

Attachment B

Florida Board of Governors

Request to Offer a New Specialist, Professional or Doctoral Degree Program

University of Florida
University Submitting Proposal

Fall 2007
Proposed Implementation Date

College of Public Health and Health Professions
Name of College or School

Department of Epidemiology and Biostatistics
Name of Department(s)

Biostatistics
Academic Specialty or Field

Ph.D. in Biostatistics (26.1102)
Complete Name of Degree
(Include Proposed CIP Code)

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial commitment and the criteria for establishing new programs have been met prior to the initiation of the program.

Vice President for Academic Affairs

Date

President

Date

Indicate the dollar amounts appearing as totals for the first and the fifth years of implementation as shown in the appropriate summary columns in DCU Table Four. Provide headcount and FTE estimates of majors for years one through five. Headcount and FTE estimates should be identical to those in DCU Table Three.

	Total Estimated Costs	Projected Student Enrollment	
		Headcount	FTE
First Year of Implementation	<u>\$392,391</u>	2	1.5
Second Year of Implementation		4	3.0
Third Year of Implementation		7	5.25
Fourth Year of Implementation		12	8.62
Fifth Year of Implementation	<u>\$568,157</u>	18	12.75

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal in order to ensure that all sections have been satisfactorily addressed.

INTRODUCTION

I. Program Description

Describe the degree program under consideration, including its level, emphases (including tracks or specializations), and the total number of credit hours.

Description: The College of Public Health and Health Professions proposes to establish a doctoral program in biostatistics. The Ph.D. in Biostatistics will require a minimum of 90 postbaccalaureate credit hours. The program is designed to facilitate students' development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical doctoral student will be enrolled full-time for four years, including the dissertation research. Upon successful completion of the program, graduates will be awarded a Ph.D. degree in biostatistics (CIP 21.1102).

READINESS

II. Institutional Mission and Strength

A. Is the proposed program listed in the current State University System Strategic Plan? How do the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan?

The request to offer the Ph.D. in Biostatistics is consistent with the University's goal to become a top university. Biostatistics, defined as the theory and techniques for describing, analyzing, and interpreting health data, is integral to strong research in the health sciences. Research projects are strengthened by establishing strong collaborative relationships between a subject-matter scientist and a biostatistician. When fully developed, these relationships not only advance the area of application, but also lead to new statistical methodology. Specifically, biostatistics is fundamental to research areas highlighted in the strategic plan, such as imaging of the brain, identification of influential genes, clinical trials in cancer, evaluation of new biotechnology, remedying health problems associated with aging, assessment of environmental impacts on health, and health issues important to children and families. Several of these areas are strongly associated with public health training, including biostatistics training at the doctoral level.

In addition, we are in the application process for becoming an accredited college of public health through the Council on Education for Public Health. Accredited public health colleges must offer 3 doctoral programs relevant to basic public health knowledge. Basic public health knowledge areas are defined as biostatistics, epidemiology, social and behavioral sciences, health management and policy, and environmental health. The Ph.D. in biostatistics is therefore consistent with this recommendation. We will not be able to compete on a national level as a new College of

Public Health if we do not meet the standards being set forth by the accrediting body in public health education. In addition, we are already training individuals at the master's level whose prospective degrees would lack appropriate national accreditation should the college not succeed in its accreditation review. The Ph.D. in biostatistics is an essential component of our accreditation efforts. Finally, falling short of these national standards is inconsistent with both the University's goal to become a top tier institution and its overall educational quality.

B. How does the proposed program specifically relate to existing institutional strengths such as programs of emphasis, other academic programs and/or institutes and centers?

The program will benefit from the involvement of biostatistics faculty and scientists with complementary training in an array of programs at the University of Florida. Teaching, mentoring, and dissertation supervision will be enhanced by this broad group of faculty and their research experiences. The Biostatistics doctoral program has been designed in collaboration with the Colleges of Liberal Arts and Sciences and Agricultural and Life Sciences, and both colleges have faculty who have agreed to participate in the Ph.D. program. The College of Liberal Arts and Sciences has statisticians with strong biostatistics interests from the Department of Statistics. The faculty, including Drs. George Casella, Hani Doss, and Malay Ghosh, have agreed to participate in the Ph.D. program. Similarly, the College of Agricultural and Life Sciences has statisticians, including Drs. Mary Christman and Linda Young, who will be active in the biostatistics doctoral program. The Division Chief of Biostatistics, Dr. Mike Daniels, has a joint appointment between the Department of Epidemiology and Biostatistics in the College of Public Health and Health Professions and the Department of Statistics in the College of Liberal Arts and Sciences, which will further enhance collaboration between the units. Future collaborations are anticipated with the College of Medicine faculty in the Departments of Epidemiology and Health Policy Research and Molecular Genetics and Microbiology who become the biostatistics graduate faculty. Based on initial conversations with specific members of these departments, we anticipate College of Medicine faculty members will be involved in mentoring students and teaching and dissertation activities.

The doctoral program will also benefit from the presence of other disciplinary expertise within the College of Public Health and Health Professions that enriches biostatistics training. Epidemiology and environmental health, components of our public health enterprise, are important disciplines in biostatistics training and research. Active collaboration will be sought with faculty members in these groups; in particular, Drs. Elena Andresen (epidemiology), Nabih Asal (epidemiology), and Natalie Freeman (environmental health). The collaboration of methodologists from various units and disciplines of the University will provide a learning environment that meets current expectations in biostatistics and public health training and competency. We also expect contributions from the 'Health Professions' departments of the College of Public Health and Health Professions with which many members of the current biostatistics faculty currently collaborate. These individuals will be an important part of the practical consulting training of the doctoral degree.

The program will clearly strengthen existing University partnerships, a goal of doctoral training.

Finally, Mike Daniels, the Division Chief of Biostatistics, recently submitted an application to the National Institutes of Health (NIH) (T32) for a training program in biostatistics with emphasis on genetics and public health. This program, if funded, will further foster collaboration with investigators in genetics and other public health disciplines.

C. Describe the planning process leading up to submission of this proposal. Include a chronology of activities, listing the university personnel directly involved and any external individuals who participated in planning. Provide a timetable of events for the implementation of the proposed program.

Planning for this proposal started in November 2005. Dr. Linda Young, at that time Division Chief of Biostatistics, formed two committees: 1) the Structural Committee and 2) the Academic Committee. The charge of the Structural Committee, composed of Dr. Ramon Littell (Professor and Chair of Statistics), Dr. Hani Doss (Professor of Statistics), Dr. Yongsung Joo (Assistant Professor of Biostatistics), and Dr. Linda Young was to determine the appropriate structure for the Ph.D. program, especially in terms of interaction with the Department of Statistics. This included establishment of the initial core of faculty members with graduate faculty status and rules for admitting others. The Academic Committee, composed of Dr. Mike Daniels (current Division Chief of Biostatistics and Associate Professor), Dr. George Casella (Distinguished Professor of Statistics and former Chair), Dr. Babette Brumback (Associate Professor of Biostatistics), Dr. Mary Christman (Associate Professor of Statistics), and Dr. Linda Young, was to establish the academic requirements for the Ph.D. program, including course requirements, and complete new course development, as needed, for program implementation. The Academic Committee researched other Biostatistics Ph.D. programs to help set up the proposed curriculum. The recommendations of these two committees were combined and brought to the faculty of the Department of Statistics in March 2006. After appropriate modifications and approval by the faculty, these recommendations were sent to Dr. Robert Frank, Dean of the College of Public Health and Health Professions (PHHP) and Dr. Stephanie Hanson, Associate Dean of PHHP. After further discussion among Deans Frank, Hanson, and Professor Young, the proposed program was further revised. In August, 2006, Dr. Daniels took over leadership of proposal planning because of changing administrative roles by Dr. Young and Dr. Daniels. In order to solicit additional input, Dr. Daniels contacted graduate coordinators of other Biostatistics Ph.D. programs including ones at Brown University (Joe Hogan), Johns Hopkins University (Dan Scharfstein), and Emory University (John Hanfelt) in addition to statistics and biostatistics faculty at UF prior to finalizing the proposal.

Proposed implementation timeline

Assuming the present proposal is approved, the timetable for program implementation over the next year is as follows:

Spring 2007

Acquire approval of new courses necessary for Year 1; assign teaching

responsibility for Year 1; clarify administrative responsibilities for program components; interview candidates for Biostatistics faculty positions and appoint them.

Fall 2007

Admit the first class of students

III. Program Quality - Reviews and Accreditation

If there have been program reviews, accreditation visits, or internal reviews in the discipline pertinent to the proposed program, or related disciplines, provide all the recommendations and summarize the institution's progress in implementing the recommendations.

The Department of Epidemiology and Biostatistics was established in 2006. The faculty currently contribute to the Master of Public Health program, and, through this Ph.D. proposal, are seeking University approval for the establishment of a doctoral-level program. The Ph.D. program is a key component for accreditation of the College of Public Health and Health Professions by the Council on Education for Public Health (CEPH). An initial accreditation site visit is tentatively scheduled in March, 2008.

IV. Curriculum

A. For all programs, provide a sequenced course of study and list the expected specific learning outcomes and the total number of credit hours for the degree. Degree programs in the science and technology disciplines must discuss how industry-driven competencies were identified and incorporated into the curriculum, as required in FS 1001.02 (6). Also indicate the number of credit hours for the required core courses, other courses, dissertation hours and the total hours for the degree.

Students with an M.S. in Statistics or Biostatistics are eligible to apply to the Ph.D. program.

The following five courses are required for all Ph.D. students and compose the biostatistics core of the program.

Course	Title	Hours
PHC 7XXX	Large Sample Theory	3
STA 7346	Statistical Inference	3
STA 7179	Survival Analysis	3
PHC 7XXX	Longitudinal Data Analysis	3
STA 7249	Generalized Linear Models	3

The courses "Survival Analysis", "Longitudinal Data Analysis", and "Generalized Linear Models" make up the methods core of the program. These are advanced courses which cover the essentials of statistical methods for different types of data. The courses "Large Sample Theory" and "Statistical Inference" form the theoretical part of the core and will provide students with the mathematical foundation necessary to do their

dissertation research.

In addition, each student must complete six credits from the Public Health Core.

Course	Title	Hours
PHC 6001	Principles of Epidemiology in Public Health	3
PHC 6102	Introduction to Public Health Administrative Systems	3
PHC 6313	Environmental Health Concepts in Public Health	3
PHC 6406	Psychological, Behavioral, and Social Issues in Public Health	3

PHC 6001 is required and then the student may choose one of PHC 6102 or 6313 or 6406.

Students are also required to complete at least three additional biostatistics/statistics courses. Among the courses that may be used for this requirement are the following:

Course	Title	Hours
STA 6178	Genetic Data Analysis	3
STA 6209	Design and Analysis of Experiments	3
STA 6247	Advanced Topics in Design and Analysis	3
STA 6466	Probability Theory I	3
STA 6467	Probability Theory 2	3
STA 6826	Stochastic Processes 1	3
STA 7347	Advanced Inference	3

At least three Ph.D. elective courses are currently offered every year in addition to the core courses. Additional electives are also offered under the "Special Topics" number, STA 6934; examples of offerings in recent years including "Analysis of Spatial Data", "Microarray Data Analysis", and "Applied Bayesian Methods". Other courses will be selected by students in consultation with their supervisory committees. We expect the development of additional electives in the first few years of the program, including methodology for imaging, spatial data, and causal inference.

Cognate Requirement:

Students are required to explore a selected cognate field in some depth. The field and courses must be approved by the student's advisor. At least 6 credits of ordinarily graded courses in the cognate field must be completed. Some examples of cognate areas include Genetics, Epidemiology, and Environmental Health. For Public Health cognate fields, 6 credits beyond the Public Health core are required.

Consulting Requirement:

Students must acquire experience in the planning of experiments and establishing a collaborative interaction with an investigator. This requirement is fulfilled by registering for STA 6092 (3 credits).

A minimum of 90 credits beyond the bachelor's degree is required for the doctoral degree. Formal course work accumulated by students should be in the neighborhood of 60 credit hours. The remaining hours will be in PHC 7980 (dissertation research). The credits are broken down as follows:

Component	# of credits
Core Biostatistics courses	15
Core Public Health courses	6
Biostatistics/statistics electives	9
Consulting requirement	3
Cognate requirement	6
Previous M.S. in Biostatistics/Statistics	30
Dissertation	21

Total **90**

The curriculum shares some components with the Ph.D. in Statistics (two of the core courses are shared, STA 7249 and STA 7346). However, there is considerably more emphasis on methodology courses and less on mathematical theory courses in the biostatistics Ph.D. (Three of the five core courses for the Ph.D. in Biostatistics deal with methodology whereas three of the core courses for the Ph.D. in Statistics must be mathematical theory courses.) There is a "subject matter" component in the Ph.D. in Biostatistics, consisting of the Public Health core courses, the cognate requirement, and the consulting requirement that is a key component in training for Biostatistics but is absent in the Ph.D. in Statistics.

Learning Outcomes:

All graduates of the program will be expected to be able to:

- Conduct independent research in the development of new biostatistical methodology.
- Engage in successful collaborations with investigators in new quantitative fields.
- Write statistical methodology papers for peer-reviewed statistical and biostatistical journals.
- Write collaborative papers for peer-reviewed subject matter journals.
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private

institutions.

B. Describe the admission standards and graduation requirements for the program.

The University of Florida Registrar's Office (Graduate Admissions and Pre-Admissions) will send applications for admission to the Biostatistics Graduate Program (BGP) to the BGP Graduate Coordinator. The Graduate Coordinator will chair the admissions committee that will review and rank all applicants. Final selections will be made by the admissions committee.

Candidates for admission to the program must have earned a master's degree in either statistics or biostatistics (e.g. MPH with biostatistics concentration) from an accredited university. In addition, all students are expected to meet the minimal admission requirements of the University of Florida's Graduate School which include (1) a baccalaureate degree from an accredited university or college, (2) a combined verbal-quantitative score of 1000 on the GRE, (3) a 3.0 junior-senior level grade point average, and (4) a completed application for Graduate School, including a letter of intent, official transcripts, completed application form, and 3 letters of recommendation. International students whose primary language is not English will have to demonstrate a minimum score of 550 on the paper-based, 213 on the computer-based, or 80 on the web-based version of the TOEFL (Test of English as a Foreign Language). Application deadlines will be February 15 (notification by May 15) for Fall applicants and June 15 (notification by September 15) for Spring acceptance.

After the completion of the set of five core (Biostatistics) courses with an average grade of no lower than "B", usually at the end of the first year, the students will take the Part I qualifying exam consisting of questions from the following core Ph.D. courses: PHC 7XXX (Large Sample Theory), STA 7346, STA 7179, and PHC 7XXX (Longitudinal Data Analysis). The Part II qualifying exam is an oral exam in which the student presents his or her proposal to the Ph.D. committee. After successfully passing Part I and Part II qualifying exams, the student is admitted to candidacy and must complete dissertation research, write and defend the dissertation (following Graduate School rules) and submit the dissertation to the Graduate School.

C. List the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?

The Council on Education for Public Health maintains the accreditation for Schools of Public Health. In 2003, the College of Health Professions changed its name to the College of Public Health and Health Professions and began the process to seek accreditation as a college of public health. We are currently in the process of collecting all relevant data and information for the required accreditation self-study document, which is due in 2007. An accreditation site visit has been tentatively scheduled for March 3-5, 2008.

D. Provide a one or two sentence description of each required or elective course.

Biostatistics Core Courses

PHC 7XXX: Large Sample Theory: This course provides a detailed introduction to large-sample theory.

STA 7346: Statistical Inference: This course covers statistical inference at the Ph.D. level with topics including decision rules and risk functions, sufficiency, and minimax and Bayes rules.

STA 7179: Survival Analysis: This course provides a theoretical introduction to statistical inferential procedures useful for analyzing right censored time-to-event data.

PHC 7XXX: Longitudinal Data Analysis: This course covers likelihood-based and semiparametric methods for the analysis of (incomplete) longitudinal data.

STA 7249: Generalized Linear Models: This course covers fitting of generalized linear models, diagnostics, asymptotic theory, overdispersion, estimating equations, and mixed models.

Public Health Core Courses

PHC 6001: Principles of Epidemiology in Public Health: This course provides an overview of epidemiology methods used in research studies that address disease patterns in community- and clinic-based populations.

PHC 6102: Introduction to Public Health Administrative Systems: This course provides an overview of the public health system, including public health concepts and practice and health care delivery and financing.

PHC 6313: Environmental Health Concepts in Public Health: This course provides a survey of major topics in environmental health.

PHC 6406: Psychological, Behavioral, and Social Issues in Public Health: This course covers health and behavior from social and community perspectives, including comparison of various theories regarding social and behavioral approaches to public health.

Consulting Requirement

STA 6092: Applied Statistical Practice: This course provides an introduction to communication, management, organizational, computational, and statistical thinking skills necessary to consulting in statistics.

Biostatistics/Statistics Elective Courses

STA 6178: Genetic Data Analysis: This course provides an introduction to the statistical analysis of genetic data including linkage analysis and QTL mapping.

STA 6209: Design and Analysis of Experiments: This is a second course in design and analysis of experiments that covers tests of assumptions, block designs, cross-over designs, and (fractional) factorial designs.

STA 6247: Advanced Topics in Design and Analysis: This third course in design and analysis covers additional advanced topics in design and analysis of experiments including response surface designs, designs for nonlinear models, and unbalanced mixed models.

STA 6466: Probability Theory I: This course provides an introduction to measure theory.

STA 6467: Probability Theory 2: This course provides an introduction to measure theoretic probability including laws of large numbers, types of convergence, and characteristic functions.

STA 6826: Stochastic Processes I: This course covers discrete time and state Markov processes and ergodic theory.

STA 6934: Special Topics in Statistics: A special topics course on advanced and current statistical/biostatistical theory and methods.

STA 7347: Advanced Inference: This course covers additional topics in statistical inference at the Ph.D. level including Bayesian inference, large sample inference, and relative efficiencies of tests.

Dissertation

PHC 7980: Research for Doctoral Dissertation.

- E. Describe briefly the anticipated delivery system for the proposed program as it may relate to resources e.g., traditional delivery on main campus; traditional delivery at branches or centers; or nontraditional instruction such as instructional technology (distance learning), self-paced instruction, and external degrees. Include an assessment of the potential for delivery of the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to the feasibility of shared courses utilizing distance learning technologies, and joint-use facilities for research or internships.

The program will be delivered in the traditional manner of doctoral education: on-campus work and seminars leading to qualifying exams, admission to candidacy, dissertation research, and defense. Being in a health science center and an academic environment is integral to proper training in Biostatistics. Thus, it would not be appropriate to offer this program through a distance learning mechanism.

V. Assessment of Current and Anticipated Faculty

- A. Use DCU Table One to provide information about each existing faculty member who is expected to participate in the proposed program by the fifth year. Append to the table the number of master's theses directed, number of doctoral dissertations directed, and the number and type of professional publications for each faculty member.

The table below contains information on publications and dissertations supervised by the faculty members who will be involved in the program (see DCU Table One). The program faculty consists of all members of the Department of Epidemiology and Biostatistics in the College of Public Health and Health Professions, along with specific faculty members from the College of Agricultural and Life Sciences and the College of Liberal Arts and Sciences and other Public Health disciplines.

Faculty	Master's theses	Ph.D. theses	Collaborative Publications	Methods Publications
Mike Daniels	0	4	12	31
Babette Brumback	1	1	4	15
Deb Burr	1	1	17	7
Yongsung Joo	0	0	3	3
Linda Young	16	3	43	45
George Casella	17	20	66	92
Mary Christman	7	2	22	14
Hani Doss	0	6	3	26
Malay Ghosh	6	36	—*	233
Elena Andresen	15	5	51	16
Nabih Asal	10	11	55	—
Natalie Freeman	2	8	53	—

* Indicates unable to differentiate into collaborative and methods publications.

- B. Also, use DCU Table One to indicate whether additional faculty members will be needed to initiate the program, their faculty codes (i.e., A, B, C, D, or E as detailed in the lower portion of Table One), their areas of specialization, their proposed ranks, and when they would be hired. Provide in narrative the rationale for this plan; if there is no need for additional faculty, explain.**

As of Fall 2007, we anticipate five full-time faculty members in the Division of Biostatistics. The Department of Epidemiology and Biostatistics is currently undergoing a search for a tenure-track assistant professor for the Biostatistics Division. The hire this year will be integral in terms of both teaching the necessary courses for the Ph.D. program and in terms of the College of Public Health and Health Professions being accredited by CEPH, who requires a minimum of five full-time FTE faculty members. As the program grows, we anticipate another hire necessary by year five (2012) to help teach additional elective courses that will be developed and to serve as a mentor, particularly dissertation supervision.

- C. Use DCU Table One to estimate each existing and additional faculty member's workload (in percent person-years) that would be devoted to the proposed program by the fifth year of implementation, assuming that the program is approved. (Note: this total will carry over to DCU Table Four's fifth year summary of faculty positions.)**

DCU Table One contains the faculty workload devoted to the program by its fifth year of implementation. The bulk of the workload in terms of teaching will be provided by faculty members in the Division of Biostatistics (all at .25 person years). The Chief of the Division will have the most administrative responsibility for the program and will serve

as the graduate coordinator. The remaining faculty members in the table will teach individual courses in the program.

- D. In the case of Ph.D. programs, use DCU Table Two to compare the number of faculty, research productivity and projected number of students to at least three peer programs, two of which must be outside Florida. For those disciplines that are included in the National Research Council (NRC) Research-Doctorate Programs in the United States and the National Science Foundation (NSF), please utilize the data from these two sources. NRC data is available on CD ROM and the NSF data is available on-line at www.nsf.gov/sbe/srs/profiles/. For disciplines that are not included in these two sources, please utilize alternate sources to provide comparable data. Universities may choose to provide additional peer data comparisons that are not available from NRC or NSF, such as percent of graduate students supported by contracts and grants, and total contracts and grants for the most recent year.

We obtained information from three Ph.D. programs in Biostatistics: the University of South Florida, the University of Iowa, and the University of South Carolina. The University of South Florida was chosen because it is the current program offering a Ph.D. in Biostatistics in the SUS and the program is offered out of a Department of Epidemiology and Biostatistics as it would be at UF. The University of Iowa was chosen given it is a publicly funded institution that has only offered a Ph.D. recently. The College of Public Health was established at the University of Iowa in 1999 and the Department of Biostatistics was also established at that time. The Ph.D. program was started in 2000. The University of South Carolina is a state institution in the Southern Region of the United States that offers a Ph.D. in Biostatistics from a Department of Epidemiology and Biostatistics.

The information on R&D expenditures in DCU Table Two corresponds to the entire department for the Departments of Epidemiology and Biostatistics at the University of South Florida and the University of South Carolina. Also, the very large year 3 number for the University of Iowa is due to obtaining funding (\$9.6 million) for a data management center for a large study.

VI. Assessment of Current and Anticipated Resources

- A. In narrative form, assess current facilities and resources available for the proposed program in the following categories:

1. Library volumes (Provide the total number of volumes available in this discipline and related fields.)

The University Library System, made up of 9 libraries, constitutes the largest information resource in the State of Florida. It contains more than 4,000,000 volumes, 1,000,000 government documents, 4,200,000 microforms, and 550,000 maps and images. In addition, the Libraries provide over 425,000 links to online resources, including e-books, databases, government documents, and full texts of journals. The Digital Library Center is developing the UF Digital Collections and contributes to the Publication of Archival, Library & Museum Materials (PALMM) initiative of the State University System. All of the libraries serve the university's faculty and students; however, each

has a special mission to be the primary support of specific colleges and degree programs. Six are in the system known as the George A. Smathers Libraries of the University of Florida. The other two (Health Sciences and Legal Information) are attached to their respective administrative units.

The University of Florida Health Science Center (HSC) Library serves as a primary information center for the staff, faculty and students within the Health Science Center. The University of Florida Health Science Center has expanded into the most comprehensive academic health center in the Southeast. The HSC now encompasses six colleges (Dentistry, Medicine, Nursing, Pharmacy, Public Health & Health Professions, and Veterinary Medicine), a statewide network of affiliated hospitals and clinics, including Shands Hospital as the flagship teaching hospital, and the neighboring Veterans Affairs Medical Center of Gainesville.

The HSC Library is part of the National Network of Libraries of Medicine and has an extensive public computing area that provides access to MEDLINE, CINAHL, Web of Science (Science/Social Science Citation Indexes), Health Reference Center, AIDSLINE, TOXLINE, Dissertation Abstracts International, Journal Citation Reports, the Cochrane suite of Evidence-Based Medicine resources, and multiple additional databases available through Cambridge Scientific Abstracts, EbscoHost and WilsonOmniFiles. Remote library access is provided through a campus-wide fiber optic backbone, proxy and dialup services and a downloadable Virtual Private Network software package. Classes on database searching, catalog instruction and use of bibliographic software packages such as EndNote and RefWorks are taught each semester for UF faculty, staff, and students. These classes can help to improve library and information searching skills. Some classes are taught through course-integrated instruction while others are offered for the whole UF community. Several private-study rooms can be reserved for group discussion or private work, as well as the primary student study area--available 24/7--called the "blue room."

The HSC Libraries' collection supports instruction and research for the six HSC colleges. The Collection Management department orders all formats of materials and evaluates the quality and use of the materials received. The HSC Libraries provide public access to electronic resources in the Informatics Lab, located on the second floor. There are approximately 89,660 books and 251,090 journal volumes. There are an estimated 110,000 total number of journal volumes and 30,000 books (monographs). The libraries currently hold about 500 books and 2000 journal volumes on statistics and biostatistics.

2. Serials (Provide the total number available in this discipline and related fields, and list those major journals which are available at your institution.)

The University of Florida has an extensive library of reference materials relevant to the biostatistics program. There are more than 60 journal

titles currently listed in the UF libraries covering both statistical and biostatistical training. The top seven titles are listed below.

Biometrics

Biometrika

Biostatistics

Journal of the American Statistical Association

Journal of the Royal Statistical Society, Series B

Journal of the Royal Statistical Society, Series C

Statistics in Medicine

3. Describe classroom, teaching laboratory, research laboratory, office, and any other type of space, which is necessary and currently available for the proposed program

The Biostatistics Program benefits from Health Science Center educational resources available to the College of Public Health and Health Professions. The majority of classroom teaching will be scheduled in the HPNP Complex. The HPNP building is a state-of-the-art teaching facility that opened for student use in 2003. HPNP is equipped with classrooms and teaching labs ranging in size from 20 seats to 139 seats, plus a 500-seat auditorium and 76-seat distance learning lab. The smaller classrooms have moveable seats and are designed for discussion groups and teaching labs. All HPNP classrooms are equipped with a broad range of audio-visual services, including a podium with an enclosed, networked PC, already attached to one or more ceiling mounted projectors. The current classroom space is sufficient for existing teaching. The faculty office and research space for the Biostatistics Ph.D. program include 6 offices for the Division of Biostatistics (12 for the department as a whole), 2 staff offices, and accessible conference rooms.

4. Equipment, focusing primarily on instructional and research requirements

All students at the University of Florida are required to have access to a computer with minimum specifications for coursework. This access will satisfy the equipment needs for the program outside of the classroom. Classrooms are fully equipped to meet most program needs during classroom-based coursework. Faculty members have access to a wide variety of teaching facilities to meet educational goals. As noted above, standard equipment in each classroom includes a podium and computer access to the web as well as PowerPoint presentations and PDF presentations. The College of Public Health and Health Professions provides staff who are capable of diagnosing and repairing common audiovisual problems on-site and have access to a cache of commonly used equipment (e.g. DVD players, VCRs, video recorders, etc) to address audiovisual needs not met by the equipment already in the classrooms.

5. Fellowships, scholarships, and graduate assistantships (List the number and amount allocated to the academic unit in question for the past year.)

Because the Biostatistics Ph.D. program is being offered out of a new department in PPHP, there has been no previous allocation of awards to that specific academic unit. However, the College of PPHP has a proven record of support for its doctoral students. In academic year 2005-2006, graduate assistantship support totaled \$1.46 million for 122 students and predoctoral fellowships totaled \$986,593 for 71 students. It is the intention of the program to secure appropriate funding for students in the new Ph.D. program. Anticipated primary sources of support include research assistantships from externally funded faculty research, internal and external fellowship opportunities, and teaching assistantships. An NIH T32 training grant was submitted in September, 2006. If funded, this grant will support up to five new students per year.

6. Internship sites if appropriate

Not Applicable.

- B. Describe additional facilities and resources required for the initiation of the proposed program (e.g., library volumes, serials, space, assistantships, specialized equipment, other expenses, OPS time, etc.). If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's capital outlay priority list. The provision of new resources will need to be reflected in the budget table (DCU Table Four), and the source of funding indicated. DCU Table Four only includes I&R costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form. It is expected that high enrollment programs in particular would necessitate increased costs in non- I&R activities.

No additional facilities are anticipated for this program. The current infrastructure of the college provides adequate instructional support. Additional financial support for faculty and operating expenses are highlighted in the relevant tables. The total budget for this program by year 5 is \$568,157. Over the course of the five-year start-up of this program, we propose to hire 2 faculty members (1.0 FTE) and dedicate .25 secretarial support. We also have included 5 stipends with tuition waivers for students.

ACCOUNTABILITY

VII. Assessment of Need and Demand

- A. What national, state, or local data support the need for more people to be prepared in this program at this level? (This may include national, state, or local plans or reports that support the need for this program; demand for the proposed program which has emanated from a perceived need by agencies or industries in your service area; and summaries of prospective student inquiries.) Indicate potential

employment options for graduates for the program. If similar programs (either private or public) exist in the state, provide data that support the need for an additional program. Summarize the outcome of communication with such programs.

Rationale: As noted in *The Seventh Report to the President and Congress on the Status of Health Personnel in the United States and Objectives for the Nation*, the United States faces a critical shortage of biostatisticians with graduate training (see also Dixon and Legler, 2003 STATS). Positions are available in academia (biostatistics, statistics, public health, epidemiology, and in the biological, medical, agricultural and environmental sciences), in industry (pharmaceutical, biotechnology, food science, nutrition, genome data banks, agribusiness, biochemical, software, statistical consulting, biostatistical and environmental consulting, medical diagnostic and therapeutic technology, medical informatics, medical clinical trials, life insurance, health insurance, health care and HMOs, think tanks, health policy, etc.) and in government (federal agencies such as the Food and Drug Administration, Census Bureau, National Biological Survey, National Forest Service, Environmental Protection Agency, National Institutes of Health, Centers for Disease Control and state agencies such as state health offices, state environmental agencies, etc., as well as international agencies such as UNESCO and WHO).

The principal goal of the proposed Ph.D. program is to prepare highly qualified individuals for careers in biostatistics research and/or practice. The training will be conducted in the innovative and interdisciplinary public health culture of the College and in collaboration with campus academic and research partners. The most current biostatistics training will foster professional development of successful careers and produce graduates who will help address the shortage of biostatisticians. Our graduates will be highly competitive in three primary settings: academic university-based settings, industry, and federal agencies that involve research and/or public health practice.

The only SUS institution offering a Ph.D. program in biostatistics is the University of South Florida in Tampa. USF offers a small Ph.D. program in biostatistics, but has limited capacity for training larger numbers of Florida residents and meeting the growing demand for biostatisticians as outlined above. The program resides in a department of epidemiology and biostatistics. In addition, USF does not have a large affiliated department of statistics. The Department of Statistics at UF will be an invaluable resource to the Biostatistics Ph.D. program. There is a close connection between the Department of Biostatistics and Epidemiology in PPHP and the Department of Statistics in CLAS at UF which is further facilitated by the joint appointment held by the Division Chief of Biostatistics between the two departments.

- B. Use DCU Table Three-B to indicate the number of students (headcount and FTE) you expect to major in the proposed program during each of the first five years of implementation, categorizing

them according to their primary sources. In the narrative following Table Three, the rationale for enrollment projections should be provided and the estimated headcount to FTE ratio explained. If, initially, students within the institution are expected to change majors to enroll in the proposed program, describe the shifts from disciplines, which will likely occur.

- C. For all programs, indicate what steps will be taken to achieve a diverse student body in this program. Please create a place for signature at the end of section (VII) (C) and have your university's Equal Opportunity officer read, sign, and date this section of the proposal.

We will work actively with the Director of Graduate Minority Programs at the University of Florida to recruit both minority and women students. Here is a brief summary of their current programs.

Recruitment services involve creating a pool of students from groups traditionally underrepresented in the student body by participating in 1) graduate fairs nationwide, 2) partnerships with foundations and organizations, and 3) the Campus Visitation Program.

Retention services are provided in the form of the Florida Board of Education (FBOE) Summer Program, the Office of Graduate Minority Programs (OGMP) Supplemental Retention Program (SRP), and academic support services and programs for graduate students.

There are partnerships with (1) the Florida Educational Fund, (2) the Florida A&M University (FAMU) Feeder program, (3) Santa Fe Community College Faculty Development Project, (4) the National Consortium for Graduate Degrees for Minorities in Engineering and Sciences, Inc. (GEM), and (5) the National Science Foundation-Alliance for Graduate Education and the Professoriate.

The Campus Visitation program is conducted twice a year, during the fall and spring semesters. The program is intended to provide an opportunity for prospective minority graduate students and school advisers to visit our campus.

The staff of the Office of Graduate Minority Programs (OGMP) and five University of Florida faculty and staff members were also involved in recruiting trips. A total of 23 recruiting trips were made during the last academic year.

We will work to identify potential candidates for the training program, and we will participate in the Campus Visitation Program by offering a short introduction to Biostatistics in the training program.

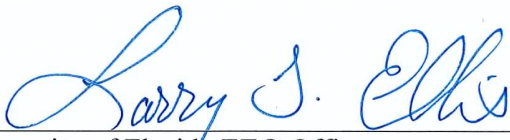
Potential biostatistics students identified through any of these activities will be actively recruited. Once the student is recruited we will focus on helping the student be successful. For example, the Florida Board of Education Summer Fellowships prepares new graduate students from

underrepresented demographic groups, admitted to the University of Florida for fall semester, during the summer. Participants receive a tuition waiver and around \$1,500 as a stipend, and enroll in four credit hours of summer graduate coursework. This enables new graduate students to spend the summer on campus prior to the fall semester, and we will make every effort to obtain these scholarships for all eligible graduate students.

Another retention effort is the Professional Development Workshop offered to enrich the educational experience of students who are typically underrepresented in graduate education. This series of mentoring workshops addresses issues such as writing literature reviews, effective reading strategies, summarizing and critiquing readings or lectures, passing qualification examinations, getting manuscripts published, using professional meetings to advance one's career, and getting research grants.

Opportunities also exist for additional funding should a student from an underrepresented group need longer to complete the degree, but is no longer eligible to receive a fellowship, assistantship or other funding from his/her department or college. Limited tuition assistance and the help of a structured retention program are provided to the student.

These University programs will supplement the efforts of the program faculty to recruit, retain and graduate Ph.D. biostatisticians from underrepresented groups.



University of Florida EEO Officer

January 9, 2007

Date

VIII. Budget

A. Assuming no special appropriation for initiation of the program, how would resources within the institution be shifted to support the new program?

The Ph.D. program in Biostatistics was planned for as part of the Public Health enterprise at the University of Florida as a whole. This program is also necessary for Council on Education for Public Health (CEPH) accreditation. As can be seen in Table 4, a significant proportion of the core support for the new program will be derived from current budget allocations to the department. The recruitment of biostatistics faculty that will impact the Ph.D. program is already underway. Therefore resources have been set aside for these new lines. It is anticipated that student support will be primarily derived from grants as the program grows and increased external funding is secured. Student growth in the program is projected based

on anticipated support dollars available.

- B. Use DCU Table Four to display dollar estimates of both current and new resources for the proposed program for the first and the fifth years of the program. In narrative form, identify the source of both current and any new resources to be devoted to the proposed program. If other programs will be negatively impacted by a reallocation of resources for the proposed program, identify the program and provide a justification.**

The resources for this program will come from the budget for the original planning of the public health initiative at UF. No other programs will be negatively impacted.

- C. Describe what steps have been taken to obtain information regarding resources available outside the institution (businesses, industrial organizations, governmental entities, etc.). Delineate the external resources that appear to be available to support the proposed program.**

The Chief of the Division of Biostatistics recently submitted an application for a training grant, which could support three to five students per year in the program. Current faculty have grants to support RA's in the program. In addition, the Public Health Advisory Board is an important resource.

- D. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants) and explain what steps will be taken to mitigate any such impacts. Also discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting edge research, improved labs and library resources).**

There will be no negative impacts of the proposed program on related undergraduate programs. However, there will be positive aspects. It is expected that creation of the Biostatistics Ph.D. program will expand available research opportunities to undergraduates throughout campus for both independent study and honors thesis work. In addition, Biostatistics faculty members will bring their expertise to the classroom via opportunities for guest lecturing in the Bachelor of Health Science program. There will also be increased opportunity for undergraduates to attend seminars related to cutting-edge biostatistical research.

- E. Describe any other projected impacts on related programs, such as required courses in other departments.**

Biostatistics Ph.D. students will take some Ph.D. courses offered in the Statistics Department. This should have minimal impact on these courses during the first five years of the Biostatistics Ph.D. program. As this program and the Biostatistics faculty grow, some of these courses will have a section specific to the Biostatistics students.

The Master's of Public Health (MPH) program will be enhanced by the ability to attract top-notch researchers who will teach specific MPH courses and will be attracted by the opportunity to supervise Ph.D. students.

IX. Productivity

Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student headcounts in major or service courses, degrees granted, external funding attracted; as well as qualitative indicators of excellence.

The current faculty members within the Division of Biostatistics in the Department of Epidemiology and Biostatistics have been quite productive. With respect to teaching and advising, the faculty members have taught on average about three courses per year and over the period from 2004-2006, served as the primary advisor on two Ph.D. (in Statistics) graduates and on the committees of many more Ph.D. students. Funding for (biostatistical) methodology and collaborative research was obtained from NIH, CDC, the VA, and the Florida Fish and Wildlife Commission. The faculty members have averaged about four publications per year. They have also served on the editorial boards of top biostatistical journals.

The faculty members in the Department of Statistics in the College of Liberal Arts and Sciences involved in the program have also been very productive over the last three years (2003-2006). With respect to teaching and advising, the participating faculty members teach on average about 3 courses per year and over the period from 2003-2006, served as the primary advisor for 6 Ph.D. graduates. Over the same period, funding for development of new statistical methodology has been received from NIH, NSF, USDA, and CDC and the faculty members have averaged about 5 publications per year. They have served as officers in national bio/statistical organizations, including the American Statistical Association (ASA) and the Eastern North American Region (ENAR) of the International Biometrics Society (IBS), and served on editorial boards of top statistics and biostatistics journals.

**DCU TABLE ONE
FACULTY PARTICIPATION IN PROPOSED DEGREE PROGRAM BY FIFTH YEAR**

Faculty	Faculty Name or	Academic Discipline/Spe	Rank	(For Existing Faculty Only)	Initial Date for	5 th Year Workload
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CODE	"New Hire"	Specialty		Contract Status (Tenure status or equivalent)	Highest Degree Held	Participation in Proposed Program	in Proposed Program (Portion of Person-year)
A	Mike Daniels	(Bio)-Statistics	Associate Professor	Tenured	Ph.D.	Fall, 2007	0.50
A	Babette Brumback	Biostatistics	Associate Professor	Tenure-Track	Ph.D.	Fall, 2007	0.25
A	Deborah Burr	Biostatistics	Associate Professor	Tenure-Track	Ph.D.	Fall, 2007	0.25
A	Yongsung Joo	Biostatistics	Assistant Professor	Tenure-Track	Ph.D.	Fall, 2007	0.25
B	New Hire	Biostatistics	Assistant Professor	Tenure-Track	Ph.D.	Fall, 2007	0.50
A	George Casella	Statistics	Professor	Tenured	Ph.D.	Fall, 2007	0.05
A	Malay Ghosh	Statistics	Professor	Tenured	Ph.D.	Fall, 2007	0.05
A	Linda Young	Statistics	Professor	Tenured	Ph.D.	Fall, 2007	0.05
A	Hani Doss	Statistics	Professor	Tenured	Ph.D.	Fall, 2007	0.05
A	Mary Christman	Statistics	Associate Professor	Tenured	Ph.D.	Fall, 2007	0.05
A	Elena Andresen	Epidemiology	Professor	Tenured	Ph.D.	Fall, 2007	0.05
A	Nabih Asal	Epidemiology	Professor	Tenured	Ph.D.	Fall, 2007	0.05
A	Natalie Freeman	Environmental Health	Associate Professor	Tenure-Track	Ph.D.	Fall, 2007	0.05
C	New Hire	Biostatistics	Assistant Professor	Tenure-Track	Ph.D.	Fall, 2012	0.50

Faculty CODE	Corresponding Faculty Position Category in TABLE 3 for the Fifth Year	Proposed Source of Funding for Faculty	TOTAL 5 th Year Workload by Budget Classification
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A	Current General Revenue	Existing Faculty - Regular Line	1.65
B	Current General Revenue	New Faculty - To be Hired on Existing Vacant Line	0.50

C	New General Revenue	New Faculty - To be Hired on a New Line	0.50
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D	Contracts and Grants	Existing Faculty - Funded on Contracts and Grants	
E	Contracts and Grants	New Faculty - To Be Hired on Contracts and Grants	

Overall Total for 5th Year			2.65
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DCU TABLE TWO PEER COMPARISON DATA

Select at least three peer programs, two of which must be outside Florida, offering the proposed Ph.D. In identifying peers select programs in the same or similar field which are comparable to yours, perhaps located in institutions with missions analogous to yours, except that they already offer a Ph.D. Specify your criteria for selecting the peers. Utilizing data from the National Research Council (NRC) and National Science Foundation (NSF), provide comparative data for the department that will house the new program or core faculty who will participate in the new program, and comparative data for the projected student headcount. If the discipline proposed is not included in these sources, obtain comparable data from other sources. *Universities may choose to provide additional data comparisons that are not available from NRC or NSF, such as percent of graduate students supported by contracts and grants, and total contracts and grants for the most recent year.*

NRC DATA	University of Florida Biostatistics	University of South Florida Biostatistics	University of Iowa Biostatistics	University of South Carolina Biostatistics
Total Program Faculty	12	7	13	7
% Supported	100% (yearly)	100% (yearly)	100% (yearly)	100% (yearly)
% with Publications	100%(yearly)	100% (yearly)	100% (yearly)	100% (yearly)
Publications/Faculty	4 per year (running average from 2003-2005)	5 per year (running average from 2003-2005)	4 per year (running average from 2003-2005)	5 per year (running average from 2003-2005)
Total Graduate Students	18 Ph.D.s (by year 5)	10 Ph.D.s	13 Ph.D.s	13 Ph.D.s

NSF DATA	University of Florida Epi & Biostat	University of South Florida Epi & Biostat	University of Iowa Biostatistics	University of South Carolina Epi & Biostat
R&D Expenditures (most recent three years in NSF data)	2.8 million	4.36 million	11.7 million	11.4 million
Year 1 Total	679,918 thousand	1.15 million	1.7 million	2.8 million
Year 2 Total	1.38 million	1.65 million	1.2 million	5.2 million
Year 3 Total	788,562 thousand	1.56 million	10.8 million	3.4 million

DEFINITIONS

- Total Faculty:** Total headcount of ranked faculty (professor, associate or assistant professor) participating in the program; full-time or part-time.
- Supported:** Percentage of Total Program Faculty with external research support. If not using NRC data, specify time period and sources. For visual and performing arts faculty, include any external grants, commissions, and performance fees.
- % with Publications:** Percentage of Total Program Faculty publishing refereed journal articles. If not using NRC data specify time period. If this is a discipline in which books, music or other creative activity are a more important indicator of scholarly activity, you may include them, but justify doing so.
- Publications/Faculty:** The ratio of the total number of program publications to the number of Total Program Faculty. If not using NRC data, specify time period.
- Total Students:** The number of full and part-time graduate students enrolled. For the proposed program list projected headcount in the fifth year. Specify the year for peer data.
- R&D Expenditures:** Separately budgeted R&D current fund expenditures designed to produce specific research outcomes and either funded by an agency external to an academic institution or separately budgeted by an internal unit of the institution.

DCU TABLE THREE-B
NUMBER OF ANTICIPATED MAJORS FROM POTENTIAL SOURCES*

GRADUATE DEGREE PROGRAM										
ACADEMIC YEAR	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
	2007	2008	2008	2009	2009	2010	2010	2011	2011	2012
Source of Students (Non-Duplicated Count in Any Given Year)	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Individuals drawn from agencies/industries in your service area (e.g., older returning students)										
Students who transfer from other graduate programs within the university										
Individuals who have recently graduated from preceding degree programs at this university**	1	.75	1	.75	2	1.5	4	2.81	4	2.81
Individuals who graduated from preceding degree programs at other Florida public universities	1	.75	2	1.5	2	1.5	3	2.06	4	2.63
Individuals who graduated from preceding degree programs at non-public Florida institutions					1	.75	1	.75	1	.75
Additional in-state residents**										
Additional out-of-state residents**			1	.75	2	1.5	3	2.25	6	4.31
Additional foreign residents**							1	.75	3	2.25
Other (Explain)**										
TOTAL	2	1.5	4	3.0	7	5.25	12	8.62	18	12.75

* List projected yearly cumulative ENROLLMENTS instead of admissions.

Revised 8/8/03

** Do not include individuals counted in any PRIOR category in a given COLUMN.

*** If numbers appear in this category, they should go DOWN in later years.

We expect to slowly build the program over the five-year period, starting out with two students in Fall 2007 and gradually building to a steady state of eight new students by Fall 2012 (year 5). We expect the first few classes to consist mostly of M.S. graduates from the Department of Statistics at the University of Florida or other state institutions. By year 3, we will start actively recruiting candidates from out of state and internationally. The headcount to FTE ratio is based on an average credit load of 24 credits (.75 FTE production) for each graduate student in the first three years with the remaining 18 credits completed in the final year. Therefore, as additional students are added and returning students progress toward completion of the program, the headcount to FTE ratio drops slightly to .71 in years 4 and 5.

**DCU TABLE FOUR
COSTS FOR PROPOSED PROGRAM**

INSTRUCTION & RESEARCH	FIRST YEAR				FIFTH YEAR			
	General Revenue		Contracts & Grants	Summary	General Revenue		Contracts & Grants	Summary
	Current	New			Current	New		

POSITIONS (Person-years)	FIRST YEAR		FIRST YEAR		FIFTH YEAR		FIFTH YEAR	
Faculty	1.65	.50		2.15	*2.15	.50	*	*2.65
A & P								
USPS	.25			.25	.25			.25
TOTAL	1.90	.50		2.40	2.40	.50		2.90

* Cells should relate directly to faculty numbers in Table 2

SALARY RATE	FIRST YEAR		FIRST YEAR		FIFTH YEAR		FIFTH YEAR	
Faculty	206,523	40,000		246,523	285,788	45,000		330,788
A & P								
USPS	10,000			10,000	11,593			11,593
TOTAL	216,523	40,000		256,523	297,381	45,000		342,381

I & R EXPENSES	FIRST YEAR		FIRST YEAR		FIFTH YEAR		FIFTH YEAR	
Salaries and Benefits	276,009	52,400		328,409	380,714	58,357		439,071
Other Personnel Services	47,482			47,482	109,086			109,086
Expenses	12,500			12,500	16,000			16,000
Operating Capital Outlay		4,000		4,000		4,000		4,000
Electronic Data Processing								
Library Resources								
Special Categories								
TOTAL I & R	335,991	56,400		392,391	505,800	62,357		568,157