**Seminar:**
**Vertical GaN Power Devices: Research Advances and Navy Applications**

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10:00- 11:00 AM, November 1, 2018, Thursday
Room 1116, Marcus Nanotechnology Building, Georgia Institute of Technology
345 Ferst Dr. NW, Atlanta, GA

**Abstract:**
Wide bandgap semiconductors such as SiC and GaN represent the next-generation materials for high performance medium voltage and high voltage power switch technology. Vertical SiC power device technology has matured rapidly over the past two decades, owing to advances in substrates, a fundamental understanding of epitaxial growth to eliminate performance-limiting defects, as well as device design breakthroughs. This has enabled breakthroughs in highly integrated module design for medium voltage power conversion with switching frequency >100 kHz. In parallel, lateral GaN-based high electron mobility transistor (HEMT) technology has been highly successful for RF power amplifiers and is well positioned to supersede GaAs-based microwave circuits. Recently, GaN-based vertical and lateral power devices have attracted significant interest due to promising device results coupled with progress in native substrate, epitaxial growth, and processing technology developments. The realization of high performance vertical GaN devices relies heavily on advances in both epitaxial growth of GaN drift layers on commercially available GaN substrates and selective area n-type and p-type doping in a planar process. This talk will present an assessment of substrate-dependent effects on the quality of homoepitaxial GaN films, evaluate ion implantation processing for selective area doping, address basic vertical devices such as vertical GaN junction barrier Schottky (JBS) diodes and Schottky barrier diodes (SBDs) with implanted junction termination extension (JTE) using the NRL-developed symmetric multicycle rapid thermal annealing (SMRTA) process, and identify process module development toward vertical trench MOSFET devices.

**Biography:**
Travis Anderson is a senior chemical engineer in the High Power Electronics Branch at the U.S. Naval Research Laboratory in Washington, DC, where his work focuses on wide bandgap power switches. He has expertise in processing, reliability, failure mechanisms, and radiation effects in GaN, SiC, diamond, and graphene-based devices. Dr. Anderson received a PhD in Chemical Engineering from the University of Florida in 2008, and a BS in Chemical Engineering from the Georgia Institute of Technology in 2004. He is the author of over 200 publications, 250 presentations (70 invited), and has been awarded 31 patents.