

Summer course “Synthetic Biology: New concepts and new methods” with Prof. dr. Torsten Waldmingaus, Philipps-Universität Marburg and the University of Gdansk

Participants: 24 students

Duration: one week

Date: 30.09-04.10.2019

Target audience: Ph.D. students, post-docs. Master course students' applications will also be considered.

The course is planned as summer school with the whole program filling one week. Lectures on synthetic biology with a focus on synthetic chromosomes will be combined with a lab course introducing the students to state of the art DNA assembly methodologies. Participants will learn to carry out the experiments and document, present and discuss their results.

Lecture: Synthetic Biology (Total of 5 hours)

Lecture divided in five topics:

1. Introduction to Synthetic Biology
2. Synthetic chromosomes
3. New DNA assembly approaches
4. Xenobiology: Changes to the genetic code and non-canonical amino acids
5. Current developments in Synthetic Biology

Lab course: DNA assembly (Total of 35 hours)

DNA cloning is the basis for most research projects in molecular biology and new approaches have the potential to make this much easier and more efficient. This course will introduce participants to two state of the art DNA assembly techniques, namely Gibson Assembly and Modular Cloning (MoClo).

Gibson assembly allows the combination of up to 24 DNA fragments in a single reaction without leaving “scars” between them. It was developed and used within the first synthetic chromosome project by the lab of Craig Venter and has since then gained wide distribution for simple and complex DNA assembly projects. Participants will perform a set of Gibson Assemblies with different numbers of fragments to measure the assembly efficiency relative to the number of fragments assembled.

The Modular Cloning (MoClo) allows fast and easy assembly of genetic parts which are cloned into entry vectors without the need for fragment isolation etc. The system is frequently used to assemble many different combinations of genetic parts as promoters, coding sequences, terminators and ribosome binding sites to design synthetic genetic circuits. Participants will construct fragments in entry vectors and combine them in further steps to assemble reporter systems for which we will measure activity.

The lectures and the lab course will be held at the Faculty of Biology, University of Gdansk. Participants will be accepted on a first-come first-served basis. To enroll the course, please send an e-mail to dr. Monika Glinkowska (Department of Bacterial Molecular Genetics), monika.glinkowska@ug.edu.pl. Details of the course will be sent to applicants by e-mail.