

Wavelengths



IEEE SEM Spring Conference Features Keynote on Hybrid Vehicles

DATE: Thursday, April 13, 2006

PLACE: Fairlane Center, University of Michigan-Dearborn, Dearborn, MI

Who should attend: IEEE members, their guests, engineering managers, engineers, technical professionals, engineering students.

Early Registration Open Through Wednesday, March 29, 2006. To register, visit the registration web page:

<http://www.emcsociety.org/sectionregistration.html>

*** Keynote (8:00 pm) ***

“Evolution of Hybrid Vehicles, Architectures, and Energy Storage Systems”

by John Miller, Ph.D., P.E.

Hybrid electric vehicles were first developed in 1894 but disappeared from the automotive scene as the power capability of the internal combustion engine improved. A century later the hybrid re-emerged and was again offered to the motoring public by visionary companies that saw hybrids as the bridge to a future hydrogen economy in the face of a looming oil gap. Relative toddlers to the industry, hybrid electric vehicles have appeared in various mechanical and electrical architectures, having a broad span of performance and economy, while relying primarily on advanced chemistry battery energy storage. This talk looks at the present state of hybrids in their micro power to battery heavy implementations, their close cousin the plug-in hybrid, and why all of these will benefit from ultracapacitor plus battery combinations.

Contents

- Spring Conference Keynote to Highlight Hybrids
- IEEE USA Focuses on Global Market
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Outline:

- Hybrid history and the situation with oil
- Types of hybrids including fuel cell architectures
- Market samples and vehicle specifications
- Performance and economy and why it matters
- What's with plug-ins? Yes, the battery is included
- Wrap up

Dr. Miller is Vice President Advanced Transportation Applications at Maxwell Technologies and a strong advocate of introducing ultracapacitors into truck and bus, automotive, industrial utility vehicle, and utility voltage support applications. In 2002 he founded J-N-J Miller Design Services, P.L.C. where he practiced independent consulting. Previously he was a member of the technical staff at Texas Instruments, Dallas, Texas and later a research engineer at the Ford Motor Company where he worked on electric and hybrid vehicle programs. He has worked in the white goods industry where he applied embedded controls to appliances and in technical consulting with Exponent Failure Analysis Associates. Dr Miller is an Adjunct Professor at Michigan State University and Texas A&M University. Dr Miller is Editor-in-Chief, IEEE Power Electronics Society Newsletter and Chairman, Education and Outreach Committee of KiloFarad International and he is an IEEE Power Electronics Society distinguished lecturer. He holds 50 U.S. patents and has authored more than 120 publications on automotive electrical and electronic systems and has authored or co-authored 3 books. Dr Miller is a Fellow of IEEE, the recipient of the Henry Ford Technology Award and is a registered Professional Engineer in Michigan.

TECHNICAL CHAPTER SPEAKERS FIRST HALF (5:00pm-5:45pm)

IEEE CIRCUITS & SYSTEMS SOCIETY SPEAKER (CHAPTER I)

IEEE INFORMATION THEORY SOCIETY SPEAKER (CHAPTER I)

IEEE SIGNAL PROCESSING SOCIETY SPEAKER (CHAPTER I)

Dr. John Frazier

IEEE COMPUTER SOCIETY SPEAKER (CHAPTER V)

Subra Ganesan, Ph.D., Professor, Oakland University.
"RFID and Applications"

IEEE POWER ENGINEERING SOCIETY SPEAKER (CHAPTER VII)

IEEE INDUSTRY APPLICATIONS SOCIETY SPEAKER (CHAPTER VII)

IEEE INDUSTRIAL ELECTRONICS SOCIETY SPEAKER (CHAPTER IX)

IEEE POWER ELECTRONICS SOCIETY SPEAKER (CHAPTER IX)

Andy Velez, Territory Manager, S&C Electric Company.
"Medium Voltage Power Quality Solutions"

STUDENT SPEAKER

The 2005 University of Michigan Solar Car Team

This past summer, they won Michigan's fourth National Championship and went on to place 3rd in the World Solar Challenge.

TECHNICAL CHAPTER SPEAKERS SECOND HALF (6:00pm-6:45pm)

IEEE ANTENNAS AND PROPAGATION SOCIETY (CHAPTER IV)

IEEE ELECTRON DEVICES SOCIETY (CHAPTER IV)

IEEE MICROWAVE THEORY AND TECHNIQUES SOCIETY (CHAPTER IV)

IEEE ELECTROMAGNETIC COMPATIBILITY SOCIETY (CHAPTER VIII)

Tayfun Özdemir, Ph.D., President, Virtual EM Inc. "Reduction of Interference Among Antennas, Cable Harness and Electronics in Automobiles Using Computational Electromagnetics and Optimization Techniques"

IEEE ENGINEERING MANAGEMENT SOCIETY SPEAKER (CHAPTER X)

Steven W. Baker, Methodologist, DTE Energy. "A Principle-Based Approach to Agile Solution Delivery"

IEEE ROBOTICS AND AUTOMATION SOCIETY SPEAKER (CHAPTER XIV)

Tom Higgins, "Robotics"

Executive Committee Column

IEEE-USA Leadership Conference Focuses on Global Market

by Adel Marzougui, Professional Activities Director

On March 3, I attended the 2006 IEEE-USA Leadership Workshop in St. Louis, MO. The Workshop focused on the global market and what that means for the IEEE-USA members.

The Workshop sessions were designed to help members understand and prepare for the flattening of the global market. Preliminary sessions discussed IEEE-USA's Career, Member, Professional Activities and Government Relations Programs; four other tracks were titled Member/Student Professional Conferences, Government Relations, Local Programs, and "Roadmap or Roadkill."

After attending the workshop, I now know that IEEE-USA is very aware of the very challenging environment that U.S. engineers must contend with. As a result, IEEE-USA programs are now designed to provide members with the right tools not only to survive in the global marketplace, but also to enhance their career prospects. These programs have the following goals:

- **Support the Profession.**

Promote the engineering profession by supporting beneficial governmental policies in the areas of education, employment benefits, workforce, intellectual properties and state/local issues.

- **Support the Professional.**

Provide support for the engineers' professional advancement through:

- Create an online Career Navigator with links to employment sites, services for consultants and entrepreneurs, and career-related materials for all technical professionals.
- Publish employment-assistance guides for students and engineers.
- Sponsor career workshops, skill banks and global employment services.
- Offer professional development conferences for members seeking career enhancement.



- Publish eBooks, IEEE-USA Today's Engineer magazine, and other online professional guides.
- Provide online courses for continuing education and P.E. Review classes.

- **Shape technology policy.**

Develop beneficial technology policy in such areas as aerospace, aviation, space policy, biomedical, energy, information policy and research and development. Communicate these policies directly to decision-makers in Washington.

- **Link engineers with government.**

Create IEEE-USA Government Fellowship programs to link engineers with government. Organize visits to local, state and federal legislators to provide testimonies on technology and employment issues.

These are just few of the many programs that IEEE-USA is involved in to bolster the professional standing and careers of the U.S. IEEE members. For more comprehensive and detailed information on the IEEE-USA programs, I strongly encourage the local members to visit the IEEE-USA web site and get more involved in these programs at the local and/or national level.

Editor's Note: For a summary of the keynote address at the IEEE-USA Leadership Conference, see the story "Talent, Techniques, Tools Key to Future" below...Dan.

Congrats to New Senior Members

IEEE-SEM congratulates its new senior members:

- Alfredo Munoz, Industry Applications Society
- Virgil Nacuta, Computer Society
- Alekseev, Electron Devices Society, Microwave Theory & Techniques Society

IEEE SEM is ESD Partner of the Year

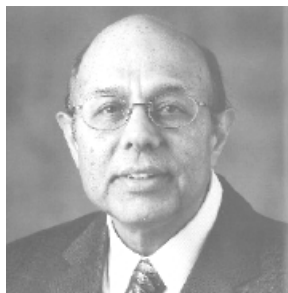
by Mark Ciechanowski, P.E.

I had the privilege of accepting the “Partner of the Year” Award for IEEE at the ESD Affiliate Society 35th Annual ESD Gold Award Banquet. The award recognizes and honors participation and achievement in the Affiliate Council. In case you haven’t heard of the ESD Affiliate Council, it is composed of engineering organizations from all disciplines. The award encourages member organizations to work together in their support of the mission of the Affiliate Council. At the banquet, all of the organizations presented their annual awards to their awardees. IEEE recognized our 2006 Outstanding Professional (see below).

I was glad to see so many members join me for this evening of dinner, networking, awards, and speeches: Sam Barada, Mo Berri, Marie Ciechanowski, Don Bramlett, Dave Laurent, Ralph Mackiewicz, Adel Marzougui, Ramas Ramaswami, Dennis Siemiet, Kevin Taylor, Kimball Williams, Aisha Yousuf.

2006 ESD Gold Award

The Gold Award this year was awarded to Vinod K. Sahney, Ph.D. (see photo, right). Dr. Sahney is Senior Vice President, Special Projects at Henry Ford Health Systems. In his speech, he told us about founding the Institute for Healthcare Improvement in 1988, whose purpose is to improve the quality of health care and to share best practices. He showed results of measurable improvement in patient care and hospital facility utilization using a systems approach to scheduling. He also showed reduced patient injuries and complications. See his work online at <http://www.ihl.org/>.



Outstanding Professional Award

Every year our Section awards one of our members with the Outstanding Professional Award. This is a kind of “life-time achievement” award for an engineer or other technical professional IEEE member in our Section. This year, we award this honor to IEEE Fellow Ronald M. Gilgenbach, Ph.D. (see photo, right).



His fellow citation reads: “for contributions to high power microwave vacuum-electron devices”. Dr. Gilgenbach is a professor in the Nuclear Engineering and Radiological Sciences Department and also serves in the Applied Physics Program at the University of Michigan. He has served multiple terms on the ExCom and is currently Vice-Chair of the IEEE Plasma Science and Applications Technical Committee. He has published some 125 articles in refereed journals and has supervised 36 graduated Ph.D. students.

Don Bramlett will present Prof. Gilgenbach his award at the Spring Section Conference and Dinner, Thursday, April 13, 2006 at Fairlane Center, Dearborn.

Robotics Technology Replacing Automotive in Michigan?

By Robert Sealy, Chapter XIV Chair

I think it is fair to say that all of us know that the automotive industry is changing, and those changes will adversely affect Michigan's economy. If GM, Ford, and Chrysler decide to close, or they decide to drastically change the way they do business (i.e. they slim down to approximately 1/5th of their current business), Michigan will definitely feel the impact. In 2005, automakers employed more than 5% (265,000 people) of Michigan's labor force. A sizable percentage worked for suppliers.

Given that this may happen in the near future, wouldn't it be prudent for Michigan to find industries and technologies that will employ Michigan citizens and keep us competitive in the global market? If so, what technology should that be? I would like to suggest that robotics is one technology that has the potential to impact the economy of Michigan on nearly the same scale as the automotive industry has.

The success of the automobile started with Henry Ford and his concept of the assembly line. The assembly line allowed Ford to reduce the price of automobiles, making them affordable for the middle class. At the same time, Ford paid relatively high wages to his workers, increasing the demand for automobiles.

Now let's apply these same ideas to the robotics industry. If robots were to be built in large numbers on assembly lines then their unit price would be driven downward as well. The novelty of having a robot do your dishes or walk your dog, I think, would be more than enough for people to want one especially since these are the types of chores people don't want to do anyway. The skills it will take to design robots that can be built on assembly lines and allow that line to build multiple type of robots (much like auto plants build multiple styles of vehicle), will most definitely demand high wages.

In order to build such a high tech industry, the average Michigan worker will need a better education and better skills. Robots are very complex, and to design and build them, companies will need competent engineers and technicians. Many technologies go into the making of a robot, including mechanics, pneumatics, electronics, and software are all part of a working robot.

That's not, however, much different than the technology in an automobile. Cars today have an abundance of computing power, requiring many lines of softwares, in addition to the mechanical, hydraulic, and

pneumatic components. Shifting Michigan's attention from automotive products to robotic products seems to me an ideal solution.

Some might be thinking "Yes but what about the assembly jobs the automotive industry offers. Where will they be in Michigan in a robotic future?" and that would be a fair question. The answer, I feel, is that robots need to be assembled just like cars and trucks do. Currently, most industrial robots have 3 main pieces and 6 joints. There is a base and two sections which form the arm. These pieces have to be made separately and then jointed together by the joints of the robot. Gear boxes need to be assembled, wiring has to be installed to the motors and external devices, nuts and bolts have to be placed and tightened on top of other peripheral operations that go into the assembly of one industrial robot. When industrial robots give way to residential robots and personal robots, their will be more assembly required proportional to the varying applications and complexity of these machines. Assembly positions within robotics companies may not be as plentiful as they are within the automotive industry, but they will certainly not disappear.

As I am sure most of you have realized, this article has not been a comprehensive study of how Michigan could move from an automotive economy to a robotics economy. My intent was to simply get people excited about the possibilities. What I've outlined is certainly not going to happen overnight. But, if we, as the engineering community, open our minds to the possibilities of robotics to improve our economy and our lives, as older technologies have, then maybe we have a future that is worth looking forward to.

If you are interested in learning more about robotics and how to affect changes like those described in this article, please contact me by calling me at 248-894-2364 or by e-mailing robert.sealy@ieee.org.

Talent, Techniques, Tools Key to Future, Says IEEE Fellow and Former NSF Official

WASHINGTON (9 March 2006) -- "In anticipating the future, we must recognize that civilization is on the brink of a new industrial world order," IEEE Fellow Dr. Joseph Bordogna said during his keynote address at the IEEE-USA Leadership Workshop in St. Louis on 4 March.

"Success will not be garnered by those who simply make commodities faster and cheaper than the competition. They will be those who develop talent, techniques and tools so advanced that competitive capability can be continually robust."

Bordogna is a former deputy director (1999-2005) and chief operating officer of the National Science Foundation, and served as IEEE president in 1998. His address, "Round, Flat or Spiky, the World Turns on an Axis," provided his vision on how engineers can contribute to future innovation in a world undergoing swift and constant technological transformation.

"Engineers will have to be effective collaborators, innovators, risk takers, and communicators, working across shifting boundaries, and embracing diversity," Bordogna said. "They will need to know the human and social dimensions of technology. Our social and economic progress depends upon it. All of you carry the excitement and the responsibility to make it happen."

Bordogna, now the Alfred Fitler Moore Professor of Engineering at the University of Pennsylvania, added that "creative transformation" -- the process of converting energy to momentum -- is the flip side of "creative destruction":

"That process -- energy to momentum -- which engineers certainly embrace, speaks directly to the excitement and inspiration of integrative 21st century science and engineering innovation at the frontier. Propelled by advances in genomics, materials, computer communications, and advances in cognition, mathematics and social science, our profession is on the verge of new, exhilarating frontiers."

To read the entire Bordogna address, go to <http://www.ieeeusa.org/calendar/conferences/2006workshop/Presentations/Bordogna-keynote.pdf>

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Events

Thursday, March 23rd

8:00 AM

DTE/ESD Energy Efficiency Conference and Exhibition

Rock Financial Showplace in Novi

As a member of an ESD Affiliate Council society IEEE members can register for the member rate of \$65 and save 25%.

FOR MORE INFORMATION: <http://ww2.esd.org/EVENTS/EnergyConf.htm>

Monday, April 3

6:00 PM

Executive Committee (XCOM) Meeting

Univ. of Michigan, Dearborn Professional Education Center (PEC) Bldg.

For more information, contact Mark Ciechanowski, 248-755-4477, mark.ciechanowski@ieee.org.

Thursday, April 13

5:00 PM

2006 Spring Section Conference and Dinner

UofM-Dearborn, Fairlane Center

Moved from April 4th to April 13th.

Early Registration Open Through Wednesday, March 29, 2006. To register, visit the registration web page:

<http://www.emcsociety.org/sectionregistration.html>

For more information, contact Dr. Chris Mi (mi@ieee.org).

For a complete listing of events visit the IEEE SEM website:

(<http://www.ieee-sem.org/events/calendar.php>).

Advertising in Wavelengths

Wavelengths is published eight times a year and sent to more than 3,500 members. These readers are responsible for specifying and purchasing a wide range of electronics components, equipment, and services.

RATES

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Eighth Page	270W x 180H	\$500	\$90

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For more information, contact Dr. Ramas Ramaswami, MDR, ramaswamis@comcast.net, 734-786-8409.

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