

**New Program Proposal
Bachelor of Science
Computational Science
University of South Carolina - Beaufort**

Summary

USC Beaufort requests approval to offer a program leading to the Bachelor of Science degree with a major in Computational Science on the North (Beaufort) and South (Bluffton) campuses, to be implemented in Fall 2010.

The Program Planning Summary was reviewed by the Advisory Committee on Academic Programs at its meeting on October 8, 2009, without substantive comment. The Board of Trustees of the University of South Carolina approved the proposal on October 16, 2009. The full proposal was submitted for Commission review on November 12, 2009.

According to the institution, the purpose of the program is to increase the number and diversity of scientists and technicians who are trained for careers in new computationally-intensive technology-oriented industries in the state. The institution lists four specific objectives for the proposed program: (1) to develop and offer modern curricula for such a program; (2) to enhance the infrastructure for research and develop state-of-the-art research opportunities in computational science at USC Beaufort; (3) to implement a program that will reach an enrollment of 48 students at minimum by Fall 2015; and (4) to engage students in undergraduate research programs in order to prepare them for careers in Computational Science and utilize modern computing resources in a field of their choice.

The institution indicates that the President's Information Technology Advisory Committee (PITAC) has affirmed that using the capabilities of advanced computing to understand and solve complex problems is critical to national security, scientific leadership, and overall economic competitiveness. The institution also notes that development of a computational science program in the region is critical to the economic development of the Lowcountry as the area offers primarily low paying jobs in the hospitality and tourism industries and in agriculture. Additionally, and in specific response to needs summarized in the Lowcountry Council of Governments' Economic Diversification plan, the institution states that implementing the program leading to the B.S. degree in Computational Science will help to provide employees skilled in the use of computers and computational technology in areas such as financial modeling and forecasting, security and logistical analysis, the use of CAD design processes in architecture and manufacturing, and medical database mining. USC Beaufort has received requests from local employers to provide students trained in computational science for employment in the areas of network computing, information technology, and data management. The institution considers its ability to offer this program as critically linked to the revitalization of the region's and the state's economy.

The institution expects that the proposed program will appeal to a wide variety of students with interests in science and engineering disciplines, specifically those with interests in aerospace technology, biology, and information management. In surveys of students enrolled in computer science courses conducted in 2007-2008, approximately one-quarter of all students expressed interest in entering into a Computational Science program if such a program were available. The institution also notes that it has strong existing relationships with area high schools which have strong math and science programs. The institution anticipates that a

computational science degree would be a very attractive choice for such local students who graduate from high school well-prepared to enter an undergraduate program of study in Computational Science.

USC Beaufort states that no other program in Computational Science exists in the state. The institution notes that Wofford College offers an emphasis in Computational Science within its Computer Science degree. According to the institution, the program at Wofford demonstrates interdisciplinary collaboration among the departments of science, computer science, and mathematics. The institution also notes that there are few institutions in the nation which offer undergraduate degrees in this increasingly important field. Institutions which currently offer similar Bachelor of Science degree programs in Computational Science are George Mason University, Oregon State, Stanford, and the State University of New York – Brockport. The institution notes that the proposed program will be interdisciplinary and will integrate computer science and mathematics with other science and engineering fields.

Students must complete 120 credit hours of coursework, including approximately 50 hours of general education and 70 hours of coursework in the major and electives. The program will feature requirements in math courses (Linear Algebra, Statistics and Calculus I – III) and computing courses (Computational Tools I and II) as well as High Performance Computing, Simulation, and Computational Mathematics. The proposed curriculum will require that ten new courses be added to the USC Beaufort catalog: Introduction to Computational Science; Computational Mathematics; Techniques of Computation I and II; Computer Simulation; Advanced Mathematical Modeling; Experimental Design; High Performance Computing; Applications in Probability and Statistics; and a capstone independent research course.

The institution seeks to utilize the program in Computational Science as the fundamental academic infrastructure for all related programs within the institution that will integrate with this program through the use of both cognate (disciplinary-specific) and capstone (independent research) courses. In particular, the institution maintains that its proposed program will provide greater emphases on mathematics, on collaboration between and among other science disciplines, especially biology, and a greater emphasis on computational methods and infrastructure.

New enrollment in the proposed program is estimated to begin at five students (4 FTE) in FY 2010-2011, increasing to 11 students (10 FTE) in FY 2011-2012, increasing to 23 students (21 FTE) in FY 2012-2013, increasing to 35 students (33 FTE) in FY 2013-2014, and increasing to an additional 42 students (40 FTE) in FY 2014-2015. If enrollment projections are met, the program will meet the current CHE program productivity standards.

A total of nine faculty members (two full professors, two associate professors, four assistant professors, and one instructor) and one lab manager will be required to support the proposed program; however, only two assistant professors and one lab manager will be new to the institution. Of these new faculty members, both will have expertise in computational science; one will be an expert in computational biology, while the other will be an expert in information management. Although the program is interdisciplinary in nature, the proposed new program will reside within the Department of Science and Mathematics.

The University will not seek accreditation for the proposed program as no specialized or professional accreditation is required. Licensure is not required for employment.

The institution states that no additional physical plant will be needed to implement the proposed program for at least its first five years. Both USC Beaufort campuses have fully equipped computer labs from which students are able to access computing resources and facilities at either site.

The institution affirms that library resources are more than sufficient to support the proposed program and that holdings are both current and broad enough to support such a program. The institution's library subscribes to a robust set of electronic services that supplement other resources available to students. These resources include databases that are computational science-specific. The institution notes that its membership in PASCAL provides important interlibrary loan services for students and faculty as well as expanded access to an even broader array of library resources. Financial resources are sufficient to allow for the expansion of titles on a yearly basis in further support of the Computational Science program.

During the February 4, 2010, meeting of the Committee on Academic Affairs and Licensing, an institutional representative from USC Beaufort informed the Committee that the institution had submitted and was awarded a National Science Foundation EPSCoR (Experimental Program to Stimulate Competitive Research) grant to fund the proposed program. The total amount of funding awarded for five years is \$573,245. These federal funds will cover lab equipment which will be used by students and faculty as well as the hiring over a two year period of faculty members who will teach and perform research. The annual breakdown of the funds for years one through five is as follows: \$114,330; \$114,309; \$115,577; \$115,386; and \$113,643.

Shown below are the estimated Mission Resource Requirement (MRR) costs to the state associated with implementation of the proposed program for its first five years. Also shown are the estimated revenues projected under the Mission Resource Requirement and the Resource Allocation Plan as well as student tuition.

Estimated Program Costs and Revenue

	Estimated Program Costs		Estimated Program Revenue				
	(A) MRR Cost	(B) Other Costs*	(C) Actual State Funding	(D) Tuition	(E) Additional Revenue	(F) Total Revenue (C+D+E)	(G) Total Revenue - Total Costs (F-(A+B))
Year 1	\$32,905	\$0	N/A	\$29,515	\$114,330	\$143,845	\$110,941
Year 2	\$82,261	\$0	\$15,317	\$74,546	\$114,309	\$204,172	\$121,910
Year 3	\$172,749	\$0	\$37,890	\$156,849	\$115,577	\$310,315	\$137,567
Year 4	\$271,462	\$0	\$79,407	\$246,152	\$115,386	\$440,945	\$169,483
Year 5	\$329,045	\$0	\$124,955	\$298,940	\$113,643	\$537,538	\$208,493

*Includes costs of an extraordinary nature not otherwise included in the MRR cost calculation (e.g., costs for a new building required to support a program).

These data show that if the new program meets its enrollment projections as shown in the proposal, the program will be able to cover new costs with revenues it generates beginning in the second year of its implementation.

In summary, USC Beaufort proposes a program leading to the B.S. degree in Computational Science. This program will provide a unique academic offering in South Carolina and will increase choices available to students of information systems and information technology in the state. The program will also directly support important economic development efforts, both in the region and in the state.

Recommendation

The Committee on Academic Affairs and Licensing commends favorably to the Commission approval of the program leading to the Bachelor of Science degree with a major in Computational Science to be offered on the North (Beaufort) and South (Bluffton) campuses of USC Beaufort, to be implemented in Fall 2010, provided that no “unique cost” or other special state funding be required or requested.