Chloroplasts are subcellular organelles in plant and algae that carry out reactions of photosynthesis, they originate from a cyanobacteria-like ancestor and were incorporated into pre-eucaryotic cell about 1 billion years ago. In the course of evolution most of chloroplastic genes were transferred to the nucleus. However, present chloroplasts still contain a genome with a set of c.a. 100 protein coding genes. To make a protein from a gene, the gene is transcribed to produce messenger RNA (mRNA), which in next step passes through the huge protein-RNA machinery called ribosome. The ribosome, in a process called translation, reads information encoded by the mRNA and "translates" it into amino acids which are joined together into protein. Interestingly, recent experiments showed that the translation, due to some reasons, can be stopped and ribosomes pause on mRNA.

Detailed description of translation in chloroplasts is still missing. Therefore, this project aims to characterise translation processes in chloroplasts and to test how this translation is regulated by light. The light which is indispensable for photosynthesis and drives photosynthetic electron transport also leads to the production of, possibly harmful, reactive oxygen species (ROS). We want to test whether ribosomes in chloroplasts can pause in response to ROS production and photosynthesis-related signals.

To address these questions, we will use cutting-edge, molecular biology techniques that allow for analysis of ribosome positions in a scale of whole genomes as well as experiments showing the rate of protein synthesis *in vivo*. As a result of planned experiments, we will create a repertoire of ribosome pause sites throughout the chloroplast genome that will shed light on the regulation of translation in plants.