

Force Sensing Forceps

Problems:

1. Force Spike due to slack in electrode.
2. Drift of the Wittenstein sensor (HEX 21).
3. Sensor reading are almost 10 times the threshold (0.018N)

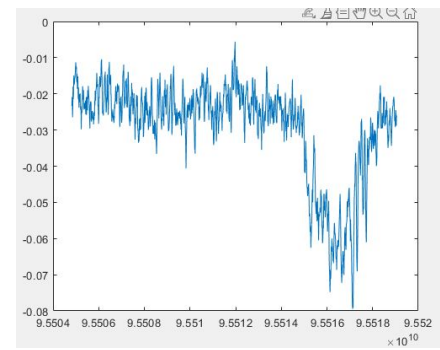
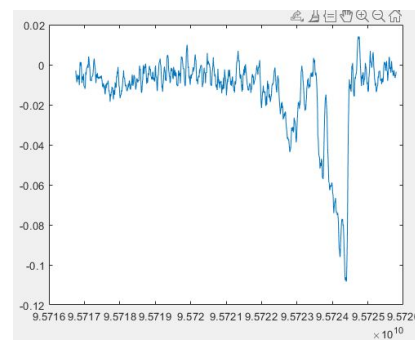
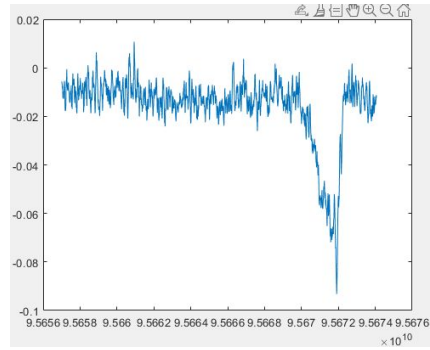
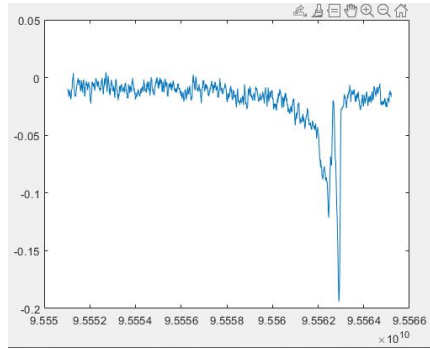
Next Milestones:

1. Reducing the force spike by mounting
2. Comparison of the Gamma sensor and Wittenstein readings
3. Comparing the forces by Forceps with the Gamma Sensor ground truth.

Recorded Data

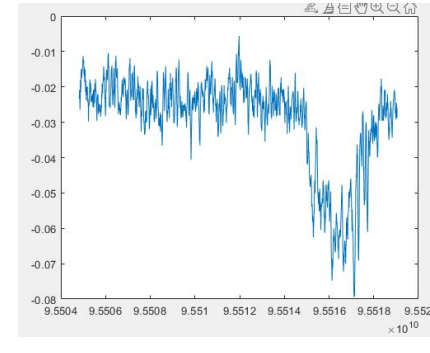
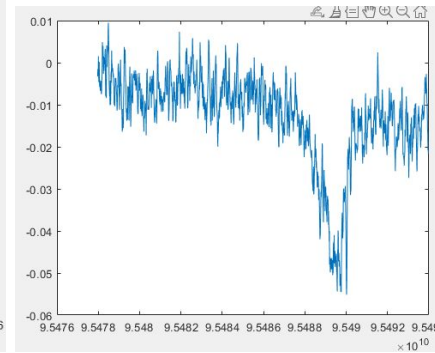
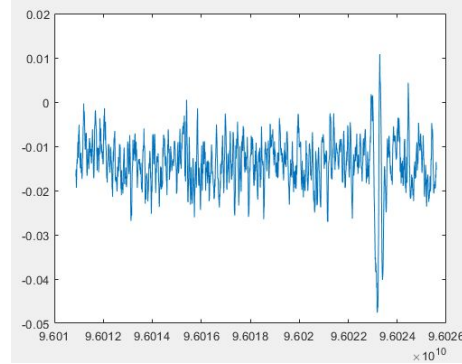
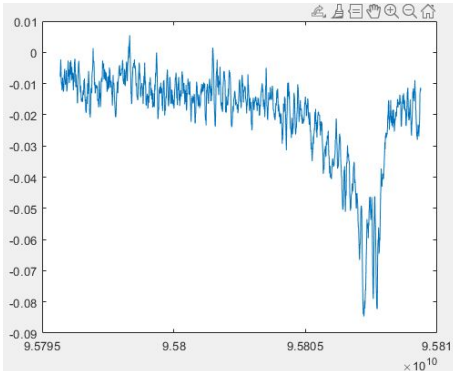
Electrode Sensing (by Dr. Deepa)

- **Mean of Max Force = 0.085N (Fz)**
- **Angle of the Force = 60 degrees**
- **Actual force on the Cochlea = 0.17N**



xPlot: Time (in S)

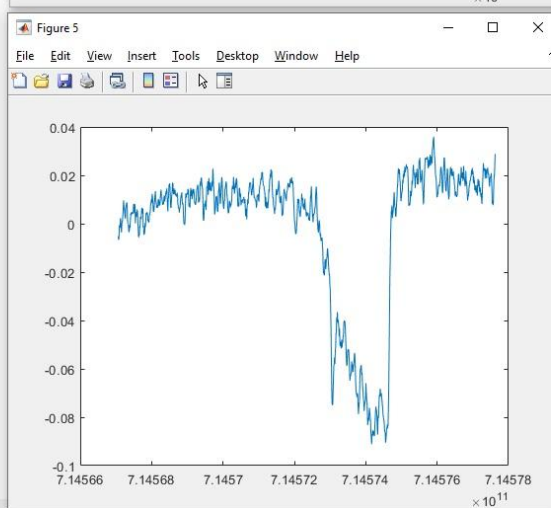
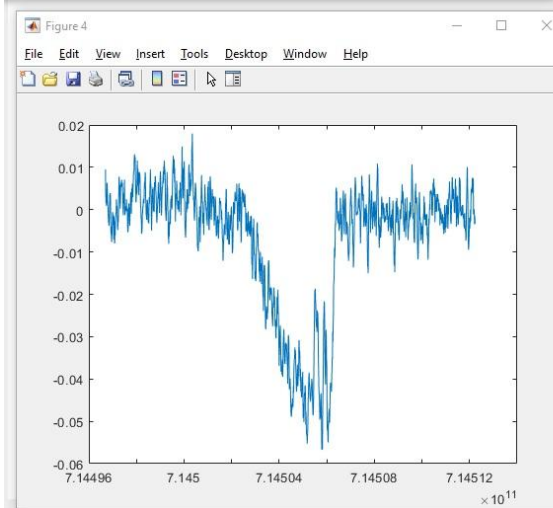
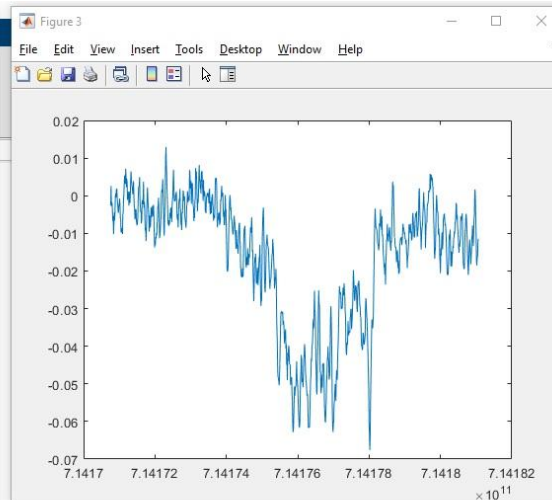
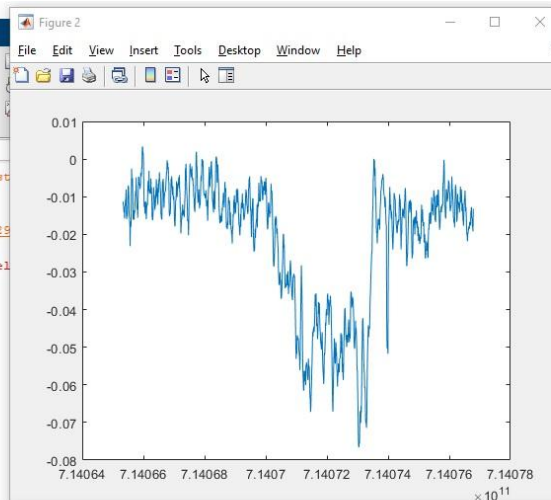
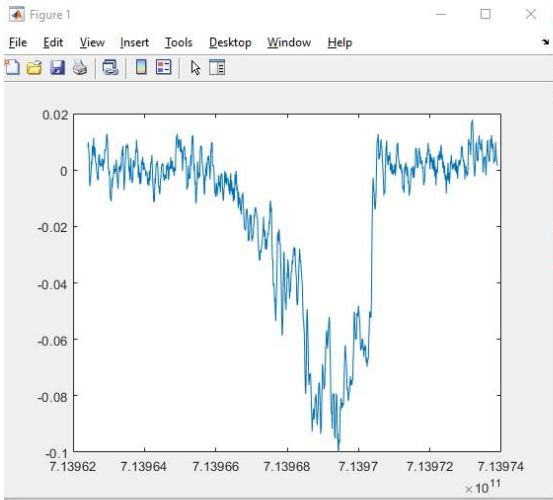
yPlot: Force(in N)



Updates

Results:

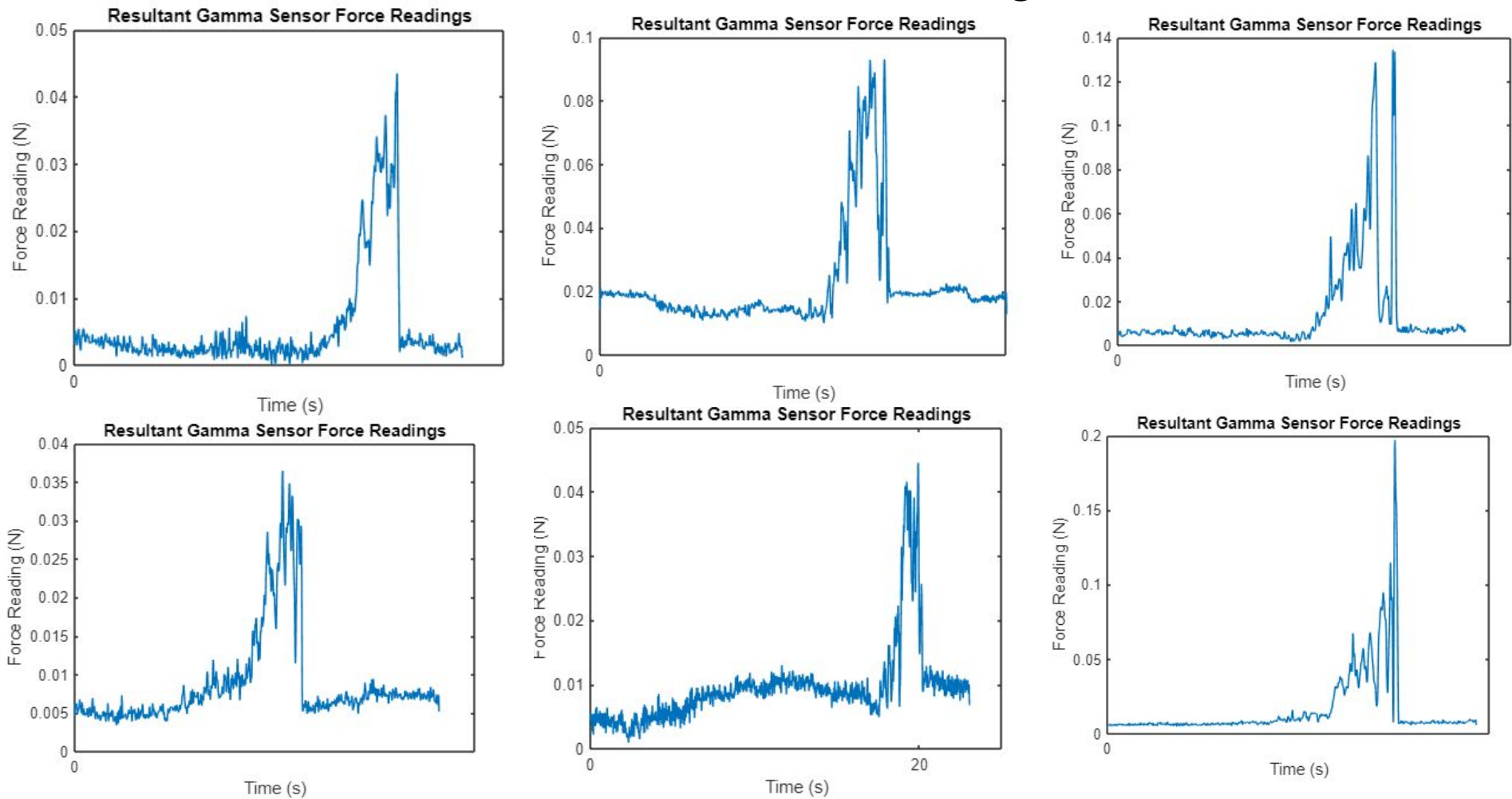
1. Decrease the mean of maximum force by **25.9%** [From **0.085N** to **0.063N**]
2. Electrode slack exerts force (lesser but still larger than threshold)

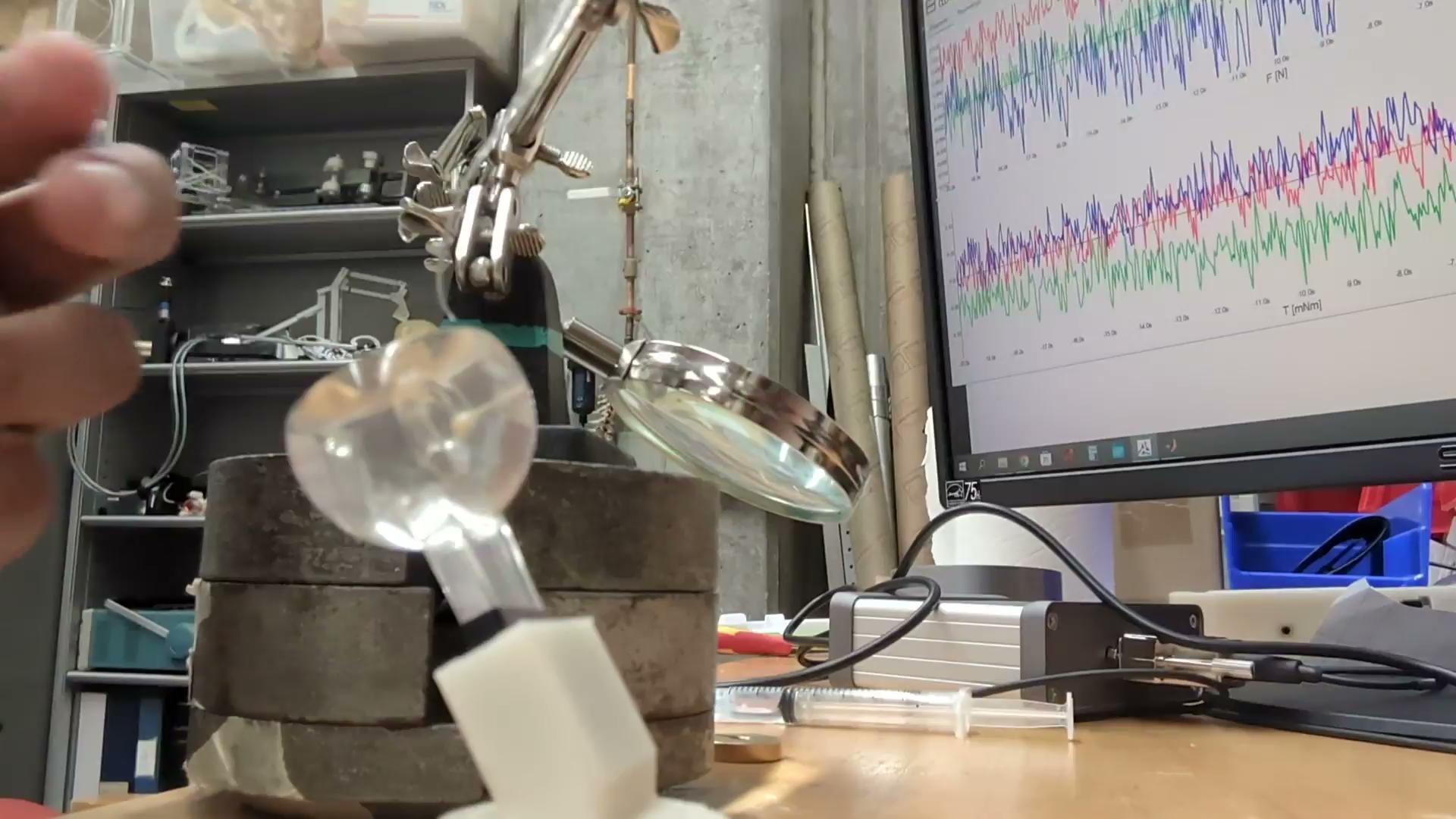


xPlot: Time (in S) / yPlot: Force(in N)

- **Mean of Max Force = 0.073N (Fz)**
- **Angle of the Force = 60 degrees**
- **Resultant force on the Cochlea = 0.14N**

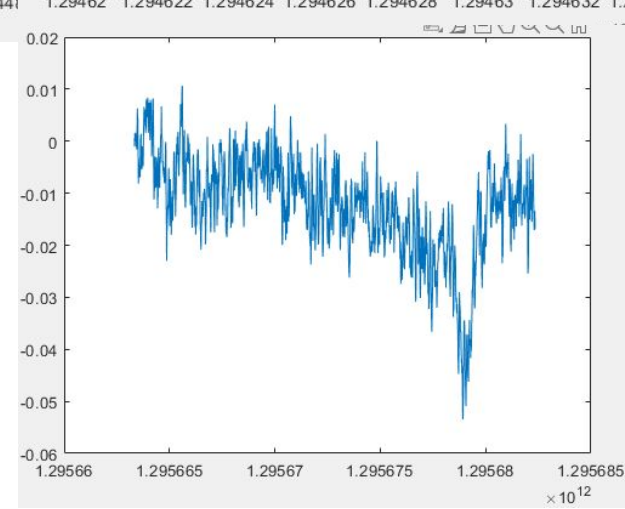
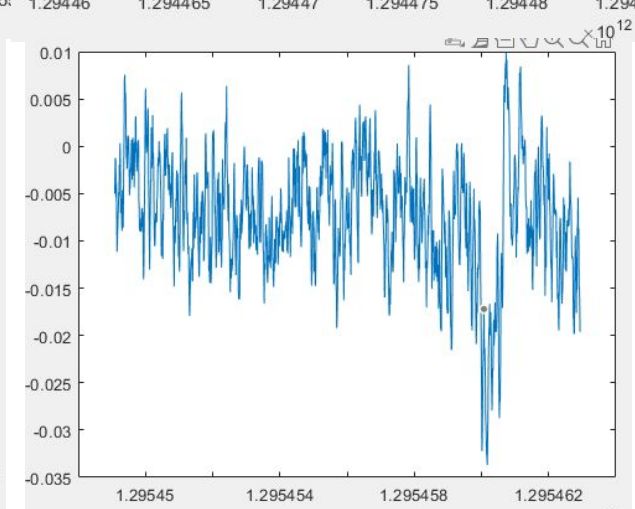
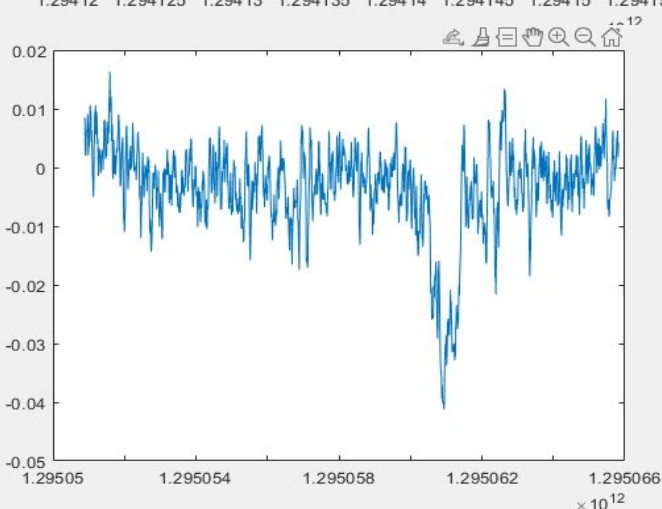
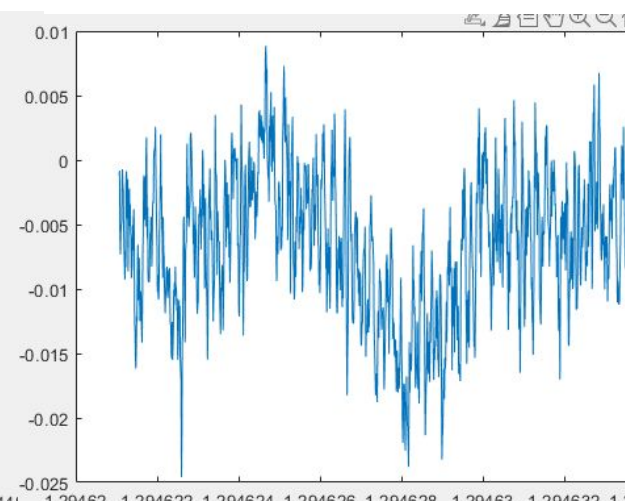
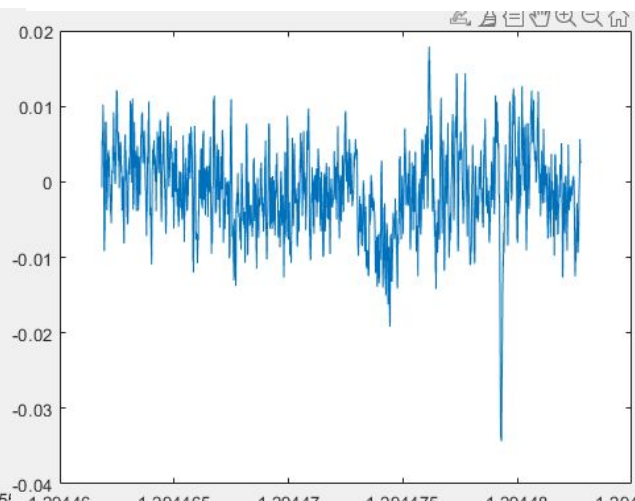
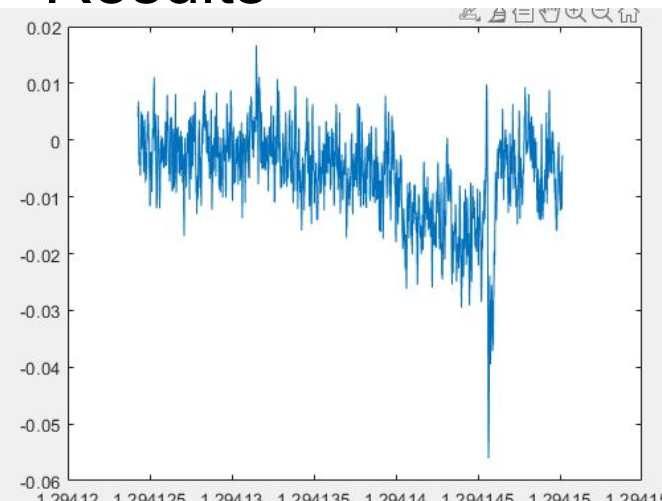
Resultant Force Calculation on the gamma sensor





Results

xPlot: Time (in S) / yPlot: Force(in N)



Improved Mounting

- Feeding the electrode from the tube above the cochlea
- Decrease the mean maximum force by **62%**
- Mean maximum force: **0.038N**
- Resultant Force on cochlea: **0.06N**

