Project Summary

S³: STEPping up STEM at SSU
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Sonoma State University (SSU) will improve the long-term retention and graduation rates of our Science, Technology, Engineering and Mathematics (STEM) majors by providing them with an inquiry-based educational experience based on the multi-disciplinary theme of sustainability, improving STEM student support services, and providing additional opportunities for mentored research. The STEPping up STEM at SSU (S³) program consists of three major elements:

1. **Core Curriculum Development**: Development of a new STEM-oriented First Year Experience (FYE) to immediately immerse incoming students into “scientific inquiry” while developing a personal connection to the institution and community. STEM-FYE will fit within the framework of existing general education core courses, immersing students in learning communities that focus on quantitative skills, biological principles and the process of science, within the overarching topical curricular theme of environmental sustainability.

2. **Improving Support for STEM Students**: Creation of a coherent and expanded recruitment and support structure to increase the diversity of SSU’s STEM population. Advising pathways for potential STEM majors will be improved and existing mentoring, research and service-learning opportunities for STEM students available through a variety of campus programs will be integrated.

3. **Expanding the “MESA model”**: Bringing MESA’s best practices to the larger population of STEM majors, including creation of new Academic Workshop courses for gateway classes in Chemistry and Physics, additional peer and professional mentoring for STEM-student learning communities, and additional undergraduate research opportunities for under-represented students in the physical science and technical fields.

Individual student degree progress will be tracked, and external evaluators from WestEd will be utilized to quantify the success in achieving the learning outcomes defined for the STEM-FYE course and Academic Workshops, as well as meeting benchmarks for improving the retention and graduation rate of STEM students.

**Intellectual Merit**: The proposed plan for S³ is derived from many years of research into successful FYE programs, building on this work by increasing the STEM curricular content while still incorporating support and learning community aspects essential to the improvement of retention and graduation. The program will be developed by members from each SSU STEM department, led by the School of Science and Technology Dean and working closely with the SSU Preserves Director and a faculty member in philosophy. The proposed STEM-FYE curriculum will involve students in arguably the most important problem facing the world today – environmental sustainability – providing tools across many disciplines to make meaningful contributions to this truly interdisciplinary field.

**Broader Impacts**: This work will impact our local region and other areas where our graduates gain employment. The project’s results are applicable to other universities seeking to increase STEM graduate and retention rates while expanding diversity. The project will provide mentored research opportunities to under-represented students in the physical science and technical majors, broadening their participation and helping prepare them for graduate school and technical careers. Service-learning components embedded within the STEM-FYE curriculum will benefit the local community and communities where our graduates eventually settle. Facilities developed as part of the STEM-FYE project will enhance introductory biology laboratories and improve environmental sensor networks at the Fairfield Osborn and Galbreath Wildlands Preserves. Results will be disseminated through scientific and educator conferences, quantifying achievements in improving the quality, quantity and diversity of SSU’s STEM graduates. The program will use the SSU Preserves as a real-world test-bed for investigation and experimentation in environmental sustainability, facilitating discovery and understanding of these issues at a critical time for society.