Designing and prototyping nano-sensors for integrated photodetectors technologies.

The ability to detect a single photon is the quantum limit of photo-detection. Highly sensitive Single-Photon Detectors (SPDs) are an enabling technology and are vital in quantum communications, photonic quantum computing and quantum imagers. While most single photon detectors include superconducting nanowire single-photon detectors (SNSPDs) and photomultipliers, much effort is focused on solid-state photo detection exploiting semiconductor materials. This is because semiconductors are low cost, highly scalable and have better compatibility with existing Complementary Metal Oxide Semiconductor (CMOS) technology.

We are seeking an industrial designer or electronic engineer with design expertise to join our multidisciplinary team seeking to design, prototype and test a novel type of solid-state CMOS compatible detector. The ultimate goal is to deliver a prototype with the excellent performance characteristics of SNSPDs, but with the ability to operate at room temperature and with the scalability and compatibility of Silicon Avalanche photodiodes. As a PhD researcher, you will have access to state-of-the-art nanofabrication tools and cleanrooms to explore new materials fabrications and packaging techniques. In addition, this research will put you at the forefront of integrated photodetectors technologies that are widely applied in LIDAR, Time of Flight 3D imaging and optical communications.

During this PhD project, you will be joining an experimental research team working towards the design, fabrication, prototyping, and packaging of devices that are new to the world. Your role as the main designer will involve generating solutions to diverse electronic engineering challenges through application propositions and developing various product concept possibilities. You will also build the technical skills through the construction of application-oriented optoelectronic systems.

This project is supported by the Australian Defence Science and Technology (DST) Group, the Australian nanofabrication facilities (ANFF), and at the University of Sydney Nano. If you want to know more about this opportunity please get in touch and send your CV and transcript to:

Associate Professor Cara Wrigley: Cara.wrigley@sydney.edu.au
Professor Benjamin Eggleton: benjamin.eggleton@sydney.edu.au
Dr. Alvaro Casas Bedoya: alvaro.casasbedoya@sydney.edu.au