



The Y-Distribution

Brigham Young University

Department of Statistics

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See you in Denver!

From the Chair



In this issue of the Y-Distribution it is my pleasure to highlight some of last year's accomplishments. I am delighted to report that Shannon Neeley has joined our faculty.

We look forward to her contributions to the department (see "New Faculty" below).

We are now analyzing the assessment data related to the undergraduate and graduate curriculum and program changes implemented last year. Some of these changes are: (1) We made additional changes to our department programs. The name of the Business Analysis emphasis was changed to Applied Statistics and Analytics. (2) We tweaked our Statistics Minor and added an Actuarial Minor. (3) The students admitted in Fall 2007 into our revised Master's program finished their first year and after the winter semester they all took their comprehensive exams. (4) Stat 336 is now a six-credit hour class. We have integrated introductory coverage of linear algebra, statistical theory, and LaTeX, as well as intermediate coverage of R, into the traditional three hours of regression coverage. (5) We surveyed Stat 221 students to see why they were taking this class. The predominant reason the students stated was that Stat 221 was a prerequisite or requirement of their major and not that it fulfilled General Education. We are now assessing the course learning outcomes so that we can do a better job reporting to all Stat 221 stakeholders. We invite you to visit the URL, <http://learningoutcomes.byu.edu>, and make comments, suggestions or observations about our programs.

Undergraduate mentoring (see "Undergraduate Mentoring" pg. 3) receives significant resources and attention because the university, college, and department believe that this opportunity greatly enhances the BYU undergraduate experience. We are constantly looking for ways to increase the

number of opportunities in our undergraduate mentor program (see "Faculty/Student Collaborations" pg 3).

Finally an important event is around the corner. The Statistics Department at BYU was founded in 1961. In 2011 we will be celebrating our 50th Anniversary. We invite you to send in suggestions on how we could celebrate this important milestone.

We look forward to our traditional breakfast and open house at JSM this year. Thank you for your continued support and interest in the department.

ASA/JSM Denver Breakfast Social



If you are planning on attending the ASA/JSM meeting in Denver, Colorado, we invite you to join us Tuesday morning, August 5, 2008, from 7:00–8:30 a.m. for a BYU Alumni and Friends Breakfast Social sponsored by the Department of Statistics. We will meet in the Hyatt Regency Capitol Ballroom 6, Level 4. A delicious breakfast buffet will be served. Hope to see you there!

Summer Institute of Applied Statistics



The 33rd Annual Summer Institute of Applied Statistics was held June 18–20, 2008. Presenting was Dr. Scott M. Berry, of Berry Consultants, College Station, Texas. Dr. Berry presented a three-day seminar on Bayesian clinical trial design and analysis. The Summer Institute featured innovative models for dose-response modeling, both parametric and non parametric, and designs for clinical trials. The Bayesian clinical trials presented by Dr. Berry allow for more efficient decisions on the efficacy of drugs. The adaptive approach to trial design was shown to result in shorter trials (arriving at a decision of stopping for "success" or "futility" sooner) than traditional clinical trials. The Summer Institute was attended by practitioners in clinical trials from a variety of medical hospitals, pharmaceuticals, and general industries.

We are pleased to present Dr. Di Cook from Iowa State for Summer Institute 2009 to be held June 17–19. Dr. Cook will be discussing "Exploring Data Visually". Dr. Cook

will examine the process of extracting knowledge from data and using interactive graphics as an integral part of the statistical analysis. Participants will learn about graphical methods for multivariate data, handling missing values, supervised classification, cluster analysis, longitudinal data, network data, and a visual inference. Examples will be from topics such as tipping, spam, food quality, global warming, and music. Open source software, R and GGobi, will be used for all of the examples. Make your plans now to join us. Check our web site for further details. 

New Faculty



We are pleased to announce Dr. Shannon Neeley has accepted a position as assistant professor. Shannon received both her BS and MS in Statistics at Brigham Young University. She then completed her PhD at Rice University in Houston, Texas. Shannon's work, which focused on processing methods for data from reverse-phase protein arrays, allowed her to collaborate with the University of Texas MD Anderson Cancer Center, also in Houston, where she worked under Keith Baggerly.

Shannon is originally from Ohio and resides in Provo, Utah. She served a mission in Ecuador and enjoys running and crafting.

Prestigious Faculty Awards

Dr. H. Dennis Tolley was chosen as the 2007-08 recipient of the BYU Statistics Melvin W. Carter Professorship.



Dr. Tolley is an ideal scientist, researcher, teacher, and collaborator. He is committed to scientific honesty and is enthusiastic about communicating statistical principles to others.

He stimulates students to perform their best and he is an active mentor to faculty and students.

His circle of collaborators extends internationally, and he has gained recognition and influence in his discipline, reaching well beyond local and regional boundaries. His work has been recognized with awards from the students of BYU, the College of Physical and Mathematical Sciences, and the University, as well as by international peers, the Society of Actuaries, and the American Statistical Association. According to a statement by the ASA, he received his award for "unbounded enthusiasm in communicating statistical principles to diverse audiences at all levels; for contributions to modeling of social, economic, and environmental issues on a world-wide scale; for diversity of interest and contributions in many areas of science; and for excellence in research and consulting". He sets a high standard as the first recipient of the Melvin W. Carter Professorship.

In addition to the Professorship Award, Dr. Tolley is an active researcher in areas of importance to society. Recently he collaborated with researchers at Duke University and the National Council of Spinal Cord Injury Association in a study to determine if a Federal health care research investment would transform the aging workforce. The report, published in the *Proceedings of the National Academy of Sciences*, found that the gains from a greater investment in biotechnology and medicine would offset the rising cost of programs like Medicare, and yield discoveries that increase both life expectancy, and the length of time that workers remain active.

Dr. Gilbert W. Fellingham and Dr. Scott D. Grimshaw have been named as recipients of the BYU Statistics Faculty Heritage Fellowship in Statistical Science, 2007-08.



Dr. Gilbert W. Fellingham is a committed scholar and researcher who strives for excellence in everything he does. His research and analysis have been published not only in the best statistical simulation, actuarial science and sports analysis venues, but also in the best scientific sports journals associated with physiology, exercise, training, rehabilitation, medicine, metabolism, and nutrition. Since his arrival in the department in 1990, Dr. Fellingham has brought an energy to the classroom that resonates well with his students. He was honored in 2002, 2004, and 2006 with the department's Teacher of the Year award.



Dr. Scott D. Grimshaw has proven himself to be an innovative and dedicated scholar, a person with high standards, an outstanding teacher, and an active citizen of the University. He has provided insightful and innovative extensions to the statistical body of knowledge and has demonstrated the relevance of these extensions by using them to solve practical problems. The breadth of Dr. Grimshaw's contributions to the statistical literature is particularly impressive. He has contributed in process mentoring and experimental design, as well as in the area of likelihood inference, statistical education, and various areas of application.

Dr. Grimshaw's teaching averages have been consistently above department, college, and University averages. In 2005, he was honored by students with the department's Teacher of the Year award. Dr. Grimshaw has served the department well, and currently serves as the department's Associate Chair and Graduate Coordinator.

Department Teaching Awards were given to the following:

Natalie Blades, 2007 Faulkner Award, recognizing outstanding teaching in Statistics graduate courses and graduate mentoring.

Bruce Collings, 2007 Hendrix Award, recognizing outstanding teaching and curriculum development in the BYU Actuarial Science program.

Shane Reese, 2007 Christensen Award, recognizing outstanding teaching in Statistics General Education and service courses.

Shane Reese, 2007 Outstanding Paper in Applied Statistics, "Advances in System Reliability", *Statistical Science*, 2006, 21, 1-20.

Research Spotlight

Drs.' Gilbert W. Fellingham and C. Shane Reese, along with graduate student Garrett Page conducted a study proving that assists and teamwork are of great importance when it comes to winning a basketball game, even more important than what the star player can do. This is contrary to the modern NBA philosophy, which is very much about the individual player. They compared the value of 13 box score statistics from an entire NBA season across five player positions to see how much each contributed to the winning games. The result of the statistics on assists, passing to set up a score, steals, turnovers, and rebounds were sometimes surprising. However, according to Dr. Fellingham, the bottom line is "...having a group of players play as a single unit increases the chances of winning a game". The study, entitled "Using Box-Scores to Determine a position's Contribution to Winning Basketball Games", can be found in the *Journal of Quantitative Analysis in Sports*: Vol. 3:Iss 4, Article 1. It is available at:

<http://www.bepress.com/jqas/vol3/iss4/1>

Rothamsted Research Award



The Rothamsted Award is presented to graduate students who demonstrate excellence in statistical research exemplary of the work done by Sir R. A. Fisher at Rothamsted Research Station.

This years recipient of the Rothamsted Award is Lindsay Florence for her project entitled "Skill Evaluation in Women's Volleyball". The article, which she coauthored with several others at BYU, is found in the *Journal of Quantitative Analysis in Sports*: Vol. 4:Iss 2, Article 14. It is available at: <http://www.bepress.com/jqas/vol4/iss2/14>.

Lindsay graduated with her Master's Degree in Statistics in April 2008, just in time to give birth to the couple's first son on May 13, 2008.

Summer Internships

Many of our graduate students are currently off-campus working at internships.

Andrea Lundrigan Thomas, recipient

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of the Rencher Undergraduate Mentoring Award, is investigating a type of climate variability found in the last glacial period called Dansgaard-Oeschger events. She finds it very rewarding to be able to devote full time to evaluating the characteristics and suggested cyclic nature of the events.

Claire Owen is an intern at the Statistical Data Center at Intermountain Health Care, where she has the opportunity to consult with medical doctors and other researchers to discuss their data collection and analysis plans. Following a preliminary analysis on data they've collected, she fixes any problems or makes any adjustments and prepares a final statistical write-up to be used in the paper/proposal/research grant. Her boss, Greg Snow, and other coworkers guide her through which methods should be used to ensure that her analysis is reasonable.

Michelle Allan works for Lead Media Partners, a marketing company in South Jordan. The company works with online universities to provide the opportunity for students to continue their education. Michelle develops and implements a prediction method through creating graphical displays. This enables management to see which factors influence the probability that a given student would enroll at a specified university.

Jonathan Prasad has an internship with Zions Bank Corporation. His primary task involves putting together a ranking model that predicts the stability of a given bank in the current market. The model is one of the tools used to identify good investments, as well as how to avoid bad investments.

David Burk is an intern at the Sphere Institute, a non-profit organization near San Francisco that provides the government with expertise and technical assistance on a variety of health policy issues. He conducts applied research, working with large sets of Top Secret data. In particular, he studies racial bias in the Child Welfare System and Medicare expenditures. A recent discovery that he has picked up is approximating a step function with a CDF of a Gaussian distribution with very small variance.

Mike Ulrich works in the Statistics Department Consulting Center. His primary responsibilities are to analyze data provided by clients, and to interpret the results for clients who have already completed a statistical analysis. The analysis that he performs is done primarily in SAS, allowing him to expand his computing repertoire. His projects range from

evaluating alternative methods of teaching English to Hispanic children, to determining the effectiveness of a weight loss program for a nutrition supplement company.

Richie Wyss is working at the VA Medical Center in Salt Lake. He is involved in the area of public health, specifically epidemiology. He is helping to develop computer simulations that determine the cause and effect relationships between disease and exposure to a drug.

Rachel Poulsen is an intern for American Express in the service engineering department. She analyzes surveys using logistic regression and various variable selection techniques. She has had many opportunities to present her work to the VP of the company in Salt Lake City, as well as senior leaders in New York City.

We continue to receive positive feedback from many organizations that currently employ our students as interns. If you know of any internship opportunities that are available and that would be of interest to our students, please e-mail the details to: statsec@stat.byu.edu.

Undergraduate Mentoring

In 2007, 18 students were divided into four research groups. The groups were as follows: Bayesian Computation under the direction of Shane Reese, Environmental Statistics led by William Christensen, Predictive Analytics with Scott Grimshaw, and Statistical Genomics by Evan Johnson. These groups used the Statistics Undergraduate Research Computing Laboratory (SURCL) for weekly group meetings. Extensive individual work was done using the four Mac workstations in the lab. All students participating in undergraduate mentoring made presentations in the 2008 BYU Spring Research Conference.

The 2007-08 Alvin C. Rencher Undergraduate Mentoring Award was given to Andrea Lundrigan Thomas. For her research, she has chosen to work in the environmental statistics group. She is collaborating with Dr. William Christensen and Dr. Summer Rupper (BYU Geology) analyzing ice core data.

Funding from the College of Physical and Mathematical Sciences supports our undergraduate mentoring research.

Faculty/Student Collaborations

Several papers and presentations have resulted from faculty-student collaboration. They include:

Christensen, W.F. and **Florence, L.W.**

(2008), "Predicting Presidential and other Multistage Election Out-comes using State-level Pre-election Polls," *The American Statistician*, 62, 1-10.

Lingwall, J.W. and Christensen, W.F. (2007), "Pollution Source Apportionment Using a Priori Information and Positive Matrix Factorization," *Chemometrics and Intelligent Laboratory Systems*, 87, 281-294.

Lingwall, J.W., Christensen, W.F., and Reese, C.S. (2008), "Dirichlet based Bayesian Multivariate Receptor Modeling," to appear in *Environmetrics*.

Page, G.L., Fellingham, G.W., and Reese, C.S. (2007), "Using Box-Scores to Determine a Position's Contribution to Winning Basketball Games," *The Journal of Quantitative Analysis in Sports*, 3, Article 1.

Eddleman, J.L., Sorber, S.C., Morris, T.H., Grimshaw, S.D., **Dastrup, E.**, Christensen, W.F., and **Morris, S.L.** (2007), "Analysis of Fremont River strath terraces in the area of the Capitol Reef National Park, Utah. Implications for fluvial landscape evolution and the role of climate forcing," in *Central Utah-Diverse Geology of a Dynamic Landscape*, eds. G.C. Willis, M.D. Hylland, D.L. Clark, and T.C. Chidsey, Jr., Salt Lake City: Utah Geological Association.

Florence, L.B. and Fellingham, G.W. (2007), "Skill Importance in Women's Volleyball: A Bayesian Approach," poster at New England Symposium on Statistics in Sports, Boston, MA.

Tolley, H.D., Nackos, A.N., Truong, T.V., Kimball, J.A., **Pulsipher, T.C.**, Barthomew, C.H., Robison, R.A., and Lee, M.L. (2007), "Chemical Biomarker Approach to Differentiating Biological Agents," PITTCON Conference and Expo, Chicago, IL.

Student Information

We had 144 undergraduate majors in 2007. There were 68 Actuarial Science majors and 76 Statistics majors. The Business Analysis emphasis had 36 majors, the Statistical Science emphasis had 22, the Biostatistics emphasis had 14, the Quality Science emphasis had 1, and the Information Systems emphasis had 4. The total number of B.S. graduates was 49, with 20 Actuarial Science graduates and 29 Statistics graduates (15 Business Analysis, 4 Biostatistics, and 9 Statistical Science). One student earned

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Summa Cum Laude designation, one earned Magna Cum Laude, and three earned Cum Laude. Nineteen students earned their Master's Degree in 2007. 26% of our students made the Dean's List at least one semester (3.75 GPA with at least 14 credit hours per semester). Our students passed a total of 23 Actuarial Exams. 4693 students enrolled in service classes taught by the Department. 4105 students were enrolled in Statistics 221. Approximately 1000 students registered for the Independent Study version of Statistics 221. 858 students enrolled in our major courses.

Faculty Positions

The Department of Statistics invites applications for continuing status track faculty. Please visit our web site at <http://statistics.byu.edu/> for more information. Visit <http://yjobs.byu.edu/> to complete an on-line application.

Important Department Web Pages

Check out the department web page for in

formation regarding majors and emphases offered by the department, upcoming events, and other information.

<http://statistics.byu.edu/>

Please keep us up-to-date on your contact information. To update your address, visit:

http://statistics.byu.edu/address_change.php

Call for Donations

While evaluating student applications for Department of Statistics scholarships, it was obvious that there were more qualified students in need than the Department's endowments allowed. Please support the Department of Statistics at Brigham Young University, and continue the tradition of giving. Make contributions to the BYU Annual Fund, identifying your gift to the College of Physical & Mathematical Sciences for Statistics and Actuarial Science Scholarships (contact Brent Hall at 801-422-4501 if you have any questions). You have the power to make an incredible difference in the lives of our students.

MS Statistics Graduates

2007–2008

Bradley J. Barney
Paul C. Cannon
Jared M. Collings
Edward P. Johnson
Rebecca L. Richardson
Andrew W. Stacey

April 2008

Lindsay W. Florence

August 2008

Emily B. Bell
Benjamin A. Carper
Scott T. Howard
Gregory K. Johnson
Todd G. Remund