

**BOARD OF GOVERNORS  
STATE UNIVERSITY SYSTEM OF FLORIDA  
NEW DOCTORAL DEGREE PROPOSAL STAFF ANALYSIS**

**Program:** Ph.D. in Cell and Molecular Biology    **CIP Code:** 26.0406  
**Institution:** University of South Florida    **Proposed Implementation Date:** Fall 2013  
**Staffed By:** A. Morse & T. Bujak    **Second Review    Last Update:** 5/13/2013  
**Date:** 4/8/2013

**Projected program costs:**

	Total	% & \$ Current Reallocated	% & \$ New Recurring	% & \$ New Non- Recurring	% & \$ C&G	Auxil- iary Funds	Cost per FTE	SUS 10-11 Average Cost per FTE
Year 1	\$784,438	91.5% \$717,502	0% \$0	0% \$0	8.5% \$66,936	0% \$0	\$28,137	\$17,522 26 CIP
Year 5	\$871,416	92.3% \$804,480	0% \$0	0% \$0	7.7% \$66,936	0% \$0	\$21,453	

**Projected FTE and Headcount are:**

	Student Headcount	Student FTE
<b>First Year</b>	34	25.5
<b>Second Year</b>	39	29.5
<b>Third Year</b>	43	32.25
<b>Fourth Year</b>	46	34.5
<b>Fifth Year</b>	50	37.5

*On March 29, 2007, the Florida Board of Governors approved Board Regulation 8.011, which sets forth criteria for implementation and authorization of new doctorates by the Board of Governors, as well as criteria for implementation and authorization of Bachelor's, Master's and Specialist degrees by Boards of Trustees. The following staff analysis is an assessment of how well the university meets Board Accountability and Readiness criteria for implementation of this degree program.*

**Proposal Page Numbers:**

INTRODUCTION		ACCOUNTABILITY		READINESS				
Program Description	BOG Goals	Overall	Budget	Mission and Strength	Program Quality	Curriculum	Faculty	Resources
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**A. Program Description:**

The University of South Florida proposes to offer a Ph.D. in Cell and Molecular Biology (CIP: 26.0406) at the main campus in a traditional format. Currently, USF offers a Ph.D. program in Biology (26.0101) with separate concentrations in Cell and Molecular Biology and Integrative Biology. The proposal to offer the Ph.D. in Cell and Molecular Biology represents a final step at the graduate level to formally reorganize the former Department of Biology into two distinct departments, with the proposed program operating within the Department of Cell Biology, Microbiology, and Molecular Biology. As cited in the external reviewer's comments of the proposal, the effort to reorganize with a more specialized focus into two distinct areas is supported by a divergence in the biological sciences as a discipline.

The proposed Ph.D. program in Cell and Molecular Biology will focus on the scientific study of cells, cellular systems, and the molecular basis of cell structure and function. The proposed program will require 90 credits at the doctoral level, inclusive of faculty-led research and dissertation hours. Specifically, the curriculum will include 13 hours of required coursework, 6 hours of electives, 32 hours of directed research, 38 hours of dissertation research, and a one-hour seminar in which students share original research with graduate colleagues and faculty. In addition to the curricular requirements, students must also publish an article in a peer-reviewed scientific journal and present two research studies at regional or national scientific meetings to complete the program.

**B. System-Level Analysis and Evaluation in accordance with Board of Governors Regulation 8.011:**

The proposed program supports the State University System (SUS) Strategic Plan to increase degree productivity and program efficiency; to increase the number of degrees awarded in STEM; to strengthen quality and reputation of scholarship, research, and innovation; and to strengthen quality and recognition of commitment to community and business. The University of Florida offers two similar concentrations at the doctoral level: One in Animal Molecular and Cellular Biology and another in Microbiology and Cell Science. A letter submitted by the University of Florida states that the proposed program does not increase the amount of overlap or duplication with the University of Florida's existing programs.

With regard to university strengths, USF has included in its strategic plan a commitment to increase science, technology, engineering, and mathematics (STEM) and health disciplines. Although the proposed program is already offered as a STEM degree program at the doctoral level, its new placement not only continues to support the institution's strategic prioritization of STEM but also strengthens the quality and recognition of the program.

In the proposal, need and demand are based upon industry reports and government documents that describe bioscience as a growing industry with unmet need in the future both nationally and in Florida (Battelle Report, 2009; CRS Report to Congress, RL 34539; OPPAGA Report No. 06-71).

The proposal states that graduates from the Ph.D. in Cell and Molecular Biology program will be prepared for employment in bioscience fields within higher education, government, and industry. Board staff review of data at the national level provided by the United States Bureau of Labor Statistics reports slightly higher than average growth (13%, or from 20,300 to 23,000 jobs) between 2010-2020 for microbiologists. Further, the Bureau of Labor Statistics projects 17 percent growth (from 1,756,000 to 2,061,700) for postsecondary teachers across all disciplines between 2010 and 2020.

To document research employment opportunities for graduates in this discipline, a 12-month review (April 2012 to April 2013) of position listings was conducted by consulting a major website for higher education job openings ([www.higheredjobs.com](http://www.higheredjobs.com)) for full-time positions. Upon review, a list of all postings for postdoctoral research associates, instructors, entry-level tenure-track faculty, and laboratory researchers in the biosciences was generated. From the site, there were 245 postings nationally, 11 of which appeared in Florida.

A review of job listings related to the degree program in Florida was conducted. The review included an analysis of position descriptions by educational level, noting the number of jobs for which a doctorate was and was not required for eligibility. Using [www.EmployFlorida.com](http://www.EmployFlorida.com), a 12-month compilation (April 2012 - 2013) of position listings produced the following results: 1 full-time faculty position at a university; 33 full-time researcher positions within private industry; 32 full-time related administrative position listings within private industry; and 3 full-time position listings for laboratory research workers in government and higher education. Whereas the listings on [www.higheredjobs.com](http://www.higheredjobs.com) primarily indicated that a doctorate was needed for consideration, only two positions on [www.EmployFlorida.com](http://www.EmployFlorida.com) required the credential for consideration. Lastly, a review of employment data produced by the Agency for Workforce Innovation in Florida was conducted. A report of 2012 employment statistics indicates that, in 2012, there were 451 persons employed with the job title of microbiologist (with 2.3 percent job growth anticipated by 2020) and 1,697 persons employed with the job title of biologist in the state (with .97 percent job growth anticipated by 2020).

Aside from position openings, recent publications illustrate that full-time employment opportunities in the life sciences are not keeping pace with the production of doctoral degree recipients (National Science Board, 2012; Patton, 2012). The National Science Foundation's *Science and Engineering Indicators 2012* survey indicated that full-time faculty positions, the most common type of employment, increased more slowly than

postdoc and other full- and part-time positions in the sciences. According to an article appearing in the *Chronicle of Higher Education*, Patton (2012) stated that the percentage of new doctoral recipients with employment offers in the sciences had fallen to its lowest level in the past 10 years. Further, Weissman (2013) reported on a study conducted by the National Science Foundation, which indicated that at the time of graduation unemployment for new doctorates in the life sciences had risen by twelve percent (from 26% to 38%) from 1991 to 2011.

Given recent publications on the job prospects for new doctoral graduates in the life sciences, it is unclear whether or not graduates will have ample prospects for steady full-time employment upon graduation, especially within academia. However, it should be noted that the program faculty are actively engaged in research, holding a total of \$7.5 million in extramural funds and spending approximately \$2.2 million a year on research activities conducted primarily by graduate students. In addition, the proposed program is affiliated with the Moffitt Cancer Center and its Ph.D. in Cancer Biology, which is administratively housed within the same program department.

**C. Assessment of the University Review Process in accordance with Board of Governors Regulation 8.011:**

*Due to the system of stair step accountability set in place by the Board of Governors in Regulation 8.011, it is now incumbent upon the University Board of Trustees to verify that all doctoral programs coming before the Board of Governors have met the requirements of the regulation. The following is an assessment of the university review process to ensure that all criteria set forth have been considered by the University prior to submission to the Board of Governors office.*

**ACCOUNTABILITY**

*Check 'yes' or 'no' box, and make comments beneath criterion as appropriate.*

**1. Overall** - *The proposal is in the correct format, includes all necessary signatures, and contains complete and accurate tables for enrollment projections, faculty effort, and the proposed budget.*

**YES NO**

**The proposal has been approved by the university board of trustees and includes all required signatures.**

The proposal was approved by the University of South Florida Board of Trustees on March 21, 2013, and all required signatures are included.

**The university has provided a proposal written in the standard SUS format which addresses new academic program approval criteria outlined**

**in Board of Governors Regulation 8.011.**

The proposal is written in the standard SUS format, which addresses academic program approval criteria outlined in Board of Governors Regulation 8.011.

- The university has provided data that supports the need for an additional program in the State University System as well as letters of support or concern from the provosts of other state universities with substantially similar programs.**

According to the proposal, the Battelle Report (2009) estimated that the bioscience industry accounts for 7.5 million jobs due to direct and indirect employment. In addition, anecdotes from government agencies and Governor Scott were included to support more specialized training in biological science disciplines related to cell and molecular biology as a means to attract new industry to the state (pg. 5 of the degree proposal).

Upon review of the program proposal, the University of Florida submitted a letter of support that stated the proposed program would not overlap or duplicate its similar doctoral programs and that the UF faculty was open to future opportunities for collaboration.

The proposal states that all students currently enrolled in the existing concentration in Cell and Molecular Biology are expected to transfer to the new Ph.D. in Cell and Molecular Biology. If any existing students wish to graduate under the current concentration instead of switching to the new program, they will be allowed to do so under the Ph.D. in General Biology (CIP 26.0101) which is being terminated. No problems would arise from this configuration because the two programs are fundamentally similar.

- The university has provided complete and accurate projected enrollment, faculty effort, and budget tables that are in alignment with each other.**

In the proposal, projected enrollment for Year 1 of the program is based on current enrollment in the Cell and Molecular Biology concentration at USF. According to the proposal, 34 students are currently enrolled in the Cell and Molecular Biology concentration. It was noted that 40 students are currently enrolled in the Integrative Biology concentration. These numbers are aligned with current enrollment numbers of doctoral students in the life sciences at USF.

According to the proposal for the Ph.D. in Cell and Molecular Biology program, the proportion of out-of-state students in the total headcount is expected to increase from between 24% to 38% during the first five years of the program.

The projected E&G Cost per FTE for Year 1 is \$28,137 and for Year 5 is \$21,453, matching the amounts provided in Table 2 of the proposal. The decreased E&G cost per FTE from Year 1 to Year 5 is due to a projected jump in FTE enrollment from 25.5 to 37.5. The estimated cost per full-time equivalent student appears reasonable and although slightly higher than the 2010-11 average for CIP 26 in the State University System Expenditure Analysis, it is important to keep in mind that the Expenditure Analysis average includes a number of different life science programs with highly varying costs.

- The university has included a statement in the proposal signed by the equity officer as to how this proposal will meet the goals of the university's equity accountability plan.**

USF has provided a statement that describes its plans to target recruitment efforts to minority-serving institutions and to attract students from within the university to pursue the program. Further, the department plans to continue marketing on predominant graduate school recruitment websites ([www.gradschools.com](http://www.gradschools.com) and Science Magazine's Career site). The proposal is signed by USF's Equal Opportunity Officer.

- The program does not substantially duplicate programs at FAMU or FIU or, if it does, evidence was provided that consultations have occurred with the affected university on the impact of the new program on existing programs.**

The proposal states that the proposed doctoral program does not duplicate programs at FAMU or FIU. Upon review of the Board of Governors Active Degree Inventory, the only other SUS institution offering a doctoral program with a CIP of 26.0406 is the University of Florida. Further, the proposed program is currently offered as a concentration within an already existing Ph.D. program at the University of South Florida.

*2. Budget - The proposal presents a complete and realistic budget for the program consistent with university and Board of Governors policy, and shows that any redirection of funding will not have an unjustified negative impact on other needed programs.*

**YES NO**

- The University Board of Trustees has approved the most recent budget for this proposal.**

The University of South Florida Board of Trustees approved the most recent budget for this proposed doctoral program on March 13, 2013.

- The university has reviewed the budget for the program to ensure that it is complete and reasonable, and the budget appears in alignment with expenditures by similar programs at other SUS institutions.**

According to the proposal, the Ph.D. in Cell and Molecular Biology is anticipated to cost \$784,438 in total for Year 1 and \$871,416 in total for Year 5. In Year 1, \$717,502 of the budget will be derived from E&G funds and the remaining \$66,936 from contracts and grants. For Year 5, \$804,480 of the budget will be derived from E&G funds and the remaining \$66,936 will be from contracts and grants.

- In the event that resources within the institution are redirected to support the new program, the university has identified this redirection and determined that it will not have a negative impact on undergraduate education, or the university has provided a reasonable explanation for any impact of this redirection.**

The proposal states that the reallocation of resources to operate the program occurred in January of 2009 and the program will retain the same course format as the current Ph.D. in Biology with a Concentration in Cell and Molecular Biology.

### **READINESS**

*Check 'yes' or 'no' box, and make comments beneath criterion as appropriate.*

*3. Program Quality – The proposal provides evidence that the university planning activities have been sufficient and responses to any recommendations to program reviews or accreditation activities in the discipline pertinent to the proposed program have been addressed.*

**YES NO**

- The university has followed a collaborative planning process for the proposed program in accordance with policies and procedures adopted by the University Board of Trustees.**

A chronological description of events has been provided to show that the planning process followed approved policies and procedures and included appropriate stakeholder groups (students, faculty, and staff).

- An external consultant has reviewed the proposal and supports the department's capability of successfully implementing this new program.**

An external review was conducted by Dr. Brian Wilkinson, Professor of Microbiology at Illinois State University. Dr. Wilkinson stated that the move to create two separate doctoral programs in Cell and Molecular Biology and Integrative Biology is aligned

with the shift in biology as a discipline. Further, Dr. Wilkinson noted that the two programs are distinct in terms of their content and that the two disciplines will be relevant for the foreseeable future. Lastly, Dr. Wilkinson reported that the faculty is well-qualified to operate the doctoral program.

- The university has found the level of progress that the department has made in implementing the recommendations from program reviews or accreditation activities in the discipline pertinent to the proposed program to be satisfactory.**

The current Ph.D. in Biology program at USF is scheduled for external review in the fall of 2013. Splitting the program into two distinct degrees will necessitate scheduling program reviews for each one.

- The university has analyzed the feasibility of providing all or a portion of the proposed program through distance learning.**

The proposed program will be offered in a traditional format because of the program's primary focus on laboratory research, which requires hands-on, in-class instruction under the guidance of program faculty.

- If necessary, the university has made allowances for licensure and legislative approval to be obtained in a timely manner.**

Not applicable.

*4. Curriculum - The proposal provides evidence that the university has evaluated the proposed curriculum and found that it describes an appropriate and sequenced course of study, and that the university has evaluated the appropriateness of specialized accreditation for the program.*

**YES NO**

- The university has reviewed the curriculum and found that the course of study presented is appropriate to meet specific learning outcomes and industry driven competencies discussed in the proposal.**

The proposal states that graduates will be prepared for work in industry, government, and academia upon completion. The curriculum offerings, course descriptions, and student learning outcomes are consistent with the stated goal to prepare graduates for work in these sectors.

- The university anticipates seeking accreditation for the proposed doctoral program, or provides a reasonable explanation as to why accreditation is**

**not being sought.**

According to the proposal, the discipline does not have a specialized/ programmatic accrediting body. Currently, neither the Council for Higher Education Accreditation nor the U.S. Department of Education recognizes an accrediting body for doctoral study in the life sciences.

*5. Faculty – The proposal provides evidence that the university is prepared to ensure a critical mass of faculty will be available to initiate the program based on estimated enrollments, and that faculty in the aggregate have the necessary experience and research activity to sustain a doctoral program.*

**YES NO**

**The university has reviewed the evidence provided and found that there is a critical mass of faculty available to initiate the program based on estimated enrollments.**

The proposal states that enrollment during Year 1 will not deviate from current enrollment levels in the Ph.D. in Biology with a concentration in Cell and Molecular Biology. In addition, the same faculty teaching in the current concentration will continue into the proposed program. As a result, a critical mass of faculty is available to initiate the program based on estimated enrollments for Year 1.

**The university has reviewed the evidence provided and found that the faculty in aggregate has the necessary experience and research activity to sustain the program.**

The proposed program states that 16 faculty members will provide instruction and/or doctoral student supervision. Further, the proposal's external reviewer, Dr. Brian Wilkinson, stated that the faculty is appropriately credentialed and well-established scholars in appropriate disciplines.

**The university has reviewed the evidence provided and found the academic unit(s) associated with this new degree to be productive in teaching, research, and service.**

According to the proposal, earned student credit hours and student head count have increased substantially from 2008 to 2011. This indicates that the faculty members are productively engaged in teaching. Further, faculty associated with the Cell and Molecular Biology program have increased annual extramural support from \$1.5 million in 2006-2007 to \$2.5 million in 2010-2011. Finally, the proposal indicated that faculty have served as journal editors/reviewers, conference organizers, and science fair judges. Review of CVs included in the proposal also indicates that the faculty has

been productive in teaching, research, and service.

- If appropriate, the university has committed to hiring additional faculty in later years, based on estimated enrollments.**

According to the proposal, the doctoral program does not anticipate a need to hire additional faculty to support the program through Year 5.

*6. Resources – The proposal provides evidence that the university has ensured the available library volumes and serials; classroom, teaching laboratory, research laboratory, office space, equipment, clinical and internship sites, fellowships, scholarships, and graduate assistantships will be sufficient to initiate the program, and that if applicable, funding has been secured to make more resources available as students proceed through the program..*

YES NO

- The university has provided a signed statement from the Library Director verifying that the library volumes and serials available are sufficient to initiate the program.**

The library director at USF has provided a signed statement verifying that the library volumes and serials are available and sufficient to initiate the program.

- The university has ensured that the physical space necessary for the proposed program, including classrooms, laboratories and office space, is sufficient to initiate the program.**

The proposal states that no additional classroom, laboratory, or office space will be necessary for the proposed program because this program is currently offered at the institution.

- The university has ensured that necessary equipment is available to initiate the program.**

According to the proposal, the degree program already benefits from access to technology, laboratory space, and resources that are sufficient to operate the program, and no additional specialized equipment will be needed.

- The university has ensured that fellowships, scholarships, and graduate assistantships are sufficient to initiate the program.**

The proposal indicates that \$535,488 in assistantships and fellowships, along with additional money coming from foundation sources, will provide financial support for students enrolled in the program. According to the proposal, 39 students are supported

from the teaching assistantships, fellowships, or external grant support for Year 1. Funding levels are expected to be maintained over the first 5 years. However, the enrollment for the program is expected to increase by 6 FTE students by Year 5 with an increased number of the FTE to come from out-of-state. In the proposal it appears that the proportion of in-state residents will decline from 76 percent of the total headcount to 62 percent.

- If applicable, the university has ensured that the department has arranged a suitable number of clinical and internship sites.**

The proposal states that internship and clinical sites would not be sought because the research opportunities provided through laboratory research to students under the direction of faculty is the principal focus of the program. Currently, the program offers research and teaching opportunities to students.