

EE/CprE/SE 491 WEEKLY REPORT 9 - sday18-24

11/12/17 –11/18/17

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

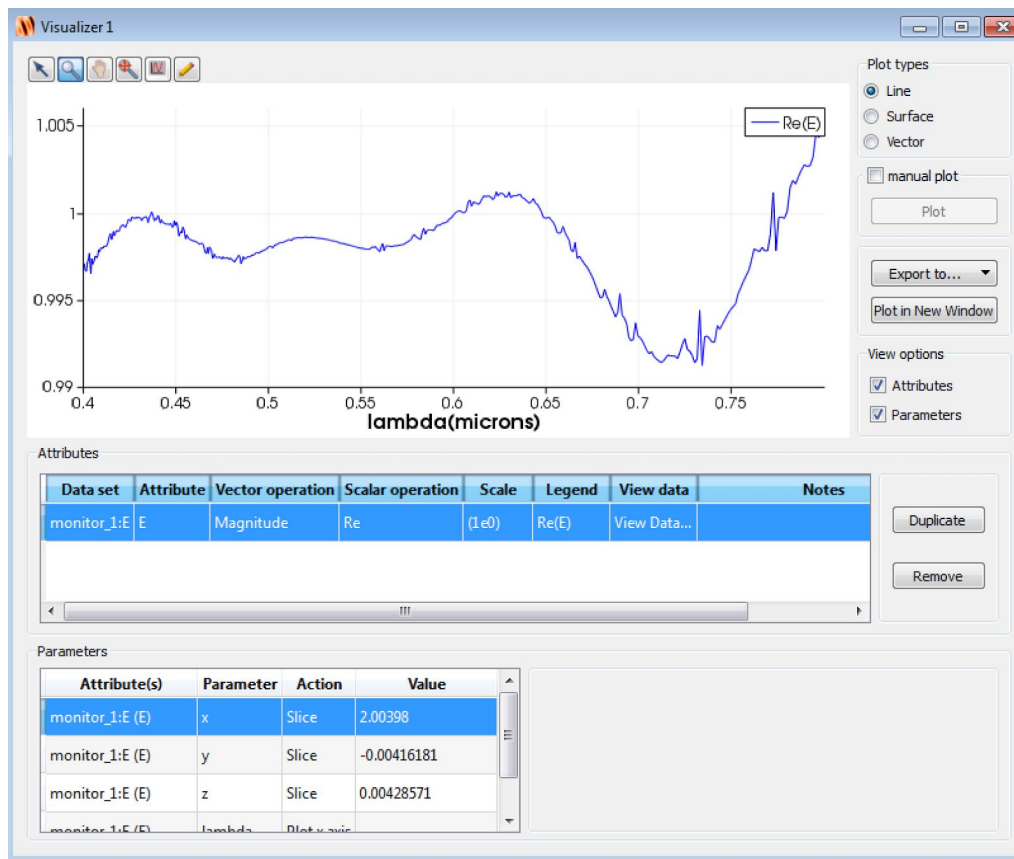
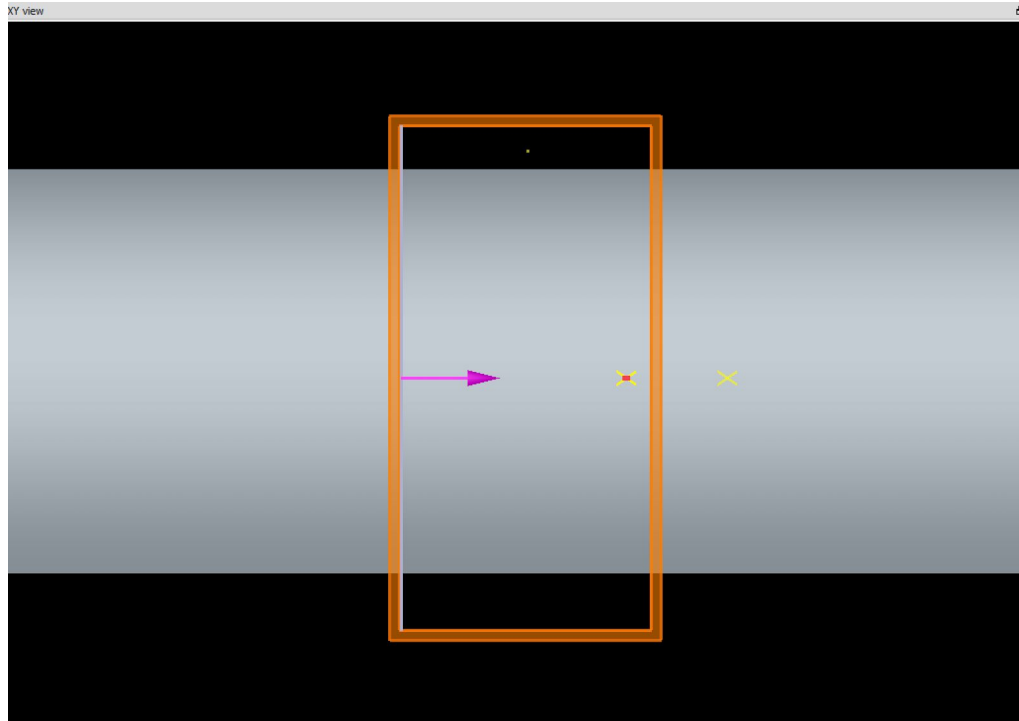
o Past week accomplishments

● Quan Wang and Yalun Tang:

1. We finished the HF wet etching of the fiber core in MRC, the length of etching time is 1 hour. We can clearly observe the decreased thickness.
2. We prepared the solutions needed for surface chemistry, and cleaned the fiber core using DI water

● Jiameng Li:

We put small gold ball inside the FDTD frame, and we get the following result:
Figure 1 shows the simulation fiber in XY axis. Figure 2 shows the electric field intensity when we put metal ball into the calculating field.



- Qinming Zhang:
 1. We did the simulation again

2. We tested the etching platform
3. We tried to make the simulation process more efficient in order to save time.

- Group:

1. The HF wet etching for the optical fiber is complete
2. Started to prepare the fourth trial of surface chemistry
3. Changing the parameters in 3D numerical model for wavelength vs. intensity curve

o **Pending issues**

1. We need to measure the exact dimension of the fiber core, figuring out the diameter we have etched using HF acid

o **Individual contributions**

Team member	Contribution	Weekly hours	Total hours
Yalun Tang	Finished the HF wet etching	10	63
Quan Wang	Finished the HF wet etching	10	63
Jiameng Li	Finish building 3D model and get result for inserting metal balls	15	59
Qinming Zhang	Test etching platform	10	54

o **Plan for coming week**

- Yalun Tang and Quan Wang(fabrication):

1. Finish the fourth trial of surface chemistry, and add gold nanoparticles onto the fiber core
2. Send the optical fiber sample to SEM, observing the light scattering of the gold nanoparticles

- Jiameng Li and Qinming Zhang(simulation and modeling):

1. We tried to make the simulation process more and more efficient.

2. We want to change the location of the metal ball to see more wavelength of electrical intensity, and we also need to collect magnetic field distribution into our database.

O Summary of weekly advisor meeting

For the meeting this week, we discussed about the HF wet etching with our advisor, and he suggest us to measure the diameter of the fiber etched. Professor Meng Lu helped us to go through the waveguide of lumerical model, and we made some technical improvement about our 3D model.