Implementation and Transition Plan

Draft of May 14, 2008

Implementation and Transition Workgroup

Introduction

The prior PhD program in Mathematics is being modified to a PhD in Computational Science(s). As part of developing the program, a workgroup was formed to study the transition from the existing MSCS graduate program to the modified program and the implementation of the modified program. The workgroup consists of Iqbal Ahamed, Anne Clough, Francis Pastijn and Craig Struble and received input from Dennis Brylow, Kim Factor, Peter Jones, Stephen Merrill, and Rebecca Sanders.

The following plan summarizes discussion on various aspects of transitioning into and implementing the PhD in Computational Science(s). At the end of each section, recommendations for consideration by the MSCS department are made. ***The materials in this plan are intended for internal departmental discussion and are not expected to be passed to upper administration without prior departmental approval.***

Transition of Current Graduate Program(s)

The existing graduate programs including the Masters of Science in Mathematics, Statistics, and Computer Science with specializations in Statistics, Computer Science and SPSST, the Masters of Science in Bioinformatics, and Masters of Science in Computing are impacted by the modification to the PhD in Computational Science(s) at various levels. The committee felt that the existing MS in MSCS should be modified in a fashion similar to the PhD. The other programs Masters of Science in Mathematics, Statistics, and Computer Science specialization in SPSST, and Masters of Science in Computing would remain largely untouched.

Recommendation: *The Masters of Science in Mathematics, Statistics, and Computer Science should be modified to become a Masters of Science in Computational Science(s). The Statistics and Computer Science specializations should be dropped as part of the program modification. The SPSST specialization will be modified as described in the following recommendation.*

Recommendation: *The SPSST specialization should be modified to become a self-standing masters program.*

Recommendation: *The Bioinformatics and Computing programs should remain untouched in 2008-2009.*

Recommendation: *A program modification to the Masters of Science in Bioinformatics program to be more consistent with a Masters of Science in*

Computational Science(s) should be pursued during 2008-2009 in cooperation with the Medical College of Wisconsin.

Transition and Implementation of Courses

A number of new courses, including courses in simulation, high-performance computing, applied linear algebra, discrete mathematics and applied mathematics are being proposed as part of the PhD modification. Initial pilot versions of these courses should be offered where possible during the upcoming year.

Recommendation: *The graduate committee should review the course offerings for Spring 2009 and plan on offering pilot courses in place of traditionally offered courses. Faculty are encouraged to modify course content in other courses when possible and where appropriate.*

Transition of Current Students

There are currently 11 part time students and 26 full time students in the current MSCS and PhD programs. These students need to be able to graduate according to their plan or given waivers to allow graduation to happen.

Two (2) of the part time students are in the PhD program with the remaining 9 in SPSST. Eight (8) of the full time students are in the PhD program, with 2 expected to graduate in Summer/Fall of 2008, and 2 expected to switch into the MS program. The remaining PhD students have completed at least 2 years of coursework.

The workgroup felt that the number of students in this situation was small enough to be handled on a case-by-case basis. Furthermore, the remaining PhD students in the existing program are far enough along in their studies that the PhD program modification should have little impact on their programs of study.

Recommendation: *Any current students will be given waivers and instruction by the graduate committee on a case-by-case basis, in order to facilitate timely graduation.*

Recruitment and Advertising

Of central concern to the workgroup was recruitment of students and program advertising. The workgroup discussed several advertising options, including traditional avenues through the university and untraditional avenues including Google ads, ads in professional organization publications, and the departmental web site.

Recommendation: *A faculty member delegated by the graduate committee should be responsible for advertising and recruiting activities, particularly during the initial 3-5 years of the program. This faculty member should receive release time during the first year (or two?) to get recruitment and advertising initiated.*

Recommendation: *The graduate committee should delegate the responsibility of maintaining personal contact with prospective students by matching students with*

faculty interests where possible. Where not possible, the responsibility of maintaining personal contact lies with the committee.

Recommendation: *The department should set yearly recruitment goals to be met by the responsible faculty member and graduate committee. See* Timeline and Milestones for Transition *for more details.*

Recommendation: *A portion of the departmental budget should go towards travel to regional universities, e.g., career fairs, to advertise our graduate programs.*

Recommendation: *Work on advertising and recruitment should begin as soon as possible, with the working assumption that the PhD program modification will be successful.*

Recommendation: *Development of the departmental web site is essential for attracting international students. Departmental funds should be utilized for improving and maintaining the department web site at a level higher than is currently being done.*

Funding

Central to a successful program in this area is grant funding. Two distinct types of funding avenues will be pursued and encouraged. The first consists of applications in support of the activities of the Department, particularly equipment and training grants. The second encompasses applications by individual faculty members within the Department, or groups thereof, for support of their research.

i.) *Federal and private foundation grants and awards in support of the activities of the Department*

The submission of at least two significant grant applications to support graduate training will be a priority of the Department within the next year. Examples of programs currently under consideration are listed here.

GAANN: Graduate Assistance in Areas of National Need (Sponsor: Department of Education) This program provides support to graduate students with financial need who plan to pursue a Ph.D. in an area of national need, which includes mathematics and the sciences. Generally, grants are awarded to programs to enhance their capacity for teaching and research.

IGERT: Integrative Graduate Education Traineeships (Sponsor: National Science Foundation) This program supports graduate training by supporting programs that embrace collaborative interdisciplinary research and novel approaches to graduate training.

SCREMS: Scientific Computing Research Environments for the Mathematical Sciences (Sponsor: National Science Foundation)

This program provides equipment and supplies in support of computational resources required for research projects involving symbolic and algebraic computation, numerical computation, simulation, and visualization.

ii) *Investigator initiated grants and contracts*

The Department will encourage submission of a range of applications including support for individual research projects via traditional federal agencies, from contracts from corporations, and through collaboration with investigators housed outside MSCS. The Department will seek to provide the administrative and equipment support required for successful, sustainable projects.

Recommendation: *Faculty should receive course reductions and/or summer funding from the department to prepare competitive grant proposals that will result in funded research assistantships, lab improvements, course release time, and summer funding.*

Recommendation: *The department should establish a research committee responsible for identifying strategic funding opportunities, particularly for training and infrastructure grants that broadly support department activities.*

Recommendation: *The group recommended that administrative and technical support including opportunities for training be provided for grant writing. This would include help from the office staff with budgets, forms, copying, running, etc. and help from the technical staff with prototypes, software support, etc. as needed.*

Recommendation: *The group recommends that the department seek additional endowment opportunities with the help of Office of Advancement for the support of an endowed chair, endowed fellowships, or an endowed lecture series, as a long term plan.*

Faculty Development

In order to assist in the cultural shift represented by the PhD program modification, investment in faculty development is crucial. The workgroup did not discuss this in great detail, but the following recommendation was made.

Recommendation: *The department should hold a series of brown bag lunches focused on faculty development. The lunches may include speakers to discuss grant writing and opportunities, collaborative research, collaborative or problem-centered teaching methodologies, etc.*

Gauging Interest in the Program

The workgroup discussed the potential interest in the program, since it was identified as a potentially major hole in the existing proposal. Specifically, the Provost's office guidelines for developing new programs state that the following should be included:

> "Discuss the various factors (external and internal) that suggest adequate demand for this program."

Some discussion about surveying existing majors and chairs of related departments at other universities took place. After further discussion, however, it was felt that the success of other similar programs, the additional market analysis provided to the EC in March, job demand, uniqueness of program in the upper Midwest, letters of support, and an aggressive recruitment plan should provide a compelling argument for adequate student demand.

Recommendation: *Revisit the proposal and make sure the components of the market analysis and other discussion points are included to argue for sufficient demand. If, after revisiting the proposal, the argument is still considered weak, a specific action plan can be developed.*

Timeline and Milestones for Transition

Below is a suggested timeline for program transition. Program recruitment goals are established assuming a 4-5 year timeline for PhD graduation, an approximately 50% attrition rate, and sufficient assistantships to support PhD students. The graduation goal of 3-4 students a year is scheduled be met by 5 years into the program. The early graduates in 2011-2012 and 2012-2013 represent recruiting well-prepared students with masters degrees that can complete the program in 3 years and possibly one strong candidate without a masters degree that graduates in 4 years.

MS recruitment goals are also set, with the assumption that MS students are needed to have sufficient course enrollment. No specific indicators were used for MS recruitment goals other than consideration for necessary course enrollments.

Some initial ideas for activities during the years are presented in Table 1. For recruitment goals, the years indicate when students will start the program, not the year in which they are recruited. In addition, the graduate committee has reported that 6 of the students entering in 2008-2009 are potential candidates for the modified PhD program. Assuming the program modification is approved, specific attention should be given to these students to recruit them into the program.