

## Single Molecule Studies in Supported Lipid Membranes

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This project will build on advances made in the group for the study of single molecules using i) AFM and ii) SPR enhance Raman. High resolution patterning of lipid membranes on planar surfaces.[1] Recently we have demonstrated we can create single component membrane structures with feature sizes down to 10 nm by combining the patterning with fast scan AFM this permits properties such as “crowding” and the effects of dimensionality on diffusion to be studied in lipid membranes. Such studies are important for understanding the behaviour of membrane proteins and processes. ***Here we will develop methods for the formation of two (and higher) component membranes to allow us to position the proteins involved in light harvesting in relation to one another to permit the effects of dimensionality of energy capture to be followed and biomimetic systems to be created.***

Nanoparticle based plasmonics has allowed us to characterize the components of lipid membranes at the single molecule level [2]. ***Here we will combine our ability to pattern membranes with plasmonic/ electrical interfaces to allow us to undertake single molecule spectroscopy of small molecules and proteins involved in light harvesting.***

During this project you will develop the underlying tools for membrane studies using AFM and SPR-SERS and apply them to study biological systems and processes of relevance for light harvesting.

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