

*EE/CprE/SE 491 WEEKLY REPORT 4 - sday18-24*

9/24/17 – 9/30/17

*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**

- Yalun Tang:
  1. Removed the coating from the single mode optical fiber
  2. Did the surface chemistry for the previous multimode optical fiber for attaching gold nanoparticles later
  
- Quan Wang:
  1. Obtained the new single mode optical fiber
  2. Cleaned the optical fiber thoroughly
  3. Finished the first part of surface chemistry(trial 1)
    - a. PVA and GA experiment
  4. Stored the optical fiber in the refrigerator(In DI water)
  5. Prepared the next stages of surface chemistry experiment
  
- Jiameng Li:
  1. Finished reading materials about fibers and modeling simulation
  2. Getting to understand every step of modeling simulation process with advisor
  
- Qinming Zhang:
  1. Started design the second cuber holder in order to stabilize the optical fiber during the surface chemistry experiment.
  2. Chose the material (Acrylics) and ask ETG to make the cube.
  
- Group:
  1. New optical fiber of single mode has been purchased

2. Finished the surface chemistry for optical fiber, ready to attach gold nanoparticles
3. Learned how to handle the chemicals needed in the chemistry experiment
4. Finished purchasing solid-work material
5. Simulation model completed

**o Pending issues**

1. The material for Solidwork printing has not arrived yet, cannot move on to the next step until it arrives
2. We need to create a holder for the optical fiber when implementing the surface chemistry experiment in order to stable the tip of the optical fiber
3. We need to gain access of the lab room, or move it to the coover lab room, otherwise it is inconvenient to perform experiment
4. The multimode fiber connector is out of stock, we need to make it by ourselves; however, our ultimate goal is to do the connection with single mode fiber, connecting the multimode fiber is for practice only

**o Individual contributions**

Team member	Contribution	Weekly hours	Total hours
Yalun Tang	First part of surface chemistry, removed the coating of the single mode fiber	5	25
Quan Wang	First part of surface chemistry has completed	5	25
Jiameng Li	First model of fiber is finished design.	5	25
Qinming Zhang	Holder has been made.	5	25

**o Plan for coming week**

- Yalun Tang and Quan Wang(fabrication):
  1. Finish the first trail of surface chemistry, and make ten more samples of optical fiber for ten different concentrations of gold nanoparticles solution
  2. Find the concentration of gold nanoparticle solution that can best attaches the optical fiber
  3. Need to make the multimode fiber connector ourselves

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

1. We will try to test model using the fiber they already prepared.
2. We need to optimize parameters to find the best data for this fiber, it needs us a few weeks to deal with.
3. We will test the previous holder and prepare to design another size holder for different sized holder.
4. We are going to test the cube holder to make sure it is stable.

### **O Summary of weekly advisor meeting**

We have discussed the problems of nanoparticle concentration, the purchased concentration solution is very large, so we need to dilute the solution in ten or more levels to find the best concentration for attaching gold nanoparticles. In the meeting, we have learned how to handle the laser instrument and connect it with our optical fiber. We have requested the key access form of the Sweeny Lab room while meeting with our advisor, and he assigned a graduate student to help us with the lab access and teach us how to handle the toxic chemicals. We will need to practice handling the fragile optical fiber during surface chemistry experiment. As the connector tool kit has not arrived yet, we cannot move on to the laser experiment stage.