

## PhD Studentship Available: Development of Boron Doped Diamond Transcutaneous Sensor Technology for Blood Gas Measurement

A fully funded four year PhD studentship has just become available within the University of Warwick Electrochemistry and Interfaces Group ([www.warwick.ac.uk/electrochemistry](http://www.warwick.ac.uk/electrochemistry)) under the supervision of Prof. Julie Macpherson, and in collaboration with Radiometer Medical, a multinational diagnostic healthcare solutions development company. The group although based in Chemistry, has a diverse background of expertise covering Chemistry, Physics, Engineering, Biomedical Sciences and Maths.

The project offers an exciting opportunity to play a key role in developing the next generation of sensors for transcutaneous (TC) monitoring of ventilation status in critically ill neonatal patients and beyond. The sensor sits on the skin of the patient and can locally measure the oxygen and carbon dioxide content of the blood in the vessels beneath the skin. Your work will align with current research in the group, which builds on recent developments in the fabrication of novel electrochemical sensors made of conducting diamond functionalised appropriately to be responsive to pH, oxygen, and CO<sub>2</sub> [1,2]. The project is in collaboration Radiometer, who are world-leading in TC sensor development, and there will be opportunities to work closely with them.



Many avenues of exploration have been identified in this project area and the research project will be tailored to your background. Research areas of interest include: sensor design and fabrication; finite element modelling of skin/sensor interfaces and species transport through different fluids; measurement protocol development, scientific programming/application development and data visualization; signal processing and data analysis. This is an ideal project for a student who enjoys problem solving and interdisciplinary research, with an interest in analytical/physical sciences, sensor applications, modelling and data analysis/signal processing. There will be opportunities to learn many desirable and widely applicable scientific skills, ranging from electrochemical methods to sensor design modelling and fabrication, scientific programming and data visualisation, microscopy, instrumentation, materials, as well as gaining key transferable skills and commercial insight.

The group hosts a significant array of state-of-the art equipment including a clean room for materials processing, AFMs, confocal microscopes, electrochemical workstations, rapid prototyping tools (3D printing, laser micromachining) and finite element modelling capabilities and has access to world leading electron microscopy facilities and spectroscopic equipment.

**Funding Notes:** This project will be joint funded by the University of Warwick and Radiometer Medical. Applicants must be UK citizens and hold a minimum first degree equivalent to 2:1, backgrounds in e.g. Physics, Chemistry, Biomedical Engineering, Biomedical Sciences, Maths and Statistics. Interested applicants should contact Prof. Julie Macpherson [j.macpherson@warwick.ac.uk](mailto:j.macpherson@warwick.ac.uk) for further details and supply a CV.

[1] T. L. Read, S. J. Cobb, J. V. Macpherson, *ACS Sens.* **2019**, 4, 756-763

[2] Z. J. Ayres, A. J. Borrill, J. C. Newland, M. E. Newton and J. V. Macpherson, *Anal. Chem.* **2016**, 88, 974-980