

CURRICULUM VITAE

Narae Kang

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EDUCATION

- 2015 **Doctor of Philosophy in Physics**
University of Central Florida, Orlando, FL
- 2012 **Master of Science in Physics**
University of Central Florida, Orlando, FL
- 2009 **Bachelor of Science in Applied Physics**
Hanyang University, Republic of Korea

PROFESSIONAL AFFILIATIONS

- 2015-Present **Senior Device Engineer/Scientist**
Intel Corp., Hillisboro, OR
- 2015 **IBM Integration Engineer/Scientist**
GlobalFoundries, Malta, NY
- 2010-2015 **Graduate Research Assistant**
University of Central Florida, Orlando, FL
- 2010-2012 **Graduate Teaching Assistant**
University of Central Florida, Orlando, FL
- 2008-2009 **Undergraduate Research Assistant**
Hanyang University, Republic of Korea

HONORS AND AWARDS

- 2015-2018 Employee Recognition Awards, Intel Corp.
- 2015 Grand Prize for Poster Presentation, Florida-American Vacuum Society
- 2013-2015 Graduate Research Excellence Fellowship, University of Central Florida
- 2012-2015 Graduate Travel Fellowship Award, University of Central Florida
- 2012-2015 SGA Travel Expense Award, University of Central Florida
- 2013 Honorable Mention for Poster Presentation, Florida-American Vacuum Society
- 2009 Summa Cum Laude, Hanyang University
- 2008 Grand Prize of Contest in Applied Science Technology, Hanyang University
- 2006-2009 Excellence Student Scholarship for Mentor Activities, Hanyang University

PUBLICATIONS

[DISSERTATION]

- **N. Kang**, *Nanoelectronic Device using Carbon Nanotubes and Graphene Electrodes: Fabrication and Electronic Transport Investigations* for the degree of Doctor of Philosophy (2015)

[JOURNAL PUBLICATIONS]

1. **N. Kang**, B. K. Sarker, and S. I. Khondaker, *Density Dependence Investigation on Semiconducting Carbon Nanotube Thin Film Transistors Using Metallic Carbon Nanotube Electrode (Under Review)*
2. **N. Kang**, C. W. Smith, M. Ishigami, and S. I. Khondaker, *Comparative Study of Organic Transistors with Different Graphene Electrodes Fabricated using a Simple Patterning Method*, Applied Physics Letter, 111, 233303 (2017)
3. N. Choudhary, M. R. Islam, **N. Kang**, L. Tetard, Y. Jung, S. I. Khondaker, *Two-dimensional lateral heterojunction through bandgap engineering of MoS₂ via oxygen plasma*, Journal of Physics: Condensed Matter 28 (36), 364002 (2016)

4. **N. Kang**, and S. I. Khondaker, *The Impact of Carbon sp^2 Fraction of Reduced Graphene Oxide on the Performance of Reduced Graphene Oxide Contacted Organic Transistors*, Applied Physics Letter, 105, 223301 (2014)
 5. **N. Kang**, H. P. Paudel, M. N. Leuenberger, L. Tetard, and S. I. Khondaker, *Photoluminescence Quenching in Single-Layer MoS_2 via Oxygen Plasma Treatment*, Journal of Physical Chemistry C, 118, 21258 (2014)
 6. M. R. Islam, **N. Kang**, U. Bhanu, H. P. Paudel, M. Erementchouk, L. Tetard, M. N. Leuenberger, and S. I. Khondaker, *Tuning the Electrical Property via Defect Engineering of Single Layer MoS_2 by Oxygen Plasma*, Nanoscale, 6, 10033 (2014)
 7. **N. Kang***, B. K. Sarker*, and S. I. Khondaker, *High Performance Semiconducting Enriched Carbon Nanotube Thin Film Transistors Using Metallic Carbon Nanotubes as Electrode*, Nanoscale, 6, 4896 (2014)
 8. **N. Kang***, B. K. Sarker*, and S. I. Khondaker, *The Effect Carbon Nanotube/Organic Semiconductor Interfacial Area on the Performance of Organic Transistors*, Applied Physics Letter, 101, 233302 (2012)
- *denotes equally contributed authors.

[INVITED TALKS]

1. **N. Kang**, *Nanoelectronic Device using Carbon Nanotubes and Graphene Electrodes: Fabrication and Electronic Transport Investigations*, Hanyang University, Republic of Korea (2016)
2. **N. Kang**, *Nanoelectronic Device using Carbon Nanotubes and Graphene Electrodes: Fabrication and Electronic Transport Investigations*, Gwangju Institute of Science and Technology (GIST), Republic of Korea (2016)
3. S. I. Khondaker, M. R. Islam, **N. Kang**, U. Bhanu, Hari P. Paudel, M. Erementchouk, L. Tetard, and M. N. Leuenberger, *Tailoring the Properties of Two Dimensional Molybdenum Disulfide*, Energy Materials Nanotechnology (EMN) Fall meeting, Orlando, FL (2014)
4. S. I. Khondaker, B. K. Sarker, and **N. Kang**, *Semiconducting Enriched Carbon Nanotube Thin Film Transistors Using Metallic Carbon Nanotube Contact*, The Electrochemical Society (ECS) meeting, Toronto, ON, Canada (2013)

[CONFERENCE PRESENTATIONS]

1. *Oral*: **N. Kang**, H. P. Paudel, M. N. Leuenberger, L. Tetard, and S. I. Khondaker, *High Performance Short-Channel Organic Field-Effect Transistors with Graphene Electrodes*, American Physics Society (APS) March meeting, San Antonio, TX (2015)
2. *Poster*: **N. Kang**, and S. I. Khondaker, *Photoluminescence Quenching in Single-layer MoS_2 via Oxygen Plasma Treatment*, APS March meeting, San Antonio, TX (2015)
3. *Oral*: **N. Kang**, H. P. Paudel, M. N. Leuenberger, L. Tetard, and S. I. Khondaker, *Photoluminescence Tuning in Single-Layer MoS_2 via Oxygen Plasma Treatment*, Material Research Society (MRS) Fall meeting, Boston, MA (2014)
4. *Poster*: **N. Kang**, and S. I. Khondaker, *Investigation of Organic Field-Effect Transistors Using Reduced Graphene Oxide Electrodes with Different Reduction Efficiency*, MRS Fall meeting, Boston, MA (2014)
5. *Oral*: **N. Kang**, C. W. Smith, M. Ishigami, and S. I. Khondaker, *Simple Patterning of Graphene by Metal Mask using Sacrificial Polymer Layer and Their Applications in Organic Field-Effect Transistors*, The Electrochemical Society (ECS) meeting, Orlando, FL (2014)
6. *Poster*: **N. Kang** and S. I. Khondaker, *The Impact of Carbon sp^2 Fraction of RGO on the Performance of RGO-Contacted Organic Field-Effect Transistors*, Graduate Research Forum, Orlando, FL (2014)
7. *Oral*: **N. Kang**, and S. I. Khondaker, *Investigating Organic Field-Effect Transistors with Reduced Graphene Oxide Electrodes of Different Reduction Efficiency*, APS March Meeting, Denver, CO (2014)
8. *Poster*: **N. Kang**, B. K. Sarker, and S. I. Khondaker, *High performance semiconducting enriched carbon nanotube thin film transistors using metallic carbon nanotube electrodes*, Industrial Advisory Board (IAB) Meeting for Professional Science Master's (PSM) Program, Orlando, FL (2014)

9. *Oral: N. Kang, B. K. Sarker, and S. I. Khondaker, Semiconducting enriched carbon nanotube thin film transistors using metallic carbon nanotube electrodes*, Nano Florida, Gainesville, FL (2013)
10. *Poster: N. Kang, B. K. Sarker, and S. I. Khondaker, Carbon Nanotube Thin Film Transistors using Carbon Nanotube Electrodes*, Graduate Research Forum, Orlando, FL (2013)
11. *Oral: N. Kang, B. K. Sarker, and S. I. Khondaker, Carbon Nanotubes Thin Film Transistors using Carbon Nanotube Electrodes*. APS March Meeting, Baltimore, MD (2013)
12. *Poster: N. Kang, B. K. Sarker, and S. I. Khondaker, Carbon Nanotube Thin Film Transistors using Carbon Nanotube electrodes*, Florida Chapter American Vacuum Science and Technology Society (FLAVS), Orlando, FL (2013)
13. *Poster: N. Kang, B. K. Sarker, and S. I. Khondaker, The Effect of Carbon Nanotubes/Organic semiconductor Interfacial Area on the Performance of Organic Field-Effect Transistors*, Nano Florida, Tampa, FL (2012)
14. *Oral: N. Kang, B. K. Sarker, and S. I. Khondaker, Does Organic Field-Effect Transistors (OFETs) Device Performance using Single-walled Carbon Nanotubes (SWNTs) Depend on the Density of SWNT in the Electrodes?* APS March Meeting, Boston, MA (2012)

RESEARCH EXPERIENCES

Project and Job Description	Principal Investigator	Dates
Advanced Transistor Research and Development	Dr. Peter VanderVoorn	10/2015-Present
<u>Role:</u> Senior Device Engineer/Scientist, Intel Corp.	Dr. Ryan Mackiewicz	
<ul style="list-style-type: none"> • Developed advanced transistor design and enhanced performance for Intel's next-generation technology node and process control • Led SoC device test-chip layout design and design spec validation • Engaged in process/materials to performance and process to design-rule correlation • Developed computational simulation tool to predict device performance parameters 		
Advanced Module Research and Development	Dr. Richard McGowan	07/2015-09/2015
<u>Role:</u> IBM Integration Engineer/Scientist, GlobalFoundries		
<ul style="list-style-type: none"> • Focused on next-generation technology node development and process control in the areas of optical overlay, and scatterometry measurement 		
Emerging 2D Materials for Nano Electronics	Dr. Saiful Khondaker	01/2014-05/2015
<u>Role:</u> Research Assistant, University of Central Florida		
<ul style="list-style-type: none"> • Mastered hands-on expertise in device design, fabrication, and electrical/optical characterization of mechanically exfoliated molybdenum disulfides (MoS₂) • Developed the ability to create and manipulate defects for tailoring properties of MoS₂ • Investigated and characterized electronic/optoelectronic properties of defect-induced bandgap engineering in MoS₂ by time-dependent oxygen plasma exposure 		
Emerging 2D Materials for Nano Optoelectronics	Dr. Laurene Tetard	08/2014-05/2015
<u>Role:</u> Research Assistant, University of Central Florida		
<ul style="list-style-type: none"> • Developed the ability to analyze optoelectronic tools for properties of defected MoS₂ • Investigated and characterized electronic/optoelectronic properties of defect-induced bandgap engineering in MoS₂ by time-dependent oxygen plasma exposure 		
High-Performance Organic Field-Effect Transistors (OFETs) for Organic Electronics		
<i>Funded by the National Science Foundation (NSF)</i>	Dr. Saiful Khondaker	01/2011-05/2015
<u>Role:</u> Research Assistant, University of Central Florida		
<ul style="list-style-type: none"> • Pioneered fabrication techniques of carbon-based electrodes (such as graphene and CNT electrodes) using state-of-art lithography patterning and plasma etching • Designed and fabricated CMOS compatible high-performance OFETs with carbon-based electrodes for enhancing charge injection at electrodes/organic interface to overcome limitations of conventional metal electrodes 		

- Carried out electrical measurements and investigated charge injection mechanism at electrode/organic interface at variable temperature

Carbon Nanotube Thin Film Transistors (CNT-TFTs) for Nano Electronics

Funded by the National Science Foundation (NSF) Dr. Saiful Khondaker 01/2011-05/2015

Role: Research Assistant, University of Central Florida

- Developed assembly techniques of solution-processed single-walled CNTs via dielectrophoresis method
- Fabricated tunable density of semiconducting enriched CNT TFTs using metallic CNT electrodes
- Performed electronic transport measurements at variable temperature to investigate the charge injection and transport mechanism at electrode/semiconductor interface

Surface Segregation in Bimetallic Alloys in Transition Metals

Role: Research Assistant, Hanyang University Dr. Simon Bongjin Mun 06/2008-08/2009

- Characterized Ag nanoparticles with X-ray photoelectron spectroscopy (XPS)
- Analyzed the surface segregation in bimetallic alloys with transition metals

TEACHING EXPERIENCES

Course and Job Description	Level	Term
PHY 2048: Physics for Engineers and Scientists I	Undergraduate	Fall 2010
<u>Role:</u> Graduate Teaching Assistant, Department of Physics, University of Central Florida		
<ul style="list-style-type: none"> • Created problem-sets and solutions for quiz, and provided discussion and instructions to help students for conceptual understanding of the course • Assisted instructors with proctoring and grading 		
PHY 2048: Physics for Engineers and Scientists I	Undergraduate	Spring 2011
<u>Role:</u> Graduate Teaching Assistant, Department of Physics, University of Central Florida		
<ul style="list-style-type: none"> • Created problem-sets and solutions for quiz, and provided discussion and instructions to help students for conceptual understanding of the course • Assisted instructors with proctoring and grading 		
PHY 2053: Physics I	Undergraduate	Summer 2011
<u>Role:</u> Graduate Teaching Assistant, Department of Physics, University of Central Florida		
<ul style="list-style-type: none"> • Developed course curriculum with the instructors • Created problem-sets and solutions for quiz, and provided discussion and instructions to help students for conceptual understanding of the course 		
PHY 2053: Physics I	Undergraduate	Fall 2011
<u>Role:</u> Graduate Teaching Assistant, Department of Physics, University of Central Florida		
<ul style="list-style-type: none"> • Developed course curriculum with the instructors • Created problem-sets and solutions for quiz, and provided discussion and instructions to help students for conceptual understanding of the course 		
PHY 2053: Physics I	Undergraduate	Spring 2012
<u>Role:</u> Graduate Teaching Assistant, Department of Physics, University of Central Florida		
<ul style="list-style-type: none"> • Developed course curriculum with the instructors • Created problem-sets and solutions for quiz, and provided discussion and instructions to help students for conceptual understanding of the course 		

Instructional Support and Advising

Undergraduate/Graduate 2012-2015

Role: Facility Owner, NanoScience and Technology Center, University of Central Florida

- Mentored and trained undergraduate/graduate students to perform laboratory research work
- Maintained lab equipment and provided/developed user manual

