BITNG LAB UPDATE

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Date 6/07/2021

Progress from last week

- Shriner’s project
  - Strain sensor manufacturing
  - PCB redesign
    - Waiting for workday confirmation
- LP ECG
  - Waiting for workday confirmation
- Chip socket programmer
  - Waiting for components from McMaster-Carr

SHRINER'S PROJECT

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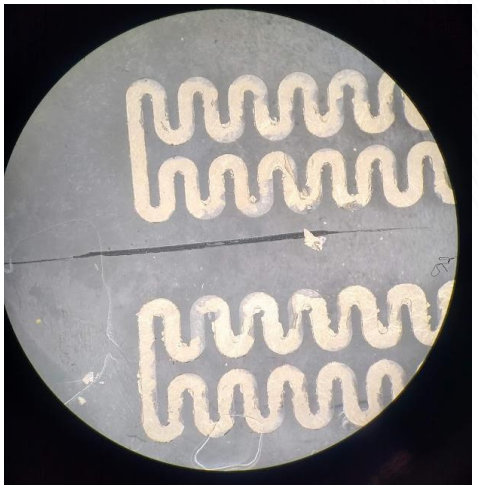
Strain sensor

Problem:

- Flakey AgNW
- Clumps and sticks together
- Disconnection in AgNW
- Bonds to the PI stencil

Proposed solution:

- Plasma treat PDMS
  - Result: No obvious benefit
- Oven instead of hot plate
  - Result: Lower temperature improves surface quality ~ 50 C
- PI film with single side adhesive instead of two-sided adhesive
  - Result: Better removal of stencil from PDMS base material



Cracks in AgNW

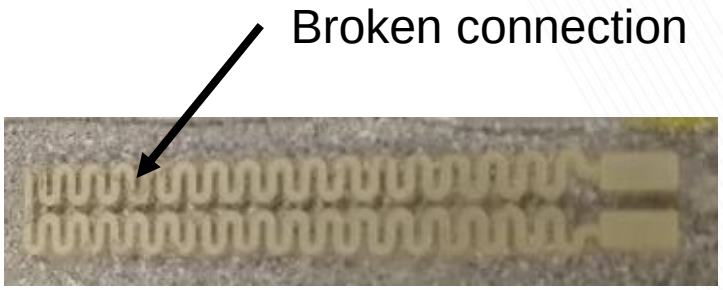
W = 0.5 mm

Strain sensor

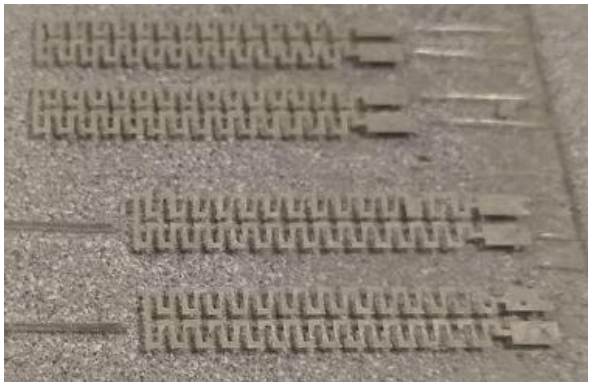
Observation:
- Rounded pattern has a higher likely hood of removing AgNW from PDMS

Proposed solution:
- Square serpentines instead of rounded serpentines
  - Rational: Square/sharp pattern will cause shear force to split AgNW

Results:
- No obvious benefit



Rounded serpentine pattern



Square serpentine pattern

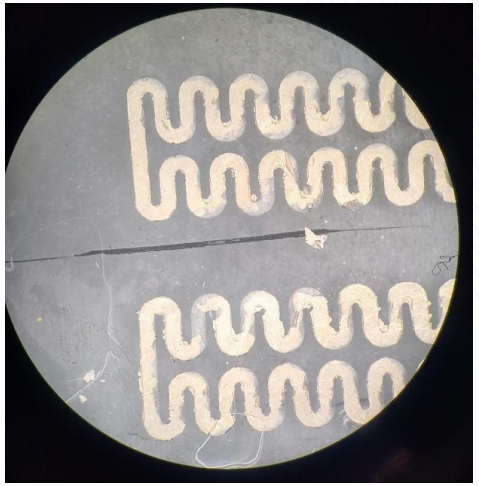
Strain sensor

Problem:
- Serpentine pattern increases the likelihood of flakes and cracks in AgNW
- Most academic papers of an AgNW strain sensor have a width > 3 mm

Solution:
- Straight line AgNW

Result:
- Works effectively
- Manufacturing yield is about 50%
- Width = 0.5 mm

Takeaway:
- Thicker width increases likelihood of success



Cracks in AgNW

Strain Sensor

PATH FORWARD

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Path forward (6/07/21 – 6/14/21)

- Shriner's Project:
  - Sensor fabrication:
    - Strain sensor
    - Pressure sensor
  - Sensor characterization:
    - Strain sensor
    - Pressure sensor

APPENDIX