Department of Physics
Condensed Matter Physics
Clarendon Laboratory, Parks Road, Oxford OX1 3PU

UNIVERSITY OF OXFORD

CONDENSED MATTER SEMINAR

Friday 2nd of June at 11.45pm

"Advanced materials & device concepts for plastic electronics"

Prof Thomas D Anthopoulos
Division of Physical Sciences and Engineering
King Abdullah University of Science and Technology (KAUST)

Solution-processable semiconductors represent an emerging class of materials that promise to revolutionize the way large-area/volume electronics of the future will be manufactured. Due to the often modest performance, however, their use to date has been limited to a few "low-end" applications. In the first part of my talk I will outline an alternative approach towards solution-processed semiconductors based on metal oxides and organic-metal oxide hybrid systems, with dramatically improved charge transport characteristics. I will show that despite the simple processing techniques employed, carefully engineered semiconducting nano-structures, such as low-dimensional single layers, heterojunctions and superlattices, can be grown over large-area substrates and integrated in high electron mobility transistors, quantum-effect devices, phototransistors and biosensors. In the second part of the talk, I will describe the development and application of a novel patterning method for the manufacturing of large-scale, ultra-high aspect ratio metal electrode nanogaps. I will show how downscaling of key device dimensions in combination with asymmetric metal electrodes, enable the development of a plethora of devices including, high-speed diodes, non-volatile memory cells, nano-LEDs, and photodetectors.

Host: Prof Donal Bradley

Audrey Wood Seminar Room, Clarendon Laboratory