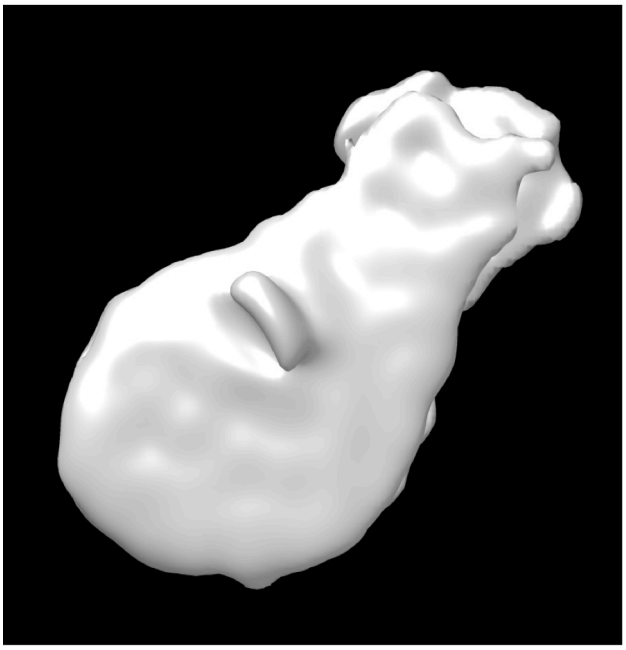
Activity Report CM01 mx2246– 18 to 20 June 2020

We aim at solving the structure of temporal supercomplexes formed around Photosystem I (PSI) during steady state and under stress conditions by the cryo EM technique. So far our visits yielded two high-resolution structures of two distinct forms of Photosystem I (PSI) from the halotolerant green algae *Dunaliella salina*. We solved the crystal structure of this supercomplex at 3.2 A resolution (Perez-Boerema A, Klaiman D, Caspy I, Netzer-El S, Amunts A, Nelson N., 2020. Structure of a minimal photosystem I from a green alga. Nature Plants 6:321-327 PDB 6RHZ). The second visit yielded structure at 2.84 A resolution of a much larger form of PSI containing 8 additional subunits and about 40 additional prosthetic groups (Caspy I, Malavath T, Klaiman D, Fadeeva M, Shkolnisky Y, Nelson N. (2020) Structure and Energy Transfer Pathways of the *Dunaliella Salina* Photosystem I Supercomplex. BBA - Bioenergetics, in press PDB 6SL5). In the current experiment we attempted solving larger complex of PSI from TSP4 temperature sensitive mutant of *Chlamydomonas reinhardtii*. PSI was isolated from cells grown at 37^{O}C where PSII is absent. 3D classification clearly shows two classes of particles; smaller one with 10 light-harvesting complexes and larger supercomplex that was not observed before (see Figures). We are processing the somewhat complicated data and are quit certain to get the two distinct classes at high resolution. We would like to continue our program and in next visit to collect more data for solving the large supercomplex at high resolution.

The 3 days experiment excided all my expectations.

3D initial structure of large PSI supercomplex



3D initial structure of PSI

Initial structures of large (left) and normal (right) PSI of TSP4 *C. reinhardtii* mutant.