Meet
Dr James Semple

Dr James Semple is a Research Associate at the Centre for Plastic Electronics and Department of Physics in Imperial College London. He is working under the supervision of Prof. Thomas Anthopoulos on the Centre's PLANALITH project. The project focuses on optimising device structures to enable high frequency printed diodes for radio frequency identification (RFID) applications.

James received his PhD in Physics from Imperial College London in 2016, on the topic of large-area plastic nanoelectronics, with a focus on electronic devices based on adhesion lithography. Prior to that, he received his BA in Physics from Trinity College, Dublin, with projects focused on the mechanical and optoelectronic properties of solution processed two dimensional composite materials. His research interests include printed radio frequency Schottky diodes, photodetectors and memory devices, based on planar electrode device architectures.

Imperial College London

I was delighted to have the chance to begin working within the EPSRC Centre for Innovative Manufacturing in Large-Area Electronics after finishing my PhD at Imperial College in April of this year. Since then, I have been working on the PLANALITH project, with the aim of further developing solution-processed high frequency diodes for radio frequency identification (RFID) technology.

Much of the focus of my PhD had been on developing adhesion lithography, a technique to create nanoscale separation between metal electrodes at low cost and with high throughput. Working on the PLANALITH project has afforded me not only the opportunity to put the skills and knowledge gained through my PhD into practice, but to do so while envisaging a real world application of my research. The shift from pure academic research to addressing problems of a more industrial nature has been challenging but at the same time incredibly gratifying.

In particular, I am looking at high frequency rectifying diodes. The nanoscale dimensions afforded by techniques such as adhesion lithography allow the potential for high frequency electronic operation, exceeding what is possible in traditional design concepts using printed semiconductors. A great deal of work has already been done; my primary job is to optimise the devices, integrate them with external components and scale up the process.

Developing this type of innovative manufacturing process is crucial to the progress of the field of large-area electronics. The PLANALITH project presents the opportunity to prove to researchers, industry and investors that nanoscale patterning is compatible with large-area electronics. If that assertion holds true, it opens the door to a multitude of applications, and even beyond the scope of high frequency electronics.

There is of course a vast amount of subject-specific knowledge within the EPSRC Centre for Innovative Manufacturing in Large-Area Electronics, and the ability to tap into that is invaluable from the perspective of a newcomer. What has struck me more, however, is the level of enthusiasm from all working in the Centre, from the students to the investigators to the operations team. The aims of the Centre, in addressing the key challenges in large-area electronics and promoting its industrial uptake, while certainly ambitious, seem all the more achievable in this environment.

Working within the EPSRC Centre for Innovative Manufacturing in Large-Area Electronics has allowed me to meet a fascinating network of people. I look forward to continuing working on ambitious research topics with ambitious researchers, and am excited to see what the next year holds for the ever advancing field of large-area electronics.