



Scan for Demo



Embroidered Electronic Interfacing for Health Monitoring: An Electrocardiogram T-shirt

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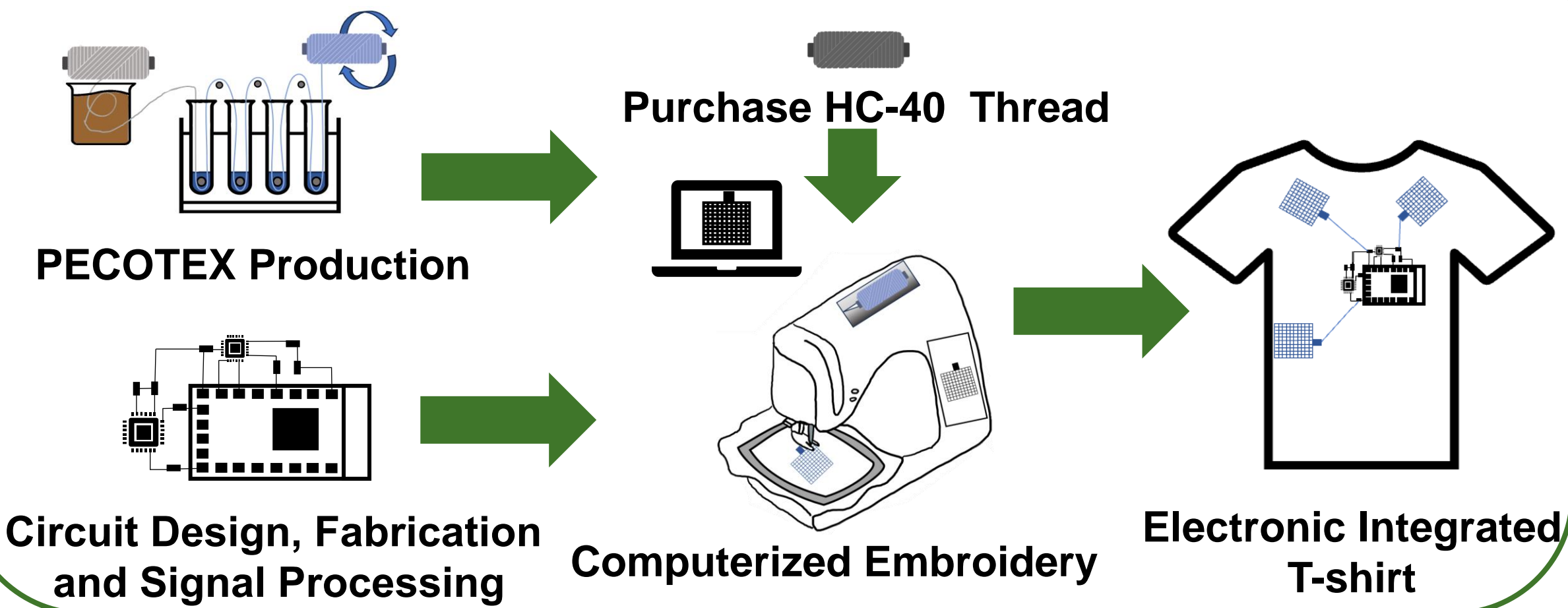
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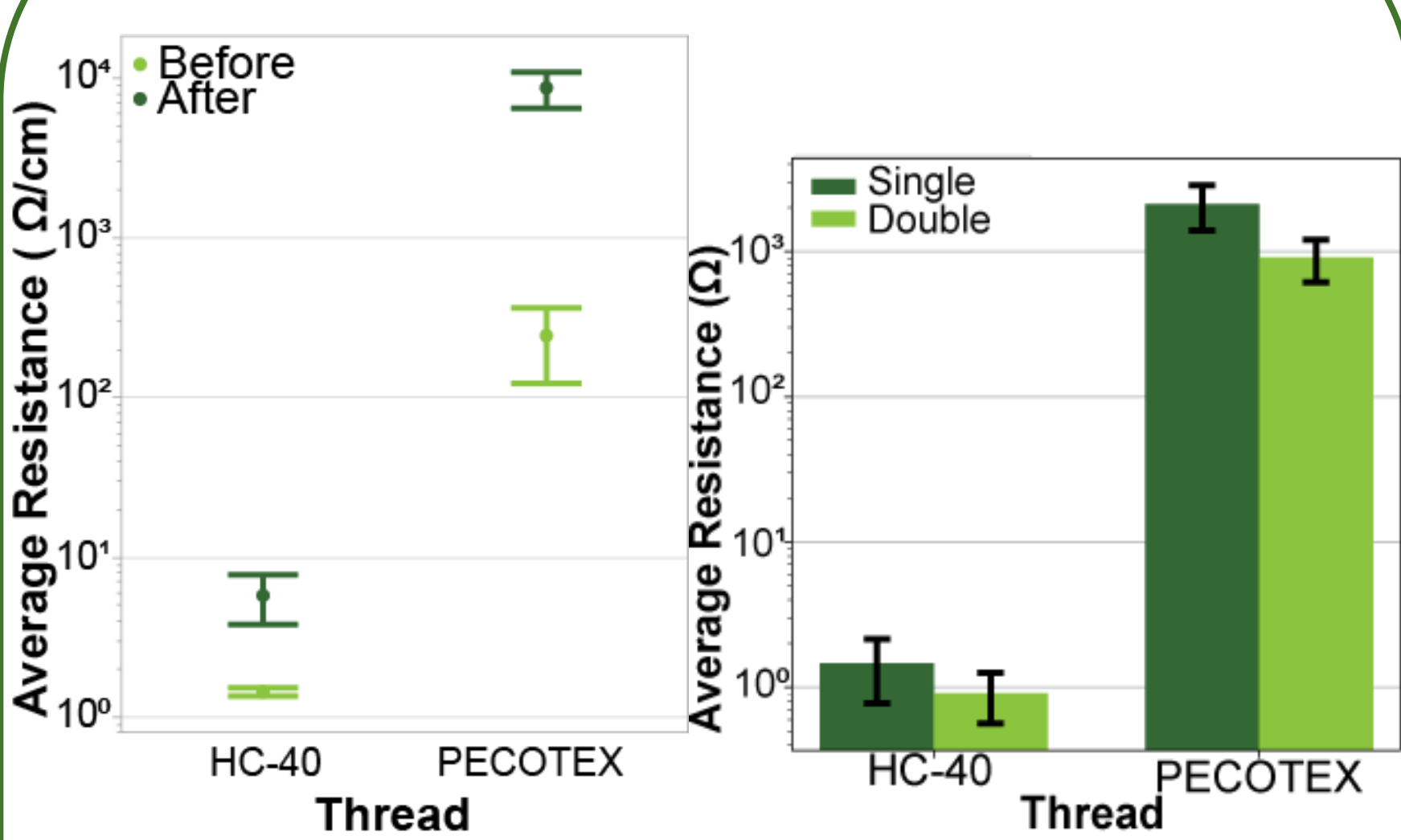
Embroidered electronics enhance non-invasive health monitoring through increased sensing surface area [1]. Computerized embroidery facilitates high spatial definition sensor fabrication [2]. To ensure widespread use, the thread must withstand embroidery forces, integrate easily with standard electronics, and preserve fabric properties.

These traits are investigated via the creation of an electrocardiogram (ECG) T-shirt using lab-modified PEDOT: PSS cotton thread (PECOTEX) and commercially available Madeira HC-40 polyamide thread.

FABRICATION METHODOLOGY



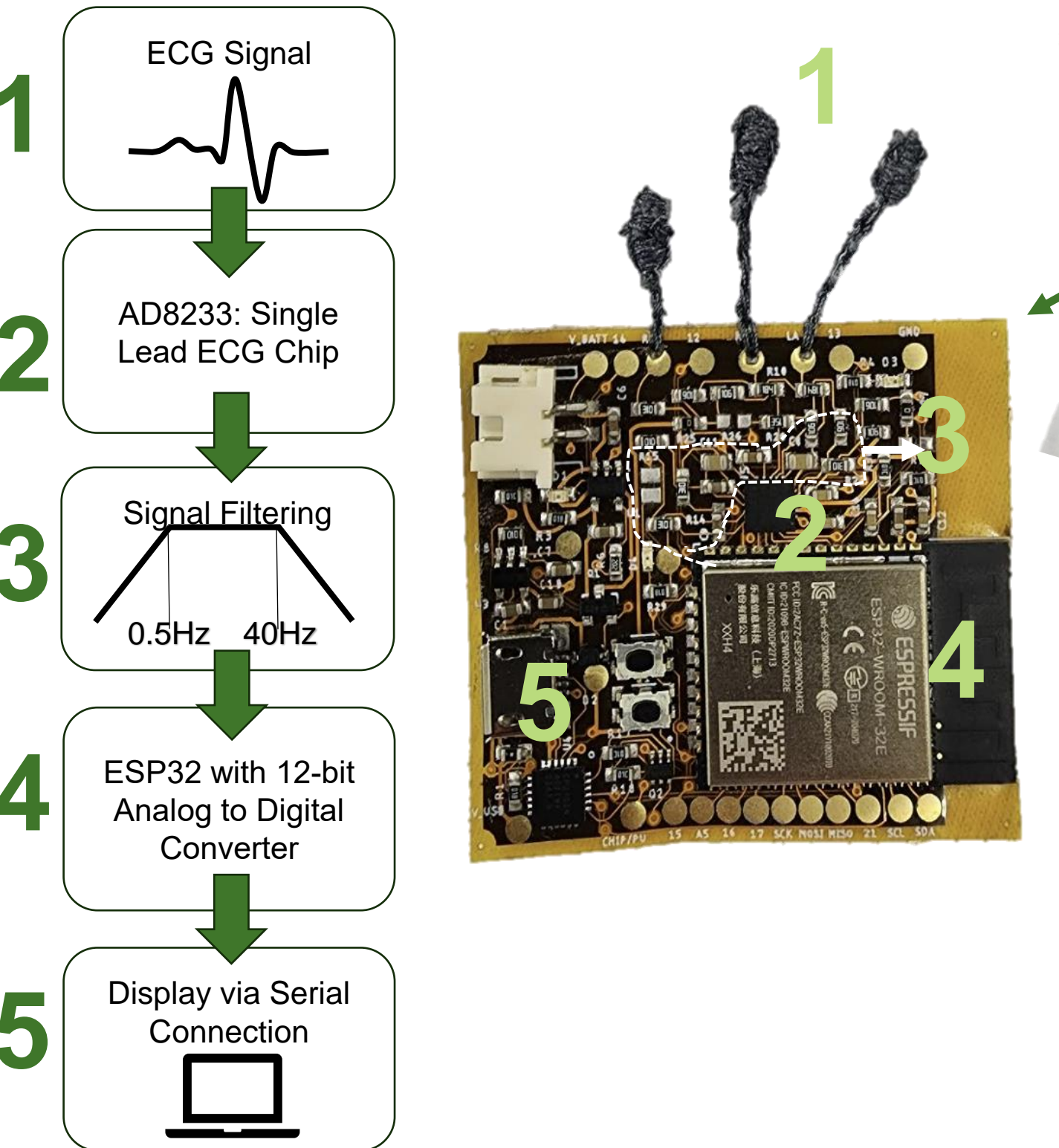
EMBROIDERY EFFECTS



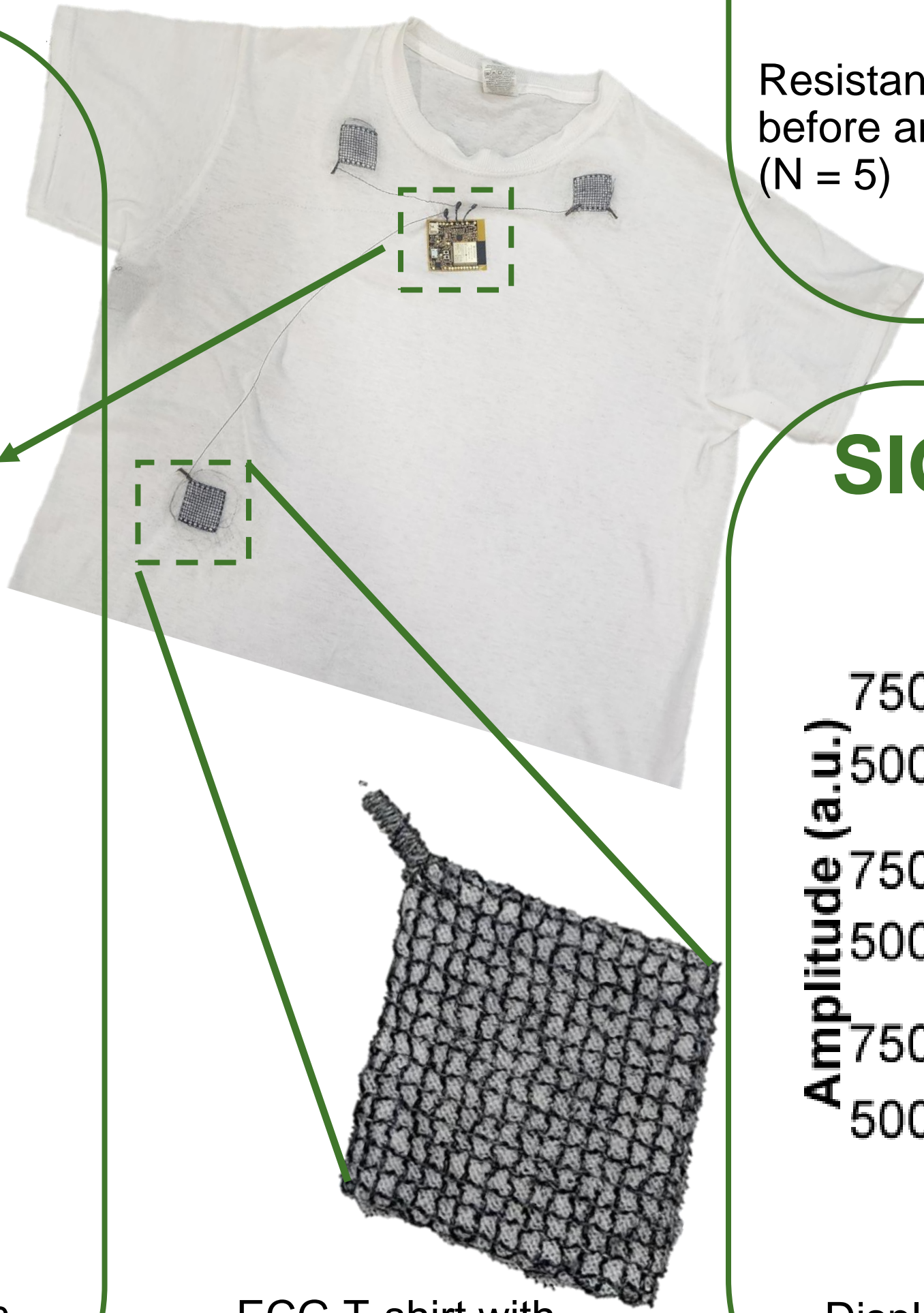
Resistance measurement before and after embroidery (N = 5)

Resistance measurement after connecting the thread to the flexible circuit via a single or double connection (N = 3)

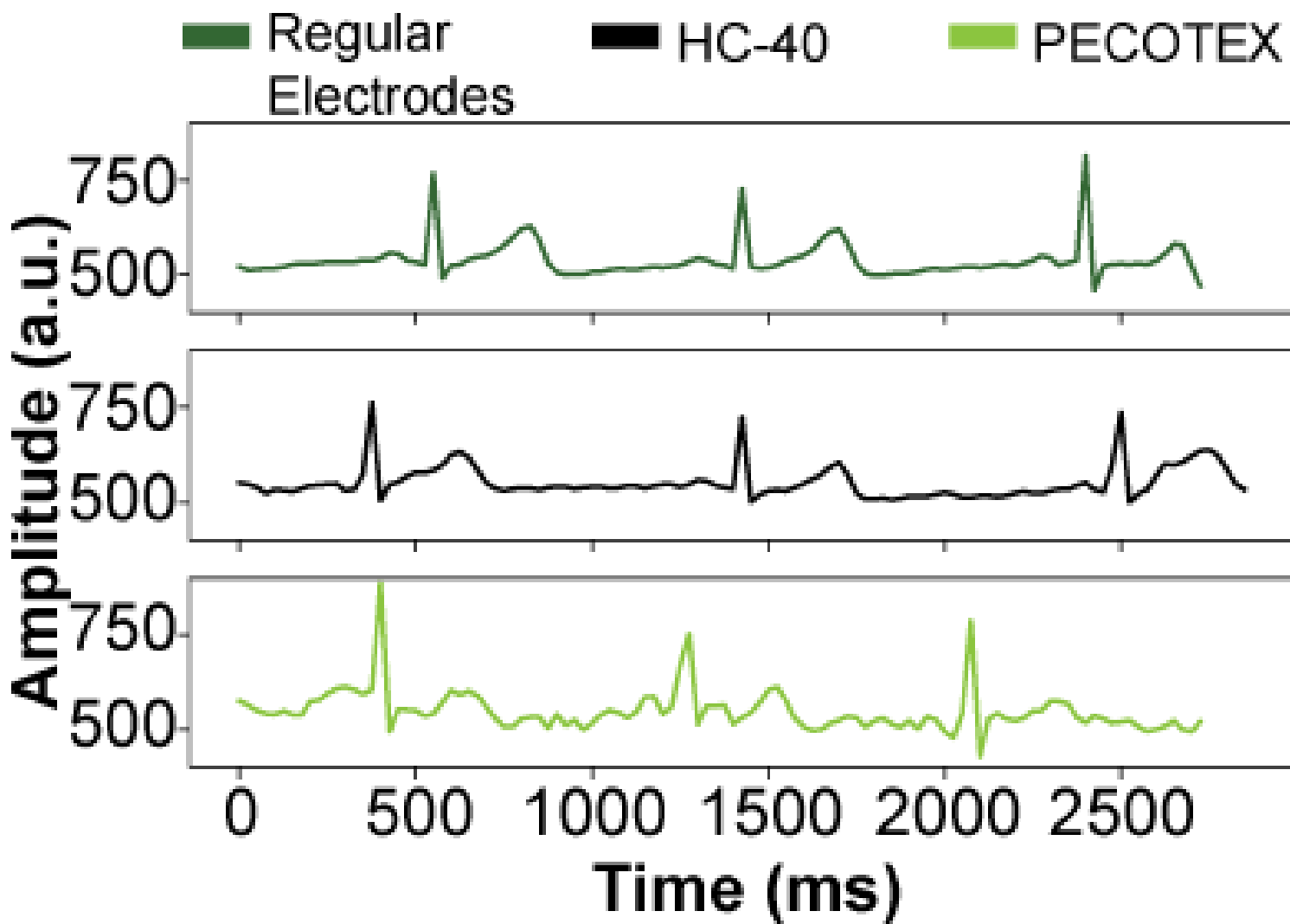
ECG ELECTRONICS



Flow diagram of the ECG measurement system and the corresponding placement on the flexible printed circuit board



SIGNAL COMPARISON



Display of ECG signal for different electrode types on same circuit

FUTURE PLAN & CONCLUSION

	5-17 July	19 – 30 July	3 -15 August	17 – 31 August
Full Integration and Bluetooth Functionality				
Mechanical Characterisation				
Industrial Embroidery Machine Testing				
Thesis Write Up				

- HC-40 has similar capabilities as regular electrodes when embroidered in an ECG T-shirt
- PECOTEX enables ECG extraction with a nosier interface

[1] A. A. Simegnaw *et al.*, *Materials*, 2021, doi: 10.3390/ma14175113.

[2] F. Alshabouna *et al.*, *Materials Today*, 2022, doi: 10.1016/j.mattod.2022.07.015.

