



## AVVISO di SEMINARIO

**Venerdì 19 aprile, ore 10.30 – 12.30**

SALONE DI RAPPRESENTANZA PIANO NOBILE

VILLA CAMBIASO

# Flexible Electronics The backbone of Tactile Skin

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The birth of microelectronics and subsequent advances have revolutionized computing and communications. Yet, as revolutionary as it has been, the applications such as tactile or electronic skin, which require various sensors and electronics over large and bendable substrates, are not well addressed by it. Early attempts to achieve conformable systems primarily followed the flexible printed circuit boards (PCB) route. Flexible PCB based skin-like patches for robots have been reported by various groups in Europe, Japan and USA. These solutions are akin to having mechanically integrated but otherwise distinct and stiff sub-circuit islands of off-the-shelf electronic and sensing components, connected to one another by metal interconnects. The PCB approach, albeit worthy, can only offer a limited degree of mechanical flexibility. For instance, it is difficult to wrap flexible PCB based structures around the finger of a robot which has multiple curvatures. As the number of off-the-shelf components increases (e.g. multiple sensors types, communication and electronics), issues such as the thickness and weight of PCBs also become of concern. Recent efforts to address these challenges include fabricating sensing and electronic components directly on flexible substrates or on thin silicon wafers. A variety of solutions, ranging from TFTs (Thin Film Transistors) to ultra-thin chips and printed electronics have appeared using a wide spectrum of organic and inorganic semiconductor materials. A new trend in this direction is the printable electronics; using high-performance materials based micro-/nano-structures such as micro-/nanowires. The bendable POSFET tactile sensing chip is another interesting development, complementing the micro-/nano-wires approach. This lecture will present these developments, particularly in context with the electronic skin for robots.

Bio-sketch of Dr. Ravinder S. Dahiya is available at: <http://biomems.fbk.eu/Dahiya>  
Ravinder S. Dahiya received PhD from University of Genoa and Italian Institute of Technology, Genoa. Currently he is working as a researcher (Marie Curie Fellow) at Fondazione Bruno Kessler, Trento (Italy). His interdisciplinary research interests include Bendable/Flexible Electronics, Electronic Skin, and Microsystems. He has worked on many European projects on the related topic. He is a senior member of IEEE. He is on the editorial board of IEEE Sensors Journal and IEEE Transactions on robotics.

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