



**From  
the  
Chair**

The Section Treasurer, Dave Vaglia, and I attended the IEEE Region 2 Officers' meeting that was held in Baltimore April 9 and 10. We gained first-hand knowledge about the operation of Region 2 and its ambition to serve the IEEE members better than ever.

I attended the IEEE Annual Dinner Banquet on April 16 at the University of Pittsburgh and presented two book scholarships. Dave presented a book scholarship on April 27 at Geneva College. We would like to offer book scholarships to the students from other colleges.

The monthly Executive Committee meeting was held at the University of Pittsburgh at Greensburg with two state-of-the-art presentations by freshman students. Prof. Guy Nicoletti hosted the event.

The Annual History Dinner at the APICS castle was a success with participation of about 25 members and guests. John Casazza, an IEEE Life Fellow and an IEEE Distinguished Lecturer, was the guest speaker.

We solicit your participation in many upcoming events, such as forming a new EMC Chapter. Please contact me if you are interested ([senkk@ieee.org](mailto:senkk@ieee.org) or (724) 696-1611).

- Kal Sen

## Miniature Micro/Nano-Robotics

Metin Sitti

Carnegie Mellon University



Micro/Nanorobotics as an emerging robotics field is based on the micro/nanoscale physics, fabrication, sensing, actuation, system integration, and control taking the scaling effects into consideration. Micro/Nanorobotics encompasses: (i) design and fabrication of micro/nanorobots with overall dimensions at the centimeter, millimeter and micrometer ranges and made of micro/nanoscale components; (ii) programming and coordination of large numbers of micro/nanorobots; and (iii) programmable assembly of micro/nanoscale components. This presentation will focus on current miniature micro/nanorobot research activities at the NanoRobotics Laboratory. One of the application areas of miniature robots is customized manufacturing and assembly at the micro- and nanoscale using many precision robots in parallel. For this purpose, Integrated Nano-Tool Carrier walking robot concept is described. As the second miniature robot, miniature surface climbing robots inspired by geckos are presented. Geckos have unique dry adhesive fibers in their feet to climb any surface with a very high maneuverability. Discovering the principles of gecko adhesion recently, synthetic polymer micro/nanofibers are analyzed and fabricated in our team using micro/nanomolding and optical lithography techniques. Using these synthetic adhesives, tank, whegged, and legged type climbing robot prototypes are designed, built, and tested. The results of current prototype adhesive fibers and miniature climbing robots are reported. The next robot is the Water Walker, which is inspired by water strider insects. It can stay and navigate on water surfaces using actuated side legs. Current analysis, design, test results, and issues are presented. Our team is also building a Water Runner robot which is a large scale bipedal robot running on water surface inspired by basilisk lizards. Finally, miniature robots are very promising for health-care applications inside or outside the human body. Biomedical swimming and wireless endoscopic crawling micro-robots are designed and built for diagnosis and treatment of diseases in the urinary and digestive system, respectively. All of these miniature robots with many open research challenges could revolutionize health-care, environmental monitoring, desktop manufacturing systems, and space exploration applications in the future.

Mr. Sitti received BSc and MSc degrees in electrical and electronics engineering from Bogazici University, Istanbul, Turkey, in 1992 and 1994, respectively, and a PhD degree in electrical engineering from the University of Tokyo, Tokyo, Japan, in 1999. He is currently an assistant professor and the director of the NanoRobotics Lab in the Department of Mechanical Engineering and the Robotics Institute at the Carnegie Mellon University. His research interests include micro/nano-robotics, micro/nano-manufacturing, MEMS/NEMS, and biomedical micro/nanotechnology. He is the chair of the IEEE Nanotechnology Council, Nanorobotics and Nanomanufacturing Technical Committee and the IEEE Robotics and Automation Society, Rapid Prototyping in Robotics and Automation Technical Committee.

Place: Benedum Hall, Room 1175  
University of Pittsburgh  
Date: May 5<sup>th</sup>  
Social: 6:30 PM  
Program: 7:00 PM

This meeting will be of particular interest to the members who belong to the Robotics Society. For more information or to register, please contact Dr. Ron Stone at (412) 488-1100 or [RStone@Icoria.com](mailto:RStone@Icoria.com) by May 3, 2005.

Benedum Hall is located at 3700 O'Hara Street in Oakland, on the University of Pittsburgh main campus. Parking is conveniently located in the O'Hara parking garage across the street, or on the neighboring streets.



## Shielding: Theory and Design

Michael J. Oliver

MAJR Products Corporation



It is important for electronic and hardware engineers to not only be knowledgeable of a product's intended function and performance, but also the ability of the product to perform within electromagnetic compatibility (EMC) limits. In this talk, practical shielding theory and design fundamentals are introduced including crosstalk, electromagnetic fields, board level and enclosure shielding. A segment on testing of board level shields is presented that is affiliated with an aperture attenuation modeling program used to model attenuation characteristics prior to expensive compliance testing. Finally, honeycomb vent panels and respective plating attenuation comparisons are discussed.

Not addressed in this talk, but as background information, standard EMC limits are maintained by the international regulatory environment for EMC such as the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission (IEC). For product acceptance, the Federal Communication Commission (FCC) in the US and the Conformite Europeenne (CE) compliance marks are paramount for product sale throughout the world.

Mr. Oliver is Vice President of Electrical / EMC Engineering at MAJR Products Corporation in charge of new product development, customer technical quoting/consulting, and quality management. His expertise is in EMI/RFI shielding technology with a background in electronics, military shelter electrical systems, and high power antenna/radome design. He holds a B.S. degree in Electrical Engineering from Gannon University and has been an Electrical Engineer since 1989. He holds three patents (two pending) on thermal management-EMI/RFI shielding devices, has experience in the design and testing of aerospace antennas, military shelter electrical systems, and electronic components, and has performed open and anechoic chamber radiated tests to military standards. He has written numerous technical papers on electromagnetic shielding components, shielding product enhancement, and the development of test specifications and procedures for antenna and radome measurements. He currently serves as Vice Chairman of the SAE AE4 Electromagnetic Compatibility Committee and a member of the IEEE EMC Standards Advisory Coordination Committee (SACCom) Societies.

Place:	Westinghouse Energy Center, Monroeville
Date:	June 29 <sup>th</sup>
Social:	6:30 PM
Program:	7:00 PM

This meeting will be of particular interest to the members of PES and IAS. For more information or to register, please contact Dr. Kal Sen at (724) 696-1611 or [senkk@ieee.org](mailto:senkk@ieee.org) by June 22<sup>nd</sup>.

Directions: From downtown Pittsburgh, take the Parkway East Outbound to Exit 14A (Monroeville). Cross the traffic light (Business 22) and proceed on Rt. 48 South for two traffic lights. Turn left onto Northern Pike. Proceed East ~ 0.2 miles and turn right at the first traffic light onto Westinghouse Drive. Travel 0.7 mile to the three flags where the main entrance is located. Parking in the evening will be plentiful in the large area in front of the building. Enter the main entrance. Check with the security inside. You will be directed to the proper auditorium for the presentation.

From PA Turnpike, take Exit 57 (Monroeville). After the toll plaza, get in the left lane (Business-22). At the first light, turn left on to Rt. 48 South and follow the directions shown above.

### Life Member Chapter Issues Associated with the Interconnection of Distributed Generation to the Electric Power Supply System

Mr. Joseph L. Koepfnger

### Meeting Postponed

The Life Member Chapter meeting originally scheduled for April 8<sup>th</sup> has been postponed until further notice. A date for this meeting will be announced in a future Bulletin. This postponement is due to health problems that the speaker has encountered on a trip he took in late March.

Please look for updated information in a future Bulletin, and we wish Mr. Koepfnger a full recovery.

#### Section Officers

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## Wind Farm Tour

FPL Energy (a sister company of Florida Power and Light) owns and operates the wind farms here in western PA, and will host two tours of their facility this month. FPL Energy suggests a group size of 20 people for each of the tours. The tours will last 1.5 hours, and it will take about 1 hour and 40 minutes (90 miles) to drive there from downtown Pittsburgh.

Place: Wind Farm, Meyersdale PA  
Date: May 31<sup>st</sup>  
Tours: 2:00 PM and 3:30 PM  
Program: 7:00 PM

As this will be a site visit, there will not be a technical presentation. If there is enough interest, we may do that later in the year. Also, the tour leader will not be a technical person, but she is willing to get answers to technical questions if they are submitted in advance.

If you have any questions about the details of the tour, would like to reserve a spot on the tour, or would like to submit a technical question to be answered, please contact Dave Vaglia at (412) 491-6944 or [davevaglia@ieee.org](mailto:davevaglia@ieee.org).



## Graduates Of the Last Decade

IEEE GOLD is starting up here in Pittsburgh. Graduates Of the Last Decade (GOLD) is for new professionals and aims to help with networking and social events for our members. If you have graduated within the last decade then you are already a member. We will be hosting an initial startup event on Saturday May 21<sup>st</sup> at 6:00 PM at Dave and Buster's in order to gauge what you want from GOLD.

If you have any questions or would like to suggest functions that you would like to participate in, please feel free to contact Chuck Jewart at (412) 913-0063 or [cjewart@engr.pitt.edu](mailto:cjewart@engr.pitt.edu).



## Congressional Advocacy Recruitment Effort - CARE



Members of the Pittsburgh Section are encouraged to join the Congressional Advocacy Recruitment Effort (CARE). This is a highly efficient method to alert IEEE-USA members to current legislative matters that affect the careers of IEEE members. These alerts are calls to action. If you are on a CARE contact list you will be alerted to contact your Congressional Representatives for appropriate immediate action. Engineers are the least politically active of the major professions, and this is an effort to change that.

The most powerful voice of any Congressional office is that of the voter. Elected officials must listen to their constituents if they want to continue to be elected officials. With 227,000 members, IEEE-USA has the potential to be a major voice in Washington.

These voices will only be heard if they speak up. The CARE network is designed to help electrical engineers find and amplify their political voices. CARE helps teach IEEE-USA members how to communicate effectively with elected officials, and then alerts members when action is required. This allows CARE advocates to bring their concerns directly to members of Congress through timely phone calls, letters, e-mail, and personal visits.

CARE membership is not a commitment to act on any IEEE-USA action alert. Rather, it is a public statement of your support for IEEE-USA's grassroots advocacy program, and an expression of your willingness to help strengthen that program.

No experience is necessary. IEEE-USA will provide CARE members with the resources and training they need to be effective advocates in Washington. All that is needed is an interest in helping strengthen the engineering profession by engaging the political system.

To join, simply fill out the form below. Your participation will help strengthen the profession's voice in Washington and help advance IEEE-USA's legislative agenda.

Name: \_\_\_\_\_

Home Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

E-Mail: \_\_\_\_\_

### Areas of Interest

- |  |   |
|--|---|
| <input type="checkbox"/> Pensions/Retirement                 | <input type="checkbox"/> Energy Policy/Electric Reliability |
| <input type="checkbox"/> Federal R&D Funding                 | <input type="checkbox"/> Guest Workers/Immigration          |
| <input type="checkbox"/> U.S. Space Program                  | <input type="checkbox"/> Intellectual Property Protection   |
| <input type="checkbox"/> Digital Information Privacy         | <input type="checkbox"/> Info Infrastructure Protection     |
| <input type="checkbox"/> Precollege Math & Science Education |   |

This form can be faxed to Russ Harrison at (202) 785-0835. Contact Russ with any questions at (202) 785-0017 or visit: [www.ieeeusa.org/policy/care](http://www.ieeeusa.org/policy/care)

## Consultants Network

The Consultants Network will meet this month. Plans for the meeting are being finalized and will be emailed to all CN members.

If you are a consultant or are considering becoming a consultant of engineering services, the Consultants Network is the place to go to meet other IEEE members who are also consultants. In addition, the CN maintains an On-line listing of IEEE members who are consultants for reference by interested companies.

This group can be a very valuable resource on consulting, information and networking for IEEE members. Speakers can discuss such topics as taxes, self-marketing, finances, fee setting, software, and liability insurance.

Place: Westinghouse Energy Center, Monroeville

Date: Fourth Tuesday of the month

Social: 6:30 PM

Program: 7:00 PM

For more information, to be listed on the email mailing list, or to register for the meeting, contact George Crawford at (412) 675-9164 or gwc2@psu.edu.

### 2004-2005 Pittsburgh Section IEEE Program Calendar

Group/Society	October	November	December	January	February	March	April	May	June
ExecComm Kalyan Sen (724) 696-1611	25 WVU	18 Point Park	16 Point Park	20 Point Park Officer Elections	17 Pitt - Oakland	17 CMU	21 Pitt - Greensburg	19 Restaurant in Pittsburgh	ExecComm does not meet in summer
Section Mtngs Kalyan Sen (724) 696-1611					19 Robot Car Race		28 History Dinner		
Life Members Bob Grimes							8 Distributed Generation <i>POSTPONED</i>		
IAS & PES Charles Urso (412) 338-4871 Faruq Ahmed (724) 477-1253	6 Power Electronics 28 Tutorial	4 Tutorial 11 Industrial Power Systems 17 Tour Alleg. Eng.	2 Dist. Generation 9 Voltage Sag	26 Adaptive Identification	23 Rail Guns	30 Project Management		31 - Wind Farm Tour	29 Shielding
Computer John Twigg (724) 387-2772		6-12 SC2004 Conference	15 Software Quality			16 Next Gen. Search Engines			
Communication Prashant Krishnamurthy (412) 624-5144		12 RFID Privacy				25 New Techniques for Telecom Monitoring			
Robotics Guy Nicoletti (724) 836-9922 Ron Stone (412) 488-1100	26 Image Processing		9 Patient Recovery					5 Miniature Micro/Nano Robotics	
Prof. Activities Joe Kalasky (724) 838-6492	2 Consulting Seminar								
Signal Processing Mike McCloud (412) 624-9674	26 Image Processing	3 Tracing Traitors 18 Double-Disp. Channels					20 Wireless Network Design Based on Constrained Capacity		
Magnetics Ganping Ju (412) 918-7046						31 Half Metals Spin Torque and Nanorings			
Constants Network George Crawford (412) 675-9164							26 Contract Employment		