

GOMACTech-22 Workshops

Trusted Supplier Industry Day

Sponsor: Lisa McIlrath

Monday March 21, 2022, 8AM-5PM

The 11th Trusted Supplier Industry Day will be an interactive event with an opportunity for all attendees to hear from key leaders and provide input on the critical issues facing our community. The theme of the day is “Enabling Distributed Capabilities: Microelectronics Thriving in the Face of Change” and is meant to provoke discussion on how the industry should address the current challenges. The keynote speaker, Dr. Willy Shih of Harvard Business School, will address the complex interdependencies of globalized supply chains and how organizations are rethinking their operations to ensure resilience in the face of disruption. The keynote will be followed by a panel comprised of members of the Defense Microelectronics Cross Functional Team discussing current focus and initiatives. The Honorable Ian Paul Steff, former assistant secretary of Commerce for Global Markets, will discuss the status of the CHIPS for America Act and the role of the USICA and AMERICA Competes acts for evolving a strong domestic semiconductor industry. The Trusted Electronics Supplier Group, an industry group of circuit assembly companies, have planned an afternoon session featuring a government panel, industry presentations, talks from IPC and USPAE, and a discussion on today’s domestic circuit board and chip assembly industry. Please join us on March 21st for a lively and important discussion of the most critical electronics issues of the day!

Ultra Wide Band Gap Workshop

UWBG Materials and Devices: Ready for Prime Time? Technical Challenges to Creating a Viable UWBG Device Technology

Sponsor: Dr. Thomas Kazior

Date: Monday March 21, 2022, 8AM-5PM

Future systems require higher performance (e.g., higher output power RF devices, higher power handling switching transistors and protection circuits, high temperature transistors, UV sources) to meet application requirements. Just as SiC and GaN technology provided a leap ahead in capability over legacy Si and GaAs technology, the Ultra-Wide BandGap (UWBG) semiconductors (e.g., AlN, cBN, diamond, Ga₂O₃) show promise as the next leap in RF, power and opto-electronics. However, these materials and associated devices are in their infancy. The objective of this workshop is to review the current status of UWBG material and device research and identify the key technical challenges (material quality/defectivity, thermal limitations, reliability, integration/packaging - codesign) that must be overcome to make UWBG devices ready for system insertion.

GaN Workshop

Advanced GaN Modeling: New Modeling Paradigms Based on a Physics-Based Compact Model Framework

Sponsor: Tony Quach, Steve Hary

Date: Monday March 21, 2022, 8AM-5PM

This technical workshop will provide an overview of state-of-the-art advances in non-linear modeling of GaN HEMT high frequency power devices. The focus will be on a new paradigm shifting framework to be used in next generation GaN MMIC designs. The new framework is founded on a physics-based compact modeling core. This relatively new class of GaN models, in contrast to purely empirical compact models, such as the popular Chalmers-Angelov model, include model parameters and equations that are tied to the GaN-specific physical material and geometry parameters. Examples are the ASM-HEMT model and the MIT Virtual Source physics-based compact models. These models enable improved scalability of process parameters (beyond the conventional gate-width and number of fingers), more meaningful statistical analyses and allow extrapolation to operating domains outside of the extraction data set. The Air Force Research Laboratory (AFRL), in collaboration with a Qorvo-led team is pursuing extension of these advanced core modeling capabilities to equip designers with the ability to predict aging and reliability at the initial design stage, along with the nominal performance optimization capability required of all useful non-linear GaN compact models.

This workshop will provide an overview of the exciting new GaN modeling framework that is being developed, built around a physics-based modeling core, with extensions that include: foundry process scaling, advanced charge-trapping treatments and long-term aging and reliability estimations that will bring significant new capabilities and agility to future GaN-based circuit design processes. Opportunities for additional organizations to participate in a related “Design Challenge” and to have future access to the new modeling framework will also be discussed.

JFAC Workshop

Sponsor: Mona Massuda

Date: Monday March 21, 2022, 1-6PM

The Joint Federated Assurance Center (JFAC) is a federation of Department of Defense (DoD) organizations that promote and enable Software and Hardware Assurance. JFAC member organizations and their technical service providers interact with DoD Program Offices and other government agencies to provide software and hardware assurance expertise and support. JFAC lab capabilities and services include vulnerability assessment, detection, analysis, mitigation assessment and guidance, information on emerging threats and capabilities, software and hardware assessment tools and services, and best practices.

This workshop will serve to educate the broader DoD, intelligence community, defense industrial base, and industry on JFAC capabilities and services and specifically identify efforts in support of Trusted & Assured Microelectronics and the Microelectronics Quantifiable Assurance initiatives.

ACT-IV Digital Array Workshop

Sponsor: Bae-Ian Wu, Tom Dalrymple

Date: Monday March 21, 2022, 8AM-12PM

Northrop Grumman Corporation delivered the Arrays at Commercial Timescales Integration and Validation (ACT-IV) system to the Defense Advanced Research Projects Agency (DARPA) and the Air Force Research Laboratory (AFRL). ACT-IV is one of the first multifunction systems based on a digital AESA using the semiconductor devices developed on the DARPA Arrays at Commercial Timescales (ACT) program. By applying the flexibility of the digital AESA, the ACT-IV system can perform radar, electronic warfare and communication functions simultaneously by controlling a large number of independent digital transmit/receive channels. The agility of the digital AESA was demonstrated during multiple demonstrations at the Northrop Grumman test range and will enable future warfighters to quickly adapt to new threats, control the electromagnetic spectrum, and connect to tactical networks in support of distributed operations. The ACT-IV system will be a foundational research asset for the Department of Defense's multi-service research initiative for digital radars and multifunction systems. This initiative will support a community of researchers that are developing new algorithms and software to explore the possibilities of next generation digital AESAs for national security missions. This workshop will cover the ACT-IV system and ongoing mode development activities at AFRL.