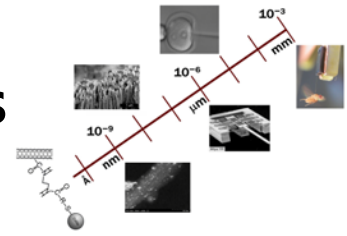


Undergraduate Research Topics



Lab: Advanced Micro and Nanosystems Lab

<http://amnl.mie.utoronto.ca>



Year: 2014

AMNL accepts strong undergraduate students from Engineering Science, Mechanical Engineering, Electrical and Computer Engineering, and Biomedical Engineering.

1. Topic: Smartphone microscope for cell imaging

Number of Students: 1 (EngSci/MIE/ECE)

Description: The student will develop an instrument that turns a smartphone into a microscope and cell imaging tool. The student will perform mechanical design and programming. Previous experience in smartphone optics and programming is required.

2. Topic: Microfluidic characterization of cancer cells

Number of Students: 1 (EngSci/MIE/ECE)

Description: The student will develop a microfluidic device and use the devices to perform many rounds of cell experiments. The purpose is to quantify cancer cell contraction on thin membranes to understand cancer cell contractibility. The student will conduct hands-on experiments and will also be responsible for analyzing cell image/data. Previous experience in cell experiments and image processing is required.

3. Topic: Mechanical design of apparatuses for operation under microscopes

Number of Students: 1 (MIE)

Description: The student will design and construct a number of mechanical systems/mechanisms such as motorized stages, fixtures, sample holders etc. for use under optical microscopes. Prior experience in CAD design (e.g., in SolidWorks) and working with motors and control circuits is required.

4. Topic: Circuit development for controlling nanorobots

Number of Students: 1 (MIE/EngSci/ECE)

Description: The student will design and construct a number of circuits that involve high-voltage circuits, sensor interfaces, and microcontrollers. Strong skills in circuit design and construction is required.

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Prof. Sun is on the faculty of the following departments:

- Mechanical and Industrial Engineering
- Institute of Biomaterials and Biomedical Engineering
- Electrical and Computer Engineering