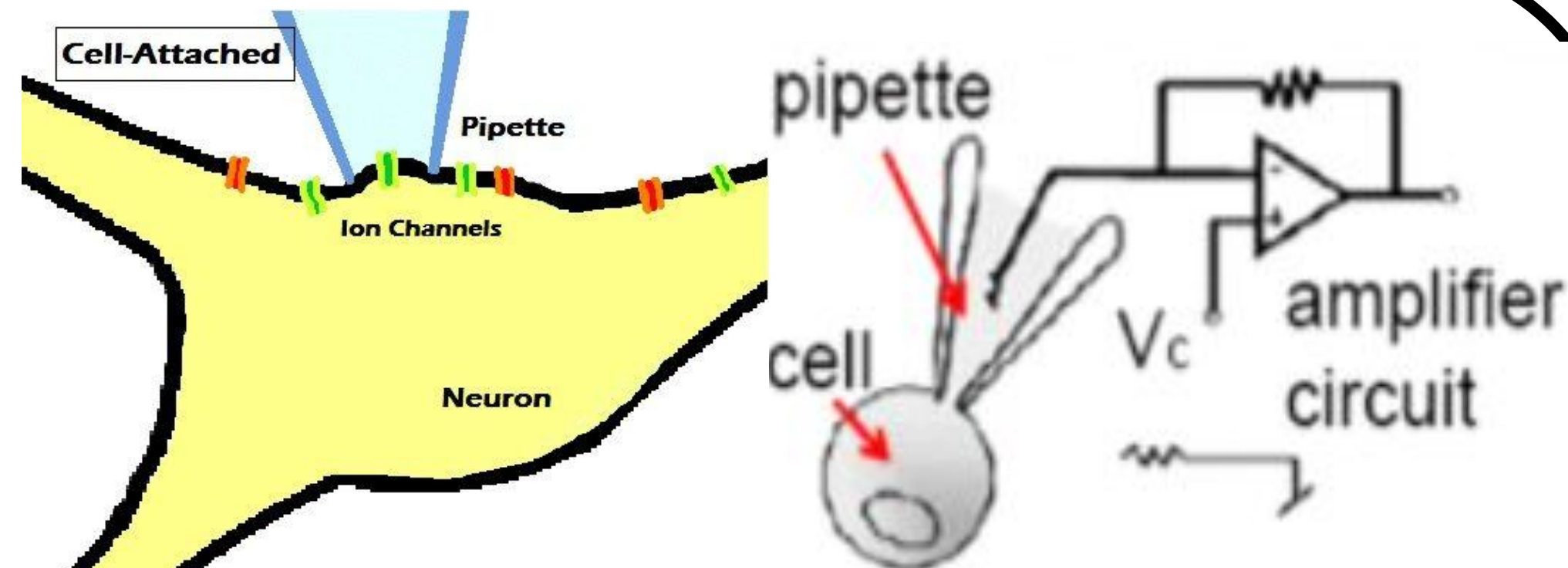


## INTRODUCTION



- Patch-clamp is a technology in biological engineering field which refers to catching cell with tiny clamp and observe the bioelectricity behavior of the cell.
- Our project is focusing on designing the microchip model and build up a set of electric environment and circuit to provide operational interface simulation.

## TEAM INFO

### Team Members:

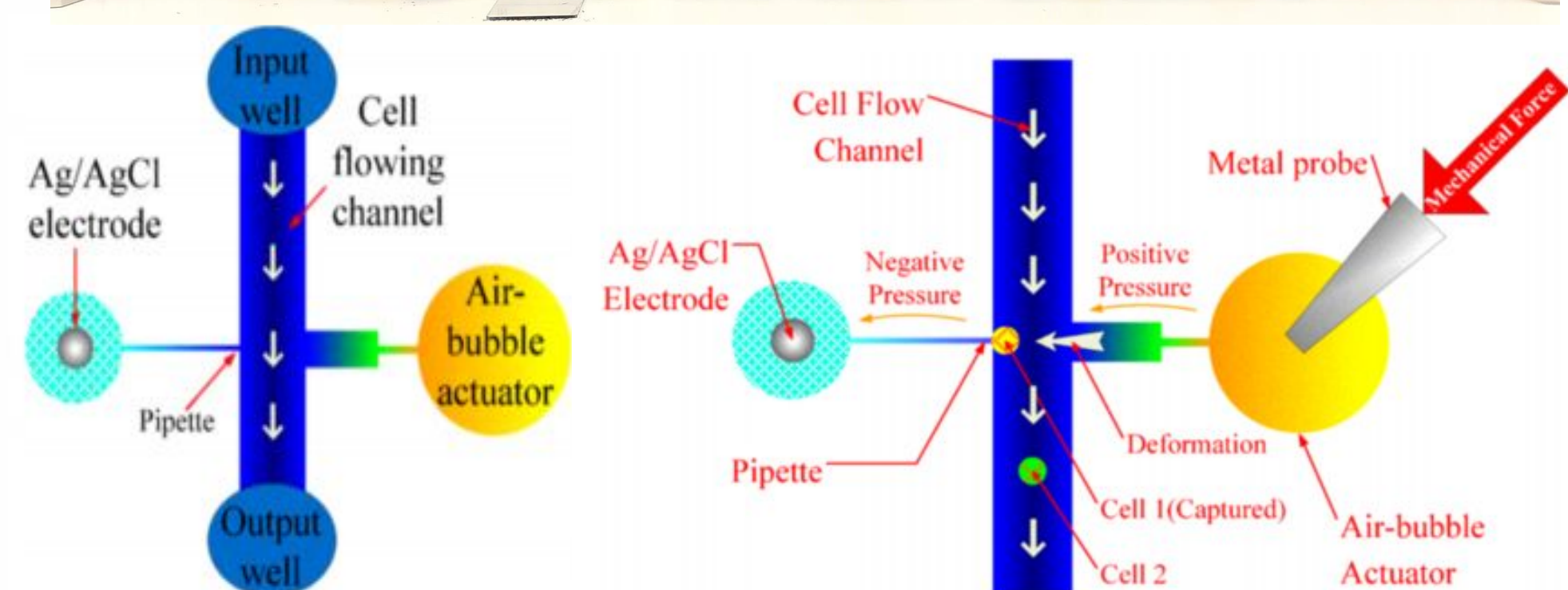
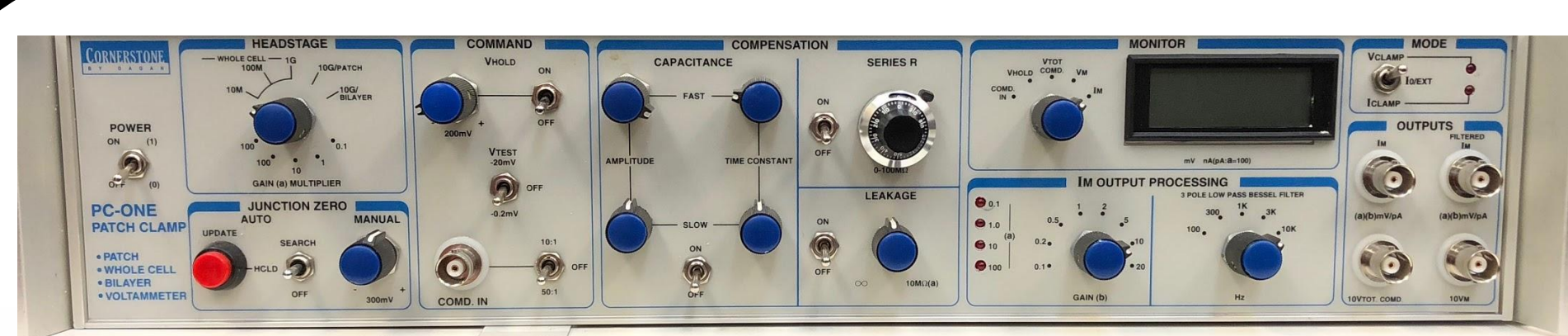
Chenheng Xu      Daiyuan Ding  
Li Qian              Ningyuan Zhang  
Yigao Li

## INTENDED USERS

Patch-clamp technique can not only be used in neuroscience but also a huge variety of physiological questions. For this technique is still the laboratory technique, the user for this technique are the experimenters.

- Experimenters who want to know the ion current on the membrane when we apply different voltage or we use different solution.
- Give biological engineers and scientists necessary data for more possible experiments.

## DESIGN METHODOLOGY



In order to set up the interface to observe the electric current through neuron's membrane, we need a cell module, PC-ONE patch-clamp, headstage of PC-ONE, and an oscilloscope.

When Patch recording, vibration, and electrode movement problems are even more of a source of noise than it is with conventional microelectrode recording setups. Microphonic noise is generated whenever motion such as a vibration due to machinery, touching the preparation area, nearby walking, and even loud speech occur near the PC-ONE Headstage and pipette holder. The vibration causes small changes in the capacitances associated with the pipette holder and Headstage input circuitry.

## TECHNICAL DETAILS

### Functional requirements:

- Pipette could catch neuron inside microchip model.
- Current could be observed through PC-ONE interface.
- Neuron must be alive during operation.
- Noise should be reduced to an acceptable range.
- Data Reading and Calculation should be correct.

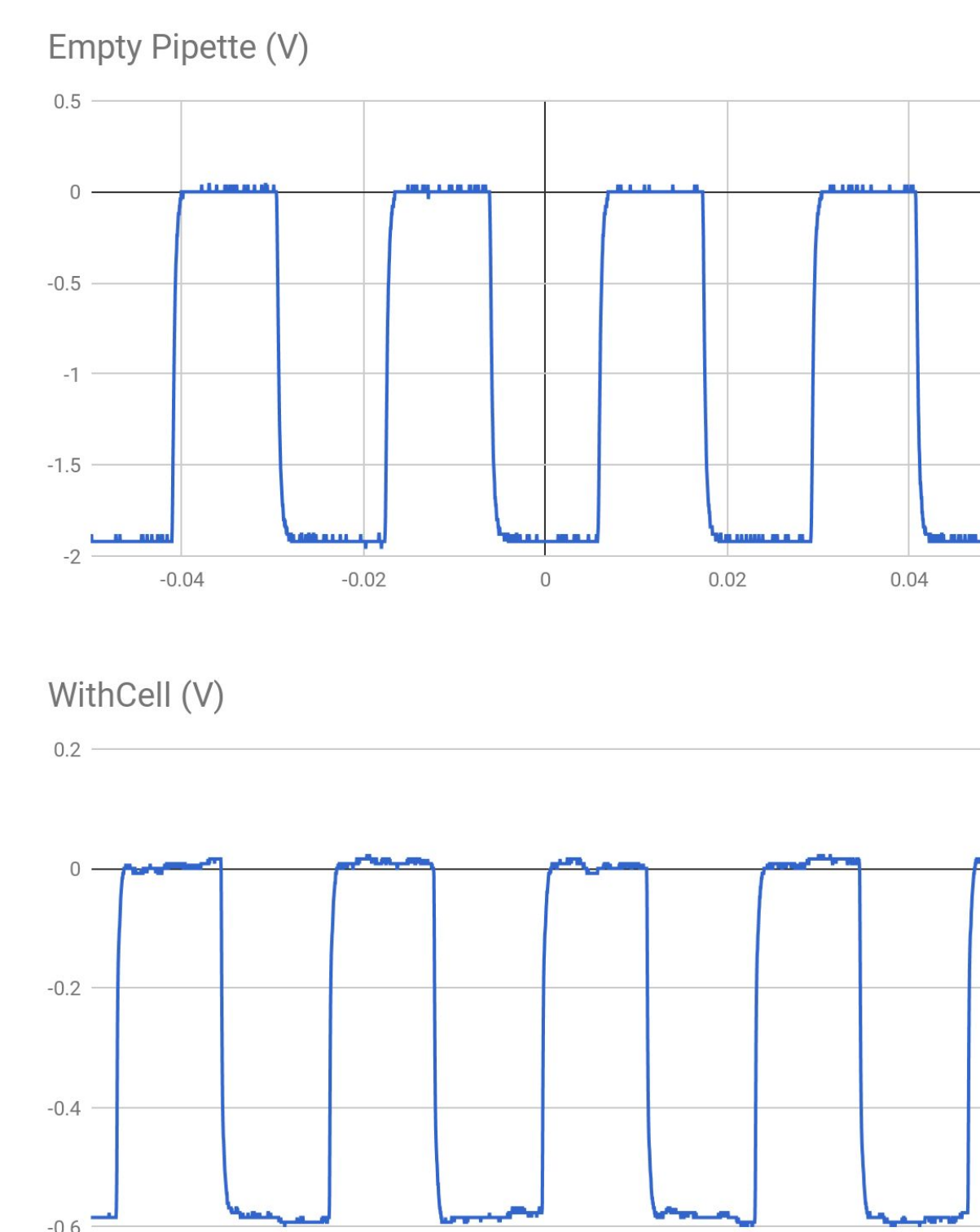
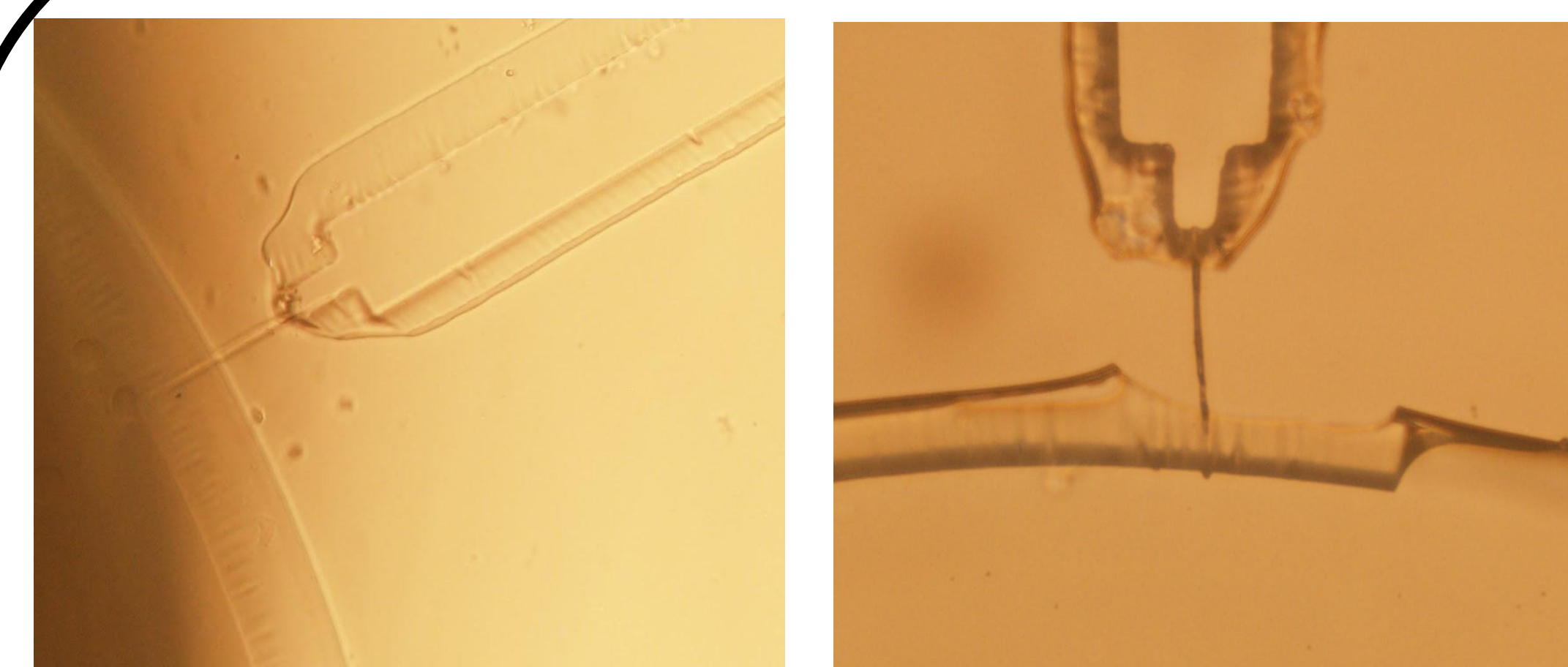
### Non-functional requirements:

- We need to strictly follow the equipment manual to operate all operations to fulfill the project requirements.
- We have to strictly follow the safety guide of laboratory to make the experiment process safely.
- We have to cite every sources we used during the development, and ensure that the project is totally independent.
- Plan regular meeting with client to make sure the project is meeting the requirement.
- Timely maintain the project to avoid critical bugs.
- Refresh reports and document on time to meet current process.

## STANDARD

- Be honest and realistic in stating claims, or estimates based on available data.
- Care about the human health.
- Use the resource that can be recycle used.
- The gap between neuron and tip of pipette is less than 150 um
- All tests need to be done in 5 days
- All data need to be collected together

## TESTING



- Lab provide by the client.
- No electronic devices work around the microchip and PC-ONE exclude the testing machine
- Place the headstage inside the aluminum foil
- Cells cycle period is 7 days. Finish the measurements in 5 days, or the status of the cells will be unstable.

