1. **Title:** Novel multimode metal oxide sensors for detection of explosives
2. **Academic Lead:** Janice Kiely (supervisors: Tim Cox and Roshan Weerasekera). Contact: [Janice.Kiely@uwe.ac.uk](mailto:Janice.Kiely@uwe.ac.uk)
3. **Description of research topic:**

The ability to detect with high specificity and at high sensitivity (parts per billion level) volatile compounds is an exciting research topic which addresses a number of high impact challenges. One example is the detection of Improvised Explosive Devices (IEDs) via the vapour signature of the explosives. Detection of such devices can give early warning to allow evacuation and deactivation of the device.

Commercially available detection systems are expensive (~£30k) and bulky. UWE is developing novel miniaturised inexpensive sensor technologies to address these detection challenges. Currently, these operate as single sensors within a specific instrument. The ability to network these and other sensors would allow the sensors to be deployed e.g. in public spaces to provide warning of explosives being brought into the area and also allow use for remote environmental monitoring.

Thus the sensors are required to be sensitive, operate remotely, be low powered and be part of a larger network. The project will focus on (i) the use of signal processing to improve the specificity of the sensors, e.g. via the frequency dependence of the sensor response, (ii) methods to reduce the power required for sensor operation and (iii) novel methods of instrument integration that could combine a range of sensor systems for measuring explosive compounds and environmental pollutants in air samples.