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

Collins Aerospace

Perkin-Elmer

Photronics

Pitney Bowes

United Technologies Research Center

Coherent

Lumentum

C-Cor

ASML

Connecticut Symposium on Microelectronics & Optoelectronics

TWENTY NINTH ANNUAL SYMPOSIUM: VIRTUAL

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

University of Connecticut
Storrs, CT 06269

October 2, 2020

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

- Dr. J. Chow, Quantum Computing**,** IBM Thomas J. Watson, Research Center
- Dr. E. Fossum, Quanta Image Sensor, Dartmouth College
- Dr. H. Lee. Electronic and IR Sensing in Forensics, U. New Haven
- 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
Webex Event link (page 3)

Connecticut Microelectronics & Optoelectronics Consortium

The principal purpose of the 29th 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 co- operative entrepreneurship among Connecticut industries and universities in the areas of microelectronics and opto- electronics.

Connecticut Microelectronics and Optoelectronics Symposium
Program Friday October 2, 2020

Sessions and Keynotes
10:00am

10:00 – 11:00	Session I: Materials and Session II Devices
11:00 – 11:15	Welcome: T. Katsouleas, UConn President,
11:15 – 11:20	CMOC Mission
11:25 – 12:00	H. Lee, Electronic and Infrared Sensing in Forensic, UNH, Henry Lee Center for Forensic Research
12:00 – 12:30	Luncheon Break (Poster Viewing)
12:30 – 1:00	Session III Applications
1:00 – 1:30	E. Fossum, Quanta Image Sensor, Dartmouth College,
1:30 – 2:00	Sessions IV
2:00-2:30	J. Chow, Quantum Computing, IBM Thomas J. Watson Research Center
2:30-3:00pm	Session V
3:00-3:30pm	Poster Viewing (PPTs to be posted)

PURPOSE:

The CMOC 29th 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 10:00-10:30am

- J. E. Ayers[1,2], Tedi Kujofsa[1], Johanna Raphael[1,3], and Md T. Islam[1], Recent Advances in the Modeling of Strain Relaxation and Dislocation Dynamics in InGaAs/GaAs, 1ECE, UCONN, [2]Epitax Engineering, Ashford, CT, [3]U. Hartford, CT.
- S. Sahoo, S. L. Suib, S. P. Alpay, Computational Modeling of Single-Atom Heterogeneous Catalysts for Clean Energy Solutions UConn.
- A. Mohammad, S. Ilhom, D. Shukla, T. Kashem, A B M H. Talukder, H. Silva, A. Gokirmak, B.Willis, and N. Biyikli, Real-time in-situ monitoring atomic layer co-dosing processes for Aluminum doped ZnO layers: A competitive nature of reactions between the TMA and DEZ precursors. UConn.

SESSION II: Devices 10:30-11:00am

- F. Xia, Transport in two-dimensional semiconductors, Yale University.
- M. Bhuiyan, Gate-All-Around Nanosheet Transistor for Logic Technology, IBM T.J. Watson Research Center, NY.
- A. Arjunan, G. S. Tompa, and H. Yu*, Low-Temperature Plasma Enhanced Chemical Vapor Deposition of SiGeSn for Photonic Integrated Circuit Applications, Structured Materials Inc., Piscataway, NJ, *Arizona State University.

POSTER SESSION:

Poster papers PowerPoint slides will be posted.
Twenty-Nine Poster Papers (see page 4).

SESSION III: Applications (12:30-1:00pm)

- M. Tentzeris, Flexible Electronics-Additive Manufacturing, Georgia Tech..
- M. Chang, S. Das, D. Montrone and T. Chakraborty, Systems for implementing data communication with security tokens, Domani Systems, Shelton, CT.
- D. Parvin, T. Oh and S. Islam, Design of a Smart Maximum Power Point Tracker (MPPT) for RF Energy Harvester, University of Missouri.

SESSION IV: Biosensing/Nano-Biosystems

- B. Zhang and P-X. Gao, Single Nanoarray Sensor for Multi-Analyte Detection, UConn.
- N. Nolta, P. Ghelich, and M. Han, Fabrication of Recessed Traces for Improved Longevity of Implantable MEMS, UConn.
- R. H. Gudlavalleti, A. Leggasey*, A. Valdes, P-Y. Chan, D. Burgess, F. Papadimitrakopoulos, F. Jain, Miniaturized Needle-Implantable Glucose Sensors using 65nm CMOS Technology, UCONN and *Biorasis Inc., Storrs, CT.

SESSION V: Emerging Technologies Energy/AI /Robotics (2:30-3:00pm)

- T. Shimpi and W. Sampath, CdTe Thin Film Solar Cells, Colorado State University, Fort Collins, CO.
- J. Chandy and L.Wang, Anti Reverse Engineering using Transient Electronics, UCONN.
- K. Pattipati, On the Identification of Noise Covariances and Adaptive Kalman Filtering: A New Look at a 50 Year-old Problem, UConn.
- V. Mutalik, Fiber Optical Communications (TBC), Comcast, CT.

Poster Paper Viewing (3:00-3:30pm)

Best Poster Paper Award Announcement

Organizing Committee

D. J. Ahlgren (Emeritus), **Trinity College**
J. Han, **Yale University**
C. Broadbridge, **SCSU**
R. Zeitler, **IEEE Connector**
R. LaComb, **NUWC (Newport, RI)**
A. Fish, **University of New Haven**

S. Grodzinsky (Emeritus), **University of Bridgeport**
E. Murphy, **Lumentum**
B. Wu, **SCSU**
A**.** DeMaria, (Emeritus), **University of Connecticut**
F. Jain, **University of Connecticut**
M. Gherasimova **, University of Bridgeport**
T. Schwendemann, **SCSU**

T. P. Ma, **Yale University**
J. Orszak, **CONNSTEP**
C. Valerio, **CMOC**
J. F. Zheng, **Entegris**
F. Xia, **Yale University**
Q. Xia, **UMass, Amherst**
H. Jiang, **Micron**

REGISTRATION INFORMATION Prof. M. Gherasimova

Fees: The registration is free for authors, undergraduate and graduate students, and members.

Webex Event (see next page)

Symposium Location: **Webex Event**

Local Arrangements: NA

Symposium Parking : NA

Connecticut Symposium on Microelectronics & Optoelectronics

October 2, 2020

Registration is free for graduate and undergraduate students, authors and attendees.

Event address for attendees: https://uconn-cmr.webex.com/uconn-cmr/onstage/g.php?MTID=ef16af7fd54cdc6b273142ab98d025367

Event address for panelists/paper authors: https://uconn-cmr.webex.com/uconn-cmr/onstage/g.php?MTID=ecfb86916552f76a7ffd9dda5a15c440f

PAPERS FOR POSTER PRESENTATIONS

P1. Johanna Raphael, Tedi Kujofsa, J. E. Ayers, Comparison of Buffer Layer Grading Approaches in InGaAs / GaAs (001), UCONN.

P2. Tedi Kujofsa, J. E. Ayers, A Modeling Study of Dislocation Sidewall Gettering in II-VI and III-V Semiconductor Heterostructures, UCONN

P3. Tedi Kujofsa, J. E. Ayers, A Jogging and Weaving Model for Dislocation Interactions in Heterostructures Containing Strain Reversals, UCONN

P4. Eric Wang and Binlin Wu, Human glioma diagnosis and grading based on analysis of resonance Raman spectra using artificial intelligence, SCSU, Amity HS

P5. Raja Hari Gudlavalleti, Roman Mays, Evan Heller, Faquir Jain, High Mobility Transport in Ge Quantum Dot Nanocrystalline Channel for a-Si Thin Film Transistors, UCONN

P6. Chengwu Zhang, Jie Qi, Tuo Gao, Brian Willis, Laser Assisted Area Selective Atomic Layer Deposition on Plasmonic Nanostructures, UCONN

P7. Lauren Bledsoe, Dominick Hollister, Truc Min Nguyen, Matthew Sodoski, Bilal Khan, Roman Mays, Raja Hari Gudlavalleti, Evan Heller, Faquir Jain, Quantum Dot Gate (QDG) SRAMs: Fabrication and Modeling, UCONN

P8. S. Singh, S. Riccardi, X. Lu, M. Platt, X. Wen, R. Gudlavalleti, R. Mays, B. Khan, and F. Jain, Modeling of Ligh Activated SCRs, UCONN

P9. Thomas Link, S M Rakiul Islam, Sung-Yeul Park, Impedance Spectroscopy of Photovoltaic Module, UCONN

P10. Roman Mays, Raja Hara Gudlavalleti, Bilal Khan, Evan Heller, Faquir Jain, Electroluminescence in cladded Ge quantum dot structures, UCONN

P11. J. Grasso, B. Willis, Study of Crystallinity of Yttrium Oxide Thin Films Grown by Plasma Enhanced Atomic Layer Deposition (PEALD), UCONN

P12. Raihan Sayeed Khan, Nadim H. Kan'an, Jake Scoggin, Helena Silva and Ali Gokirmak, Multi-contact Phase Change Toggle Logic Device Utilizing Thermal Crosstalk, UCONN

P13. Rian Tucci, Rahul Singhal, Thomas Sadowski, Jules Scanley, and Christine C. Broadbridge, Characterization of MnO2-MWCNT Nanocomposite Morphology for Supercapacitor Applications, SCSU

P14. Shefalika Asthana, Srikanth Reddy Karna, Irine Ann Shelby, Biny Varghese, Sarosh Patel, Amaranthine: A Humanoid Robot, UB

P15. Nathaniel Keri, Ian Sands, Libo Zhou, Yupeng Chen, and Martin Han, Electrochemical characterization of nanotube coatings on silicon-based microelectrodes, UCONN

P16. Pejman Ghelich, Nicholas F. Nolta, and Martin Han, Sputtered Iridium Oxide Film (SIROF) Characterization on Implantable Neural Microelectrodes, UCONN

P17. Susrutha Babu Sukhavasi, Khaled Elleithy, Abdelshakour Abuzneid, Suparshya Babu Sukhavasi, Analysis of CMOS Image Sensors with High Dynamic Range, UB

P18. Eugene P. Gerety and Khaled M. Elleithy, Overcoming Image Aliasing in Decoding Ultra-High Density 2D Barcodes, UB

P19. Alpaslan Ersöz, Insoo Kim, and Martin Han, A Portable and Multifunctional 16-Channel Neurostimulator System, UCONN

P20. Saidjafarzoda Ilhom, Adnan Mohammad, Deepa Shukla, John Grasso, Brian Willis, Necmi Biyikli, Studying the role of N 2 /H 2 radicals in the plasma-induced microstructural transformation of ALD-grown InN films, UCONN

P21. Saidjafarzoda Ilhom, Adnan Mohammad, Deepa Shukla, John Grasso, Brian Willis, Necmi Biyikli, Towards as-grown crystalline β -Ga 2 O 3 films at sub-200 °C via plasma-enhanced atomic layer deposition, UCONN

P22. A. Mohammad, Krishna D Joshi, S. Ilhoma, D. Shukla, J. Grasso , B. Willisd, Barrett Wells, A. K. Okyay and N. Biyikli, Low-temperature atomic layer deposition of Boron Nitride via hollow-cathode nitrogen plasmas: In-situ process monitoring and post-deposition annealing, UCONN

P23. Adnan Mohammad, Krishna D Joshi, Deepa Shukla, Saidjafarzoda Ilhom, Brian Willis , Barrett Wells, Necmi Biyikli, Plasma-enhanced atomic layer deposition of vanadium oxide using TEMAV and oxygen plasma and post-deposition annealing, UCONN

P24. Deepa Shukla and Necmi Biyikli, Low temperature growth of crystalline GaN film using hollow-cathode plasma-assisted atomic layer deposition for flexible devices, UCONN

P25. Steven Ang, Said Mikki and Saion Sinha, Machine Learning Application on a Point of Care Diagnostic System, UNH

P26. Kiruthiga Ramakrishnan, Chengde Cui, Ewa Kirkor, Saion Sinha, OPTIMAL POC BIO-NANOSENSOR TO DETECT THE PRESENCE OF PATHOGENS IN PLANT, UNH

P27. N. R. Butterfield, R. Mays, B. Khan, R. Gudlavalleti, F.C Jain, Quantum Dot Gate (QDG) Quantum Dot Channel (QDC) Multistate Logic Non-Volatile Memory (NVM) with High-K Dielectric HfO2 Barriers, UCONN

P28 Suparshya Babu Sukhavasi , Khaled Elleithy, Abdelshakour Abuzneid, Susrutha Babu Sukhavasi, Study and Evaluation of Noise Immune CMOS Image Sensors with Low Power Consumption, UB

P29. Kenneth Jimenez and Binlin Wu, Distinguish human breast cancer cells with different metastatic abilities using resonance Raman spectroscopy and machine learning, SSCU.