PhD Program in Plant Sciences: Next-Generation Sequencing and its Application using Machine Learning (BIO610)

Lecturer: Prof. Kentaro Schimizu**,** Prof. Dr. Jun Sese, Dr. Masaomi Hatakeyama, Dr. Rie Shimizu-Inatsugi, Dr. Deepak Tanwar
Location: University of Zurich, tbd
Dates: 06.-07.11.2024
Time: 09:00 – 18:00
Credit Points: 1 ECTS

Course Description:

Handling of the huge data produced by next generation sequencers (NGS) requires us experimental knowledge and data analysis skills. The aim of this course is to familiarize the participants with experimental methods and data analysis about NGS. Topics will include: fundamental analysis of the sequence data, UNIX tools, and RNA-seq analysis. Fundamentals of data analysis and machine learning are also introduced.

Course Objectives:

By the end of the module the students should be able to
- Understand concepts of NGS technologies
- Understand fundamentals of data analysis
- Understand basic operation of UNIX operating system
- Design a research experiment and the data analysis involving biologically relevant issues affecting populations of plants or animals
- Map NGS data onto a reference genome, detect polymorphisms, and estimate gene expression levels
- Run machine learning analysis process
- Understand basic bioinformatics of large datasets for practical use in genetic analyses

Number of Participants: 8 out of 18. For Master & PhD students. Priority will be given to the PhD programs of Evolutionary Biology and Plant Science.

Individual Performance and Assessment: Attendance at lectures and active participation in the hands-on exercises are required

Special Note: BIO609 "Introduction to UNIX/Linux and Bash scripting" is a prerequisite to set up computers (contact coordinators if you have appropriate previous knowledge in the Linux/Unix command line and bash scripting). Basic studies completed.