

Physical Chemistry Seminar

Architecture and Functional Regulation of a Plant PSII-LHCII Megacomplex

Haijun Liu Ph.D

Assistant Professor
Department of Biology
Saint Louis University



Photosystem II (PSII) splits water in oxygenic photosynthesis on Earth. The structure and function of the C4S4M2-type PSII-LHCII (light-harvesting complex II) megacomplexes from the wild-type and PsbR-deletion mutant plants are studied through electron microscopy (EM), structural mass spectrometry, and ultrafast fluorescence spectroscopy [time-resolved fluorescence (TRF)]. The cryo-EM structure of a type I C4S4M2 megacomplex demonstrates that the three domains of PsbR bind to the stromal side of D1, D2, and CP43; associate with the single transmembrane helix of the redox active Cyt b559; and stabilize the luminal extrinsic PsbP, respectively. This megacomplex, with PsbR and PsbY centered around the narrow interface between two dimeric PSII cores, provides the supramolecular structural basis that regulates the plastoquinone occupancy in QB site, excitation energy transfer, and oxygen evolution. PSII-LHCII megacomplexes (types I and II) and LHC aggregation levels in Arabidopsis psbR mutant were also interrogated and compared to wild-type plants through EM and picosecond TRF.



Wednesday, April 2, 2025



10:30am



BRWN 4102



PURDUE
UNIVERSITY®

James Tarpo Jr. and Margaret Tarpo
Department of Chemistry

Liu Bio

Ph.D., Biochemistry, Dept. of Biological Sciences, Louisiana State University, 2008

M.S., Plant Biology, Dept. of Biology, Sichuan University, 1996

B.A., (graduated with honors) Biology, Dept. of Biology, Hebei Normal University, 1993