May 20, 2015

Sarah C. Mangelsdorf, Ph.D.  Wendy C. Crone, Ph.D.
Provost and                      Professor and
Vice Chancellor for Academic Affairs  Interim Dean of the Graduate School
150 Bascom Hall  333 Bascom Hall
- campus -  - campus -

Sent Electronically

Re: Review of the Bioinformatics Capstone and Graduate Certificate Programs

Dear Provost Mangelsdorf and Interim Dean Crone:

On behalf of the School of Medicine and Public Health, I wish to provide my personal endorsement of the Review of the Bioinformatics Capstone and Graduate Certificate Programs. After discussion at the May 20, 2015 meeting of the SMPH Academic Planning Council, APC members have unanimously approved the report. I have enclosed a copy of the report for your review.

Program Strengths: Bioinformatics is the application of computational and statistical methods to molecular biology. Training in bioinformatics has been identified by NIH as a prerequisite for rapid translation of basic and clinical data. The Bioinformatics Graduate and Capstone Certificates were established in 2000 to provide formal training in the fundamental skills of bioinformatics to pre-doctoral graduate students and working professionals, respectively. The Bioinformatics Certificates offer a way for people to gain the necessary skills in a relatively short time.

The Bioinformatics Certificates are distinct from other training opportunities on campus, including the recently-approved MS in Biomedical Informatics, which requires more than twice the amount of coursework to complete. Because the required courses for these Certificates already exist for other degrees or majors, the cost to operate the Certificates is modest.

Students stated that they find the certificate to be of value, both in terms of improving their job prospects, and in providing them with bioinformatics knowledge that they use or hope to use in their current or future research.

Issues and Recommendations: The Review Committee, and indeed the program’s self-study, identified low enrollment as the greatest challenge facing the Bioinformatics Certificates. This may be a direct result of the lack of a “faculty champion” who serves as a face for the program. Further, because the required courses exist for other degrees or majors, there is little incentive for department faculty to participate in the Certificate programs. The Review Committee recommended that the Certificates be more actively marketed, and concurrently plan for growth based on the successful marketing.
Along the same lines, the Review Committee also suggested that the instructors of core courses consider video capture and other methods for offering more online material, which could facilitate enrollment of working professionals.

Other review committee recommendations have been considered by the Bioinformatics Certificate leadership and changes are in progress. As an on-going evaluation metric, the review committee suggested that the program conduct a review of the major curriculum and electives, and to consider ways for students to bring their own research questions into the coursework. The leaders have indicated that such review will occur on a bi-annual basis. The program will also develop a handbook for students, and will also be more diligent in the future about tracking student outcomes.

Both the SMPH Academic Planning Council and I concur with the Review Committee’s recommendation of continuation of the Bioinformatics Certificates, with another review in 3 years (2018) to allow assessment of their efforts to increase enrollment. Depending on the outcome, the Certificates may or may not be continued at that time.

Thank you for your consideration of this request. If you require additional information, please do not hesitate to contact my office.

Sincerely,

Robert N. Golden, M.D.
Robert Turell Professor in Medical Leadership
Dean, School of Medicine and Public Health
Vice Chancellor for Medical Affairs
University of Wisconsin-Madison

xc:
Paul Rathouz, Department of Biostatistics and Medical Informatics
Mark Craven, Department of Biostatistics and Medical Informatics
Whitney Sweeney, Department of Biostatistics and Medical Informatics
Rick Moss, School of Medicine and Public Health
Tracy Cabot, School of Medicine and Public Health
Daniel Kleinman, Graduate School
Marty Gustafson, Graduate School
Alan Joranliem, Graduate School
Jennifer Martin, Graduate School
Jocelyn Milner, Academic Planning and Institutional Research

Enclosures:
Bioinformatics Certificates Self Study
Bioinformatics Certificates Review Committee Report
Bioinformatics Certificates Response
Date: 13 April 2015

To: Richard Moss, Senior Associate Dean for Basic Research, Biotechnology and Graduate Studies

From: Paul Rathouz, Chair, Department of Biostatistics & Medical Informatics (BMI)  
Mark Craven, Director, Bioinformatics Certificate Programs

Re: Program and Department Replies to ‘Bioinformatics Capstone and Graduate Certificate Review Committee Report, March 13, 2015’

We would like to thank you, your office, and the Program Review Committee for their thoughtful and diligent work in reviewing our Bioinformatics Capstone Certificate and Bioinformatics Graduate Certificate programs. The summary of the programs and suggestions for their future success are largely accurate and very constructive. Our reply is limited to several points as follows:

(IV.B.2) We will explore video capture and online instructional offerings as a way to reach a wider audience without substantially driving up the costs of program implementation and administration.

(IV.B.3) Regarding curriculum review, including electives, going forward on a bi-annual basis, the steering committee will (a) review the current definition and main content areas of the field of “bioinformatics”, (b) review whether the core courses are adequately covering that area, and (c) review the list of electives. Revisions will be proposed and vetted through the BMI Curriculum and Executive Committees.

(IV.B.4) Given the current trends in the needs for greater training in the manipulation and analysis of biomedical big data, we do anticipate growth in program enrollment. Administrative burden of the program is fairly minimal, and we could handle substantial growth with our existing resources. The core course and several of the elective courses are fairly large as they stand and indeed could be in need of additional sections in coming years. This is unlikely to be the result of isolated growth in these certificate programs, but rather that in related programs with elements of biological data science, such as graduate programs in Biomedical Informatics, Computer Sciences, and Statistics. We will collaborate with these sister programs to manage this growth. Our faculty has been growing in recent years and with it our teaching capacity for such core courses.

(IV.B.5 and IV.B.6) Developing a program handbook is an excellent suggestion that we will pursue. We have been doing some work on tracking students after completion, but we will make these efforts more systematic and comprehensive.
(IV.B.7) The issue of a tuition loophole seems like a general issue facing all certificate programs. We will look to the Graduate School and other campus leadership for any future guidance in how to resolve this issue.

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Bioinformatics Capstone and Graduate Certificate Review Committee Report
March 13, 2015

I. Functions

In December 2014, a committee was formed to review the Bioinformatics Capstone Certificate and Bioinformatics Graduate Certificate programs. The committee was tasked with (1) reviewing the programs’ self-study document, (2) gathering additional information regarding the programs, primarily through meetings with program-associated individuals, and (3) writing this report, which summarizes the committee’s findings and recommendations regarding the continuation of the programs.

II. Activities

Associate Dean Richard Moss presented the charge to the committee on December 2, 2014. The committee then reviewed the programs’ self-study document and identified issues requiring further investigation. On December 17, 2014, the committee met and interviewed a number of faculty, staff, and students involved with the programs. The individuals interviewed were:

- Paul Rathouz (Professor and Department Chair, Biostatistics and Medical Informatics), chair of the department that administers the programs
- Mark Craven (Professor, Biostatistics and Medical Informatics), director of the certificate programs
- Whitney Sweeney (Student Services Coordinator, Biostatistics and Medical Informatics), program coordinator for the certificate programs
- Sushmita Roy (Assistant Professor, Biostatistics and Medical Informatics), member of the certificate committee and instructor of BMI 576, a core course of the certificate programs
- Lei Shi, current capstone certificate student
- Erik Jessen, former graduate certificate student
- Darin Kalisak, former capstone certificate student

The committee then drafted and discussed this report in February 2015.

III. Summary of Findings

III.A Key features of the programs

- The programs aim to train students in the core computational and statistical methodologies used in the analysis of biomolecular data.
- The graduate certificate targets graduate students in the biological sciences whereas the capstone certificate targets postdocs and other researchers in university labs and local biotech companies. Students have come into the programs from departments including Dairy Science, Animal Science, and Botany and from local companies including Roche NimbleGen, Stemina Biomarker Discovery, and Exact Sciences.
Both programs have identical course requirements and admissions criteria. The curriculum consists of four courses: two bioinformatics courses, one biostatistics course, and one elective.

III.B  Strengths of the programs

- The biological sciences have entered a data-rich era and as such, are increasingly dependent on computational and statistical methodology. The bioinformatics certificate programs are well positioned to train people, in a relatively short amount of time, in the use of the appropriate methodologies to analyze their biomolecular data of interest.
- The resources required for the program have significant overlap with those for other programs associated with BMI, and, as a result, there is currently minimal overhead in the offering of the certificate programs.
- The programs are sufficiently distinct from all others on campus, including the recently approved MS in Biomedical informatics, and therefore target unique audiences. The key differentiators between the certificates and the MS in Biomedical informatics are (1) the certificates are narrowly focused on bioinformatics whereas the MS is significantly broader, covering other areas such as medical imaging, medical informatics, and clinical informatics (2) the certificate requires only 12 credits of coursework, compared to the 30 credits required by the MS, and is thus a viable option for students with a limited amount of time.
- Interviews with three students suggested that they find the certificate to be of value, both in terms of improving their job prospects, and in providing them with bioinformatics knowledge that they use or hope to use in their current or future research.

III.C  Challenges for the programs

- The key challenge facing the programs is their low enrollment. In the past five years, only four students have completed either program. The programs need to significantly increase their enrollment in order to provide evidence that there is sufficient demand for their continuation. During interviews, the committee learned that seven students were admitted to the program in Fall 2014 (a figure not reported in the self-study), which suggests a positive enrollment trajectory.
- There is little incentive for BMI faculty to help with the programs, beyond teaching the courses that are already part of other programs. Perhaps as a result, there are no “faculty champions” of the programs, who can provide faces for the programs and assist in marketing them.

IV.  Recommendations

IV.A  Recommendation regarding the continuation of the programs
The committee recommends that the two certificate programs be continued, with the next review of the programs occurring in three years. This recommendation is made based on the following points.

1. There is a compelling need for the programs.
2. Minimal resources are needed to maintain the programs with their current sizes.
3. To date, there has been little advertisement of the programs, and thus they may grow considerably after efforts to inform the communities both within and outside of the university of their existence.
4. The programs have had low enrollment, particularly within the past five years, and thus their next review should take place on a shorter interval than normal (ten years) to assess if advertisement efforts are successful in increasing enrollment. Depending on this outcome, the programs may or may not be continued.

IV.B Recommendations for the improvement of the programs

The committee identified a number of opportunities for improvement of the programs.

1. As acknowledged by the programs’ self-study, the programs need to be more actively marketed. Possible marketing targets include local biotech companies, UW-Madison biological sciences departments, and individual PIs who may benefit from having their students or postdocs in these programs. Possible venues for marketing include campus websites (e.g., that of the recently founded Quantitative Biology Initiative) and courses on campus with students who may be interested in the programs (e.g., Genetics courses). It may be useful to collect data on how enrolled students learned about the programs so that advertising efforts can be focused on the most fruitful venues.

2. The instructors of the core courses required by the programs should consider video capture of lectures and other methods for offering more online instructional material. It may be difficult for some students, particularly the capstone students, to attend lectures on a regular basis because of work schedules. Online course materials such as lecture recordings may alleviate this issue.

3. The committee overseeing the programs should review the list of electives and make revisions based on current course offerings. Seminar courses (e.g., the CIBM seminar) could be considered as counting toward the certificate requirements, as they provide insights into how bioinformatics methods are used in current research. In addition, modifications to the course requirements and core courses that allow for students to bring their own bioinformatics-related research questions into the coursework would be encouraged.

4. The committee overseeing the programs should consider developing a plan for accommodating much larger enrollment numbers, should marketing efforts be successful.

5. A handbook should be developed for the programs that describes the various program-related procedures, including those for addressing student grievances.

6. The programs should make an effort to track where students go after completion and survey them regarding their perception of the value of the certificate. This information will be important for the next review of the programs.
7. Program administrators should examine the tuition rates paid by capstone students for the certificate courses. The review committee was made aware of a possible loophole in the tuition structure in which students pay a low rate for some of the courses before applying to the program, get admitted to the program, and then pay a standard rate for the remaining courses needed for the certificate.

V. Committee Membership

Cindy Czajkowski, GFEC representative (Neuroscience)
Colin Dewey, chair (Biostatistics and Medical Informatics)
Xin Sun (Medical Genetics)
John Yin (Chemical and Biological Engineering)