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FOR
ACADEMIC AFFAIRS COMMITTEE

Committee Meeting: 5/3/2023

Board Meeting: 5/4/2023
Austin, Texas

Rad Weaver, Chairman
Christina Melton Crain
R. Steven Hicks
Janiece Longoria
Nolan Perez
Stuart W. Stedman

1.   **U. T. System Board of Regents: Discussion and appropriate action regarding Consent Agenda items, if any, assigned for Committee consideration**

RECOMMENDATION

The Board will be asked to approve the Consent Agenda beginning on .

2. <u>**U. T. Rio Grande Valley: Approval to establish a Doctor of Philosophy in Computer Science with Interdisciplinary Applications degree program**</u>

<u>RECOMMENDATION</u>

The Chancellor concurs in the recommendation of the Executive Vice Chancellor for Academic Affairs and the institutional president that authorization, pursuant to Regents' *Rules and Regulations*, Rule 40307, related to academic program approval standards, be granted to

    a.   establish a Doctor of Philosophy in Computer Science with Interdisciplinary Applications degree program at U. T. Rio Grande Valley; and

    b.   submit the proposal to the Texas Higher Education Coordinating Board for review and appropriate action.

<u>BACKGROUND INFORMATION</u>

<u>Program Description</u>

U. T. Rio Grande Valley proposes a Doctor of Philosophy (Ph.D.) in Computer Science with Interdisciplinary Applications degree program, which will be designed to provide rigorous, fundamental training in computer science and the application of computational methods to other disciplines, including science, business, medicine, health care, and engineering. The program will be designed to prepare graduates to become faculty at research-intensive universities or to establish research careers in industry. Students entering with a bachelor's (B.S.) degree will be required to complete 72 Semester Credit Hours (SCH) while those entering with a master's (M.S.) degree in computer science or a related field will complete 54 SCH. All students will complete 12 SCH of required core coursework covering fundamental computer science theory and systems, research seminars to connect students with faculty mentors, and doctoral training to increase accessibility and elevate soft skills critical for collaboration and productivity. They will also complete 3 SCH of a prescribed elective focused on advanced operating systems, computer architecture, or parallel computing. Students will also need to complete 36 SCH of research/dissertation, with research activities beginning in the first semester of study. Remaining coursework is chosen from computer science and interdisciplinary electives by the student together with their advisor to best support each student's research development.

<u>Need and Student Demand</u>

Workforce projections in the U.S. and the State of Texas predict a large and ongoing shortage of workers in computer science and related fields. This includes the long-standing shortage in technology-focused industries such as software development, communications, and cybersecurity, and is now exacerbated by the rapid adoption of computational, data-driven methods across engineering, business, healthcare, logistics, and other sectors. Data from the National Science Foundation (NSF) and the National Center for Science and Engineering Statistics (NCSES) databases and the 2021 Taulbee Survey data demonstrate an increasing demand for doctorally qualified computer science graduates.

The number of graduates with B.S. and M.S. degrees has grown nationally by 175% (212% in Texas) since 2010. The number of Ph.D. graduates has not kept pace, growing only 44% nationally and 39% in Texas over the last decade. In the year 2020, there were only 1,935 computer science Ph.D. graduates in the U.S. and 146 in Texas. This is not enough to support the current or projected growth in academic computer science programs, as computer science departments across the nation struggle to hire faculty to support undergraduate and master's-level program growth. As a result, the gap between the supply of qualified B.S. and M.S. computer science graduates and workforce demand continues to grow.

This shortage of computer science Ph.D. graduates is detrimental to the research enterprise. Data-driven computational methods have revolutionized research in all fields. A search of the NSF awards database shows that 40% (19,254) of all active grant awards contain the word "computation" in their title or abstract. Research teams need interdisciplinary collaboration with computer science faculty and students, especially at the Ph.D. level.

A significant contributing factor to the shortage in academia is the increasing demand for Ph.D. graduates in the industrial workforce. The 2021 Taulbee Survey showed that 58% of computer science Ph.D.'s produced in North America went into industry or government and only 32% took academic positions in North America. Even in the current down market for traditional "big tech", the need for computational expertise is ramping up in every other quantitative sector. Searching for open job listings on indeed.com in computer science with a Ph.D. as a job requirement returns 15,905 in the U.S. and 893 in Texas.

Program Quality

The program will begin with seven core faculty and anticipates hiring one new faculty member each year in the first two years of the program. Current core faculty are active scholars, producing 194 refereed papers and receiving more than $14 million in external grant awards in the past five years. An additional 10 faculty will serve as support faculty, providing a wide range of expertise from engineering, mathematics and statistics, biomedical sciences, and human genetics. This year, seven research-oriented, tenure-track faculty were hired by the College of Engineering and Computer Science in a college-wide cluster hire in artificial intelligence, machine learning, and intelligent systems. Two of those faculty are assigned to the Department of Computer Science, and all the cluster of hires are expected to be involved in research collaborations surrounding the proposed program.

Computation is an increasingly critical tool for every scientific endeavor. Faculty supporting this proposal come from the computer science engineering, the sciences, mathematics, statistics, business, and health professions, including medicine. Through this partnership, students will participate in joint research projects, training for effective collaboration across disciplinary boundaries to maximize their career options and impact.

Core to the mission as a regional Hispanic-Serving Institution is to create accessible pathways from secondary education to career. In research, this often means introducing and mentoring students who have never considered a research career and have no background or model of it. The program faculty have a strong record of successfully including undergraduate and master's-level students on their projects and publications. The proposed program will widen this pipeline and raise the ceiling with a cycle of increased opportunities and Ph.D. students training to mentor and engage.

Revenue and Expenses

Expenses	5-Year Total
Faculty	
Salaries	$2,710,569
Benefits	$ 758,959
Graduate Students	
GRA Salaries	$3,657,600
GRA Benefits	$ 182,880
Staff & Administration	
Administrative Staff Salaries	$ 179,165
Staff Benefits	$ 53,749
Other Expenses	
Scholarships	$1,198,555
Equipment	$ 120,000
Library Resources	$ 10,000
Student Travel	$ 15,000
Total Expenses	**$8,886,477**

Revenue	5-Year Total
From Student Enrollment	
Formula Funding	$1,279,556
Tuition and Fees	$ 888,624
From Institutional Funds	
Reallocation of Existing Resources	$3,974,115
Institutional Enhancement	$1,956,215
From Grant Funds	
Grant-funded GRAs	$ 789,451
Total Revenue	**$8,887,961**

Coordinating Board Criteria

The proposed program meets all applicable Coordinating Board criteria for new doctoral degree programs.