

**HANDS-ON INTRODUCTION TO NANOTECHNOLOGY
WORKSHOP FOR EDUCATORS**

Tuesday, November 11th, 2014

- 8:00 a.m. – 8:30 a.m. **Continental Breakfast/Registration**
114 Lubert Building
- 8:30 a.m. – 9:30 a.m. **Welcome and Overview Workshop and CNEU**
Bob Ehrmann
Managing Director, NACK Network
Center for Nanotechnology Education & Utilization
- 9:30 a.m. – 10:30 a.m. **Nanotechnology: An Overview**
Dr. Stephen Fonash
Director, Center for Nanotechnology Education & Utilization (CNEU)
PI/Director NACK Network
Professor of Engineering Science & Mechanics
- 10:30 a.m. – 10:45 a.m. **Break**
- 10:45 a.m. – 11:45 a.m. **Bottom Up Nanofabrication**
Dr. Wook Jun Nam
Assistant Professor, Engineering Science & Mechanics
Center for Nanotechnology Education & Utilization
- 11:45 a.m. – 12:00 p.m. **Overview of Lab Activities**
Dan Cavanaugh
Remotely Accessible Instruments for Nanotechnology (RAIN) Coordinator
Outreach/Research Assistant
Center for Nanotechnology Education & Utilization
- 12:00 p.m. – 1:00 p.m. **Lunch**
Room 114 Lubert Building
- 1:00 p.m. – 3:30 p.m. **Rotating Activity Sessions: See Lab Agenda for Details**
(230 Building Room 114)
- Degrees That Work and PACE presentation
 - Bob Ehrmann & Terry Kuzma
 - Tour of Educational Clean Room and MSC virtual tour
 - Zac Gray & Dan Cavanaugh
- 3:30p.m. – 4:30p.m. **General Discussion / Q&A**
114 Lubert Building

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Wednesday, November 12th, 2014

- 8:00 a.m. – 8:30 a.m. **Continental Breakfast**
114 Lubert Building
- 8:30 a.m. – 9:30 a.m. **Nanoscale Pattern Transfer: Lithography, Etch, Deposition, & Liftoff**
Zac Gray
Research Assistant
Center for Nanotechnology Education & Utilization
- 9:30 a.m. – 9:45 a.m. **Break**
- 9:45 a.m. – 11:00 a.m. **Plasma Technology-An Enabling Tool For Modern Manufacturing**
Terry Kuzma
Instructor, NMT Program
Center for Nanotechnology Education & Utilization
- 11:00 a.m. – 12:00 p.m. **Basic Nanoscale Characterization**
Dan Cavanaugh
Remotely Accessible Instruments for Nanotechnology (RAIN) Coordinator
Outreach/Research Assistant
Center for Nanotechnology Education & Utilization
- 12:00 p.m. – 1:00 p.m. **Lunch & Video (TMIYOH)**
114 Lubert Building
- 1:00 p.m. – 3:30 p.m. **Rotating Lab Activity Experiments: See Lab Agenda for Details**
(230 Building Room 114)
- Atomic Force Microscopy
 - Lithography
 - Deposition and Liftoff
 - Scanning Electron Microscopy
- 3:30 p.m. – 4:30 p.m. **General Discussion / Q&A**
(114 Lubert Building)

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Thursday, November 13th, 2014

- 7:45 a.m. – 8:15 a.m. **Continental Breakfast**
114 Lubert Building
- 8:15 a.m. – 9:15 a.m. **Nanotechnology: Education and Research, Economics, and Workforce Development**
Dr. Osama Awadelkarim
Professor of Engineering Science and Mechanics
Associate Director, Center for Nanotechnology Education & Utilization (CNEU)
Penn State
- 9:15 a.m. – 9:30 a.m. **Break**
- 9:30 a.m. – 10:30 a.m. **NanoScience and Nanotechnology: How the Smallest Building Blocks are Impacting Life Today and Tomorrow**
Dr. R. Allen Kimel
Assistant Professor of Materials Science and Engineering
Associate Head for Undergraduate Studies
Penn State
- 10:30 a.m. – 11:00 a.m. **Environmental Impacts of Nanoparticles**
Dr. James Kubicki
Professor of Geosciences
College of Earth and Mineral Sciences
Penn State
- 11:00 a.m. – 11:15 a.m. **Break**
- 11:15 a.m. – 12:00 p.m. **Status and Perspectives of III-Nitride Semiconductor Growth and Applications on the Nanoscale**
Zak Al Balushi
PhD Candidate in Materials Science and Engineering
Penn State
- 12:00 p.m. – 1:00 p.m. **Lunch**
114 Lubert Building
- 1:00 p.m. – 3:30 p.m. **Rotating Lab Activity Experiments: See Lab Agenda for Details (230 Building Room 114)**
- Atomic Force Microscopy
 - Lithography
 - Deposition and Lift-off
 - Scanning Electron Microscopy
- 3:30 p.m. – 4:30 p.m. **Final Workshop Q & A / Workshop Evaluations / Wrap-up**
Bob Ehrmann
Managing Director, NACK Network
(114 Lubert Building)