Presenter: Vincent Meyers, SUNY Poly PhD Candidate
Title: Microwave-induced annealing, its impact on Mg diffusion, and photoluminescence activity in implanted and *in-situ* doped GaN
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Wide bandgap III-Nitride materials, including GaN, AlN, InN and their alloys, are among the most technologically important material systems. Over the last three decades, III-nitrides have become invaluable for applications including high brightness visible and UV LEDs, lasers, power management, RF, and optoelectronic devices. Formation of selective-area p-type regions either by ion implantation or selective area growth is critical for field management in both lateral and vertical device architectures and remains a significant challenge for higher-voltage next-generation GaN and AlGaN architectures. Activation of the p-type dopant Mg, especially in the case of ion-implanted $Al_xGa_{1-x}N$, requires temperatures high enough to cause significant diffusion of the dopant, potentially distorting the doped region shape. In my talk, I will review the use of novel gyrotron microwave annealing for efficient activation of implanted Mg dopants into GaN films. Through this method I show the presence of Mg_{Ga} acceptor optical activity by photoluminescence (PL). Evidence of Mg diffusion during annealing will be discussed and compared to diffusion rates during conventional thermal annealing.