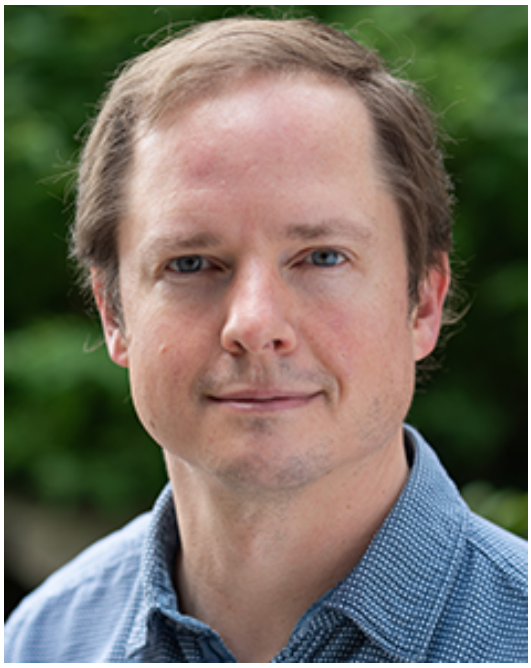
Autumn 2023

Optics & Photonics Group Lunchtime Seminar Series

University of Nottingham

From Advanced Single-Molecule Sensors and Microlasers to Applications in Synthetic Biology: Whispering-Gallery Mode Optoplasmonic Microcavities

Prof Frank Vollmer
University of Exeter



13:30 Wednesday 15 November 2023
Life Sciences Building - B3

OPTICS & PHOTONICS
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Frank Vollmer

From Advanced Single-Molecule Sensors and Microlasers to Applications in Synthetic Biology: Whispering-Gallery Mode Optoplasmonic Microcavities

Optical microcavities, specifically Whispering-Gallery Mode (WGM) microcavities, with their remarkable sensitivity to environmental changes, have been extensively employed as biosensors, enabling the detection of a wide range of biomolecules and nanoparticles. To push the limits of detection down to the most sensitive single-molecule level, plasmonic nanorods are strategically introduced to enhance the evanescent fields of WGM microcavities. This advancement of optoplasmonic WGM sensors allows for the detection of single proteins, conformational changes and even atomic ions, marking significant contributions in single-molecule sensing. I will discuss the exciting research prospects in optoplasmonic WGM sensing of single molecules, including the study of enzyme thermodynamics and kinetics, the emergence of thermo-optoplasmonic sensing, the ultra[1]sensitive single-molecule sensing on WGM microlasers, their applications in quantum sensing and synthetic biology.

Frank Vollmer is Professor in Biophysics at the University of Exeter, UK. He obtained his Ph.D. in 'Physics & Biology' from the Rockefeller University in NYC, USA, in 2004. He was Rowland Fellow at Harvard University from 2004 to 2009, Scholar-in-Residence at the Wyss Institute at Harvard in 2010, Group Leader (untenured Associate Professor) at the Max Planck Institute for the Science of Light in Germany from 2011-2016 and Instructor in Medicine at Brigham and Women's Hospital/Harvard Medical School where he directed a satellite laboratory from 2011- 2016. Since 2016 he is Professor in Biophysics at the School of Physics, University of Exeter, UK. He received the Royal Society Wolfson Research Merit Award in 2017 and in 2021 the Rosalind Franklin Medal and Prize from the Institute of Physics (IoP). Since 2021 he is Fellow of the IoP.

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All are welcome

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