

Title: Advances in III-N Devices for 5G and Beyond

Abstract:

Achieving the vision and promise of 5G (and beyond) communication systems requires significant advancements in device technologies. To obtain the low latency and high bandwidths required on a mobile platform, devices offering millimeter-wave performance with low power consumption while simultaneously delivering low noise figure, high linearity, and the ability to be integrated into complex systems in compact form factors are essential. The unique properties of the III-N material system (e.g. polarization, LO phonon mediated electron transport) enables new approaches for designing millimeter-wave transistors for switching and low-noise amplifier applications, while novel fabrication processing techniques such as epitaxial lift-off and the use of ferroelectric gate stacks provide additional options for realizing highly-integrated heterogeneous systems with enhanced performance. In this talk, recent advances in these areas that promise to provide significant improvements will be presented.

Bio:

Patrick Fay is a Professor in the Dept. of Electrical Engineering at the University of Notre Dame; he received a Ph.D. in electrical engineering from the University of Illinois at Urbana-Champaign in 1996. His research focuses on the design, fabrication, and characterization of microwave and millimeter-wave electronic devices and circuits, as well as the use of micromachining techniques for the fabrication of RF through sub-millimeter-wave packaging. He established the High Speed Circuits and Devices Laboratory at Notre Dame, which includes device and circuit characterization capabilities at frequencies up to 1 THz. He also oversaw the design, construction, and commissioning of the 9000 sq. ft. class 100 cleanroom housed in Stinson-Remick Hall at Notre Dame, and has served as the director of this facility since 2003. Prof. Fay is a fellow of the IEEE, is an IEEE Electron Devices Society Distinguished Lecturer, and has published 11 book chapters and more than 350 articles in scientific journals and conference proceedings.

