GRADUATE PROGRAM REVIEW

2009 - 2015

MATHMATICS AND STATISTICS DEPARTMENT

UNIVERSITY OF NORTH CAROLINA WILMINGTON
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EXECUTIVE SUMMARY

This report contains the review of the graduate program for the period 2009 – 2015. It also incorporates the findings of the previous review conducted in spring 2009 for the period 2001 – 2008.

In the fall semester of 1989, the Department of Mathematical Sciences accepted its first class in a program leading to the Master of Arts or Master of Science degree in mathematics. The two-year program is designed to prepare students for careers in business, industry, government or teaching, as well as for further study toward the Ph.D. degree. Since the program began the department has had almost 200 graduates with 86 in the last seven year period. About 40% of them are teaching, mostly at the collegiate level; about 40% have gone into industry with an emphasis on statistical programing and/or data analytics and several have entered advanced graduate programs in mathematics, statistics, biology, economics and medicine.

We continue to attract high quality students that are diverse in gender and ethnicity. We currently have 18 students, 44% of which are female. Three of our current students are international students or permanent residents and two students who are spouses of active duty military personnel. We also have two students in our five year program with several more to join next semester.

The department has 13 graduate teaching assistantships paying $11,000 per academic year with some additional funding for summer support. The teaching assistantships require 20 hours of contact time a week which currently is spent grading, tutoring in the University Center Math Lab and assisting instructors in the classroom. We are currently looking at how to better use those TAs to improve their experience as well as be more of an asset to the departmental teaching mission. The department also has four out of state tuition waivers, but all students must pay in-state tuition. We regularly use graduate students (four currently) that meet the SACS requirement to be instructors of record, after they have gone through at least one semester of training with our faculty.

We offer a five year bachelors/masters program in which qualified undergraduates majoring in mathematics may count up to four graduate mathematics or statistics courses towards both their bachelors’ and masters’ degrees, enabling them to finish both degrees in five years. We also offer a graduate certificate in statistics.

The graduate faculty for the department is very active in research and scholarship, particularly given our teaching commitment. They have publications in top journals, whether the measure be Journal Citation Reports impact factor, SJR ranking or A* journals in the Australian Mathematical Society. The access to that expertise has clearly impacted the students and enables them to be coauthors on 19 publications and 21 research presentations.

Our students are consistently securing quality internships in the fields of statistical programing, data science and biostatistics. These internships frequently turn into high
paying permanent positions that complement our large number of graduates who go on to teach at the community college and university level, as well as those that pursue other advanced graduate degrees.

Like many programs of similar size we face challenges when it comes to resources for both the students and the faculty. Cost of attendance, or the lack of tuition waivers, can be prohibitive in attracting the best students. Lack of faculty relief time that recognizes the time consuming, but important, efforts made in graduate student mentoring is also an issue. However, we are always searching for creative ways to reduce the impact of these obstacles and we will continue to do so in the future.

In summary, the graduate program in the Department of Mathematics and Statistics is a strong program that produces well trained graduates to enter the job market or further their academic training. In 2015 Actuary, Mathematician, Statistician, and Data Scientist were all ranked among the top 6 Best Jobs by CareerCast. Our graduates have been very successful in their pursuit of all of these careers and more, and we are confident they will continue to do so in the future.
SECTION I – DEPARTMENT CHARACTERISTICS

I.1 History

The Department of Mathematics at Wilmington College was established in 1947, beginning as a one-person junior college mathematics department. Mr. Adrian D. Hurst oversaw the development of the program that was by 1961-1962, a five-person Mathematics Department. The department provided service courses in mathematics for non-majors and started graduating mathematics majors in 1963-1964. By 1963-1964, the department had become the Department of Mathematics and Engineering with nine faculty members and Wilmington College became a four-year senior institution.

With the transition to a senior institution, a teacher certification program in secondary school mathematics along with other content areas was developed. Secondary education majors were required to complete major and minor requirements in two different fields. A major in mathematics consisted of at least 30 quarter hours of mathematics at the junior-senior level. This includes five hours of differential equations and modern algebra each, and 10 hours of advanced calculus. A minor in mathematics consisted of satisfying the standard introductory calculus sequence through multivariable calculus followed by one five-hour junior-senior course.

When UNCW became a part of the UNC system in 1969, the mathematics program went through major revision and curriculum development. At this time, computing and statistics became increasingly important components of the curriculum. According to the 1969-1970 catalog, the Mathematics and Engineering Department had 10 faculty members, two with doctorates. Ten years later the faculty had increased to 14 of whom 80 percent were doctorates.

In 1970-1971, the Mathematics and Engineering Department offered for the first time both a BA and BS degree in mathematics. From 1971-1973, the department offered courses designated either as mathematics, engineering, or computer communications. In 1973, the name of the department was changed to the Mathematics and Computer Science Department. In 1975, the Mathematics and Computer Science Department changed its name to the Department of Mathematical Sciences and expanded its degree offerings to include a B.S. in computer science. The M.S. and M.A. programs were established in 1989, and the department began offering graduate classes in the fall semester of 1989. The departmental operation had become sufficiently complex to justify the amicable reorganization of the department into two new separate departments effective July 1, 1998: the Mathematics and Statistics Department and the Computer Science Department. Statistics continued to be of major interest in the department and in fall 2002, a BS degree in statistics was established. In fall 2005, a post-baccalaureate certificate in statistics was offered by the department. A bachelors’/masters’ five year degree program was approved by the graduate school and was offered by the department beginning in fall 2003. In this program, students may count four graduate courses for both their bachelor’s degree and their master’s degree to enable them to finish both degrees in five years. At the same time the department decided to reduce the hours
required for the M.S. degree from 36 to 30 so that both the M.S. and the M.A. required the same number of hours. This change resulted in the M.S. degree being pursued by almost all the interested students. Also, the faculty had difficulty defining a difference between the two degrees. Thus, the M.A. degree was discontinued on August 1, 2006. The reviewers report from the 2001-2008 report asked: *Are there ways in which the curriculum can be redesigned to focus the program, perhaps combining in some fashion the pure and applied sequences?* In the fall of 2012, we revised our curriculum so all students take the same core courses, Complex Analysis and Linear Algebra. These courses were chosen because they both have a nice blend of application and theory as well as covering topics that are very prevalent in other parts of the curriculum.

The current faculty are very active in research and their interests cover a wide scope of topics in math, mathematics education and statistics. As of fall 2015 the department is comprised of the following:

- 12 tenured mathematics faculty and 6 math lecturers;
- 3 tenured mathematics education faculty;
- 6 tenure or tenure track statistics faculty and one statistics lecturer;
- 11 part time faculty;
- 4 graduate students teaching in the department.

The department support staff includes two administrative associates and an undergraduate assistant. We currently offer B.A., B.S., and M.S. degrees in mathematics, a B.S. degree and a post-baccalaureate certificate in statistics, and undergraduate minors in mathematics and statistics.

**I.2 Mathematics and Statistics Department Mission Statement**

The Department of Mathematics and Statistics is a diversified community of scholars dedicated to excellence in teaching, scholarship, research, and service in the disciplines of mathematics, statistics, and mathematics education.

The department is dedicated to the education of our students in the fields of mathematics and statistics and to the certification of teachers in secondary education. We support curricula that lead to undergraduate and graduate degrees in mathematics and certification for teaching mathematics in secondary schools. In addition, the department offers courses in mathematics and statistics that serve the needs of other degree programs of the University. To provide for the general education of all students, the department offers course for students of varying backgrounds in levels of mastery in mathematics. The department strives for excellence in teaching in all of these activities.

The department is dedicated to scholarship and research in the mathematical sciences, and to active participation in the professional life of its disciplines. This is done through publications and professional meetings.
The department regularly sponsors special lectures and activities to enrich the academic life of the campus and the larger community. Department members share in the role of faculty governance through committee participation at all levels within the University.

The department will continue to serve as the primary regional resource for the mathematical sciences by providing a diverse, energetic, and highly qualified faculty with the instructional and research skills necessary to fulfill our mission.
SECTION II - FINDINGS OF PREVIOUS REVIEW AND THE DEPARTMENT’S RESPONSE

II.1 Report of the Visiting Team on the Graduate Program in Mathematics at UNC Wilmington

Dr. Chal Benson, Professor of Mathematics and Director of Graduate Studies in Mathematics, East Carolina University

Dr. Holly Hirst, Professor of Mathematics and Associate Dean for Graduate Studies, Appalachian State University

The reviewers were sent the departmental self-study covering the time period of 2001 through 2008. The self-study, prepared by the committee of Graduate Advisors, is well written and informative. It documents the productivity of the program during the past seven years and details changes made in response to a previous program review.

We visited the UNC Wilmington Department of Mathematics and Statistics on March 26 and 27, 2009. After being charged by the Dean of the Graduate School, we met with the Graduate Director, the Dean of Arts and Sciences, the Department Chair, faculty, and graduate students. We appreciate the hospitality and welcome we received from all of the UNC Wilmington faculty, staff, and students.

In our view the Mathematics graduate program is well thought out and well-functioning, filling a need in the Wilmington area. The Mathematics Department merits institutional support in the continued development of this program.

We were impressed by the overall quality of the program, especially as regards the engagement of students with faculty in meaningful research. A number of points are particularly noteworthy:

• In contrast to comparable programs a large majority of enrolled students elect the thesis option. In total, the program has produced 40 theses during the 2001-2008 period.

• These theses are of high quality and some have resulted in publications and conference presentations. This is relatively rare for Mathematics master’s theses.

• More than one quarter of the program graduates since 2001 were subsequently admitted to PhD programs elsewhere.

• Other recent graduates are gainfully employed in positions that use their mathematical expertise, either in industry or as instructors at the college, community college and high school levels. Graduates have had great success realizing their career goals.
Compared to other master’s-only graduate programs in mathematics, the program is healthy in size and stable in its enrollment:

• Program enrollment (including non-degree seeking students) has averaged 23 students per year during the past eight years.

• 26 students are currently enrolled.

• The program has produced on average 8.4 graduates per year during the 2001-2008 period.

A combined bachelor’s – master’s program was introduced in 2003, allowing 12 credit hours to count towards both degree components. To date between two and five students have participated in this “4+1” program each year. The program appears to be functioning well. It provides a head start for the department’s better undergraduates and a modest boost in graduate enrollment. The faculty regard the students involved as being among the best of their graduate cohort.

The department has attempted to address the recommendations from the last review. The Graduate School has increased the stipend, some additional recruiting is taking place, the four-plus-one combined bachelor’s – master’s program has been implemented, the MA degree has been discontinued, and the department has sought closer ties with both local business and with nearby doctoral institutions.

Our review of the self-study document and further conversations with faculty and students led us to the following assessment of the program.

Strengths

• The department faculty are actively engaged in research, some of which results in publications coauthored with students, despite an 18 hour annual teaching load.

• Because of the Wilmington location, the department has opportunities to work with business and industry on research and internship opportunities. Some students are attracted by the natural beauty of the coastal area.

• The students are quite satisfied with the program, including the quality and rigor of the courses, the accessibility of the faculty, and their perception of the utility of the degree once they graduate.

• The department has had excellent success in recruiting and enrolling international students, in comparison with other master’s-only programs.
• The faculty is willing to offer courses late in the day to accommodate non-traditional, working students, although that population is still a small portion of the student body.

Weaknesses
• The inability to waive tuition and fees for graduate assistants makes it difficult to attract strong applicants, particularly in competition with universities from surrounding states. In addition, students in mathematics have the option of proceeding directly into a doctoral program, so the competition for the top students also includes doctoral programs, which generally offer more competitive financial packages.

• The self-identified strengths of the program were “master’s students can get an assistantship” and “we give personal attention to our students.” While these attributes mark the program as different from a master’s in a PhD granting department, they do not distinguish the programs from other, master’s only programs (for example, ECU, Appalachian, Western Carolina, UNC-Greensboro).

• There is little “proactive” recruiting on the part of the department to identify prospective students. However, once a prospect is identified, the department is very responsive to requests for information and follows up with prospective students as they navigate the application process.

• Only about one third of the faculty seem to be actively involved in the graduate program, as evidenced by who is teaching and mentoring students on a regular basis.

• Office space and computational resources made available to graduate assistants are inadequate.

Opportunities
• The majority of theses have been involved applications of mathematics and statistics; this could be used to provide a focus to the program.

• The emerging requirement that programs produce expectations for and assessment of student learning outcomes could provide an impetus for the faculty to clarify and solidify the goals and objectives for the program beyond “The two year program is designed to prepare students for careers in business, industry, government or teaching, as well as for further study toward the Ph.D. degree.”

Threats
• The vast majority of students choose to complete a thesis, and the amount of mentoring needed to ensure quality products strains faculty resources. There is a danger of more faculty choosing not to participate in the graduate program.
• Having four introductory sequences, of which students must choose two, forces four of the offerings each semester to be pre-determined. Offering additional courses results in a need to run them as senior-graduate courses or very low enrolled – or both.

• The increased pressure to ensure that graduate courses have five or more students enrolled will force the department to reduce its offerings, further eliminating choices for the students.

Recommendations:

(1) We recommend that the department compensate the faculty for thesis mentoring. Forty theses have been completed in the last seven years, and despite the addition of a non-thesis option, the vast majority students still elect to complete a thesis. This has created a large mentoring workload, which is largely uncompensated. Such compensation could be handled by implementing the current policy of a one course reassignment based on chairing three thesis committees. Probably this policy is insufficient but represents, at least, a starting point. This recommendation was also made in the previous program review, and although the policy was established, it does not appear to be uniformly implemented.

(2) We recommend that GAs each have individual desk space, preferably lockable so that they have a secure location to leave personal items and the papers that they are responsible for grading. The facilities for the graduate assistants – secure office space and technology – are insufficient. In addition, GAs should have access to computers capable of running current software without having to schedule their work between classes in a lab or late at night when the computer system maintenance interferes with running software.

(3) We recommend that the department continue its self-study process beyond the report prepared for the review and investigate a more specific mission statement, program goals, objectives, and learning outcomes. In fact, such a process may be required for purposes of accreditation. During this process we encourage the department to consider the following questions:

   (a) Is it possible to focus the program and provide more definition for the qualities that differentiate this program from other master’s-only programs? Is a professional science master’s (http://www.sciencemasters.com) a viable option?

   (b) Are there ways in which the curriculum can be redesigned to focus the program, perhaps combining in some fashion the pure and applied sequences? Having one pair of required analysis courses and one pair of required algebra courses that may not be a sequence? Eliminating this choice for entering students might open up more choices for students later
in the program after they have a better idea of the research they wish to participate in.

(c) Are there ways in which the GAs can be “repurposed” to provide a more meaningful experience for the students and more support for the faculty? Would RAs be useful for some faculty? Would GTAs that assist in class in ways other than grading? Does the benefit provided to the department and the GAs by math tutoring duties outweigh the cost (half of the GA resources are only indirectly benefiting the department.)

II.2 Response

MEMORANDUM

TO: Bob Roer, Dean Graduate School
FROM: John Karlof, Graduate Coordinator
Mathematics and Statistics Department
DATE: August 31, 2009
RE: 2009 Review of Graduate Programs Report

The external review of the science degree program in mathematics was conducted March 26, 27, 2009. The external reviewers made three recommendations. The department believes these recommendations are consistent with the goals of the program. Each of the recommendations is addressed below.

Recommendations.

“In our view the Mathematics graduate program is well thought out and well-functioning, filling a need in the Wilmington area. The Mathematics Department merits institutional support in the continued development of this program.”

(1) “We recommend that the department compensate the faculty for thesis mentoring. Forty theses have been completed in the last seven years, and despite the addition of a non-thesis option, the vast majority students still elect to complete a thesis. This has created a large mentoring workload, which is largely uncompensated. Such compensation could be handled by implementing the current policy of a one course reassignment based on chairing three thesis committees. Probably this policy is insufficient but represents, at least, a starting point. This recommendation was also made in the previous program review, and although the policy was established, it does not appear to be uniformly implemented.”
**Response:** The 2002 reviewers report contained a similar recommendation and the department instituted what is called the current policy in the recommendation. However, it has never been implemented because the department has not been able to afford course releases for thesis mentoring because of the pressure of offering enough basic study sections of mathematics and statistics.

(2) “We recommend that GAs each have individual desk space, preferably lockable so that they have a secure location to leave personal items and the papers that they are responsible for grading. The facilities for the graduate assistants – secure office space and technology – are insufficient. In addition, GAs should have access to computers capable of running current software without having to schedule their work between classes in a lab or late at night when the computer system maintenance interferes with running software.”

**Response:** The department whole heartedly agrees with the recommendation. However, we have not been able to secure more space from the University for more GA offices.

(3) “We recommend that the department continue its self-study process beyond the report prepared for the review and investigate a more specific mission statement, program goals, objectives, and learning outcomes. In fact, such a process may be required for purposes of accreditation. During this process we encourage the department to consider the following questions:

a) Is it possible to focus the program and provide more definition for the qualities that differentiate this program from other master’s-only programs? Is a professional science master’s (http://www.scinemasters.com) a viable option?

b) Are there ways in which the curriculum can be redesigned to focus the program, perhaps combining in some fashion the pure and applied sequences? Having one pair of required analysis courses and one pair of required algebra courses that may not be a sequence? Eliminating this choice for entering students might open up more choices for students later in the program after they have a better idea of the research they wish to participate in.

c) Are there ways in which the GAs can be “repurposed” to provide a more meaningful experience for the students and more support for the faculty? Would RAs be useful for some faculty? Would GTAs that assist in class in ways other than grading? Does the benefit provided to the department and the GAs by math tutoring duties outweigh the cost (half of
the GA resources are only indirectly benefiting the department)?

d) Given the research focus of the programs, there may be funding available for additional graduate assistantships or fellowships. Would the federal programs GK12(http://www.nsf.gov/funding/pgm_list.jsp?type=xcut) or GANN(http://www.ed.gov/programs/gaann/index.html) or SSTEM(http://nsf.gov/pubs/2006/nsf06527/nsf06527.htm) be possibilities?

Response: This recommendation will be on the agenda of the Graduate Advisors Committee for fall, 2009. The committee anticipates making recommendations to the department on the following issues:

• Program focus, goals, and objectives.
• How to emphasize program qualities that differentiate it from other masters’ programs.
• Reconsider the curriculum with the goal of emphasizing the program’s focus, goals, and objectives and to make course offerings more efficient.
• Reconsider the roles of GA’s in the department.
• Graduate student funding from outside sources.
SECTION III – PROGRAM DESCRIPTION

III.1 Graduate Program Educational Objectives

The Mathematics and Statistics Department offers programs of study leading to the Master of Science degree in mathematics. The Master of Science program is designed to prepare students for careers in business, industry, or government as well as for further study in the mathematical sciences. Applications from the sciences, industry and management are stressed in course work from the areas of classical applied mathematics, operations research, and statistics.

The graduate program complements the undergraduate mathematics/statistics curriculum in several ways. The graduate teaching assistants offer problem sessions, grade assignments for undergraduate mathematics/statistics courses, and tutor in the University Learning Center. The work of the teaching assistants enables undergraduates in all programs to receive extra help with their study in mathematics and statistics.

In addition to offering courses supporting the M.S. degree in mathematics, the department also offers graduate courses supporting other graduate programs, especially in education, marine sciences and biological sciences. Graduate students in education with emphasis in mathematics must take 15 hours of graduate mathematics courses. The mathematical analysis courses and modeling courses are elective courses for the master’s program in marine science. Statistics courses are taken by students in many areas, particularly biology and psychology.

III.2 Admission Requirements

Applications for admission may be made at any time. Applicants are required to submit, normally by April 15 but no later than June 15 for fall or summer admission (by April 1 for full consideration if applying for a Teaching Assistantship) and by November 30 for spring admission, the following to the Graduate School:

1. An application for graduate admission.
2. Official transcripts of all college work (undergraduate and graduate).
3. Official scores on the Graduate Record Examination (GRE) aptitude test. It is not necessary for applicants to take the advanced test in mathematics. However, they are encouraged to do so. Scores more than five years old will not be accepted.
4. Three recommendations from individuals in professionally relevant fields.

Each applicant also must have a strong overall academic record and have passed, with a "B" or better average, the following undergraduate mathematics courses: an introductory calculus sequence including multivariate calculus, a course in linear algebra, and at least 15 additional semester hours of mathematics or statistics courses beyond the level of calculus.
Individuals who fall below the established criterion in one of the areas may be considered for provisional admission.

**III.3 Degree Requirements (as taken from university website)**

The Master of Science degree requires a total of 30-33 semester hours of graduate work in mathematics and statistics. With the permission of the graduate coordinator and the chair, the coursework may include up to six hours of graduate courses from outside the department. To fulfill part of these requirements each student must select one of the following plans:

**Thesis Plan (30 total credit hours)**

Each student must complete two semester hours of seminar (MAT 595) and four semester hours of thesis (MAT 599). Each student must present a thesis, acceptable to his/her thesis committee, prior to graduation. The student will report orally on the thesis to a general audience during the final semester before graduation. The thesis defense will be followed by an oral examination on the student’s course work. The student must successfully complete a written comprehensive examination administered during the semester the student plans to graduate.

**Non-thesis Plan (33 total credit hours)**

Each student must complete two semester hours of seminar (MAT 595) and a one-semester hour research project (MAT 596) or internship (MAT 598). The student must successfully complete a written comprehensive examination administered during the semester the student plans to graduate.

**Core Requirements (12 credit hours)**

Each student must complete:

- **MAT 515 - Introduction to Complex Variables** Credits: (3)
- **MAT 531 - Linear Algebra** Credits: (3)
- One of:
  - **MAT 535 - Linear Programming** Credits: (3) Or
  - **MAT 541 - Modern Algebra I** Credits: (3) Or
  - **STT 512 - Applied Regression and Correlation** Credits: (3)

And one of:

- **MAT 511 - Real Analysis I** Credits: (3) Or
• **MAT 518 - Applied Analytical Methods I** Credits: (3) Or
• **STT 566 - Mathematical Statistics I** Credits: (3)

Additional Requirements (12 credit hours thesis and 18 credit hours non-thesis)

The remaining hours of coursework are selected from MAT 500 - 599 or STT 500 - 599 in consultation with an advisor, who will assist in selecting those courses best suited to the student’s goals and interests. A candidate for the M.S. degree may petition the graduate coordinator for permission to apply up to six hours of graduate coursework from outside the department toward fulfillment of degree requirements. This petition must address the relevance of this coursework to the student’s academic goals and to a coherent program of study. Detailed advising guidelines supplied by the department recommend courses for students preparing for further graduate work; for careers in teaching community college of secondary school; and for careers in industry, business and government.

**III.4 Bachelors/Masters Five Year Degree Program**

The Department of Mathematics and Statistics has a program that enables a student majoring in mathematics to receive a Bachelors and a Master’s degree in a five year period. The key feature of the program is that a student can count up to 12 hours of graduate level courses satisfying requirements for the B.A. or B.S. toward the M.A. or M.S. in Mathematics.

This program is designed for students in the B.A. or B.S. program in Mathematics at UNCW who have:

- Completed a minimum of seventy-five (75) and a maximum of ninety-eight (98) credit hours in their undergraduate programs in mathematics, including credits earned from advanced placement if they start at UNCW or are transfer students and have completed a minimum of two semesters as a full-time student at UNCW, a minimum of 24 hours.
- Completed a minimum of nine (9) hours of 300-400 level mathematics or statistics courses.
- A minimum accumulated grade point average (GPA) of 3.0 and minimum grade point average (GPA) of 3.0 on all 300-400 level mathematics or statistics courses at UNCW.

If you are accepted to this program, during your senior year, you must submit the standard application for admission to the Graduate School including: an application form for Graduate School, application fee, transcripts, and GRE scores.

Upon review of the submitted materials by the Graduate School, a letter of acceptance (or denial) to the Master's program, will be sent to the student and copied to the Department
Chair and the Graduate Coordinator. Acceptance will be provisional and contingent on meeting specified degree requirements; including completion of the Bachelor's degree.

A student who is ineligible to participate or continue in, or withdraws from the Bachelor's/Master's program cannot double count any courses for both Bachelor's and Master's degrees.

**III.5 Undergraduate Program Profile**

The Department of Mathematics and Statistics offers three undergraduate degree programs (B.A. and B.S. in Mathematics and B.S. in Statistics). A student may choose to obtain Teacher Licensure in Mathematics with the B.A. degree in mathematics. In addition, undergraduate students may also obtain a minor in either mathematics or statistics.

The undergraduate degree programs consist of a group of core courses (30 hours for the B.A. and 33 hours for the B.S. in Mathematics, and 29 hours for the B.S. in Statistics) that is followed by additional course work in the particular area of interest. An overall average of 2.00 or better is required for all 300-400 level mathematics and statistics courses counted toward the major. In addition, all degree programs require an oral communication competency course. A student must successfully complete MAT 346 (History of Math) or any other approved oral intensive course for the B.A. degree and MAT 495 (Capstone course) for the B.S. degree in Mathematics to satisfy the oral communication competency requirement; for the B.S. Degree in Statistics, the student must complete STT 490 (Case Studies) or 498 (Internship). A student must complete MAT 161-162, 261 (Calculus sequence), and 335 (Linear Algebra); and STT 215 (Introductory Statistics) to satisfy the computer competency requirement for either degree in Mathematics; for the degree in Statistics the student must complete STT 305 (SAS Programming).

The minor in Mathematics requires 20 hours in mathematics and statistics. MAT 161-162 (Calculus I and II) and at least 12 hours selected from mathematics courses numbered 261 (Calculus III) or higher, or STT 315 (Probability). These hours must include one of the following: MAT 261, MAT 275 (Axiomatic Systems) or MAT 335. At least six hours must be from coursework at the 300 or 400 levels.

The minor in statistics requires 18 hours in statistics. It requires STT 215, STT 305, and at least twelve additional hours in statistics at the 300 or 400 levels.

The Teaching Licensure in Mathematics requires completion of the Teacher Education Program from the Watson School of Education and the completion of the B.A. degree requirements with the specification of certain courses that are needed for licensure in North Carolina.
The Department of Mathematics and Statistics offers a series of undergraduate courses, which are taken by non-majors as part of the Basic Studies Requirement of the University. These courses, mainly at the 100-level, are used to fulfill some of the requirements in Natural Science and Mathematical Sciences Category.
SECTION IV - CERTIFICATION AND INTERDISCIPLINARY PROGRAMS

The Department of Mathematics and Statistics proactively seeks and creates interdisciplinary opportunities for faculty and graduate students. Graduate programs in marine science, biology, nursing, psychology, chemistry, and education work closely with the mathematics and statistics department to enrich their programs.

IV.1 Applied Statistics Certificate Program

The department introduced a post-baccalaureate certificate in applied statistics in the fall of 2005. The certificate program was developed to provide advanced statistical training for graduate students at the University of North Carolina Wilmington and working professionals in the surrounding area. A total of 17 hours in approved course work is needed to complete the graduate certificate. Students are given flexibility to choose courses within the Department of Mathematics and Statistics or statistically rigorous courses outside the department. Dr. James Blum is the coordinator of the Applied Statistics Certificate Program. Information regarding admission to the certificate program is shown in Table 1.

Table 1. Admissions/Graduates of the Applied Statistics Certificate Program

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<tr>
<th>Term</th>
<th>Students Enrolled</th>
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Applied Statistics Certificate Program Completion

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<td>2010-2011</td>
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Philosophy of the Program

Modern technology has allowed for the collection and dissemination of vast quantities of information, which has resulted in a parallel increase in the use of statistical techniques in a variety of fields. Leaders in business and industry and public administrators all have the desire to make the most efficient and effective use of the wealth of information available to them. As a direct result, growth of enrollment in graduate programs in statistics and expansion in the hiring of trained statisticians has been steady over the last decade.

The Professional Certification Program in Applied Statistics is intended to help fill the need for qualified personnel trained in the proper use of statistical methodology. The proposed curriculum will allow for a balance between the technical and practical aspects of statistical applications, along with perspectives on reporting results to a variety of potential audiences. The overall objective of the program is to give working professionals the necessary skills to ensure their data-based inferences and decisions are based on sound statistical principles.

The certificate program is designed for:

- Business and industry professionals and public administrators who have limited training in statistics but deal with data on a regular basis and would like to improve their working knowledge of data analysis, use more sophisticated techniques than those in current practice, and/or use the acquired knowledge to advance their career.
- Graduate students in other disciplines who perceive the need for statistical knowledge in their future career or are simply interested in a deeper understanding of statistical methodology as it relates to their field.
- Students who have earned undergraduate degrees in other programs who believe statistical training will give them a competitive advantage in their field.
- Secondary school teachers who would like to be more adequately prepared to discuss statistical techniques in their courses.
- Those who wish to pursue an advanced degree in statistics but would prefer to gain more experience before proceeding.

Certificate Program Curriculum

The program requires 17 or 18 credit hours for completion. Students must complete a minimum of fifteen hours from graduate courses containing a substantial degree of
statistical theory or application, at least twelve of which are from courses offered in the Department of Mathematics and Statistics. The remaining hours may include another three hour graduate course or a two hour research project STT 596. The course options selected are subject to approval by the program coordinator.
SECTION V. FACILITIES

Classrooms

The Department of Mathematics and Statistics moved from Bear Hall to Osprey Hall in the fall of 2015. The Building was newly renovated and finished just in time for the fall semester. The new facilities are a significant upgrade from the old facilities in Bear Hall.

Osprey Hall has two 24 seat computer lab classrooms and two 36 seat computer lab classrooms, each with two 10x4 whiteboards. Each student station is equipped with a networked Dell OptiPlex 7020. The instructor stations are adjustable height with a document camera and a dual monitor, smart screen instructor’s computer attached to a high definition Sony projector.

The Teacher Education Learning Lab is a 24 seat lab equipped with a 55 inch flat panel monitor, a 67 inch smartboard, and instructor station attached to a high definition Sony projector. This room also includes a laptop cart with 15 laptop computers which include appropriate software for educational purposes.

The rest of the Mathematics and Statistics classrooms in Osprey Hall have instructor stations that are adjustable height with a document camera and a smart screen instructor’s computer attached to a high definition Sony projector.

Five Applied Learning Spaces

DIVE (Data Intelligence Visualization and Exploration) Group
310 sf with two 8x4 white boards and two attached offices
101 sf server room two computer racks, network attached storage, 10 rack mount servers
Two computer stations with projections system and eight person conference table

IDEAL (Interdisciplinary Data Enrichment and Analytics Lab)
282 sf with 14 foot white board with projections system
Four computer stations with a six person conference table

Representation Theory Lab
124 sf 3x5 white board and a four person study station

SOAR (Simulation Optimization Analysis and Representation)
369 sf with 18x4 whiteboard
Four computer stations
A backbone conference table with attached 40 inch flat panel

Teacher Education Lab
242 sf space with 8x4 white board six attached offices
67 inch Smartboard
Two 3-person study stations

Other facilities

Main office with high speed printer, color printer, fax machine, color copier, mail center and kitchenette with full refrigerator, microwave, sink, supply storage and workspace.

Two more kitchenettes with full refrigerator, microwave, sink, supply storage and workspace, and community printers.

Conference room (223 sf) with 10 person conference table, 10x4 white board and 55 inch flat panel.

Student Fishbowl Lounge- 314 sf with 12x4 whiteboard and four 3-person work tables.

Five Student Study Rooms (123-189 sf) with tables, flat panels and whiteboards available for students to reserve.
SECTION VI. PERSONNEL

Tenure-track Graduate Faculty (Year of initial appointment)
* Graduate Faculty

Professors

Dr. Jim Blum* (2000)
Ph.D. Oklahoma State University
Research Interests: Varying Coefficient Models, Non-parametric Regression, Categorical Data Analysis, Statistics Education

Dr. Jeffrey L. Brown * (1984)
Ph.D. University of Georgia
Research Interests: Computer Aided Geometric Design, Manifolds and Cell Complexes/Algebraic and General Topology

Dr. Wei Feng * (1988)
Ph.D. North Carolina State University

Dr. Michael Freeze* (1999)
Ph.D. University of North Carolina
Research Interests: Algebraic Number Theory, Nonunique Factorization Theory

Dr. Russell Herman *(1990)
Ph.D. Clarkson University
Research Interests: Nonlinear Differential and Difference Equations (Solitons, Chaos, Integrability, Perturbations, Painleve’ Analysis, Symmetry Group Analysis), Mathematical Physics (Fluid Dynamics, Nonlinear Optics, Relativity), Instructional Technology, Numerical Analysis, Transforms

Dr. Dijana Jakelic *(2009)
Ph.D. Indiana University
Research Interests: Representation theory of quantum groups, Lie algebras, and Hecke algebras; Combinatorial representation theory

Dr. Subramanyam Kasala* (1989)
Ph.D. Indian Statistical Institute
Research Interests: Multivariate Analysis, Time Series, Inference

Dr. Mark Lammers *(2003)
Ph.D. University of Missouri
Research Interests: Functional analysis and Computational Harmonic analysis
Dr. Xin Lu *(1993)
Ph.D. North Carolina State University
Research Interests: Numerical Solutions of Differential Equations, Differential Equations

Dr. Susan J. Simmons *(2002) (Chair)
Ph.D. University of South Carolina
Research Interests: Hierarchical Models, Bayesian Inference, Decision Theory, Statistical Computing, Statistics Education

Dr. Yishi Wang *(2008)
Ph.D. State University of New York at Binghamton
Research Interests: Mathematical Statistics, Survival Analysis, Generalized Linear Model and Statistical Computation

Associate Professors
Dr. Yaw Chang *(1994)
Ph.D. John Hopkins University
Research Interests: Mathematical Programming, Operations Research, Coding Theory

Dr. Cuixian Chen *(2012)
Ph.D. State University of New York at Binghamton
Research Interests: Statistical Learning, Biometrics, Pattern Recognition, Biostatistics (Survival Analysis)

Dr. Daniel X. Guo * (1999)
Ph.D. Indiana University

Dr. Xiaojie Hou *(2007)
Ph.D. The University of Iowa

Dr. Gabriel G. Lugo * (1982)
Ph.D. University of California, Berkeley
Research Interests: Relativity, Differential Geometry, Instructional Technology, Quantum Mechanics, Analysis on Manifolds

Dr. Ginger Rhodes *(2008)
Ph.D. University of Georgia
Research Interests: Mathematics Education, Professional Development, Teacher Content Knowledge, Teacher Decisions and Instructional Practices

Dr. Kelli Slaten *(2007)
Ph.D. North Carolina State University
Research Interests: Mathematics Education, Preservice Teacher Education, Effective Teaching, Student Achievement

Dr. Matthew TenHuisen * (1993)
Ph.D. Clemson University
Research Interests: Multiple Objective Programming, Mathematical Programming, Operations Research

Dr. Allison Toney * (2008)
Ph.D. University of Northern Colorado
Research Interests: Mathematics Education, Graduate School Related Experiences in Mathematics and Mathematics Education, Autoethnography, Educational Ethnography

Assistant Professors
Dr. Indranil Ghosh *(2015)
Ph.D. University of California, Riverside

Dr. Kenneth R. Gurganus (1975)
Ph.D. University of North Carolina
Research Interests: Functions of a Complex Variable, Differential Equations/Real Functions

Phased retirement
Dr. John Karlof (1984)
Ph.D. University of Colorado
Research Interests: Coding and Information Theory, Operations Research

Non Tenure-Track Faculty

Full-time Lecturers
Stephen David Boul (2011)
M.S. Applied Mathematics, University of Missouri—Columbia
James L. Byrd III (2012)
M.A. Mathematics with Probability and Statistics concentration, East Carolina University

Elizabeth Creath (2012)
M.S. Mathematics, University of North Carolina Wilmington, Wilmington, NC.

Terry Fleck (1998)
M.A.T. University of North Carolina

Linda Gurganus (2012)
M.A. Mathematics, University of North Carolina Wilmington, Wilmington, NC.

Daniel McGhan (2014)
M.S. Mathematics, University of North Carolina Wilmington, Wilmington, NC.

Sonia Parker (2003)
M.S. Mathematics, University of North Carolina Wilmington, Wilmington, NC.

Part-time Lecturers (Fall 15)

Kimberly Bageant
Kevin Carlin
Hanns Ewald
Bailey Hall
Leopold Hartsock
Brandy Jones
Katherine Olivolo
Elisabeth Peters
Shana Sperry
Emily Stein
Ryan Story

Graduate Students Teaching Part-Time (Fall 15)

Kelly Armstrong
Daniel Jaramillo
Nikolai Lipscomb
Jennifer McCormick

Staff

Beth Casper- Administrative Staff
Jann Sulzen- Administrative Staff
Megan Reinhart – Undergraduate Work Study Student
SECTION VII. GRADUATE STUDENTS

VII.1 Student Profiles

We continue to attract high quality students that are diverse in gender and ethnicity. We currently have 18 students 44% of which are female. Three of our current students are international students or permanent residents and two students who are spouses of active duty military personnel. We also have two students in our 5 year program with several more to join next semester.

Our students are very active in research and scholarship, with many earning good internships which lead to high quality careers. Many also go on to be community college lectures, instructors at universities.
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Program Review Admissions Data
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* Enrolled

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<tr>
<td>100.0%</td>
<td>100.0%</td>
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<td>88.9%</td>
<td>11</td>
<td>100.0%</td>
<td>100.0%</td>
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* Race Enrolled

- Asian: 1 (10.0%) 1
- Black or African American: 2 (14.3%) 2
- Hispanic: 0 0
- Lawful Permanent Resident: 0 1 (12.5%) 1
- Multi Race: 0 1 (8.3%) 1
- Non-citizen: 0 50.0% 1
- Unknown: 1 (10.0%) 1
- White: 10 (80.0%) 100.0% 13

* Gender Enrolled

- Female: 8 (26.7) 36.0 8 (27.7) 5
- Male: 2 (29.5) 32.5 7 (31.0) 6

* Residency Enrolled

- N: 4 (40.0%) 9
- R: 6 (60.0%) 100.0% 11

* Alumni Total Applicants

- Non-UNCW: 7 (73.3%) 25.0% 12
- UNCW: 3 (26.7%) 75.0% 11
<table>
<thead>
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<th>Summer 2015</th>
<th>Fall 2015</th>
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* Enrolled

N 0 | 0.0% | 0 | 0.0% | 0 | 1 | 12.5% | 0
Y 8 | 100.0% | 1 | 100.0% | 0 | 9 | 72.7% | 8

* Race Enrolled

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* Gender Enrolled

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* Alumni Enrolled

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</table>
VII.2 Recruitment, orientation, advising and placement

- **Recruitment:**
  - Designed a poster for the program and sent to 450 Universities in the southeast, including all HBCU in the southeastern states.
  - Designed a Business card for the program that is featured in the Graduate School Office. Both the poster and the business card have a QR-code on them that links directly to the departmental Web Page.
  - Maintain a departmental web page for the graduate program.
  - Had a booth and a display board at the Graduate Fair of the Southeast Sectional of MAA.
  - Had a booth and a display board at the UNCW Graduate Fair.
  - Started a LinkedIn group for UNCW Mathematics Grad Program. It helps keep in touch with former students as well as create contacts with graduates looking to come back to school to get a master’s or post-baccalaureate certificate.
  - Maintain good relationships with local contract research organizations creating contacts with graduates looking to come back to school to get a master’s or post-baccalaureate certificate.
  - Worked with UNCW Graduate School and Human Resources to get the department’s first DACA (Deferred Action for Childhood Arrivals) student admitted and supported with an assistantship and an out of state tuition waiver. He will graduate this fall.
  - Contacted Centro Hispano (UNCW) about promoting our program and sent them the poster explaining some of the programs features.

- **Orientation:** The Graduate Coordinator conducts an orientation session for all new graduate students before classes begin. The graduate program is explained, students are advised, students register for classes, teaching assistant duties are discussed, and a tour of our facilities is given.

- **Advising:** The Graduate Coordinator is the advisor to all the students. He meets with them regularly and encourages them to come to his office with questions about the program, TA duties, etc. After the first year, students choose a thesis advisor or a project advisor.

- **Placement:** The Department maintains very good relationships with our local industry (PPD, INC Research, Pharpoint, Chiltern, Live Oak Bank) and community colleges (Cape Fear Community College, Brunswick Community College and Coastal Carolina Community College) and we place many of our students locally. We also bring in several recruiters from both industry and graduate schools.
  - Jay King, Director - Solution Development, SAS Advanced Analytics Lab, 2015
  - Kathy Greene, Associate Director Analytics Program, North Carolina State University, 2015
  - Professor Ratnasingham Shivaji, Department Head, Mathematics and Statistics, UNC Greensboro 2014
  - Dr. Bob Taylor, Clemson University, 2012
VII.3 Initial/Current Professional Activities of Master’s Students in Mathematics
(*Earned Post-Baccalaureate Certificate in Statistics)

Spring 2009
Soares, Jessica G
Cohen, Margaret Anne
Herndon, Andrea Lynn
Maeser, Anna Marie - Kendle/Array Biostatistics, Statistical Programmer

Summer 2009
Bageant, Kimberly Faye – Instructor, UNCW
Fang, Fang - Ph.D. candidate in Statistics, University of Arizona
Fang, Qijun - Ph.D. candidate in Statistics, University of Arizona
Lai, Yanzhao -Master’s in Economics 2011, Boston University,
     Ph.D. candidate in Economics, George Washington University
Lyon, Paul Frederick – Programmer Analyst, PPD
Moore, Sara Clair - Mind over Math Tutoring, Owner/Director; Instructor, UNCW

Fall 2009
Du, Lifang - Project Manager, Bus Operations Systems, NJ Transit
Pflaumer, Tracy Hoyle – Biostatistician, Pharpoint
Rock, Brevin Shae - Navigational Analyst, CGGVeritas
Stein, Emily Smyth – Instructor, Cape Fear Community College
Tingen, Larry Lee – Instructor, Cape Fear Community College

Spring 2010
Poku, Derick Owusu – Instructor, Coastal Carolina Community College
Schieffelbein, Fernando Gatica – Instructor, Coastal Carolina Community College

Summer 2010
Makumburage, Gayan Buddhika – Programmer Analyst, PPD
McGhan, Daniel Martin - Lecturer, UNCW
Wang, Shanshan – Ph.D. candidate, UT Dallas

Fall 2010
Gebczyk, Kathleen
Roberson, Kara Blalock- public school teacher

Spring 2011
Aktas, Feray – Instructor, UNCW
Antonino, Phillip Joseph
Beck, Christopher Loyd* – (Earned MS Psychology at UNCW)
McNulty, Tiffany Marie* - (Earned MS Psychology at UNCW)
Rocco, Nicole Angela
Stampe, Simon Oliver – MD student, SUNY Upstate Medical University

Summer 2011
Bullard, Jonathan Brian
Creath, Elizabeth Ann - University of Mary Washington; Lecturer, UNCW
Millard, Tyler Richard - Singer/songwriter for the Tyler Millard Band
Nelson, Youri Noel – Ph.D. candidate, University of Auckland; Data Analyst, Live Oak Bank
Peterson, Jonathan Graham* – (Earned MS Psychology at UNCW)

Fall 2011
Brown, Timothy Douglas- Actuary
Cramer, Rachel*
Dunlop, Stacey Abigail
Gresham, Jeremy Scott - Accepted into Ph.D. Program (University Fellowship) IUPUI; Scientific Programmer, Duke Cancer Institute's Bioinformatics Shared Resource
Pangburn, Allan Clark - Instructor, USC-Lancaster.
Parker, Travis James

Spring 2012
Cohoon, Erica Rene – Pharpoint; Statistical Programmer, Quintiles
Crosby, Gary Wayne – Ph.D. candidate in Mathematics, UNC Charlotte
Keebaugh, Christof Kuhbach
Kitchens, Joseph Andrew
Knebel, Robert Wayne – Kendle/INC; Programmer Analyst, PPD
Lundin, Keith David* - Programmer Analyst, PPD
Oberfeitinger, Hannah K

Summer 2012
Jones, Brandy Mereta – Instructor, Cape Fear Community College
Retz, Caylah Natielle – Ph.D. candidate in Mathematics, UNC Charlotte

Fall 2012
Fruendt, Rachel Suzanne – High School Teacher, East Mecklenburg High School
Greene, Jessica Adora
Hollingsworth, Emma Kate
Jenkins, Tanglea Vontryce
Johnson, Shana Lynn – Instructor, UNCW
Kinney, Wesley T – Programmer Analyst, INC Research
Smith, Jason Albert – Instructor, Brunswick Community College

Spring 2013
Carnevale, Zachary Arthur – Dental School student, University of North Carolina
Cowen, Michael Thomas – Ph.D. candidate in Mathematics, University of South Carolina
Faulkner, Matthew Steven – Ph.D. candidate
Hartsock, Leopold Bruce – Instructor, UNCW
Jethwa, Hiten Bharatsinh- Kesler, Johanna Ashley - Senior Statistical Programmer INC Research; Senior Statistical Programmer, PPD
Merlini, Jonathan – Ph.D. Candidate, University of Oklahoma
Reavis, Candice Michelle - Cape Fear Tutoring Inc.
Scott, Robert Zackery – Statistical Programmer III, Chiltern
Wilson, Brandie Partin – Secondary Mathematics Teacher, Horry County Schools

Summer 2013
Figliolia, James Vincent - Professional Development Coordinator, UNCW Human Resources

Fall 2013
Landers, Dustin Alan* - Statistical Analyst Senior at Virginia Department of Labor and Industry
Linz, Alan Ray – Business Technician, UNCW
Manching, Heather Kristen - MCRT
McLiverty, Madison Torie – Statistical Programmer, PharPoint
Moore, Douglas Bradford - Statistical Programmer Chiltern
Peters, Elisabeth Frances – Assistant Director, Mind over Math, Instructor, UNCW
Pierce, Brian Michael - Statistical Programmer, Chiltern
Siddons, Thomas L’amoreaux – Instructor, Central Piedmont Community College; Data Analyst, Publicis Hawkeye

Spring 2014
Blacklock, David Norman – Instructor, Brunswick County Community College
Elliott, Bailey Meredith – Instructor, Isaac Bear Early College High School and UNCW
Kotz, Andrew Lee – Fireman Charleston, SC
Liu, Ying
Livinski, Victoria – Instructor, Wake Technical Community College
Olivolo, Katherine Rose – Test Prep Coordinator, Mind over Math; Instructor, UNCW
Pierce, Allison Michelle* – (Earned MS Psychology at UNCW)
Prescott, Blaine Olivia* – (Earned MS Psychology at UNCW)
Welch, Remy Louise* - NC State, Analytics program; Technology Consultant, Deloitte Consulting
Summer 2014
Blackmon, Hannah Jean Ritchie – Ph.D. candidate, Biomathematics, Bioinformatics and Computational Biology Research Assistant, North Carolina State University
Hancock, Daniel Isaac – Ph.D. candidate, Applied Science, William and Mary Watkins, Valerie Jean – Prometrics, Wilmington, NC
Zaytseva, Sofya Yevgeniy - Ph.D. candidate Applied Science, William and Mary

Fall 2014
Marcley, Nicolette – Business Energy Professional, Utility Management Services

Spring 2015
Ashby, Cody James
Auman, Stacey Leigh – Instructor, Wake Technical Community College
Carlin, Kevin Andrew – Instructor, UNCW
DeSimone, Craig Matthew – Data analyst, Live Oak Bank
Mangum, Nicholas Patrick – Systems Engineer, Boeing
McVey, Allison Anne* – (Earned MS Psychology at UNCW)
Sauls, Madison Elizabeth* – (Earned MS Psychology at UNCW)
Story, Ryan Blake* - Instructor, UNCW; Intern, Chiltern; SAS

Summer 2015
Miner, Nathaniel Paul – Director, Office of Resource Management, College of Health and Human Services, UNCW

Fall 2015
Jaramillo, Daniel – Instructor, UNCW

VII.4 Student Joint publications with Faculty (2009-2015)
(Student’s name in boldface)


Wang, Y., Chen, C., **Watkins, V.**, Ricanek, K. *Modified Supervised Kernel PCA for Gender Classification*. IScIDE 2015. [Accepted 03/2015]

**Qijun Fang**, Walter W. Piegorsch, Susan J. Simmons, Xiaosong Li, Cuixian Chen and Yishi Wang. *Bayesian Model-Averaged Benchmark Dose Analysis Via Reparameterized Quantal-Response Models*. Biometrics. [Accepted 05/2015]
VII.5 Graduate Student Presentations at Professional Meetings (2009-2015)


VII.6 Student Support

The department maintains one large office for the graduate students and smaller office for the graduate students teaching their own classes. Both offices have several computers. We have 3 departmental “commons” rooms with sinks, microwaves and refrigerators. The department has the following financial support available for graduate students: (all students including TA’s are required to pay in-state tuition)

- 13 teaching assistantships at $11,000.00 per year (TA’s are assigned a total of 20 hours per week of tutoring in the Learning Center and/or grading for departmental faculty)
- $7,000.00 in in-state tuition scholarships
- Four out-of-state tuition remissions
- Two $500.00 “new scholar awards” for outstanding applicants
- Research Assistantship for Statistics Consulting with College of Health and Human Services, $12,000
- Opportunity for students with at least 18 graduate hours in mathematics to teach their own courses paid with part-time money instead of a TA
- TAs have an office with 12 cubicles, each with a computer
- Grad students who are teaching share a separate office
- Lounge space and a kitchenette with a full size refrigerator and a microwave oven
- The graduate school offers travel grants to graduate students attending professional conferences
- The graduate school offers summer research awards, and four scholarships open to all graduate students at the university.
SECTION VIII. AFFIRMATIVE ACTION

The University of North Carolina at Wilmington emphatically states that it will provide equal employment opportunities for all persons regardless of race, color, national origin, creed, religion, sex, age, handicapping condition, or political affiliation, except where religion, sex, or age are bona fide job related employment requirements. This is in keeping with Title VII of the Civil Rights Act of 1964 as amended, Executive Order 11246, the Rehabilitation Act of 1973, the Civil Rights Restoration Act of 1987, NC G. S. 126-16 and 126-17, and other applicable federal and State laws.

In furtherance of this policy, UNC Wilmington prohibits retaliatory action of any kind taken by any employee of the university against any other employee or applicant for employment because that person made a charge, testified, assisted or participated in any manner in a hearing, proceeding, or investigation of employment discrimination.

To ensure that equal employment opportunity exists throughout the university, a results oriented equal employment opportunity/affirmative action program will be implemented to overcome the effects of past discrimination and to eliminate any artificial barriers to employment opportunities for all qualified individuals that may exist in any of our programs.

This program shall ensure greater utilization of all persons by identifying the underutilized groups in the work force (especially minority, female, and handicapped workers), and making special efforts to increase their participation in recruitment, selection, training, development, upward mobility programs, and any other term, condition, or privilege of employment.

Goals and timetables shall be established to reduce and eliminate the underutilization of all groups through the equal employment opportunity/affirmative action plan and program. Responsibility for the development of this plan and program is hereby assigned to the EEO/AA Officer and Director of Human Resources. However, responsibility for the implementation of and compliance with the plan and program will be shared by all managers and supervisors.

The equal employment opportunity/affirmative action program will be evaluated and monitored continuously. Periodic reports on the progress of this program will be presented to the chancellor by the EEO/AA Officer and to the Board of Trustees by the chancellor.

The University of North Carolina at Wilmington is committed to this program and is aware that with its implementation, positive benefits will be received from the greater utilization and development of previously under-utilized human resources.
SECTION IX. SUMMARY OF RESEARCH AND SCHOLARSHIP

Faculty in the Department of Mathematics and Statistics are engaged in a variety of forms of research and scholarship. They have publications in top journals, whether the measure be Journal Citation Reports impact factor, SJR ranking or A* journals in the Australian Mathematical Society. They also have strong record of scholarship in the form of grants, presentations, publications with students, editing and referring duties, organizing meetings, awards and other leadership roles.

IX.1 Faculty Research and Scholarship 2009-2015

Snapshot from ReachNC*

Note: Not all publications are indexed in Reach NC and many of the works listed in the next table are collaborative hence the descprencies in the numbers.

2009 8 publications and 43 citations
2010 17 publications and 112 citations
2011 16 publications and 43 citations
2012 3 publications and 0 citations
2013 7 publications and 6 citations
2014 8 publications and 3 citations
2015 7 publications and 0 citations
## IX.2 Summary of Research and Scholarship

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Current Rank</th>
<th>Number of Refereed Journal Publications</th>
<th>Number of Refereed Proceedings Articles</th>
<th>Number of Other Publications</th>
<th>Number of Presentations at Conferences</th>
<th>Number of Articles Referred AMS/ASA Other Reviews</th>
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</table>

47
IX.3 Editorial Positions

Wei Feng
Associate Editor, Communications in Pure and Applied Analysis (SCI), 2005-present.
Associate Editor, Journal of Applied Analysis and Computation (SCIE), 2010-present.
Invited Issue Editor (with Professor Zhaosheng Feng), on a special issue of Discrete and Continuous Dynamical Systems - Series S (DCDS-S)entitled “Analysis and Computations on Differential Equations and Dynamical Systems”, 2012-2013.
Issue Editor (with Professor Zhaosheng Feng), on a Theme Issue “Dynamical Systems and Applications in Engineering and Biology”, Communications on Pure and Applied Analysis, 2008-2010.

Indranil Ghosh
Editorial board member, Far East Journal of Theoretical Statistics
Associate Editor, International Journal of Computational and Theoretical Statistics

Russel Herman

Dijana Jakelic

Xin Lu
Managing Editor of the international mathematics journal: Discrete and Continuous Dynamical Systems Series B, September 2004-present.
Editor in Chief of the international mathematics journal: Discrete and Continuous Dynamical Systems-Series S, January 2008-present.
Editor of Dynamical Systems and Differential Equations (bi-annual series), Proceedings of AIMS International Conferences, 2002-present.

Susan Simmons
Associate Editor, Environmetrics
Co-editor of Special session of Environmetrics in Qualitative Risk Assessment, December 2012

Conference Proceedings

Dynamical Systems and Differential Equations , Edited by David Costa, Wei Feng, Zhaosheng Feng, Xin Lu, Xingping Sun, Masaharu Taniguchi, Antonio Vitolo; ISBN-10:

IX.4 Textbooks


IX.5 Patents, Featured Articles, Featured Presentations

Patent

Selected Featured articles


IX.6 Conference Organization

Conference Organizer Committee
AIMS International Conferences

2016 Orlando Florida.
Organizing Committee: Xin Lu (chair), Yaw Chang, Wei Feng, Michael Freeze, Jonathan Rowell, Beth Casper (Administrative Assistant)

2014 Madrid, Spain.
Program Committee: Yaw Chang, Michael Freeze, Xin Lu
Conference Coordinator: Xin Lu

2012 Orlando Florida.
Organizing Committee: Xin Lu (chair), Yaw Chang, Edwina Johnson, Wei Feng, Semen Koksal, Zhaosheng Feng, Nolan McMurray, Michael Freeze

2015 SROC Summer Research Conference. Carolina Beach, NC. Local Organizer: Susan Simmons

2015 MAA-SE Section Meeting, Wilmington, NC. Local organizing committee. Russ Herman (chair), Michael Freeze, Matthew TenHuisen, Yishi Wang

2010 From Banach Spaces to Frame Theory and Applications. In Honor of Professor Pete Casazza's 65th Birthday. Norbert Wiener Center, University of Maryland College Park
Organizing Committee
Radu Balan (local organizer, University of Maryland, USA).
Bernhard Bodmann (University of Houston, USA).
Chris Heil (Georgia Institute of Technology, USA).
Gitta Kutyniok (University of Osnabrück, Germany)
Mark Lammers (University of North Carolina, USA).
Thomas Strohmer (University of California, Davis, USA).

Special Sessions/Poster Session/Section Chair

Cuixian Chen
- Section Chair for the Techniques for Functional Data, Section on Statistical Learning and Data Mining, Joint Statistics Meeting (JSM), August 2013. Her duties included organizing the Statistical Learning and Data Mining program at JSM 2013.
- Section Chair for Regression in Data Mining, Section on Statistical Learning and Data Mining, JSM 2014, August 2014. Her duties included organizing the Statistical Learning and Data Mining program at the JSM 2014.

Wei Feng
- Coordinator of the student paper competition, 10th International Conference on Dynamical Systems and Differential Equations, Madrid, Spain, July 2014.
- Organizer of the Special Session titled “Qualitative theory of differential equations and applications” at the 10th International Conference on Dynamical Systems and Differential Equations, held in Madrid, Spain, July 7-11, 2014.
- Organizer of the Special Session titled “Analysis and Simulations of Nonlinear System”and the Contributed Session titled “Modelling and Math Biology” at the 9th International Conference on Dynamical Systems and Differential Equations, held in Orlando, Florida, July 1-5, 2012.

Xiaojie Hou
- Co-organized special session for the International DEQ at Florida in 2014
- Organized special session for the DEQ conference in Madrid in 2014.
Dijana Jakelic
- Organizer of the American Mathematical Society Special Session on Geometric and Algebraic Aspects of Representation Theory at the AMS Southeastern Fall Section Meeting in New Orleans, LA, October 13-14, 2012.

IX.7 Research Grants and Other Funding
We list funding of $25,000 or more although numerous Internal Research awards and travel Grants have been obtained. There have been numerous grants to conduct research at BIRS, IMECC-unicamp, Max Planck Institute for Mathematics, SAMSI and other notable research institutions.

Research

Other Funding Awarded
2009-2012 Mathematics and Science Partnership Grant, Bridges, $333,777, Consultant, professional development project for Onslow County School District (accepted April 14, 2009) Ginger Rhodes

2009-2012 Mathematics and Science Partnership Grant, Math Achievement Success Today, $99,972, Consultant, professional development project for Brunswick County School District (accepted April 14, 2009) Ginger Rhodes

2012-2014 Mathematics and Science Partnership Grant, Problem Based Mathematics (PBM), $873,924, Consultant, Professional development project for Onslow County School District (accepted April 8, 2012). Ginger Rhodes

2012-2014 Mathematics and Science Partnership Grant, Mathematics and Common Core (MACC), $280,000, Consultant, Professional development project for Brunswick County School District (accepted April 9, 2012). Ginger Rhodes

2014-2017 Mathematics and Science Partnership Grant, Math Teacher Leader Collaboration, $101,000. Consulting, development and implementation of professional development project for Brunswick County School District. Alison Toney

2012-2014 Mathematics and Science Partnership Grant, Mathematics and Common Core, accepted April 9, 2012, $280,000. Consulting, development and implementation of professional development project for Brunswick County School District. Alison Toney
2011-2012 Mathematics and Science Partnership Grant, Mathematics Achievement Today, $99,972, accepted April 14, 2010 - joined project in 2012. Consulting, development and implementation of professional development project for Brunswick County School District. **Alison Toney**

"Clinical Research Workforce Development Grant"
Funding Source: Duke Energy
Key Personnel: **Jim Blum**, Kathy Browder, Randall Johnson, Susan Sinclair
Award: $390,000, 2015


University Innovations Funding for Analytics on UNCW Student Data
Funding Source; UNCW
Key Personnel: **Jim Blum, Jeff Brown, Mark Lammers**, Dylan McNamara
Award: $40,000 2015

**Conference Grants**

$30,000, National Science Foundation (DMS 1407408), “Tenth AIMS International Conference on Dynamical Systems and Differential Equations”, **Yaw Chang (PI), Wei Feng (Co-PI), Michael Freeze (Co-PI), Xin Lu (Co-PI)**, funded in February 2014.

$25,000, National Science Foundation (DMS-1204497), “Ninth AIMS International Conference on Dynamical Systems and Differential Equations”, **Yaw Chang (PI), Wei Feng (Co-PI), Zhaosheng Feng (Co-PI), Xin Lu (Co-PI)**, submitted in October 2011, funded in February 2012.

$25,000, National Science Foundation (DMS-1020977), “The AIMS' Eighth International Conference on Dynamical Systems and Differential Equations”, **Yaw Chang (PI), Wei Feng (Co-PI), Xin Lu (Co-PI)**, funded in January 2010.

**Other Funding Submitted**

2015-2017 Math Teacher Leader Collaboration (Math TLC), $280,000, Consultant, Professional development project for Brunswick County School District (submitted February 6, 2015).

**IX.8 Other Leadership roles**

**James Blum**
Biostatistics Team Leader for North Carolina Coast Clinical Research Initiative (NCCCRI)

Xin Lu
Associate Director of American Institute of Mathematical Sciences, 2005-present. 
http://www.aimsciences.org/index.html
Conference Coordinator, International Conference on Dynamical Systems and Differential Equations (bi-annual series), 2002-present.

IX.9 Awards Honors

Wei Feng
Graduate Mentor Award, University of North Carolina Wilmington, 2015.
Distinguished Faulty Scholar, University of North Carolina Wilmington, 2010.

Dijana Jakelic
Research Fellow, Max Planck Institute for Mathematics, Bonn, Germany, March – July 2013 ($12,100.00)

Yishi Wang
Research Fellow, Statistics and Mathematics Sciences Institute (SAMSI). 09/13-05/14

Ginger Rhodes
Cahill Award 2012 ($3500)

Cuixian Chen and Yishi Wang
Cahill Award 2014 ($3500)

Indranil Ghosh
Cahill Award 2015 ($3500)

IX.10 Selected Invited Speakers

- Professor Louis Kauffman, University of Illinois at Chicago, *Introduction to Virtual Knot Theory*, 2014
- Dr. Michael Kutner, Emory University Biostatistics 2014
- Dr. David Banks, Duke University, *Network Modeling in Social Media*, 2012
- Professor Jerry Bona of the University of Illinois at Chicago *Tsunamis, rogue waves and beach protection: all in the everyday life of a mathematician*, 2011
X. STRENGTHS AND WEAKNESSES

X.1 Strengths

- **Student Body** We continue to attract high quality students from all over the world that are diverse in gender and ethnicity. Our 5 year program allows us to attract some of the best of our own students that are a good fit for the program. The intimate class settings encourage detailed discussion between students and the faculty.

- **Graduate Faculty** The department has diverse, well-qualified graduate faculty in pure and applied mathematics and statistics. The graduate faculty are dedicated to excellence in both teaching and research, and work diligently to maintain a challenging intellectual climate for themselves and for their students. The faculty take a strong personal interest in the graduate students both during their time at UNCW and as their careers evolve.

- **Student involvement in Research and Scholarship** Students have been coauthors on 19 Publications and have made 21 research presentations in the last 9 years. In addition student attendance at regional conferences continues to grow.

- **Internships** We have placed at least 15 students in internships in the past 7 years with 9 of them registering for MAT 598, making it a credit bearing experience. The internships have been at PPD, INC Research, Chiltern, PharPoint, Boeing, Live Oak Bank, Wake Forest Baptist Medical Center, and Credit Suisse.

- **Upgraded Student Facilities** Since moving to Osprey Hall in fall 2015, the graduate student area is twice the size what had been available in Bear Hall and students have much greater access to the computers, including appropriate software needed for their studies, instruction and research. The centrally located student study area has been highly utilized by the graduate students and promotes energy and collaboration among the graduate students.

- **Placement** Students continue to quickly secure quality jobs in community colleges and industry as well have a good record of being accepted to Ph.D programs, dental and medical school.

X.2 Weaknesses

- **Financial Support for Graduate Students:** We still have just 4 out of state tuition waivers and that is the same number since the inception of the program in 1989 and there are no in-state tuition waivers. That together with the relatively low TA stipend puts a financial burden on students and greatly limits the ability of the program to be competitive with comparable regional universities in recruiting high quality students.
• **Lack of Release Time for Faculty Directing Theses and other Mentoring.** The graduate faculty do not receive release time for graduate mentoring, including these, research projects, internships and directed independent study. Lack of release time for faculty who are most active in mentoring graduate students strains the ability of those faculty to meet the teaching, research, and service demands placed on them.

• **Lack of Professional Support.** Support for technical needs is inadequate. Maintenance of software and hardware for research projects and office use is left for individual faculty to confront. Support for regular external speakers continues to be unavailable.

• **Faculty Positions** Budget constraints inhibit the department from hiring new tenure track faculty in areas of research lost by attrition which directly affects the graduate program.

### X.3 Actions taken to address the 2001 – 2008 Reviewer’s Recommendations

• **Compensating Faculty Graduate Mentoring and repurposing the GAs to provide a more meaningful experience for the students and more support for the faculty.** Due to lack of faculty resources we are unable to follow the recommendation of the reviewers regarding compensation of graduate mentoring. However, partially because of other external forces, we are currently pulling the graduate students out of the University Center Math Lab and looking for ways to give them a better experience other than grading or tutoring. Compensating those faculty that are doing graduate mentoring with RAs or TAs should certainly be part of that discussion, at least in the opinion of the graduate coordinator.

• **Insufficient office facilities for the graduate students.** While perhaps not meeting the recommendations of the review committee fully, the graduate student facilities have greatly improved. Since moving into Osprey Hall in this fall, they are spread out among two offices with around 14 seats and 12 computers all equipped with Matlab, R, Maple and SAS.

• **Is it possible to focus the program to differentiate from other master’s-only programs? Is a professional science master’s (http://www.sciencemasters.com) a viable option?** For the past three years the department was involved in developing an interdisciplinary professional science masters in data analytics. Appendix A, permission to plans was accepted by GA but it has recently been decided by administration that program will be in the business school instead and renamed business analytics.
• *Are there ways in which the curriculum can be redesigned to focus the program, perhaps combining in some fashion the pure and applied sequences?*

In the fall of 2012 we revised our curriculum so all students take the same core courses, Complex Analysis and Linear Algebra. They were chosen because they both have a nice blend of application and theory and they cover topics that are very prevalent in other parts of the curriculum.

**X.4 Actions taken to address perceived weaknesses from 2001-2008 report**

- **Financial Support for Graduate Students** Even though we have only 13 teaching assistantship, we have developed other ways to support our graduate students: some students are teaching their own classes and we use part time money to support them, Internships in local industry and recently Research/Teaching Assistantships from CHHS and Marine science. To increase our out of state tuition waivers we have tapped into a program that allows spouses of active duty military personnel to pay in state tuition. We currently have two students being supported this way.

- **Lack of Release Time for Faculty Directing Theses and other Mentoring** See bullet one above.

- **Lack of Professional Support.** We continue to apply for resources both externally and internally to meet these needs.
## APPENDIX A:
Masters Theses 2009 - 2015

<table>
<thead>
<tr>
<th>Term</th>
<th>Student Name</th>
<th>Instructor Name</th>
<th>Title of Thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Hall, Bailey Elliott</td>
<td>Feng, Wei</td>
<td>A mathematical study on population dynamics in an environmentally-driven infectious disease</td>
</tr>
<tr>
<td>2014</td>
<td>Olivolo, Katherine Rose</td>
<td>Feng, Wei</td>
<td>Mathematical and numerical analysis on a two-patch model for adaptive consumer movement</td>
</tr>
<tr>
<td>2014</td>
<td>Zaytseva, Sofya Yevgeniy</td>
<td>Hou, Xiaojie</td>
<td>Periodic solutions and turing patterns in an autocatalator model</td>
</tr>
<tr>
<td>2014</td>
<td>Blacklock, David Norman</td>
<td>Karlof, John</td>
<td>An alternative to the Kelly System</td>
</tr>
<tr>
<td>2014</td>
<td>Hancock, Daniel Isaac</td>
<td>Lugo, Gabriel</td>
<td>Quaternion approach to the spinning top with simulations in Matlab</td>
</tr>
<tr>
<td>2014</td>
<td>Watkins, Valerie</td>
<td>Wang, Yishi</td>
<td>Gender classification for children using supervised kernel principal component analysis</td>
</tr>
<tr>
<td>2013</td>
<td>Cowen, Michael Thomas</td>
<td>Feng, Wei</td>
<td>Coexistence and asymptotic stability in stage-structured predator-prey models</td>
</tr>
<tr>
<td>2013</td>
<td>Hartsock, Leopold Bruce</td>
<td>Feng, Wei</td>
<td>The role of refuges and antipredator actions on the behavior of a predator-prey population model</td>
</tr>
<tr>
<td>2013</td>
<td>Wilson, Brandie Partin</td>
<td>Hou, Xiaojie</td>
<td>The inclusion fronts in a non-locally diffusive Lotka-Volterra [i.e. Volterra] competition model</td>
</tr>
<tr>
<td>Year</td>
<td>Author 1</td>
<td>Author 2</td>
<td>Title</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------</td>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2013</td>
<td>Merlini, Jonathan</td>
<td>Jakelic, Dijana</td>
<td>On certain multiplicities in tensor products with the adjoint representation</td>
</tr>
<tr>
<td>2012</td>
<td>Cohoon, Erica Rene</td>
<td>Blum, James</td>
<td>Characterization of signature whistles in Tursiops truncates</td>
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<tr>
<td>2012</td>
<td>Jones, Brandy Mereta</td>
<td>Brown, Jeffrey</td>
<td>Lights Out using linear algebra</td>
</tr>
<tr>
<td>2012</td>
<td>Keebaugh, Christof</td>
<td>Chang, Yaw</td>
<td>Creating maximum cut round robin schedules and reducing a timetable to a minimum break schedule</td>
</tr>
<tr>
<td>2012</td>
<td>Retz, Caylah Natielle</td>
<td>Herman, Russell</td>
<td>Classical and nonclassical lie symmetries of the K (m, n) dispersion equation</td>
</tr>
<tr>
<td>2012</td>
<td>Crosby, Gary W</td>
<td>Lugo, Gabriel</td>
<td>Geodesic solutions of the Morris-Thorne wormhole</td>
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<tr>
<td>2011</td>
<td>Parker, Travis James</td>
<td>Chang, Yaw</td>
<td>An analysis of objective value priority choice for the vehicle routing problem</td>
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<tr>
<td>2011</td>
<td>Nelson, Youri Noel</td>
<td>Feng, Wei</td>
<td>Hierarchal inductive process modeling and analysis</td>
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<td>2011</td>
<td>Rocco, Nicole Angela</td>
<td>Feng, Wei</td>
<td>An extended Rosenzweig-MacArthur model of a tritrophic food chain</td>
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<td>2011</td>
<td>Creath, Elizabeth Ann</td>
<td>Jakelic, Dijana</td>
<td>Highest-weight vectors in the tensor products of representations of the quantized universal enveloping algebra Uq(sl₂)</td>
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<td>2011</td>
<td>Gresham, Jeremy Scott</td>
<td>Jakelic, Dijana</td>
<td>Representations of infinite dimensional lie algebras and Dirac's positron theory</td>
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<td>2011</td>
<td>Pangburn, Allan Clark</td>
<td>Karlof, John</td>
<td>A new algorithm for maximum flow distribution networks the modified push algorithm</td>
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<tr>
<td>2011</td>
<td>Stampe, Simon Oliver</td>
<td>Lammers, Mark</td>
<td>A finite Heisenberg sum</td>
</tr>
<tr>
<td>Year</td>
<td>Author(s)</td>
<td>Advisor(s)</td>
<td>Title</td>
</tr>
<tr>
<td>------</td>
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<tr>
<td>2011</td>
<td>Brown, Timothy Douglas</td>
<td>Simmons, Susan</td>
<td>Applying Markov chain Monte Carlo model composition to a restricted model space</td>
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<tr>
<td>2011</td>
<td>Dunlop, Stacey Abigail Simmons, Susan</td>
<td></td>
<td>Posterior distribution of benchmark dose estimator under the logistic extra risk function</td>
</tr>
<tr>
<td>2011</td>
<td>Cramer, Rachel Wang, Yishi</td>
<td></td>
<td>$L_1$-regularized support vector machines for soft biometric classification</td>
</tr>
<tr>
<td>2010</td>
<td>McGhan, Daniel Martin Freeze, Michael</td>
<td></td>
<td>Davenport constants of nonabelian groups</td>
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<tr>
<td>2010</td>
<td>Roberson, Kara Herman, Russell</td>
<td></td>
<td>Spiral waves in Cartesian, polar and spherical geometries</td>
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<tr>
<td>2010</td>
<td>Poku, Derick Owusu Hou, Xiaojie</td>
<td></td>
<td>Turing instability in a public goods game</td>
</tr>
<tr>
<td>2010</td>
<td>Schiefelbein, Fernando Gatica Simmons, Susan</td>
<td></td>
<td>A statistical analysis of techniques in digital face age-estimation</td>
</tr>
<tr>
<td>2010</td>
<td>Makumburage, Gayan Buddhika Simmons, Susan</td>
<td></td>
<td>Evaluation of the benchmark dose estimator with $k=1$ multistage extra risk function from a Bayesian perspective</td>
</tr>
<tr>
<td>2010</td>
<td>Wang, Shanshan Simmons, Susan</td>
<td></td>
<td>Posterior distribution of benchmark dose estimator under the logistic extra risk function</td>
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<tr>
<td>2009</td>
<td>Rock, Brevin Shae Feng, Wei</td>
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<td>Two-patch predator-prey system coupled with migration of both species</td>
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<tr>
<td>2009</td>
<td>Tingen, Larry Lee Herman, Russell</td>
<td></td>
<td>The Julia and Mandelbrot sets for the Hurwitz zeta function</td>
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<tr>
<td>2009</td>
<td>Fang, Fang Simmons, Susan</td>
<td></td>
<td>A simulation study for Bayesian hierarchical model selection methods</td>
</tr>
<tr>
<td>2009</td>
<td>Moore, Sara Clair Karlof, John</td>
<td></td>
<td>Optimizing retail location an integer linear programming approach</td>
</tr>
<tr>
<td>2009</td>
<td>Maeser, Anna Marie Lammers, Mark</td>
<td></td>
<td>Time-frequency dual and quantization</td>
</tr>
<tr>
<td>Year</td>
<td>First Author</td>
<td>Last Author</td>
<td>Title</td>
</tr>
<tr>
<td>------</td>
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<tr>
<td>2009</td>
<td>Cohen, Margaret Anne</td>
<td>Simmons, Susan</td>
<td>Estimating the growth rate of harmful algal blooms using a model averaged method</td>
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<tr>
<td>2009</td>
<td>Fang, Qijun</td>
<td>Simmons, Susan</td>
<td>Model search strategy when P &gt;&gt; N in Bayesian hierarchical setting</td>
</tr>
<tr>
<td>2009</td>
<td>Du, Lifang</td>
<td>Simmons, Susan</td>
<td>A simulation study of global model testing</td>
</tr>
<tr>
<td>2009</td>
<td>Lai, Yanzhao</td>
<td>Wang, Yishi</td>
<td>Generalized method of moments exponential distribution family</td>
</tr>
</tbody>
</table>
APPENDIX B:  
Masters Internships 2009 – 2015 *

<table>
<thead>
<tr>
<th>Term</th>
<th>Student Name</th>
<th>Instructor Name</th>
<th>Internship Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2013</td>
<td>Kesler, Johanna Ashley</td>
<td>Blum, James</td>
<td>INC Research</td>
</tr>
<tr>
<td>Spring 2013</td>
<td>Scott, Robert Zackery</td>
<td>Blum, James</td>
<td>Chiltern</td>
</tr>
<tr>
<td>Spring 2014</td>
<td>Liu, Ying</td>
<td>Blum, James</td>
<td>Biostudy Solutions</td>
</tr>
<tr>
<td>Spring 2014</td>
<td>Zaytseva, Sofya Yevgeniy</td>
<td>Blum, James</td>
<td>Biostudy Solutions</td>
</tr>
<tr>
<td>Fall 2014</td>
<td>DeSimone, Craig Matthew</td>
<td>Blum, James</td>
<td>Chiltern</td>
</tr>
<tr>
<td>Fall 2014</td>
<td>Mangum, Nicholas Patrick</td>
<td>Lammers, Mark</td>
<td>Boeing</td>
</tr>
<tr>
<td>Summer 2015</td>
<td>Beyer, Kelsey Bright</td>
<td>Lammers, Mark</td>
<td>Wake Forrest Baptist Medical School</td>
</tr>
<tr>
<td>Summer 2015</td>
<td>Dillon, Matthew Ray</td>
<td>Chang, Yaw</td>
<td>Live Oak Bank</td>
</tr>
</tbody>
</table>

*In addition to these internships for credit, six additional students participated in paid internships which were not credit bearing.