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# MNT<sup>e</sup>SIG

MICRO NANO TECHNOLOGY  
education  
SPECIAL INTEREST GROUP

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## **Interactively Teaching AFM**

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Dear MNTeSIG Family,

Please find the uploaded documents for my presentation here with the given links for my presentation. You can always reach out to me from [aoc10@psu.edu](mailto:aoc10@psu.edu) with your questions. I will give a brief description of the materials in the list.

- 1) [Pitch Talk](#):
- 2) [Presentation file](#)
- 3) [Second deck of slides](#)
- 4) [Longer Talk](#): This is an inclass live stream lab carried out with students at Penn State in Spring 2021.
- 5) [Lab Manual on AFM](#): The longer talk has the answer sheet. Instead of a formal presentation, the interactive tools make it a lot more interesting for the students under COVID-19 restrictions.
- 6) Simulation tools from NC State: Older but still wonderful and informative tools on AFM. As they are .exe files, Windows might try to block downloading them initially.
  - a. [ProbeSimulator](#)
  - b. [DrivenOscillator](#)
  - c. [AFMModel](#)

- 7) Interactive simulations to teach fundamental concepts of AFM with analogies from Phet, University of Colorado:
  - a. [Masses and Springs](#)
  - b. [Atomic Interactions](#)
  - c. [Quantum Tunneling](#)
- 8) [A good review from Veeco Bruker](#)

Separately, here is our paper from our MNTeSIG presentation last year: [Photolithography Code to Enhance Nanotechnology Learning - YouTube](#)

It includes various lab exercises that you can carry out with your students. You can download the final form of the APP from [here](#). Some of the lab scenarios are followed here: [SCENE 2021 - Lithography - YouTube](#) Here are instructions to download and run the litho APP.

The simulation package can be run after following these steps:

To use the lithography app as a standalone desktop application, one does “not” need a MATLAB™ version higher or equal to R2020a. But, one should download and install the Matlab Runtime for version “R2020a (9.8), 64bit” (free) which is suitable for your operating system (Windows/Linux/Mac) from: <https://www.mathworks.com/products/compiler/matlab-runtime.html> (Links to an external site.)

Once installing this file (around 2.6 GB), the lithography app can be used as a standalone desktop application even if your version of MATLAB™ is a lower/higher version than R2020a or is not equal to R2020a.