

## **SESSION 9: GaN DEVICE MANUFACTURING**

Chair: Scott Sheppard, *Cree, Inc.*

The GaN Device Manufacturing session contains four regular papers and one student paper that each address different aspects of GaN HMET device manufacturing: process intolerance to variable free-standing wafer shape, improved ohmic contacts, threshold voltage control, improved metal liftoff and MMIC technology. The session begins with a discussion from P. Kurpas of FBH-Berlin on a method to process and benchmark GaN devices on wafers from various epitaxial vendors who deliver a broad range of bow and/or irregular shapes. The second paper from H. P. Xin of Northrop Grumman Space Technology covers an exciting overview of AlGaIn/GaN HMET ohmic contacts that are optimized for improved surface morphology with low contact resistance, which is a crucial topic for proving that GaN is truly manufacturable. Third in line is a student paper from H. Chen at Hong Kong University of Science and Technology. This is a very clever report showing the manufacturability of enhancement mode GaN HEMT devices can be achieved using the extremely mature technology of threshold voltage control by selective ion implantation. Next will be a regular paper from R. Behtash of United Monolithic Semiconductors, explaining their method to remove metal skirts from thick evaporated Au stacks. This manufacturing solution to a tough problem offers promise for improved device performance. Completing the session will be an overview from P. Waltereit of Fraunhofer-Freiburg of X-band MMIC processing and performance. He reports on device performance and reliability of their 3-inch GaN HEMT and MMIC technology on SiC substrates.