

# Inside Engineering Lab Visit

## Visitor Information

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Group: Mott Hall II  
 Number of students: 18  
 Grade(s): 8th  
 Date: 03/01/2017  
 Time: 1:45pm-3:00pm  
 Length: two 20-30-min sessions  
 Lab: Hendon  
 Department: Electrical Engineering

## Lesson Objectives

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LO 1: Students will be able to define engineering and electrical engineering, in general terms.  
 LO 2: Students will be able to identify examples of specific applications of the lab's equipment  
 LO 3: Students will get an OCT image of their finger and be able to describe (in general terms) what the machine's uses.  
 LO 5: Students will discuss the impact of the lab's research/this topic.  
 LO 6: Students will understand the accessibility of science PhD programs – students do not pay for a PhD, tuition is covered, students receive a stipend, etc.

## Materials Needed

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- Optical imaging equipment
- Image printing materials
- Souvenirs, if any

## Lesson Outline

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### 1. Introduction (5 min)

- Make introductions:
  - PI Name, title, department
  - Graduate students and researchers
- Contextualize:
  - Ask students questions to gauge their STEM knowledge.
  - Ask or describe: What is Engineering?
  - Ask or describe: Specifically, what is Mechanical Engineering
  - Ask or describe: What does a Mechanical Engineer do?
- Research — Briefly cover any/all of the following \* *in lay terms, easily understood with only basic knowledge*.
  - What is your research area?
  - What is the problem your research addresses?
  - What's been done so far?
  - What uses or solutions will (or could) your research bring about?

### 2. Lab Demos (each room will show a demo) (10-15 min)

- Highlight fundamental concepts and key equipment
- If possible/as much as possible, show the equipment in use. Visual input on topics being discussed will help visitors grasp the concepts.
- Show the OCT equipment and other relevant instruments. Briefly discuss what they are used for. Describe some challenges of this research. Ask students what they think some of the applications are. If there is something students can pass around or touch with their hands, make sure they have the opportunity to interact with it.
- If possible, give each visitor a printed OCT image to take home as a souvenir

### 3. Conclusion (5 min)

- Discuss any statistics that you think might be interesting. For example, any statistics that motivate this research, any data that will make the students think, etc. will be great to share.
- Discuss the intersectionality of engineering types and how teamwork and collaboration is key. E.g. talk about different types of engineering that went into making a piece for your equipment.
- Emphasize *accessibility* of science Ph.D. programs — students do not pay for their programs; their tuition is covered and they will even receive a stipend to support their studies. Steps moving forward are for them to continue to study, learn, and be involved.

### 4. General Tips

- Ask the audience a question early on to gauge their STEM knowledge
- Ask questions throughout to encourage engagement — the more answers they supply, the better.
- Ask for questions at the end
- Avoid jargon as much as possible; students will be more likely to participate and ask questions
- Emphasize big-picture ideas
- When praising, praise the thought process, not intelligence (promote a growth mindset). More info on growth mindset: <https://www.youtube.com/watch?v=NWv1VdDeoRY>