- Cheap manufacturing
- Permeability
- Strength
- Thermal Resistance
- Electrical resistance

TYPES OF E-TEXTILE:

The field of e-textiles can be divided into two main types:

E-textiles with classical electronic devices such as conductors, integrated circuits, LEDs, and conventional batteries embedded into garments.

E-textiles with electronics integrated directly into the textile substrates. This can include either passive electronics such as conductors and resistors or active components like transistors, diodes, and solar cells.

Most research and commercial e-textile projects are hybrids where electronic components embedded in the textile are connected to classical electronic devices or components. Some examples are touch buttons that are constructed completely in textile forms by using conducting textile weaves, which are then connected to devices such as music players or LEDs that are mounted on woven conducting fiber networks to form displays. Printed sensors for both physiological and environmental monitoring have been integrated into textiles including cotton, Gore-Tex, and neoprene.

EXPLANATION:

MANUFACTURING OF E-TEXTILES:

A thread can be made to conduct electricity by either coating it with metals like copper or silver. It can also be made conductive by combining cotton or nylon fibers with metal fibers when it is spun.

INPUTS FOR E-TEXTILES:

To obtain information for wearable devices components such as sensors are often used, for instance, environmental sensors, antennas, global positioning system receivers, sound sensors and cameras. Such sensors can be divided on active and passive (Langenhove & Hertleer, 2004)(Seymour, 2009). Active inputs are controlled by a user via a tactile or acoustic feedback system, which provides an intuitive interaction with the garment. Passive inputs collect biometric data from the human body as well as environmental data collected via wireless transmission system.

CONSTRUCTION OF E-TEXTILES:

- Lily Pad Arduino
- Fabric kit
- Aniomagic
- Flora

Conductive fabrics and textiles are plated or woven with metallic elements such as silver, nickel, tin, copper, and aluminum these are: electro-nylon, electr-onylon nickel, clear-mesh, soft-mesh, electro-lycra and steel-cloth. All these textiles show amazing electrical properties, with low surface resistance15, which can be used for making flexible and soft electrical circuits within garments or other products, pressure and position-sensing systems. They are lightweight, flexible, durable, soft and washable (some) and can be sewn like traditional textiles, which makes them a great replacement for wires in computational garments.

Conductive threads and yarns have a similar purpose to wires and that is to create conductive paths from one point to another. However, unlike wires they are flexible and can be sewn, woven or embroidered onto textile, allowing for soft circuits to be created. Conductive threads and yarns offer alternative ways of connecting electronics on soft and flexible textiles medium as well offering traditional textile manufacturing techniques for creating computational garments.

Conductive coatings are used to convert traditional textiles into electrically conductive materials. The coatings can be applied to different types of traditional fibers, yarns and fabrics, without changing their flexibility, density and handling.

Conductive ink is an ink that conducts electricity, providing new ways of printing or drawing circuits. This special ink can be applied to textile and other substrates. Conductive inks contain powdered metals such as carbon, copper or silver mixed with traditional inks.

OTHER MATERIALS ARE:

- Shape memory alloys (SMA or muscle wire)
- Piezoelectric materials
- Chromic materials
- Photo-chromic (inks and dyes)
- Thermo-chromic inks
- Nano-materials and microfibers

Some of the most advanced functions that have been demonstrated in the lab include:

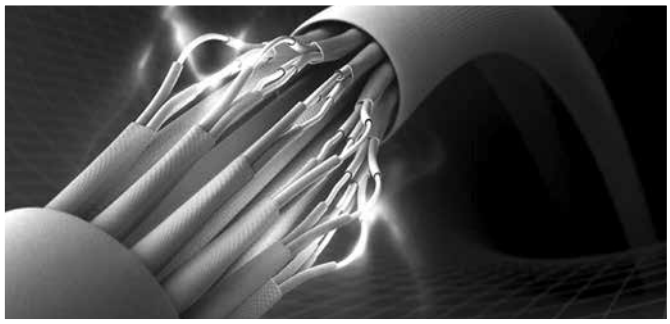
Organic fiber transistors: The first textile fiber transistor that is completely compatible with textile manufacturing and that contains no metals at all.

Organic solar cells on fibers.

The use of fabric as station to deploy electrical components results in wearable electrical/ computing devices.

SPORT
Textile

Dr. F Nayeb Morad



e-textile (Electronic Textile)

An e-textile is a fabric developed with electronics in it to enable conductivity and the use of various technologies. Electronic textiles may be embedded with sensors, batteries, LEDs and hands-free computing devices, depending on the fabric's purpose. An e-textile is usually created by including conductive materials in the fabric, for example, weaving a silver thread into cloth.

Some e-textiles are designed to support wearable computing technologies, while others are created to add new functionality to non-technical applications. E-textiles for smart clothing and interior design applications could, for example, change color or light up. Sportswear embedded with sensors and other technologies could improve performance through controlling wind resistance, regulating body temperature or monitoring the composition of an athlete's perspiration.

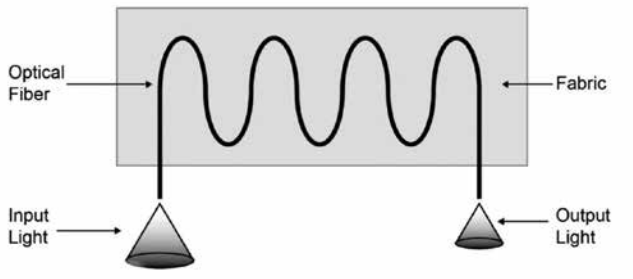
One of the most promising area for applications of e-textiles is smart medical devices. Sensors in the fabric could monitor a patient's respiration, heart rate, pulse and blood pressure, record data and notify a caregiver if there were signs of issues that required attention. E-textile patches could monitor blood levels of medication and deliver a dose as required. Sensors themselves can also be made of e-textile material, so that their inclusion in a garment is almost undetectable to the wearer.

MANUFACTURING OF ELECTRONIC TEXTILE

An electronic textile is a fabric that can conduct electricity. If it is combined with electronic components it can sense changes in its environment and respond by giving off light, sound or radio waves.. Electronic textiles (e-textiles) are fabrics that have electronics and interconnections woven into them. Components and interconnections are a part of the fabric and thus are much less visible and, more importantly, not susceptible to becoming tangled together or snagged by the surroundings. An electronic textile refers to a textile substrate that incorporates capabilities for sensing (biometric or external), communication (usually wireless), power transmission, and interconnection technology to allow sensors or things such as information processing devices to be networked together within a fabric. Electronic textiles allow little bits of computation to occur on the body. They usually contain conductive yarns that are either spun or twisted and incorporate some amount of conductive material (such as strands of silver or stainless steel) to enable electrical conductivity.

DEFINITION:

E-textiles, also known as electronic textiles or smart textiles, are fabrics that enable digital components (including small computers), and electronics to be embedded in them.



PROPERTIES OF E-TEXTILE:

- Flexible
- No wires to snag environment
- Large surface area for sensing
- Invisible to others