CONFERENCE AT A GLANCE

(All times US Eastern time zone)

MONDAY, May 24th CS MANTECH Workshop
Workshop chair: Martin Kuball, University of Bristol

9:00 AM – 10:00 AM	**Physics, Design and Processing of Smart Power GaN Devices** Paul Chow, Rensselaer Polytechnic Institute (RPI)
10:00 AM – 10:15 PM	**Workshop Break**
10:15 AM – 11:15 AM	**Epi Development on the Example of an p-GaN e-mode HEMT on 200mm Si** Hu Liang, IMEC
11:15 AM – 11:30 AM	**Workshop Break**
11:30 AM – 12:30 PM	**GaN HEMT Measurement Techniques** Michael J Uren, University of Bristol
12:30 PM – 1:30 PM	**Workshop Break**
1:30 PM – 2:30 PM	**Power Device Packaging** Christoph Bayer, Fraunhofer Institute for Integrated Systems and Device Technology IISB
2:30 PM – 2:45 PM	**Workshop Break**
2:45 PM – 3:45 PM	**RF Device Packaging** Quinn Martin, MACOM
3:45 PM – 4:00 PM	**Workshop Break**
4:00 PM – 5:00 PM	**Physics-Based Modeling to Enable Device and Circuit Co-Design** Ujwal Radhakrishna, Texas Instruments

TUESDAY, May 25th Session 1: Plenary 1
Session chairs: Peter Ersland, MACOM; Thorsten Saeger, Qorvo

9:00 AM – 9:15 AM	**Welcome Message** Conference Chair: Thorsten Saeger, Qorvo Technical Program Chair: Peter Ersland, MACOM
9:15 AM – 10:00 AM	**1.1 Next Revolution in Compound Semiconductor Materials** Mark Rosker, DARPA *(Plenary Speaker)*
10:00 AM – 10:20 PM	**Vendor Presentations**
10:20 AM – 11:05 AM	**1.2 Challenges and Opportunities in Remote Epitaxy for Releasable Epilayers on Graphene** Jeehwan Kim, MIT *(Plenary Speaker)*
11:05 AM – 11:25 AM	**Vendor Presentations**

TUESDAY, May 25th Session 2: Epi Manufacturing and Test
Session Chairs: Matthew Tyhach, Raytheon; Barry Wu, Keysight

1:30 PM – 2:00 PM	**2.1 GaN-on-Diamond Design for Manufacturing** Daniel Francis *(Invited Speaker)*, Frank Lowe, and Kyle Graham; Akash Systems
2:00 PM – 2:20 PM	**2.2 Hybrid NH_3/N_2 Molecular Beam Epitaxy with Artificial Intelligence Assisted RHEED Analysis** Young-Kyun Noh[1], Hong-Kyun Noh[1], Byung-Guon Park[1], Seullam Kim[1], Cheng-Yu Chen[2], Tsung-Pei Chin[2], Wei Li[2], Yung-Chung Kao[2]; [1]IVWorks Co., [2]IntelliEpi Inc.

2:20 PM – 2:40 PM	**2.3 Commercial N-polar GaN on SiC HEMT Epitaxial Wafers Manufactured by MOCVD for 5G mm-Wave Applications** Xiang Liu, Brian Romanczyk, Stacia Keller, Brian Swenson, Ron Birkhahn, Geetak Gupta, Davide Bisi, Umesh Mishra, Lee McCarthy; Transphorm Inc.
2:40 PM – 3:00 PM	**Vendor Presentations**
3:00 PM – 3:20 PM	**2.4 The Phenomenon of Charge Activated Visibility of Electrical Defects in 4H-SiC; Application for Comprehensive Non-Contact Electrical and UV-PL Imaging and Recognition of Critical Defects** M. Wilson[1], D. Greenock[2], D. Marinskiy[1], C. Almeida[1], J. D'Amico[1], J. Lagowski[1]; [1]Semilab SDI, [2]X-Fab
3:20 PM – 3:40 PM	**2.5 A Deep Learning-based Multi-Model Method for Etching Defect Image Classification** Shih-Kuei Chou, Yuan-Hsin Lin, Wen-Hsing Liao, Yu-Min Hsu, Chi-Hsiang Kuo, Cheng-Kuo Lin; WIN Semiconductors Corp.
3:40 PM – 4:00 PM	**2.6 Kelvin Force Microscopy and Micro-Raman Correlation Study of Triangular Defects in 4H-SiC** D. Marinskiy[1], M. Wilson[1], C. Almeida[1], S. Savtchouk[1], J. Lagowski[1], S. Toth[2], Z. Szekrenyes[2], L. Badeeb[2], A. Faragó[2]; [1]Semilab SDI, [2]Semilab ZRT

TUESDAY, May 25th **Session 3: Process and Packaging**
Session Charis: Andy Carter, Teledyne; Alex Smith, Brewer Science

1:30 PM – 2:00 PM	**3.1 Fabrication of High-Performance Compound Semiconductor RF Circuits Using Heterogeneously-Integrated Transistor Chiplets in Interposers** Florian Herrault *(Invited Speaker)*; HRL Laboratories, LLC
2:00 PM – 2:20 PM	**3.2 Wafer-Level Packages for GaN Technologies & On Wafer Humidity Test** Hermann Stieglauer[1], Klaus J. Riepe[1], Janina Moereke[1], Jan Grünenpütt[1], Daniel Sommer[1], Hervé Blanck[1], Benoît Lambert[2], Jerome Van de Casteele[2], Mehdy Neffati[2], Ulli Hansen[3], Simon Maus[3]; [1]United Monolithic Semiconductors GmbH, [2]United Monolithic Semiconductors SAS, [3]MSG Lithoglas GmbH
2:20 PM – 2:40 PM	**3.3 Wafer Breakage Reduction in Cu Bump Processing of GaAs Technologies** Chang'e Weng, Tina Kebede, April Morilon, Jesse Walker, Kris Zimmerman, Lee Tye, John Coudriet, Josh Ochoa, Jeff Moran, Matthew Porter, Kenneth P. Reis; Qorvo
2:40 PM – 3:00 PM	**Vendor Presentations**
3:00 PM – 3:20 PM	**3.4 Seeing the World from a Drop of Water: A Novel Environment-Protecting Technique for Photoresist Strip, Metal Lift-off, and Etching Byproduct Removal** Jia-You Lo, Yang-Hao Chen, Bill Chuang, Willy Chiou, Alex Weng, Kyle Chen; WIN Semiconductors Corp.
3:20 PM – 3:40 PM	**3.5 LOL 1000 Liftoff Resist as an Antireflective Coating for MMIC Electroplating** Elizabeth Werner[1], Daniel Brooks[2], Kyle Liddy[2], Robert Fitch Jr.[2], James Gillespie[2], Dennis Walker Jr.[2], Antonio Crespo[2], Daniel M. Dryden[1], Andrew Green[2], Kelson Chabak[2]; [1]KBR, [2]Air Force Research Laboratory, Sensors Directorate
3:40 PM – 4:00 PM	**3.6 Theoretical Study of Recoil-Implanted N Atoms in Mg-Implanted GaN** Kai C. Herbert[1], Kazuki Shibata[1], Joel T. Asubar[2], Masaaki Kuzuhara[1]; [1]Kwansei Gakuin University, [2]University of Fukui

WEDNESDAY, May 26th **Session 4: Plenary 2**
Session Chairs: Peter Ersland, MACOM; John Blevins, Air Force Research Laboratory

9:00 AM – 9:45 AM	**4.1 Progress Towards Prolonged IC Deployment Into Previously Inaccessible Hostile Environments Via Development of SiC JFET-R ICs** P. Neudeck[1] *(Plenary Speaker)*, D. Spry[1], M. Krasowski[1], L. Chen[2]; [1]NASA Glenn Research Center, [2]Ohio Aerospace Institute
9:45 AM – 10:05 AM	**Vendor Presentations**

10:05 AM – 10:25 PM **4.2 The Rise of Power SiC and GaN Market and The Impact of COVID-19**
A.B.Slimane, E. Dogmus, P. Chiu, C.Troadec; Yole Développement

10:25 AM – 10:55 AM **4.3 Processing Choices For Achieving Long Term IC Operation at 500° C**
D. Spry *(Invited Speaker),* P. Neudeck; NASA Glenn Research Center

10:55 AM – 11:15 AM **4.4 Monolithically Integrated GaN Power and RF ICs on 150mm Poly-AlN for Envelope Tracking Power Amplifier Applications**
Chong-Rong Huang[1], Hsien-Chin Chiu[1], Chia-Hao Liu[1], Hsiang-Chun Wang[1], Hsuan-Ling Kao[1], Ming-Chin Chen[2], Chia-Cheng Liu[2]; [1]Chang Gung University, [2]Unikorn Semiconductor Corporation

11:15 AM – 11:35 AM **Vendor Presentations**

***WEDNESDAY, May 26th* Session 5: Devices 1: GaN**
Session Chairs: Fabian Radulescu, Wolfspeed, a Cree Company; Serge Karboyan, Nexperia

1:30 PM – 1:50 PM **5.1 Performance of 0.3 um Gate Length GaN HEMT by Using i-line Stepper for High Power C-band Applications**
Sangmin Lee, Byoungchul Jun, Chulsoon Choi, Hyeyoung Jung, Seokgyu Choi, Min Han, Hogeun Lee, Myoungkeun Song, Jihun Kwon, Myungsoo Park, Sungwon Lee, Yongjae Kim, Sewon Hwang, Hangyol Ji, Insup Kim, Jinman Jin, Kyeongjae Lee and Jun-Hyeok Lee; Wavice Inc.

1:50 PM – 2:10 PM **5.2 Investigation of Un-doped GaN Cap Layer on RF and Trap Related Characteristics in AlGaN/GaN HEMTs**
Wen-Hsin Wu, Yong-Han Lin, Chieh-Chih Huang, Che-Kai Lin, Fan-Hsiu Huang, Wei-Chou Wang; WIN Semiconductors Corp.

2:10 PM – 2:30 PM **5.3 Analysis of GaN-HEMT DC-Characteristic Alterations by Gate Encapsulation Layer**
Hossein Yazdani, Serguei Chevtchenko, Ina Ostermay, and Joachim Würfl; Ferdinand-Braun-Institut (FBH)

2:30 PM – 2:50 PM **Vendor Presentations**

2:50 PM – 3:10 PM **5.4 Improved Gate Reliability Normally-Off p-GaN/AlN/AlGaN/GaN HEMT with AlGaN Cap-Layer**
Chia-Hao Liu, Hsien-Chin Chiu, Hsiang-Chun Wang, Hsuan-Ling Kao, Chong Rong Haung; Chang Gung University

3:10 PM – 3:30 PM **5.5 Temperature Dependent Measurement of GaN Impact Ionization Coefficients**
L. Cao, Z. Zhu, G. Harden, H. Ye, J. Wang, A. Hoffman, and P. Fay; University of Notre Dame

3:30 PM – 3:50 PM **5.6 High Thermal Dissipation Normally-off p-GaN Gate AlGaN/GaN HEMTs on 6-inch N-doped Low Resistivity SiC Substrate**
Yu-Chun Huang, Hsien-Chin Chiu, Hsuan-Ling Kao, Hsiang-Chun Wang, Chia-Hao Liu, Chong-Rong Huang Si-Wen Chen; Chang Gung University

***WEDNESDAY, May 26th* Session 6: Process and Control**
Session Chairs: Eric Stewart, Northrop Grumman; Michelle Bourke, Lam Research

1:30 PM – 1:50 PM **6.1 GaN Through-substrate Via Process for GaN-on-GaN HEMT Power Amplifiers**
N. Okamoto[1,2], A. Takahashi[1,2], Y. Minoura[1,2], Y. Kumazaki[1,2], S. Ozaki[1,2], J. Kotani[1,2], T. Ohki[1,2], N. Kurahashi[2], M. Sato[2], N. Hara[1,2] and K. Watanabe[1,2]; [1]Fujitsu Limited, [2]Fujitsu Laboratories Ltd.

1:50 PM – 2:10 PM **6.2 Fabrication of GaN-on-SiC Via by Using OES endpoint detection**
I.Toledo, Y.Gerchman, G.Lerner, M.Vinokorov; Gal-El (MMIC)

2:10 PM – 2:30 PM **6.3 Implementation of End Point Detection for Compound Semiconductor Wafer Thinning Applications and Investigation of Gallium Arsenide Etch Rates and Surface Roughness**

Phillip Tyler[1], Jonathan Fijal[1], Ian Cochran[1], John Taddei[1] Eric Tucker[2], Soo Min Lee[2], Eric Armour[2], Christine Notarangelo[2]; [1]Veeco Instruments – Precision Surface Processing, [2]Veeco Instruments – MOCVD

2:30 PM – 2:50 PM **Vendor Presentations**

2:50 PM – 3:10 PM **6.4 A Systematic Approach for Determining Overlay Spec Limits in Photolithography**
C. Wang, L. Huynh, F. Pool, T. Henderson, B. Lindstedt, C. Nevers; Qorvo

3:10 PM – 3:30 PM **6.5 Uncovering Process Interdependency Using Data Mining**
Kim Kok Gan, Gabe Villareal, Joe Lee; BISTel America

3:30 PM – 3:50 PM **6.6 Electrostatic Discharge (ESD) in AlGaN/GaN HEMT due to Fabrication Process**
Dana Baram, Adam Briga, Ksenya Zaft, Lina Ortenberg, Itzik Toledo, Yaron Knafo; Gal-El (MMIC)

THURSDAY, May 27th **Session 7: Plenary 3**
Session Chairs: Yohei Otoki, SCIOCS; Mario Faria, MAX I.E.G.

9:00 AM – 9:45 AM **7.1 Low-Temperature Direct Wafer Bonding Innovating CS Device Technologies**
Naoteru Shigekawa (*Plenary Speaker)*, Jianbo Liang; Osaka City University

9:45 AM – 10:05 AM **Vendor Presentations**

10:05 AM – 10:35 PM **7.2 Driving Lower Fiber Optical System Power Consumption through Monolithic Electronic and Optoelectronic Integration**
Larry Tarof *(Invited Speaker)*; Elphic

10:35 AM – 10:55 AM **7.3 How are High-Volume 3D Sensing Applications Shaping the Compound Semiconductor Industry?**
E. Dogmus, A. B. Slimane, P.Chiu, P. Mukish, P.Boulay; Yole Développement

10:55 AM – 11:15 AM **7.4 Rapid Capacity Simulation for Planning a 200mm III-V Giga Fab**
Kok Kheong Looi, Patrick See, Ariel Meyuhas; MAX I.E.G. LLC

11:15 AM – 11:35 AM **Vendor Presentations**

THURSDAY, May 27th **Session 8: Materials and Characterization**
Session Chairs: Thomas Roedle, Ampleon; Nick Dellas, Texas Instruments

1:30 PM – 1:50 PM **8.1 Demonstration of High-quality GaN Epitaxy on 200 mm Engineered Substrates for Vertical Power Device Fabrication**
K. Geens[1], H. Hahn[2], H. Liang[1], M. Borga[1], D. Cingu[1], S. You[1], M. Marx[2], R. Oligschlaeger[2], D. Fahle[2], M. Heuken[2], V. Odnoblyudov[3], O. Aktas[3]3, C. Basceri[3] and S. Decoutere[1]; [1]imec, [2]AIXTRON SE, [3]Qromis, inc.

1:50 PM – 2:10 PM **8.2 Evaluation of novel iron-free QuanFINE™ structure by 100nm and 150nm AlGaN/GaN HEMT technology**
Jan Grünenpütt[1], Daniel Sommer[1], Jörg Splettstößer[1], Olof Kordina[2], Jr-Tai Chen[2], Herve Blanck[1]; United Monolithic Semiconductors – [1]GmbH, [2]SweGaN

2:10 PM – 2:30 PM **8.3 Thin $Al_{0.5}Ga_{0.5}N$/GaN HEMTs on QuanFINE® Structure**
Ding-Yuan Chen[1,2], Kai-Hsin Wen[1,2], Mattias Thorsell[2], Olof Kordina[1], Jr-Tai Chen[1], Niklas Rorsman[2]; [1]SweGaN, [2]Chalmers University of Technology

2:30 PM – 2:50 PM **Vendor Presentations**

2:50 PM – 3:10 PM **8.4 Low Off-state Leakage Current Normally-off p-GaN Gate HEMT Using $Al_{0.5}Ga_{0.5}N$ Etching Stop Layer Design**
Min-Hung Shih, Hsiang-Chun Wang, Hsien-Chin Chiu, Hsuan-Ling Kao, Chung-Yi Li; Chang Gung University

3:10 PM – 3:30 PM **8.5 A Study of Wafer-Scale Breakdown Characteristics of Vertical GaN PIN Rectifiers**

Minkyu Cho[1], Matthias A. Daeumer[2], Jae-Hyuck Yoo[2], Marzieh Bakhtiary Noodeh[1], Qinghui Shao[2], Zhiyu Xu[1], Theeradetch Detchprohm[1], Russell D. Dupuis[1], and Shyh-Chiang Shen[1]; [1]Georgia Institute of Technology, [2]Lawrence Livermore National Laboratory

3:30 PM – 3:50 PM **8.6 Using the CnCV Technique to Explore AlN as an Alternative Passivation Layer in GaN HEMT Technology**
Marshall Wilson[1], Hocine Ziad[2]; [1]Semilab SDI, [2]ON-Semiconductor

THURSDAY, May 27th **Session 9: Devices 2: Filters and Photonics**
Session Chairs: Corey Nevers, Qorvo; Steve Mahon, Feldman Engineering

1:30 PM – 1:50 PM **9.1 5G Smartphone and Telecom Infrastructure Markets Are Empowered by Compound Semiconductors**
P. Chiu, E. Dogmus, A.B Slimane, C. Malaquin, A. Bonnabel, C. Troadec; Yole Développement

1:50 PM – 2:10 PM **9.2 State-of-the-Art Etch and Deposition Processing of Highly Doped AlScN for 5G and Wi-Fi Filter Applications**
Anthony Barker, Joanne Carpenter, Kevin Riddell, Alex Wood; SPTS Technologies Ltd

2:10 PM – 2:30 PM **9.3 Developing Production Process for High Performance Piezoelectrics in MEMS Applications**
Andrea Mazzalai, Xiang Yao; EVATEC A. G.

2:30 PM – 2:50 PM **Vendor Presentations**

2:50 PM – 3:10 PM **9.4 Continual Improvement of Cumulative Yield in GaAs Wafer Fabrication**
Michael Welch, Mario Faria; MAX I.E.G.

3:10 PM – 3:30 PM **9.5 Benzocyclobutene (BCB) Process Development and Optimization for High-Speed GaAs VCSELs and Photodetectors**
Dufei Wu[1], Xin Yu[2], Yu-Ting Peng[1], Milton Feng[1]; [1]University of Illinois at Urbana-Champaign, [2]Foxconn-Interconnect-Technology (FIT) U.S Research and Development Center

3:30 PM – 3:50 PM **9.6 Standing Wave Engineering for Mode Control in Single-Mode Oxide-Confined Vertical-Cavity Surface-Emitting Lasers**
Kevin Pikul, Patrick Su, Mark Kraman, Fu-Chen Hsiao, John M. Dallesasse; University of Illinois at Urbana-Champaign

3:50 PM – 4:30 PM **CLOSING CEREMONY**