EE/CprE/SE 491 bi-WEEKLY REPORT 6 - sdmay18-24

03/26/2018-04/06/2018

Project title: Optical force transducer for visualizing cell mechanotransduction in 3D

Client: LIOS Lab
Advisor: **Prof Meng Lu**

Team Members/Role:
Quan Wang --- fabrication and process development
Yalun Tang --- fabrication and process development
Jiameng Li --- theory and numerical modeling
Qinming Zhang --- theory and numerical modeling

o **Past week accomplishments**

- Yalun Tang:

1. Etched a optical fiber to remove the cladding
2. Performed Surface Chemistry to immobilize 40nm gold nanoparticles
3. Connected the device with laser and observed the light scattering under a microscope:

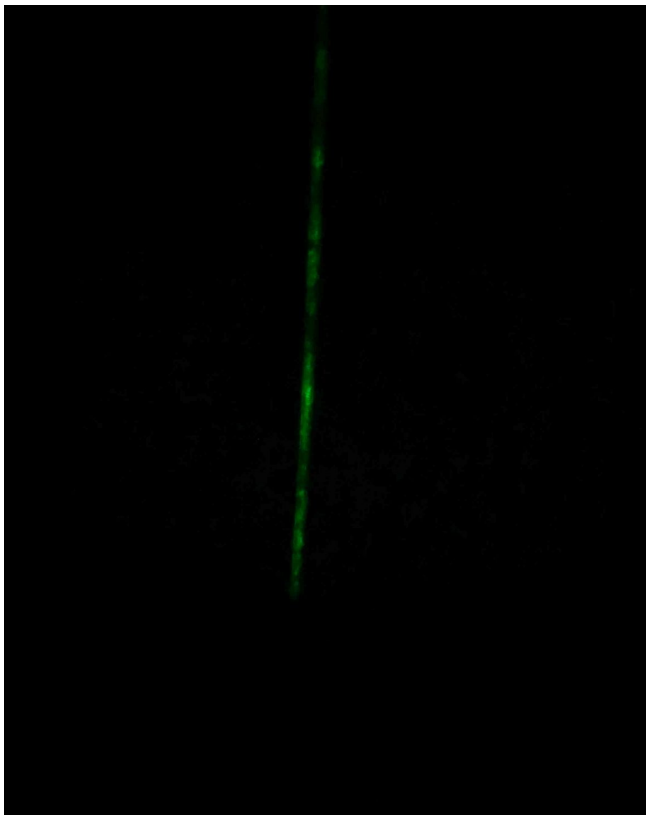

Figure. 1 The center of the sensing component (under microscope)

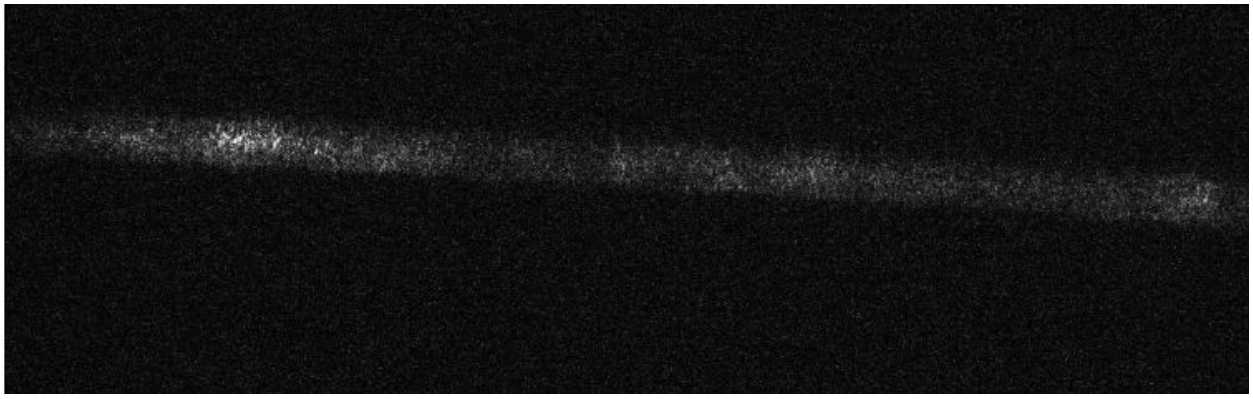

Figure. 1 The center of the sensing component (by a digital camera)

- Quan Wang:

1. Completed the etching test by mixing HF and acetic acid
2. The acetic acid will slow down the etching rate to obtain a smooth fiber surface
3. Performed the surface chemistry to prepare the fiber for the following experiment

- Jiameng Li:

1. Finished the simulation at smaller diameter (8 micrometer) to observe the light scattering of gold nanoparticles
2. Calculated the field intensity of single mode optical fiber

- Qinming Zhang:

1. Redesign the holder, the latest one is thin, short and very small. And now it is possible to fit in under the microscope.
2. Got more high density plastic material from our professor Lu.
3. Redesign the fiber hole, now the hole are in same height.

o **Individual contributions**

Team member	Contribution	Weekly hours	Total hours
Yalun Tang	Finished the first sensor device in this project; Tested the device.	10	85
Quan Wang	Finished fiber etching	10	85

Jiameng Li	Finished the simulation for various diameter	10	85
Qinming Zhang	New holder has been designed.	5	70

- **Plan for coming week**

  - Yalun Tang and Quan Wang(fabrication):

1. We will make a new optical device and perform surface chemistry on it.
2. We will observe the light scattering at various concentration of gold nanoparticles. The analysis of light intensity will be done in ImageJ.
3. We will start to design the poster and work on the final report.

  - Jiameng Li and Qinming Zhang(simulation and modeling):
    1. We are going to discuss and design ours poster in coming weeks.
    2. We will take certain photos or screenshots to complete our poster.

- **Summary of weekly advisor meeting**

For this week, we finished a complete trial of fiber etching and gold nanoparticle attachment. We will continue observing the light scattering of gold nanoparticle, and compare the light intensity result at 5 different concentration of gold nanoparticles.