PROJECT SUMMARY

Overview:

Professional societies have a crucial role in defining the technical content, professional skills, and values that new engineering graduates should have. In the last decade, in partnership with engineering education institutions, these professional societies have emphasized the need to include the social implications of engineering in parallel to techno-economic fundamentals needed for the formation of engineering professionals. Despite these efforts, the transfer of knowledge between academic institutions and professional societies, and its influence in undergraduate engineering formation, is not well understood. Prior studies have explored faculty stances on what social implications mean for the engineering profession and what challenges they have encountered in implementing transformations in the engineering curriculum. However, there still a need to uncover how engineering faculty develop strategies and the role involvement in professional societies play in these actions. This proposal aims to conduct a qualitative study to explore the strategic agency of engineering faculty involved in professional societies as they transform their teaching practices to address social implications in their classrooms.

The Strategic Agency (SA) framework has been used to understand how people transform environments by advancing individual and collective goals towards enacting a positive social change. SA involves reflection, strategy, and action over time as individuals participate in activities supported by a community of practice (CoP). Without reflection, strategies can't be developed, and actions can't occur. SA requires time and the support of a community of practice (CoP), in this case, within the professional society. Because of the PI's 20-year involvement with the American Institute of Chemical Engineers (AIChE) and AIChE's organizational structure to support undergraduate education, this study will purposefully and conveniently sample the experiences of chemical engineering faculty who are willing to implement positive social change in their classrooms but who may necessarily know yet how to be a strategic agent. In this study, Phase I will focus on the ethical validation of qualitative methods to explore participant narratives as they learn about strategic agency and social implications in engineering. In Phase II, the CoP will be formed within AIChE's Education Division and facilitated for a period of 8 months. In this longitudinal study, interviews and journal entries will be collected and coded using a combination of In-Vivo and Focused coding. Finally, in Phase III, final revisions of the data and interpretations will lead to co-constructing a narrative that reflects faculty strategic agency (developed in this CoP) as they transform their instructional practices in the classroom.

Intellectual Merit:

This work will provide new knowledge on using the SA framework in engineering education by providing insight into how faculty agency can be facilitated by a CoP within professional societies and its influence on transforming instructional practices in the engineering classroom. In a data-driven field such as engineering, a narrative inquiry approach will place the experiences of engineering faculty at the forefront of engineers' professional formation and create a national model of evidence-based strategies that can be shared with other engineering educators as they too become drivers of change in their respective disciplines.

Broader Impacts:

This proposal will support a Latina, full-time teaching faculty to become an engineering education researcher. As an active leader in AIChE, she will be positioned to be a leader in qualitative methods, communities of practice, and professional societies' role in undergraduate education. Findings around SA can be used to explore any other engineering area where a CoP composed of individuals (e.g., students, administrators, industry) want to enact radical change in their practices to reshape the professional formation engineers. Finally, the project findings will be disseminated via peer-reviewed journals, conference presentations, workshops, and the PI's website (TheEngineeringProfessor.org). Engagement with broader audiences will be done using blogs and webinars posted on the PI's website and shared using social media tools.