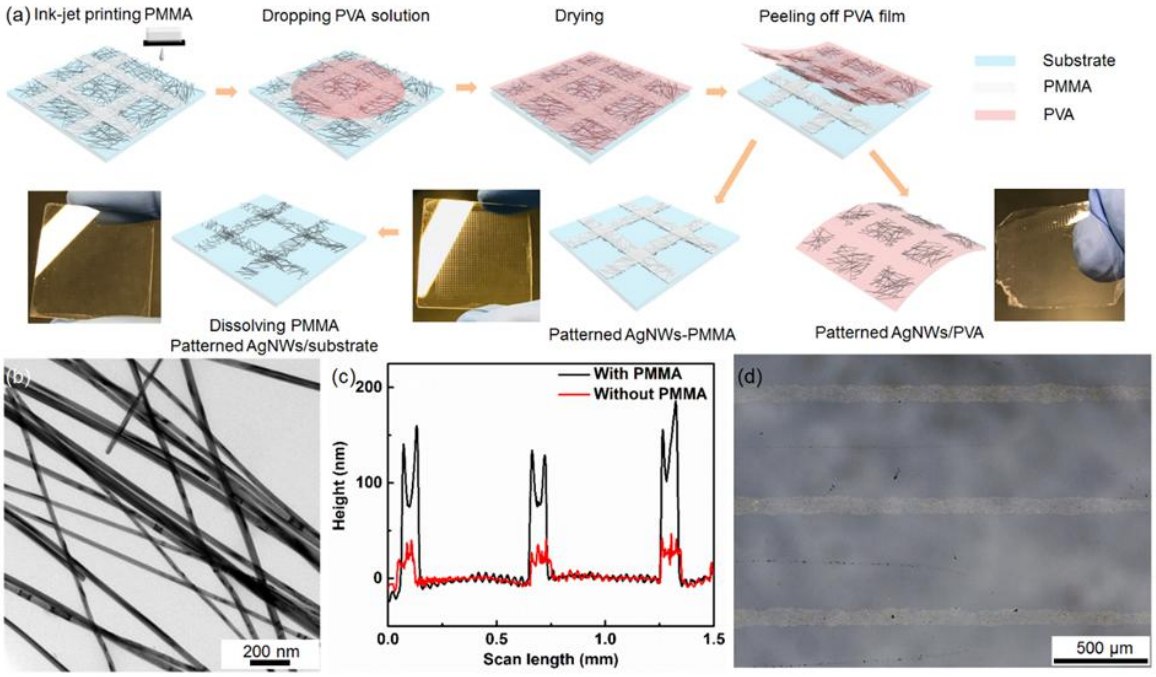
The aim of this joint project between UNSW and Tiger Pharmacy

In the past few years, remarkable advancements in novel conductive nanomaterials to achieve high stretchability, high sensitivity and integrated platforms have been made for wearable devices that can detect mechanical stimuli. In mechanical stimuli sensing, normal pressure and lateral strain are two key elements: normal pressure detection helps to realize the grasp control, object manipulation, and orientation determination, while tensile strain monitoring facilitates the enhancement of proprioception. To date, several sensing mechanism have been employed, including piezoelectric, triboelectric, capacitive and resistive responses. Among them, resistive sensor is considered as a very promising candidate because of its simple structure design, facile fabrication and excellent comprehensive properties.

A key building block in resistive sensors is the conductive electrode that is stretchable under mechanical deformation. Conventional electrodes, comprising single crystalline silicon, metals, or metal oxide films, possess an intrinsic brittle and rigid nature, which limits their applications requiring large deformation such as bending, twisting and stretching. Recently, novel stretchable electrodes, including carbon nanomaterials and metal nanowires which are capable of sustaining a large level of strain with the perseveration of conductive pathways have been identified as effective materials to develop stretchable resistive sensors.

The aim of this joint project between UNSW and Tiger Pharmacy is to develop novel conductive nanocomposites for stretchable sensor arrays that can precisely detect multiple mechanical stimuli. Utilizing printable, transparent silver nanowires (AgNWs) networks as both flexible electrodes is proposed as the new methodology to develop highly-density, large area and low power sensor arrays for wearable devices


(a) Ink-jet printing PMMA
Dropping PVA solution
Drying
Peeling off PVA film
Substrate
PMMA
PVA
Dissolving PMMA
Patterned AgNWs/substrate
Patterned AgNWs-PMMA
Patterned AgNWs/PVA
(b)
200 nm
(c)
With PMMA
Without PMMA
Height (nm)
200
100
0
0.0
0.5
1.0
1.5
Scan length (mm)
(d)
500 μm