

Research Proposal Assignment

Objective:

Each student will develop an original research proposal related to *any topic in Nanobiotechnology*. The proposal should follow the structure of the SNSF Spark Grant but will be slightly shorter. This assignment is designed to enhance your ability to formulate a novel research question, design an experimental approach, and present your ideas effectively.

For inspiration, I recommend exploring recent research articles, particularly their conclusion and outlook sections, as well as opinion or perspective articles in nanobiotechnology. The papers for the paper review debate may also serve as inspiration, and we will upload a few more papers on Moodle that area at the cutting edge of science for inspiration. These sections typically provide a forward-facing perspective on emerging directions in the field, which could serve as the foundation for your proposal.

We (*TAs and myself*) are available to discuss ideas between lectures and in exercise sessions.

Assignment Requirements:

- **Length:**
 - *Project Summary:* 1 page
 - *Project Plan:* 3 pages
 - *References:* Not included in the page limit
- **Figures:**
 - At least *one original figure* explaining the research idea
 - More figures are encouraged
- **Formatting Requirements:**
 - The project description must consist of *one document of original text* written by the applicant.
 - Must be written in *English*.
 - Must adhere to rules of *good scientific practice* with proper citation of all sources.
 - *Minimum font size:* 10 pt.
 - *Line spacing:* 1.5
 - *Maximum character count for project plan:* 12,000 characters (including spaces, footnotes, figures, tables, formulas, and references).

- **Structure (Modeled on SNSF Spark Grant format):**

- **Title of the Project**
- **Project Summary (1 page, DIN-A4 format)**
 - Provide a concise overview of the research question and objectives.
 - Explain the significance of the proposed work.
- **Project Plan (3 pages total)**
 - **State of Research in the Field**
 - Describe the current state of research in the relevant area.
 - Explain the novel and unconventional nature of the project.
 - Justify how the proposed research is distinct from existing work and not a continuation of prior studies.
 - **Detailed Description of Goals, Methods, Approach, Expected Results, and Potential Risks**
 - Clearly define the objectives and hypotheses.
 - Describe the methodology and experimental design.
 - Provide details on expected results and how they will be interpreted.
 - Discuss potential challenges and risks, along with mitigation strategies.
 - **Potential Impact of the Research**
 - Explain how the project could contribute to the field.
 - Discuss broader implications and possible applications.
- **Bibliography (No page limit)**
 - Cite relevant literature appropriately using the reference format of the American Chemical Society (ACS).

- **AI and Large Language Model (LLM) Policy:**

- Students may use ChatGPT or similar LLMs to assist in writing and refining their proposals.
- However, LLMs *must not* be used for content creation or references.
- Students *must* submit a transcript of their interactions with LLMs as an appendix to their proposal.

Scaffolded Submission Process:

- **Outline/Idea Submission (March 20):** Initial concept submission. Describe your idea in a paragraph or in bullet points outlining your research question and objectives. You can also include a figure. You will receive feedback but no grade.
- **First Draft Submission (April 17):** A complete draft is due. Feedback will be provided but no grade.
- **Final Proposal Submission (May 30 - End of Semester):** Final, graded submission.
- **Full Credit Requirement:** To receive full credit, you must submit an outline/idea and a first draft on March 20 and April 17, respectively.

Evaluation Criteria (Based on SNSF Spark Grant Assessment Criteria):

1. **Novelty / Unconventionality of the Proposed Research Project (20%)**
 - The extent to which the project idea or chosen theoretical/methodological approach is novel and distinct from established ideas.
 - Indicators of novelty include a lack of existing or completed projects, literature, or other scientific results for the topic in question.
 - The extent to which the chosen approach is unconventional and distinct from standardized research approaches.
2. **Scientific Quality of the Project (30%)**
 - The extent to which the research approach, methodology, and organization are sound and convincing.
 - The feasibility of the outlined scientific approach.
 - The suitability of the proposed methodology for achieving the project's goals.
3. **Potential for Significant Impact (20%)**
 - The extent to which the project has the potential to bring about transformative change in a central scientific topic.
 - The potential for paving the way for a new field of research, method, or technology.
 - The possibility of influencing attitudes or behaviors within society.
 - The balance between the potential for significant impact and possible project risks.
4. **Effective Use of Figures (20%)**
 - Quality and clarity of visual elements.
5. **Submission on March 20 and April 17 (10%)**
 - Timely submission of the initial concept and first draft is required to receive full credit. These submissions will not be graded but will be reviewed, and

constructive feedback will be provided. Ensuring timely participation in these stages helps refine and improve the final proposal.

- We (*TAs and myself*) are available to discuss ideas between lectures and in exercise sessions to assist in shaping and improving proposals.

Submission Details:

- **Due Dates:**
 - Outline/Idea Submission: March 20, 2025
 - First Draft Submission: April 17, 2025
 - Final Proposal Submission: May 30, 2025
- **Format:** PDF, submitted via Moodle
- **Appendix:** Include AI transcript if applicable

Additional Notes:

- Proposals should be written in a clear and professional scientific tone.
- Figures should be original and properly labeled.
- Students are encouraged to discuss their ideas with peers and instructors but must ensure their work is their own.

If you have any questions, please reach out to me (angela.steinauer@epfl.ch). Good luck, and I look forward to reading your proposals!