Department of Chemistry

Departmental Seminar:
Analytical Chemistry Month

You are cordially invited to a virtual lecture presented by

Ané Kritzinger

Supervised by Prof Patricia Forbes and Prof Andrew Forbes

Department of Chemistry, University of Pretoria and the School of Physics, University of the Witwatersrand

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Date: Friday, 12 November 2021
Time: 10:30 – 11:20
Venue: Google Meet
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Quantum dot-tagged beads in an optical trap

Optical tweezers have found countless applications in the fields of physics and biology ever since its advent in 1986 by Arthur Ashkin. Using only focused light, optical tweezers are able to trap and manipulate microscopic particles. In this work, we investigate the possibility of combining the optical tweezer with fluorescence spectroscopy to develop an ultra-sensitive analytical instrument. We specifically focus on the feasibility of quantum dot nanoparticles used in conjunction with optical tweezers. We report on the synthesis of L-cysteine capped CdSe/ZnS quantum dots (QDs) and the coupling thereof to commercial carboxyl-modified beads. A setup of an optical tweezer with a 532 nm laser was employed with which trapping of particles was demonstrated. We also show successful trapping with a structured light beam called a vector flat-top beam in attempt to minimize photobleaching of the trapped fluorophores.