Biophysics & Photonics Research Group

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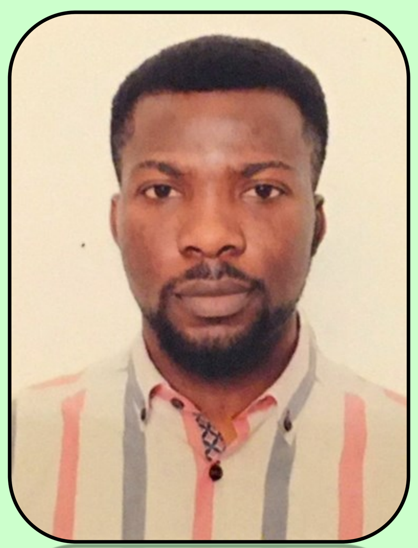

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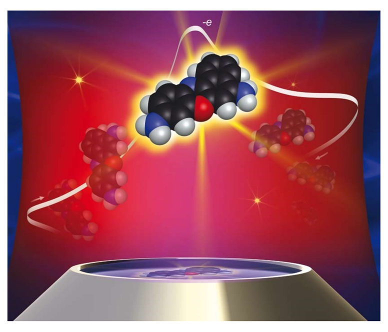
Methods

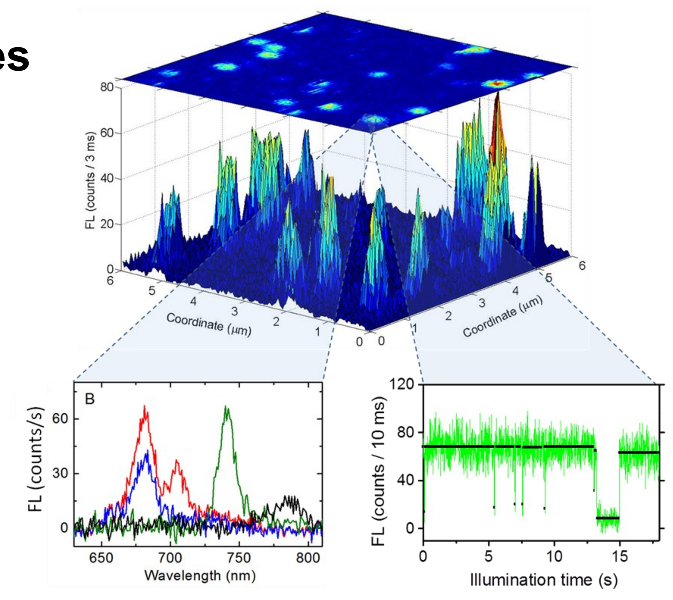
1. Single-Molecule Spectroscopy (SMS)

- Time-correlated single-photon counting
- Single-molecule plasmonics
- Fluorescence spectroscopy



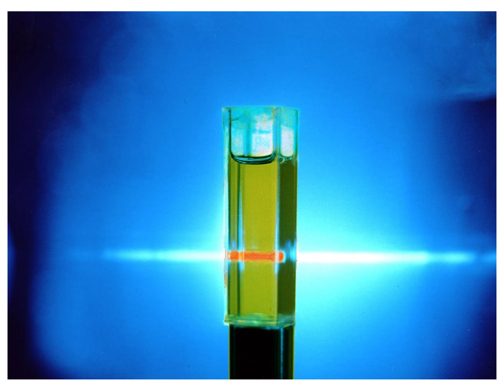
Development of new SMS techniques

- Real-time single-particle tracking
- Photon correlation spectroscopy
- Single molecule Stark spectroscopy

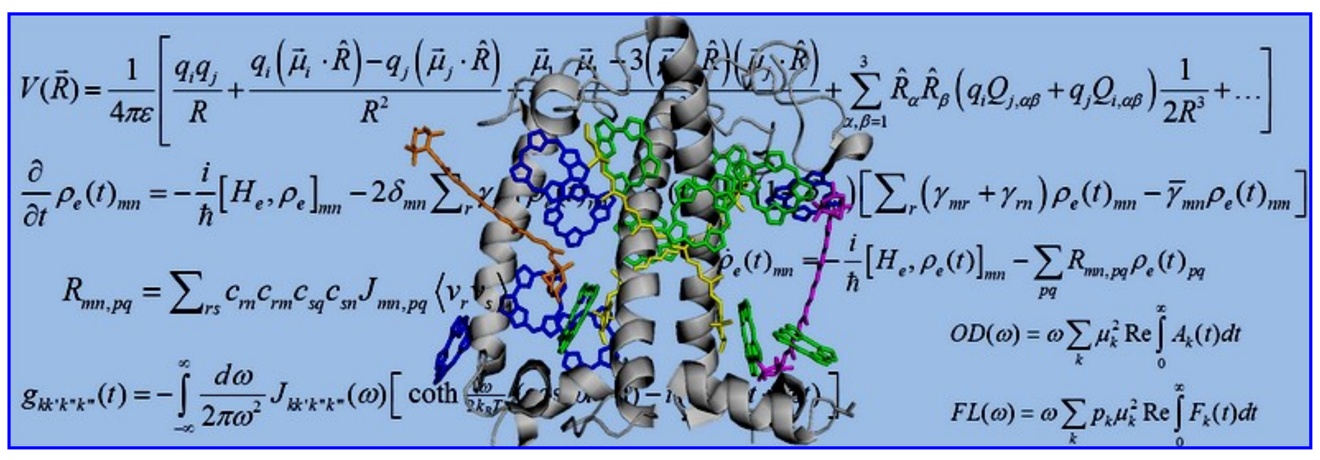


2. Ultrafast Spectroscopy

- ps—fs transient-absorption spectroscopy
- Ultrashort laser pulse shaping



3. (Quantum) Optical Modelling



Samples of Interest

- Photosynthetic pigment-protein complexes
- Biologically inspired solar cells

Selected Research Topics

- Why do light-harvesting complexes blink?
- How much can the fate of an excitation be controlled?
- How much can the energy-transport pathways be actively controlled?
- How do light-harvesting complexes adapt dynamically to external stimuli?
- What are the molecular mechanisms behind photoprotection?
- How and why do light-harvesting complexes change the degree of quantum coherence?
- How much can photophysical parameters by tuned by means of localised surface plasmon resonances?
- What aspects of photosynthesis can be mimicked to improve the performance of solar cells?

Required Background and Interests

- BSc in Physics
- A passion for multidisciplinary research
- Bonus: Familiarity with Python and/or MATLAB and/or LabVIEW
- Another bonus: background in chemistry and/or statistics

Website: http://www.up.ac.za/en/physics/article/1821193/biophysics

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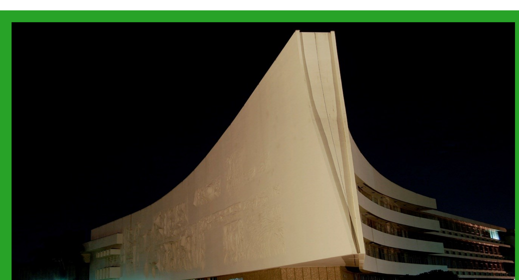

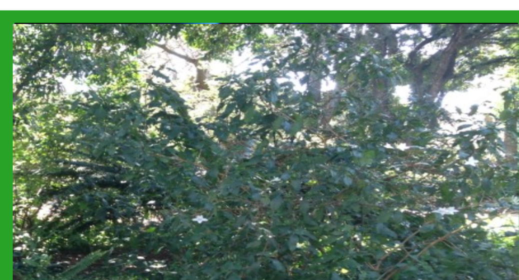


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