**PhD Project Proposal**

School of Electronics, Electrical Engineering and Computer Science

|  |
| --- |
| **Proposed Project Title: Development of Highly Sensitive Chemical Detection Platform** |
| **Principal Supervisor: Dr Hamza Shakeel Second Supervisor: Dr Neil Mitchell** |
| **Project Description:**  Global demand for sensors will increase rapidly from $12 Billion in 2017 to ~$ 58.7 Billion in 2024. Moreover, the smart-phone revolution combined with advancements in new technologies has ushered a new era of low cost portable sensors for real-time monitoring of environment, food quality, and clinical diagnosis. With all of these advancements, there still exists the need for multi-functional sensors with low power consumption, fast response time, high detection sensitivity and minimal maintenance costs.  Micro-electro-mechanical-Systems (MEMS) combined with nanotechnology provides an exciting new route towards the development of low-power, low cost, and portable chemical analysis system. The project will involve design, simulation and development of state of the art detector for chemical analysis using existing MEMS and nanotechnology methods. We will initially focus on volatile organic compounds and move towards more challenging/exciting application areas. The main objective of this work is to improve the detection sensitivity of sensor by at least a few orders of magnitude. The work will eventually lead to building a “Star-Trek Tricorder” like universal chemical analysis system.  The project will involve actively working with industrial and academic partners within/outside UK. Major part of the development work will be conducted at Queen’s Advanced Micro engineering Centre (QAMEC).  **Research Areas**: MEMS, Nanotechnology, Instrumentation, Sensors |
| **Contact details**  Supervisor Name: Hamza Shakeel Tel: +44 (0)28 9097 4083  QUB Address: 07.010 Ashby Building, Stranmillis Road Email: [h.shakeel@qub.ac.uk](mailto:h.shakeel@qub.ac.uk) |