

**Department of Mathematics  
Illinois State University**

**Annual Report for FY15**  
February 15, 2015

## **I. FY 15 Annual Report**

In 2006, the National Academies released a report, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, which resulted in the passing of the America COMPETES Act. This Act was a well-intentioned, but was never adequately funded to accomplish the stated goals. In the Fall of 2010, the National Academies issued a follow-up report, which was given a title meant to emphasize the growing concern about the state of mathematics and science education and recruitment in the U.S. and was entitled *Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5*. In this report, the authors emphasize that the problems identified in the original 2006 report have become more acute. In part, this is because other countries have followed the recommendation of the 2006 report better than the U.S. did. This heightens the perspective that mathematics and the sciences have become even more crucial to this country's economic future. Today, the STEM Disciplines (Science, Technology, Engineering, and Mathematics) are still of national interest and considered a national security issue as we work to grow our economy in a rapidly changing world. If we are to prepare students for today's and tomorrow's economy, it will be important to pay attention to the Mathematics as a STEM discipline.

In the Mathematics Department, we work hard to support our mission and to support the mathematics education of all ISU students, especially those students majoring in quantitative intense majors. We are dedicated to the education of future teachers to try to address the education of the students in Illinois and elsewhere to prepare them for the increasingly quantitative world in which they will be competing for jobs. We work to keep our Actuarial program up to date and maintain our status as a Center of Actuarial Excellence, we work to incorporate the latest teacher licensure requirements in our programs to prepare our education students (including mathematics teacher education students) with the education they need to succeed in the classroom, and we enhance our mathematics and statistics courses to prepare students for the jobs they are likely to encounter when they graduate. We have already seen some of the benefits of federal programs oriented to addressing the quantitative educational needs of students in the U.S. For example, we run an NSF-funded Research Experiences for Undergraduates in Mathematics that is geared towards prospective secondary mathematics teachers. We are also facing a potential sea of change as online teaching tools become more sophisticated and Massive Open Online Courses make advances to becoming more of a viable choice for students. Below we give some details of our current accomplishments as well as some proposed initiatives that will help us address the needs of our students and our ability to accomplish our mission.

## I.1 Accomplishments

### a. Unit Goals for FY15 tied to CAS Plan

The major goals for the Mathematics Department during FY15 were taken from the Department's strategic plan from 2012. We list these goals below and tie them to the College's strategic plan.

Recruit and Retain highly qualified faculty members to meet programmatic needs:

These requests were intended to address *Educating Illinois* Goal 2, Strategy 1 as well as supporting Goal 1, Strategy 5. In the context of the **CAS Strategic Plan**, there is **no explicit action item pertaining to faculty hiring**, but such hiring is essential to make progress on **Goals 1.1-1.4**. This current fiscal year, we have not been authorized to search in a tenure-track position, so our ability to recruit has been limited. Still, we have been successful in having three new tenure-track faculty members start in the Department this year who are doing well in their new positions. In addition, we have had a tenured faculty member return from a leave of absence and rejoin the Department as well as having had a new tenured faculty member join the Department after stepping down from an administrative position. In addition, we continue to maintain a group of high quality non-tenure track faculty who teach the majority of our introductory courses.

Enhance the quality of the Department's academic programs and courses: This goal supports **Goals 1.1 and 1.4 in the CAS Strategic Plan**. This goal is ongoing, but this year we are implementing changes to both the Mathematics Teacher Education sequence and the Actuarial Sequence that passed last year to address the changes in both disciplines. We note that the changes in the Mathematics Teacher Education sequence are designed in part to address the implementation of edTPA and the Common Core State Standards. Changes in the Actuarial sequence are designed to align our requirements with the recent changes instituted by the Society of Actuaries and the Casualty Actuarial Society. In addition, we offered MAT 349, Introduction to Complex Analysis for the first time this Spring semester and the course proposal, MAT 352, is going through the curricular process. We have started a Calculus assessment group as well as a core group working to develop online tools for our current courses. We have also renovated our computer lab in Stevenson 314 to allow for better collaboration and a better teaching environment. In addition, we have purchased equipment and software to allow for the recording of lectures and flipping classrooms. We are also starting online SharePoint sites for faculty to share their materials and expertise in teaching.

Work to serve the needs of other programs in the University through our General Education offerings and other mathematics courses: This goal supports **Goal 1.1 in the CAS Strategic Plan**. This Fall we have worked with the School of Teaching and Learning implement changes in our course and the overall sequence of courses to accommodate the needs of both the Elementary Education majors and the Middle Level Education majors to cover the required topics in the Illinois Mathematics Standards (which come from the Common Core State Standards) for these majors. In addition, we

have had a preliminary discussion with representatives of the College of Applied Science and Technology about developing a General Education problem solving course that would better meet the needs of their majors.

Optimize enrollment in our programs and recruit high-quality students: While **not explicitly mentioned in the CAS Strategic Plan**, this has become one of the University's priorities and is essential in supporting **Goals 1.1, 1.2, and 1.4**. Last Spring, the Department made an effort to increase enrollment in our programs. While the University as a whole saw a significant increase in enrollment, the College saw a slight decrease and the enrollments in the Department were relatively stable by the 10<sup>th</sup> day census this Fall. As a result, we were a little disappointed with the results. We saw a significant increase in the number of Actuarial majors that was accompanied with a significant decrease in enrollments in our Mathematics Teacher Education sequence. With respect to this goal, the results of our Fall 2014 class were disappointing. We have seen our enrollments fall and, while this is consistent with what the University has seen overall, we remain concerned about this trend, especially in the Mathematics Teacher Education sequence. As a result, we continue examining both our recruiting and retention of students in the major. In particular, we are looking at our Calculus sequence as this is the first introduction to the major and where we lose the most students. We are also looking at ways to improve supports for our undergraduate majors and have gathered some survey data to help us in these efforts. Our graduate programs seem to be healthy in this respect and we will continue to compete for high quality students in these programs.

Enhance support for faculty research activities: This goal supports **Goals 1.3, 1.5, 2.2, 3.1 of the CAS Strategic Plan**. We have worked to increase travel support for faculty, using Indirect Agency accounts and Foundation accounts to supplement existing travel allocations to support important travel opportunities for faculty and students. In addition, we have provided support for visiting faculty members and students who are working with our current faculty. We continue to sponsor the seventh annual Biomathematics and Ecology Education and Research International Symposium, a symposium that was initiated at ISU and has been sponsored by ISU since that time. We also continue to support the housing of the *Journal for Research in Mathematics Education* here at ISU. We are also starting the Intercollegiate Biomathematics Alliance as an inter-institutional organization housed at ISU where we will provide resources for faculty and students to collaborate, teach, and learn in a blended virtual and real-life environment with faculty and students from other institutions. We also have our ongoing Discrete Mathematics seminar, the Group for Educational Research in Mathematics, and an algebra seminar to support faculty research.

Improve support services for students: This goal supports **CAS Strategic Plan Goals 1.1, 1.2, 1.4 and 2.2**. This year, we were able to identify funds for an Associate Chair position and then appoint a tenured faculty member to this position. This has allowed us to better meet the needs of faculty and students in terms of scheduling, website support,

and assessment. The Associate Chair has also been able to increase activities related to career information for our majors. We have also started a Mathematics Education Club to support students in our Mathematics Teacher Education sequence. We are also continuing our assessments of what could be improved, especially in the context of retaining students in the major and our calculus sequence. We have awarded scholarships for Mathematics Teacher Education majors who enroll in our Undergraduate Research in Mathematics course to support them in this endeavor. We have updated advising materials and have worked to expand meetings for our Mathematics Teacher Education majors to keep them informed of requirements, and deadlines. We have also renovated our computer lab in Stevenson 314 to allow for better collaboration and a better teaching environment. In addition, we have purchased equipment and software to allow for the recording of lectures and flipping classrooms. We are also starting online SharePoint sites for faculty to share their materials and expertise in teaching.

Increase the profile of our programs, achievements of our students, and our faculty accomplishments: This supports **CAS Strategic Plan Goal 4.2**. This year we redesigned our website to better profile our Department and better support students. While we are still adjusting to this website, we have been able to profile a number of stories that we have promoted. Included in these is that we now sponsor the second largest annual biomathematics conference in the world. We continue to publicize Drs. Ellerton and Clements' discovery of an 11<sup>th</sup> leaf of Abraham Lincoln's cyphering book, we have publicized stories featuring two of our doctoral students as well as our Alumni award in mathematics education. We note Dr. Olcay Akman has started a new research journal, *Letters in Biomathematics* that has become a Taylor and Francis journal and we continue to support the high-profile *Journal for Research in Mathematics Education*. In addition, we that Distinguished Professor Saad El-Zanati leads a team who continue to work on the NSF-funded Research Experiences for Undergraduates in Mathematics where he has pioneered a new emphasis on prospective mathematics teachers in this program and he became a member of the advisory board for the new \$10 million URBAN CENTER grant recently awarded to ISU.

Increase the amount of external financial support for faculty and student activities: This supports **CAS Strategic goals 3.1 and 3.4**. We have a number of ongoing grants and contracts to support ongoing activities, Dr. El-Zanati's REU grant has been renewed, Dr. Olcay Akman received an NSF grant to support the Biomathematics and Ecology Education and Research International Symposium in October of 2014, we have endowed the Dianne Brewer Memorial Scholarship at the \$27,000 level and this scholarship should be awarded the first time this May, and the Bonnie Litwiller Scholarship fund has been endowed at the \$2.2 million level, with scholarships being awarded this spring. We continue to work to develop further support for those mathematics majors who are early in their academic careers.

## **b. Major Accomplishments for Each Goal**

NOTE: This year we instituted an Associate Chair position, which has been a long overdue position and supports many of the goals mentioned below. This is a major appointment that we believe will help move the Department forward.

### Recruit and Retain highly qualified faculty members to meet programmatic needs:

- We hired three new tenure-track faculty who started this Fall. We have been working to support them to help them be successful in their positions.
- We were able to hire non-tenure track faculty to meet instructional demands, including a practicing actuary to teach our MAT 283, Introduction to Actuarial Computing and three practicing actuaries this spring to cover the course typically taught by our Actuarial Director.
- One tenured faculty member returned to the Department after a two year leave of absence to be an Associate Editor for *Mathematical Reviews*.
- We were happy to have another tenured faculty member join the Department after stepping down from an administrative position. We have worked to help with this transition as well.

### Enhance the quality of the Department's academic programs and courses:

- We are implementing our revised Mathematics Teacher Education Sequence for 2014-2016 with two corresponding course revisions.
- We are implementing our revised Actuarial Science Sequence for 2014-2016, which included one new course and a revision of three other courses.
- We are offering a new course, MAT 349, Introduction to Complex Analysis, for the first time this Spring semester.
- We have a new proposed course, MAT 352, Nonparametric Statistics, that has been approved by the Department and is before the CAS Curriculum Committee.
- We are offering a data mining course under the umbrella course, MAT 411, Advanced Topics in Mathematics, to meet the demand for this material among our graduate students. This course currently has 28 student enrolled!
- Due to popular demand, we are also offering our MAT 585, Topics in Mathematics Education Seminar, this semester with an emphasis on Rasch Analysis, for our doctoral students by having Prof. John Rugutt from Educational Administration and Foundations teach this course.
- During FY15, our secondary group continues to work on the implementation of edTPA and incorporating the Common Core State Standards into our courses.
- In the Spring of 2015, we are again partnering with Pinnacle Actuarial Consulting Firm to have our students work with actuaries at Pinnacle to research various topics and then make research presentations at an event run by Pinnacle called "Pinnacle University." Students will earn credit through independent studies involving this research. We believe this will continue as an annual event for the foreseeable future.

- Drs. Saad El-Zanati and David Barker successfully conducted another year of their NSF-funded Research Experiences for Undergraduates in Mathematics. This year again included bringing Chicago Public School students down to ISU for a week and having undergraduates mentor these CPS students in doing mathematics research. This component continues to be highly successful.
- Drs. David Barker and Matthew Winsor have been Co-PIs on the NSF-funded grant *Integrating Knowledge: A Model for Secondary Teacher Preparation*.
- We have designed a system for recording lectures to allow instructors to start flipping classrooms.
- We have put together a team (lead by the Associate Chair) to review how to make our Calculus sequence better meet the needs of our students.

Work to serve the needs of other programs in the University through our General Education offerings and other mathematics courses:

- We have worked with the School of Teaching and Learning to revise our courses to meet the needs of their majors in addressing the Illinois Mathematics Standards related to the Common Core State Standards. This involved 10 different courses in the Mathematics Department as well as coordination with University College.
- We have put together a team to investigate, collect, and create online materials to support the teaching of our General Education courses.
- We have begun discussions with the College of Applied Science and Technology about developing a General Education class that would best address the needs of their programs.

Optimize enrollment in our programs and recruit high-quality students

- We have increased our acceptance rate of transfer students into the Mathematics Teacher Education sequence.
- We have revised our website and continue to work on enhancing this as a way of recruiting students.
- We have increased the number of scholarships available to majors.
- We have created a brochure that we can use to recruit undergraduate majors to our programs.
- We continue to run the Minority High School Actuarial Academic Scholars program each summer. This program is the longest continuously running program of its type for prospective actuarial students, with Howard University running the only other program of this type. This program is funded by grants from private companies, including Allstate Insurance.

Enhance support for faculty research activities:

- Continued support for the *Journal for Research in Mathematics Education*, which the top research journal in mathematics education and is housed here at ISU.
- Sponsoring the 7<sup>th</sup> annual Biomathematics and Ecology Education and Research International Symposium in October of 2014. This conference is now the second largest annual biomathematics conference in the world.
- Dr. Olcay Akman started a new research journal, *Letters in Biomathematics* and this journal has been adopted by Taylor and Francis and is housed at ISU.
- We continue to support visiting scholars who given seminars and colloquia for our students and faculty.
- We hosted Professor Daniel Hrozenick from Chicago State University during his sabbatical leave during the Fall of 2014.
- We are starting the Intercollegiate Biomathematics Alliance (IBA) hosted at ISU, which is an alliance of institutions who share faculty and students through real and virtual environments.
- We continue to explore teleconferencing possibilities to enhance the ability of our faculty to collaborate with scholars at other institutions. This is done on a regular basis by the research team lead by Drs. Barrett and Cullen as part of an ongoing NSF grant.

Improve support services for students:

- We hired a new Associate Chair to help with the scheduling and maintenance of classes, assessment of courses, and the development of new courses.
- We have extended our online offerings of actuarial materials for our students, including online exam review materials for Society of Actuaries Exams P, FM, MLC, and MFE.
- We have revised advising materials and increased meetings with students to keep them informed of requirements and application deadlines.
- We have finished a renovation of the Stevenson 314 computer lab to include laptops on round tables and a Smartboard with an instructor's station to create a more collaborative environment for students as well as enabling the instructor to interact with students better.

Increase the profile of our programs, achievements of our students, and our faculty accomplishments:

- Nerida Ellerton and M.A. (Ken) Clements published two books this year, *Abraham Lincoln's cyphering book and ten other extraordinary cyphering books* and *Thomas Jefferson and his decimals 1775-1810: Neglected years in the history of U.S. school mathematics*. Both of these books are co-authored and published by Springer.
- Our status as a Center of Actuarial Excellence was renewed for another five years after a site visit by an accreditation team.

- Dr. Krzysztof Ostaszewski has been named a member of the National Academy of Social Insurance.
- M.A. (Ken) Clements was Editor of the Third International Handbook of Research in Mathematics Education, which was published in 2013. This series of handbooks has been foundational for current mathematics education research.
- We are in the process of redesigning our website in order to better publicize our accomplishments.

Increase the amount of external financial support for faculty and student activities:

- The Dianne Brewer Memorial Scholarship was endowed at the \$27,000 level last year and will be awarded this spring.
- The Bonnie Litwiller Scholarship is now endowed at the \$2,237,000. This scholarship has been awarded to those Mathematics Teacher Education majors doing undergraduate research in addition to those MTE majors who are awarded this scholarship at the end of the academic year.
- Our NSF-funded Research Experiences for Undergraduates in Mathematics grant was renewed in 2014.
- Dr. Olcay Akman received an NSF grant to support the Biomathematics and Ecology Education and Research International Symposium in 2014.
- We have a number of ongoing grants and contracts, including funding for the *Journal for Research in Mathematics Education* and the NSF-funded *Children's Measurement Grant*.

**c. Productivity Data**

Below are some numerical summaries of our productivity data

2 Co-Authored Books  
 1 Edited Book  
 4 Textbook/Study Manuals  
 43 Journal Articles  
     9 with students  
     13 with international collaborators  
 17 Book Chapters  
     5 with students  
     3 with international collaborators  
 56 National or Regional conference presentations  
     9 with students  
 16 International conference presentations

Our faculty serve as:

Editor for 2 journals:

Cynthia Langrall is Editor of the *Journal for Research in Mathematics Education*

Olcay Akman is Editor of the new journal, *Letters in Biomathematics*

Associate Editors for 9 journals:

Olcay Akman is Associate Editor for the journals  
*Advances and Applications in Statistics*  
*Journal of Applied Statistical Science*  
*Frontiers in Systems Biology*

Nerida Ellerton is an Associate Editor for  
*Journal for Research in Mathematics Education*

Heather Jordon is an Associate Editor for *Mathematical Reviews*

Tami Martin is an Associate Editor for the *Journal for Research in Mathematics Education*.

Krzysztof Ostaszewski is an Associate Editor for *Journal of Insurance Issues*

Maochao Xu is an Associate Editor for:  
*Communications in Statistics – Simulation and Computation*  
*Communication in Statistics – Theory and Methods*

Assistant Editor for 1 journal

Amanda Miller is an Assistant Editor for the *Journal for Research in Mathematics Education*

On the Editorial Board of 3 journals

Ken Clements is on the editorial boards of  
*Mathematics Education Research Journal*  
*Prospero*  
*Journal of Science and Mathematics Education in Southeast Asia*

The Department sponsors the following:

The Actuarial Club

Field trips to Stevenson High School in Lincolnshire

High School Actuarial Career Fairs

Meet the Firms Night for Actuarial Science majors

Actuarial Research Event

Actuarial Intensive Exam Reviews

Participation in both the Undergraduate Research Symposium and the Graduate Research Symposium here at ISU

The Minority High School Scholars Actuarial Academy over the summers. (This is one of two such programs in the U.S.)

Research Experiences for Undergraduates Program (Summers)  
A new Statistics Project Competition for Graduate and Undergraduate students  
The Discrete Mathematics Seminars in MAT 363 (Fall only)  
The Graduate Group for Educational Research in Mathematics  
We field a team for the Putnam Exam competition  
We participate in the Problem Solving Competition sponsored by the Mathematical Association of America

We have supported student travel to the following conferences for research-related activities:

The International Symposium on Biomathematics and Ecology Education and Research  
The annual meeting of the Association of Mathematics Teacher Educators  
The annual meeting of the National Council of Teachers of Mathematics

**d. Measures of productivity demonstrating success**

- For FY14, the Department generated 33,292 credit hours of instruction during the regular academic year (excluding summer session). This is the largest amount generated by any department in the University by approximately 4,000 credit hours.
- We have not been able to get the amount of external funds generated by mathematics faculty at this time. External funding continues to be strong. We will include numbers once we receive these from RSP.
- Dr. Olcay Akman co-organized the seventh annual Biomathematics and Ecology Education and Research International Workshop in Claremont, CA. Dr. Akman was able to obtain support for this conference from the National Science Foundation, ISU's Department of Mathematics, Department of Physics, and School of Biological Sciences, from Marymount University, as well as funding from commercial publishers. This annual event has become a well-known national event and the second largest annual biomathematics conference in the world. The inaugural conference in this series was held at ISU in 2008 and organized by Dr. Akman as well.
- Dr. Cynthia Langrall with her associate editors, Drs. Nerida Ellerton and Tami Martin, continue as editors of the prestigious *Journal for Research in Mathematics Education*.
- Drs. Saad El-Zanati and David Barker continue to run our NSF-funded summer Research Experiences for Undergraduates designed specifically for mathematics teacher education majors throughout the country. This is a unique program that has received funding for over 5 years now. This year we were able to bring a cohort of CPS High School students for a week-long experience in research with REU participants acting as teachers/mentors for these students. This was highly successful. This grant has been renewed this spring for another three years.

- Dr. Olcay Akman, building on the success of the Biomathematics and Ecology Education and Research International Workshop annual series, has started a new online journal *Letters in Biomathematics*, which has been adopted by Taylor & Francis but remains housed at Illinois State University.
- The Bonnie Litwiller Scholarship fund is now endowed for over \$2 million and we have begun awarding scholarships from this fund. We expect to institute a Ph.D. Fellowship from these funds starting next year in addition to a series of undergraduate scholarships.
- The Dianne Brewer Scholarship has been endowed at over \$27,000 and the first award should be made this spring.

## **I.2 Internal Reallocations and Reorganizations for FY15**

### **a. Any Reallocations or Reorganizations such as movement, upgrade, or creation of positions**

We reallocated \$13,000 in resources to fund an Associate Chair position and we have appointed a tenured faculty member in this position for FY15.

### **b. Use of additional funds to enhance accomplishments and productivity**

The Mathematics Department has used additional funds in the following ways:

- Scholarships for students
- Actuarial Exam fee reimbursements for students
- Supporting student conference travel
- External speakers
- Supporting visiting scholars to collaborate with our faculty
- Supporting the Minority High School Scholars Actuarial Academy program. This program is one of only two programs in the nation of this type for actuarial science.
- Hiring someone to create the technological infrastructure for faculty to start “flipping” courses and buying the additional technology.
- Supporting faculty travel to funding agencies in Washington, D.C.
- Supporting the International Symposium on Biomathematics and Ecology Education and Research.
- Actuarial Exam Intensive Reviews.
- Using Foundation funds for recognitions and fundraising.
- Occasional social events to foster collaboration among department members.
- Cost sharing to support the Research Experiences for Undergraduates Program that is unique in its focus on prospective secondary mathematics teachers.
- Funds were used to partially support the renovation of our Stevenson 314 computer lab.
- Cost sharing for other grant work.

### **I.3 Accountability Reports**

#### **a. Provost Enhancement Accountability Report**

Not Applicable

#### **b. Instructional Capacity (Due July 1, 2015)**

## II. FY16 Planning Document

### II.1 Major objectives

In October of 2012, the Mathematics Department passed a new strategic plan for the Department. The objectives here reflect the objectives mentioned in this strategic plan.

Recruit and Retain highly qualified faculty members to meet programmatic needs. While we were not authorized to do any tenure-track searches this year, we did have three new tenure-track faculty start this Fall. In addition, we were able to retain a tenured faculty member who finished a two year leave of absence and we were able to welcome a tenured faculty member who stepped down from an administrative post. Still, with some imminent retirements, some needs for faculty in certain areas will become acute. Such staffing becomes important if we are to increase our enrollments.

Enhance the quality of the Department's academic programs and courses. This goal is ongoing and in FY16, under the leadership of our Associate Chair, we hope to continue the progress we have made in the current year. We continue to be responsive to the trends in the disciplines affecting our majors, such as the changes in state standards and requirements for teacher education majors, the changes in the syllabi for national actuarial exams, and the needs that employers expressed to us that would make our majors more marketable to them. In addition, as we look at national trends in mathematics teaching, it will become essential that we work to incorporate more online resources to enhance the delivery of our courses, which can include but is definitely not restricted to online delivery of our courses. We continue to have a group of faculty look at how to support enhancements to our courses.

Work to serve the needs of other programs in the University through our General Education offerings and other mathematics courses. In particular, we would like to increase our online presence for targeted General Education courses as well as exploring alternate delivery methods for courses. We are pursuing the request by CAST to create a General Education course that would better suit their needs. We will also continue to be responsive to the needs of the School of Teaching and Learning as they respond to the Common Core State Standards being implemented. We would also like to continue promoting dialogue with the primary stakeholders in the courses we offer for other non-majors.

Optimize enrollment in our programs and recruit high-quality students. We will continue to monitor enrollments in our programs with the goal of optimizing the enrollment to best match our resources. We are happy that we have increased capacity in the actuarial program with our most recent tenure-track hire. Still, we have grown concerned about a decrease in our enrollment numbers at the undergraduate level. Fortunately, these numbers remained relatively stable this past year. Still, we are looking at ways to improve recruitment into these programs, including potential financial incentives and creating a brochure that will encourage potential students to visit our (hopefully) redesigned website. We would like to continue to look at measures to ensure we get

closer to optimal enrollments in our graduate programs as well. As part of this optimization process, we will also continue our system of probation for students who are having difficulty succeeding in the major. This can open up additional spots in the major for students who are well-qualified. We are also looking at the support structures in place and perhaps enhancing these to help retain well-qualified students in the major. Finally, we would like to investigate alternate forms of course delivery to be able to recruit and better serve populations of potential graduate students who may not be able to come to campus as often as would be needed with traditional delivery of courses.

Enhance support for faculty research activities. We would like to increase travel support for faculty to help them disseminate their results as well as build future collaborations, we would like to increase support for speakers and visitors who come to ISU and enhance the intellectual life of the Department, and to help facilitate the submission of external grant proposals using existing funds. We would also like to continue to work on providing faculty with the technology they need to facilitate their research, including collaborations with researchers outside the department.

Improve support services for students. When we examine where we are losing majors, we notice the traditional place students change majors is during or right after their first year. With our Calculus Assessment Group, we are examining ways to better support these students as well as increasing the support for students later in our programs as well. This includes continuing to work with other offices on campus such as the Julia Visor Academic Advising Center and University College, continuing to support our extracurricular organizations such as the Actuarial Club, our newly formed Mathematics Education Club, looking at the possibility of creating a Pi Mu Epsilon chapter here at ISU, and improving the electronic resources such as the website to help students be aware of opportunities and requirements they need for their programs of study. In addition, the new Associate Chair position is helping in providing better administrative support for both faculty and students to help them get done what is necessary.

Increase the profile of our programs, achievements of our students, and our faculty accomplishments. We are looking at ways to better maintain our website. In addition, we would like to increase support for faculty and students attending national or international conferences, and continue to host or sponsor professional meetings and conferences that are consistent with ISU's strengths.

Increase the amount of external financial support for faculty and student activities, including research activities. We anticipate this will go hand in hand with increasing our profile as stated above, but also we want to devote resources to support the submissions of external grant applications as well.

## **II.2 Personnel Requests (TT Hiring –NEW)**

We are requesting authorization to hire in three areas. While there are some recent trends in enrollments within the Department we need to pay attention to, one area we anticipate a constant to growing demand in is Statistics as evidenced in the growth of the actuarial major. We anticipate the retirement of one of the four faculty members in our statistics group this summer. If this happens, we will not be able to meet the demand for statistics courses in the near future.

We will need to hire another statistician. With other retirements anticipated in the next two years, we would also be looking to hire faculty in secondary mathematics education, discrete mathematics, biomathematics, and in middle school mathematics education. We are very grateful for being able to hire three new faculty for this past fall, but we remain concerned about the need to hire more faculty to support and even increase enrollment in our programs. Furthermore, the needs in teacher education have increased with the implementation of edTPA at ISU and, relatively soon at the state level. Given about 50% of our majors are teacher education majors, the needs of this program have become more acute when the societal demand for such teachers has increased. In addition, since all our majors are required to take a significant number of mathematics courses, more faculty in traditional mathematics disciplines will be needed. We are also quite concerned about both middle school mathematics specialists and elementary education majors as the state has revised the mathematics requirements for these majors, yet it is unclear how the University takes this Math Department commitment into account when they consider productivity measures. To support these programs, more faculty in this area will be needed. Finally, if the University is looking for an opportunity for growth in enrollment, we should consider a biomathematics hire as this is an interdisciplinary area gaining considerable interest. See the attached PERS 936 forms.

### **II.3 Personnel Requests (TT Hiring – Nonreappointment or Tenure Denial)**

There is the potential for one appointment being needed for a tenure denial. We would like to make this request at this time. See the corresponding PERS 936 forms.

### **II.4 Strategic Budget Carryover Requests**

- a. SBC: We have three SBC requests
  - i. We would like to SBC a total of \$12,295 to FY 16 to cover summer salaries for faculty teaching FCR courses and the one departmentally funded course this summer that extend into July.
  - ii. We would like to SBC a total of \$7,000 to FY16 to cover one month's summer salary for the Associate Chair.
  - iii. We would like to SBC a total of \$17,000 to FY16 to support graduate assistants, one of which would be a doctoral student ½ time on a Litwiller Fellowship and the other half on a research assistantship, the rest would be to support a GA to support the Intercollegiate Biomathematics Alliance.
- b. SBC+PE: We do not anticipate having additional funds for SBC. As a result, we are moving related request to temporary enhancement requests.

### **II.5 Temporary/Permanent Enhancement Fund Requests**

#### **a. Faculty Professional Travel**

This past year, we were allocated \$17,258 for faculty professional travel. With a significant number of faculty still to use their professional travel funds for planned trips, we have used \$16,000 of this funding to date. While we are grateful for the

recent increases in travel allocations, when we have had more travel funds, we have easily used them for faculty professional travel. Faculty travel is one of the strategies used to increase the profile of the faculty and student here at ISU. As a result, we would like to request \$22,000 in faculty travel for FY16.

**b. Student Teacher Supervision Travel**

Our anticipated numbers of student teachers in our program next year are less than the current year, but the placement of our students is becoming more difficult as cooperating teachers must do more to accommodate additional requirements placed on our student teachers such as edTPA requirements being implemented, so our supervisors will need to travel further to supervise our student teachers. Hence we are asking for a further decreased allocation this year of \$6,000 for student teacher supervision travel.

**c. Internship Travel**

No request made for FY16.

**d. Instructional Travel**

We are asking \$1,000 for instructional travel. Part of these expenses are funding a trip to Stevenson H.S. in Lincolnshire, IL for our student teachers each fall for which we need to support two faculty members with mileage and lodging for this trip. In addition, as we explore videoconferencing possibilities, we have found it useful for faculty to make a limited number of trips to the areas to establish a relationship with these remote students.

**e. Instructional Capacity and IC for General Education**

We note that this current year we are spending over \$277,000 above our base budget in IC and other variance to staff our courses. This includes approximately \$130,000 in variance dollars including funds the college provided for student teacher supervisors and other funds related to grant related buyouts. As such, to maintain the same level of staffing, we will need approximately \$155,000 in IC and General Education funding for the next fiscal year.

**f. Student Teacher Supervision Salaries**

We are anticipating about the same number of student teachers in the Spring of 2016 as in the current year. Based on FY15 rates and our typical need for outside supervisors of these student teachers, we anticipate the student teacher supervision salaries for FY16 to be approximately \$26,000.

**g. GA Funding for Supporting Actuarial Program:** Currently, our graduate assistantships are being used to support teaching assistants, teaching of courses, and grading for advanced classes. We have made significant progress in putting actuarial exam reviews online, including videos of review sessions. To make further progress on developing these actuarial resources, it would be useful to have GA support for

this purpose. In particular, GA support would help to get the final review materials for two more exams in place. We are asking for \$10,000 for two years to support one graduate assistants for this time period.

- h. **Support for the Intercollegiate Biomathematics Alliance:** This is an exciting new initiative mentioned above that will allow for inter-institutional collaborations and has a strong potential for external funding as well as creating a model for other programs in the University. We anticipate approximately \$12,000 for a half-time office support person and \$4,500 for a half-time Graduate Assistant. In addition, we anticipate another \$3,000 per year on operating costs associated with the Center. The Department can commit the operating funds each year, but would like to request the additional \$16,500 for support for the next three years.
- i. **NTT Computer Recapitalization/Port Activation:** As mentioned above, online tools are being incorporated more and more in mathematics instruction. While the tenure-track faculty have a semi-regular computer recapitalization schedule, many NTT faculty have outdated computers with which to do more sophisticated things online to enhance their instruction.
- j. **Support for the URBAN CENTER Project:** This project was recently funded as a \$10 million grant and commits to institutionalizing the efforts to create a cycle of CPS students to ISU students to ISU alumni who teach in CPS. To support this effort, we are asking for \$12,000 to buy out the time for two course releases for faculty to participate in this project on a regular basis.
- k. **Creation of Math Major Lounge:** We would like to convert STV 322A into a lounge for math majors to gather. This is currently used as an antechamber for our STV 314 computer lab. Such a conversion would require moving a lab monitor station into the STV 314 lab and refurbishing the existing room. We estimate this would cost approximately \$5,000.

#### Permanent Enhancement Request

- a. **Associate Chair Stipend**

We have been able to identify approximately \$13,000 in permanent funding to support our new Associate Chair position. After many years of requesting support for this position, we anticipate an ongoing cost of an additional \$7,000 per year to fully fund such this position (\$11,000 in teaching capacity replacement and \$9,000 for a summer stipend). This position supports **Actions 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.5.2, and 2.1.4 in the CAS Strategic Plan.**

- b. **Funding for permanent visiting position**

We would like to be able to convert one of our existing NTT positions into a visiting position that would rotate among the disciplinary specialties in the

Department to foster research collaborations with such visiting scholars. We approximate this would cost another \$15,000 above our typical NTT line.

## **Appendix A**

**Department of Mathematics  
Illinois State University**

### **2012-2017 Strategic Plan**

**Approved October 1, 2012**

#### **Context:**

In 2000, Illinois State University had adopted a bold strategic plan, *Educating Illinois*, which laid out a plan to increase the quality of its multifaceted educational role in serving the people of Illinois and beyond. This document was an important strategic plan for the University to meet the educational needs of the people of Illinois. Since its initiation, *Educating Illinois* has been updated twice and has adapted to changing economic climates, with its latest version being *Educating Illinois, 2008-2014*.

In 2006, the Department of Mathematics revised its 2001 strategic plan to incorporate *Educating Illinois II* and the revised College of Arts and Sciences strategic plan. While we have made significant progress on a number of the goals in our 2006 strategic plan, a number of those goals were ongoing and continue today. Also, with the developments of the past five years, we are able to update and refine some of our previous goals as well.

Since 2001, we have seen an increased recognition of the need for quantitatively educated citizens in our society. As we see more sophisticated technologies develop and more complex situations arise in today's society, the need for citizens to support further development of these technologies and to make decisions about these complex situations has increased. For example, the National Academies in 2006 published *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future* and the follow-up report in 2010 entitled *Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5* both of which emphasize the quantitative skills needed to face the employment needs and the challenges of the 21<sup>st</sup> century. Books such as *The World is Flat* and *That Used to be Us* reinforce this perspective. Such publications point out that better career opportunities await those with solid quantitative foundations, hence such citizens have better opportunities to influence our society.

We face rapidly changing technologies that have the potential to enhance our effectiveness to carry out our mission. In this environment, the Department of Mathematics has a unique opportunity to educate students at Illinois State University to be equipped to meet the challenges society demands of them and, through our teacher education programs, influence future generations of citizens well beyond those attending ISU. It is this context that informs the current strategic plan presented here.

## Mission:

The mission of the Department of Mathematics at Illinois State University is to:

- a) provide a supportive environment for the learning of mathematics;
- b) provide the opportunity for mathematics and mathematics education majors to receive a high-quality undergraduate education;
- c) provide the opportunity for students from other disciplines to learn mathematics and its applications;
- d) provide the opportunity for high-quality graduate education through our master's and doctoral programs;
- e) contribute to the development and growth of mathematical sciences and mathematics education through research and scholarship;
- f) prepare high-quality elementary, middle school, secondary, and post-secondary mathematics teachers;
- g) contribute to the improvement of the teaching and learning of mathematics in schools and other educational institutions; and
- h) promote an understanding of the contributions mathematics has made to society through outreach and service to the community.

This mission statement underlies the Department's commitment to teaching its discipline, to teaching teachers of its discipline, and to scholarly activities and public service in its discipline.

## Vision:

As the societal need for quantitatively educated citizens increases, the Department of Mathematics recognizes the important role it must play within Illinois State University community. Guided by *Educating Illinois* and the *College of Arts and Sciences Strategic Plan 2010-2015*, our vision is to provide excellent mathematics programs and general education offerings shaped by the scholarly achievements of a nationally and internationally recognized faculty and supported by the commitment of a talented and dedicated staff. Our vision includes supporting these programs by providing opportunities for lifelong learning and for interactions with the University community, the mathematical professional communities, and the broader society.

Our vision includes:

- Undergraduate and graduate degree programs that meet the highest academic standards.
- Active disciplinary research that informs the teaching in our programs and incorporates disciplinary trends.
- A continued strong commitment to the mathematical education of prospective teachers.
- Interdisciplinary connections that will enhance the education of our students and the scholarship of our faculty.
- Excellence of instruction that includes active learning and strong academic support services.

## Values:

Consistent with *Educating Illinois* and the *CAS Strategic Plan, 2010-2015*, we in the Department of Mathematics value:

- A strong mathematics tradition that provides a basis for lifelong learning, critical thinking, engaged citizenship, and supports the professional aspirations of our students and our community.
- Active pursuit of learning and scholarship in the mathematical sciences through research and its dissemination through publication and teaching.
- Diversity of ideas, backgrounds, and approaches to the pursuit of knowledge that supports the growth of all students, faculty, and staff.
- Faculty and student collaboration in teaching, learning, and research that enhances the Department's intellectual and social life.
- Collaborative research, service projects, and other partnerships designed to meet society's needs.
- Open, collegial dialogue that supports shared governance and a spirit of genuine participatory democracy.

## STRATEGIC DIRECTIONS:

### **Strategy One: Enhance the quality of the Department's academic programs and courses.**

The Department of Mathematics recognizes its academic programs and courses as an essential part of its mission at Illinois State. Therefore, it is vital to maximize the quality of our academic programs subject to the resource constraints we are forced to deal with. Such efforts to maximize this quality include revising curriculum to address recommendations or requirements issued from professional mathematical organizations, supporting efforts to improve the quality of teaching in the Department using University resources, and increasing opportunities for students through research projects, internships, interdisciplinary studies, and professional projects. We propose the following actions to support this strategy.

#### Actions:

As part of this strategy, we recommend the following actions:

- Foster discussions and evaluation of the recommendations of the professional mathematics organizations in the context of our own programs.
- Investigate the feasibility of five-year BS/MS programs such as biomathematics, applied statistics, or actuarial science.
- Investigate the support and feasibility for a another Ph.D. program in the mathematical sciences based on the interests of those in the Department.
- Further develop the Ph.D. program to meet the advances in the field of mathematics education.
- Develop interdisciplinary ties with other departments that emphasize the centrality role of mathematics and statistics in these partner disciplines.
- Continue to expand culminating experiences for undergraduate and graduate students in our programs. This includes increasing research opportunities, internships, and other professional projects.
- Develop new courses to meet the changing nature of the various mathematical sciences represented in the Department and the broader University community.
- Explore alternative delivery methods and online resources for courses using new technologies and evaluate whether these methods enhance the learning experiences of students in these courses.
- Explore programs with Computer Science or Computational Mathematics emphasis to meet the needs of an increasingly technological society.
- Gather data on and monitor the success of students in all of the sequences in the undergraduate mathematics major.

**Strategy Two: Work to serve the needs of other programs in the University through our General Education offerings and other mathematics courses.**

The Mathematics Department plays a central role in the University through its General Education course offerings, its offerings for both Elementary and Middle Level majors interested in mathematics specializations, as well as courses for other programs such as Information Technology, the science programs, and Business. As this is an important part of the Department's mission, it will be important to review our course offerings on a regular basis to ensure we are meeting the needs of these other programs and the University as a whole.

*Actions:*

As part of this strategy, we recommend the following actions:

- Increase our online presence to better serve students in mathematics courses.
- Explore alternative delivery methods and online resources for courses using new technologies and evaluate whether these methods enhance the learning experiences of students in these courses.
- Promote dialogue with the primary stakeholders in the courses we offer as General Education or non-major courses.
- Develop new courses and further develop existing courses to better address the needs of the programs we serve in our courses.
- In courses offered for education majors, foster urban education opportunities when appropriate.

**Strategy Three: Recruit and Retain highly qualified faculty members to meet programmatic needs.**

The Department of Mathematics has a central and multifaceted role in the College and University. The Department is the largest producer of credit hours in the University each year and has a consistent demand for its major and graduate programs. The Department recognizes that its ability to advance its mission and fulfill this role is highly dependent on the quality and quantity of its faculty. As the demand for our programs remains strong, it becomes important that we continue to recruit and retain high quality faculty who will be assets to our programs. We propose the following actions to support this strategy.

Actions:

- Increase faculty salaries to make them compare more favorably with comparator institutions.
- Recruit faculty members to fill tenure-track positions and address the Department's programmatic needs.
- Revisit the reward structures in the Department with the goal of better supporting activities that advance the Department's mission and goals while respecting College and University guidelines.
- Enhance the facilities available to faculty to support their teaching and research.

#### **Strategy Four: Optimize enrollment in our programs and recruit high-quality students.**

The Department of Mathematics has benefited from the University's increased emphasis on recruiting high quality students. For the past seven years, the Department has had to limit enrollment in the undergraduate major and it has experienced students with excellent qualifications enrolling in this major. Enrollment in the Masters Program is now at approximately 90 students, but the enrollment in our Ph.D. program has remained relatively stable. We have the highest enrollment of Honors students in the College of Arts and Sciences and we are second in the University, second only to the Department of Curriculum and Instruction. Each fall, the Mathematics Department enrolls five to ten Presidential Scholars as majors in Mathematics or one of our sequences. It is also not unusual for a mathematics major to be a Bone Scholar in a given year. For the past seven years, ISU has regularly had one of its graduating actuarial students awarded the international John Culver Woody Scholarship from the Actuarial Foundation, recognizing these students as one of the top dozen actuarial students in the World graduating in their respective years. We have done an excellent job addressing this goal in the Department's 2006 strategic plan.

Still, the above success seems to have stretched the instructional resources in the Department. When there are national concerns about recruiting students into quantitative majors, we are experiencing a demand for our major that we are not able to meet given our current resources. We are also experiencing a high demand for students wanting to pursue an actuarial emphasis in our Masters program. We have seen an unusual increase in students enrolled in our Masters program since our last strategic plan. Hence there is a continued need to optimize our capacity for the major and in our graduate programs while still meeting our obligations to support other programs in the University through our course offerings, especially those courses in the University's General Education Program. The strong demand for the major also affords us the opportunity to continue to examine ways to increase the quality of our academic programs. It will also be important to continue recruitment strategies that will lead to an appropriate balance in the enrollments of the various sequences at both the graduate and undergraduate programs. We propose the following actions to support this strategy.

#### Actions:

- Continue to monitor and analyze the Department's capacity in the major and in its graduate programs.
- Continue to work with Enrollment Management and Admission Services to set appropriate enrollment targets.
- Continue to look for ways to achieve a better balance in the enrollments in the various sequences and emphases in the BS/BA and MS/MA programs.
- Continue and regularly enforce probation letters for those making inadequate progress in the major, with a follow-up advisement out of the major for those who are unable to remedy these deficiencies.
- Continue to pursue high quality students for all our sequences with the goal of increasing enrollment in the mathematics and statistics sequences while continuing to recruit excellent students to the mathematics education and actuarial sequences. We should place an emphasis on targeting quality instead of quantity.
- Institute a recruitment strategy in our Masters program that will better balance enrollment with available resources.

- Continue to monitor enrollment and implement efforts to stabilize and increase the number of students admitted into the Ph.D. program each year. Increase venues for recruiting highly qualified students to our Ph.D. program. Explore ways of making the program more accessible to part-time students while maintaining high standards for coursework and research experiences.
- Design and implement Departmental showcases during University Open Houses.
- Send mailings to high school teachers asking for recommendations for top students.
- Follow up on contacting our top students who have applied or been accepted.
- Review and revise our web presence as a recruiting tool. This would include brief biographical sketches of alumni with possible quotes from them.

### **Strategy Five: Enhance support for faculty research activities.**

The Department of Mathematics reaffirms the role of research as a vital part of the academic life of its faculty and students. Such activities should be embraced and encouraged as part of Illinois State's teacher/scholar model. Research activities help faculty stay current in their fields and increase the profile of the Department and the University. This activity and knowledge becomes an asset to the faculty in her or his interaction with other faculty, graduate students, undergraduate students, and our society. Still, given the multifaceted role of the faculty member and the corresponding time demands, it is too easy for research efforts to be lost. Therefore, it becomes important for the Department to support faculty research activities. We propose the following actions to support this strategy.

#### Actions:

- Look for ways to further increase travel support or more flexible ways to distribute existing travel funds to better support faculty travel to venues that will help develop research ideas and disseminate the results of their research.
- Facilitate faculty grant applications for resources available internal and external to the University by encouraging faculty to be aware of and take advantage of such opportunities as well as using departmental resources when needed to support such applications.
- Increase funding for speakers and visitors who enhance the intellectual life of the faculty
- Continued support for faculty development of research proposals by publicizing existing grants and creating mentoring opportunities through events such as meetings in which faculty can consult others in the Department when writing such proposals.
- Increase funding for faculty involving undergraduate students in research activities

## **Strategy Six: Improve support services for students.**

As an institution of higher learning, the primacy of our educational mission must be supported. While we strive to provide high quality instruction in our classes, we also need provide students with the support they require to be successful not only in our programs, but in pursuing further career goals and in becoming lifelong learners. Included in these support services is infrastructure support such as up to date technologies. We propose the following actions to support this strategy.

### Actions:

- Continue to coordinate with the Julia Visor Academic Advising Center to provide support services for our students, including initiatives such as supplemental instruction for targeted courses.
- Continue support of extracurricular organizations such as the Math Club, the Actuarial Club, the Graduate Group for Educational Research in Mathematics, and the Mathematics Lifestyle Floor.
- Continue to work with students to make sure they are aware of needed requirements through activities such as annual meetings with MTE majors to go over the requirements for their major, e-mail reminders of missing requirements in the major or in teacher education gateways, and putting more information on our website for reference.
- Work to institutionalize undergraduate seminars modeled after the S-STEM scholarship program.
- Continue cultivation of donor supported scholarships.

## **Strategy Seven: Increase the profile of our programs, achievements of our students, and our faculty accomplishments.**

An important component in obtaining the resources necessary to support the actions mentioned in this plan is to be able to let other constituencies know the value of what we have the potential of accomplishing. One of the best ways of convincing these constituencies of this potential is to make them aware of what we have already accomplished. Given the many accomplishments of our faculty and students, it is important to provide venues in which we can let others know of these accomplishments. We propose the following actions to support this strategy.

### Actions:

- Continue to update and revise the Departmental website to provide faculty, students, and the public with relevant information that also showcases the members of the Department and its programs. Including biographical sketches of alumni and some quotes from these alumni should also be included.
- Continued efforts to gain University recognition of faculty by nomination for College and University awards.
- Continued support of the Departmental Awards Ceremony in the Spring.
- Explore opportunities that could give our programs more of a national or international presence, potential collaborations with other departments or other institutions.
- Continue to encourage faculty leadership in national and international organizations that would help advance the Department's mission.
- Increase the number of stories about members of the Department in *CASNews*.
- Develop a Departmental newsletter.
- Continue to send newsworthy information to University Media Relations.
- Financially support faculty attending national and international conferences, including those conferences focused on current issues and national discussions involving mathematics.
- Continue to increase support for student travel to conferences and support their efforts to present their research finding in national and international venues.
- Continue to host professional conferences or meetings with an emphasis on such events that highlight the strengths of the Department or may lead to future collaborations with other institutions.
- Explore using social media such as Facebook to increase our web presence.

**Strategy Eight: Increase the amount of external financial support for faculty and student activities, including research activities.**

Much of the Department's funding comes from State appropriated funds and these funds are subject to fluctuations as the economic conditions change. It is therefore becoming increasingly important to look for other sources of funds to further support activities that advance the Department's mission. Traditionally, these funds have taken the form of external grants, usually from government agencies. While the Department should continue to pursue such opportunities, it will also be important to explore other funding sources. We propose the following actions to support this strategy.

Actions:

- Increase travel support that will advance the development of viable grant proposals.
- Continue to support the Center for Mathematics Science and Technology (CeMaST) to help find funding opportunities and develop viable grant proposals.
- Continue Departmental support for cost sharing when it would increase the competitiveness of a proposal.
- Cultivate further donor support for the Departmental Excellence Fund.
- Cultivate funding for to support the research of both graduate and undergraduate students.