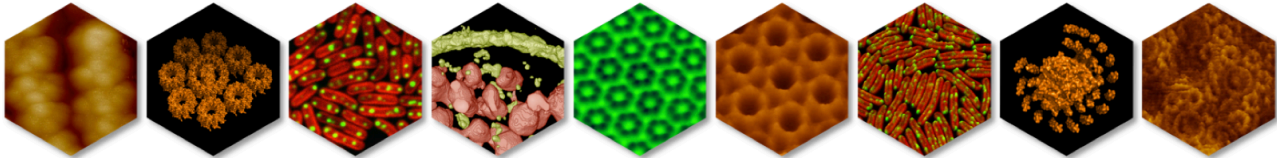




Four-year fully-funded PhD Studentship (2018-2022)

Macromolecular Structure of Bioenergetic Supercomplexes using Cryo-Electron Microscopy

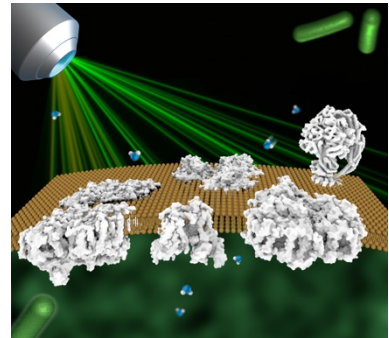
Supervisor: Dr Luning Liu (Institute of Integrative Biology, University of Liverpool)



Keywords: macromolecular structure, supercomplex, Cryo-EM, bioenergetics, protein assembly

Open to apply until 20 April, 2018. Early application is strongly recommended!

Energy conversion is essential for cell physiology and bioenergy production. Key cellular energy conversion processes take place in the biological membrane and involve electron transport powered by either light (photosynthesis) or chemical energy (respiration). These processes are efficiently carried out in electron transport chains comprising a set of membrane complexes that are self-assembled to form “supercomplexes”. The structures, function and regulation of these bioenergetic proteins and supercomplexes are fundamentally important for improving our current knowledge of cellular energy metabolism, ageing and disease, as well as cell engineering for biofuel production. This project is aimed at elucidating the macromolecular structures of photosynthetic and respiratory membrane proteins and the self-assembling supercomplexes in cyanobacteria, using the powerful *Cryo-electron microscopy* (Nobel Prize 2017) combined with *molecular genetics*, *biochemistry*, and *bioinformatics*. It will underpin our understanding of the physiology and regulation of cyanobacterial photosynthesis and acclimation to changing environments. The knowledge and techniques developed in the study can be extended to bioenergetic supercomplexes in chloroplasts and mitochondria.



This project combines the experience of the Liu Lab (University of Liverpool, UK) in cyanobacterial photosynthesis and thylakoid membrane structure (PNAS 2012, Mol Plant 2017) and the expertise of the Shirouzu Lab (Riken, Japan) in the structural analysis of macromolecular complexes using X-ray crystallography and Cryo-electron microscopy (Science 2017, PNAS 2016). The PhD student will work at Liverpool (UK) for 2 years to establish techniques for efficient biochemical isolation and characterization, and has a great opportunity to work in Riken (Japan) for 2 years to conduct high-resolution imaging using Cryo-EM. Training in all aspects of the project will be provided with access to state-of-the-art infrastructure in the Institute of Integrative Biology and with international collaborators, essential for career development.

Application: The fully-funded 4-year PhD studentship is intended to start in October 2018 for UK and EU nationals. It provides stipend at the RCUK rate (currently £14,553 per annum for 2017-2018) and tuition fees. Candidates will need to hold, or expect to hold, a first class or high II.1 degree in structural biology, biochemistry or equivalent, and have demonstrated strong motivation, intelligence, and abilities of self-management, writing scientific reports, and working in a laboratory environment. Experience in microscopy is desirable. To apply for this studentship, please send your CV and a cover letter with contact information of two referees to Dr Luning Liu (luning.liu@liverpool.ac.uk). More detailed are available via Email or website: www.luningliu.org.

Reference: (1) BBA - Bioenergetics, 2016, 1857: 256-265. (2) Science, 2017, 357: 921-924. (3) PNAS, 2016, 113: 12997-13002. (4) Mol Plant, 2017, 10: 1434–1448. (5) Proc Natl Acad Sci USA, 2012, 109: 11431-11436. (6) Nature, 2010, 464: 1210–1213. (7) Science, 2017, 357: 815-820.