

# E1.05 - Flextivity

### Chris Martinez(PM), Sarah Gonzales, Megan West, Rick White

TXST Sponsor: Dr. Maggie Chen

### Project Overview

Our project is a bending apparatus that characterizes mechanical and electrical properties of conductive materials, to aid in the production of flexible electronics. Cyclic bending will aid in determining device sustainability while resistivity/conductivity measurements will aid in performance analysis.

### Requirements

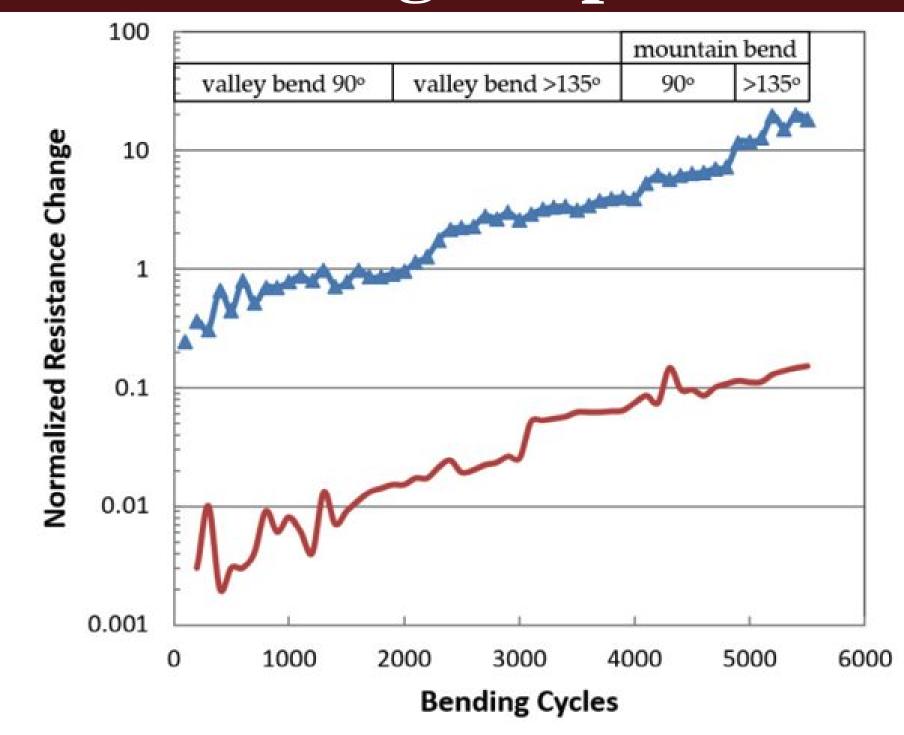
- Design an automatic bending tool that can control the bending angles and number of cycles.
- Additional function can measure the conductivity in real time and store the angle/cycle versus conductivity data

### Features

- 0° to 180° degree tension and compression bending.
- 4-Point Probe resistance
   Measurements
- Resistivity/conductivity calculations
- Accepts user inputs and displays real time data to user interface.
- Stores data on micro-USB for external data analysis

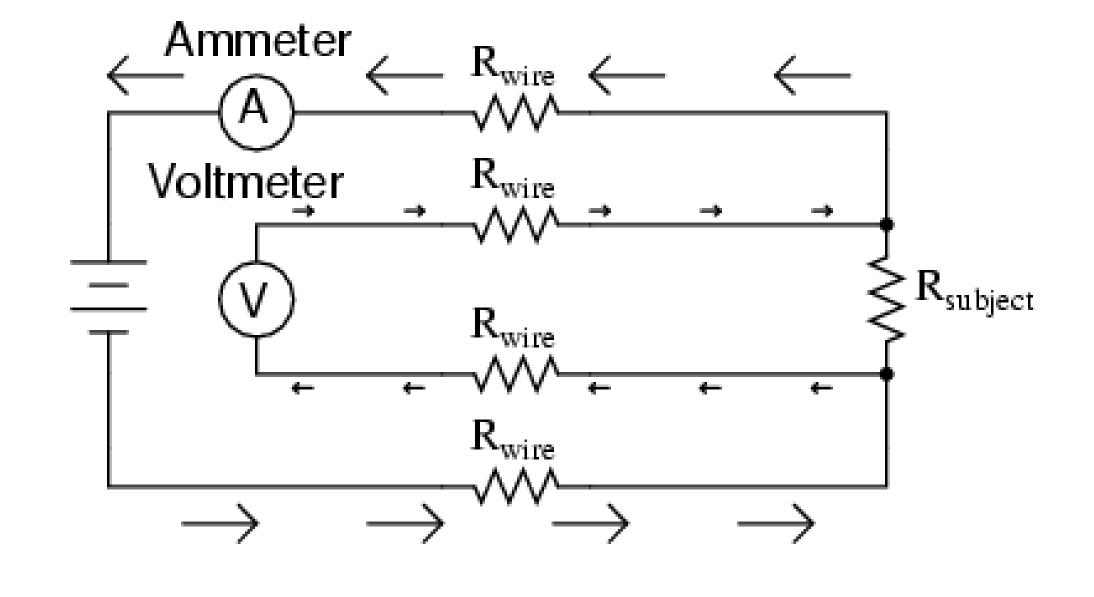
### Top Level Block Diagram INLAND NEXTION **GPIO** 32GB MICROSD TP Resistivity Data Number of Cycles 8541641720 Micro SD Card 16 Key Matrix Keypad Micro SD Card Module Spring Loaded Resistivity Value MCP342A0 3-01-0175-A Micro-Tip Test Lead ADC Power transmission (5V) 20x4 LCD Display → Cycle Number Model 8150 Voltmeter ..... Probes Power transmission (12V) Data transmission TowerPro Servo (Radius Movement) Resistivity MG90S PS1057A TowerPro Micro Servo €------2560 R3 (Bending Movement) Megan West Microcontroller PS1057A MG946R TowerPro Servo (Radius Movement System Control IIC I2C TWI 1602 Serial LCD **LCD Display** TowerPro Micro Servo €-----(Bending Movement Envistia Voltage Regulator 12V 6-12V INPUT TO 3.3V-DC Adapter 12V Output Voltage **Conversion Module** Voltage Regulator

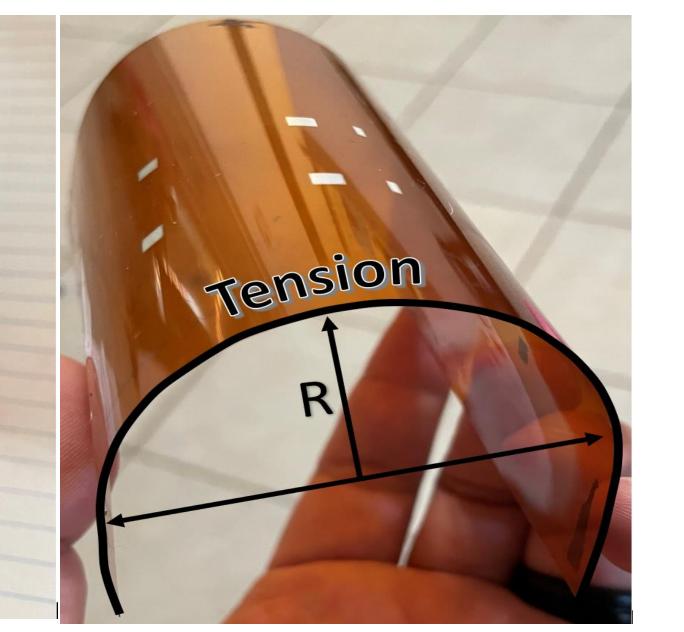
### **Bending Properties**



# Chris Martinez(PM) Rick White Sarah Gonzales Megan West

## Ohm Meter Schematic







### **Current Progress**

- ✓ User Interface accepts user input and displays sample data
- ✓ Bending operations perform tension and compression motions
- ✓ Probes sense resistance measurements

### D2 Project Goals

- Design PCB for system integration
- Design probe calibration to increase accuracy
- Optimize bending parameters to Increase bending angle precision
- Display and store live real time data

Spending per Subsystem		
Bending	\$	39.18
UI & Data Processing	\$	26.15
Power	\$	54.79
Probes	\$	113.80
Total Spent:	\$	233.92

### Acknowledgements

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- TX State Faculty: Mr. Mark Welker