

Joint Master Thesis Topic in the Field of Wearable Technology

Characterization of Electrical Properties of Conductive Fabrics on Foldable Structures

Wearable electronics are devices that are worn on or close to the body. They are able to sense body signals and/or ambient data, process them and inform the wearer or others. Other than mobile wearable devices such as smart watches, much research is conducted in the field of electronic textiles (e-textiles), aiming to incorporate soft circuit elements into fabric materials already during textile construction processes. Conductive materials are integrated into textile materials in various ways, such as by constructing the fabric itself with conductive threads or fibres, or applying conductive materials to the fabric surface, as done in embroidery or inkjet printing.



While substantial research has gone into electrical characterization of flat textile materials, three-dimensional textile circuits achieved by folding provide new possibilities for wearable sensing structures. Conductive fabrics are subject to mechanical stress during folding fabrication and usage as moveable structures. Therefore, the physical dimensions of the electrical current path changes according to the folding pattern and activation.

In this master thesis, we focus on characterizing the electrical properties of a set of foldable electronic textile structures. Depending on the different folding and stretching patterns, various electrical properties (resistance, inductance and capacitance) are measured. If possible, electrical models are developed and implications of the final applications are pointed out.

Focus of work:

- Measuring and characterizing the electrical properties of various folding patterns of wearable textiles provided by UdK
- Developing electrical models and implications in wearable electronics applications

Preferred skills:

- (Mandatory) Electrical Circuits
- (Preferred) Mathematical modeling

Contacts: If you are interested contact Prof. Dr. Sangyoung Park (**Email:** sangyoung.park@tu-berlin.de) or Prof. Dr. Berit Greinke (**Email:** b.greinke@udk-berlin.de)