

Two-year post-doc position in *Chlamydomonas* molecular biology and biochemistry available at CEA Cadarache, France

We are searching for a highly motivated post-doc to join our group to work on the energetics and regulation of the algal CO₂ concentrating mechanism.

Our research group, hosted by the Institute of Biosciences and Biotechnologies Aix-Marseille (CEA Cadarache in Provence, south France), offers a very dynamic and multi-disciplinary environment with a strong track-record in microalgal photosynthesis and lipid metabolism (<https://www.cite-des-energies.fr/en/home-biam/search/ebm/>).

The post-doctoral research project: Microalgae account for nearly half of the CO₂ annually fixed by the Earth's ecosystems. Because CO₂ diffusion is slow in water and the CO₂-fixing enzyme of photosynthesis (Rubisco) has a low affinity for CO₂, the efficiency of microalgal photosynthesis greatly depends on a mechanism called Carbon Concentrating Mechanism (CCM), which concentrates CO₂ at the catalytic site of the carboxylating enzyme Rubisco. While the CCM requires the energy of photosynthesis to operate and concentrate CO₂ against a thermodynamic gradient, the mechanism of energy supply have long remained unclear. Our group recently made a breakthrough in the field by showing that alternative pathways of photosynthesis (cyclic electron flow or CEF and pseudo-cyclic electron flow or PCEF) are required for the functioning of the CCM (Burlacot et al. 2022). The post-doctoral project will aim at unravelling regulatory mechanisms of the CCM, widely overlooked while essential to maintain an optimal balance between photosynthetic energy production by alternative pathways (CEF and PCEF) and its consumption by CCM components. For this purpose, the phenotype of *Chlamydomonas* mutants affected in candidate regulatory mechanisms (either available in the lab, at the CLiP library or generated by CRISPR) will be analyzed by different techniques (protein biochemistry, confocal microscopy and biophysics). The ambition of the project is to uncover how metabolic reactions of CO₂ fixation and CCM are co-regulated to operate in a coordinated way.

The candidate should have a Ph.D in plant/algal biology or biochemistry with experience in molecular biology, cell biology and/or biophysics. Freshly graduated Ph.Ds are encouraged

- Application deadline: January 20th, 2023
- Starting date: April 1st, 2023

Contact Dr. Gilles Peltier (gilles.peltier@cea.fr) with:

- A cover letter briefly describing your current scientific interests and past experiences
- A CV with education background and publication list
- Contact info for 3 references

Recent publications of the research team in relation to the topic:

Burlacot A, Dao O, Auroy P, Cui n  S, Li-Beisson Y, Peltier G (2022) Alternative electron pathways of photosynthesis drive the algal CO₂ concentrating mechanism. *Nature* 605, 366-371

Burlacot A, Burlacot F, Li-Beisson Y, Peltier G (2020) Membrane Inlet Mass Spectrometry: A power tool for algal research. *Front. Plant Sci.* 11, 1302

Burlacot A, Richaud P, Gosset A, Li-Beisson Y, Peltier G (2020) Algal photosynthesis converts nitric oxide into nitrous oxide. *Proc. Natl. Acad. Sci. USA* 117, 2704-2709

Chaux, F., Burlacot, A., Mekhalfi, M., Auroy, P., Blangy, S., Richaud, P., Peltier, G. (2017) Flavodiiron proteins promote fast and transient O₂ photoreduction in *Chlamydomonas*. *Plant Physiol.* 174, 1825-1836