# How to Choose a Scientific Problem, 2 credits (P000104)

**Subject:** other social science
**Education cycle**: postgraduate level
**Grading scale**: pass/fail
**Language:** English

**Prior knowledge**
Prospective students should be enrolled as a PhD student in Biology or an equivalent subject. This course is mainly intended for PhD students at SLU but post-doctoral researchers and PhD students from other universities are eligible to apply in case vacant seats are available.

**Objectives**
While science is a multifaceted puzzle with many avenues of research and problem solving, there is a lack of understanding in how to choose a scientific problem and subsequently, plan and carry out a project. Understanding the rationale or logic behind choosing the right problem can be the difference between enjoying and solving challenging problems or being stuck at a problem leading to frustration. Moreover, the world today changes at a fast pace where some questions which seemed pressing may not be as important as a new question that just arose. Thus, in the dynamic environment of the world and society today it is vital to understand and choose the right scientific problem to address, striving for a maximum scientific impact, a benefit to the society, and eventual success of the researcher.

This course is targeted at PhD students or researchers who would like to be equipped with certain tools and skills which will help them ascertain, evaluate, and analyze a potential scientific problem and choose whether to pursue a particular idea and develop a project around it.

After the completion of the course the participants should be able to:

- Understand the rationale that goes behind choosing a scientific problem.
- Critically analyze their choices and experimental plans to ensure efficient problem solving.
- Make informed choices whether a project is achievable within a given time frame.
- Be able to ascertain the potential impact of their project/projects.
- Understand the field of their interest and identify the knowledge gaps.
- Creating a more open outlook about out of the box thinking and look across the boundaries of disciplines (interdisciplinary).
- Looking beyond the self, and understand what kind of team would be required to establish a task.

**Content**

The course will train students to make informed choices about their scientific problem, guided by seminars from experts. This will also sharpen their critical thinking and analysis skills thereby helping them to progress in their projects and scientific career. The course will cover potential questions and issues such as:

- Why be circumspect when choosing a problem?
- What things to consider when choosing a problem?
- What kind of collaborative work would be needed?
- What eventualities can one plan for?
- How to ensure that efficiency is maintained?
- Ensuring both macro and micro details are maintained.

**Formats and requirements of examination**

Pass / Fail. In order to pass the course, course participants will need to attend all of the group sessions as well as submit and discuss one written assignment.

**Additional information**

The course is divided into three full days of seminars and discussions and Q&A sessions as detailed in the schedule. The course is organized by Shamik Mazumdar and Simon Stael on behalf of the SLU graduate school Organism Biology. The course will also feature

guest speakers who are experts and pioneers in scientific problem choosing and experimental planning. Maximum 20 students per course occasion.

Course literature includes:

- Fischbach, MA. Problem choice and decision trees in science and engineering. *Cell* 2024 Apr 11;187(8):1828-1833. doi: 10.1016/j.cell.2024.03.012.
- Kamoun, S. (2021). GOHREP and PLESI: guides to navigate through your research projects. Zenodo https://doi.org/10.5281/zenodo.5594443