GaN Workshop

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.