

NNCI Education and Outreach

NNCI Nanoscience Earth and Environmental Science Research
Community Virtual Workshop

May 25, 2021

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NNCI Education and Outreach Mission

- Offer education and training to address the growing need for a skilled workforce and informed public
- Provide resources, programs, and materials to enhance knowledge of nanotechnology and its application to real-world issues
- Support the US economy by enabling a STEM-literate workforce ready to meet the technological challenges of a nano-enabled economy as well as an informed citizenry that supports continued and safe growth of nanotechnologies

nnci.net/site-education-programs

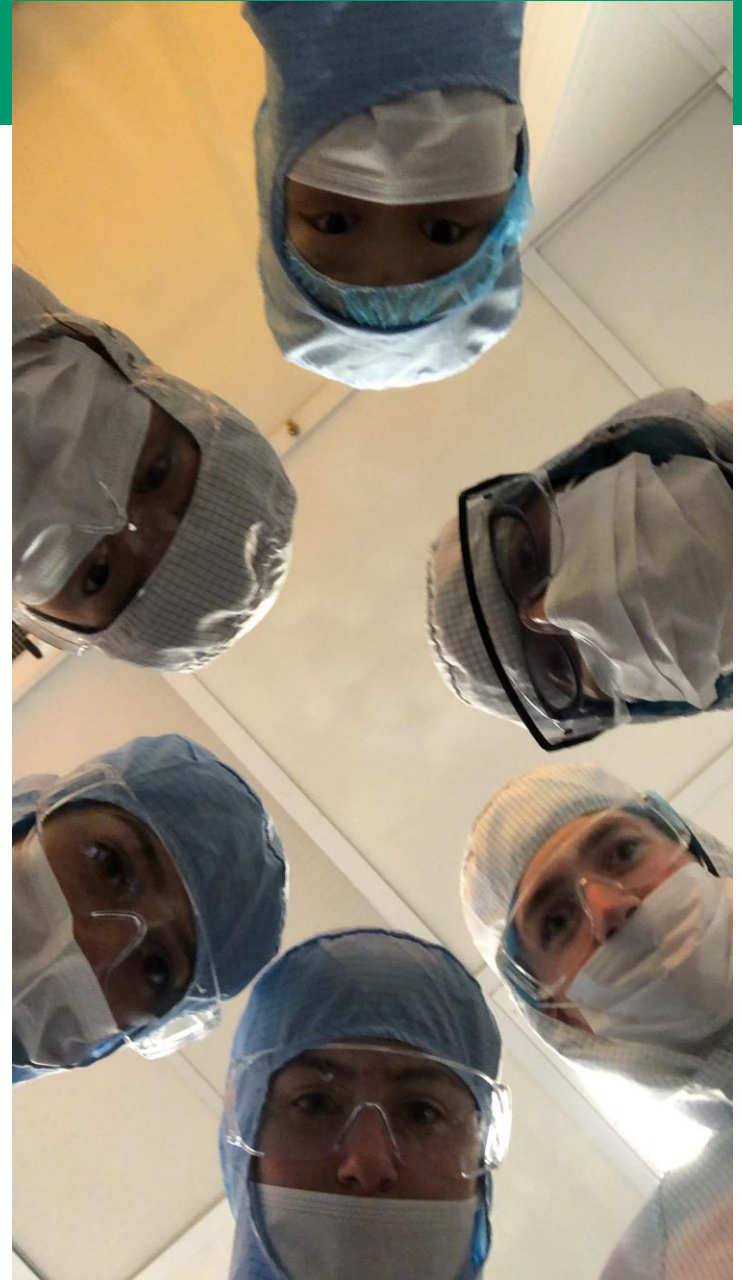
NNCI E&O

Audience	2020	2019
K12 Students	18,600	35,300
Educators	800	1,500
General Public	3,800	17,700
Professionals	8,800	8,600

K-12 Students

Examples: (not inclusive)

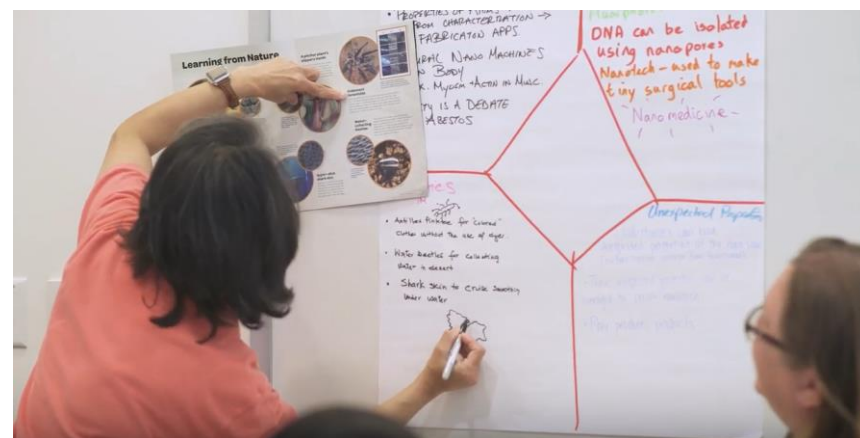
- After school programs
- Sci & Eng summer camp programs
- High School student interns
- Career Fairs
- Off and on site visits w/ tours
- Partnering with 4H
- Participation in science festivals, science celebrations, STE(A)M days, National Nanotechnology Day, Nano Days



Educators

Examples: (not inclusive)

- Resource creation
- Booths at conferences
- Educators in Residence
- Workshops
- RET



Resources for Educators (K-16)

Searchable K-16 Curriculum Materials

Search the database of curricular materials by subject area and/or education level. (Listing in table format is provided below.)

Opportunities for Educators at NNCI Sites

Explore a variety of hands-on professional development opportunities for teachers offered by NNCI supported facilities.

NNCI Resources for Virtual Classrooms, Kitchens, Backyards, and Beyond

See the list of resources including videos, online magazines, podcasts, and activities that can be done from home using common items.

Demo Guide and Information Sheets

Look for easy demonstrations to explain nanotechnology concepts during outreach events.

K-12 Reference Sheets

[Biology Reference Sheet](#)
[Chemistry Reference Sheet](#)
[Genetics & Cell Division Reference Sheet](#)
[Physical Science Reference Sheet](#)
[Physics Reference Sheet](#)

Additional Resources

[NNCI Teacher Resource Brochure](#)
[Size and Scale Poster](#)
[External Nano-Education Resources](#)
[SDNI-Hosted NNCI Education Symposium](#)

K-16 Curriculum Materials ([Searchable Listing](#))

Lesson Name	Subject Area	Grade Level
Achoo! Pollen Makes US More than Sneeze	General Science; Physical Science; Biology	Middle

General Public

Examples: (not inclusive)

- Science Festivals
- Science Cafes
- Exhibits
- Nano journalism
- Nano Days
- National Nanotechnology Day
- Plenty of Beauty at the Bottom



Professionals



Professionals

Examples: (not inclusive)

- Technical workshops
- Short courses
- Seminars/webinars
- Symposia
- Internships for students
- Course development
- Remote access
- REU/V opportunities
- Research Communities




Research Experiences for Undergraduates

- 10 of 16 sites – REU programs
- Listed on nnci.net/research-experience-undergraduates with link to each site's program and application
- Listed on NSF REU website



Goals

- 

Quattrone Nanofabrication Facility

8 subscribers

HOME

VIDEOS

PLAYLISTS

CHANNELS

DISCUSSION


ABOUT

SEARCH

+


Uploads

▶ PLAY ALL




Mask Post-processing

12 views • 4 months ago




Training Video for Using MA6 Mask Aligner Training - First Mask

10 views • 2 weeks ago




MA6 Mask Aligner Training - First Mask

10 views • 3 weeks ago



Tutorial for ABM Mask Aligner

31 views • 2 years ago



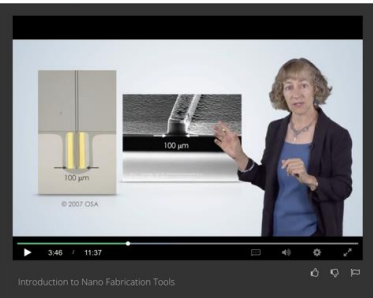
Vacuum Degassing of PDMS

99 views • 2 years ago

◀ Back to Week 1 | Lessons | This Course Nanotechnology A Maker's Course | Prev | Next

Introduction

- ▶ Welcome to the Course
8 min
- ▶ Introduction to RTNN
2 min
- ▶ Learning Objectives for Introduction
10 min
- ▶ What is Nanotechnology?
7 min
- ▶ Introduction to Nano Measurement Tools
5 min
- ▶ Introduction to Nano Fabrication Tools
17 min
- ▶ Practice Quiz: Practice Quiz for Introduction
7 questions



Introduction to Nano Fabrication Tools

Essential Technologies for Nano

Learn more about the Research Triangle Nanotechnology Network facilities and how you can access them

Module Assessment:
Introduction and Essential Technologies for Nano Quiz

Interactive Transcript

English ▾
[Help us translate!](#)

0:18 Welcome, I'm Peter Jovanovic. I'm a professor of Electrical and Computer Engineering at Duke University, and the Executive Director of Duke's Nanotechnology Shared Facility called the Shared Materials Instrumentation Facility. Today, I'm going to give you an overview about how to fabricate materials and structures at the nano scale. The basic components needed for nano fabrication are, an extremely clean environment called the clean room, in which there are very few particles. That's where we perform the fabrication work and, number two, specialized equipment for three basic functions: first, film material deposition, patterning, and etching. To illustrate this, let's think about computer chips, which are also called integrated circuits or ICs. These integrated circuits are made up of structures that include transistors and interconnections between the transistors. These transistors can be as very small, with feature sizes, that are only tens of nanometers and this allows us to integrate a large number of transistors onto a tiny piece of silicon, to create a powerful computer. To make sure that you understand what I mean, let me show you some numbers. In 1971, Intel made the 4004 chip, which was the first microprocessor. By 2009, there were 16 billion transistors on the 45 nm processor.

RTNN nanotechnology course

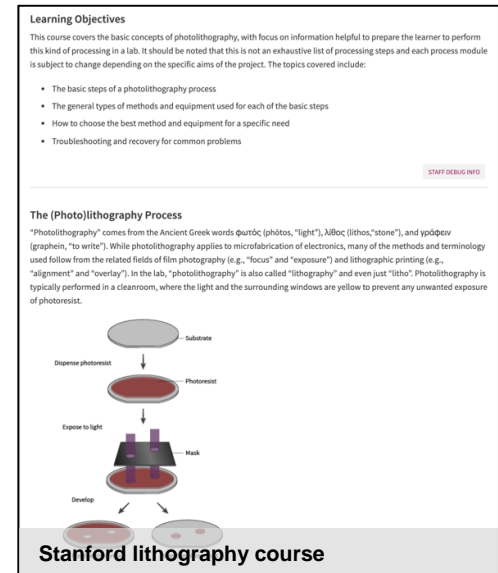
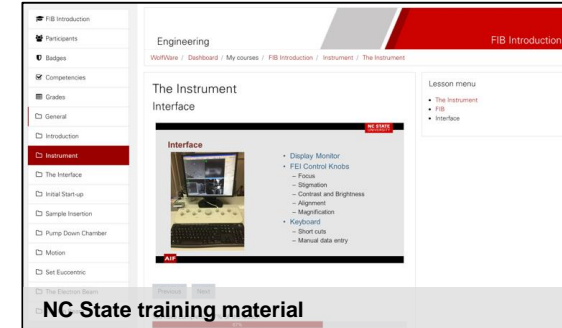
Technical Content Development Working Group

- RTNN's Nanotechnology: A Maker's Course on coursera, >20,000 people have engaged with the course, over 5,500 have completed all course materials.

coursera.org/learn/nanotechnology

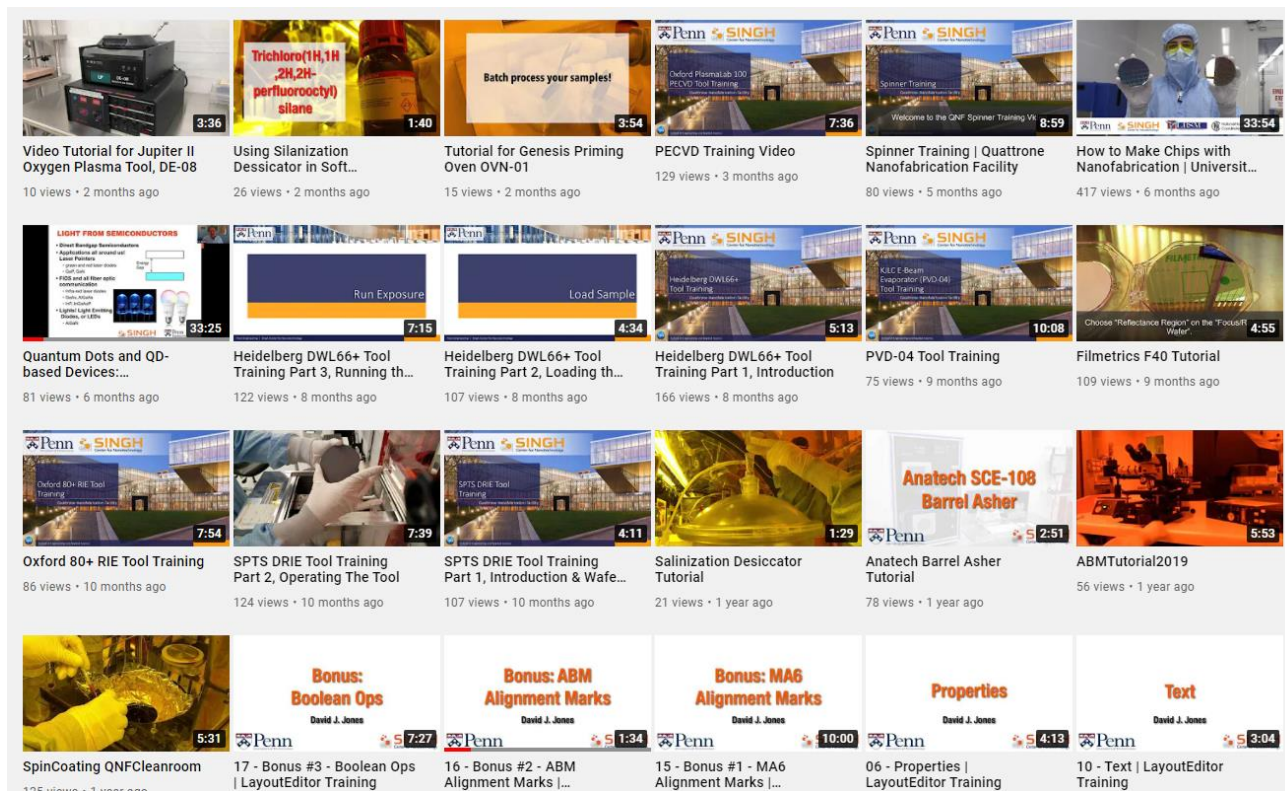
- nano@Stanford continuing to add and improve the educational training modules in their Nanofabrication & Nanocharacterization Course that will be open and free to use by the public, including a universal lithography training module.

lagunita.stanford.edu/courses/course-v1:Engineering+NanoFab01+Ongoing/info



Technical Content Development Working Group

- Some sites have YouTube channels with training content
 - MANTH's Quattrone Nanofabrication Facility
 - SHyNE's NUANCE Center



Thank You!

Questions?