CARS Microscopy Facility	**Category:** **C. Particle Characterisation in and ex-situ** **D. In-vitro toxicity studies** **Institute: School of Physics** **Location: University of Exeter, Exeter, EX4 4QL, UK** **Contact Details of Technology Expert:** **Name:** Dr Julian Moger **Phone,** +44 (0)1392 724181 **E-mail** J.Moger@exeter.ac.uk

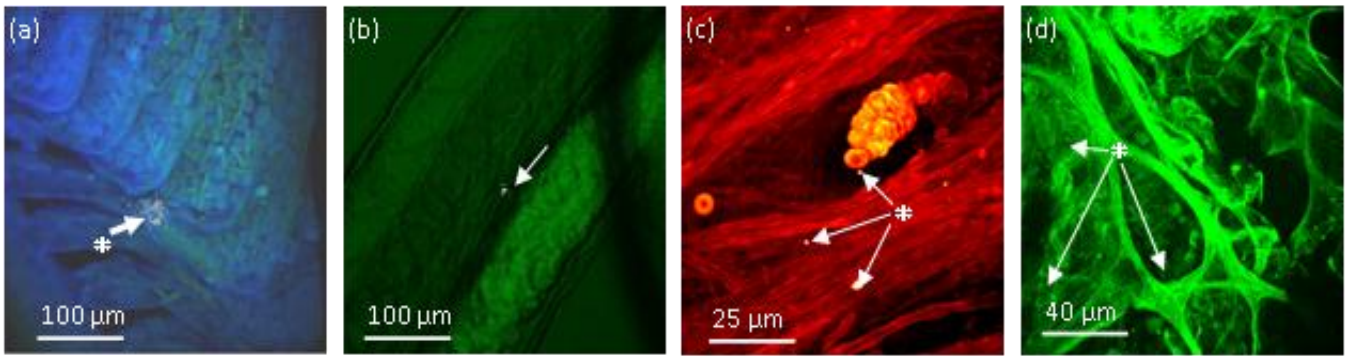
Short technology description/Overview *(approx 300 words)*:

We offer supported access to our custom built Coherent Anti-stokes Raman scattering (CARS) microscope, a unique system built around a scanning microscope with incubation chamber. CARS is emerging as a powerful tool for biological imaging with advantages over conventional microscopies that include: label-free contrast, increased depth penetration and low phototoxicity. This system has exceptional capabilities for locating nanoparticles deep within biological samples with sub-cellular resolution. The label free nature eliminates chemical perturbation seen with fluorescent labelling which can modify transport kinetics, cellular uptake and cytotoxicity. CARS is not yet commercially available and we offer our flexible prototype that can be configured to generate label free contrast of nanomaterials including metal oxides, noble metals, carbon nanotubes and polymers. The daily rate supports technical provision for bespoke experimental design, with accompanying wet laboratory/cell culture room.

Main Features:

- Provides mechanistic data regarding the entry route, distribution and fate of various ENPs in of biological tissues with 3D sub-cellular resolution at depths of up to 200 microns into intact tissues.
- Particles: ZnO, TiO_2, CeO, Ag, Au, various forms of carbon, and a range of polymers

Typical Samples & Images:



CARS images of (a) 100nm TiO_2 in intact trout gill tissue, (b) 100nm TiO_2 in a zebra fish embryo, (c) mouse blood brain barrier following IV dose of polymer nanoparticles, and (d) carbon particles in human lung tissue (* indicates location of nanomaterials).