The National ATE Center for Nanotechnology Applications and Career Knowledge (NACK) Network
Webinar Handout
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Trends in Nanoelectronics: Career and Workforce Needs

PRESENTERS:

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WEBINAR OBJECTIVES:

This webinar will:

- Describe the partnership in PA that creates a pipeline of nanotechnology graduates into jobs
- Consider lessons learned from the Oklahoma Nanotechnology Education Initiative
- Identify the challenges associated with preparing students for careers

RESOURCES:

Oklahoma Nanotechnology Education Initiative:
www.okcareertech.org/about/initiatives/oklahoma-nanotechnology-education-initiative

Oklahoma State University Institute of Technology, Department of Engineering:
www.osuit.edu/academics/engineering_technologies

Nanotechnology Applications and Career Knowledge (NACK) Network:
nano4me.org/webinars

Nano-Link: (Nanotechnology Resources for Educators)
www.nano-link.org/

Dakota County Technical College:
www.dctc.edu/

SCME - Southwest Center for Microsystems Education:
www.scme-nm.org/

Plextronics:
www.plextronics.com/

O*NET Summary Report for Nanotechnology Engineering Technicians (17-3029.12)
www.onetonline.org/link/summary/17-3029.12

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NACK NETWORK
Nanotechnology Applications & Career Knowledge
WWW.NANO4ME.ORG

Summary of Skill Sets Taught in the 6 Nanotechnology Courses offered a Penn State University:

Basic Nanotechnology EHS Awareness

- Basics of Chemical and Material Properties —Role of Scale
- Chemical and Materials Handling, Storage, and Disposal
- Nanotechnology Health, Safety, and Environmental issues

Nanotechnology Equipment and Processing Foundation Skills

- Chemical Hoods and Glove Boxes: Use and Maintenance
- Cleanrooms: Use and Maintenance
- Pumps, Flow Control Systems, Scrubbers, Sensors: Use and Maintenance
- Vacuum Systems: Use and Maintenance
- Plasma Generating Systems: Use and Maintenance
- Furnaces, Ovens, and Rapid Thermal Annealing Equipment: Use and Maintenance
- Chemical Facilities and Maintenance
- Contamination Control
- Process Integration
- Introduction to Statistical Process Control

Nanotechnology Patterning

- Optical, e-beam, and Ion Beam Lithography
- Stamping and Imprinting Lithography
- Chemical techniques; e.g., Block co-polymer and SAMs

Nanotechnology Fabrication

- Top-down Fabrication
- Reactive Ion, Sputter, and Wet Etching
- Chemical Vapor and Physical Vapor Deposition Systems
- Ion Beam, Plasma, and Chemical Materials Modification
- Nanoparticles: Etching and Grinding Approaches
- Bottom-up Fabrication
- Chemical, Physical, and Biological Self-Assembly
- Nanoparticles: Colloidal Chemistry
- Nanoparticles: Plasma Approaches
- Nanoparticles: Chemical Vapor Deposition Approaches

Nanotechnology Characterization

- Optical Microscopy
- Scanning Probe Microscopy
- Atomic Force Microscopy
- Electron Microscopy
- Scanning Electron Microscopy (SEM and FE-SEM)
- Transmission Electron Microscopy (TEM and FE-TEM)
- Chemical Characterization
- X-ray (EDS)
- Secondary Ion Mass Spectroscopy
- Auger Electron Spectroscopy
- Fourier Transform Infrared Spectroscopy
- Electrical Characterization
- Current-Voltage Measurements
- Capacitance Measurements
- Opto-electronic Device Measurements
- Physical Characterization
- Spectrophotometer
- Profilometer
- X-ray Diffraction

Nanotechnology Professional Skills

- Team Building
- Problem Solving
- Project Organization and Planning
- Research Skills
- Assessing Cost of Ownership
- Presentation Skills
- Technical Reporting and Documentation
- Handling and Generating Intellectual Property

PENNSTATE 1855

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