

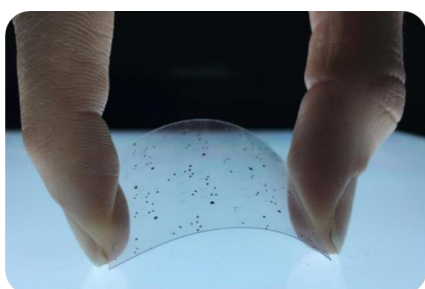
Politecnico di Milano, Department of Energy, Cesnef (Building 19), via Ponzio 34/3, Milan  
Seminar Room 1° floor

Monday, 20<sup>th</sup> May, 2019 – 14.30

## Printed Polymer Electronics

Mario Caironi

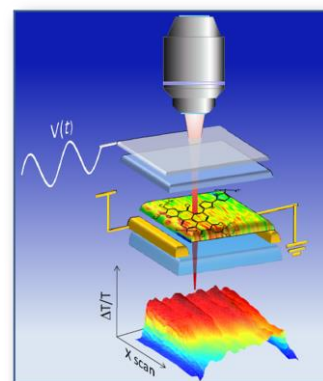
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Polymer semiconductors with steadily improved electronic properties are being synthesized, achieving charge mobility in excess of  $5 \text{ cm}^2/\text{Vs}$  for electrons and holes. Such performances are sufficient for a large range of applications of printed, light-weight and mechanically robust circuits, in diverse fields such as wearable electronics, smart packaging, and bio-electronics. I will report on recent progress in the development of low-voltage printed circuits on plastic and in the

improvement of the operational frequencies of direct-written transistors.

Despite such progresses, charge transport properties in high mobility donor-acceptor polymer films is still under debate. In this context, charge modulation spectroscopy (CMS) and microscopy (CMM) allow to gather useful information on the nexus between film microstructure and electronic properties, and on the nature of charge carriers. CMS and CMM are powerful tools as they can selectively probe and map carriers at the buried semiconductor-dielectric interface in a working field-effect transistor. I will show some examples on the use of such techniques in rationalizing transport properties in recent high-mobility polymers.



### About the speaker:

Mario Caironi obtained his Ph.D. in Information Technology at “Politecnico di Milano” with honours in 2007, with a thesis on organic photodetectors and memory devices. In 2007 he joined the group of Prof. H. Sirringhaus at the Cavendish Laboratory (Cambridge, UK) as a post-doctoral research associate. He worked in Cambridge for 3 years on high resolution inkjet printing of downscaled organic transistors and logic gates, and on charge injection and transport in high mobility polymers. In 2010 he was appointed as a Team Leader at the Center for Nano Science and Technology@PoliMi of the Istituto Italiano di Tecnologia (Milan, Italy), and in 2019 he became tenured senior researcher at the same institution. He is author and co-author of more than 120 scientific papers in international journals and books. He is currently interested in solution based high resolution printing techniques for micro-electronic, opto-electronic and thermoelectrics devices fabrication, in the device physics of organic semiconductors based field-effect transistors and their integration in high-frequency printed circuits, and in biomedical and/or implantable sensors and electronics for the healthcare. He is an 2014 ERC grantee.

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