**ALGATECH Scientific Seminars**

**for the period from October 2022 to February 2023**

**(Wednesday 13 p.m., seminar room on the 3rd floor)**

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| Month | Day | Speaker - Group | Title |
| October 2022 | 5 | Laboratory of Photosynthesis**Frédéric Berger** | Evolution of the mode of control of transposons in Archaeplastida |  |
| 12 | Laboratory of Photosynthesis**Leo Sazanov, IST Vienna** | Structures and mechanisms of membrane-embedded molecular machines |
| 19 | Laboratory of Cell Cycles of AlgaeKateřina Bišová | Growth and division of algae in deuterated water |
| 26 | Laboratory of Anoxygenic Phototrophs**Hashimi Hassan** | mitochondria & Rhodobacter project |
| November 2022 | 2 | Laboratory of Photosynthesis**Markéta Linhartová** | A small non-annotated protein interacts with NDH-1 and functions in the organization of photosynthetic complexes in Synechocystis 6803 |
| 9 | Laboratory of Algal Biotechnology**Ivan Ivanov** | **Cancelled** |
| 16 | Laboratory of Algal Biotechnology**Jan Hajek** | **2504- Final Chapter** |
| 23 | Laboratory of Algal BiotechnologyJiri Masojidek | Jiri Masojidek |
| 30 | Laboratory of PhotosynthesisRebeca Lopez-Adams | Exploring the interplay of nitrogen fixation and photosynthesis in Trichodesmium at the single-cell level using NanoSIMS |
| December 2022 | 7 | Laboratory of Anoxygenic PhototrophsDavid Kaftan | Life of an aerobic anoxygenic phototroph near the Arctic Circle |
| 14 \*11 am\* | Laboratory of Photosynthesis **Elisabeth Hehenberger, Biology Centre CAS** | Plastid evolution in dinoflagellates and beyond |
| January 2023 | 11 | Laboratory of Algal BiotechnologyPavel Hrouzek and Dominika | Untangling the mechanism of the action of nostatin A, a potent antiproliferative cyanobacterial secondary metabolite |
| 18 | Laboratory of Photosynthesis  | **Dušan Lazár (RK )** |
|  | 25 | Laboratory of Cell Cycles of Algae |  |
| February2023 | 1 | Laboratory of Photosynthesis  | **Parisa Rahimzadeh** |
|  | 8 | Laboratory of Algal BiotechnologyTomas Galica | Tomas Galica |
|  | 15 | Laboratory of Anoxygenic Phototrophs |  |
|  | 22 | Laboratory of Photosynthesis | **Guillem Pascual: Function of the Sll1071 protein in the Photosystem II repair** |

**Zimný Sem. + Letní Sem.:** Fotosyntéza 7+8

Biotechnológia 5+5

Cykly 3+2

AAP 2+3

Abstract Sazanov:

**Structures and mechanisms of membrane-embedded molecular machines**

Leonid Sazanov, IST Austria

Membrane proteins are responsible for many fundamental cellular processes including the transport of ions and metabolites, energy conversion and signal transduction. Many of these proteins work as molecular machines, employing large-scale motions to perform their function. We are interested in the structure and function of such machines, mainly from the domain of bioenergetics (i.e. biological energy conversion, such as in respiration and photosynthesis).

Respiratory chain of mitochondria and bacteria, responsible for most of energy production in the cell, comprises a series of such machines (complexes I-V) working in concert to produce ATP (universal biological energy carrier). Complex I is the first and the largest enzyme in the chain, coupling electron transfer between two substrates to the translocation of four protons across the membrane. Previously we have determined the first atomic structure of complex I, using X-ray crystallography on bacterial enzyme. More recently we have solved the first structure of the even larger (1 MDa, 45 subunits) mammalian complex I, using new cryoEM methods. In mitochondria respiratory complexes are organised into supercomplexes, or respirasomes (~1.7 MDa, 80 subunits), and we have solved structures of these supercomplexes, also using cryoEM. Current work is centred on the deciphering of the enigmatic coupling mechanism of complex I and on the functional role of the supercomplexes. Apart from complex I, we are working also on other intriguing molecular machines – proton translocators.

Each of these biological machines employs unique mechanism, resembling engineering creations. Each new structure brings a lot of surprises, showing Nature’s ingenuity in efficiently implementing different pathways necessary for life.