Participating Schools

University of Connecticut

Trinity College

Yale University

University of Bridgeport

Western Connecticut State University

Southern Connecticut State University

University of New Haven

Participating Corporations

Entegris

Anderson Laboratories

Ensign Bickford Aerospace

General Dynamics

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Connecticut Symposium on Microelectronics & Optoelectronics

TWENTY EIGHTH ANNUAL SYMPOSIUM:

Nanotechnology in Electronics, Photonics, Biosensors, and Energy Systems.

University of New Haven
Orange Campus,
584 Derby Milford Road,

March 27, 2019

Orange, Connecticut 06477 ***DO NOT GO TO WEST HAVEN CAMPUS***

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

Invited Keynote Talks

- Jon Slaughter, "Magnetoresistive Random Access Memories (MRAM)", IBM Research, Albany NanoTech, Albany, NY.
- Milton Chang, "Block Chain", Domani Systems, Shelton, CT
- Invited Technical Presentations from industrial and academic experts.

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

Discover R&D resources 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: **http://www.cvent.com/d/t6q9wy**

Connecticut Microelectronics & Optoelectronics Consortium

The principal purpose of the 28th 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 information to state government leaders and the public at large 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.

Connecticut Microelectronics and Optoelectronics Symposium
Program Wednesday March 27, 2019

Morning Session

8:00am **Registration and Refreshments**

8:45 – 10:00 Session I: Materials

10:00 – 10:15 Welcome: Ron Harichandran, Dean, UNH. CMOC Mission

10:15 – 11:30 Session II: Devices

11:30 – 12:00 J. Slaughter, "Magnetoresistive Random Access Memories (MRAM)", IBM Research, Albany NanoTech, Albany, NY.

12:00 – 1:00 Lunch / Poster Session

Afternoon Sessions

1:00 – 2:30 Session III: Applications,

2:30 – 3:00 M. Chang, Blockchain and the Emerging Trends for Improving "Smart Contract" Security, Domani Systems, Shelton, CT

3:00 – 4:15 Session IV: Biosensing/Nano-Biosystems

4:15 – 4:30 Coffee Break

4:30 – 5:45 Session V: Emerging Technologies: AI/Robotics

5:45 – 7:00 Poster Session

Evening Session

7:00 – 8:00 Reception and Awards

The CMOC 28th Symposium is developed for:

- Industrial / Academic R&D Personnel
- Engineering and Science Students
- Research and Application Technologists
- Entrepreneurs in the Micro/Opto/Bio/AI

SESSION I: Materials & Characterization 8:45-10:00

- D. Shukla, H. Malika, S. Ilhom, A. Mohammad, B. Willis, N. Biyikli Investigating plasma influence on the crystallinity of III-nitrides films grown by plasma-assisted atomic layer deposition, UCONN.
- R. H. Gudlavalleti, P. Chan, R. Mays, E. Heller, F.C. Jain, High Mobility Ge Quantum Dot Channel Thin Film Transistor on aSi/ Glass Substrates, UCONN
- A. F. M. Anwar, Anas Mazady and Abdiel Rivera, Memristor: A technology paradigm, UCONN (Invited)
- B. Zhang, J. Sun, Y. Huang, J. Zheng, P. Gao, NOx detection at ppb level using Au nanoparticles catalyzed ZnO nanosensors based on impedance- metric mode, UCONN
- B. Hu, A. Aphale, J. Hong, M. Reisert, A. Rahman, P. Singh, Tailoring Chemistry and Structure of Functional Ceramics: Applications in Harsh Environments, UCONN (Invited)

SESSION II: Devices (10:15-11:30am)

- S. Varada, Detecting Anomalies in Data Read from Remote Sensors, Domani Systems Inc., Shelton, CT
- D. Kwak, M. Wang, K. J. Koski, L. Zhang, H. Sokol, R. Maric, Y. Lei, High-Temperature Gas Sensing: Integrated Experimental and DFT Simulation Studies, UCONN
- M. A. Bhuiyan, M. Si, P. D. Ye and T. P. Ma, Effects of total ionizing dose radiation on Hf0.5Zr0.5O2-based ferroelectric capacitors, YALE
- Q. Xia and J. Hao, In-Memory Computing with Crossbar Arrays, UMass (Invited)
- H. Silva, N. Noor, S. Tripathi, C. B. Carter, Resistance drift of metastable amorphous and crystalline GeSbTe memory devices, UCONN

SESSION III: Applications (1:00-2:30pm)

- A. Chakraborty, V. Bangera, J. Banerjee, Solution as a Microservice using Blockchain Technology in Supply Chain for the Diamond Industry, DATA CORE SYSTEMS (Invited)
- T. Chakraborty, D. Montrone, Supply Chain Management Using Blockchain Technology: A Pharmaceutical Use Case. Domani Systems Inc.
- V. Mutalik, Fiber Optical Communications, Comcast, CT (Invited)
- J. Chandy, DRAM based Hardware Security Primitives, UCONN (Invited)

SESSION IV: Biosensing/Nano-Biosystems (3:00-4:15pm)

- T. Gao, C. Zhang, Y. Wang, Z. A. Pittman, A. M. Oliveira, J. Zhao, B. G. Willis, A Nanoparticle-Based Electronic Nose System for Classification of Teas, UCONN
- S. Sinha, RNA-hybridization detection, UNH (Invited)
- S. Sansare, T. Jensen, C. Finck, R. Pandey, Harnessing label-free morpho-molecular microscopy in leukemia diagnosis and treatment, UCONN HEALTH (Invited)
- F. Papadim, Overview of Implantable Biosensors, UCONN (Invited)
- R. Fan, Biosensor, YALE (Invited)

SESSION V: Emerging Technologies AI /Robotics (4:30-5:45pm)

- Y. Gao, C. Jin, J. Kim, H. Nili, X. Xu, W. Burleson, O. Kavehei, M. van Dijk, D. C. Ranasinghe and U. Rührmair, Efficient Erasable PUFs from Programmable Logic and Memristors, UCONN (Invited)
- H. Omar and O. Khan, Mitigating microarchitecture state based security vulnerabilities in processors exacting safety-critical applications, UCONN (Invited)
- M. Tenzeris, Inkjet-/3D-/4D-Printed Wireless Ultrabroadband Modules for IoT, SmartAg and Smart City Applications, GATECH, Atlanta (Invited)
- K. Sukvichai, Sliding Mode LQR Controller: A Combination of Optimal and Robust Controller for Robots, Kasetsart University, Thailand (Invited)
- S. Gupta, Machine learning and robotics, UCONN (Invited) TBC

POSTER SESSION: (12:00-1:00pm; 5:45-7:00pm):

Over 25 Poster Papers (see page 4).

RECEPTION AND AWARDS: (7:00-8:00pm)

Awards Sponsors: IEEE-CT Chapter, CRISP

Organizing Committee

D. J. Ahlgren (Emeritus), **Trinity College**
J. Han, **Yale University**
C. Broadbridge, **SCSU**
R. Zeitler, **IEEE Connector**
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F. Xia, **Yale University**
Q. Xia, **UMass, Amherst**
H. Jiang, **Yale University**

REGISTRATION INFORMATION Prof. M. Gherasimova

Fees: The registration fee of $199 includes all costs of presentation materials, refreshments, lunch, and reception on March 20, 2019. **Registration must be received by Wednesday, March 20, 2019,** in order to ensure a place at dinner/reception.
Student register free via email to Carol Jenkins: jenkinsc12@southernct.edu

Online Registration: http://www.cvent.com/d/t6q9wy

Hotel: New Haven Hotel, 229 George Street, New Haven, CT 06510
800-644-6835. Book under The University of New Haven negotiated rate.
http://www.newhaven.edu/about/campus-locations/orange/map.php
DIRECTIONS: See above link; also bottom of this page.

Symposium Location: **University of New Haven, Orange Campus**
584 Derby Milford Road**, Orange, CT**

Local Arrangements: Andrew Fish, 203-932-7163

Symposium Parking : Parking lot on right.

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

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

Refunds and Cancellations:
Cancellations received on or before **March 25, 2019** will receive a full refund minus a $35 processing fee. Participant substitutions may be made at any time.

The University of Connecticut and the University of New Haven support 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)

Connecticut Symposium on Microelectronics & Optoelectronics

March 27, 2019

At **UNH Orange Campus**, 584 Derby Milford Road, **Orange, CT**
Registration Fee: $199

Registration is free for graduate and undergraduate students: Inform Carol Jenkins by email: jenkinsc12@southernct.edu
RSVP required for dinner, please let Carol Jenkins know. Dinner choice: Chicken, Salmon, and Vegetarian

To Register:

Online: **http://www.cvent.com/d/t6q9wy**

Method of Payment: Credit Card
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 the University of New Haven

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

From Route 15 Northbound:
Take exit 56 for Orange - Route 121 / Grassy Hill Road. At the traffic light at the end of the ramp, turn left on Route 121. Immediately after crossing over Route 15, turn left on Turkey Hill Road toward Route 15 southbound. After passing the stop sign, turn right on Turkey Hill Road. Follow to end (approximately 1/2 mile). At the stop sign, turn left on Derby Milford Road. Drive 0.6 miles and the entrance to the University of New Haven Orange Campus will be on your right, immediately before passing over Route 15 on Derby Milford Road.

From Route 15 Southbound:
Take exit 56 for Orange - Route 121 / Grassy Hill Road. After turning up the hill from the off-ramp, turn left on Turkey Hill Road. Follow to end (approximately 1/2 mile). At the stop sign, turn left on Derby Milford Road. Drive 0.6 miles and the entrance to the University of New Haven Orange Campus will be on your right, immediately before passing over Route 15 on Derby Milford Road.

PAPERS FOR POSTER PRESENTATIONS

P1. R. Singhal, M. Fernando, P. K. LeMaire, B. Wu, Characterization of zinc oxide and iron doped zinc oxide nanoparticles using florescence spectroscopy, CHESHIRE HS, CCSU, SCSU

P2. C. Zhang, Q. Jiel, T. Gao, B. Willis, Photon Enhanced Area Selective Atomic Layer Deposition on Plasmonic Nanoantennas, UCONN

P3. S. Thapa, X. Zhang, N. K. Dutta, Rational harmonic mode-locked fiber ring laser for operation at 50 Gb/s, UCONN

P4. Z. Liu and T.P. Ma, On the Diminished Hysteresis Observed in Ferroelectric-gated FET's (FeFET's) Attributed to the Negative Capacitance Effect, YALE

P5. S. Matonis, J. Song, R. Ramesh, J. J. Steffes, B. D. Huey, Ferroelectricity of $BiFeO_3$ across a three-dimensional strain gradient, UCONN

P6. J. Frey, T. Schwendemann, Thin Film Deposition/CNT Synthesis, SCSU

P7. H. Divecha, M. Hajra, I. Macwan, Targeting tumors using invasive assays through Magnetosprillium Magneticum, UB

P8. M. Maung, C. Cui, S. Sinha, Novel POC Bionanosensor for Direct Detection of RNA-Virus Infections in Minutes, UNH

P9. B. A. Khan, M. B. H. Frej, Energy Efficient Clustering for Heterogeneous Wireless Sensor Networks – A Survey, UB

P10. P. K. Banerjee, D. Liu, S. Chang, An Integrated Multi-Subject Registry (IMSR) Concept Using Blockchain Technologies for Population Health Management, DATA-CORE SYSTEMS

P11. J. Grasso, B. Willis, Impact of Operating Parameters on Precursor Separation in "Air Hockey" Spatial Atomic Layer Deposition Reactor, UCONN

P12. M. T. Islam, T. Kujofsa, X. Chen, and J. E. Ayers, Evaluation of Threading Dislocations and Dislocation Compensation in InGaAs/GaAs (001) Superlattice Buffer Layers, UCONN

P13. P. K. Eranti, S. Asthana, S. Patel, Emulated Operation of a Robotic Manipulator by Electromyography Signals, UB

P14. D. Marwah, I. Macwan, P. Patra, A molecular dynamics study of interactions of Gabapentin with LAT1 transporter in Blood Brain Barrier, UB

P15. H. Jiang, Z. Liu, M. A. Bhuiyan and T.P. Ma, Versatile capacitors as ferroelectric and resistive memory devices, YALE

P16. A. Mohammad, D. Shukla, S. Ilhom, B. Willis, S. Jung, N. Biyikli, Impact of substrate and ex-situ/in-situ surface cleaning on plasma-ALD grown AlN films, UCONN

P17. S. Ilhom, L. Gerety, D. Shukla, A. Mohammad, B. Willis, N. Biyikli, Investigating the effect of plasma chemistry on the InOxNx films grown via plasma-enhanced atomic layer deposition, UCONN

P18. D. K. Biswas, N. T. Tasneem, I. Mahbub, Optimization of Miniaturized Wireless Power Transfer System to Maximize Efficiency for Implantable Biomedical Devices, UNT

P19. S. Zel, N. Sheikh, Artificial intelligence in human resource management: A game changer in talent acquisition, UB

P20. B. Bohn, A. Quereshi, H. Malik, C. Cole, R. H. Gudlavalleti, R. Mays, F.C. Jain, Improved Storage Density using Quantum Dot Gate Non-Volatile Memory, UCONN

P21. R. Mays, R. H. Gudlavalleti, P. Chan, E. Heller, F.C Jain, Self- Assembly of GeOx-Ge Quantum Dot Superlattice (QDSL) Layers for FETs and Optoelectronic Devices, UCONN

P22. H. Salama, B. Saman, R. Gudlavalleti, R. Mays E. Heller, and F.C Jain, Twin Drain Quantum Well/ Quantum Dot Channel Spatial Wave-function Switched (SWS) FETs for Multi-Valued Logic and Compact DRAMs, UCONN

P23. K. Jimenez, J. Ebenezar, S. Ganesan, P. Aruna, B. Wu, In vivo Diagnosis of Mouse Skin Carcinoma using Stokes-Shift Fluorescence Spectroscopy and Machine Learning, SCSU

P24. H. Malboeuf, Z. Woods, J. Scoggin, H. Silva, A. Gokirmak, Modeling SiO2 Behavior in Phase Change Memory Devices, UCONN.

P25. Jake Scoggin, Zachary Woods, A. Cywar, H. Silva, A. Gokirmak, Finite Element Modeling of Ovonic Switching, UCONN.

P26. Jake Scoggin, Zachary Woods, A. Cywar, H. Silva, A. Gokirmak, Ali Gokirmak, Computational Modeling of High Temperature Thermal Boundary Resistances in Phase Change Memory Devices, UCONN

P27. R. J. Cordier, J. J. Steffes, B. D. Huey, In situ piezoresponse force microscopy of strain-controlled ferroelectric domain kinetics, UCONN

P28. N. Farzad, C. Cui, S. Sinha, Ultra- sensitive Point Of Care biosensor for detecting pathogeneses, UNH

P29. S. E. Quadir and J. Chandy, Logic obfuscation and design locking for secured ICs. UCONN