Application for A Graduate Certificate in Bioinformatics

Interdisciplinary Certificate Program

I. Basic Information

1. Institution University of Georgia Date: 11 December 2003 (revised Nov. 5, 2004)
2. School/College College of Arts and Sciences
3. Department/Division Institute of Bioinformatics

   The Institute of Bioinformatics is a new, recently approved, interdepartmental and interdisciplinary entity whose goals include improving education in this new area.
4. Level (undergraduate or graduate) Graduate
5. Proposed starting date for program 18 August 2003
6. Abstract of the program for the University Council's agenda:

   Provide a one or two page summary of the proposed program that includes an overview and highlights of the response to the criteria in Section II.

   See next page.
7. Submit letters of support from the various academic unit heads involved in developing the program initiative or whose support is vital to its success.

   Supporting Departments: Biochemistry and Molecular Biology, Cell Biology, Computer Science, Genetics, Marine Sciences, Mathematics, Microbiology, Plant Biology, Statistics

SIGNATURES:

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William B. Whitman

For the Education Committee, Institute of Bioinformatics. Other members of the Education Committee are: Liming Cai, Dept. of Computer Science; Russell Malmberg, Dept. of Plant Biology; Jaxk Reeves, Dept. of Statistics; Paul Schliekelman, Dept. of Statistics

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Wyatt Anderson
Dean of School/College

6. Abstract of the program for the University Council's agenda:

We propose creating a certificate program in Bioinformatics for graduate students currently enrolled in degree programs at the University of Georgia. Bioinformatics is a new field of science, emerging from the intersection of Biology, Computer Science, and Probability and Statistics, with additional contributions from other areas. It is concerned with the creation and development of advanced information and computational technologies for problems in biology, usually molecular biology. As such, it deals with methods for storing, retrieving and analyzing biological data, such as nucleic acid (DNA/RNA) and protein sequences, structures, functions, pathways and interactions. It plays an indispensable role in modern research. For instance, scientists require bioinformatic approaches to find and characterize the enormous amount of DNA sequence data that is being generated daily: to find genes of interest, to suggest the roles of these genes in the cell and organism, and to study the evolution of the genome. Likewise, bioinformatic approaches are required to identify genes that are candidate targets for drugs, growth regulators, and herbicide and other chemical treatments.

The Institute of Bioinformatics is a newly approved, interdepartmental entity at the University of Georgia. Its purposes include developing this interdisciplinary research area, both by bringing faculty from diverse departments together and by creating educational opportunities that cross departmental boundaries.

This proposed graduate certificate in Bioinformatics is an interdepartmental collaboration, under the auspices of the Institute of Bioinformatics, to develop a curriculum in the area of Bioinformatics. This certificate program is largely composed of existing courses; although there are a small number of proposed changes to some existing courses. The certificate program is open to applicants who are currently classified as UGA graduate degree candidates. While there has been instruction in Bioinformatics existing in several departments, this certificate program is largely the result of interested faculty coordinating their efforts to create a single, interdepartmental, training program.

The area of Bioinformatics is one of intense interest for many of our graduate students. They correctly feel that training in this area will help them obtain jobs in the biotechnology industry. This proposed graduate certificate will permit our students to obtain a degree in the department of their choice, and to have a certification of having completed some bioinformatics training added to their diplomas.

The proposed certificate program has been developed using a web site to facilitate communication among the instructors and departments involved. Graduate students and prospective graduate students have already found this web site and have begun inquiring as to when the certificate program will be available. Hence, we predict this will be a popular program. Its existence will also further the interactions among the faculty involved in teaching the courses, and thus strengthen the interdepartmental, interdisciplinary Institute of Bioinformatics.

II. Response to the Criteria for All Programs

The criteria that proposed new programs are expected to meet in order to be approved and implemented within the University of Georgia are listed below. Please provide sufficient explanation as to how the proposed program satisfies each criterion.

1. *The purpose and educational objectives of the program must be clearly stated, and must be consistent with the role, scope, and long-range development plan of the institution.*

   A. State the purpose and educational objectives of the program and explain how the program complements the role, scope, and long-range development plan of the institution.

      Computational molecular biology and bioinformatics are rapidly expanding areas that provide many opportunities for employment. Rigorous education and training in these areas will enhance the development of professionals in the biotechnology industry. The major purpose for the proposed graduate certificate program is to develop a firm foundation in computational and biological sciences for graduate students who wish to join the biotechnology industry or to continue advanced academic research in these areas. As a training program, this will coordinate existing bioinformatics courses on campus, thus strengthening existing academic programs on campus.

      Furthermore, this proposed program will facilitate interactions among UGA faculty engaged in various aspects of computational molecular biology and bioinformatics research. Curriculum development, instruction, and student supervision under the proposed program will enhance research collaborations among faculty members of the institute and will be important to the growth of bioinformatics research and programs on the UGA campus.

   B. Describe the interdisciplinary nature of the proposed program. Which school(s) or college(s) and department(s) will be involved in the development of the program? Describe the expected stage of development for this program within five years.

      This proposed graduate certificate in Bioinformatics is an interdepartmental collaboration under the auspices of the Institute of Bioinformatics. We have been able to develop this program largely from existing courses and encouraging a few changes within them. Instruction in Bioinformatics currently exists in several departments; and this certificate program is the result of interested faculty coordinating their efforts to create a single, interdepartmental training program.

      Faculty members from the following departments of the Franklin College of Art and Sciences have been involved in the development of the program: Biochemistry and Molecular Biology, Cellular Biology, Computer Science, Genetics, Mathematics, Microbiology, Plant Biology, and Statistics.

2. *There must be a demonstrated and well-documented need for the program.*

   A. Explain why this program is necessary.

   Bioinformatics is an intensely active, emerging, interdisciplinary field. It requires a knowledge of biology, biochemistry, genetics, statistics, mathematics, and computing. There are many jobs available in the Biotechnology industry for persons well trained in bioinformatics, but such persons are still relatively rare. A number of other Universities have begun educational programs in Bioinformatics in recent years. Initiation of a graduate certificate program will allow UGA begin training students for the jobs that exist in this area. It will allow us to retain current graduate students and to recruit new students who would otherwise seek other institutions that have such programs.

   B. In addition, provide the following information:

   1. Semester/Year of Program Initiation: Fall 2003

   2. Semester/Year Full Implementation of Program Fall 2004

   3. Semester/Year First Certificates will be awarded Fall 2004

   4. Annual Number of Graduates expected (once the program is established) 15

   5. Projected Future Trends for number of students enrolled in the program

   We expect 5 in the first year, 10 in the second, and 15 thereafter.

3. *There must be substantial evidence that student demand for the program will be sufficient to sustain reasonable enrollments in the program.*

   A. Provide documentation of the student interest in the program, and define what a reasonable level of enrollment is for a program of this type. Provide evidence that student demand will be sufficient to sustain reasonable enrollments.

   The prospective numbers were obtained by querying the department heads of the supporting departments and by discussing the certificate program with randomly selected graduate students. Although the program has not been formally announced, the existing web site has already drawn inquiries about the program. Because the program consists largely of existing courses, a year of low enrollment in the certificate program would not adversely affect these courses.

B. In addition, provide the following information:
To what extent will minority student enrollments be greater than, less than, or equivalent to the proportion of minority students in the total student body?

As a certificate program that provides a new opportunity for students from current departments, the minority enrollment in this program will be expected to be a mirror of those in existing departments.

4. *The design and curriculum of the program must be consistent with appropriate disciplinary standards and accepted practice.*

Provide the following information:

1. Present a detailed curriculum outline of the program listing specific course requirements (to include programs of study, course prefix, number, and title).

The certificate would be achieved by taking: 1) one background course with at least 3 credit hours in an area in which the student has the least training and 2) any four of the core courses totaling at least 10 credit hours. Hence the entire requirements for the certificate are 13-17 hours, depending upon the specific courses taken.

Students must maintain an overall average of a B on courses taken for the Certificate. Exceptional students who already have a sufficient knowledge in the areas covered by the background courses may be exempted from taking them.

This program will bring together students from widely different fields; hence, we have prepared a list of background courses, so that students will learn the necessary concepts and vocabulary of the various fields that intersect to form Bioinformatics. For example, students from Computer Science, Mathematics or Statistics will be expected to take their background course in biology. Similarly, a student from Biology will be expected to take their background course in Computer Science or Statistics.

Core Courses: At least four of these must be taken.

BCMB 8140 Genomics and Bioinformatics, 2 hours (will expand to 3 hours)
A broad range of topics are covered, including structural genomics, functional genomics, DNA microarrays, proteomics, physiological genomics, and bioinformatics.
Currently taught by Drs. Michael Adams and Claiborne Glover.
Fall Semester

MIBO 8110L Electronic Exploration of Prokaryotic Biology, 3 hours .
Internet resources are used to investigate aspects of regulation, structure, and metabolism in prokaryotic cells; to critically evaluate information in current databases; to develop informational skills that will allow current paradigms of prokaryotic regulation, structure, genomics, and metabolism to be understood.

Currently taught by Drs. Mark Schell and Ellen Neidle.
Fall Semester

BIOL/BTNY 6550 Bioinformatics Applications, 2 hours (will expand to 3 hours)
An introduction to Bioinformatics tools and the principles that underlie them.
Currently taught by Dr. Russell Malmberg.
Spring Semester

CSCI 4490/6490 Algorithms for Computational Biology, 4 hours.
Application of discrete algorithms to computational problems in molecular biology.
This course has been inactive for several years but will be taught by Dr. Liming Cai.
Spring Semester

STAT 6630 Statistical Bioinformatics I, 3 hours
Probabilistic basis of bioinformatics methods.
Currently taught by Dr. Paul Schliekelman.
Fall Semester

GENE 8940 Genome analysis, 2 hours.
A laboratory course emphasizing practical application of bioinformatic methods.
Currently taught by Dr. Jessica Kissinger.
Fall Semester

Background Courses: One of these must be taken.

In preparation for the core courses, at least one of these courses will be taken in an area in which the student has the least background . For example, most students are expected to have a background in either the biological or computational sciences. Students from the biological sciences will be expected to enrich their background in the computational sciences. Students from the computational sciences will be expected to enrich their background in the biological sciences. An exception may be granted for an unusual student who already has a background in both of these areas.

BCMB 6000 General Biochemistry and Molecular Biology, 3 hours
Proposed: BIOL/GENE 7200 Genetics, 3 hours.
Proposed: CSCI 7720 Data Structures, 4 hours.
BIOL/BTNY 4500/6500 Gene Technology, 3 hours.
CSCI 6470 Algorithms, 4 hours.
CSCI 7010 Computer Programming, 4 hours.
STAT 6310 Statistical Principles, 3 hours.

2. Identify which aspects of the proposed curriculum already exist and which constitute new courses.

Most of the courses in the program already exist. The following courses are proposed, with a brief explanation of each.

Proposed: BIOL/GENE 7200 Genetics, 3 hours.
Proposed: CSCI 7720 Data Structures, 4 hours.

These two courses are being or will be proposed to provide introductory material for cross-disciplinary training. These courses will supplement other opportunities that currently exist. Bioinformatics is an interdisciplinary field, which will draw students

from Biology, Computer Science, Statistics, Mathematics, and other diverse departments. Students educated in one of these disciplines will need to learn the basics of the other disciplines in order to function in this new field. Computer science already offers CSCI 7010, a programming course designed for non C.S. graduate students. Similarly, Statistics offers STAT 6310, an introduction to Statistics at a graduate level for students from outside their program. The Department of Biochemistry and Molecular Biology offers BCMB6000, an introductory biochemistry course for graduate students from outside biology. Currently, proposals have been or are in the process of being submitted to create new sections at the 7000-level. A new graduate course (CSCI 7720) similar in content to CSCI 2720 is proposed to provide the opportunity for biology graduate students in bioinformatics to acquire these computer science skills. Likewise, a graduate course BIOL/GENE 7200 similar in content to BIOL/GENE 3200 will be proposed to provide the opportunity for graduate students from Computer Science, Mathematics, and Statistics to obtain the background in genetics necessary for advanced studies in bioinformatics.

3. Identify model programs, accepted disciplinary standards, and accepted curricular practices against which the proposed program could be judged. Evaluate the extent to which the proposed curriculum is consistent with these external points of reference and provide a rationale for significant inconsistencies and differences that may exist.

   Bioinformatics is a new field; there are not many comparable programs. A number of Universities have established interdisciplinary graduate degree programs leading to M.S. or Ph.D. degrees. Our proposal is different from these in that it will lead to a Graduate Certificate that will compliment existing M.S. and Ph.D. programs.

   One graduate certificate program is at the University of Wisconsin-Madison (http://www.biostat.wisc.edu/training/bioinfogradcourses.html). This program consists of four courses total, one of which is a statistics course, two of which are a specific bioinformatics course sequence; the fourth is an elective chosen from a selection of biochemistry, computer science, and statistics courses.

   Another certificate program exists at the University of California – San Diego (http://www.ucsc-extension.edu/main/bio_sci/biocert.html) as part of its extension program. This certificate requires three core courses and then either two or three electives. The three core courses consist of a bioinformatics course, a statistics and modeling course, and an experimental genomics course. The electives are chosen from a selection of either biological or computer science courses.

   Our proposed graduate certificate program is thus quite similar to these existing programs. Our core courses include two bioinformatics courses, a statistics course, a genomics methods course, and a computer science course; this list is quite similar to those in the above two programs.

   Our attempt to provide background courses for graduate students at the 7000 level (genetics and biochemistry courses for computer science, mathematics and statistics students, computer science and statistics courses for biologists) appears to be innovative. We think this is an important component of uniting these disciplines, ensuring that students from one discipline understand the vocabulary of the other disciplines.

4. If program accreditation is available, provide an analysis of the ability of the program to satisfy the curricular standards of such specialized accreditation.

   Bioinformatics is a new field; we are not aware of any existing accreditation systems.

5. *Faculty resources must be adequate to support an effective program.*

   A. Define the size, experience, and specializations of the full-time faculty needed to support an effective program. Identify the extent to which such faculty resources currently exist at the institution, and what additions to the faculty will be needed to fully implement the program. Specify how many full-time faculty will provide direct instructional support to this program.

      The proposed program will require no new faculty to teach the courses and to provide research opportunities for students in bioinformatics. As detailed above, most of the courses in the degree program are currently being taught. BIOL 7100, BIOL 7200, and CSCI 7720 (electives) are new sections of courses are currently taught. Thus, all course requirements will be handled by current faculty.

      There are currently 15 faculty members on the organizing committee for the proposed institute. All are conducting high-level research in bioinformatics and related disciplines. In addition there are a number of other faculty on campus conducting bioinformatics-related research. Thus, ample opportunities will exist for incoming students to conduct research in a wide variety of bioinformatics areas.

   B. In addition, for each faculty member directly involved in this program, list:

      1. Name, rank, degrees, academic specialty, educational background
      2. Special qualifications related to this program
      3. Relevant professional and scholarly activity for past five years

      The members of the organizing committee are listed below. Biographical Sketches for each participant are given in the Appendix.

      John McDonald, Department of Genetics (Chair)
      Liming Cai, Department of Computer Science
      Dan Kannan, Department of Math
      Jessica Kissinger, Department of Genetics and Center for Tropical and Emerging Global Diseases
      Eileen Kraemer, Department of Computer Science
      Russell Malmberg, Department of Plant Biology
      Andrew Patterson, Departments of Crop and Soil Science, Plant Biology, and Genetics.
      Lee Pratt, Department of Plant Biology
      James Prestegard, Complex Carbohydrate Research Center, Departments of Chemistry and Biochemistry and Molecular Biology

Jaxk Reeves, Department of Statistics
Paul Schliekelman, Department of Statistics
Rick Tarleton, Department of Cellular Biology
Will Taylor, Department of Pharmaceutical and Biomedical Sciences
Brahm Verma, Department of Biological and Agricultural Engineering
William Whitman, Department of Microbiology

4. Projected responsibility in this program and required adjustments in current assignments

Projected teaching assignments are detailed in the section explaining the proposed curriculum. One faculty member will act as administrator for the program. The first administrator will be William B. Whitman of the Department of Microbiology and Chair of the Education Committee of the Institute of Bioinformatics.

C. Where it is deemed necessary to add faculty in order to fully develop the program give the desired qualifications of the persons to be added.

No new faculty will be required.

6. *Library, computer, and other instructional resources must be sufficient to adequately support the program.*

A. Describe the available library resources for this program and the degree to which they are adequate to support an effective program. Identify the ways and the extent to which library resources need to be improved to adequately support this program.

UGA has a top-level research library with access to most journals relevant to the bioinformatics field. It is not anticipated that any additional library resources will be required.

B. Likewise, document the extent to which there is sufficient computer equipment, instructional equipment, laboratory equipment, research support resources, etc. available to adequately support this program. Specify improvements needed in these support areas.

As noted above, there are a large number of faculty members currently conducting research in bioinformatics at UGA. Thus, extensive resources for bioinformatics research already exist at UGA. We anticipate that students will be funded by existing mechanisms in their individual departments.

7. *Physical facilities necessary to fully implement the program must be available.*

Describe the building, classroom, laboratory, and office space that will be available for this program and evaluate their adequacy to fully support an effective program. Plans for allocating, remodeling, or acquiring additional space to support the program's full implementation of the program should also be identified.

Most classes in the proposed curriculum are currently being taught. Thus, the current physical facilities are adequate for classroom needs of the program. All involved faculty have office and laboratory space allocated by their individual departments.

8. *The expense to the institution (including personnel, operating, equipment, facilities, library, etc.) required to fully implement the program must be identified.*

   A. Detailed funding to initiate the program and subsequent annual additions required to fully implement the program are needed below. Estimates should be based upon funding needed to develop an effective and successful program and not upon the minimal investment required to mount and sustain a potentially marginal program.

Year	First Year	Second Year	Third Year
(1) Personnel	0	0	0
(2) Operating Costs	0	0	0
(3) Capital Outlays	0	0	0
(4) Library Acquisitions	0	0	0
(5) TOTAL	0	0	0

   This graduate certificate program is the result of coordinating existing resources.

   B. Indicate the extent of student support (fellowships, assistantships, scholarships, etc.) available for this program, and evaluate the adequacy of this support. Assistantships funded from institutional (as opposed to sponsored) funds should be included in this funding analysis as well.

   This graduate certificate program is the result of coordinating existing resources.

9. *Commitments of financial support needed to initiate and fully develop the program must be secured.*

   A. Identify the sources of additional funds needed to support the program and the probability of their availability.

   This graduate certificate program is the result of coordinating existing resources.

   B. It is particularly important to include in this response the long-range plans for additional or expanded facilities necessary to support an effective program. Evaluate the timing and likelihood of such capital funding.

   This graduate certificate program is the result of coordinating existing resources.

10. *Provisions must be made for appropriate administration of the program within the institution and for the admission to and retention of students in the program in keeping with accepted practice.*

Describe and evaluate the structure for the administration of the program. Explain the degree to which that structure is in keeping with good practice and accepted standards. Similarly, explain how and by what criteria students will be admitted to and retained in the program, and how these procedures are consistent with accepted standards for effective and successful programs.

The Certificate program will be administered by the Chair of the Education Committee of the Institute of Bioinformatics. Admission to the graduate program of one of the departments participating in the IOB will be sufficient to enter the Certificate program. The graduate coordinator will be responsible for determining that the Program of Study is consistent with the outlines for the Certificate as described above and for notification of the Registrar when the Certificate has been completed.

The University of Georgia

J. David Puett
Regents Professor & Head

Department of Biochemistry and Molecular Biology

B129 Life Sciences Building
120 Green Street
Athens, Georgia 30602-7229

February 17, 2003

Dr. William E. Whitman, Chair
Education Committee of the Institute of Bioinformatics
Department of Microbiology
Biological Sciences Building
Campus

Dear Barney:

On behalf of the Department of Biochemistry & Molecular Biology, I am writing to express the department's enthusiastic support of the Certificate Program in Bioinformatics for eligible graduate students. You and your colleagues have developed an excellent program, in large part taking advantage of our current resources, to address this very important and critical need on campus. We have a number of BMB faculty members who will be active participants in the Certificate Program, and I pledge the resources of the department to assist the Program in any way possible. As you know, the department is currently searching for a Regents-Georgia Research Alliance Eminent Scholar in Bioinformatics and Computational Biology, and the occupant of this Chair will surely be interested in participating in this exciting new program.

In closing, I applaud the Organizing Committee for the splendid development of this important program.

Sincerely,

J. David Puett, Ph.D.
Regents Professor & Head

JDP/rhh

cc: Russell L. Malmberg, Head

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The University of Georgia

Franklin College of Arts and Sciences
Department of Cellular Biology

February 3, 2003

Dr. William B. Whitman
Department of Microbiology
University of Georgia
Athens, GA 30602

Re: Graduate Certificate in Bioinformatics

Dear Dr. Whitman:

The Department of Cellular Biology supports the development of a Graduate Certificate in Bioinformatics, as described in the current application for an Interdisciplinary Certificate Program. The value of this certificate program is clearly evident, both for training of graduate students and for achieving overarching institutional objectives. The University of Georgia is wise to proceed with implementation of this program at an early date, which will serve current students and will function as an additional attraction for students to be recruited in the future.

Thank you for your work on this important initiative, which our department strongly supports.

Sincerely,

Joe W. Crim
Professor and Head

cc: W. Anderson
J. McDonald
R. Malmberg

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1785
The University of Georgia

Department of Computer Science

December 5, 2003

Professor William B. Whitman
Institute of Bioinformatics
The University of Georgia
Campus

Dear Professor Whitman:

The Institute of Bioinformatics has proposed an interdisciplinary Graduate Certificate in Bioinformatics. I believe that this certificate will offer a valuable opportunity to the graduate students in the area of Biological Sciences to acquire some background in Computer Science and Statistics. The reverse will also be true, as the certificate will present a chance to the students in Computer Science and Statistics to gain valuable insight into Biology.

The Computer Science Department is in support of the proposed Graduate Certificate in Bioinformatics. I hope the Certificate will be approved and become available to the interested students.

Thank you for your consideration.

Sincerely,

Krys J. Kochut
Professor and Head

KJK:jp

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The University of Georgia

Franklin College of Arts and Sciences
Department of Genetics

December 11, 2003

TO WHOM IT MAY CONCERN:

The Genetics Department strongly supports the proposal for a Bioinformatic Certificate at the University of Georgia. There is a strong and growing interest in bioinformatics among graduate students in our department and other departments throughout the university. I believe that a Certificate in Bioinformatics is an appropriate means of recognizing graduate training in the field of bioinformatics until such time that a formal graduate degree program is established.

Please let me know if I can provide any additional information to support this proposal.

Sincerely,

John F. McDonald
Professor and Head

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The University of Georgia

Franklin College of Arts and Sciences
School of Marine Programs
Department of Marine Sciences

Date: 20 February, 2003

To: William Whitman, Ph.D.
Chair, Education Committee of the Institute of Bioinformatics

From: James T. Hollibaugh, Ph.D
Head, Department of Marine Sciences

Subj: Graduate Certificate in Bioinformatics

Barny,

I would like to voice the Department of Marine Science's support for the proposed Graduate Certificate in Bioinformatics as a necessary area of emphasis in graduate training. As the use of genomic and other "-omic" data becomes more mainstream, our students will need to be able to demonstrate competence in the techniques used to analyze these data in order to stay competitive. The proposed certificate program provides a way of demonstrating this, as well as serving as a recruiting tool for talented graduate students we will need to keep UGA at the forefront of this rapidly developing area of biological sciences.

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The University of Georgia

Department of Mathematics

April 25, 2003

Professor William Whitman
Chair, Bioinformatics Education Committee
Department of Microbiology
University of Georgia
Athens, GA 30602

Dear Professor Whitman:

This is a letter supporting the proposal for the Graduate Certificate in Bioinformatics. We are about a decade behind Europeans in this. I will even go one step further and recommend, for future consideration, a full graduate program (MS, PhD) in bioinformatics.

Bioinformatics, an important emerging field, is a combination of biology (at the foundation) and mathematical sciences (at the analysis front). One conclusion made at the conference "Meeting the Challenges," jointly organized by various national associations, was that "Biologists and mathematicians participate in the same institutes where ideas can be shared in both directions and even where new ideas for joint research projects can be developed." *The proposed graduate certificate program will serve the above purpose and benefit students from both biosciences and mathematical sciences in not only learning a very important emerging area but also in finding a suitable job where they can make a difference in medicine and other areas.* We are advising many of our PhD students to get an M.S or a graduate certificate in engineering or bioinformatics because the 21st century curriculum is going interdisciplinary. I do support and recommend that this proposal for Graduate Certificate in Bioinformatics be approved.

Sincerely,

Dan Kannan, Head
Department of Mathematics

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The University of Georgia

Duncan C. Krause
Professor and Head

Franklin College of Arts and Sciences
Department of Microbiology

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February 13, 2003

Dr. William B. Whitman
Chair, Education Committee
Institute of Bioinformatics
Department of Microbiology
University of Georgia
Campus Mail

RE: Certificate in Bioinformatics

Dear Barny,

On behalf of the Department of Microbiology I strongly endorse the proposed Graduate Certificate in Bioinformatics. It is important that we provide our graduate students with intense training opportunities in this rapidly expanding interdisciplinary area. The need is clear, and the proposed curriculum is both rigorous and balanced. I appreciate the time and effort of the Education Committee in developing this important new initiative.

Sincerely yours,

Duncan C. Krause
Professor and Head

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The University of Georgia

College of Arts and Sciences
Department of Plant Biology

2502 Plant Sciences
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Tel (706) 542-3732
Fax (706) 542-1805

6 February 2003

William B Whitman
Department of Microbiology
541 Biological Sciences Bldg
Campus 30602-2605

Dear Barny:

The Plant Biology Department supports the development of a Graduate Certificate in Bioinformatics, as described in the current application for an Interdisciplinary Certificate Program. We have a number of current graduate students who are interested in bioinformatics to help their research programs, and who believe bioinformatics training will improve future employment prospects. The proposed graduate certificate program should help meet their needs, and also help attract additional graduate students to our programs.

Sincerely,

Russell L. Malmberg
Professor and Head
Plant Biology Department

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The University of Georgia

Department of Statistics

February 10, 2002

TO: Professor Williams B. Whitman
Department of Microbiology
UGA

FROM: I. V. Basawa, Acting Head
Department of Statistics
UGA

SUBJECT: **Letter of Support for Graduate Certificate in Bioinformatics**

On behalf of the Department of Statistics, I am pleased to support the application for a Graduate Certificate in Bioinformatics. Statistical modeling and data analysis form an important component of bioinformatics. Our graduate students will certainly benefit from this interdisciplinary certificate program. We have qualified faculty members who are interested and willing to participate in the program. Dr. Paul Schliekelman of our Department will teach STAT 6630 (Statistical Bioinformatics I). At least 5-6 of our graduate students per year would be interested in this certificate program.

I enthusiastically support the Certificate program in bioinformatics.

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