



BITNG PROJECT UPDATE

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Date 11/12/2020

Outline

- Progress to date
- Shriner's project
- Schedule
 - Gantt Chart update
- Path forward

PROGRESS TO DATE

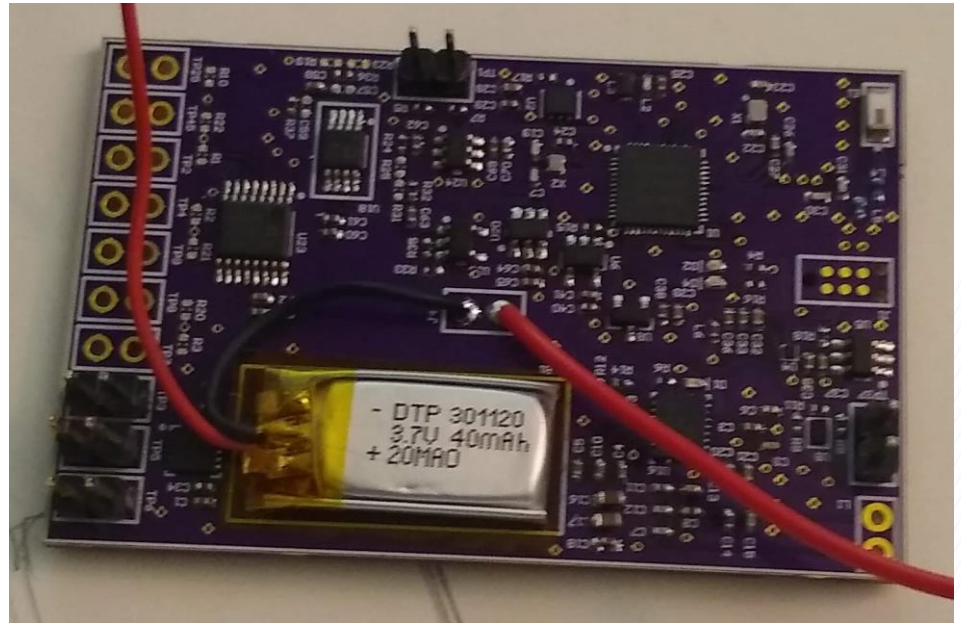
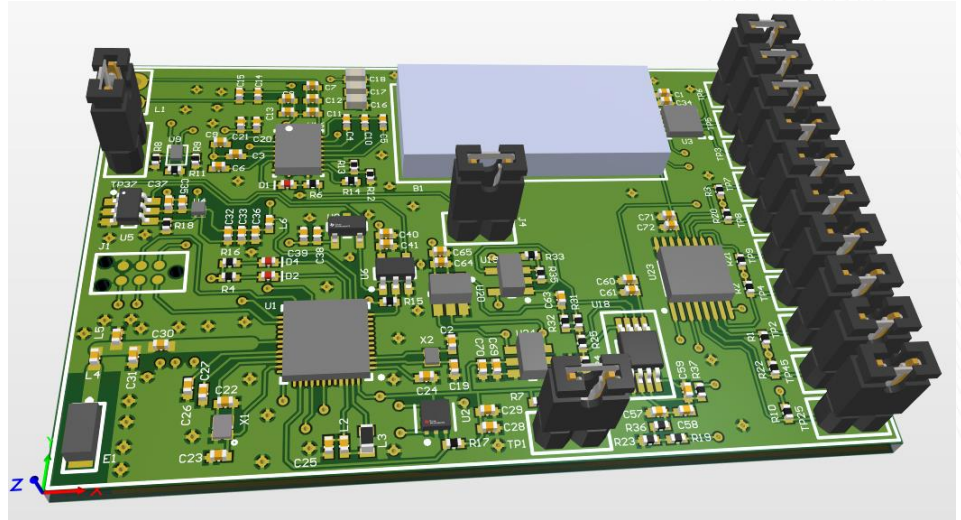
Progress from last week

- Shriner's project
 - PCB debugging
 - Capacitance Pressure Sensor Characterization
 - Bi-Weekly meeting
- LP ECG
 - PCB debugging

SHRINER'S PROJECT

PCB design

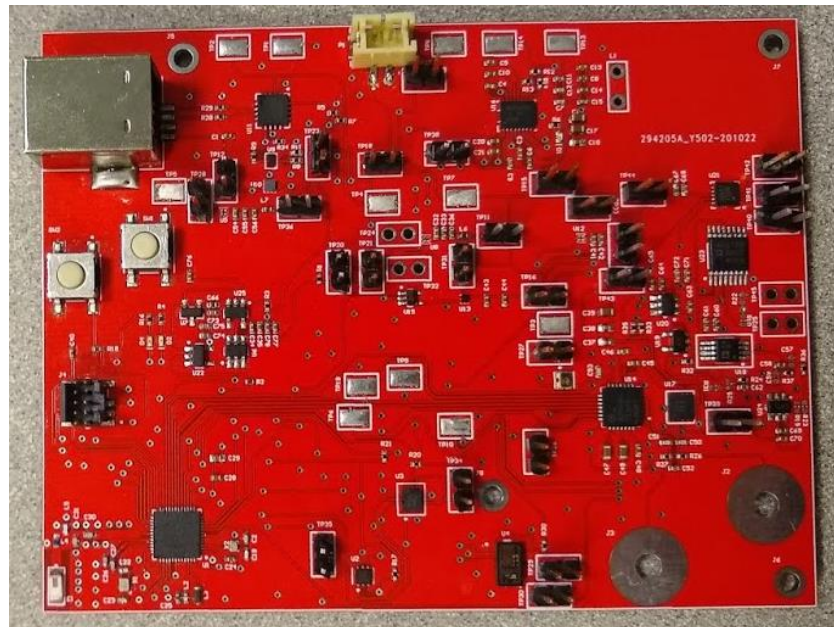
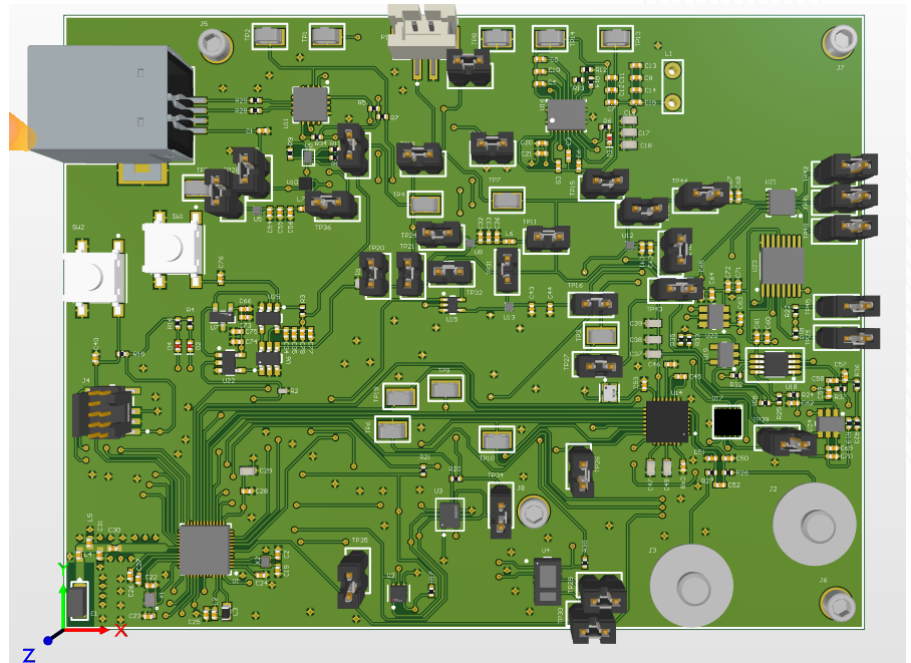
- PCB: Arrived
- Stencil: Arrived
- Digikey: Arrived
- Assembly: Complete
- Hardware Debug: Completed
- Programming Check: TO DO



LP ECG PROJECT

PCB design

- PCB: Arrived
- Stencil: Arrived
- Digikey: Arrived
- Assembly: Completed
- Hardware Debug: Completed
- Programming Check: TO DO



Firmware

- ECG
 - MAX30003
 - Drivers
 - Optimization
- FRAM
 - CY15B108QI
 - Drivers
 - Optimization
- NRF52
 - BLE
 - Power Optimization

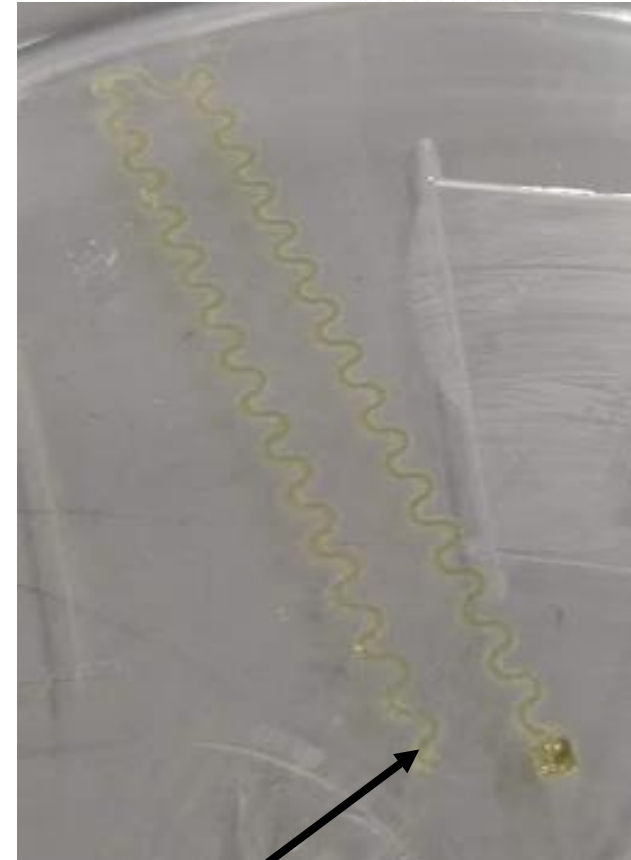
STRAIN SENSOR

Strain sensor

- PDMA: Finished
- PI: Finished
- AG NW: Finished
- PDMS: Finished
- ASSEMBLY: FAILED
- ENCAPSULATION: FAILED
- Characterization: FAILED



Not enough
nano-wires

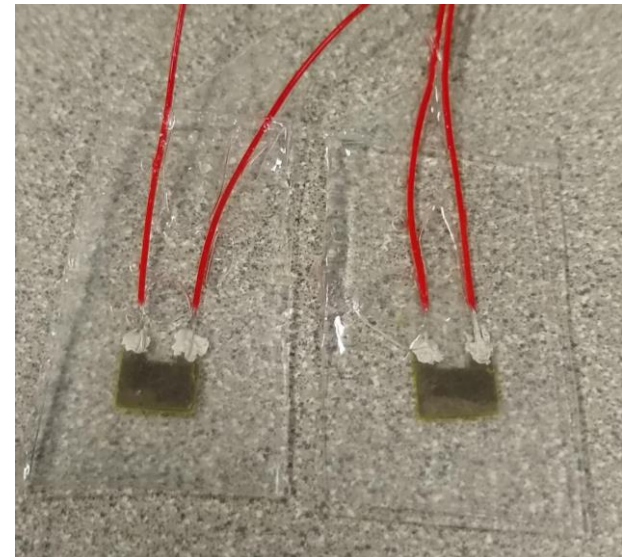


Broken pads

CAPACITANCE SENSOR

Capacitance sensor

- PDMA: Finished
- PI: Finished
- AG: Finished
- PDMS: Finished
- ASSEMBLY: Finished
- ENCAPSULATION: Finished
- Characterization: TO-DO



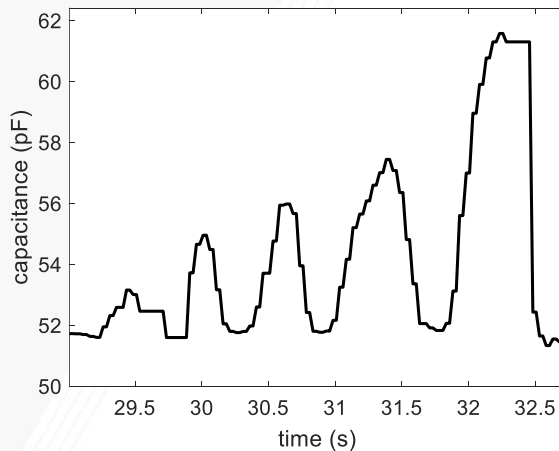
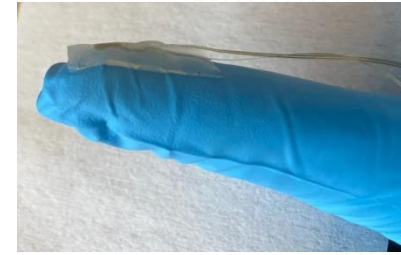
Capacitance/Force characterization

- Mark-10 Force Gauge
 - Automated testing characterization

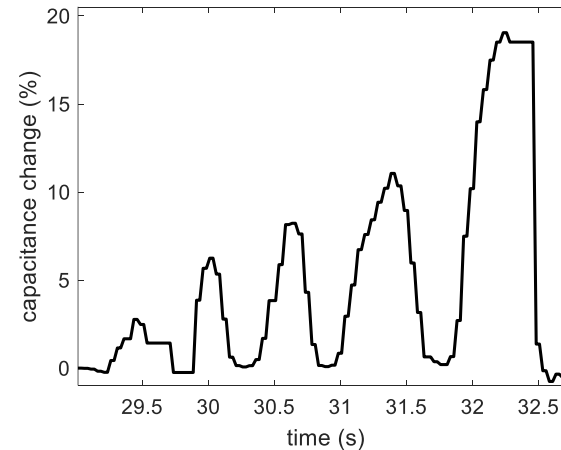


Capacitor sensors

- Data collected from Robby
- Max capacitance change
 - 20% ~ 10 pF



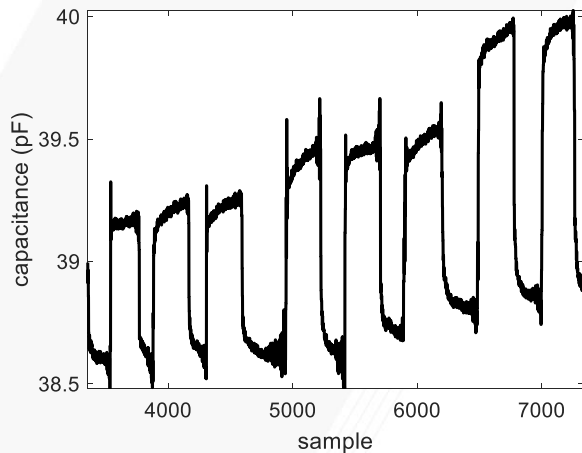
→
Increasing pressure



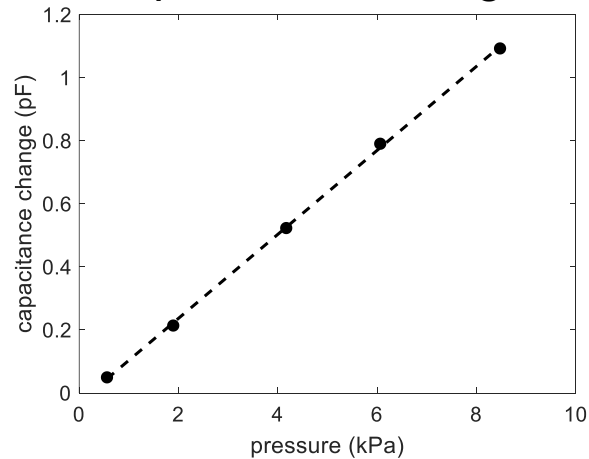
Capacitor sensors

- Data collected from Robby
- Sensitivity: 0.133 pF/kPa
- Pressure threshold > 0.5 kPa

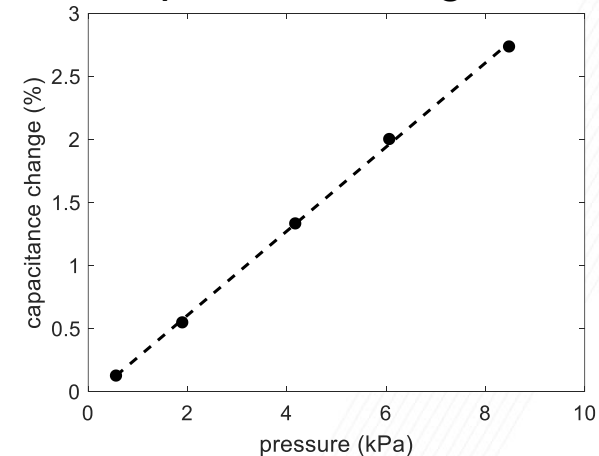
example data



capacitance change



percent change



Capacitance sensor design

- Capacitor area (prior art): 3mm x 5mm
- Initial capacitance: 52 pF
- Sensitivity: 0.133 pF/ kPa

	Low threshold	High Threshold
Target force (g/N)	4 / 0.0392	180 / 1.764
Target pressure (kPa)	1.568	70.56
Capacitance change (pF/%)	0.2085 / 0.4	9.384 / 18
CDC units	910	40,999

IRB PROPOSAL

IRB proposal

- Initial Draft X01:
 - Draft sent to IRB Review Board on 10/13
- Revision X02:
 - Draft sent to IRB Review Board on 10/26
- Revision X03:
 - Draft sent to IRB Review Board on 10/29
- Revision X04:
 - Draft sent to IRB Review Board on 11/2

PATH FORWARD

Path forward (11/02/20 – 11/11/20)

- Shriner's Project:
 - Literature review
 - Add more sources to tables
 - Sensor Manufacturing:
 - Capacitance sensors (2X)
 - Force/Capacitance characterization
 - Strain sensors (2X)
 - Begin manufacturing
- LP ECG:
 - Firmware development

SCHEDULE

Schedule Gantt chart

Task	10/25-11/01	11/01-11/08	11/08-11/15	11/08-11/15	11/16-11/23	11/23-11/30	11/30-12/07
LOW POWER ECG							
-PCB ASSEMBLY	✕						
-HARDWARE DEBUGGING		●					
-FIRMWARE DEVELOPMENT		●					
NEUROMOTOR PEDIATRIC WEARABLE							
-LITERATURE REVIEW	✕	●					
-PCB ASSEMBLY							
-HARDWARE DEBUGGING		●					
-FIRMWARE DEVELOPMENT							
-PRESSURE SENSOR MANUFACTURING	✕	●					
-IRB PROPOSAL	✕	●					

LEGEND

- ✕ FINISHED
- TO-DO

Personal Schedule

- Thanksgiving: In Atlanta
- Winter: 12/15 – 1/2

APPENDIX