



GOMACTech Workshops and Tutorials

Trusted Suppliers Industry Day

Monday, 20 March, 2023, 8:00 AM – 5:00 PM

Sunday Night Reception, March 19, 2023, 6:00 – 8:00 PM

Town and Country Ballroom A

“Microelectronics – the Engine to Keep the US Moving Forward”

The 12th 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. We have seen tremendous change since last year’s Industry Day, not only with the enactment and funding of the CHIPS and Science Act but also with the increasing uncertainty regarding China’s intentions with Taiwan. To provide insight into these issues, Dr. Tai Ming Cheung, recipient of multiple DoD Minerva Research Initiative awards and director of the University of California Institute on Global Conflict and Cooperation (IGCC), is scheduled to deliver the keynote address on the emergence of the Chinese techno-security state. The keynote will be followed by a panel comprising members of the Defense Microelectronics Cross Functional Team discussing current focus and initiatives. Confirmed speakers include Dr. Mike Fritze of the Potomac Institute for Policy Studies and a member of the CHIPS Industry Advisory Committee; Dr. Nick Martin, Director, Defense Microelectronics Activity; Dr. Matt Kay, Program Manager, Trusted & Assured Microelectronics; Dr. Alison Smith, Program Lead, DoD Microelectronics Commons; Dr. Yadu Zambre, Chief Microelectronics Technology Officer, AFRL; Kirk Thompson, MITRE Engenuity’s Semiconductor Alliance; Chris Peters, Executive Director, U.S. Partnership for Assured Electronics; and Chris Mitchell, Vice President – Government Relations, IPC. As you can see, we have a full day planned designed to provoke thoughtful conversations! Please join us on March 20th to add your voice to the discussion of the most critical electronics issues of the day.

Advanced GaN Modeling Workshop

Monday, 20 March, 2023, 8:00 AM – 5:00 PM

Town and Country Ballroom B

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 also 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 Hardware Assurance Workshop
Monday, 20 March, 2023, 8:00 AM – 5:00 PM
Town and Country Ballroom C

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 program offices and their performers to provide software and hardware assurance expertise and support, to include vulnerability assessment, detection, analysis, and remediation services, as well as information about emerging microelectronics risks, software and hardware assessment tools, services, and best practices.

This workshop will serve to educate the DoD and National Security Innovation Base (NSIB) community on JFAC capabilities and how programs, in support of meeting their microelectronics assurance needs, can utilize JFAC.

GEEGAH Fab Capabilities & PDK for Acoustoelectric Devices Tutorial
More-Than-Moore Using Piezoelectric CMOS-MEMS PDK
Monday, 20 March, 2023, 8:00 AM – 12:00 PM
Town and Country Ballroom D

This session will provide an overview of Geegah’s efforts in developing a general-purpose piezoelectric MEMS on CMOS process design kit. Piezoelectric devices require innovations in material science, device physics, fabrication, and integration of electronics. Geegah is developing the PDK to reduce the barrier for designers to realize highly capable microsystems that can simultaneously enable sensing, actuation, and computation, in a turnkey fashion. This session will introduce the myriad piezoelectric devices such as RF filters, BAW transducers, PMUTs, microphones, speakers, energy harvesters, etc. The need for CMOS integration will be illustrated by circuit models that minimize sensitivity-degrading parasitic circuit

elements. The manufacturing process of the Geegah PDK will be covered and will be compared to various other PiezoMEMS processes available. Examples of existing Piezo/CMOS devices will be presented that include Geegah ultrasonic imagers, PMUTs, and filters. Guidance on using the future PDK for sample devices will be given as a mini-tutorial. We aim to provide training to attendees on how to design new devices and make complex systems out of standard building blocks from the nominal Piezo-MEMS PDK. This workshop will serve to educate the broader DoD, intelligence community, defense industrial base, and industry on PiezoMEMS capabilities and services at Geegah.

AKOUSTIS Fab Capabilities + PDK for AlN/ScAlN Tutorial

Learn to Design in the Akoustis XBAW Foundry: A Manufacturable, Compact, High-Performance BAW and MEMs Filter Technology from 10's of MHz through Ku Band

Monday, 20 March, 2023, 1:00 – 5:00 PM

Town and Country Ballroom D

Akoustis uses pioneering materials science and process technology to develop resonators and RF filters with improvements in size, bandwidth, operating frequency, and power required for next generation WiFi, 5G infrastructure, 5G mobile, and defense applications. Bulk acoustic wave (BAW) is the technology of choice for RF signal filtering in the range of 2 - 7 GHz because it enables compact high-performance filters, leading to smaller systems, improved design tradeoffs and lowered system cost. The high quality-factor (Q) of BAW resonators enables improved performance, lower passband loss, and steeper filter skirts. Under the DARPA COFFEE program, Akoustis is expanding its BAW technology through Ku band.

In this workshop, Akoustis will showcase the capability and performance of XBAW, a novel manufacturing process, capable of producing state-of-the-art BAW RF resonators and filters. Using this XBAW wafer manufacturing process and a variety of advanced high-quality piezoelectric materials including single crystal and high purity polycrystalline AlN and AlScN thin films, RF filter solutions are created to address needed improvements in bandwidth, operating frequency, and output power compared to incumbent BAW technology deployed today. In addition to BAW filters, Akoustis will present the capability of the XBAW wafer manufacturing platform to extend into the MHz frequency spectrum, demonstrating high-performance Micro-Electro-Mechanical (MEMS) resonators using various acoustic vibrational modes with improved AlN and AlScN piezo electric materials. Akoustis will present its XBAW Foundry services, including an overview of the technology and examples of designing filters using process design kits (PDK) offered by Akoustis XBAW Foundry for realizing BAW and MEMs resonators and filters.