GRADUATE STUDIES IN STATISTICS

Department of Statistics
University of South Carolina

Graduate Brochure
Academic Year 2008-09
Prepared by: Graduate Committee
Statistics is the science of processing data to extract information needed for decision-making. This entails the mathematical modeling of the data generation process, including the sampling process or the proper design of scientific experiments, through the development of probabilistic and stochastic models; the efficient and organized presentation and summarization of data; and the making of inferences about population characteristics using incomplete sample information.

As the Information Age moves forward, increasing amounts of data are generated in business and economic sectors, engineering and industrial sectors, biomedical and public health arenas, and in other areas such as environmental, educational, political, psychological, and sociological research. With this increase in data there is a corresponding need for statisticians capable of processing such data. As Rutherford D. Rogers aptly stated, society is now

... drowning in information, but starving for knowledge ...!

Statisticians are in a position to nourish society by being prime players in the extraction of useful information from these mountains of data!

Regardless of your undergraduate major, if you have talents or interests that span mathematics, computers, and collaborating with others, then graduate training in Statistics offers you abundant, interesting, and challenging career opportunities. Almost all of our graduates this past year have jobs awaiting them even before graduation! Indeed, almost all of our masters and Ph.D. graduates seeking employment in the past five years found a job in the field within six months of graduation. Many of the Ph.D. students pursued academic careers and have secured tenure-track positions upon graduation. Our alumni are currently on faculty at universities such as Mississippi State, Texas Tech, Clemson, the University of New Hampshire, Elon University, Oklahoma State, Washington State, University of Missouri-Rolla, University of North Carolina-Greensboro, and Western Kentucky University. A very recent Ph.D. graduate is a post-doctoral fellow at North Carolina State University. Non-academic employers at all levels include Abbott Laboratories, Battelle Research Labs, Blue Cross/Blue Shield, Hughes Aerospace, Michelin Tire, A.C. Nielsen, Smith-Kline Beecham, the U.S. Census Bureau, Westinghouse, and Fred Hutchinson Cancer Center.

We are proud of the graduate experience and the academic training we provide to our graduate students, which is a blend of theory and applications. Our department, formed in 1985, is large enough to offer a broad array of course selections and possesses an energetic and internationally respected faculty. Yet, we are not so large that students get lost in a crowd. Your graduate experience here can be one of the best times of your life; the friends you make here, including faculty, will be some of the best friends you’ll have in your life.

This brochure contains information regarding our programs, the Department, the University, and Columbia. Georgie Baker, the Graduate Coordinator, or I, would be happy to discuss our programs with you, by phone, e-mail, or in person.

Dr. Edsel A. Peña, Professor & Graduate Director
The Department

The Department is made up of 17 faculty, 2 staff members, 35 full-time students, almost all supported through assistantships, and about 30 part-time students. The students come to the University from a variety of backgrounds ranging from those already having a master’s degree in statistics to those having a bachelor’s degree in fields such as mathematics, physics, psychology, or sociology. Of the full-time students pursuing an MS or PhD, just over half are female and just over half are international students from countries such as Bulgaria, China, India, and Romania. Former international students were from Austria, Benin, Bulgaria, Cyprus, Ecuador, Oman, the Philippines, among others. The part-time students include a variety of professionals around the state pursuing a Master of Industrial Statistics (MIS) degree or a Certificate of Applied Statistics (CAS) through our distance education program. They also include students in other departments extending their primary training with a CAS.

The Department extends well beyond its degree programs. The staff of the Statistical Laboratory provides expert statistical advice to researchers across the campus, to government agencies, and to industry. The Statistics Club and the local chapter of Mu Sigma Rho, the national honor society for Statistics, allow for social and professional interaction among students, faculty, and prospective employers. More informally, the faculty and students get together for activities such as bowling, squash, tennis, or a bridge game.

The Department of Statistics is located in the heart of the University’s beautifully landscaped lawns and only steps away from the historic Horseshoe.

Graduate Programs

The Department offers programs of study leading to the CAS (Certificate of Graduate Study in Applied Statistics), MIS (Master of Industrial Statistics), MS (Master of Science), and PhD (Doctor of Philosophy) degrees in Statistics. All programs emphasize broad training in both applied and theoretical statistics.

A new partnership between the University of South Carolina and the Center for Quality at Midlands Technical College allows MIS and CAS students to earn credits towards the Six Sigma Certificate Program while earning their MIS and CAS credits. Designated courses in the MIS and CAS programs earn dual credit in both the MIS and CAS program and the Six Sigma Certificate Program.

The CAS program is a graduate level “minor” in statistical methods. It is designed to provide engineers and scientists with the modern data analytic tools needed for effective practice as a specialist in statistical methods. The CAS requires 18 semester hours of approved graduate credits in statistics.

The Master of Industrial Statistics (MIS) degree is geared toward persons who are currently working in a business, government, or industrial setting. While some theory is introduced, the focus is on applications of statistics and how statistics can be used to improve quality in an organization or an industrial process. The entering MIS student have two years work experience.

The MS degree is designed to provide students with the necessary background for employment as a professional statistician in business, industry, or government. It also builds a solid foundation for students interested in a PhD in Statistics or a related field. Considerable flexibility in program emphasis is possible through the selection of elective courses and the thesis topic.

The PhD degree is designed to prepare the candidate to teach statistics at the college or university level, to do independent research, and/or work as a lead statistician in business and industry. It emphasizes training in both theoretical and applied statistics, and develops students into independent researchers through their dissertation research.

The Faculty and Staff

Faculty in the Department of Statistics are committed to excellence in both research and teaching, aside from their
service responsibilities. In Research, several of the faculty have been recognized nationally and internationally, with two of the regular faculty having been Elected Fellows of the American Statistical Association (ASA). Distinguished Professor Emeritus Joe Padgett is also an Elected Fellow of the ASA and an Elected Fellow of the Institute of Mathematical Statistics (IMS), aside from being an Elected Member of the International Statistical Institute (ISI). Distinguished Professor Emeritus John Spurrier is also an Elected Fellow of the ASA. Distinguished Professor Emeritus Joe Padgett is also an Elected Fellow of the Institute of Mathematical Statistics (IMS), aside from being an Elected Member of the International Statistical Institute (ISI). Distinguished Professor Emeritus John Spurrier is also an Elected Fellow of the ASA. Jayaram Sethuraman is an award-winning Distinguished Visiting Professor from Florida State University. Currently, several of the faculty are members of Editorial Boards of professional journals. In both Teaching and Research, many of the current faculty are regularly nominated for university-wide teaching awards. Distinguished Professor Emeritus Spurrier was a recipient of the University’s most prestigious award, the Amoco Foundation Outstanding Teaching Award, and was also awarded the Governor’s Teaching Award. Professor Edsel Peña was the 2007 recipient of the Michael Mungo Graduate Teaching Award and the 2008 USC Educational Foundation Research Award in Science, Mathematics, & Engineering.

![Figure 2: Group picture of the faculty and staff of the Department of Statistics.](image)

Professors

- **Mark P. Becker**, PhD, 1985, Pennsylvania State University, Provost and Executive Vice-President of Academic Affairs, and Professor. Categorical data analysis; Biostatistics.
- **Don Edwards**, PhD, 1981, Ohio State University, Professor. Response Surface Methodology, Measures of Inter-Rater Agreement. Department Chair.
- **Ian Dryden**, PhD, 1989, University of Leeds, Professor. Shape Analysis, Statistical Image Analysis, Medical Image Analysis, Spatial Statistics, High-Dimensional Data Analysis. (On the faculty of the University of Nottingham until January 2009.)
- **Brian T. Habling**, PhD, 1998, University of Illinois at Urbana-Champaign, Associate Professor. Psychometrics - Item Response Theory, Scale Construction, Multivariate Statistics, and Educational Measurement.
- **Xianzheng (Shan) Huang**, PhD, 2006, North Carolina State University, Assistant Professor. Diagnosing of model misspecification, Measurement Error, Group Testing (new interest), Longitudinal Data Analysis, Survival Analysis, Joint Modeling (old interest).
- **Joshua M. Tebbs**, PhD, 2000, North Carolina State University, Associate Professor. Group Testing, Order-Restricted Inference, Categorical Data Analysis, Multiple Comparisons, Epidemiology and Public Health, Biomedical Applications. Undergraduate Director.
- **Lianming Wang**, PhD, 2006, University of Missouri, Assistant Professor. Survival Analysis, Bayesian analysis, Non- and semi-parametrics, Multivariate Analysis.
- **Ou Zhao**, PhD, 2008, University of Michigan, Assistant Professor. Probability Theory, Mathematical Statistics, Nonparametrics, Computing. (On leave at Yale until August 2009)

Visiting Faculty

- **Xiaoyan (Iris) Lin**, PhD, 2008, University of Missouri, Visiting Assistant Professor. Bayesian Hierarchical Modeling, Objective Bayesian Analysis, Item Response Theory.

Instructors

- **Georgie R. Baker**, MS, 1996, University of South Carolina; MBA, 1985, St. John’s University, Instructor. Quality control and process improvement. Graduate Coordinator and Assistant to the Chair.
• Beth Johnson, MS, 2002, University of South Carolina, Instructor. Statistical Education and Educational Measurement.
• Maureen Petkewich, MS, 2003, University of South Carolina, Instructor.

Emeritus Professors
• William J. Padgett, PhD, 1971, Virginia Polytechnic Institute & State University, Distinguished Professor Emeritus. Reliability and life testing, Industrial statistics, Nonparametric function estimation.
• John D. Spurrier, PhD, 1974, University of Missouri, Distinguished Professor Emeritus. Multiple Comparisons, Nonparametrics, Statistics Education.

Adjunct Faculty
• James Hardin, PhD, 1992, Texas A&M University, Research Associate Professor of Biostatistics. Estimating equations, statistical computing.
• Huynh Huynh, PhD, 1969, University of Iowa, Professor of Educational Studies. Psychometrics, Large-scale Educational Assessment Programs, Repeated Measures Designs.
• Andrew Lawson, PhD, 1990, University of St. Andrews, Professor of Biostatistics. Spatial and Environmental Epidemiology, Directional Statistics; Environmental Science and Geoscience.
• Elizabeth Slate, PhD, 1991, Carnegie-Mellon University, Professor at the Medical University of South Carolina, Charleston. Bayesian methods, biostatistics, longitudinal data analysis, statistical computing.
• Cary Tuckfield, PhD, 1985, Indiana University, Section Leader of Statistical Consulting at Savannah River Technology Center. Applied statistics, environmetrics.

Staff
• Minna Moore, Information Technology Manager.
• Tina Ormenisan, Business and Office Manager.
• Anita Wood, Administrative Specialist.

Applying for Admission
To be considered for the graduate program, applicants should have a bachelor’s degree and an appropriate training in mathematics which should include at least three semesters of calculus, and, for the MS or PhD, a course in advanced calculus or introductory analysis, and a course in matrix algebra. Prior training in statistics is not required but is highly recommended. Application should be made online via the internet. Go to http://www.gradschool.sc.edu/ and click on the link pertaining to “Future Students”. Paper applications are still possible and an application packet may be requested through the Graduate School, though online applications are preferred for efficiency purposes. Applicants should submit an official transcript from each college previously attended, at least two letters of recommendation, and a report of scores achieved on the Graduate Record Examination (GRE) directly to the Graduate School. The Graduate Management Admission Test (GMAT) is acceptable for the CAS and MIS programs. Generally, a grade point average of at least 3.20 with high grades in mathematics and statistics and a total verbal and quantitative GRE score of at least 1050 are expected for admission at the Master’s level, and generally a higher score is needed for the PhD degree.

We welcome applications from students outside of the U.S. and we automatically consider all applicants for assistantships. International applicants are required to submit a report of scores on the Test of English as a Foreign Language (TOEFL) examination. For students from countries where English is not an official language, in order to be considered for financial support we require the following TOEFL scores (depending on the examination method):

- Paper-based total above 600 with a minimum of 60 on the Section 1 score.
- Computer-based total above 250 with a minimum of 25 on the Section 1 score; or
- Internet-based total above 100 with a minimum of 20 on Sections 2 & 3 scores.

To be considered for admission without financial support we require the following TOEFL scores:

- Paper-based total above 570;
- Computer-based total above 230; or
- Internet-based total above 88.

The TOEFL requirement is waived for students who have received a degree from an accredited university in the United States. An application fee of $40 is also required. The MS and PhD programs are designed to be entered in the Fall semesters, and applicants are encouraged to have their applications completed by January 15th, although applications received through March 1st will receive full consideration. Applications for the Spring semester are due by November 15th.

Financial Assistance
The primary source of financial aid is the graduate assistantship. Graduate assistants gain valuable work experience by teaching statistics, working in the consulting laboratory, or assisting faculty with research projects. Half-time teaching assistantships require 20 hours of commitment per week and carry an academic-year stipend of at least $15,000/year for the 2008-09 academic year. In recent past, the Department has also been able to support all graduate assistants in the summer. Current summer stipends is $2,500 for a five-week term.
Beyond the stipend, all supported graduate students are charged tuition at the in-state rate and receive a tuition reimbursement of at least 85% of the full tuition. Health insurance is available through the University, and the Graduate School has helped to subsidize this for graduate assistants in each of the past two years. Visit the Graduate School website for more information about insurance.

In addition, fellowships through the Department and Graduate School of up to $8,000/year for PhD applicants and $4,000/year for MS applicants are competitively available for top candidates.

Office Space and Computing

Students who attend the University on assistantships are provided office space in LeConte College, which also houses the department office, computer facilities, and most classrooms. Each graduate assistant is provided a computer in his/her office desk. The computers are connected to the College and University computing networks and includes statistical software such as SAS and R, in addition to the standard Microsoft Office programs.

Housing

Low-cost, convenient University housing is available. Since some facilities have fairly long waiting lists and are assigned on a first-come, first-served basis, prospective graduate students should register with the Office of Housing and Residential Services (Phone: 803-777-4283 or E-Mail: housing@usc.edu) as soon as possible after being accepted into the graduate program. In addition to University housing, Columbia has a number of apartments. Typically, a two-bedroom, air-conditioned apartment rents for $500 to $600 per month.

Certificate of Graduate Study in Applied Statistics

The 18-hour (six courses) CAS program requires a core of STAT 700, 701, and 706 (or 506), or the equivalent - please see the course descriptions below. The remaining 9 hours are electives. Up to six hours of approved statistics courses may be taken outside the Department, but at least nine of the 18 hours must have the STAT designator at the 700-level or above.

Courses taken in the CAS program may be applied with permission towards other graduate degrees. It is possible to complete the entire CAS program through distance learning.

Master of Industrial Statistics

The MIS degree requires a core of seven courses: STAT 525, 700, 701, 702, 703, 506 or 706, and 750 or 761, as well as 12 semester hours of electives. Additionally, three hours of STAT 798 (independent study) is required. Students without consulting experience are highly encouraged to take STAT 790 (Introduction to Statistical Consulting). The independent study course will ideally be a study of an appropriate application of statistics to the student’s work experience. It is possible to complete the entire MIS degree through distance learning.

Master of Science in Statistics

The MS degree requires at least 30 hours of approved course work including a core of STAT 704, 705, 712, 713, and 714 and three semester hours of thesis preparation (STAT 799). In addition to these 30 hours, one semester hour each of the consulting seminar (STAT 790) and practicum (STAT 791) are required. Typically, the MS degree requires two full years (four major semesters) of study. At least 21 semester hours of the MS program, excluding thesis credits, must be earned in courses numbered 700 and above.

Candidates for the MS are required to complete a thesis. The thesis is a guided introduction to statistical research and develops the scientific and technical communications skills that a professional statistician needs and offers the students the opportunity to work closely with a faculty member on an extended project.

Doctor of Philosophy

The PhD in Statistics requires at least 48 semester hours of regular coursework, including the core courses STAT 704, 705, 710, 711, 712, 713, 714, 721, 722, 723, 724 and 740. In addition to this regular coursework, one
semester hour each of the consulting seminar (STAT 790), practicum (STAT 791), and the three-semester-hour doctoral seminar (STAT 890) are required.

The doctoral dissertation is to be written in conjunction with the dissertation research course (STAT 899), for which at least 12 semester hours must be earned beyond the 48 hours of regular course work. The content of the dissertation is expected to make a significant contribution to the statistical literature and to be publishable in a reputable journal. No foreign language is required for the PhD degree (or any other graduate degree in Statistics at USC).

Students pursuing the PhD in statistics are required to pass three examinations. The first, the Admission to Candidacy Examination, taken after one year of study, is designed to measure potential for advanced study in statistics at the doctoral level. The second, the Comprehensive Examination, is typically taken after all course work is completed and consists of orally presenting and defending the written dissertation proposal. The third and final, the Dissertation Examination, is a defense of the dissertation results.

Selected Graduate Courses

Below is a listing of graduate courses offered by the Department of Statistics. Other courses that could be taken as elective courses are from other departments, such as the Department of Mathematics and the Department of Epidemiology & Biostatistics. Please refer to the Graduate Bulletin (http://www.sc.edu/bulletin/grad/index.html) for information about courses from other units.

- STAT 506 Introduction to Experimental Design
- STAT 510 Introduction to Applied Probability
- STAT 517 Computing in Statistics
- STAT 518 Nonparametric Statistical Methods
- STAT 519 Sampling
- STAT 520 Forecasting and Time Series
- STAT 522/523 Financial Mathematics I/II
- STAT 525 Statistical Quality Control
- STAT 530 Exploring Multivariate Data
- STAT 582 Bayesian Networks and Decision Graphs
- STAT 700/701 Applied Statistics I/II
- STAT 702/703 Intro to Statistical Theory I/II
- STAT 704/705 Data Analysis I/II
- STAT 706 Experimental Design
- STAT 708 Environmetrics
- STAT 709 Environmetrics II
- STAT 710/711 Probability Theory I/II
- STAT 712/713 Mathematical Statistics I/II
- STAT 714 Linear Statistical Models
- STAT 715 Analysis of Variance
- STAT 716 Selected Topics in Probability
- STAT 718 Selected Topics in Statistics
- STAT 720 Time Series Analysis
- STAT 721 Stochastic Processes
- STAT 722 Advanced Statistical Inference
- STAT 723 Large Sample Theory
- STAT 724 Nonparametric Inference
- STAT 730 Multivariate Analysis
- STAT 740 Statistical Computing
- STAT 750 Response Surface Methodology
- STAT 761 Reliability and Life Testing
- STAT 770 Categorical Data Analysis
- STAT 771 Longitudinal Data Analysis
- STAT 775 Generalized Linear Models
- STAT 778 Item Response Theory
- STAT 790 Seminar in Statistical Consulting
- STAT 791 Practicum in Statistical Consulting
- STAT 798 Independent Study
- STAT 799 Thesis Research
- STAT 890 Doctoral Seminar
- STAT 899 Dissertation Research

Each year the Department provides a special topics course. Such a course enables students the opportunity to acquire knowledge on an active or emerging area of research. For example, a previous special topics course (STAT 718) was Modern Survival Analysis taught by E. Peña. Last Spring Semester 2008, Distinguished Visiting Professor Jayaram Sethuraman offered a course on Nonparametric Bayesian Inference.
Colloquia, Seminars & Conferences

The Department conducts a regular colloquium series featuring visiting scholars and university faculty to share their research activities. Different subgroups of the department’s faculty, together with the advanced graduate students, also conduct regular research seminars on a variety of research topics of current interest. All graduate students are encouraged to participate in these colloquia and research seminars to enhance their exposure to research.

The Department has also been active in organizing and holding national and international conferences held in the USC campus. In May 2003 it organized the International Conference on Reliability and Survival Analysis which attracted numerous national and international researchers who are leaders in the field of reliability and survival analysis.

In October 2007, jointly with the American Statistical Association (ASA) Section on Nonparametrics and the National Institutes of Statistical Sciences (NISS), it hosted the Current and Future Trends in Nonparametrics Conference, which attracted top-notch researchers in nonparametrics and semiparametrics. These conferences enable the graduate students to meet and interact with many researchers and provide them opportunities to network with future professional colleagues.

Travel support for graduate students to attend national and international research conferences and meetings is available through the Department, College of Arts and Sciences, and Graduate School. Priority for granting travel support is provided to those presenting posters and talks.

Job Placement of PhD Graduates

The Department is committed to providing excellent training to the students in order for them to have competitive chances of getting a job upon completing their degrees. Below is a list of the PhD graduates of the Department, together with the year of graduation, their PhD adviser(s), and their initial place of employment. All graduates obtained their jobs within six months after graduation. The abbreviations are: TT for tenure-track; PD for post-doctoral fellow.

1. Laura Taylor (2008, Peña), TT Assistant Professor, Elon University, North Carolina.
4. Akim Adekpedjou (2007, Peña), TT Assistant Professor, University of Missouri, Rolla.
5. Melanie Autin (2007, Edwards), TT Assistant Professor, University of Western Kentucky.
6. Roland Deutsch (2007, Grego/Habing), TT Assistant Professor, UNC Greensboro.
9. Jonathan Quiton (2007, Peña), TT Assistant Professor, University of Western Kentucky.
11. Brooke Buckley (2006, Piegorsch), TT Assistant Professor, University of Northern Kentucky.
12. Thomas Jaki (2006, West), TT Assistant Professor, Cleveland State University.
13. Yuping Wu (2006, West), TT Assistant Professor, Cleveland State University.
15. Jun Han (2005, Peña), TT Assistant Professor, Georgia State University.
18. Russ Stocker (2004, Peña), TT Assistant Professor, Mississippi State University.
19. David Hare (2004, Spurrier), TT Assistant Professor, Louisiana Lafayette University.
20. Meredith Tomlinson (2003, Padgett), TT Assistant Professor, Winthrop University.
22. Parul Bhargava (2003, Spurrier), Quintiles, Inc. (California).
23. Carl Miller (2002, Grego), TT Assistant Professor, University of Northern Kentucky.
24. Wei Pan (2002, Piegorsch), NOAA, Charleston, SC.
25. Susan Simmons (2002, Piegorsch), TT Assistant Professor, UNC Wilmington.
26. Obaid Al-Saidy (2001, Piegorsch), TT Assistant Professor, Sultan Kaboos University (Oman).
28. Eleane Solorzano (1999, Spurrier), TT Assistant Professor, University of New Hampshire.
29. James Surles (1999, Padgett), TT Assistant Professor, Texas Tech University.
30. Arzu Onar (1998, Padgett), TT Assistant Professor, University of Miami, Coral Gables.
32. Jason Owen (1997, Padgett), TT Assistant Professor, University of New Hampshire.
33. W. Scott Street, IV (1997, Edwards), TT Assistant Professor, Georgia Southern University.
35. Jan Dasgupta (1996, Spurrier), TT Assistant Professor, Washington State University.
36. Jonathan Kuhn (1995, Padgett), TT Assistant Professor, James Madison University.
37. Melinda McCann (1994, Edwards), TT Assistant Professor, Oklahoma State University.
38. Carlos Diniz (1993, Padgett), TT Assistant Professor, Federal Univ. of San Carlo, Brazil.
39. Shiow-Jen Lee (1993, Lynch), Visiting Assistant Professor, VPI, Blacksburg, VA.
41. Robert E. Lee (1992, Spurrier), Visiting Assistant Professor, Clemson University.
42. Sneh Gulati (1991, Padgett), TT Assistant Professor, Clemson University.
43. Ping Sa (1991, Edwards), TT Assistant Professor, University of North Florida.

Figure 8: Two of our recent Ph.D. graduates, Dr. Alex McLain and Dr. Laura Taylor.

Statistical Laboratory

Statistical consulting is provided by the Department’s Statistical Laboratory. Directed by John Grego and managed by Roumen Vesselinov, the lab provides service both
within and outside the University. In particular, assistance is given to faculty and graduate students of the University in the statistical aspects of their research. These services range from simple application of standard statistical methods and computer packages, to derivation of theory to handle more complex problems. The laboratory regularly employs statistics graduate students as assistants, providing valuable experience in addition to financial support.

Graduate Student Life

The Graduate Students in the Department of Statistics are members of the national Statistics honor society, Mu Sigma Rho (\(\mu\Sigma\rho\)), and also of the department’s Stat Club. Both organizations are active and hold monthly social activities that include dinner and bowling, a Corn Maze at Halloween, the Lights Before Christmas exhibit at the Riverbanks Zoo, and other events of interest to the students. Faculty members also attend these events that offer friendly interaction between graduate students and their professors. In previous years, students have been actively involved in the South Carolina branch of the American Statistical Association (SCASA) which offers bi-annual meetings in historic Charleston and Columbia. Students could present research presentations in this meeting. Trips to Charleston tend to be extended in order to go on one of Dr. John Grego’s famous tours.

Outside of the department, the city of Columbia is home to The Vista, a trendy area of downtown with shopping and culture. Five Points is the center of Columbia’s nightlife with unique restaurants, stores, and bars. Five Points is also the location for many downtown festivals, such as St. Patrick’s Day. The Colonial Center also calls Columbia home which brings in many major attractions such as Rascal Flatts, Billy Joel, and Cher and is located next to the Koger Center where the Columbia City Ballet performs along with other cultural attractions. Several malls dot the outskirts of the metropolitan area of Columbia including Columbiana Centre and Richland Fashion Mall. Along with the malls, Columbia is home to at least half a dozen movie theaters that range from mainstream entertainment to the Nickelodeon Theater located behind the State House which attracts many indie films. During the summer, the outdoors beckons with access to Lake Murray for fishing or swimming and tubing or kayaking down the Saluda River Shoals park. A quick trip to Carowinds amusement park outside of Charlotte, NC, about 80 miles from Columbia, is also a great way to spend a day during the warmer months or make plans to visit Alligator Adventure or the House of Blues in Myrtle Beach, SC, about two and half hours away from Columbia.

The University

The University of South Carolina is the state’s flagship and largest university and Columbia is the nucleus of eight statewide campuses. Many statistics about the university could be found by visiting the website http://www.sc.edu/aboutusc/. About 27,000 students are enrolled at Columbia campus and about 40,000 in all the campuses. About a quarter of the students in the Columbia campus are graduate students. There are approximately 1950 full-time faculty members in all of the campuses, with about 1,000 in the Columbia campus. The University attracts students from every state in the nation and more than 100 foreign countries. The Columbia campus offers 75 programs of study leading to the bachelor’s degree. Master’s degrees are offered in about 123 disciplines (5 professional); 60 programs leading to the PhD degree, and 12 professional doctorates including law, medicine, pharmacy, and public health. With nearly 10,000 students currently enrolled in post-baccalaureate work, the University is one of the largest postgraduate institutions in the nation in terms of size. About 1,600 master’s and about 250 PhD degrees are awarded annually.

As a member of the highly competitive Southeastern Conference (SEC), the University features a wide range of nationally recognized intercollegiate athletic programs in both men’s and women’s sports. The football, baseball, and soccer teams are usually ranked nationally and provides excellent entertainment to the university community, the city, and the state.

Recreation facilities are also available to all students and faculty. The Strom Thurmond Wellness and Fitness Center (http://campusrec.sc.edu/WFC/default.html) is a highly modern student-run facility. The Solomon Blatt Physical Education Center (http://campusrec.sc.edu/PEC/default.html) is also highly functional and is a favorite facility among the faculty.

The City of Columbia

Columbia, with a metropolitan population of approximately 700,000 combines the advantages of a progressive, growing area with the pace of a smaller city. Residents enjoy temperate seasons with mild winters. In the spring, dogwood and azalea create a profusion of color. At the geographic center of South Carolina, Columbia is the seat of state government as well as headquarters for numerous state and regional businesses.

The metropolitan area is also home to several institutions of higher education, and some of South Carolina’s most outstanding public schools. Located at the intersection of three interstate highways, Columbia is midway between Miami and New York. Columbia Metropolitan Airport is served by six airlines and has direct flights to major cities such as Atlanta, Charlotte, Dallas, Washington (DC), New York, New Jersey, Detroit, and Chicago. Amtrak, Greyhound, and Trailways provide additional passenger service to Columbia.

The Columbia area offers a variety of recreational opportunities for the outdoor enthusiast. With several large
lakes nearby, plus the Congaree and Saluda rivers, boating and other water sports are year-round pastimes. You can reach either ocean beaches or mountain vistas in two to three hours. As a cultural center in South Carolina, the city is home to a philharmonic orchestra, a symphony, ballet, dance companies, theatres, and galleries. The Columbia Museum of Art contains an important part of the Kress Collection of Renaissance art. The State Museum, one of the largest in the South, features art, history, science and technology displays, and special visiting exhibits.

Figure 9: A view of the Columbia Skyline from Finlay Park.

The city boasts a thriving nightlife, especially in the Vista and Five Points areas, which are close to the university. Throughout the year, numerous outdoor festivals and concerts provide additional leisure activity. One of Columbia’s most popular attractions is Riverbanks Zoo and Botanical Gardens. Home to more than 2,000 animals, it is one of the finest small zoos in the world.

Faculty Interests & Research

- **Ian L. Dryden**, Ph.D., Professor, RSS Chartered Statistician, Elected Member ISI
  
  Website: [http://www.stat.sc.edu/~dryden/](http://www.stat.sc.edu/~dryden/)

  **Areas of Research**: shape analysis; statistical image analysis; medical image analysis; spatial statistics; high-dimensional data analysis; applications of statistics in biology, medicine and computer science.

  **Research Activities**: My broad research interests concern the development of generic statistical methodology motivated by important real-world applications. I am particularly interested in geometrical problems, for example the statistical analysis of the shapes of objects. Such data are routinely available in a very wide variety of settings, from the smallest scale of atoms and molecules in chemistry, to the study of complex organisms in biology and medicine. A typical question of interest is are there significant differences in brain shape between schizophrenia patients and control volunteers?

  I am also very interested in the analysis of highly-structured complex systems, as often encountered in image analysis and in biological systems. Frequently the types of research problem I study are very high-dimensional (e.g. image or microarray data) with relatively low sample sizes. Careful modelling is required in order to cope with such problems, and often new statistical methodology needs to be developed. I have many interdisciplinary collaborations, including projects in medical image analysis, bioinformatics, chemoinformatics, systems biology, physiology, computer science and archaeology.

  **Why I Like Being a Statistician:**

  I have always been fascinated by numbers. So when I found out about a subject which combines mathematical and computational skills, and attempts to make sense of the uncertain world we live in, I was hooked. The enormous variety and breadth of applications, and the ability to help others in making informed decisions, are major attractions of working as a Statistician. Also, the job prospects are excellent!

  **Selected Recent Publications:**

Don Edwards, Ph.D., Department Chair and Professor, Fellow of the ASA

Website: http://www.stat.sc.edu/~edwards/

Areas of Research: Response Surface Methodology, Measures of Inter-Rater Agreement.

Research Activities: I love the diversity of all applications of statistics. I have a new research interest in statistical methods for sampling in Medicare benefit integrity investigations, and in the measurement of inter-rater agreement in subjective judging scenarios. I have a continuing interest in response surface methodology and statistical methods for simultaneous inference. I am also fortunate to have interfered with the research of a number of fine ecologists and environmental scientists.

Why I Like Being a Statistician: In a word, the variety. I’ve had the good fortune to work collaboratively with scientists in virtually every University of South Carolina department in the physical sciences, engineering, public health, and business schools, for example. In other words, I’ve never really had to decide “what I’m going to do when I grow up.”

Selected Publications:


- Edwards, John M. Grego, Ph.D., Associate Professor

Website: http://www.stat.sc.edu/~grego/


Research Activities: I initially worked on mixture models for attitudinal surveys and aptitude tests; mixture models assume that subjects come from more than one population and the population of origin is unknown. I have recently had the opportunity to apply mixture concepts to an environmental application with interesting policy applications—determining the magnitude of a 100-year flood for a watershed when floods can be caused by different types of meteorological events.

In developing an industrial design of experiments short course with Prof. Lynch and Prof. Edwards, I became interested in simultaneous modeling of process mean and variance. In addition to research in this area, I have also been studying feedback control. Statistical modelling of a continuous production process can be used to make adjustments to the process more efficient. In my capacity as a statistical consultant, I am currently applying this work to local industry.

About Statisticians: Statisticians have a unique opportunity to be a resource for the community, running the gamut from assisting on scientific issues within the university, helping local industry, or providing expertise on environmental issues.

Selected Publications:

Areas of Research: Psychometrics - Item Response Theory, Scale Construction, Multivariate Statistics, and Educational Measurement

Research Activities: Psychometrics is the application of statistical methods and theory to educational and psychological measurement. (Psychometry on the other hand is the ability to tell the history of an object just by touching it - a much more lucrative skill that I’ve never mastered.) While psychometricians use a variety of multivariate methods (and I am interested in most of them) my particular area of expertise is item response theory (IRT), the class of models used for analyzing the relationship between discrete observed data, such as test items, and underlying latent variables, such as ability. My research has focused on developing statistical methods for determining how many different latent traits educational tests and psychological instruments measure and well they measure them. I have also conducted research on the related question of bias in standardized tests and on the development of new IRT models. Research in IRT allows for the application of virtually every area of statistical theory, and mine has ranged from clustering algorithms to nonparametric regression to theoretical probability. My research has been and is currently supported by grants from the Measurement, Methodology, and Statistics Program of the National Science Foundation.

Why I Like Being a Psychometrician: I was first attracted to statistics, and psychometrics in particular, because of the opportunity to apply my theoretical mathematics training to actual sets of numbers. (If you’ve taken lots of advanced math courses you’ll know what I mean!) One of the great benefits of doing research in this area is that much of the research is of immediate interest to those who produce the major educational and psychological exams. You thus have the potential for your work to quickly play a part in something that eventually touches the lives of almost everyone in the country. That psychometricians (whether from statistics, psychology, or educational psychology backgrounds) are often eager and friendly collaborators is an added bonus.

Selected Publications:


• David B. Hitchcock, Ph.D., Assistant Professor
Website: http://www.stat.sc.edu/~hitchcock/
Research Activities: Functional data are characterized by being generated from some underlying continuous process, so that the data arise conceptually as curves, rather than simply sets of numbers. With modern sophisticated monitoring equipment, this type of data is becoming more common. Smoothing methods, particularly nonparametric regression, involve finding patterns in one or several
variables without making such restrictive assumptions about the distribution of the data as classical parametric regression requires. My research has investigated the effect of smoothing functional data on the clustering and the estimation of dissimilarities among the data. I am currently interested in developing novel methods of analyzing functional data sets, including inference about the median curve and outlier detection. I also enjoy investigating the history of statistics and seeing what the insights of the great pioneers in our science can still teach us today.

Why I Like Being a Statistician: I have always enjoyed investigating data and trying to see patterns and draw conclusions from data. I am excited about developing novel methods for learning from complicated data, as well as teaching students the beauty and applicability of statistical methods.

Selected Publications:

- Xianzheng (Shan) Huang, Ph.D., Assistant Professor
  Website: [http://www.stat.sc.edu/~huang/](http://www.stat.sc.edu/~huang/)
  Areas of Research: Diagnosis of model misspecification, Measurement Error, Group Testing (new interest), Longitudinal Data Analysis, Survival Analysis, Joint Modeling (old interest).
  Research Activities: With a research background in joint modeling of survival response and longitudinal process back in graduate school, I have been consistently interested in longitudinal data analysis and survival analysis. After I joined USC, on one hand I started to mix my previous research interests with the interesting topics (new to me) arising while interacting with colleagues in the department, such as group testing in the presence of measurement error; on the other hand, I have become further involved in diagnosing model misspecification. Except maybe in the field of nonparametric, one almost always needs to make certain parametric assumptions on part of the statistical model, without which the following statistical inference can be invalid. Often times the validity of these assumptions is not verifiable directly via the observed data. One of my continuing interest is to develop diagnostic tools for model misspecification.

Why I Like Being a Statistician: As a possibly “hyperactive” person, being a statistician suits me well (not that one has to be hyperactive to be a statistician). I can always add new items to the list of applications where new problems arise for statisticians to solve. This makes the problem-solving procedure fun and rewarding. Ever since I joined USC, being in a department with colleagues very much dedicated to teaching at all levels, I have started to appreciate more and more the art of teaching and instructing. The delicacy of fine presentation in classroom and instilling the statistical ideas in students is something about this career that attracts me.

Selected Publications:

- Xiaoyan (Iris) Lin, Ph.D., Visiting Assistant Professor
  Website: [http://www.stat.sc.edu/~lin/](http://www.stat.sc.edu/~lin/)
  Areas of Research: Bayesian Hierarchical modeling; Objective Bayesian analysis; Item response theory.
**Research Activities:** My research interests lie in Bayesian statistics and its applications. I have been doing my research in both theoretical and application areas. For the theoretical part, I have been working on objective Bayesian analysis. For example, I explored a general definition of multi-parameter reference priors during my graduate study. For the application part, I have been working on several psychological projects collaborating with psychologists in the Department of Psychological Sciences at MU. One is about the memory process dissociation models. The other is about the recognition-memory experiment. I am also interested in applying some objective Bayesian techniques or nonparametric Bayes to item response models.

**Selected Recent Publications:**


**Why I Like Being a Statistician:** In 1997, I chose "probability and statistics" as my major before I went to college. I am glad that I made the correct decision even though at that time I really didn't know what probability and statistics is. Since that year, I have been dealing with statistics and gradually loving being a statistician. I love the diversity of application of statistics. I enjoy the procedure of analyzing/discovering data using different statistical methods. Teaching is part of my life of being a statistician. I enjoy teaching people statistics because I think its useful in real life.

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**James D. Lynch**, Ph.D., Professor, Director of Reliability Center

**Website:** [http://www.stat.sc.edu/~lynch/](http://www.stat.sc.edu/~lynch/)

**Areas of Research:** Probability, Applied Probability, Stochastic Processes, Reliability, Industrial Problems. Currently have interests in complex systems, reliability and industrial problems.

**Personal Statement about my Profession:** I suckered someone into paying me for doing my hobby!

**Selected Papers:**

– F. Vera and J. Lynch (2007). General Convex Stochastic Orderings and Related Martingale-Type Structures. *Advances in Applied Probability* 39, 105-127. (Extends Blackwell’s dilation/one step-martingale ideas regarding comparison of experiments having the same first moment to experiments where the first 2k-1 moments are equal.)


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**William J. Padgett**, Ph.D., Distinguished Professor Emeritus, Fellow of the ASA, Fellow of the IMS, Elected Member of ISI

**Website:** [http://www.stat.sc.edu/~padgett/](http://www.stat.sc.edu/~padgett/)

**Areas of Research:** Reliability and life testing, Industrial statistics, Nonparametric function estimation.
Research Activities: The focus of my research for more than thirty years has been in the areas of reliability and life testing, survival analysis, and nonparametric estimation of densities, failure rate functions, and survival functions from various types of censored data. Early work for a dozen or so years from my dissertation concerned stochastic models for general systems and their qualitative behavior.

Why I Like Being a Statistician: I was attracted to statistics after completing an MS degree in mathematics with emphasis on numerical analysis. The attraction was that the broad applicability and the accompanying theory of statistics (using mathematics and computing) always present new challenges and never becomes boring! The opportunity to do something new, and perhaps creative, as well as being able to present statistical ideas to students every day, kept the job of being a statistics faculty member interesting and rewarding.

Selected Publications:

- Edsel A. Peña, Ph.D., Professor, Fellow of the ASA
  Website: http://www.stat.sc.edu/~pena/

Areas of Research: Reliability; Survival Analysis; Non- and Semi-parametric Inference; Mathematical Statistics; Applied Stochastic Processes and Probability.

Research Activities: I have several on-going research projects with collaborators and students. One of them deals with the development of models and methods of inference for recurrent events and coupling this with longitudinal markers. Since recurrent events occur in many areas, such as public health, biomedicine, reliability, engineering, economics, finance, sociology, and political science, the applicability of this research is quite broad. Another research that I am involved in, partly motivated with my consulting with colon cancer researchers, is on methods of inference with high-dimensional data, notably those from microarrays. I am also involved with research pertaining to decision-making when there are several competing models, the so-called decision-making with model selection. This is a very important area since the increase in variability arising from the model choice need to be taken into account to properly assess the properties of inferences or decisions. This problem arise for instance in environmental risk assessment, in survival analysis, in reliability, and in many other areas. With my sabbatical leave during Fall 2008 spent at the Statistics and Applied Mathematics Institute (SAMSI) in North Carolina, I have also learned a lot about particle filters and sequential Monte Carlo methods, and hope to utilize these important techniques in some of my research as well as perform research into theoretical underpinnings of this area.

I have been fortunate to get external research funding from different agencies such as the National Science Foundation, the National Institutes of Health, and the Environmental Protection Agency. I am also serving as Director of the Biometry Core of the NIH-funded Center for Colon Cancer Research in the university. This Core is responsible for the statistical aspects of research performed in this Center.

Why I Like Being a Statistician: Being an academic statistician is an ideal job for me since it allows me to do mathematical research, which I enjoy immensely, through the development of new statistical methods which have potential applicability in many areas such as in biomedical and public health research and in the engineering and reliability settings. Probabilistic and statistical research also suits my temperament because it is non-trivial mathematically and so it challenges and forces me to exercise my mental capabilities and creativity to the utmost. There is also an inherent philosophical nature to the subject of probability (“the only certain
thing in this Universe is that everything is uncertain”), and it still amazes me that one is able to make very accurate inferences about unknown parameters through the use of incomplete sample data that is quite minuscule relative to the population of interest, through the exploitation of the “order emanating out of the chaos of randomness!” I also firmly believe that an academic position is the best job for me since it allows me to learn newer and newer things and be able to interact with many exciting students and colleagues.

**Selected Recent Publications:**


- **Jayaram Sethuraman**, Ph.D. Indian Statistical Institute, Distinguished Visiting Professor, Fellow of the IMS, ASA, Elected Member of the ISI, Army Wilks Award.

**Website:** http://www.stat.sc.edu/~sethuram

**Areas of Research:** Probability; Mathematical Statistics; Reliability; Nonparametric Bayesian Inference; Stochastic Processes, Image Analysis.

**Research Activities:** I recently introduced partition based nonparametric priors as the most natural priors to analyze data obtained by repair and censoring models. My colleagues in the department are finding new examples to apply these prior distributions.

In my recent research, jointly with Fred Huffer and Sunder Sethuraman, we looked at the records set by an infinite sequence of independently and identically distributed random variables. The number of times will you have to wait k units of time for the next record is called the the count of strings of length k. What is the joint distribution of counts of length k, for k=1,2, etc.? This problem has applications in combinatorics and has been studied till now only by combinatorial methods. We have shown that we can embed this problem in conditional marked Poisson process and obtain all previous results and some new ones. We are looking at further extensions when the number of variables is finite.

**Why I Like Being a Statistician:** I enjoy being an academic, not just a statistician. It makes you look at all sides and make a logical decisions. Statistics is an efficient tool to do this. You will have to bring tools from several disciplines to do this.

**Selected Recent Publications:**


John D. Spurrier, Ph. D., Distinguished Professor Emeritus, Fellow of the ASA, Principal of the Capstone Scholars.

Website: http://www.stat.sc.edu/~spurrier/

Major Research Areas: Multiple Comparisons, Nonparametrics, Statistics Education.

Research Activities: I love to develop statistical methods that will be useful to practitioners of statistics. The field of multiple comparisons involves comparing three or more treatments. Early work in this field involved comparing mean responses for the treatments. My most recent work involves comparing the treatments based on the regression relationship between Y and x. For example, is the relationship between the amount of a chemotherapy agent absorbed in the kidneys (Y) over time (x) affected by the administration of other drugs? The mathematical tools that I most often use in multiple comparisons research are calculus, linear algebra, and numerical analysis. The field of nonparametric statistics deals, in part, with analyzing data without assuming that the data follow a normal distribution. My recent work in this field has involved developing nonparametric multiple comparisons methods, forming new approximations to the distribution of a famous nonparametric test statistic, and developing bounds on a probability that arises in nonparametric statistics. The mathematical tools that I most often use in nonparametric statistics are combinatorics and recursive functions. My work in statistical education has centered on developing hands-on learning activities for use in elementary statistics and in a capstone course for senior statistics majors. These help students better understand the role of statistics and the statistician in scientific investigations.

Why I Like Being a Statistician: I love wearing three hats. As a researcher, I use computers and mathematics to tackle interesting and challenging problems. As a teacher, I have the opportunity to help students reach their full potential. As a consultant, I learn about exciting research in numerous fields.

Selected Publications:


Joshua M. Tebbs, Ph. D., Associate Professor.

Website: http://www.stat.sc.edu/~tebbs/index.htm

Major Research Areas: Group Testing, Categorical Data, Multiple Comparisons, Order-Restricted Inference, Epidemiology and Public Health, Biomedical Applications.

Research Activities: My research currently focuses primarily on categorical data and regression models for group testing data. I’m especially interested in biomedical applications, particularly those involving sexually transmitted diseases. A recently funded grant from NIH proposes to find more efficient protocols for identifying infected (positive) individuals through new regression modeling techniques. This methodology can be used in other applications, including drug discovery, agroterrorism, genetics, and environmental risk assessment.

Why I Like Being a Statistician: Being a statistician is an ideal career for someone that likes mathematics and aspires to work on real-life problems. For example, a colleague from the College of Pharmacy has recently asked me to help him design a randomized experiment to learn about the effects of giving heparin (an anticoagulant) to premature babies born here in South Carolina.

Selected Publications:


Lianming Wang, Ph.D., 2006, University of Missouri - Columbia.

Website: http://www.math.sc.edu/~wangl/

Areas of Research: Survival Analysis; Bayesian analysis; Non- and Semi-parametric modeling; Hypothesis testing; Model selection; Stochastic ordering; functional data analysis; Biomedical application.

Research Activities:
My research aims to derive novel methodologies for analyzing complex data occurring in biomedical, epidemiologic, environmental, and health-related studies. Such real-life data usually have their own unique features of complexity and require flexible modeling. Semi- and non-parametric models using either frequentist or Bayesian approaches are my primary choices because they make very few model assumptions. Model selection and robustness are some specific concerns of mine.

Why I Like Being a Statistician:
Life is full of uncertainty, and probability and statistics can deal with uncertainty and provide reliable and accurate inference. Being a statistician helps me understand the world and eases my mind. I like being a statistician because I like doing creative research in many areas (e.g., environment and epidemiology) with my knowledge in statistics, and such research can likely benefit people’s life.

Selected Recent Publications:

Equal Opportunity & Affirmative Action

The University of South Carolina provides equal opportunity and affirmative action in education and employment of all qualified persons regardless of race, color, religion, sex, national origin, age, disability, or veteran status.

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