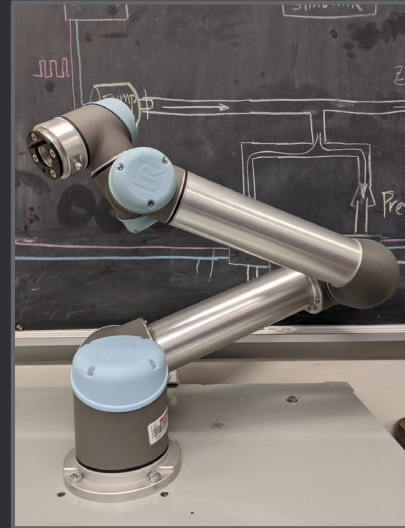
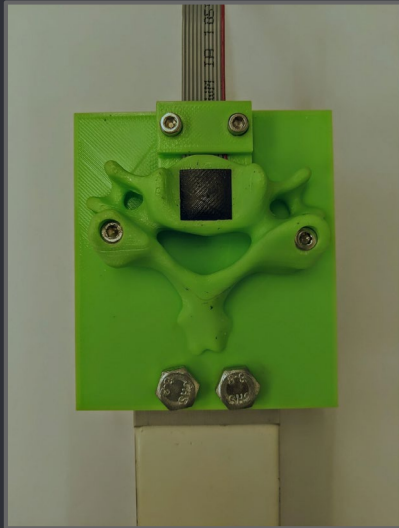


# Development and Applications of Flexible Ferrofluid Magnet Sensors



## ● What is a Flexible Magnet Sensor (FMS)?

Concept



Uses silicone as a flexible medium to contain ferrofluid

- Interaction with the silicone causes displacement of the ferrofluid which can be detected by a change in the magnetic field
- A Hall effect sensor array is used to detect the change in magnetic field formed by the ferrofluid

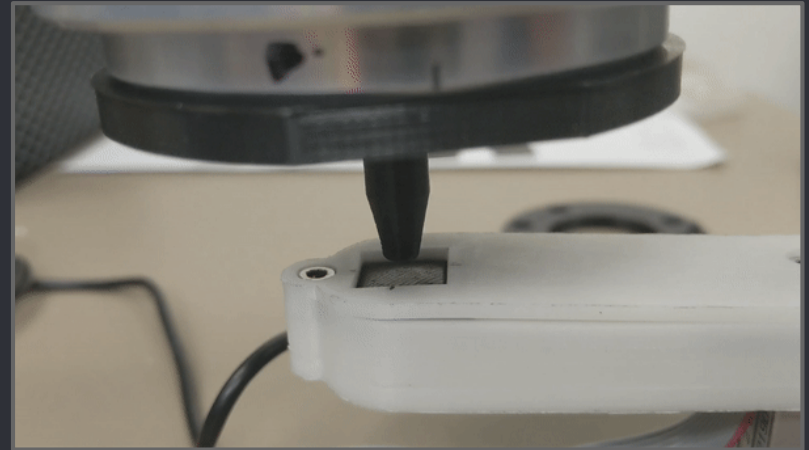
● What is a Flexible Magnet Sensor (FMS)?

○ What properties are being explored?

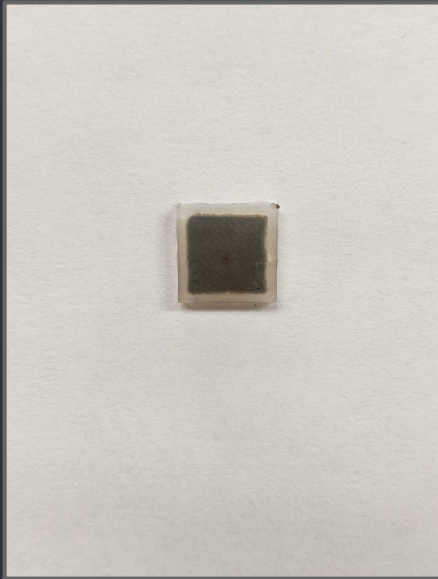
- Touch location sensitivity
- Load Sensitivity
- Shear load detection

Unexplored Topics

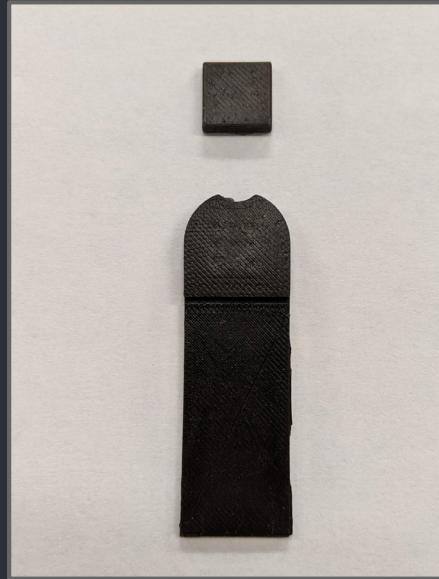
- Tilt Detection
- Stretch detection
- Multi-touch capabilities



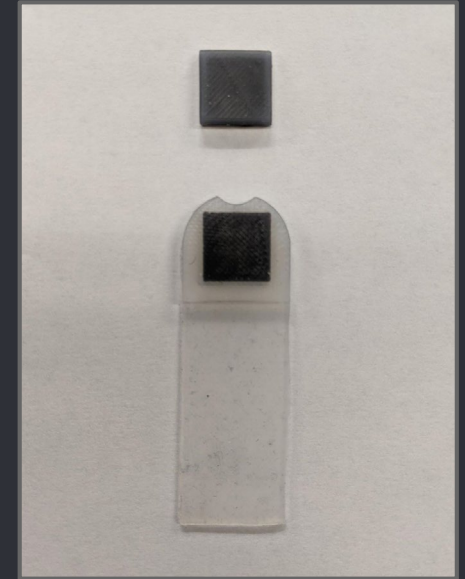
Ferrofluid Capsule



Complete Composite



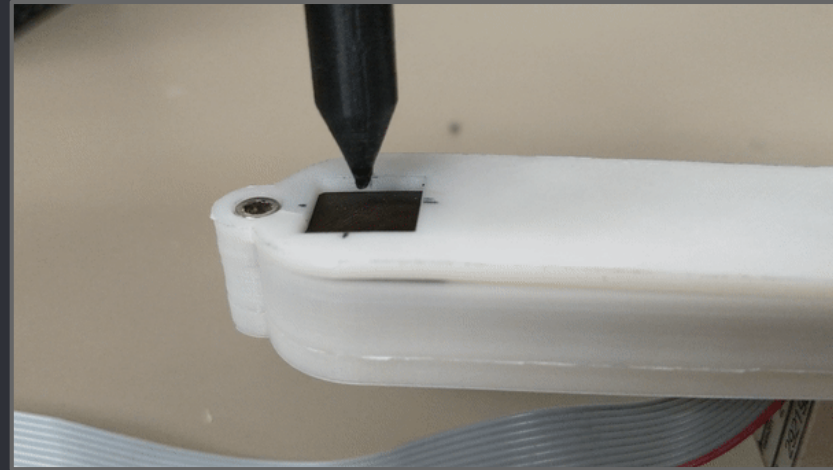
Enclosed Composite



## Experiments

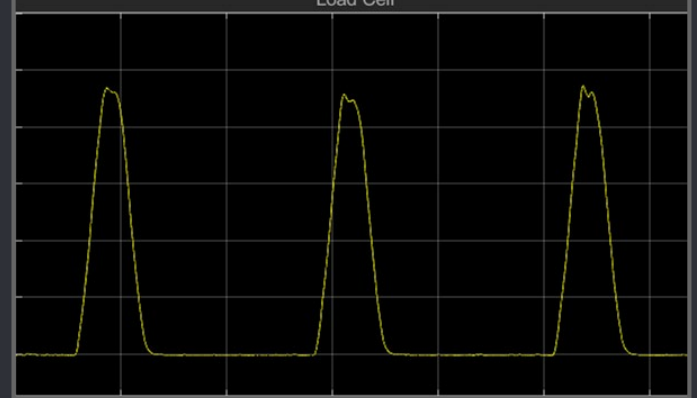
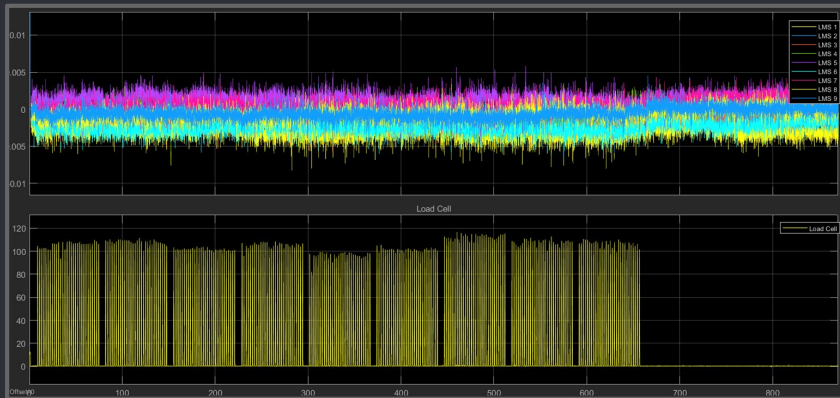
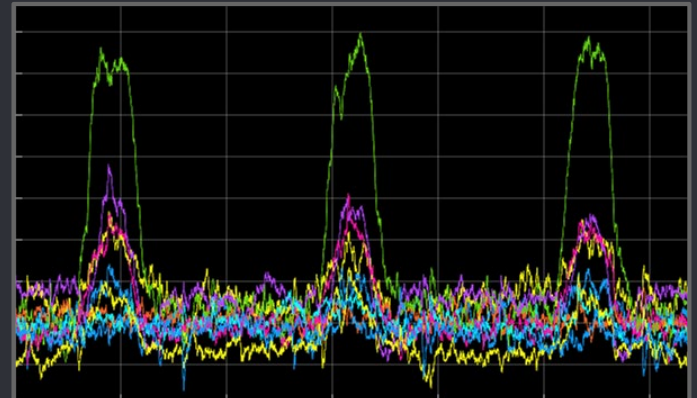
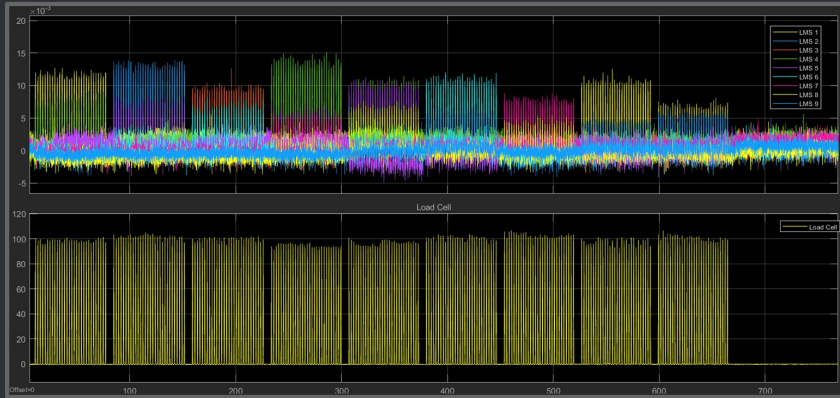
### Testing sensor viability:

- Differentiate nine probing locations in a 3x3 grid
  - Probing was performed at multiple loads
- Detecting direction of shear in the cardinal and intercardinal directions
  - Shear was performed at multiple distances



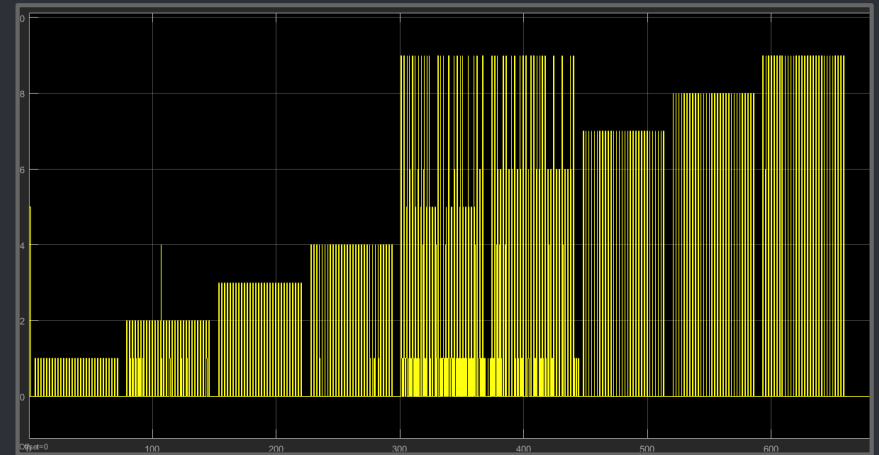
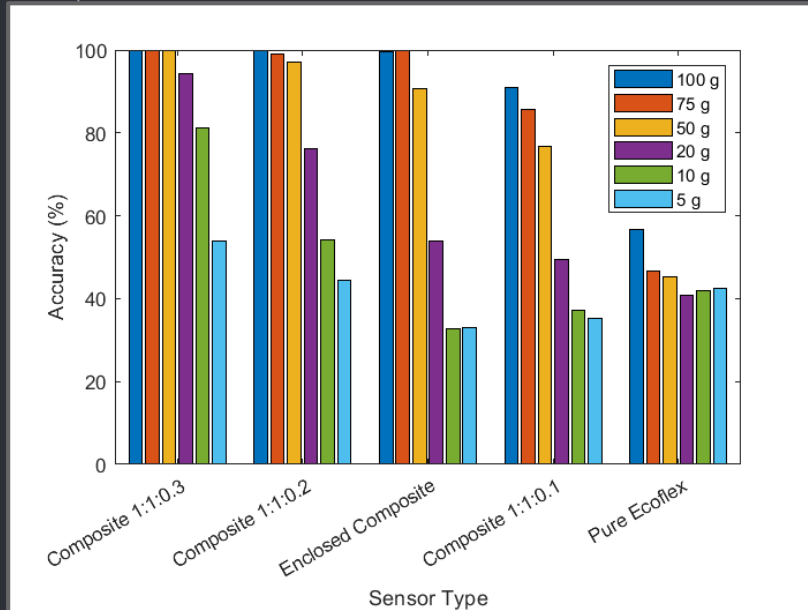
# Results

# Probing

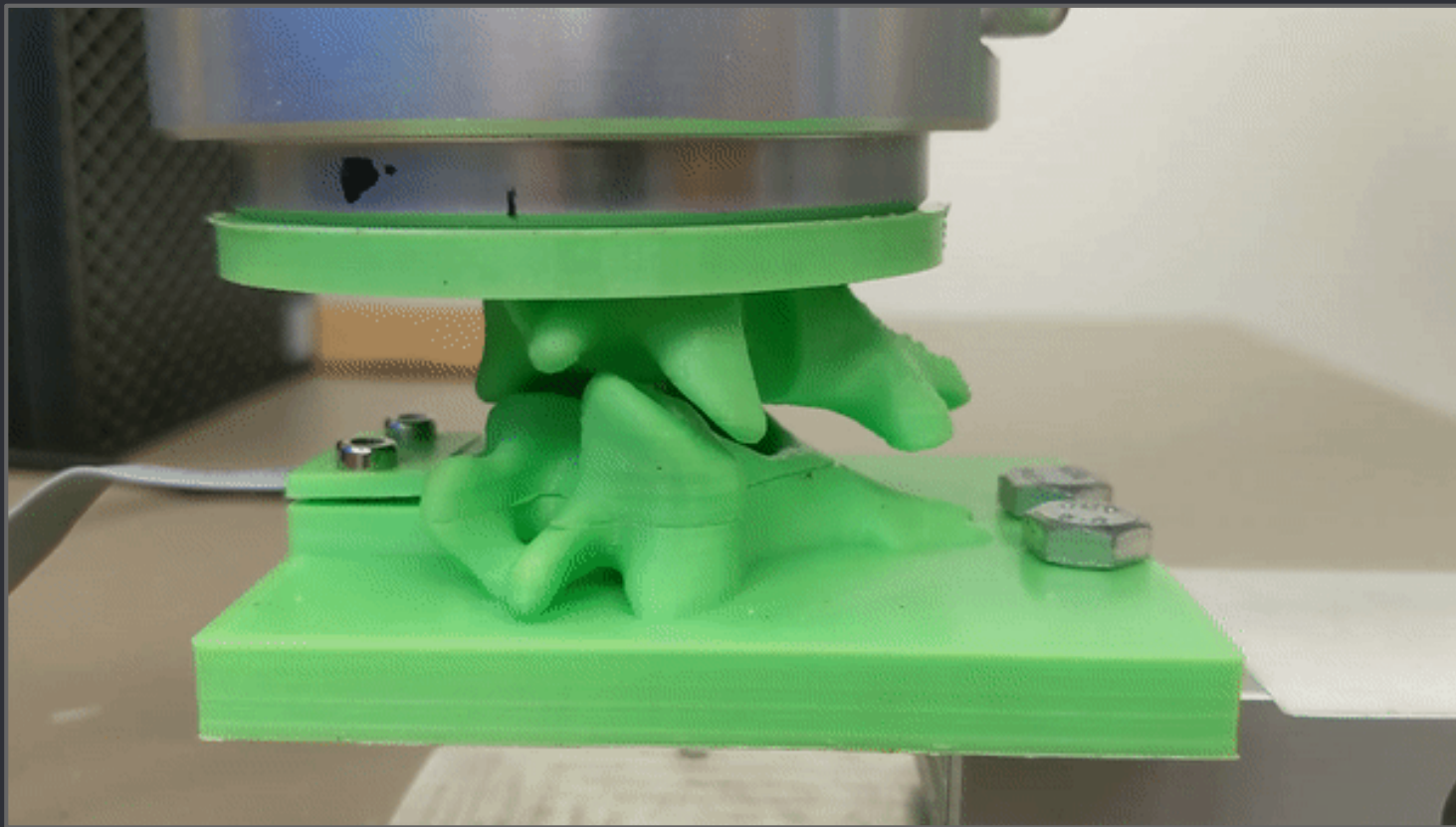


## Neural Networks

Extracted peak data was run through MATLAB's neural network plug-in



- Future Work





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