

## EDUCATION

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**Doctor of Philosophy in Electrical Engineering – Electronics**

*Expected Graduation February 2019*

Virginia Tech, Blacksburg, Virginia

Research Topic: Understanding the effect of carbon contamination in GaN drift layers for power devices

**Master of Science in Electrical Engineering – Electronics**

*December 2014*

Virginia Tech, Blacksburg, Virginia

Thesis Title: “Electrical Characterization of Ruthenium Dioxide Schottky Contacts on GaN”

**Bachelor of Science in Electrical Engineering**

*May 2009*

Georgia Institute of Technology, Atlanta, Georgia

## RESEARCH INTERESTS

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Understanding non-idealities in semiconductor device operation through electrical and optical characterization methods with a focus on power semiconductor materials and devices

## RESEARCH EXPERIENCE

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**Graduate Researcher**, Graduate Program at Virginia Tech

*January 2010 to Present*

Virginia Tech, Blacksburg, Virginia

Research Mentor: Louis Guido, PhD

- Project: Understanding the effects and origin of deep-level traps in GaN power devices introduced during MOCVD growth
- Fabricate Schottky and PN diodes in a cleanroom environment capable of large breakdown voltages and low on-resistances
- Utilize optical and electrical characterization methods (DLTS, SSPC, IV, CV etc.) to explain deviations from ideal operation

**Summer Intern**, Electronic Systems Sector at Northrop Grumman

*May 2010 to August 2010*

Northrop Grumman Advanced Technology Labs, Baltimore, MD

Internship Mentors: Monica Lilly and Joe Payne, PhD

- Created high resolution Raith E-Beam lithography process to minimize CNTFET channel
- Produced a DUV process for higher resolution photolithography and assisted colleagues with SEM imaging

**Undergraduate Researcher**, NNIN REU Program at Cornell NanoScale Facility

*May 2008 to August 2008*

Cornell University, Ithaca, NY

Research Mentor: Mr. Donald Tennant

- Project: “Using Near-field Holography to Investigate Super Hydrophobic Surfaces”
- Created high resolution resist process for near-field holography system in the attempt to study its application for super hydrophobic surfaces

**Undergraduate Researcher**, Georgia Tech Research Institute Nanotechnology Lab

*August 2007 to May 2009*

Georgia Institute of Technology, Atlanta, Georgia

Research Mentor: W. Jud Ready, PhD

- Project: “Correlation of Design Parameters in Carbon Nanotube-Based Supercapacitors”
- Developed process and fabricated carbon nanotube electrodes for electro-chemical double layer supercapacitors

## PUBLISHED WORK

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- *[In Progress]* Allen, Noah, et al. “Modeling forward and reverse IVT Schottky characteristics on GaN with a Log-Normal barrier height distribution”
- *[In Progress]* Allen, Noah, et al. “Impact of increasing TMGa and Silane on GaN carrier concentration and deep level defects by metal organic chemical vapor deposition”
- Wang, Jingshan, et al. “Thin-film GaN Schottky diodes formed by epitaxial lift-off” *Applied Physics Letters* 110.17 (2017): 173503.
- Chern, Kevin T., et al. “GaN/GaN solar cells made without p-type material using oxidized Ni/Au Schottky electrodes.” *Materials Science in Semiconductor Processing* 55 (2016): 2-6.
- Nguyen, Peter D., et al. “Heteroepitaxial Ge MOS Devices on Si Using Composite AlAs/GaAs Buffer.” *IEEE Journal of the Electron Devices Society* 3.4 (2015): 341-348.
- Chern, Kevin T., et al. “GaN/GaN-Ni/Au transparent conducting oxide Schottky barrier solar cells.” *Photovoltaic Specialist Conference (PVSC), 2014 IEEE 40th. IEEE*, 2014.
- Allen, Noah, et al. “Paper-based capacitive mass sensor.” *Sensors, 2011 IEEE*

## TEACHING & MENTORING EXPERIENCE

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**Instructor**, Electrical Engineering Department at Virginia Tech

*Summer I 2016*

Course Titles: (ECE 2004) Electric Circuit Analysis

- Introduced basic laws and analysis techniques for electric circuits

# Noah P. Allen

## TEACHING & MENTORING EXPERIENCE (CONTINUED)

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**Instructor, Electrical Engineering Department** at Virginia Tech

*Summer II 2015*

*Course Titles: (ECE 2204) Electronics*

- Introduced concepts of non-linear electronic devices including theory, biasing and circuit design.

**Instructor, Engineering Education Department** at Virginia Tech

*Summer I/II 2014*

*Course Title: (ENGE 1104) Exploration of Digital Future*

*Summer I 2013 <sup>(2)</sup>*

- <sup>(1)</sup>Successfully introduced the use of LabVIEW myDAQ as a tool for teaching electric circuit theory and computer programming
- <sup>(2)</sup>Designed and implemented Arduino-based microcontroller workshops as a means for introducing embedded programming and circuit design

*Spring 2013*

*Summer II 2012*

*Summer II 2011 <sup>(1)</sup>*

**Teaching Assistant, Electrical Engineering Department** at Virginia Tech

*Summer I 2012*

*Course Titles: (ECE 2504/3544) Intro. To Computer Engineering / Digital Design I*

Instructor: Jason Thweatt

- Provided support for two courses answering questions, validating lab assignments and grading homework, tests and projects

**Graduate Mentor, Electrical Engineering Department** at Virginia Tech

*Fall 2012*

*Student: Evan Clinton (ECE Junior)*

*Spring 2012*

- Mentored undergraduate student in the area of semiconductor characterization techniques
- Guide student in the practices of IV, IVT, and CV electrical measurements along with the data analysis for characterizing Gallium Nitride Schottky diodes
- Advise student on final presentation encompassing work done during semester

**Teaching Assistant, Electrical Engineering Department** at Virginia Tech

*Spring 2011*

*Appointment: Electronics/Circuit Support Group*

*Fall 2012*

Advisor: Dennis Sweeney, PhD

- Fielded questions pertaining to 7 undergraduate circuit analysis and electronics courses along with providing support for the MATLAB and PSPICE software packages

**Teaching Assistant, Engineering Education Department** at Virginia Tech

*Fall 2012*

*Course Title: (ENGE 1024) Engineering Exploration*

Instructors: Jaime De La Reelopez, PhD / Kacie Hodges, PhD / Holly Matusovich, PhD

- Instructed three lab sections where the engineering design process, scientific method and professional ethics topics and applications were covered

**Student Worker, Engineering Education Department** at Virginia Tech

*Summer I/II 2011*

Advisor: Tom Walker

- Employed by Engineering Education Department to create LabVIEW myDAQ projects used to demonstrate different Electrical and Computer Engineering practices

**Teaching Assistant, Engineering Education Department** at Virginia Tech

*Spring 2011*

*Course Title: (ENGE 1104) Exploration of Digital Future*

Instructor: Tom Walker

- Introduced students to computer and software based technologies in a lab setting
- Received highest evaluation as a teaching assistant during semester

## AWARDS & ACTIVITIES

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- Bradley Department of ECE Bradley Fellowship Award, Spring 2015
- Engineering Education Teach Talks Scholarship, Spring 2013
- Electrical Engineering Department Fellowship Award, Spring 2011
- ETA KAPPA NU (HKN) Electrical and Computer Engineering Honor Society, February 2010
- Student Member, IEEE, January 2007 - Present
- Presidential Undergraduate Research Award, UROP, August 2008
- PURA Travel Award, UROP, March 2008/February 2009
- Poster Presentation at Annual TMS Conference, March 2008/February 2009
- Intel Diversity Summit 2008, Intel Foundation, August 2008
- Intel 2008 REU Fellow, Intel Foundation, May 2008

## SKILLS

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- Class 100/1000 Cleanroom Experience, *Georgia Tech MRC / Cornell NanoScale Facility / Virginia Tech MicrON Cleanroom*
- Semiconductor Device Processing Experience, *GaN / GaAs / InN / Si*
- Programming and Modeling Knowledge, *Crosslight / L-Edit / Silvaco SSuprem3 / C / LabVIEW / MATLAB / VHDL / Assembly*