

EE/CprE/SE 491 WEEKLY REPORT 8 - sdmay18-24

11/05/17 –11/11/17

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. Get the training of using 49% HF in MRC under a PhD student
 2. Stabilize the tip area of the fiber which the fiber core will be exposed
 3. Removed the coating layer of fiber to perform the wet etching
- Jiameng Li:
 1. Simulation model in 3D has been completed.
 2. We accumulated waving graph when there is no metal ball inside of FDTD frame.
- Qinming Zhang:
 1. We put certain monitor and metal sphere besides and on the fiber.
 2. We did the simulation again.
 3. We tried to make the simulation process more efficient in order to save time.
- Group:
 1. The fiber holder made for wet etching is completed, the material of this tool cannot be etched by the hydrofluoric acid, therefore, it is safe to use
 2. The 3-D numerical model of optical fiber calculated the first trial of waveguide by optimizing the parameters(fiber diameter, refractive index)

o Pending issues

1. The 3-D model takes 48 hours to run after changing the parameters, the time concern matters
2. The solution used for wet etching has unknown concentration although the tag says it's 50% concentration. The actual concentration should be much less than 50% as the first trial of wet etching did not remove majority of the cladding layer
3. We need to find the Hydrofluoric acid with accurate concentration to finish etching

o Individual contributions

Team member	Contribution	Weekly hours	Total hours
Yalun Tang	Learned wet etching	10	53
Quan Wang	Learned wet etching	10	53
Jiameng Li	Add the metal sphere on the fiber during the simulation process.	4	44
Qinming Zhang	Add the metal sphere on the fiber during the simulation process.	3	44

o Plan for coming week

- Yalun Tang and Quan Wang(fabrication):
 1. Going to use 49% HF to perform the wet etching under Dr. Wai in MRC
 2. Prepare to observe the fiber under the microscope
- Jiameng Li and Qinming Zhang(simulation and modeling):
 1. Working on finding a new set of waveguide while adjusting the parameters in 3-D models
 2. We want to observe the wavelength vs intensity curve

O Summary of weekly advisor meeting

For this week, we are doing our wet etching preparation in the fabrication part and optimizing the fiber parameters in the simulation part. While we are still waiting for the wet etching holder,

our advisor Professor Meng Lu suggest us to practice etching the fiber core using the stable material found in MRC.