



Basic Research Innovation Collaboration Center (BRICC)  
 4100 N Fairfax Drive, Suite 450  
 Arlington, VA 22203

**Combined MURI/COE/Core Projects Review**

**Agenda Day 1 | November 1, 2023**

Time	Topic	Speaker
8:00	Check-in	
8:30	Welcome and logistics	Art Edwards, Ken Goretta, and Michael Yakes - AFOSR
8:40	Overview of MURI	Rongming Chu, Penn State U
8:55	Overview of COE	Ron Schrimpf, Vanderbilt U
9:10	Discussion of coordination among projects	

**Theory Session**

9:30	Radiation-induced crystalline defects in GaN/AlN/AlGaN by molecular dynamics	Mia Jin, Penn State U
9:55	Threshold defect formation and properties in GaN/AlN/AlGaN	Blair Tuttle, Penn State U
10:20	<b>BREAK</b>	
10:50	Defect processes enabled by radiation-induced excess electron-hole pairs – A comparative study of Ga <sub>2</sub> O <sub>3</sub> , GaN, and SiC	Sok Pantelides, Vanderbilt U
11:15	Fundamental studies of radiation damage mechanisms in wide-band-gap semiconductors	Chris Van de Walle, UCSB
11:40	Bulk and near-interface, charged point defects in SiC, SiO <sub>2</sub> , and GaN	Renee van Ginhoven, AFRL Directed Energy
12:05	<b>LUNCH</b>	

**Theory Session Continues**

1:15	Local defect properties and their signatures in electrical probes of GaN defect spin dynamics	Michael Flatte, U Iowa
1:40	Thermalization of radiation-induced carriers in insulators and wide bandgap semiconductors	Max Fischetti/Dallin Nielsen, U Texas at Dallas

<b>2:05</b>	Intrinsic and extrinsic defects in AlN and AlGaN	Art Edwards, AFRL Space Vehicles
<b>2:30</b>	Discussion of expectations for remainder of day	
<b>2:40</b>	<b>BREAK</b>	
<b>3:00</b>	Panel discussion: Connecting theory to experiments for understanding radiation effects	
<b>5:00</b>	Panel discussion: Emerging needs in radiation effects (participants from the advisory board)	
	<b>Review Adjourn</b>	

<b>Agenda Day 2   November 2, 2023</b>		
<b>Time</b>	<b>Topic</b>	<b>Speaker</b>
<b>8:00</b>	Check-in	
<b>8:30</b>	Overview of Day 2	
<b>Sample Fabrication Session</b>		
<b>8:40</b>	Development of high-voltage and radiation-hard vertical GaN p-n diodes	Jim Speck, UCSB
<b>9:05</b>	Development of high-voltage and radiation-hard vertical $\beta$ -Ga <sub>2</sub> O <sub>3</sub> Schottky diodes	Esmat Farzana, UCSB and Iowa State U
<b>9:20</b>	Engineering radiation performance through wide bandgap transistor design – extreme-permittivity dielectrics and tri-gate geometry	Siddharth Rajan, Ohio State U
<b>9:45</b>	Alloying and doping effects on radiation hardening properties of wide gap semiconductors and scintillator crystals	Arnold Burger, Fisk U
<b>10:10</b>	<b>BREAK</b>	
<b>Device Design Session</b>		
<b>10:25</b>	Design and fabrication of GaN device test structures for collaborative research on radiation effects	Rongming Chu, Penn State U
<b>10:50</b>	Extreme permittivity for electric field management: Overcoming SEEs in wide bandgap space power electronics	Shin Mou and Adam Neal, AFRL Materials and Manufacturing
<b>11:15</b>	Heterogeneous integration of GaN-HEMTs for RF applications	Mona Ebrish, Vanderbilt U

<b>11:40</b>	Transient current induced by heavy ion single event in field-plate and super- heterojunction GaN devices	Jianan Song, Penn State U
<b>12:05</b>	<b>LUNCH</b>	
<b>Defect Spectroscopy Session</b>		
<b>1:15</b>	Cavity formation in GaN/AlN by swift heavy ion irradiation	Xing Wang, Penn State U
<b>1:40</b>	High-resolution X-ray diffraction to characterize radiation-induced defects and strain in GaN epitaxial structures	Reeja Jayan, Carnegie Mellon U
<b>2:05</b>	Electron spin techniques to investigate radiation damage in GaN based devices	Pat Lenahan, Penn State U
<b>2:30</b>	DLTS and DLOS studies of radiation effects in GaN and Ga <sub>2</sub> O <sub>3</sub> for electronics and AlGaInP for space PV	Steve Ringel, Ohio State U
<b>2:55</b>	Impact of radiation-induced defects on WBG/UWBG transistors	Aaron Arehart, Ohio State U
<b>3:20</b>	Poster session	
<b>4:50</b>	<b>Review Adjourn</b>	

<b>Agenda Day 3   November 3, 2023</b>		
<b>Time</b>	<b>Topic</b>	<b>Speaker</b>
<b>8:00</b>	Check-in	
<b>8:30</b>	Overview of Day 3	
<b>Radiation Effects Experiments Session</b>		
<b>8:40</b>	New insights into the low-frequency noise of GaN-based HEMTs and Si MOS transistors	Dan Fleetwood, Vanderbilt U
<b>9:05</b>	Single event effects in wide bandgap high voltage devices	Sajal Islam, Vanderbilt U and Enxia Zhang, UCFU
<b>9:25</b>	Effects of gamma irradiation on GaN devices	Nate Martin, Penn State U
<b>9:50</b>	Response of wide-bandgap semiconductors to energetic heavy-ion irradiation	Maik Lang, U Tennessee
<b>10:15</b>	Understanding radiation-induced defects in GaN devices by electrical characterization techniques	Tania Roy, Duke U
<b>10:40</b>	Perspectives on radiation damage of space-based electronics (Stefania Esquer and Jesse Mee	AFRL Space Vehicles

<b>11:00</b>	<b>BREAK</b>
<b>Breakout Meetings</b>	
<b>11:10</b>	Advisory board
	MURI Team
	COE Team
<b>12:00</b>	<b>LUNCH</b>
<b>1:00</b>	Discussion and feedback
<b>2:00</b>	<b>Review Adjourn</b>