

Photo-lithography

photo:

Of, relating to, or produced by light

lithography:

Printing or patterning on a flat surface

Summary: Duke’s Shared Materials Instrumentation Facility (SMIF) is offering a hands-on photolithography lab experience. Photolithography is a technique that uses light to transfer a pattern onto a substrate to produce a device or structure such as a computer chip. The lab experience includes an introduction to photolithography and a demonstration of the photolithography equipment at SMIF. Participants will enter the cleanroom and perform photolithography on their own samples using photomasks that **they design**. This is a chance to not only learn about photolithography, but to perform the process and pattern a sample; participants can take their samples home as a souvenir!



Students in the cleanroom.

Target grades: 9-12

Preparation:

- Permission form(s): filled out and signed by parents if student is under age 18.
- Complete the in-class **Photo-patterning** lesson plan; Duke will provide all materials (40 min, optional).

Session 1 in your classroom (~1 hour):

- Introduction to SMIF & Safety Training Presentation: A SMIF representative will visit your classroom and give a presentation outlining safety procedures of SMIF. This is required prior to utilizing SMIF facilities. (30 min)
- Homework: Watch the RTNN Coursera video covering Photolithography (will provide link).
- Homework: Draw your mask pattern. Your teacher will describe the method to be used for creating patterns. Drawing files will be collected by the teacher and emailed to SMIF. SMIF will prepare the masks and have them ready when you visit Duke.



Using photolithography instrument.

Session 2 Visit to Duke SMIF lab (~ 1-1.5 hours for each group of 7 students):

- Photolithography in the cleanroom (~ 1 hour per group of 7 students).
- Site tour and/or brief equipment demonstrations (in addition to photolithography), as time permits.
- Groups of up to 14 can be split into two smaller groups. While one group is in the cleanroom, the other group will tour, then the groups will switch, for a total time of about 2.5 hours.