



## **Genome editing by CRISPR/Cas9 in theory and practice, 5 credits**

The SLU research school Organism Biology welcomes PhD students and other interested scientists to a course in genome editing (5 credits). Gene-editing technologies such as CRISPR have the potential to transform science at an astonishingly rapid rate. In this course we will cover the basics of genome editing and guide you through genome editing workflows in both plants and fungi, with hands-on laboratory instruction.

The course will take place on part time from 2<sup>nd</sup> to 30<sup>th</sup> of October at the Uppsala BioCenter and will include lectures both from in-house scientists and well-renowned international experts. Laurence Tomlinson from the Sainsbury Lab, UK and Fabien Nogue from INRA, France have confirmed their contributions.

The course is organized by Panagiotis Moschou at Plant Biology on behalf of the research school Organism Biology. For more detailed information about the course, please refer to the course syllabus and the preliminary schedule attached.

For registration on first serve basis (student number limited to 20), send an e-mail before September 22 to [panagiotis.moschou@slu.se](mailto:panagiotis.moschou@slu.se) indicating your name, university, department, position and whether you would like to participate in the social event with food in the evening on 5<sup>th</sup> of October (if yes, please state allergies or food preferences).

If you are only interested in the talks on 5<sup>th</sup> of October there is no need for registration.

# Syllabus: PNS0151 Genome editing by CRISPR/Cas9 in theory and practice, 5 HEC

**Syllabus approved:** 28/08/2017

**Credits:** 5

**Subject:** Biology

**Course type:** Subject course

**Language:** English

**Prerequisites:** The practical part of the course is primarily intended for PhD students within the SLU Graduate School Organism Biology, but will be open to all interested PhD students and researchers who want to learn how to edit genomes of plants/fungi using the most recent and advanced CRISPR/Cas9 system. No previous experience in genome editing is required but experience in molecular biology is essential. All lectures will be carried out as open events, no registration is required to attend the theoretical part of the course.

**Objectives:** After this course you should be able to design and implement CRISPR to manipulate your gene(s) of interest in, and validate the outcome of the procedure at the molecular level.

**Content:** The course provides the participants with a strong theoretical background in genome editing in form of lectures, seminars and open discussion. Furthermore, different applications of genome editing will be covered. This course will provide hands-on training in genome editing and cell engineering in plant and fungal species using genome editing with special emphasis on CRISPR/Cas9. Participants will learn to design CRISPR strategies using bioinformatics, generate gene knockouts/knock-ins, and validate targets using the most state of the art technologies. During the practical part students will design and perform an experiment within a given framework, analyse the results and present the data in a form, which would be required for a publication. The course consists of roughly equal theoretical and practical parts and will run on part time over a 4 week period.

**Examination:** Students are expected to attend theoretical parts, take active part in discussions and complete the practical part of the course. The practical part includes the design of an experiment within a given framework, execution of the experiment and analysis of the data. The data should be presented as a written report in form of a materials and methods chapter plus a figure, prepared as it would be for a publication. At the end of the course, students will give a short presentation on how their research could benefit from the use of genome engineering.

**Contact for application and further information:**

Panagiotis Nikolaou Moschou, [panagiotis.moschou@slu.se](mailto:panagiotis.moschou@slu.se)

**Literature:** Articles and hand-outs

**Additional Information:** The course is organized by Panagiotis (Panos) Moschou on behalf of the SLU graduate school Organism Biology. Maximum 20 students per course occasion.

Date	Title	Time (hours)
2-Oct-17	<b>CRISPR in theory</b>	4
3-Oct-17		4
4-Oct-17	<b>Non-canonical models for CRISPR-mediated editing</b>	4
5-Oct-17	<b>At the forefront of CRISPR research (invited speakers Laurence Tomlinson from the Sainsbury Lab, UK and Fabien Nogue from INRA, France )</b>	4
9-Oct-17	<b>CRISPR in practise: introduction</b>	2
10-Oct-17	<b>Design of CRISPR strategies</b>	1
12-Oct-17	<b>Design of CRISPR strategies</b>	2
16-Oct-17	<b>Multiplexing CRISPR targets-Lab course I</b>	4
17-Oct-17	<b>Multiplexing CRISPR targets-Lab course II</b>	1
18-Oct-17	<b>Multiplexing CRISPR targets/genotyping of CRISPR targets-Lab course III</b>	4
19-Oct-17	<b>Discussions</b>	2
23-Oct-17	<b>Transient CRISPR approaches and RNP complexes-Lab course I</b>	4
26-Oct-17	<b>Discussions</b>	4
30-Oct-17	<b>Presentations</b>	4