Department of Mathematics and Statistics
Georgia State University
2014-15 ACTION PLAN

Status of Action Items from the Previous Review

There were four major recommendations from the 2006 action plan:

- Increase tenured/tenure-track (TT) faculty from 29 to 34.
- Add $60,000/year to support four PhD GTAs for four consecutive years.
- Provide funds for the MAC (Math Assistance Complex) and MILE (Mathematics Interactive Learning Environment), including tuition waivers for the student assistants.
- Increase the space available to the department.

Despite this previous plan, the department has not been able to expand its tenure-track faculty. Since this point, Mathematics and Statistics has lost seven TT positions due to retirements and resignations. The department has maintained its instructional capacity with non-tenure track faculty, temporary visiting positions, and graduate assistants. The department currently has 22 tenure track faculty and is in the process of hiring for a CFI position and a TT position in statistics newly awarded by the college. The MILE has been established with university and college support and has the potential for further expansion and broader impact on student success. Finally, although limited in space in the years since the review, the department will transition into newly-renovated space in 25 Park Place in the coming year.

Major Findings in the Current Review

Since 2008, the department has completed its transformation from an M.S./B.S. degree unit to a PhD research department and has instituted major improvements in both undergraduate and graduate instruction. A summary findings from the self-study and related reviews follows:

1. **Undergraduate Programs**: As of fall 2014, the department has 227 undergraduate majors, up from 170 in fall 2008. This represents a rate of growth of 33% in six years.

2. **Core Curriculum/STEM Instruction**: Our 11 core courses and other service courses have been transformed from barriers that hindered the progress of GSU students to national models for ensuring student success. The average success rate (ABC rate) of our Calculus I sections have increased from well below 40% prior to 2009 to nearly 80% today. In part due to our success in teaching, our classes have become more popular and total enrollment in math courses has increased. Annual total teaching credit hours has increased approximately 40%, from 33,716 in 2006-07 to 47,019 in 2013-14. Currently, the department teaches more students in a lecture format than any other GSU department except for Communications.

3. **Graduate Programs**: The department has 46 Ph.D. students and 59 M.S. students. The Ph.D. enrollment has grown steadily from 10 students in 2008 to the current enrollment of 46. Although the program is new, the department has been very successful in placing its graduate students. Some of our Ph.D. students have had offers from federal research agencies prior to graduation and at prestigious institutions such as an Assistant Professorship from the Department of Mathematics of Vanderbilt University.

4. **Research**: The department has strong research programs in mathematical biology, discrete math and algebra, and biostatistics. Both the number of and amount of grants from federal
agencies have increased during the last few years. In the period from the 2009-10 academic year to the 2013-14 academic year, the department received 30 external research grants, totaling $1,900,992. We also received $70,000 in research conference grants.

Building on our growing reputation, the department will be hosting three major research conferences with over 300 participants each. Funded by NSF and NSA, we have cohosted 13 mini-conferences of Atlanta Lecture Series in Combinatorics and Graph Theory and will host the 14th and 15th in spring 2015. The series has become a major event in the field.

Faculty members serve on editorial boards of prestigious research journals and as officers in mathematics and statistics societies (e.g., managing editor of Graphs and Combinatorics and the Coordinator of SIAM Discrete Math Active Group). Other departmental faculty serve as associate editors of the PLoS ONE, IEEE Transactions on Circuits and Systems, and Central European Journal of Mathematics, among others.

**Action Steps for the Coming Cycle:**

Over the next seven years, the department has set the following goals aligned with the university and College of Arts and Sciences strategic plans.

1. **Undergraduate Programs:** Grow our undergraduate programs in mathematics, with the long-term goal of graduating 75 undergraduate math majors per year. Specific goals include:
   a. In 2015-16, we will seek approval for a B.S. concentration in Applied Mathematics that emphasizes applied and applicable mathematics such as computation, statistics and modeling. It is our expectation that this will both attract new students and help ensure the progress of students who do not wish to pursue a focus on pure mathematics.
   b. Build on existing dual degree programs offered with the Robinson College of Business, including our concentrations in Actuarial Science, Computer Information Systems, and Managerial Science, and our dual degree programs in Actuarial Science, Mathematical Risk Management, and Computer Information Systems. These areas all provide excellent job opportunities for graduates should attract new students. Additionally, in 2015-16 we will seek approval to offer a dual BS/MS in Mathematics, which should attract additional students to our undergraduate and graduate programs.
   c. Develop classes that help support and retain math majors, such as Honors sections and freshmen and sophomore seminar courses.

2. **Undergraduate Core Curriculum/STEM Instruction:**
   a. Continue to enhance undergraduate student success university-wide by building on our achievements in core courses such as the MILE courses (Math 1111, 1113, and 1070) and our calculus sequences. We propose expanding the MILE emporium model to Math 1101 (Introduction to Mathematical Modeling) whenever the university has identified appropriate space for this initiative. The department stands ready to move forward with this important course re-design project.
   b. Continue to provide core curriculum courses at levels sufficient to meet growing student enrollment. As previously noted, growth in enrollment in mathematics classes has been steady. Our department routinely adds sections each semester to accommodate unmet demand, including 13 additional sections in fall 2014 and spring 2015. Taking a simple
linear extrapolation of the growth rate since 2011, we would expect to be teaching an additional 786 students in Fall 2017, which at an estimate of 40 students per section corresponds to an additional 20 sections in fall 2017. The department will work with the college to accommodate student demand that exceeds current instructional capacity.

c. In support of strong STEM students, we plan to continue to increase the availability of honors courses in order to ensure that our courses serve the needs of strong students in these majors as much as possible.

3. **Graduate Programs:** We will steadily increase the number of M.S. and Ph.D. students graduating in Mathematics and Statistics. Starting from a current base of 19 M.S. and 4 Ph.D. students graduating in 2013-14, we seek to achieve this growth, by intensifying student recruitment efforts and establishing new and graduate programs:

a. As noted above, we will propose a dual B.S. Math/M.S. Math program, with the M.S. degree concentrating in statistics and applied mathematics. These are areas that provide strong job opportunities and should serve as an incentive for own strongest undergraduates to continue into our M.S. programs.

b. We will work with the college and university to fully utilize existing recruitment tools and to develop new materials to promote our graduate programs. As part of this effort, we will expand faculty engagement in graduate student recruitment initiatives.

4. **Research Programs:** We will continue to develop strong research programs as follows:

a. Build on current departmental strengths in applied mathematics (specifically mathematical biology) and discrete math (including algebra and graph theory). We will focus future hiring opportunities on these areas and hire strong researchers in these three areas, with particular focus on how they fit into the department and how they can enhance current strengths and build collaborations both in the department and with other departments at GSU. Toward this end, we will complete the 2CI senior hire this year. Additionally, we are in the process of hiring for one tenure track position in statistics.

b. Raise the department's national profile by hosting at least one major research conference each year.
Appendix A:
Action Steps Timeline and Benchmarks

A timeline and benchmarks for these goals is below. Note that efforts related to encouraging faculty publication, grant activities, and appropriate hiring to enhance departmental strengths can be considered to be on-going during all years.

2015/16: Develop a proposal for a B.S. concentration in applied mathematics. Work with RCB on advertising the business dual degree programs and ensuring that qualified students can move easily into these programs.

2016/17: Develop a dual B.S./M.S. mathematics degree programs in applied mathematics and statistics. Develop a lower level seminar course for math majors. Adapt Math 1101 so that it can be introduced in an emporium format. Expand honors offerings. Implement undergraduate concentration in applied mathematics.

2017/18: Introduce Math 1101 as a MILE course if a lab space is provided. Implement dual applied mathematics and statistics degrees. Offer new undergraduate mathematics seminar course.

2018-22: Maintain growth and promotion of new programs. Assess success of new courses and courses such as 1101 offered in a new format and the growth of new programs and their effect on graduation rates.

Guantao Chen, Chair, Mathematics and Statistics [Signature] Date 2-1-15

William Long, Dean, Arts and Sciences [Signature] Date 2-1-15

Risa Palm, Provost and Senior Vice President [Signature] Date 12/15/15