

Reimagining the STEM Doctorate: The Pathways to Entrepreneurship (PAtENT) program

Doctoral programs in Science, Technology, Engineering and Mathematics (STEM) are designed primarily to train candidates in conducting original research, and to prepare them for careers as faculty members at institutions of higher education. In this model, the capstone requirement for the STEM PhD is satisfied through the publication of original research in academic journals, where the work must be evaluated favorably by experts through a process called peer-review. In recent years, there has been an increasing participation of STEM PhDs in technology entrepreneurship, through the development of patentable technologies, and the formation of startup companies. The STEM PhD program, as it exists, does not adequately provide this growing proportion of the STEM workforce who are active in entrepreneurship with the necessary professional skills and preparation. This National Science Foundation Innovations in Graduate Education (IGE) award to the University of North Carolina at Charlotte (UNCC) will introduce an innovative approach in which STEM PhD students will develop patentable technologies as the capstone requirement. These innovations will be implemented in a novel program called Pathways to Entrepreneurship (PAtENT), which will provide an alternate pathway to earning a doctoral degree that has the potential to spur graduation rates, generate employment in the local communities in which it is deployed, and maintain the nation's edge in technological innovation.

The central goal of the project will be to develop an alternate roadmap for STEM PhD students that is scalable and reflects the rapidly evolving workforce needs. This goal will be achieved without sacrificing the technical rigor of the traditional PhD program, by subjecting the patent applications to external peer review. An independent evaluator will collect extensive data on the efficacy of the program, and address specific objectives such as the alignment of the roadmap with the core scientific and professional elements required for a PhD, assess the scalability potential of the pilot study, develop recommendations for STEM programs at other doctoral institutions across the country, and measure the participation rates and employment outcomes of under-represented minorities targeted by the program. The evaluation will consist of a mixed-methods design that will include surveys, polls and interviews developed for current students and faculty, and reflective questions for the project leadership. The project will emphasize the recruitment of female and veteran students, groups that are currently under-represented in the technology startup workforce. If successful, the project will help modernize STEM doctoral programs to suit the needs of the country's future as a knowledge-based economy.