EE/CprE/SE 492 Bi-WEEKLY REPORT 1 - sdmay18-24

01/14/18 – 01/26/118

Project title: Optical Wash-free Transducer for Biomarkers analysis
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 2 weeks accomplishments**

- Yalun Tang:

1. Perform the wet etching in MRC

- Quan Wang:

1. Prepared the optical fiber, apparatus attachment and performed the HF wet etching in MRC

- Jiameng Li:

1. Finish reading paper about optimization of the sensing strategy, which means the diameter of the optical microfiber and size of gold nanoparticles were optimized through theoretical calculations combined with experimental considerations. By changing the diameter of optical microfiber, the evanescent wave decays exponentially. Thus, ultrathin OMFs (optical microfibers) should be used to achieve high sensitivity. Furthermore, the optical cross-section of GNPs (gold nanoparticles) also should be optimized to enhance their interaction with the evanescent field.

- Qinming Zhang:

1. Designed the fiber chip.
2. Read the Optimization of sensing strategy.
3. Decided what material we are going to use for the chip.

- Group:

1. Prepared for the presentation
2. Designed the new fiber holder

o **Pending issues**

1. Need to improve the holder for the fiber during the wet etching

o **Individual contributions**

Team member	Contribution	bi-Weekly hours	Total hours
Yalun Tang	Wet etching	10	10
Quan Wang	Wet ething	10	10
Jiameng Li	Simulation on changing the diameter of OMFs and the size of GNPs	10	10
Qinming Zhang	Design fiber chip. Finish reading.	10	10

o **Plan for coming weeks**

- Yalun Tang and Quan Wang(fabrication):

1. Keep trying the wet etching to get the sensing part of the fiber etched to around 1 micrometer.

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

1. We will work on simulating optical microfiber by our own. In this case, we would like to change the diameter of OMFs to evident the decay of evanescent in the exponential form. Since every time of simulation will spend a few hours to process, and we want to input more parameters for accuration, the whole process we accumulating the result will cost us a few weeks.
2. We will send the chip design file to lee and certain company, and then ask them to design several different size fiber chip.