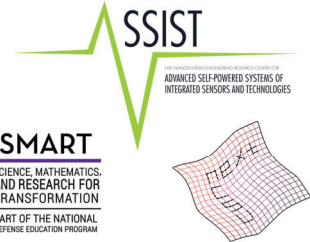


# Influence of Textile-Based Armband Form Factors on Wearable ECG Monitoring Performance

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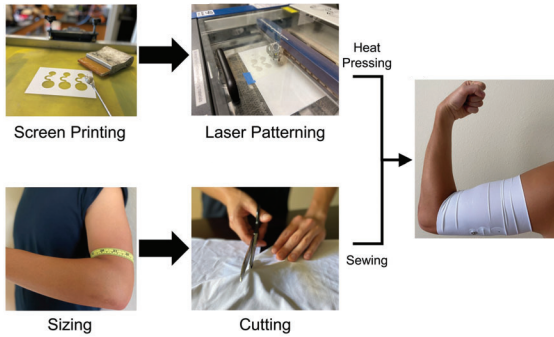
## Research Questions

- What is the ideal electrode location for an ECG armband?
- How does the textile form factor influence contact pressure?
- How does the textile form factor influence the ECG performance of the armband?

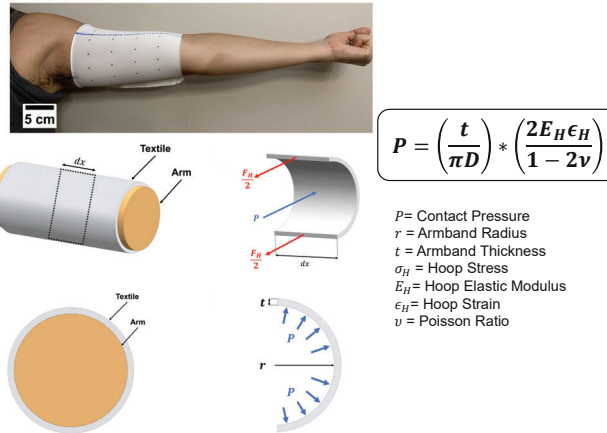
## Observations

- Identified optimal electrode location to acquire high quality ECG.
- Developed a model to predict contact pressure of cylindrical textile form factors.
- Identified ideal contact pressure of ~1300 Pa to monitor ECG.

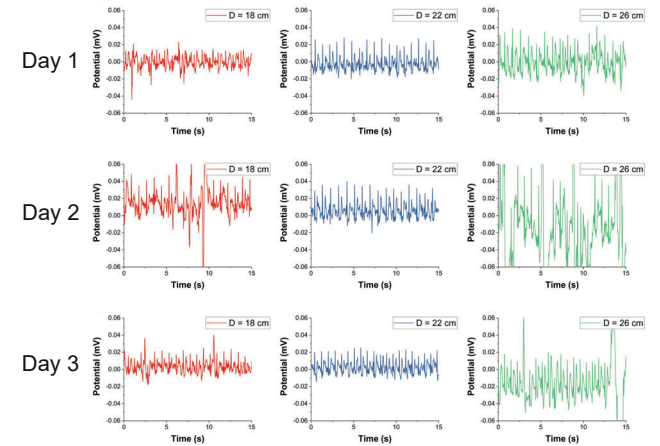
## Armband Design & Fabrication



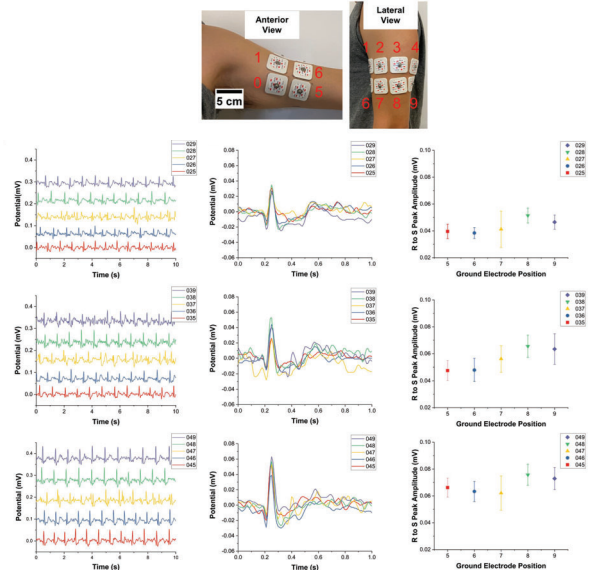
## Armband Pressure Model



## ECG Analysis of Armband



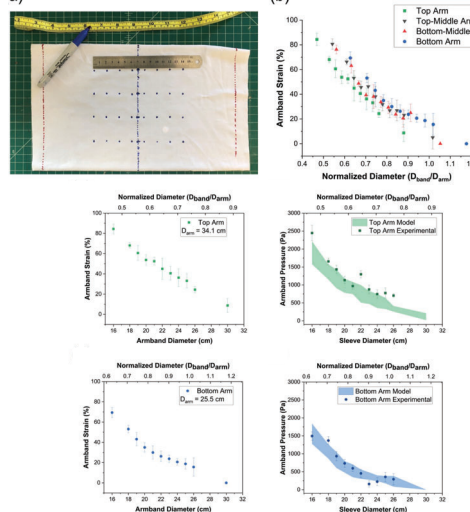
## Optimal Electrode Location



### Optimal Location & Justification

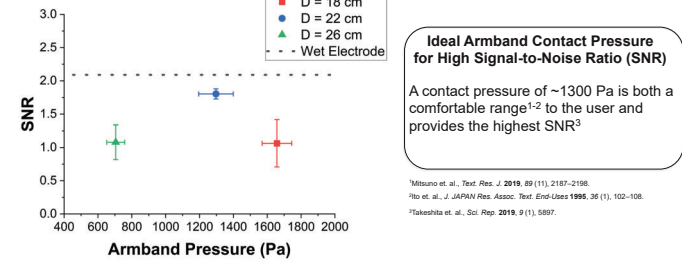
- 046 Configuration
- Good ECG signal
- Sufficient space on textile for assembly

## Pressure Model Experimental Validation



### Contact Pressure Model vs. Experimental

Model provides a good ballpark measurement to model contact pressures based on a user's upper arm anatomy.



## Future Outlook

The fundamental design principles and knowledge disclosed in our study lays the groundwork for enabling future E-textile form factors with efficient sensing capabilities.

### Future work will explore:

- Using 3D body scanning techniques to enhance and refine this works pressure model.
- Human trial studies with both sexes and multiple body types.
- Influence of contact pressure and textile form factor on other biosignals such as EMG.
- Influence of textile form factor on biosensing noise artifacts (i.e. movement).

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