ENG-CAREER PROPOSAL WORKSHOP

Effectively Integrating Broader Impacts and Evaluation into a CAREER Proposal

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What are Broader Impacts?

- The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes

What Does That Practically Mean?

- This is where you want to describe how your work, if funded, will impact those outside of the small circle of experts
- (Disclaimer: This is my personal take)

These are the Official Criteria

- What is the potential for the proposed activity **to benefit society or advance desired societal outcomes?**
- To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
- Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
- How well qualified is the individual, team, or organization to conduct the proposed activities?
- Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

These are the Official Criteria

Broader impacts may be accomplished **through the research itself**, through the activities that are directly related to specific research projects, or through activities that are supported by, but **are complementary** to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of **societally relevant outcomes**. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and other underrepresented groups in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

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2. INTEGRATED EDUCATION OBJECTIVES

Thrombus plays diametrical roles in our bodies: On the one hand, it is of vital importance during wound healing[21,22]. On the other hand, it is the source for many devastating diseases[23–25]. Thus, knowledge of thrombus is critical to our general education on human physiology and pathophysiology. Furthermore, knowledge of thrombus and its role in many diseases is of practical importance as it may allow patients to perform prophylactic activities, recognize symptoms, and perform self-care.

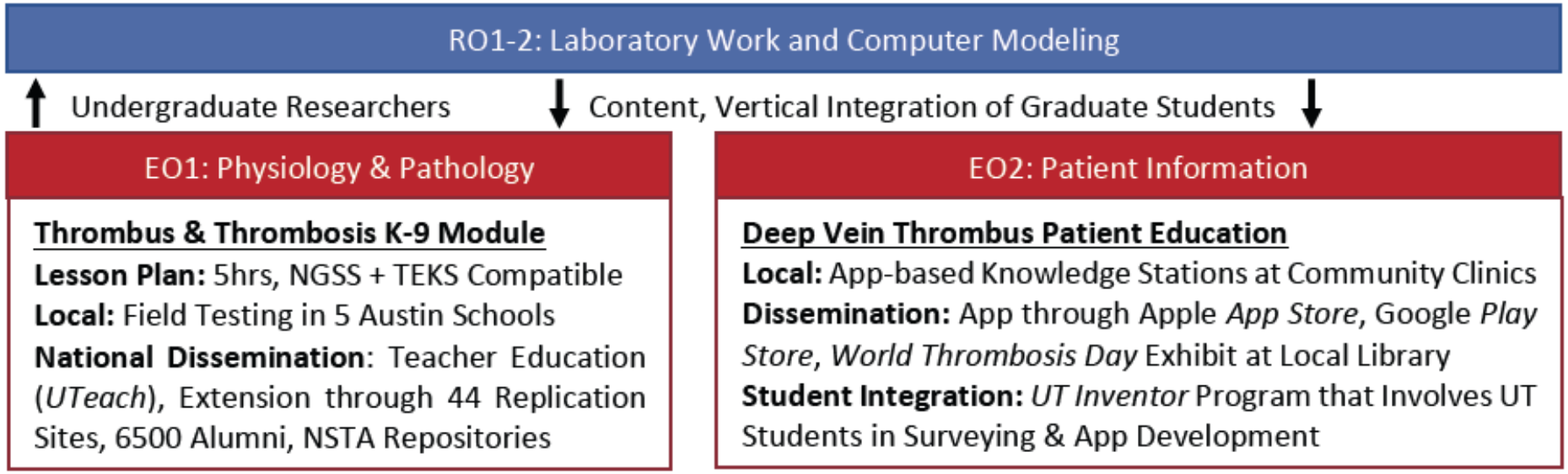

Fig 3: Integration of Research Objectives (ROs) and Educational Objectives (EOs)

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Overall Outreach & Education Goal: Inform the public about thrombus pathophysiology and to reduce thrombus-related mortality through dissemination of knowledge about prevention, self-diagnosis, and self-care. Toward attaining my overall outreach & education goal, I will execute the following objectives:

Educational Objective 1 – Create awareness and understanding of thrombus physiological function and role in diseases such as DVT and to thereby foster early interest in science, engineering, and medicine
Educational Objective 2 – Disseminate knowledge about preventative measures, self-diagnosis, and self-care among vulnerable populations

I will integrate my research objectives into my education goal by directly informing the educational objectives with research findings, by involving undergraduate students in my research, by K-9 outreach activities, and through "Knowledge Stations" that specifically target vulnerable populations, see **Fig 3**.

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3. RELATIONSHIP TO LONG-TERM GOALS

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*My **educational & outreach career goal** is to create a close link between research in my laboratory and the public in order to accelerate the transformation of research findings into public value.* If funded, the work arising from this proposal will allow me to develop the expertise in public engagement and design of sustainable tools that reach populations that otherwise may not benefit from our advancements in knowledge and understanding. On a local level, it will allow me to integrate my research into K-9 outreach activities in five local schools and my "Knowledge Station" thrust. My lesson plan and the information tools will be valuable to public education of thrombus physiology & pathophysiology. Moreover, through *UT Austin*'s location in Central Texas I will be able to reach a traditionally unrepresented minority. Specifically, *Travis County* has a Latinx population of 33.9% (source: census government website), which translates to a large Hispanic student body at *UT Austin* of 20.9% (source: *UT Austin* website). On a national level, if granted, the support from this proposal may allow me to extend my lesson plan to 44 *UTeach* replication sites that will disseminate my lesson plans across the country. Additionally, through collaboration with the *UT Inventor* program I will learn to integrate students into modern media strategies that provide scalability and thus amplify my outreach efforts in the future.

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9. EXTERNAL EVALUATION PLAN

An external evaluation of the proposed research and education objectives will be conducted by the *UT STEM Center Evaluation Service* (see Letter of Collaboration from its director, *Dr. Garbrecht*). The evaluation for this project will include both formative and summative components. The main objectives will be to: i) assess whether the project is making satisfactory progress, ii) recommend reasonable and evidence-based adjustments to project plans, and iii) attest to the integrity and success of any outcomes. These objectives will be assessed in Years 2-5 through annual reviews of project materials and data. In addition, *Dr. Garbrecht* will design and conduct post-surveys with undergraduate students participating in Educational Objectives 1&2 to assess their development/implementation of lesson plans and project outcomes, and to make recommendations to strengthen the project. *Dr. Garbrecht* will conduct formative evaluations at the end of Years 2-4 to inform project improvement and a summative evaluation at the end of Year 5 to document the project's outcomes, impacts, and lessons learned across its duration. The evaluation reports will summarize findings from the annual document reviews and post-surveys to address the extent to which the project met its objectives and completed activities on time.

Letter of Support from my CAREER

Dear Review Committee:

If the proposal submitted by Dr. Rausch, entitled "Toward a fundamental understanding of deep vein thrombus dissolution, persistence, and embolization" is selected for funding by NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description or the Facilities, Equipment and Other Resources section of the proposal.

Sincerely,

Lisa Garbrecht, Ph.D.
Director of STEM Evaluation Services
Expanding Pathways in Computing (EPIC)
Texas Advanced Computing Center (TACC)
The University of Texas at Austin