New Program Proposal
Doctor of Philosophy
Human-Centered Computing
Clemson University

Summary

Clemson University requests approval to offer a new program leading to the Doctor of Philosophy in Human-Centered Computing to be implemented in Summer 2011. The proposed interdisciplinary program is to be offered through traditional instruction methods on the Clemson campus.

The Program Planning Summary was submitted to the Commission in August 2010 and reviewed and voted upon favorably without substantive comment by the Advisory Committee on Academic Programs on October 20, 2010. The Clemson University Board of Trustees approved this proposal in July 2010. The full proposal was received by the Commission on April 7, 2011.

According to the proposal, the purpose of the proposed program is to establish one of the first doctoral programs in the nation in the relatively new interdisciplinary field of human-centered computing, which the institution defines as "understanding how to design, build and evaluate computational technologies as they relate to the human condition and how these technologies affect society." The CIP code definition describes the field as focused "on computer systems from a user-centered perspective...."

The proposed interdisciplinary program will be closely affiliated with Clemson's School of Computing and will partner with a number of Clemson University departments, including Psychology, Industrial Engineering, Policy Studies, Mathematics & Statistics, Education, English, Social Studies, and History. The proposal states that the proposed degree supports Clemson University's mission statement, especially the call for public service, and will serve "to broaden participation of women and underrepresented minorities" in STEM disciplines.

The proposal indicates that there are only two other human-centered computing doctoral programs in the nation, at the Georgia Institute for Technology and the University of Maryland Baltimore County. CHE staff has further identified similar, although not identical, doctoral programs at Carnegie-Mellon University, at Indiana University-Purdue, at Iowa State University, at Rice University, and at University of Washington. None of these similar programs offers the same mix of theoretical and applied experiences as the proposed program.

The proposal indicates that there is a market in the information technology industry and academia for human-centered computing graduate students. CHE staff identified that the National Science Foundation has established Human-Centered Computing as a cluster in its Information and Intelligent Systems Core Program; this cluster provides evidence of the burgeoning state of the discipline.

The U.S. Bureau of Labor Statistics (BLS) reports there were approximately 1.3 million computer software engineers and computer programmers in 2008, one-third of whom were employed in computer systems design and related services. Overall employment in this field is expected to increase more than 20 percent between 2008 and 2018, with total computer software engineer and computer programmer positions increasing to more than 1.6 million. However, BLS projects that employment of computer programmers is expected to decline three percent during this time period.

Should the proposal be approved, Clemson University would be the only South Carolina institution to offer any human-centered computing degree. The proposal differentiates between the proposed degree and the Human Factors Psychology doctoral program offered at Clemson University, stating that human factors programs do not require a computer programming core in the curriculum. The proposal states that the proposed program will not be subject to specialized or professional accreditation.

The proposed program will consist of 60 credit hours of course work, which includes a core curriculum of three credit hours in Fundamentals of Human-Centered Computing (new course); 12 credit hours of computing course work; six credit hours in the "People Track," which includes courses from the disciplines of history, psychology, business, computer science, policy studies, rhetoric, applied economics, and industrial engineering; 12 credit hours of research methods and pre-dissertation research; and nine credit hours of a cognate or specialty area (public policy, human factors, or entrepreneurship). In addition, the proposed program includes 18 hours of dissertation research, plus successful dissertation defense. The proposed program requires one new course to be offered at Clemson University, an 800-level introductory course in human-centered computing (see above). All other proposed program courses are currently offered by the School of Computing and at other departments at the institution.

Thorough and positive external evaluations of the proposed program were submitted on October 10, 2010, by Dr. Rebecca E. Grinter, Associate Professor in the School of Interactive Computing at Georgia Institute of Technology, and on October 11, 2010, by Dr. Andrew Sears, Chair in the Department of Information Systems at University of Maryland Baltimore County, respectively. Both faculty members represent institutions which offer Human-Centered Computing doctoral programs. Dr. Grinter's recommendation states that, in her opinion, the program closely replicates the curriculum of the Georgia Tech program and could be expected to experience similar successes. Dr. Sears' recommendation asserts that graduates of the proposed program will likely be able to fill a growing number of academic positions in the field as well as having access to more traditional industry jobs.

According to the proposal, admissions requirements for the proposed program include an undergraduate degree which includes coursework in "computer programming courses through data structures," plus demonstrated success on the GRE general exam (verbal score of 498 and quantitative score of 756).

The proposal anticipates there will be five new students (7.2 FTE) in the program's first year (four students in the fall semester and five students in the spring semester), and five new students (7.8 FTE) in years two through five.

The proposal indicates that the proposed program will not result in the addition of new faculty members. The proposal lists as currently on staff and available to support the program ten professors (fields of study are Visual Computing, Computer Science, and Human-Centered Computing), 13 associate professors (fields of study are Visual Computing, Computer Science, and Human-Centered Computing), and four assistant professors (fields of study are Computer Science and Human-Centered Computing. Total FTE faculty devoted to the proposed program will be 26 FTE.

The proposal indicates there will be no new costs for the proposed program. The five-year costs for the proposed program total $20,950,095, and are broken down evenly at $4,190,019 million per annum. The proposal states the following: "The department has the

resources—for faculty, staff, and materials to offer the degree program. Many of the courses for the degree are offered within other doctoral programs, which helps to eliminate the need to add faculty."

        The chart below shows the current budget for the School of Computing, which will support the proposed program.

ESTIMATED COSTS BY YEAR						
CATEGORY	1st	2nd	3rd	4th	5th	TOTALS
Program Administration	$130,000	$130,000	$130,000	$130,000	$130,000	$650,000
Faculty Salaries	$3,186,955	$3,186,955	$3,186,955	$3,186,955	$3,186,955	$15,934,755
Graduate Assistants	$410,000	$410,000	$410,000	$410,000	$410,000	$2,050,000
Clerical/Support Personnel	$278,064	$278,064	$278,064	$278,064	$278,064	$1,390,320
Supplies and Materials	$125,000	$125,000	$125,000	$125,000	$125,000	$625,000
Library Resources	0	0	0	0	0	0
Equipment	$60,000	$60,000	$60,000	$60,000	$60,000	$300,000
Facilities	0	0	0	0	0	0
Other (Identify)	0	0	0	0	0	0
TOTALS	$4,190,019	$4,190,019	$4,190,019	$4,190,019	$4,190,019	$20,950,095
SOURCES OF FINANCING BY YEAR						
Tuition Funding *	$82,520	$123,780	$148,536	$148,536	$156,788	$660,160
State Funding	0	0	0	0	0	0
Reallocation of Existing Funds**	$2,188,630	$2,066,239	$2,041,483	$2,041,483	$2,033,231	$10,371,066
Federal Funding	$1,918,869	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$9,918,869
Other Funding	0	0	0	0	0	0
TOTALS	$4,190,019	$4,190,019	$4,190,019	$4,190,019	$4,190,019	$20,950,095

*Tuition is based on total enrollment and $4126/semester cost.
** This program requires no new funds. The department has the resources—for faculty, staff, and materials to offer the degree program. Many of the courses for the degree are offered within other doctoral programs, which helps to eliminate the need to add faculty. The collaboration across campus is extremely beneficial for all the departments. The budget shown is for the School of Computing which will support the PhD program.

        The proposed program will be able to meet costs from the first year of implementation.

In summary, Clemson University is proposing a program leading to the Doctor of Philosophy in Human-Centered Computing. Designed as the state's first and one of the nation's first terminal degrees in the science of computing and computer systems as related to the human condition, the proposed interdisciplinary program will prepare "a new type of researcher who can design, implement and evaluate computing systems/technologies in real world, or applied, context."

Recommendation

The Committee on Academic Affairs and Licensing commends favorably to the Commission approval of the program leading to a Doctor of Philosophy in Human-Centered Computing at Clemson University, to be implemented in Summer 2011 and offered on the Clemson campus, provided that no "unique cost" or other special state funding be required or requested.