



# IEEE Crosstalk



The Newsletter of the Mid-Hudson Section of the IEEE

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## Chairman's Corner

I hope that everyone was able to participate in the National Engineers Week activities held across our area throughout February. Since IEEE is the national sponsor of Engineers Week, this was a special year for us. Many IEEE members volunteered their time speaking at local schools, or helping with special events such as Engineering Day at SUNY New Paltz, where the IEEE student chapter helped run a booth in the career center (thanks to Mike Otis, Dave Dittman, and others for supporting this event). The annual banquet was memorable this year, with over 200 attendees and two outstanding speakers who explained the August 2003 blackouts and the response to recent anthrax contamination in the northeast. I want to extend special thanks to everyone who helped make these events a success, especially Rob Atkins, Lisa Shay, Dave Dittman, and Vic Melville from the banquet committee. I also want to congratulate the winner of our first annual IEEE Engineering Awareness contest, Jessica DiNapoli, a 12<sup>th</sup> grade student from Newburg Free Academy. Although she was unable to attend the banquet due to prior commitments, Jessica receives a \$50 cash prize and her winning entry will run in the Newburg Times Herald Record in early March. Honorable mention also goes to one other entry, Mason DiMarco from St. Denis/St. Columba. To see their advertisements for why you should be an engineer, visit [http://www.ewh.ieee.org/r1/mid-hudson/2004\\_ieee\\_poster\\_contest.htm](http://www.ewh.ieee.org/r1/mid-hudson/2004_ieee_poster_contest.htm). Thanks to everyone who entered this year's contest, those who helped publicize it (SUNY Engineering Day, the Verge section of the Poughkeepsie Journal, and the Spaceship Discovery science museum) and to our volunteer judges!

*Dr. Casimer DeCusatis, Chair*  
[decusat@us.ibm.com](mailto:decusat@us.ibm.com)

## Upcoming Events

**March 25, 2004:** Speaker on CMOS Biochips from Columbia University, to be held at IBM East Fishkill. See inside for details.

**April 3, 2004:** Interested in volunteering to help judge the Dutchess County Regional Science Fair today? Contact Casimer DeCusatis for details ([decusat@us.ibm.com](mailto:decusat@us.ibm.com)).

**April 21, 2004:** Speaker on research at West Point. See inside for details. Today there will also be an IEEE awareness day talk at IBM Poughkeepsie, not open to the general public.

**Coming Attractions:** tentative plans include a tour of our local electric power station (weather/construction permitting), and the annual banquet in June!

**Life Member Group Forming:** Interested in joining a Life Member group in Mid-Hudson IEEE? Contact **George Krembs** ([krembsgl@hotmail.com](mailto:krembsgl@hotmail.com))

## Mid-Hudson Section Leadership

**Chair:** Casimer DeCusatis  
**Immediate Past Chair:** Jean R.S. Blair  
**Vice-Chair:** Robert Sadowski  
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**Computer Society:** Paul S. Basile  
**Education Society:** Michael Otis

## Mid-Hudson Section Website

<http://www.ewh.ieee.org/r1/mid-hudson/index.htm>

## Mid-Hudson Section General Contact

[Decusat@us.ibm.com](mailto:Decusat@us.ibm.com) (845) 435-7232

# March Meeting: CMOS Biochips

**CONTACT:** Michael Hargrove  
([mhargrove@erd.epson.com](mailto:mhargrove@erd.epson.com))  
**DATE:** Thursday, March 25, 2004  
**TIME:** 7:00 PM  
**LOCATION:** IBM East Fishkill Bldg. 320 Conference Room # 42 (non-IBM members meet in lobby)

**ABSTRACT:** This talk will describe an ongoing research project to develop CMOS DNA microarrays, biochips that incorporate silicon microelectronics technology for detection, programming, and hybridization control. Biochips have been a very important part of low-cost DNA analysis. The general approach is one of hybridization analysis, in which target single-stranded DNA binds to immobilized DNA probes generating double-stranded DNA. The detection scheme that is used to determine if the DNA has bound to the probe site relies on fluorescent tagging of the hybridizing DNA. The array is illuminated with laser light and the fluorescence is captured with optics and an external CCD or PMT detector. The equipment used for this measurement is expensive and bulky. We have instead fabricated an active CMOS DNA microarray substrate with integrated photodiodes below each array site. The chip contains integrated analog-to-digital converters to detect the light from each sensor element and convert the data to digital form. "Meshed" metal pads allow electrostatic control of hybridization and should make the chips ultimately electrically "programmable."

**ABOUT THE SPEAKER:** Ken Shepard received the B. S. E. degree from Princeton University, Princeton, NJ, in 1987 and the M. S. and Ph. D. degrees in electrical engineering from Stanford University, Stanford, CA, in 1988 and 1992, respectively. From 1992 to 1997, he was a Research Staff Member and Manager in the VLSI Design Department at the IBM T. J. Watson Research Center, Yorktown Heights, NY, where he was responsible for the design methodology for IBM's G4 S/390 microprocessors. Since 1997, he has been at Columbia University, where he is now Associate Professor. He was also Chief Technology Officer of CadMOS Design Technology until its recent acquisition by Cadence Design Systems, where he now consults as a senior architect. Current research interests include design tools for advanced CMOS technology, on-chip test and measurement circuitry, low-power design techniques for digital signal processing, low-power intrachip communications, and CMOS imaging applied to biological applications. He received the Hertz Foundation Doctoral Thesis Prize in 1992, IBM Research Division Awards in 1995 and 1998, a National Science Foundation CAREER Award in 1998, the 1999 Distinguished Faculty Teaching Award from the Columbia Engineering School, and a Best Paper Award at the 2001 International Conference on Computer Design.

## **DIRECTIONS:**

**From Rt. 84 East,** Take Exit 15 (Lime Kiln Road). Bear right onto Lime Kiln Road. At second traffic light on Lime Kiln Road, make left through Hudson Valley Research Park Gate 5. At next traffic light make a right for Building 320, and follow the signs.

**From Rt. 84 West,** Take Exit 15 ramp to traffic light. Turn right onto Lime Kiln Road. At first traffic light, make left into Hudson Valley Research Park through Gate 5. At next traffic light, make a right for Building 320, and follow the signs.

**From Rt. 9,** Follow Route 9 to the intersection of Route 52. Proceed East on Route 52, for approximately four miles. Turn right into Hudson Valley Research Park, Gate 1. To reach the West campus, follow West Drive bearing right at the fork in the road just before the traffic light. Follow signs to building 320.

**THE PUBLIC IS INVITED TO ATTEND !**

# April Meeting

## Recent Research at West Point

**CONTACT:** Michael Otis, SUNY New Paltz [otism@engre3k.engr.newpaltz.edu](mailto:otism@engre3k.engr.newpaltz.edu)

**DATE:** Wednesday, April 21, 2004

**TIME:** 7:00 PM

**LOCATION:** SUNY New Paltz campus, Resnick Hall, room 109

**ABSTRACT:** The Department of Electrical Engineering and Computer Science and the Photonics Research Center at the U.S. Military Academy are currently engaged in several photonics-related research projects which integrate faculty and students and are making contributions to the field of photonic-based analog-to-digital (A/D) conversion. This presentation will first motivate the need for high-speed and high-resolution A/D conversion and discuss limitations to achieving high performance A/D conversion using traditional electronic approaches. The advantages provided by optics and photonics include high-speed nonlinear devices and the inherent parallelism of two-dimensional optical approaches. Several different approaches to photonic A/D conversion currently under investigation will be discussed as well as the relatively new field of integrating optics and electronics called smart pixel technology.

**ABOUT THE SPEAKER:** Colonel Barry L. Shoop is on active duty in the U.S. Army, and currently serves as the Director of the Electrical Engineering Program at the United States Military Academy at West Point. His military career spans 24 years of service; he is a Senior Member of IEEE, and has been active in IEEE leadership, having served as Chair of the Mid-Hudson Section of IEEE for 2 consecutive years, two terms as Area C Chair, and is currently as Director-Elect for Region 1. He will serve as Director-Elect for 2004-2005 and will assume the duties of Region 1 Director from 2006-2007. He received the B.S. degree from the Pennsylvania State University in 1980, the M.S. degree from the U.S. Naval Postgraduate School in 1986, and his Ph.D. from Stanford University in 1992, all in electrical engineering. In 2002, he received the M.A. in National Security and Strategic Studies from the U.S. Naval War College. He currently serves as a member of the Education Activities Board for IEEE and has served on the Board of Directors and Finance, Member and Education Services, and Strategic Planning Committees for the Optical Society of America (OSA). He is a Fellow of the OSA and SPIE, and a member of Phi Kappa Phi, Eta Kappa Nu, and Sigma Xi.

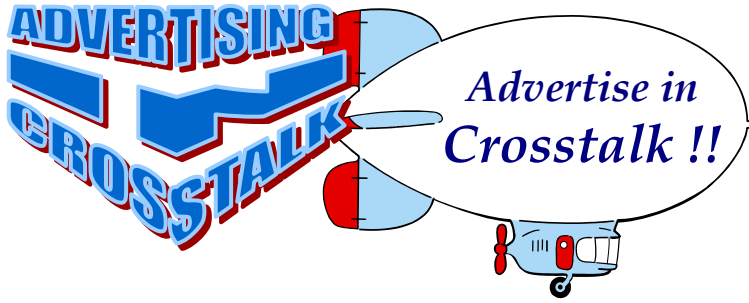
**DIRECTIONS:** Refer to the SUNY New Paltz website, <http://www.newpaltz.edu/map/>, for a campus map, directions, and parking information. **THE PUBLIC IS INVITED TO ATTEND !**

### *Member News*

Congratulations to our new 2004 IEEE Fellows from the Mid-Hudson Section, **Gary Bronner & Casimer DeCusatis** ! This brings our section to a total of 15 Fellows.

Congratulations to **Tom Duffy**, who was recently elevated to IEEE Senior Member.

Thanks to **Jean Blair**, who represented our section at the IEEE Region 1 Board of Governor's meeting in New Jersey on February 7 (and of course our Region 1 Director-Elect, **Barry Shoop**, who also attended).



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