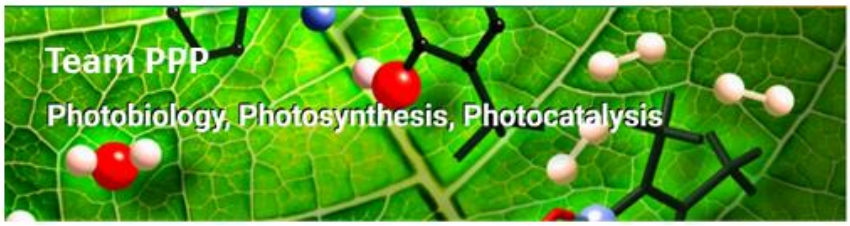

Offer for a 3-years PhD student position

Scientific context. In nature, plants are exposed to fluctuations in light intensity. Plants must have enough pigments to grow in dim light, but too much bright light causes damage the photosynthetic machinery and reduces plant growth. The additional production of ATP by alternative electron transport pathways is vital for preventing damage. Cyclic (CET) and pseudocyclic electron transport (PCET) are attractive targets for enhancing stress resistance in crops and improving plant productivity. The aims of the project are (1) to biochemically characterize the PGR5 protein and to test the hypothesis that the PGR5 protein plays a direct role in CET in plants and cyanobacteria and (2) perform a systematic analysis of chloroplast redox networks with specific focus on the role of members of the thioredoxin protein family in regulating CET and PCET. We will study the cyanobacterium *Synechocystis* PCC 6803 as a prokaryotic model that performs oxygenic photosynthesis and the higher model plant *Arabidopsis thaliana*.

***Methods/approach*:** CET has been shown to be crucial under fluctuating light while PCET is stimulated by short photoperiods. Cyanobacterial mutants lacking Pgr5, NDH and the proposed PGRL1 homologue plus equivalent Arabidopsis mutants will be studied. In addition, mutants affected in the thioredoxin system will be used. Arabidopsis and Synechocystis mutants will be subjected to different light regimes to test the redox regulation of the CET and PCET pathways and to study the importance of CET and PCET for growth. Photosynthetic performance will be monitored by chlorophyll fluorescence. CET will be studied by transient absorption changes (ECS, KLAS-NIR-PAM). PCET will be determined via O_2 consumption in the light and by a spin trapping EPR spectroscopy to detect ROS. Organisation of the photosystems and supercomplex formation will be determined by blue-native PAGE and immunoblots. Redox modifications of photosystem I subunits will be detected by standard gel shift assays.

Your profile. The PhD candidate should have a strong motivation to work on photosynthesis at the interface between biophysics and plant biology. A background and training in biophysics, as well as experience in biochemistry and molecular biology would be appreciated.

Your working environment: the work will be based at the I2BC, University Paris-Saclay, France. The institute is located 20 km southwest from Paris. Our research lab PPP (Photobiology, Photosynthesis, Photocatalysis) offers unique interdisciplinary expertise on photosynthesis with state-of-the-art spectroscopy. The project will be done in close collaboration with the team of Prof. Peter Nixon, Imperial College London, UK.

Context: CNRS grant for 3 years
Start date: from 1st October 2021
Contact: Anja Krieger-Liszkay, e-mail: anja.liszkay@i2bc.paris-saclay.fr, phone : +33 1 6908 1803