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Engineering the Diamond Surface for Quantum Technologies

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Quantum technologies promise exciting and transformative futures in many areas of human endeavour. An example is the field of bio-sensing, where quantum probes are already being used to answer fundamental questions about living cells. In these applications diamond often takes centre stage, as a material which simultaneously exhibits both bio-friendly and quantum-friendly properties. This presentation will review efforts to exploit diamond for quantum bio-sensing applications, encompassing practical cellular measurements to the development of fundamentally new sensing techniques. In particular, I will address the biggest materials challenge we currently face, which is the presence of uncontrolled defects at the solid state surface, and detail the use of surface science techniques, based at the Australian Synchrotron, to understand and re-engineer this important quantum/life interface.

Primary author: Dr STACEY, Alastair (Centre of Excellence for Quantum Computation and Communication Technology, The University of Melbourne)

Co-authors: Dr SIMPSON, David (School of Physics, The University of Melbourne); Dr TETIENNE, Jean-Philippe (Centre of Excellence for Quantum Computation and Communication Technology, The University of Melbourne); Dr HALL, Liam (School of Physics, The University of Melbourne); Prof. HOLLENBERG, Lloyd (Thomas Baker Chair, School of Physics, The University of Melbourne)

Presenter: Dr STACEY, Alastair (Centre of Excellence for Quantum Computation and Communication Technology, The University of Melbourne)

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