

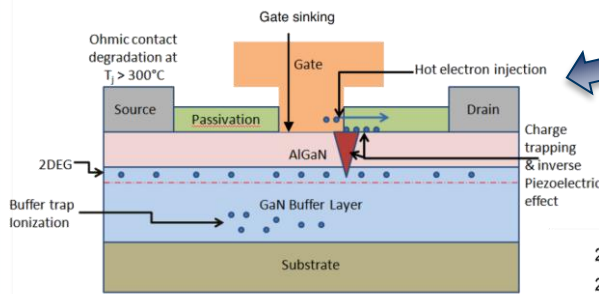


**Brent Gila, Associate Director of the RSCs**

Dr. Brent Gila holds a PhD (2000) in Materials Science & Engineering at the University of Florida. In 2008, Brent joined the NRF staff and became NRF Director in 2011. His background is synthesis and characterization of semiconductor materials and devices and he has over 200 publications in these related fields.

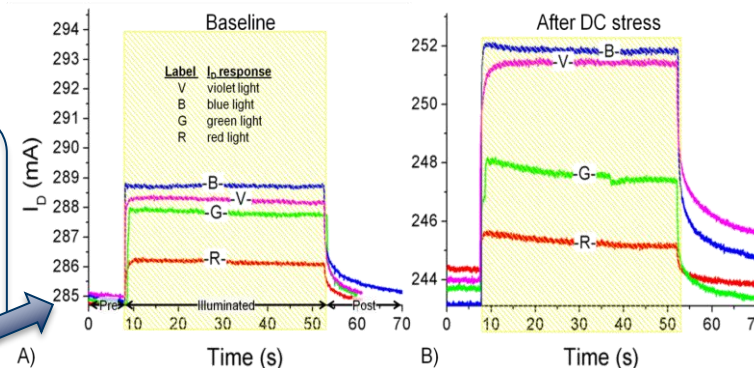
**Sub-bandgap optical pumping defect analysis in AlGaIn/GaN HEMT's**

Native defects in GaN can lead to premature device failure in high power and high temperature device applications.

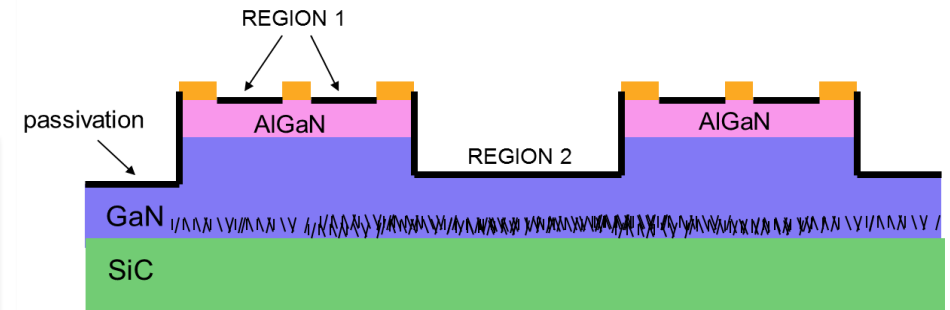


**AlGaIn/GaN Failure Mechanisms:**  
 crystalline defects (dislocations, vacancies, impurities), interface diffusion, mechanical stress, thermal stress

**Excitation with sub-bandgap light.** Certain traps respond to different wavelengths. The change in current response is equal to a change in trap population.



**Device surface passivation**



**Device passivation in source/drain region and between devices.** Improves performance and reliability. Crystalline oxides outperform traditional silicon nitride on AlGaIn/GaN devices.

**Power Measurements Before and After Sc<sub>2</sub>O<sub>3</sub> Passivation ~ 10nm**

