Transactions on Circuits and Systems.

He has published over 150 papers and authored or co-authored six texts. He has received numerous awards for his research and educational contributions including the 1970 and 1985 Best Paper Awards from the IEEE Circuits and Systems Society; the 1976 Frederick Emmons Terman Award from the American Society of Engineering Education; the 1979 W.R.G. Baker Prize Paper Award from the IEEE; an IEEE Centennial Medal in 1984; the Society Award (Van Valkenburg Award) from the Circuits and Systems Society and Best Paper Award from the ACM/IEEE Design Automation Conference in 1992; and the Outstanding Achievement Award from the IEEE Education Society in 1995.

Dr. Director was named a Distinguished Alumnus of the State University of New York at Stony Brook in 1984 and was elected to the National Academy of Engineering in 1989. In 1996 he was selected as the first recipient of the Aristotle Award from the Semiconductor Research Corporation, and received the Outstanding Alumnus Award in Electrical Engineering from the University of California, Berkeley.

## IEEE Heinrich Hertz Medal

*This medal is sponsored by the IEEE Foundation and Siemens AG Munchen. It was established in 1987 and is awarded to recognize an individual for outstanding achievements in Hertzian (radio) waves.*

The medal was awarded to Chen-To Tai, IEEE Life Fellow and Professor Emeritus, Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor.

Citation:

*“For outstanding contributions to electromagnetic and antenna theory and the development and application of Green’s dyadics.”*

Chen-To Tai obtained his bachelor’s degree in physics from Tsing Hua University in China and



his doctorate in communication engineering from Harvard University. He worked at the Stanford Research Institute (1949-54), Ohio State University (1954-56, 1960-64), Technical Institute of Aeronautics, Brazil (1956-60), and the University of Michigan (1964-present). He has been Professor Emeritus since 1986.

He is an IEEE Life Fellow, a member of URSI Commission B, and a member of the US National Academy of Engineering. He was President of the Antenna-Propagation Society in 1971. He has served as a visiting professor at universities and research institutes in the US, Brazil, Sweden, Japan, China, and Taiwan.

At the University of Michigan, he received the EKN Outstanding Faculty Award from the Electrical Engineering Department (1971, 1977), Tau Beta Pi Outstanding Faculty Award from the College of Engineering (1974), and the Distinguished Achievement Award from the university (1975). He is also the recipient of the IEEE Centennial Award (1984) and the Distinguished Achievement Award from the AP Society (1986).

He is the author of over 50 technical articles in antenna theory, electromagnetic theory, and applied mathematics. He is also the author of two books: “Generalized Vector and Dyadic Analysis” (Second Edition 1997) and “Dyadic Green Functions in Electromagnetic Theory” (Second Edition 1994), both published jointly by the IEEE Press, Piscataway, New Jersey, and the Oxford University Press, Oxford, England.

## Supporting Local Members

I will be turning over the job of Section Membership Director to Maurice Snyder, [snyder@adi.com](mailto:snyder@adi.com), this summer, and I will become Assistant Membership Director for the section. I started working in the membership area as the custodian of the local membership database and things expanded from there. Membership is now much more than a single person's job and even more than the two of us can handle. Volunteers are always welcome.

Harry Bostic, the Region 4 Director, convinced me last January to become the Region 4 Membership Development Committee Chair. Shortly after taking the position I was able to attend the annual membership retreat for the region and society MDC chairs where I shared ideas with other IEEE members and staff. One of my primary goals as Region MDC Chair is to establish membership director communications among the sections in our region so that we can share ideas and resources in this same way.

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### Free IEEE E-mail Alias Services

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IEEE and the Computer Society both offer free e-mail aliases to their members. These forwarding services simplify the myriad number of constantly changing computer e-mail addresses. Messages addressed to [youralias@ieee.org](mailto:youralias@ieee.org) or [youralias@computer.org](mailto:youralias@computer.org) will automatically be forwarded to your real Internet e-mail address. IEEE/SEM recommends that all section and chapter officers obtain an IEEE or Computer Society alias. Benefits of an alias include:

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- Protect yourself from e-mail viruses, [ieee.org](http://ieee.org) aliases are scanned.
- Display your affiliation with IEEE or the Computer Society.

For information about the Computer Society's alias service, see <http://www.computer.org/epub/alias.htm>. You must be a Computer Society member to get a [computer.org](http://www.computer.org) alias.

You can find information about IEEE aliases at <http://mail.ieee.org/electcomm/personal-aliases.html> or by sending an e-mail message to [alias-info@ieee.org](mailto:alias-info@ieee.org). The IEEE service scans attachments to mail messages for viruses.

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### Hybrid Electric Vehicles Offer Technical & Social Solutions *(Continued from page 9)*

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The basic EV consists of an electric motor directly connected to a drive train. The electric motor has the almost ideal torque-speed characteristic for a vehicle because its torque and the vehicle load curve have almost the same shape (again see the figure illustrating this comparison.) The limiting component is the battery. If one looks at the periodic table and considers all possible combinations of elements, there are none that can produce a battery as good as the gas tank in an IC engine. Also for an IC engine, the vehicle is literally swimming in an ocean of half of its fuel (i.e., oxygen). Whereas for an EV, the oxidant and the reactant both have to be carried on board.

The hybrid electric vehicle can be an improvement solution not just a compromise because of the combined characteristics of its two power sources. To obtain performance parity with the ICEV, it needs to have improvement in architecture, system design, vehicle system control, and components. Is it possible to convert a car from the previous generation (for example, a comfortably sized and

by Mark A. Hunter, Membership Director

IEEE is a professional organization dedicated to helping its members find jobs, manage their careers and keep their skills current. New initiatives supporting these areas are introduced periodically. Region 3 has developed a tool which allows users to search for companies that employ technical professionals. The IEEE Electro-Technology Industries Database is at:

<http://sandbox.ieee.org/r03/eti/or eti-info@eng.uab.edu>

The Career Asset Manager is also now electronic. Look for it at [ieee.org](http://ieee.org).

You can also upgrade your membership within IEEE. You don't have to remain at the same membership level forever. Members can apply for Senior Membership after they acquire ten years of experience (not necessarily ten years of membership). Associate members can apply for upgrade to full membership after six years of experience. Increasing your membership grade shows greater professionalism and may increase your membership benefits.

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### Become an IEEE Senior Member

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Senior Membership in IEEE is not a membership level reserved for engineers approaching retirement or Nobel Prize candidates. You may be eligible for Senior Membership with just ten years of professional experience, up to five of which may be your educational experience. Members may be eligible while still GOLD members!

The Senior Membership application process includes a primary application form that is filled out with information about the member, plus three reference forms. The application form may be filled out by the applying member or by a separate nominator. The reference forms must be submitted by IEEE Senior Members or IEEE Fellows.

The difficult part of applying for Senior Membership can be finding members to submit reference forms. The section hopes to help members find references this year by identifying them at Section Meetings, holding Senior Member application gatherings and finding Senior Members that will work with applicants.

You can receive application information, nomination and reference forms by sending a blank e-mail message to [senior-member-forms@ieee.org](mailto:senior-member-forms@ieee.org) or by leaving your name, address and phone # with Mark Hunter, 248-588-0355, [m.hunter@ieee.org](mailto:m.hunter@ieee.org). Mark can also help you find references.

Applicants: Please enter 'R40035, SE Mich. Section' as the Nominating Section/Society on the application form!

responsively powered Buick) to an HEV, maintain the performance and roominess attributes but reduce emissions and double the economy from 20 to 40 MPG? If the electric and mechanical power are dynamically proportioned such as through applying small bursts of electric power into the drive train at critical times, such performance objectives can indeed be achieved.

For any further interest in this topic, Dr. Ehsani will be teaching courses at the Ford Training and Development Center in the near future.

For additional details contact John Miller at:

[jmille24@ford.com](mailto:jmille24@ford.com).



## Wavelengths Quick Bits:

### Engineering Career Fair on July 20, 21.

*Information on page 3.*

### E-mail aliases are now available to all members!

Change your Internet e-mail without telling anyone.

*Story on page 11.*

**Become an IEEE Senior Member.** You may be eligible even if you are still a GOLD member.

*Story on page 11.*

**Reference no longer required on membership application.** The IEEE Reference may be left blank.

**Become active in the local IEEE section.** Join the team that creates Wavelengths. Contact Mark Hunter, 313-453-0800, m.hunter@ieee.org or Sandy Hunter, 248-588-0355, s.e.hunter@ieee.org.

**The next Wavelengths issue will be published in September.** For summer events, see:

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## Chapter VIII: EMC

## Meeting Announcements

### EU Directive Impact

*by Kimball Williams, Secretary/Treasurer*

The IEEE/SEM EMC chapter will hold a technical presentation on the subject of 89/336/EEC Compliance. The presentation will be held on **Tuesday, June 16 at 6 p.m.** at MIRA North America, 47523 Clipper Street in Plymouth. For a map or directions to MIRA North America, contact MIRA at 734-455-8200. Snacks and refreshments will be provided at 5:45 p.m.

From January 1<sup>st</sup> 1996, European Union Law requires that all products placed on the market, containing electrical and/or electronic components, must satisfy the EMC requirements of Directive 89/336/EEC. Failure to comply may result in the withdrawal and prohibition of that product from the market. The Motor Industry Research Association (MIRA), a Competent Body for 89/336/EEC certification, has developed an EMC test strategy for off highway vehicles intended for the European Market. This presentation describes the background to the new legislation and the routes to compliance.

Steve Clayton studied physics at Sheffield University from 1981-84. After graduating with Honors, he specialized in automotive electronic systems at Rover. While working for Rover, he successfully completed a master's degree in design systems for manufacturing at Warwick University, graduating in 1991.

During his career he spent seven years in Rover's Product Engineering Group. He left Rover as their Audio Systems Manager and worked at JCB Excavators for seven years as Chief Engineer of their Electrical Group. Steve joined MIRA two years ago and is currently responsible for the Electrical Approvals Group in the US and UK. He is the UK's principal expert for harmonization of EMC tests for Construction equipment. He currently sits on the ISO 14982 & ISO 13766 committees representing the Off Road Industry through MIRA.

### EMC Concerns in Automotive Radar Announcement

*by Scott Lytle, Vice Chair*

Chapter VIII will host an overview of EMC Concerns in Automotive Radar on **Monday, July 20, at 6 p.m.** The meeting will be held at the Eaton Corporation Innovation Center, at 26201 Northwestern Highway, in Southfield. At the Eaton building, use the Civic Center West entrance to the Eaton parking lot. Look for the white IEEE sign at the door. Enter and take the elevator to the 2nd floor. The B conference rooms are straight ahead as you exit the elevator. Snacks and refreshments will be provided at 5:45 p.m. Please contact Scott Lytle, 248-354-5245 or ScottRLytle@eaton.com, if you plan to attend.

Automotive radar engineers must execute their designs within limits imposed by both the FCC and the Society of Automotive Engineers. The former deals with the ability of the equipment to operate without interference among co-existing electronics systems. The latter is concerned with the ability of the equipment to continue to operate in a severe electromagnetic environment. The FCC has allocated frequency slots within the electromagnetic spectrum with limits on the power that may be radiated. These restrictions set limits on the level of performance of the radar systems that can affect their effectiveness as collision warning systems or automatic cruise control systems. The author will discuss the impact of FCC limits on system design. He will also talk about interference problems with actual systems and the means by which they were mitigated. He will further present some of the design challenges for installation and housing for electromagnetic compatibility of radar on a truck platform.

Jim McDade is in charge of the Advanced Products Group at Eaton VORAD Technologies in San Diego. He is involved with the design and development of the E-V's automotive radar products. Jim has worked on radar and related technology for several years. For 15 years he helped develop phased array antenna systems for the General Electric Company in Utica, NY. In 1987 he joined Alcoa Defense Systems in San Diego, where he established a department for radar design and development. That group went on to develop several advanced radar systems for forward air defense. He worked for four years at TRW in San Diego, where he participated in the development of a millimeter wave radar system for a synthetic vision landing system and worked on the payload definition for the unmanned aerial vehicle. He has been with Eaton VORAD for three and a half years. Jim has a doctoral degree in physics from the Catholic University of America in Washington, DC.