



Topic: Creating 3D Flexible Sensor Array using Standard Laser and 3D Printers

Goal: This project aims at enhancing the creativity of researchers in the field of ubiquitous computing and human computing interaction, by finding methods to merge object creating and sensor creating together. The work will be based on pioneer works (flexible PCB printed on paper using standard Laser printer, flexible or conductive 3D objects using standard 3D printer) and push the boundary of the state of the art by:

- 1) sensor array manufacturing in 3D space
- 2) creating flexible sensor array cheaply under standard (CS/EE) lab environment

Workflow:

Month 1: get familiar and selection of proper printers and material

Month 2: create 2D sensor array and sensor-electronics interface

Month 3: create 3D structures with different types of material

Month 4: integration and evaluation of 1 type of 3D structure and 2D sensor-electronics interface

Month 5: create another 2 types of novel 3D sensor arrays

Month 6: documentation, paper and thesis writing

Advantages:

1) The Wearable Computing Lab (WCL) has a long history of creating sensor arrays and is in possession of a series of sensing platforms (large scale resistive array, high precision capacitive array, acoustic array and etc.), which can be used directly as evaluation platforms for the 3D sensing object created in this project.

2) The methods developed in this project will enable the creation of many new sensors, which can be used in Ubiquitous Computing, HCI, Robotics, Pervasive Healthcare and etc. A scientific paper is thus expected based on this thesis and shall be highly cited afterwards. The 3D sensors created are expected to be used in further experiments in WCL, further enhancing the citation rate of this paper.

Requirements:

- . Experience of creating or using one or more sensing platforms
- . Experience with 3D printers
- . Creativity and imagination
- . Experience and joy with handwork
- . Experience in or lecture on Analog Circuit
- . Good written and oral English