Connecticut Symposium on Microelectronics & Optoelectronics

TWENTY FOURTH ANNUAL SYMPOSIUM: Micro-and Nano-technologies for Electronics & Photonics

University of Bridgeport
Arnold Bernhard Center, 84 Iranistan Avenue,
Bridgeport, Connecticut

April 1, 2015

Sponsored by The Connecticut Microelectronics & Optoelectronics Consortium, SPIE-UConn Chapter, the University of Connecticut's Center for Continuing Studies, and the Yale Center for Microelectronic Materials and Structures.

Invited Keynote Talks

- Eric Fossum, CMOS Image Sensors - From Zero to Billions: A Story of Technology Innovation, Dartmouth College, Hanover, NH
- Shu-Jen Han, Carbon Nanotubes: Can They Really Replace Silicon? IBM, Yorktown Heights, NY.

- Invited Technical Presentations from industrial and academic experts.

Technical Sessions: Oral and Poster presentations on topics including Materials, Devices, Applications, Bio-sensing/Nano-Biosystems, and Clean Energy/Storage/Emerging Technologies.

Discover R&D resources available in Connecticut and neighboring states.

Network with internationally renowned experts and learn about the R & D activities in micro- and nano-technologies applied to electronics, photonics, biosensors and energy applications.

CMOC Home Page: http://www.ee.uconn.edu/cmoc

Online registration: **https://www.regonline.com/cmoc2015**

The principal purpose of the 24th Connecticut Symposium on Microelectronics and Optoelectronics is to strengthen cooperation and sharing of resources between Connecticut industries and universities in the areas of microelectronics, optoelectronics, biosensors, energy and emerging technologies.

Another goal is to expose Connecticut industries to new technologies, trends, and current issues through invited presentations by nationally and internationally recognized experts.

The symposium will act as a forum to disseminate, to state government leaders and the public at large, information about current directions and developments in these key areas.

Finally, the symposium will seek to identify resources that encourage cooperative entrepreneurship among Connecticut industries and universities in the areas of microelectronics and optoelectronics.

Morning Session

8:00am   **Registration and Refreshments**

8:45-10:00am   Session I: Materials

10:00 - 10:10   Welcome--Dr. Tarik Sobh, Dean/VP Res. CMOC Mission

10:10 - 11:45   Session II: Devices

11:45 - 12:20   E. Fossum, "CMOS Image Sensors - From Zero to Billions: A Story of Technology Innovation", Dartmouth College, Hanover, NH

12:20 - 1:30   Lunch / Poster Session

Afternoon Sessions

1:30 – 2.45   Session III: Applications,

2.45 - 3:20   **Keynote Speaker** Shu-Jen Han, "Carbon Nanotubes: Can They Really Replace Silicon?", IBM, Yorktown Heights, NY

3:20-4:20   Session IV: Biosensing/Nano-Biosystems

4:20 - 5:20   Session V: Clean Energy / Storage / Emerging Technologies

5:30 - 6:30   Poster Session

Evening Session

6:30 - 7:30   Reception and Awards

The CMOC is pleased to offer our twenty fourth annual symposium developed for professionals including:
- Industrial / Academic R&D Personnel
- Engineering and Science Students
- Research and Application Technologists
- Entrepreneurs in the Micro/Optoelectronics
- Chief Executive Officers/Directors of Engineering.

Technical Papers (Oral Presentations)

SESSION I: Materials (8:45-10:00am)
- Ge Nanowire/III-V Nanocomposites, *Larry Lee, Yale (Invited)*.
- Integrating Complex Oxides with Semiconductors, *L. Kornblum, E. N. Jin, C. H. Ahn, and F. J. Walker, Yale (Invited)*.
- Lanthanum Chromite based Perovskites for Oxygen Transport Membrane,
- *S. Gupta and P. Singh, UConn (Invited)*.
- Progress and Challenges of MOCVD GST for Phase Change Memory, *J-F. Zheng, Entegris (Invited)*.
- Manipulating and Perfecting the Physical-Chemical Environment around Single Wall Carbon Nanotubes, *F. Papadimitrakopoulos, UConn (Invited)*.

SESSION II: Devices (10:00-11:45am)
- Memristors: From Devices to Systems, *A. Mazady, A. Rivera, A.F. M. Anwar, UCONN*
- Total Ionizing Dose (TID) Effects on Ultra-thin InGaAs Nanowire Gate-All-Around MOSFETs with ALD Al2O3 Gate Dielectrics, *S. Ren, X. Sun, M. Si, E. X. Zhang, J. Chen, D. M. Fleetwood, P. D. Ye, S. Cui, and T. P. Ma, Yale and Purdue. (Invited)*
- Fabrication and Characterization of Radhard Power MOSFETs, *X. Wan, D. Liu, J. Wen, W. Zhou, B. Zhang, J. Xun, and H. Bo, Yale*.
- TCAD Modeling of Devices for Quanta Image Sensors, *Jiaju Ma, Eric R. Fossum, Thayer School of Engineering, Dartmouth College, Hanover, NH*.

SESSION III: Applications (1:30-2:45pm)
- Cyber Robust SRAM-PUF: Cell Stability Analysis and Novel Bit-Selection Algorithm, M. T. Rahman, A. Hosey, K. Xiao, D. Forte, and *M. Tehranipoor, UConn (Invited)*.
- Fiber to Home, *V. Mutalik, Arris (Invited)*.
- A 1 Megapixel 1000fps Path-Finder Single-bit Quanta Image Sensor, *S. Masoodian, A. Rao, I. Ma, K. Odame and E. R. Fossum, Dartmouth, NH*
- Enhancing Low Light Color Imaging with Pixel Concept utilizing two vertically stacked Detector layers, *L. Anzagira & E.R. Fossum, Dartmouth*.
- The Impact of Big Data on the Development and Tracking of Microcontroller Software Technology, *J. Jagtiani, U. Bridgeport*.

SESSION IV:Biosensing/Nano-Biosystems
- Interaction of Photosensitive Proteins with Microfabricated Sensor Array, *L. Andre, L. Fernandes, J. Greco, N. L. Wagner, P. Hafliger, M. Azadmehr, E. Johannessen, and R. R. Birge, UConn*.
- Imaging of ovarian Cancer using Ultrasound and Laser Photoacoustics, *H. Salehi and Q. Zhu, UConn (Invited)*.
- Co-detecting 40+ proteins in single cells via a high-density nanoliter microchamber array, *R. Fan, Yale (Invited)*.
- Protein Characterization using Surface Acoustic Wave Devices, *V. Dhagat, J. Kahl, P. Dufilie, D. Kalonia, and F. Jain, UConn and Phonon Corp.*.
- Fourier Transform Holographic Associative Processors Based on Bacateriorhodopsin, *J. Greco, N. L. Wagner, L. Andre, L. Fernandes, A. Messana, E. Johannessen, and R. R. Birge, UConn*

SESSION V: Clean Energy /Storage/ Emerging Technologies (4:20-5:30pm)
- Efficiency Reclimbing in High-Current Droop for GaN based Light-Emitting Diodes, *G-B. Lin and E. F. Schubert, RPI (Invited)*.
- Nanoporous GaN distributed Bragg reflector with near-unity (>99%) reflectance, Cheng *Zhang, Sung Hyun Park, Danti Chen, and J. Han, Yale*.
- Superconducting devices on silicon for quantum information, *Y. Chu, T. Brecht, C. Wang, W. Pfaff, L. Frunzio, M. H. Devoret, and R. J. Schoelkopf, Yale (Invited)*.
- X-band Cavity Electro-Opto-Mechanical Oscillators, *X. Han and H. Tan*g, *Yale*.
- Nanocomposite Electrodes for Energy Storage, *A. Aphale and P. Patra, U. Bridgeport (Invited)*.
- Use of Glucowizzard™ to Predict Exhaustion *via* Continuous Metabolic Monitoring, *M. Kastellorizios, S. Vaddiraju, A. Legassey, F. Jain, F. Papadimitrakopoulos, and D. J. Burgess, UCONN and Biorasis*.

POSTER SESSION: (5:20-6:20pm)
Over 35 Poster Papers will be presented at the Symposium (see details on page 4).

Organizing Committee

D. J. Ahlgren, **Trinity College**	S. Grodzinsky (Emeritus), **University of Bridgeport**	T. P. Ma, **Yale University**
J. Han, **Yale University**	E. Murphy, **JDSU**	J. Orszak, **OES**
C. Broadbridge, **SCSU**	H. Bajwa, **University of Bridgeport**	C. Valerio, **Phonon Corp.**
R. Zeitler, **IEEE Connector (Phonon)**	A. DeMaria, **Coherent-DEOS**	J. F. Zheng, **Entegris ATMI**
R. LaComb, **NUWC (Newport, RI)**	F. Jain, **University of Connecticut**	R. C. Barker (Emeritus), **Yale University**
A. Fish, **University of New Haven**	M. Gherasimova **, University of Bridgeport**	Y.-F.Yen, **WCSU**
	T. Schwendemann, **SCSU**	

REGISTRATION INFORMATION

Fees: The registration fee of $199 includes all costs of presentation materials, refreshments, lunch, and reception on April 1, 2015. **Registration must be received by Monday**, **March 30**, **2015,** in order to ensure a place at reception. **Students registration is free via email to Dr. Ahlgren at david.ahlgren@trincoll.edu by March 30, 2015.**

Online Registration: https://www.regonline.com/cmoc2015

For Hotel accommodations. Please contact Bridgeport Holiday Inn
1070 Main St, Bridgeport, CT 06604
Phone: 203 334-1234 or 888-Holiday (465-4329)

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Symposium Location:	**University of Bridgeport** Arnold Bernhard Center, 84 Iranistan Avenue, **Bridgeport CT**
Local Arrangements:	Ashkan Vakil (203) 893-9294 Maria Gherasimova (mgherasi@bridgeport.edu)
Symposium Parking :	Free parking lot directly adjacent to the building Arnold Bernhard Center, 84 Iranistan Avenue

For information regarding symposium contents: Contact F. Jain at (860) 486-3752. http://www.ee.uconn.edu/cmoc

For information regarding symposium logistics: Contact University Events and Conference Services at (860) 486-1038.

Refunds and Cancellations:
The registration fee is refundable less a $35 processing fee, prior to the first day of the program. Participant substitutions may be made at any time.

The University of Connecticut supports all federal and state laws that promote equal opportunity and prohibit discrimination. This is a self-supporting program.

Registration Form for Paying Participants: (not for student use)

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April 1, 2015

At **University of Bridgeport**, Arnold Bernhard Center, 84 Iranistan Avenue**, Bridgeport, CT**

Registration Fee: $199

Registration is free for graduate and undergraduate students (Inform Dr. D. Ahlgren by email:david.ahlgren@trincoll.edu<http://trincoll.edu>)

To Register:
Online: **https://www.regonline.com/cmoc2015**

Method of Payment
In an effort to increase security and prevent identity theft, we have changed our payment methods. Please choose one of the methods below:
_____Check enclosed payable to UConn
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IN PERSON: At the conference site at U. Bridgeport.

Please indicate below if you have any special needs we should know about.

PAPERS FOR POSTER PRESENTATIONS

P-1. Design of Super Lattice Metamorphic Buffer Layers for High Built-In Residual Strainstics, T. Kujofsa, and J. E. Ayers.

P-2. Multi-bit Characteristics in FETs using Self-Assembled Cladded Quantum Dot Layer as Transport Channel, J. Kondo, M. Lingalugari, P-Y. Chan, J. Chandy, E. Heller, and F. Jain.

UP-3. Comparison of Environmentally Friendly Graphene Oxide Reduction Techniques for Supercapacitor Applications, P. Litwin.

P-4. Fabrication and Mathematical Modeling of SWCNT Scaffold DNA Spiral Nantenna, A. Vakil, A. Alshahrani, C. Bach, J. Pallis, and H. Bajwa.

P-5. Modeling of Quantum Dot, Well and Carbon Nanotube FETs, B. Saman, M. Alzaidi, J. Kondo, P. Gogna, and F.C. Jain.

P-6. Variations in Gabor Filter Asymmetry for Edge Detection in the Analysis of Zinc Oxide Nanowire Images, B. E. Scanley, T. E. Sadowski, C. I. Pelligra, M. Kreider, C. O. Osuji, and C. C. Broadbridge.

P-7. Patterned Deposition of Nanoparticles Using Dip Pen Nanolithography For Synthesis of Carbon Nanotubes, K. F. Dahlberg, K. Woods, C. Jenkins, C. C. Broadbridge, and T. C. Schwendemann.

P-8. Absorption Spectrum of Si & Ge Self -assembled Quantum Dots, P. Mirdha, M. Lingalugari, E. Heller, and F. Jain.

P-9. Enhancing Hadoop MapReduce Performance for Bioinformatics Data, H. Alshammari, H. Bajwa, and J. Lee.

UP-10. Optimization of EDS Parameters for the Creation of a Compositional Database for Bulk Metallic Glasses, H. Pham, B. E. Scanley, and C. C. Broadbridge.

P-11. Multiple Coupled Quantum Wells (CQW) Based Optical Modulator, M. Lingalugari, P-Y. Chan, W. Huang, E. Heller, and F. Jain.

P-12. Comparison of Sonochemically and MOCVD grown ZnMgO Nanowires and Nanorods, A. Rivera, A. Mazady, and A. F. M. Anwar.

P-13. THz Optical properties of ZnMgO/ZnO core-shell nanostructures, A. Rivera, K. Ahi, A. Mazady, and A. F. M. Anwar.

P-14. Authentication of electronic components by time domain THz Techniques, K. Ahi, N. Asadizanjani, M. Tehranipoor, and A. F. M. Anwar.

P-15. Engineered Nanostructures for Counterfeit Prevention, A. Rivera, K. Ahi, and A. F. M. Anwar.

P-16. Authentication of Electronic Components using Embedded Nano-Signatures, K. Ahi, A. Rivera, A. Mazady, and A. F. M. Anwar.

P-17. AlGaN/GaN versus ZnO/ZnMgO Quantum Cascade Lasers, A. Chou, A. Mazady, and A. F. M. Anwar.

P-18. Dynamical X-ray Diffraction from Inverted Metamorphic Triple-Junction Solar Cells on GaAs Substrates, P. B. Rago and J. Ayers.

P-19. Diagnosis of Ovarian Cancer using Elasticity based Optical Coherence Tomography, S. Nandy, and Q.Zhu.

P-20. Diffuse Light System for Breast Cancer Diagnosis, H. Vavadi, and Q. Zhu.

P-21. Two-bit floating gate nonvolatile memories using self-assembled quantum dots, M. Lingalugari, P-Y. Chan, J. Chandy, F. Papadimitrakopoulos, E. Heller and F. Jain.

P-22. A Low Cost Photoacoustic Microscopy Imaging Systems, M. Erfanzadeh, T. Wang, and Q. Zhu.

P-23. Finite Element Modeling of Two-Port Surface Acoustic Wave Device for Protein Characterization, V. Dhagat, J. Kahl, P. Dufilie, D. Kalonia, and F. Jain.

P-24. Finite element modeling of phase-change memory, J. Scoggin, Z. Woods, N. Kanan, A. Cywar, H. Silva, A. Gokirmak.

P-25. Effect of Baseline Voltage on the Set Dynamics of Phase Change Memory Devices, K. Cil, G. Bakan, Z. Woods, F. Dirisaglik, M. B. Akbulut, C. Lam, A. Gokirmak, and H. Silva.

P-26. Van Der Pauw Hall Mobility Measurement Setup for Thin Film Characterization at High Temperatures, L. Adnane, F. Dirisaglik, K. Cil, A. Gokirmak, and H. Silva.

P-27. Blue and White Light Emission from ZnO Nanoforest Microplasmas, N. Noor, V. Manthina, K. Cil, A. G. Agrios, H. Silva, and A. Gokirmak.

P-28. Finite Element Analysis of Thermoelectric Generator Scaling, N. Williams, H. Silva, and A. Gokirmak.

P-29. Phase Change Memory Devices using Vacuum Insulation, S. Muneer, A. Gokirmak, and H. Silva.

P-30. A Power Management System for Bioturbation Resilience in Benthic Microbial Fuel Cells, R. Umaz, F. Qian, C. Garrett, B. Li, and L. Wang.

P-31. A Low Power Impulse-Radio Ultra Wideband (IR-UWB) Transmitter for Biomedical Applications, I. Mahbub, S. Islam.

P-32. A Low Power Apnea Detection System Based on Pyroelectric Sensor, F. Quaiyum, I. Mahbub, Md. S. Hasan, S. A. Pullano, C. P. Stephens, S. K. Islam, A. S. Fiorillo, M. S. Gaylord, V. Lorch, N. Beitel.

UP-33. SRAMs using QDG-FETs, A. Clark, F. Javed, P. Vicente, G. Gutierrez, N. Kulla, M. Lingalugari, P. Mirdha, and F. Jain.

P-34. Denoising and Beat Detection of ECG Signal by Using FPGA, D. Alhelal and M. Faezipour.

P-35. Computing the Interaction of Pulmonary Surfactant Proteins Adsorption on Carbon Nanotube for Specific Biosensor in Detecting Respiratory Distress Syndrome, B. Dharmadhikari, Y. Jiang, and P. Patra.