

IET Travel Award 2022 - Report

Dr Christoforos Panteli

Optical and Semiconductor Devices
Electrical and Electronic Engineering
Imperial College London

18 November 2022

Despite the fast internet, high-definition cameras and microphones, current technology for online conferences and meetings cannot substitute real human connection. So, when the invitation from IEEE Sensors Council for an invited talk to the 2022 conference came, I couldn't refuse. I have never been offered an invited talk before and this was due to my paper having the largest numbers of downloads from the IEEE Xplore website. The IEEE Sensors international conference is well-known, high prestige and covers all types of sensors for all sorts of applications. Due to the scale of the conference, well known scientists and industrial partners attend and exchange ideas in their field for the future of sensors. This was a great opportunity to attend a physical event after two years, promote our paper and research in the UK, expand my professional network and learn about the coming technologies.

The paper presented at the conference was my latest journal paper from the work done during my PhD on graphene inspired sensors. In this paper we took a controversial approach to improve the performance of CMOS Ion-Sensitive Field-Effect Transistors (ISFETs) pH sensors using graphene sheets. Despite departing from the unmodified CMOS process that offers cheap and industrial quality manufacturing, we explored surface post-processing techniques to reduce the sensors' drift in time with graphene sheets, while previous methods used circuit-based techniques. We pioneered the graphene-coated ISFET pH sensors using our in-house Polymer-Assisted Graphene Transfer (PAGT) process. This was the opposite type of post-processing from our previous journal paper that removed material from the top of the CMOS ISFET sensors using plasma. The results on the performance of the graphene coated ISFETs were very encouraging showing 50% reduction in drift and thus encouraged us to extend the work to a 78x56 array of CMOS sensors, and this was included in the invited talk.

My talk was quite popular with about 30 people audience, because during the conference I took the opportunities during lunch, dinner, and coffee breaks to advertise it. The international community engaged well with the oral presentation with an interesting discussion about the future of CMOS biochemical sensors and their departure from unmodified technology for lab-on-chip rapid diagnosis of infectious diseases.

Additional to the invited talk, it was requested from me to chair the same session I was presenting. This was a new experience for me that showed international recognition of my work. It was very interesting, and I am very grateful for being offered to support this big conference.

During the conference I attended interesting sessions on gas and pH biomedical sensors, the main topic of my research. There, I learned about environmental applications of the gas and

pH sensors and MEMS and Wi-Fi sensing. The talk from Prof Berengere Lebantal from France was focused on environmental monitoring for cities using gas sensors and I had the chance to chat with her during the lunch breaks. We discussed our work and possible future collaborations. Furthermore, industrial sessions presented the standardisation of the coming 6G network and agriculture data collection and communication. Industrial networking was very interesting since I met scientists and engineers from NASA, CERN, Texas Instruments, Dianyx innovations and more. Finally, I met again with Prof Ravinder Dahiya, expert in sensors, after his plenary talk.

The conference committee organised a Halloween night for more casual networking with other attendees and a gala dinner where traditional Texas dance was part of the show. Given the opportunity of being at the conference for few days, I visited the John F. Kennedy memorial and the Margaret Hunt Hill Bridge, iconic attractions in Dallas city.

The IEEE Sensors 2022 conference was a fantastic experience! It refocused my career goals by being immersed among experts in the scientific community of sensors. I would like to thank The Institute of Engineering Technology (IET) for offering the Travel Award and allowing me to promote the research done in Imperial College London and UK to the international community, expand my professional network!

