



IEEE Crosstalk



The Newsletter of the Mid-Hudson Section of the IEEE

Volume XLVI, No 3, April 2007

Chairman's Corner

Congratulations to the winners of the Dutchess County Regional Science Fair! I had the privilege of judging for the 4th year in a row and was once again very impressed with the quality of the projects. We have some budding engineers in the area – encourage them to continue to pursue their interests!

First Prize: Robert Verkuil, "Cooling the Power Grid"

Second Prize: Melissa Ercolino, "Cease and Resist"

Third Prize: Ryan Smith, "Electromagnetic Crane"

Hon. Mention: Frank Valentino, "Is Your Produce ReVOLTING?"

Hon. Mention: Ankit Prasad, "Effects of Solar Cell"

As promised, we will hold another Senior Member Elevation night. The meeting will be at SUNY New Paltz before the May Education Society talk. If you wish to participate either as a candidate for elevation or as a nominator, please email lisa.shay@ieee.org by Friday, April 27th.

We're interested in knowing what you'd like from the Section. Please fill out the survey on pages 5 and 6.

Upcoming Events

25 April 2007: Computer Society talk at SUNY New Paltz at 6:30 PM. See p. 3 for details.

1 May 2007: Senior member elevation night, similar to the one in Dec. See <http://www.ieee.org/organizations/rab/md/smprogram.html>. Please email your resume to lisa.shay@ieee.org by Friday, April 27th if you wish to be elevated.

1 May 2007: Education Society talk at SUNY New Paltz on the Solar Race Car challenge. See p. 4 for details.

10 May 2007: Electron Device Society talk at IBM Fishkill at 5 PM. See p. 6 for details.

June 21, 2007: Mark your calendar! Mid-Hudson Section Summer Banquet at the River Terrace Restaurant. Cocktails at 5:30, dinner at 6:30. Guest speaker will be Jeff Irish of Hudson Valley Clean Energy. Details and RSVP will be in the next newsletter.

June 20-22, 2007 8th Annual IEEE SMC Information Assurance Workshop. Co-sponsored by the Mid-Hudson Section. Guest Speakers include Mr. Tom Cross from IBM's Advanced Research, **Advanced Registration deadline is May 2, 2007.**
<http://www.itoc.usma.edu/workshop/2007/index.htm>

Mid-Hudson Section Leadership

Chair:	Lisa Shay
Immediate Past Chair:	Rob Atkins
Vice Chair:	Michael Otis
Treasurer:	David J. Dittmann II
Secretary:	Baback Izadi
Members-at-Large:	Larry Boland Bill McCarthy * opening
Program Chair:	Kwok Soohoo

Society Chairs:

Computer:	Baback Izadi
Education:	Robert Kewley
Electron Devices:	Fernando Guarin
Power:	Hal Turner
WIE Affinity Group:	Rebecca Gott

Student Activities	Robert Kewley
Membership:	Casimer M. DeCusatis
Awards Chair:	Lisa Shay
Newsletter Editor:	Brett Arteta
Associate Editor:	* opening

PACE Chair:	Larry Winkler
Publicity Chair:	* opening
Engineer's week:	* opening
Tech Societies Liaison	Vic Melville
Webmaster:	Larry Winkler



Mid-Hudson Section Website

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



Mid-Hudson Section General Contact

izadi@computer.org (845) 257-3823

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* Focuses on corporate visits and presentations by professors from non-U.S. universities and professionals in relevant fields.

Computer Society Meeting

Challenges in ASIC Design Verification

Lisa Mohr

*IBM Systems and Technology Group
2455 South Road
Poughkeepsie, New York 12601
lmohr@us.ibm.com*

**Wednesday, April 25, 6:30 PM
Resnick Engineering Hall, Room 109
SUNY New Paltz**

Abstract

ASIC designs are becoming increasingly more complex. They can have millions of gates and often are considered systems on a chip. Highly functional first pass chips are required to meet aggressive product time-to-market goals. Functional verification of the chip design is a key factor in ensuring the fabricated chip will operate as expected. This talk will focus on the verification challenges created by the need to develop high quality, complex ASICs as quickly as possible. After an overview of how functional verification fits into the ASIC design process, a variety of verification techniques will be described. Hierarchical verification, reuse of verification code, and functional coverage will then be discussed as solutions to some of the ASIC design verification challenges.

Biography

Lisa Mohr received a B.S. degree in electrical engineering from Rutgers University in 1981, joining IBM in Kingston, NY that same year, where she worked on the development of IBM 3270 display systems and PC monitors. She received an M.S. degree in electrical engineering from Syracuse University in 1984. In 1986, she joined IBM Graphics Systems where she designed peripherals, boards, rendering chips and RAMDACs for IBM 5080 and 6090 systems. Mrs. Mohr then led the hardware verification of high-performance communication adapters and switches for IBM RS/6000 SP and pSeries systems for ten years. Her current focus is the verification of I/O hub and bridge chips for IBM's future systems. Mrs. Mohr is a Senior Engineer and leads several I/O chip verification teams. She is a Senior Member of IEEE.

Please join us for Pizza and soft drink at 6:00 PM.

Directions: http://www.newpaltz.edu/map/loc_reh.html , <http://www.newpaltz.edu/map/>

Information: Baback Izadi izadi@computer.org or (845) 257 - 3823

Education Society Meeting

Solar Car Challenge and NFA's Solar Racing Program

Guest Speakers: Christopher Eachus and Lee Cabe

Technical Talk hosted by SUNY New Paltz

co-sponsored by the IEEE Education Society, Mid Hudson Section

When: May 1, 2007

Where: Room 109, Resnick Engineering Hall, SUNY New Paltz

Abstract: Newburgh Free Academy is one of the largest high schools in New York State. With 2900 students in 10th through 12th grade, the school has the ability to support many programs that smaller schools can not. A program founded in 1992 by Physics teacher, Mr. Lee Cabe, now retired, is the NFA Solar Racing Program. It is a hands-on program for high school physics students and any other interested students in which the most basic fundamentals of physics can be expressed and enjoyed. We have built 7 Solar Racing cars and three solar racing bikes since the inception of the program and have raced across the United States numerous times. We were national champions in 2000 and went to the World Solar Challenge in Australia coming in third place for high schools in the world that year. Besides competing every year at the national level, another primary function of the team and advisors is to encourage the formation of this type of program in surrounding educational institutions and to encourage hands-on applications of physics concepts.

Biographies:

Christopher W. Eachus holds a B.S. in Education Physics/Physical Sciences from SUNY, College at Cortland and an M.S. in Elementary Education from SUNY, College at New Paltz. He is currently teaching at Newburgh Free Academy in Newburgh (since 2000.) He has been a Physics Teacher (Regents, APB, APC), 30 years all in the Hudson Valley. Chris is also very active throughout the region as he is an: AAPT Member, Orange County Legislator, 15th District, New Windsor-Cornwall, Former NYS OMNI Mentor for Physics President, New Windsor-Cornwall Optimist Club (3 years), Varsity Coach - Swimming, Soccer, Lacrosse, Softball, and Advisor for NFA Solar Racing Team (7 years). Chris is married with 4 kids!!!

Lee Cabe is a native Beaconite and a (now retired) physics teacher at NFA. Back in the early 90s Lee got the idea of building a solar powered car and having his students work on it for lab credit. He currently explores ways of integrating advanced technologies such as lightweight materials (with help of his son whom studied engineering at RPI) and electronics into the next generation of solar vehicles. In his spare time Lee enjoys boating on Orange Lake (his backyard!) Lee is married with 2 sons.

Senior Membership Elevation Night

If you are interested in elevating your IEEE Membership to Senior status please join us at SUNY New Paltz before the talk (5:30 – 6:30 PM.)

- All interested candidates should email their resume to Lisa Shay at lisa.shay@ieee.org by 4/27/2007 and bring 3 copies of their resume with them to the event. Members must be present to be considered for the elevation.

We are looking for current Senior members (and above) to write letters of recommendations. You do not have to be present at the meeting as long as you are comfortable writing the letter based solely on the applicant's resume. Please email Lisa Shay at lisa.shay@ieee.org by 4/27/2007 if you are interested in helping out your fellow members.

Additional Information:

- On NFA Solar Racing Team: <http://www.nfasolar.org/>
- On IEEE Senior Elevation: <http://www.ieee.org/web/membership/senior-members/guide.html>
- Maps and direction to Resnick Engineering Hall at SUNY New Paltz: http://www.newpaltz.edu/map/loc_reh.html and <http://www.newpaltz.edu/map/>
- Questions? Please contact Michael Otis, ECE Dept., SUNY New Paltz, (845) 257-3827, otism@engr.newpaltz.edu
- Refreshments at 6:00 PM.

Electronic Devices Society Meeting

“Terahertz Sensing Technology”

By: Professor Michael S. Shur

Center for Integrated Electronics
ECSE and Physics
Rensselaer Polytechnic Institute

Thursday, May 10, 2006, 5:15-6:30 PM

IBM East Fishkill, Conference room 42 (see map below)

(Snacks will be available from 5:15 to 5:15 PM)

ABSTRACT

Terahertz sensing technology has a promise of many breakthrough and enabling applications including detection of biological and chemical hazardous agents, cancer detection, detection of mines and explosives, enhancement of people, building, and airport security, covert communications (in THz and sub-THz windows), and applications in radioastronomy and space research. This lecture will review the famous “THz gap” and the state-of-the-art of existing THz sources, detectors, and sensing systems. As application examples, Dr. Shur will discuss the THz space exploration, sensing of biological materials, broadband THz reflection and transmission detection of concealed objects, THz explosive identification, THz nanocomposite spectroscopy, and THz remote sensing.^{1,2}

Most existing terahertz sources have low power and rely on optical means of the terahertz radiation. THz quantum cascade lasers using over thousand alternating layers of gallium arsenide and aluminum gallium arsenide have achieved the highest THz powers generated by optical means. Since the energy of a terahertz photon (4.2 meV for 1 THz) is much smaller than the thermal energy at room temperature, room temperature operation of THz lasers might be limited to the high frequency boundary of the terahertz range of frequencies (e.g. close to 30 THz). Improved designs and using quantum dot medium for THz laser cavities are expected to result in improved THz laser performance. Huge THz powers are generated using free electron lasers.

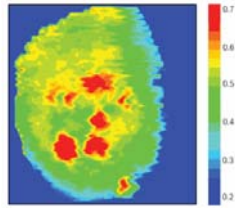
Two-terminal semiconductor devices are capable of operating at the low bound of the THz range, with the highest frequency achieved using Schottky diode frequency multipliers (exceeding 1 THz). High speed three terminal electronic devices (FETs and HBTs) are approaching the THz range (with cutoff frequencies and maximum frequencies of operation around 600 GHz and 340 GHz for InGaAs and SiGe technologies respectively, and over 800 GHz for InGaAs-based Heterojunction Bipolar Transistors,). A new approach called plasma wave electronics recently demonstrated terahertz emission and detection in GaAs-based and GaN-based HEMTs and in Si MOS and SOI, including the resonant THz detection at room temperature.

¹ D. Woolard, W. Loerop, and M. S. Shur, and, Editors, Terahertz Sensing Technology, Volume II. Emerging Scientific Applications and Novel Device Concepts, World Scientific (2003) ISBN 981-238-611-4

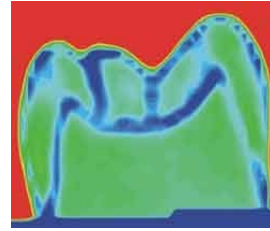
² D. Woolard, W. Loerop, and M. S. Shur, and, Editors, Terahertz Sensing Technology, Volume I. Electronic Devices & Advanced Technology, World Scientific (2003) ISBN 981-238-334-4



COBE satellite composite galaxy image at THz wavelengths of 60, 100, and 240 microns. (photo: Michael Hauser (Space Telescope Science Institute and NASA))



Imaging Breast Cancer
From Opto & Laser
Europe October 2002



THz image of human tooth. From
http://www.teraview.com/ab_imageLibrary.asp

SPEAKER



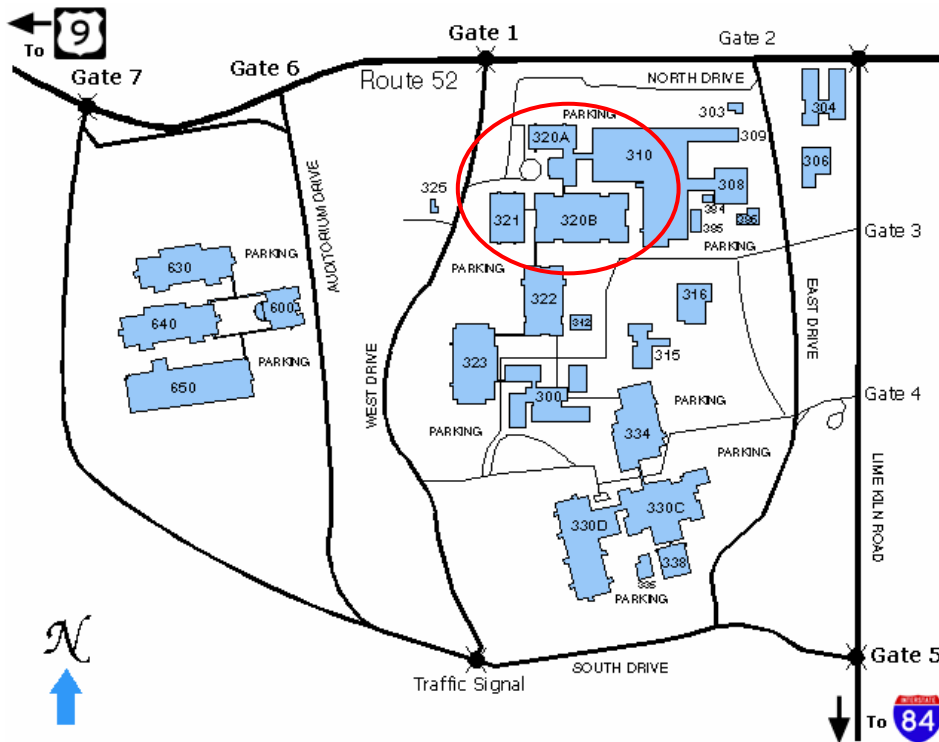
Michael Shur received his M. S. E. E. degree (with honors) from St. Petersburg Electrotechnical Institute, Ph. D. in Physics and Mathematics from A. F. Ioffe Institute of Physics and Technology and Doctor of Science in Physics and Mathematics degree from A. F. Ioffe Institute in 1992. He has held research or faculty positions at A.F. Ioffe Institute, Cornell, Oakland University, University of Minnesota, and University of Virginia, where he was John Money Professor of Electrical Engineering and served as Director of Applied Electrophysics Laboratories. He is now Patricia W. and C. Sheldon Roberts'48 Professor of Solid State Electronics, Professor of Physics, Applied Physics and Astronomy, Acting Director of Center for Integrated Electronics, Director of Center for Broadband Data Transport Science and Technology, and Director of the RPI Research Site of the NSF I/UCR

Dr. Shur is a Fellow of Institute of Electrical and Electronic Engineers (IEEE), Fellow and Life Member of the American Physical Society (APS), Fellow of Electrochemical Society (ECS), Fellow of World Innovation Foundation, Fellow of AAAS, Fellow of EIT, Life Member of IEEE MTT, Sigma Xi, and of Humboldt Society of America, Member of Eta Kappa Nu, and Tau Beta Pi, Electromagnetic Academy, Materials Research Society, and ASEE, an Elected Member and former Chair of US Commission D, International Union of Radio Science (URSI), and elected Member of NRC of URSI (2003-2004). Dr. Shur is Editor-in-Chief of the International Journal of High Speed Electronics and Systems, Editor of the book series on Selected Topics in Electronics and Systems published by World Scientific, Regional Editor for North America of *physica status solidi*, Member of the Honorary Board of Solid State Electronics, Member of the International Advisory Committee of Journal of Semiconductor Technology and Science, Vice-President for publications of the IEEE Sensor Council, and Member (1999-2003) and Chair of the IEEE Prize Papers/Scholarships Award Committee 2004-2005. He is also Distinguished Lecturer of IEEE Electron Devices Society (EDS) and served as Distinguished Microwave Lecturer of IEEE Microwave Theory and Techniques (2003-2006). In 1990-1993, he served as an Associate Editor of IEEE Transactions on Electron Devices.

Dr. Shur has served as Chair, Program Chair, Organizing and Program Committee Member of many IEEE conferences. He is one of co-developers of AIM-Spice (with over 60,000 users world wide) and co-founder of Sensor Electronics Technology, Inc - the first and the only commercial supplier of deep UV LEDs and the winner of Palmetto Pillar Award for Technology Development.

Professor Shur has published many technical papers, authored, co-authored or edited many books and book chapters, and has been awarded over 35 patents on semiconductor devices and circuits. Several of his technical publications received the best paper awards. In 1994, the Saint Petersburg State Technical University awarded Professor Shur an Honorary Doctorate. Among his other awards are 2007 IEEE Donald Fink Prize, 2007 IEEE Leon K. Kirchmayer Award, the Gold Medal of the Russian Ministry of Education, several A. F. Ioffe Best Paper Awards, van der Ziel Award, Senior Humboldt Research Award, Pioneer Award from Compound Semi, RPI School of Engineering Research Award, and Commendation for Excellence in Technical Communications. Dr. Shur is listed by the Institute of Scientific Information (ISI) as one of the Highly Cited Researchers.

Directions to IBM East Fishkill Conference room 42



The conference room is located between Buildings 320A and 320B. Please enter through the Building 320 Lobby where you'll be given a visitors badge

Free and open to the public

Survey

The Mid-Hudson Section leadership is interested in providing value to our members. We would like to know what programs/events/services you would find interesting or useful. Please complete this survey and return to the Mid-Hudson Section chair, Lisa Shay, via regular mail or email (MS Word version is available at <http://www.ewh.ieee.org/r1/mid-hudson/index.htm>)

1. Please check the items that affect your involvement in local IEEE events:

- I regularly come to meetings.
- Evening meetings are inconvenient. A better time would be:
 - during the work day
 - weekends
 - other (please specify)
- Too busy / not enough time
- Need to serve more/better food (pizza, subs, etc.)
- Topics aren't of interest to me
- Other (please specify)

2. Please rate your interest in the following types of events (1=no interest, 4=highly interested)

- Tours of local facilities (for example: Central Hudson, IBM 300mm wafer fab, West Point)
- Technical meetings
- Social events
- "Soft-skills" seminars (for example: how to run a meeting, how to give a presentation, how to get a patent, etc)

3. Last year we switched to sending out the Crosstalk newsletter solely via email to reduce costs. It is sent to whatever email address members have on record with the IEEE.

- a. Have you been receiving Crosstalk? (If not, please verify that you have a valid address on file: <http://www.ieee.org/web/membership/myieee.html>)
- b. Would you prefer to receive a paper copy?

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

If so, please print your name and address:

4. Mid-Hudson IEEE held the following seminars in the past year, free and open to the public; which ones would you have attended if you had known about them & had free time:

- _____ Free buffet dinner at Cappucino's to meet the new officers and discuss plans for the year.
- _____ Technical presentation sponsored by the Electron Device Society titled "Nanotechnology Opportunities in the Silicon CMOS World" by an IBM Fellow and researcher at T.J. Watson Research Center.
- _____ Technical presentation sponsored by the Computer Society titled "Software Oriented Architecture (SOA)" by a Senior Technical Staff Member at IBM SWGA Competitive Technology Laboratory.
- _____ Technical presentation sponsored by the Computer Society titled "Security in the World Wide Web" by an Assistant Professor, Department of Electrical Engineering and Computer Science at the United States Military Academy.
- _____ Technical presentation sponsored by the Computer Society titled "Insight Racing and the DARPA Grand Challenge" by the leader of the Insight Racing team.
- _____ Dinner (at a greatly reduced cost for members and a guest) with a guest speaker who spoke about advances in hardware and software control systems for trains in the Hudson Valley.
- _____ Workshop sponsored by the Power Society titled "Alternative Energy".
- _____ Senior Member elevation meeting where prospective Senior Members had their resumes reviewed and each prospective Senior Member was linked up with 3 Senior members who agreed to write recommendations for them.
- _____ Technical presentation sponsored by the Electron Device Society titled "Beyond Scaling Realizing Value Through the Integration of Memory and Autonomic Chip Features" by an IEEE Fellow and IBM researcher.

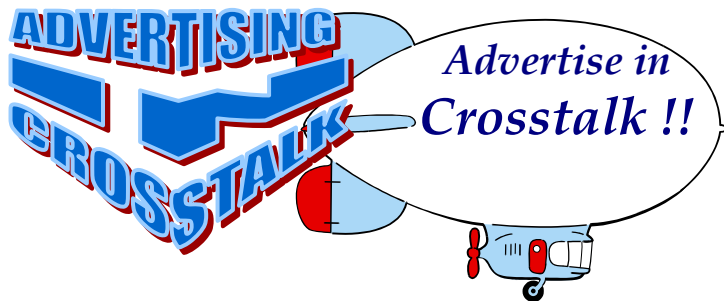
5. Please note any other suggestions or comments. For example, are there any particular seminar topics or events of interest to you? Are you interested in being a guest speaker? Are you interested in helping organize meetings or becoming an IEEE officer?

Please return this survey to:

Lisa A. Shay
Department of Electrical Engineering and Computer Science
601 Thayer Road
West Point, NY 10996

or email to: lisa.shay@ieee.org

(this survey is available as an MS Word document on the Mid-Hudson section's website:
<http://www.ewh.ieee.org/r1/mid-hudson/index.htm>)



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Are you an IEEE Senior Member?

Becoming a Senior Member is not as difficult as you might think. According to the IEEE bylaws, "a candidate shall be an engineer, scientist, educator, technical executive or originator in IEEE-designated fields. The candidate shall have been in professional practice for at least ten years and shall have shown significant performance over a period of at least five of those years."

More information on Senior Member Elevation:
<http://www.ieee.org/organizations/rab/md/smforms.htm>

Congratulations to the recently elevated senior members:

Baback Izadi
Dallas Lea
Ronaldo Lu
Lisa Mohr
Stewart Rauch
Wenli Huang
Edward Sobiesk