Clinical Project Application for Engineering Innovation in Health

About Engineering Innovation in Health

Engineering Innovation in Health is a yearlong program to develop working, cost-effective solutions to health challenges that are positioned to make a clinical impact in a wide range of specializations. The program operates by teaming clinicians, engineering faculty, and undergraduate and graduate engineering students to solve real-world, unmet health challenges.

The projects and deliverables are managed within the design course sequence in the College of Engineering. The program commences in autumn quarter and runs until June. The entire first quarter (Oct-Dec) is dedicated to developing a thorough understanding of the clinical need and the various aspects that must be addressed for the project to be successful. Design, prototyping, and evaluation of engineering solutions occur in the winter (Jan-March) and spring quarters (March-June).

The success of the projects depends on engaged clinical and engineering faculty mentors. The end **goals** of the projects are:

1. A working prototype of a cost-effective and innovative solution
2. Intellectual property (i.e., patents)
3. Data towards a publication or application for continued funding

As clinician partners, your insight and understanding of unmet needs are **invaluable** in the design process and in generating a solution that could improve your future practice. If you are interested in submitting a project for our program, we would like to hear from you! Often the clinical challenges come from a team of clinicians so please feel free to engage your colleagues. Having a team brings in multiple perspectives and ensures participation at every meeting when you might have a time conflict.

Project proposal process

Application due August 1. Return to EIHealth@uw.edu.

1. Complete the following **project summary** and submit it to EIHealth@uw.edu.
2. Projects that align with our students' background and program goals may be invited to prepare a **brief presentation** (10 minutes max) to explain the need and how a successful solution would impact clinical care. Presentations will be evaluated by a team from the Schools of Engineering and Health Sciences.

Need-based approach

We follow a need-based approach to design and innovation. As such, the most successful projects for this program are based around an unmet clinical challenge rather than a specific device. We challenge students to understand the need and explore a diverse set of solutions. For example,

rather than “building a device to intra-operatively measure tendon force” we challenge students to “improve the accuracy and repeatability of tendon transfer surgeries.” Examples of prior projects include:

> **Need:** Intra-operatively prevent and treat pneumothoraces during and after lung biopsy
> **Solution***:* Modified biopsy co-axial introducer that allows intra-procedural vacuum and can act as a temporary chest tube
>
> **Need:** Quickly quantify blood clot strength in trauma patients
> **Solution***:* Microfluidic diagnostic system to form and measure clot mechanical strength
>
> **Need:** Prevent parastomal hernias in patients with gastrointestinal stomas
> **Solution***:* An easily adjustable, rigid hernia belt.

Clinical partners’ involvement

The clinical partners (or clinical team) are expected to interact with students on a regular basis to provide feedback and engage in the design process. The typical time commitment for a clinical mentor (or team) involves meeting with the student teams 4-5 times (or more) per 10-week quarter and attending final presentations at the end of each quarter.

If you are interested in developing innovative solutions to pressing clinical challenges, please complete the attached **project summary** by August 1 and submit it to EIHealth@uw.edu. If you have further questions or would like to brainstorm potential projects, we would be more than happy to chat further.

Project Summary

Title: _____

Proposed by: _____

Potential clinical mentors: _____

Clinical specialty: _____

Please provide a paragraph addressing each of the following questions.

What is the unmet clinical need?

Describe how this challenge affects clinical practice, patient health, or quality of life. What is the magnitude of this clinical need (e.g., prevalence, annual cost, social impact)? How often do you encounter this problem in your practice? Who would benefit from a solution to this problem? What would be the clinical or health impact of a working solution? Would this lead to potential cost-savings?

What are current solutions for this problem?

Describe current solution(s) for this need. How do these current solutions meet or not meet the clinical needs? Do you know of other solutions that have been tried (e.g., not commercialized)? Why were they not adopted? How much do the current solutions cost?

What are specific design requirements?

Describe some specific “must haves” aspects required to address the clinical need. What will be required for clinical translation or adoption? How do you envision the use of a successful design?

What are future pathways you envision for this project?

We like to identify projects that have the potential to live-on beyond our year-long class – either through further research, open-source designs, commercialization pathways, or direct clinical implementation. Please describe what testing or primary outcome measures could be used to evaluate if the team has addressed the clinical need or provided proof-of-feasibility. If the project is successful, what do you foresee as the next step in translating it to clinical practice or future development? Are there possible funding options to support future activities?