

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 the last week of September and runs until the start of 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: _____

What is the unmet clinical need?

Describe how this challenge affects clinical practice, patient health, or quality of life:

- (1) What is the magnitude of this clinical need (e.g., prevalence, annual cost, social impact) and who would benefit from a solution to this problem?
- (2) How often do you encounter this problem in your own practice?
- (3) Would a solution to this problem lead to potential cost-savings? What is the economic incentive to solve this problem?

As a reminder, please try to describe the overarching clinical problem and AVOID describing a technical solution or design concept that you may already have in mind (this will be done in an unbiased approach with the students).

What are the current solutions, if any, for this problem?

Describe current solution(s) for this need, if they exist. 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 or discontinued)? Why were they not adopted? How much do the current solutions cost?

What are the 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 outcome measures could be used to evaluate a future prototype. 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?