HANDS-ON NANOFACTORICATION WORKSHOP FOR EDUCATORS

This workshop will be an exploration of the world of nanotechnology. Participants will learn about the growing applications of nanotechnology in many industries including the biotechnology, MEMS, optoelectronics, chemical, and nanoelectronics industries. The basics of nanofabrication processes and tools will be covered and emphasized through processing labs held in the class 10 cleanrooms of the Penn State Nanofabrication Facility and the CNEU Teaching Cleanroom as well as the CNEU Teaching Cleanroom. This three-day workshop is broken down into daily morning lectures by nationally recognized Penn State researchers and engineering staff and into afternoon lab sessions in nanofabrication. The agenda is attached.

Target Audience: Secondary Science and Technology Teachers, Vocational-Technical Teachers, Guidance Counselors, school administrators and others

Where: Penn State Center for Nanotechnology Education and Utilization
101 Innovation Blvd., Suite 112
University Park - State College, PA 16802

When: November 17-19, 2009

Workshop Fee: $200.00 * PA Educators
$500.00 * Non PA Educators

Workshop Fee Includes:
• Workshop registration
• Workshop materials/lab manuals (distributed at the workshop)
• Breakfast/Lunch as a group function

How does it work?
• Complete and return the workshop registration form to the Penn State Center for Nanotechnology Education and Utilization by fax to: 814-865-9400 or email to ldaub@engr.psu.edu
• Rooms are currently being held at the Penn Stater Conference Center Hotel, please call 1-800-233-7505 and reference reservation identification #CNEK09A by Friday, October 16, 2009
• You will be responsible for your transportation to and from the workshop each day
• Additional details will be mailed/faxed to you as a confirmation
• If you have any registration questions, contact Lisa Daub at (814) 865-9635, or ldaub@engr.psu.edu
• If you have any workshop questions, contact Amy Brunner at (814) 865-8977 or abrunner@engr.psu.edu

Registration closes October 30, 2009. Please register as soon as possible; spaces fill up quickly.

This workshop is co-sponsored by the State of Pennsylvania under grant no. C000036659 and by The National Science Foundation under grant no. 0802498.
HANDS-ON NANOFABRICATION WORKSHOP FOR EDUCATORS

(Must be received by October 30, 2009)

Name: ________________________________________________________________

Title: ___________________________________________________________________

Organization: ____________________________________________________________

Address: ___________________________________________________________________

City: ___________________________ State: _______ Zip Code: _______

Work Phone: ___________________ Home Phone: _______________________

Fax: ___________________________ E-mail: _______________________________

Institution Type:       ☐ Secondary School       ☐ Vocational Technical School
              ☐ 2-Year College       ☐ 4-Year College/University

Workshop Fee:       ☐ $200 PA Educators       ☐ $500 non PA educators
              ☐ Requesting Financial Support

Special Needs: _________________________________________________________

Dietary Restrictions: ___________________________________________________

Sorry, we do not accept credit cards.

Make checks payable to Penn State and send to the address below:

Return To: Penn State Center for Nanotechnology Education and Utilization
            Attn: Lisa Daub
            101 Innovation Blvd., Suite 112
            University Park, PA 16802-7003

            Phone: 814-865-9635
            Fax: 814-865-9400
            Email: ldaub@engr.psu.edu
This agenda is a sample only and subject to change.

AGENDA

Day One

8:00 a.m. – 8:30 a.m.  Continental Breakfast/Registration

8:30 a.m. – 9:30 a.m.  Welcome and Overview of the Workshop and the CNEU

9:30 a.m. – 10:30 a.m.  Keynote: The World of Nanotechnology

10:30 a.m. – 10:45 a.m.  Break

10:45 a.m. – 11:45 a.m.  Nanoscale Characterization

11:45 a.m. – 12:00 p.m.  Introduction to Lab Activities

12:00 p.m. – 1:00 p.m.  Lunch

1:00 p.m. – 4:30 p.m.  Rotating Activity Sessions: See Lab Agenda for Details
  • Nanotechnology Products, Applications, Careers, and Education
  • Tour of Clean Room / Lab
# AGENDA

## Day Two

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8:00 a.m. – 8:30 a.m.</td>
<td>Continental Breakfast</td>
</tr>
<tr>
<td>8:30 a.m. – 9:45 a.m.</td>
<td>Lithography and Deposition Techniques</td>
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<tr>
<td>9:45 a.m. – 10:00 a.m.</td>
<td>Break</td>
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<tr>
<td>10:00 a.m. – 11:15 a.m.</td>
<td>Etch Techniques</td>
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<tr>
<td>10:45 a.m. – 11:00 a.m.</td>
<td>Break</td>
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<tr>
<td>11:15 a.m. – 12:00 p.m.</td>
<td>Nanoparticle Synthesis</td>
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<tr>
<td>12:00 p.m. – 12:45 p.m.</td>
<td>Lunch</td>
</tr>
<tr>
<td>12:45 p.m. – 3:15 p.m.</td>
<td>Rotating Lab Activity Experiments: See Lab Agenda for Details</td>
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<tr>
<td></td>
<td>• Atomic Force Microscopy (AFM)</td>
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<td>• Lithography and Etching</td>
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<td>• Deposition and Characterization</td>
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<td>• Scanning Electron Microscopy</td>
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<td>3:15 p.m. – 4:15 p.m.</td>
<td>General Discussion / Q &amp; A Session</td>
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AGENDA
Day Three

8:00 a.m. – 8:30 a.m.  Continental Breakfast

8:30 a.m. – 9:30 a.m.  Optical Devices

9:30 a.m. – 9:45 a.m.  Break

9:45 a.m. – 10:45 a.m.  Bio Sensors and Lab on a Chip

10:45 a.m. – 11:00 a.m.  Break

11:00 a.m. – 12:00 p.m.  Nanotechnology in Food

12:00 p.m. – 12:45 p.m.  Lunch/Workshop Evaluation/Wrap-Up

12:45 p.m. – 3:15 p.m.  Rotating Lab Activity Experiments: See Lab Agenda for Details
  •  Atomic Force Microscopy (AFM)
  •  Lithography and Etching
  •  Deposition and Characterization
  •  Scanning Electron Microscopy

3:15 p.m. – 4:00 p.m.  Final Workshop Q & A / Workshop Evaluations / Wrap-up