B. Project Summary

STudent Retention Enhancement Across Mathematics and Sciences (STREAMS) will implement a common approach to improving student retention in biology, chemistry, computer science, earth sciences, mathematics and physics at Bridgewater State College (BSC). STREAMS will lead to an approximate increase of 40 STEM graduates annually from an average of approximately 120 to 160 STEM degrees granted per year. STREAMS will provide a common, inquiry-based approach for all STEM introductory courses; attach structured learning assistance to gateway courses with pervasive high student failure rates; implement an electronic portfolio-based mentoring program emphasizing undergraduate research; provide a three week, residential summer bridge program; create a STEM residential learning community; and develop stronger connections with local community colleges and better transfer orientation programming. These six interventions infuse active-learning approaches into a common preparatory groundwork that will lead students to take advantage of existing undergraduate research and internship opportunities later in their careers. The interventions are tailored to overcome specific barriers to STEM persistence at BSC determined by BSC institutional research.

Intellectual Merit: The underlying intellectual principle of the STREAMS proposal is that a coherent set of institutional changes known to support the retention of three traditionally underserved populations (students of color, first generation college students, and low income students) will result in a substantial rise in the total number of BSC STEM graduates through all populations. These three traditionally underserved populations represent approximately 42% of BSC students. The interventions we propose are rooted both in the STEM literature and the literature for assisting underserved populations. With the exception of a summer bridge program designed to jumpstart a group of at risk students from the traditionally underserved population, all these interventions will be available to all STEM students. By closely tracking and monitoring students who participate in different interventions and using surveys and focus groups, BSC will determine the efficacy of program components for increasing persistence. Existing background research on the student population at BSC allows a thorough study of interventions within underserved populations in particular. These assessments will be used in real time to improve the delivery components, and key personnel will present results of these studies at regional and national disciplinary meetings.

Broader Impact: This proposal will support the economic development of the fastest growing region in New England by increasing the number of STEM graduates. By developing stronger ties with STEM faculty at local community colleges, curricular improvements and mentoring will spread beyond BSC. As the principle source for K-12 teachers in the region, STREAMS will increase the quality and quantity of local science teachers. Further, STREAMS allows for a study of best practices for STEM retention within traditionally underserved populations on college campuses – who represent an undersubscribed resource for possible STEM graduates. Many existing studies look at higher profile and more selective institutions enrolling relatively few underserved students. The dissemination of our study results will assist the large number of public colleges and universities that struggle to increase their STEM graduation rates on a larger and more meaningful scale.