



The Y-Distribution

Brigham Young University

Department of Statistics

Vol. XIV July 2009

See You In Washington DC!

From the Chair Dr. Del T. Scott



This is the fourth contribution that I have made to the Y-Distribution. As I start my second term as Department Chair I acknowledge the work of all the faculty, staff, and students to improve the department environment. We appreciate all our alumni and friends who have given us information on jobs, internships, etc. A change you might want to know about is that Dr. Bruce J. Collings has left the department administration and has been replaced by a new associate chair, Dr. David G. Whiting. Dr. Collings was the department's undergraduate coordinator and served on various college and university undergraduate committees. I have asked Dr. Scott D. Grimshaw to remain as an associate chair.

I usually have the opportunity to introduce new hires. However, at the end of 2008 a hiring freeze was implemented at BYU. This policy left us with two vacant positions. The University gave us permission to fill one of these positions for the 2009-2010 academic year with part-time faculty who had previously worked for the department. In response to the hiring freeze we have elected to scale back some of our programs. One big change was the teaching of Statistics 221 in a large lecture which had approximately 750 students. Professors Shane Reese and Dennis Tolley each taught one large class in the 2008-2009 academic year. We made no changes to the lab sections.

One goal we had with the changes to our graduate program was that all masters students graduate with their degree in two years,

which was accomplished. Our integrated BS/MS program allows students to complete both degrees in five years. We are looking to increase the number of students in this program.

A new class, Introduction to Bayesian Statistics, was taught for the first time in the Winter 2008 semester. This class services both majors and non-majors.

Because of the current economic situation we have seen two changes. The first is that our undergraduate and graduate students have had a more difficult time finding internships. The second is that we have seen an increase in the number of graduate applications.

The department has always been interested in improving interactions with the high school teachers in the area who are teaching statistics. This year Jan Horton, a Timpview math teacher, spent her professional development leave with us. She worked as a teaching assistant and took classes to expand her education.

Last year I mentioned the fiftieth anniversary of the department was around the corner. The department was founded in September of 1960 and our students first graduated in 1961. We would be particularly interested in stories, experiences, remembrances, etc. about fellow students, faculty, TA's, and staff. We would also like to know about department activities and events that impacted your personal and professional lives. Please send your reflections to scott@d@byu.edu.

Some of the highlights of the past year are referenced in sections of this newsletter, spotlighting some of the faculty and students.

We will again have our traditional breakfast and open house at JSM this year. Thank you for your continued interest in and support of the department. ◇

ASA/JSM Washington D.C. Breakfast Social



If you are planning on attending the ASA/JSM meeting in Washington, DC, we invite you to join us Tuesday morning, August 4, 2009 at 7:00 a.m. for a Friends and Alumni of Brigham Young University Open House Breakfast Social sponsored by the Department of Statistics. We will meet in the Walter E. Washington Convention Center, 2nd floor, overlook west. A delicious breakfast will be served! We hope to see you there! ◇

Education Week Alumni Open House

You are invited to our Department of Statistics Open House being held in conjunction with Education Week. Please join us on Wednesday, August 19, 2009, from 5:00-7:00 p.m. in the Gordon B. Hinckley Alumni and Visitors Center in the Assembly 3rd Floor Open Area. Take the elevator (or stairs) to the third floor where you will be treated to refreshments and faculty members eager to visit with you. See you there! ◇

Summer Institute of Applied Statistics



The 34th Annual Summer Institute of Applied Statistics was held June 17-19, 2009. Dr. Dianne Cook of Iowa State University gave a three-day seminar entitled "Exploring Data Visually." Topics included graphical methods

for multivariate data, handling missing values, supervised classification, cluster analysis, longitudinal data, network data and visual inference. Dr. Cook taught the process of extracting knowledge from data using interactive graphics as an integral part of the statistical analysis.

Summer Institute was a great success and enjoyed by all. Noteworthy is the fact that we had an international attendee from Yumbo, Colombia joining us for the seminar. ♦

Prestigious Faculty Awards



Bruce J. Collings received the College Distinguished Citizenship Award from the College of Physical and Mathematical Sciences. He has served the department, college, and university in numerous capacities. He is deserving of the acknowledgment that comes with this award.

Bruce has served in the department administration as associate chair, graduate coordinator and most recently as undergraduate coordinator. He was the department's face for all things associated with undergraduate education. He spent countless hours counseling with students about their future. Bruce always made time for students who had questions about the path to their degree. He learned about their personal lives and knew about events that impacted their academic life.

Bruce has been the key component in the growth of our actuarial program. He used his own resources to obtain study materials for the students to use as they prepared for the actuarial exams. He has taught the majority of the actuarial courses and has always been involved in the last two classes that actuarial students take as they prepare for exams. Actuarial students make up about 40% of our majors resulting in a heavy advisory role for Bruce. Because of his dedication, our program is recognized as a strong undergraduate program with a high passing rate on the exams.

Bruce is an excellent teacher. His ratings are consistently very high. The university recognized Bruce's teaching by awarding him an Alcuin Fellowship in General Education (2003–2006.)

Bruce has represented the department

at the college level serving on the College Curriculum Committee, as well as on the University Scholarship Committee. He has served on the Faculty General Education Council (2001–2006) and the Presidential Scholarship Committee (1997–2005) and has been serving on the University Honors Faculty Council since 2007.

Bruce has been involved in AP Statistics since 1999. He has taught many workshops to high school teachers and graded statistics AP exams. Additionally, he has provided data collection and analysis assistance for a variety of awards competitions on and off campus. These entities include the Scholarship Office, Women in Science, the Student Bar Association, the College of Physical and Mathematical Sciences, the Department of Food Science and Nutrition, the Alumni Association, and the Provo High School Reflections Committee.

Over the past 10 years no one has exceeded Bruce's citizenship contribution to the department or the university. ♦

Research

Dr. C. Shane Reese, Professor of Statistics, participated on a National Academy of Science panel on "Test and Evaluation of Biological Standoff Detection Systems." A biological warfare agent (BWA) is a microorganism, or a toxin derived from a living organism, that causes disease in humans, plants, or animals or that causes the deterioration of material. The effectiveness of a BWA is greatly reduced if the attack is detected in time for the target population to take appropriate defensive measures. Therefore, the ability to detect a BWA, in particular to detect it before the target population is exposed, will be a valuable asset to defense against biological attacks. The ideal detection system will have quick response and be able to detect a threat plume at a distance from the target population. The development of reliable biological standoff detection systems, therefore, is a key goal.

However, testing biological standoff detection systems is difficult because open-air field tests with BWAs are not permitted under international conventions and because the wide variety of environments in which detectors

might be used may affect their performance. This research explores the question of how to determine whether or not a biological standoff detection system fulfills its mission reliably if we cannot conduct open-air field tests with live BWA.

Dr. William F. Christensen, Professor of



Statistics, was the featured speaker for the Fourth John C. & Susan S. G. Wierman Lecture in Air Quality Data Analysis. The annual lecture was held on October 30, 2008 at The Johns Hopkins University in Baltimore, Maryland. This lecture series, hosted by the Johns Hopkins Department of Applied Mathematics and Statistics, features talks on developments in air quality data analysis that are relevant for policy development. It seeks to bring together faculty and researchers in engineering and sciences with state and local air quality officials to enhance understanding and stimulate collaboration on important air quality issues. The lectures are intended to showcase new developments, to encourage the quantitative analysis of scientific issues related to air quality, and to elucidate the policy implications of recent research.

The title of Dr. Christensen's presentation was "Identifying Pollution Source Locations for Air Quality Monitoring." The lecture discussed the pollution source apportionment (PSA) problem which involves quantifying the impact of major sources of pollution on air quality. The identification of pollution source directions is an important part of PSA. Estimated source directions are used both as inputs to a Bayesian source apportionment analysis, and as part of a post-analysis check to associate identified pollution factors with potential pollution sources. The lecture discussed two approaches for source location identification which can be used in different settings. The first requires wind direction data measured at the air quality receptor and makes use of statistical and/or deterministic (AERMOD) models for chemical transport of particulate matter from source to receptor. The second makes use of HYSPLIT back-trajectory estimates and a kriging estimator which filters heterogeneous measurement errors.

Mapping the Genome

BYU'S College of Life Sciences is home to a new DNA genome sequencer, thanks to a \$630,000 grant from the National Science Foundation and additional funding from the university. The sequencer allows researchers to decode DNA, identifying the order of DNA nucleotides, or base pairs, in an organism's genome. The human genome is made up of over 3 billion base pairs.

While the university's old sequencer produced about 67,000 base pairs in a single run, the new machine produces about 500 million pairs and is about a thousand times cheaper per sequence, increasing BYU's research possibilities.



Dr. W. Evan Johnson, Assistant Professor of Statistics, and Mark J. Clement, Associate Professor of Computer Science, are working on the Genomic Next-Generation Universal MAPper, a program that maps larger reads from the sequencer and enables researchers to reconstruct genomes without losing as much data. ♦

Department Awards

Natalie Blades, 2009 Faulkner Award, recognizing excellence in teaching Statistics majors and graduate courses.

Bruce Collings, 2009 Faulkner Award recognizing excellence in teaching Statistics majors and graduate courses.

Dennis Eggett, 2009, recognizing excellence in teaching Statistics graduate service courses.

John Lawson, 2009 Citizenship Award, recognizing curriculum development and promotion of Quality Science.

Lynne Nielsen, 2009, recognizing excellence in teaching Statistics General Education and service courses.

Shane Reese, 2009, recognizing excellence in teaching Statistics General Education and service courses

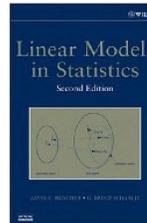
Check out the department web page for information regarding majors and emphases offered by the department, upcoming events, and other information. <http://statistics.byu.edu/>

Faculty Publications



Hamada, M.S., Wilson, A.G., **Reese, C.S.**, and Martz, H.F. Bayesian Reliability. New York: Springer-Verlag. 2008.

Rencher, Alvin C. and **Schaalje, G. Bruce.** Linear Models in Statistics, 2nd Ed. New Jersey: Wiley and Sons, Inc. 2008.



Faculty-Student Collaborations

Florence, L.B., Fellingham G.W., Vehrs, P.R., and Mortensen, N., "Skill evaluation in women's volleyball." The Journal of Quantitative Analysis in Sports, 4(2), Article 14, (2008)

Christensen, W.F., and **Florence, L.W.** "Predicting presidential and other multistage election outcomes using state-level pre-election polls." The American Statistician, vol. 62, pp. 1-10, (2008)

Hathaway, J.E., Schaalje, G.B., Gilbert, R.O., Pulsipher, B.A., Matzke, B.D., "Determining the optimum number of increments in composite sampling." Environmental and Ecological Statistics, 15: 313-327, 2008.

Dr. Eggett Bikes from Seattle to Portland



Dr. Dennis L. Eggett, head of our Consulting Center, has accomplished an amazing feat! On July 11, 2009 he participated in the 30th Annual Cascade Bicycle Club Group Health Seattle to Portland Bicycle Classic. The trip is an endurance ride between the two cities, a distance of 202.25 miles. Dr. Eggett made the ride in just under 12 hours, all in one day, even though it is a two-day event. He rode along with 9,999 other participants including his wife, Loretta.

Of the experience Dr. Eggett wrote, "The ride from Seattle to Portland is on scenic back roads through densely wooded forests and small towns. It is primarily flat with a few minor climbs. The one-day riders this year were treated to perfect weather for the

ride, but it was rainy for the two-day riders on Sunday. The wind was at our backs as we rode up the Columbia River Gorge for the last forty miles into Portland. At that point having the wind at your back is a real blessing. I had a great time on the ride and slept most of the day Sunday." He certainly earned the brightly colored windbreaker he brought back with him. Congratulations Dr. Eggett! Interesting details of the event can be found at www.cascade.org/stp and click on "View the 2009 event fact sheet." ♦

MS Statistics Graduates

December 2008

Thomas Stewart enjoys his PhD program at the University of North Carolina at Chapel Hill. Some days he struggles with the "bio" in "biostatistics," but overall Thomas is very happy. He appreciates that UNC basketball beat Duke twice and won the 2009 National Championship. Thomas is a 2008 recipient of the John and Diane Fryer Fellowship.

April 2009

Michelle Allan is working as a MS Statistician for the University of Utah in the Pediatrics Department in the Critical Care Unit. She will primarily be working on a study that looks at identifying high-risk and low-risk indicators of traumatic brain injury.

Andrea Lundrigan Thomas works for the University of Utah Pediatrics Critical Care Department analyzing car crash data from the state of Utah. Through these analyses, relationships between driving characteristics and the outcomes are identified. If the findings are compelling, the analyses are presented to a Utah State Legislator so that driving safety laws can be created or modified.

Claire Owen is enjoying taking care of her new baby girl and having time to travel and visit people now that she has finished her degree. She keeps her statistics sharp by tutoring statistics students and advising her husband, who finds many applications for statistics in electrical engineering.

August 2009

David Burk spent the first part of the summer finishing up several projects: his MS project with Professor Tolley; a research

project with Professors Evans and Spencer of the economics department; a research project with Dr. Clifford Winston of the Brookings Institution; and a research project with Professor Jay Bhattacharya, an economist at the Stanford University School of Medicine. David will be travelling to China to work with Professor Tao Ran, an economist at the Chinese Academy of Sciences. In September, he will begin his PhD in economics at the University of Chicago.

Rachel Poulsen is currently working for Huntsman Cancer Institute with Dr. Johnson helping them publish a few papers and submit a grant. She will be working in the San Francisco Bay Area as her husband attends law school.

Jonathan Prasad is working for Zions Bancorporation as a Financial Analyst with the Asset Liability Management (ALM) group. His specific assignment is to look at prepayment models. He looks at the probability of a loan being prepaid, and if the probability is high, then he also estimates how many days it will be prepaid by.

Michael D. Ulrich will be working for the RBL Group, a business consulting firm based in Provo, Utah. His responsibilities will include analyzing data to better understand organization, leadership, and human resource problems. Mike plans on working for RBL for one to two years before applying to PhD programs in business management.

Richie Wyss will be attending the University of North Carolina at Chapel Hill to earn his PhD in epidemiology. ♦

MS Statistics Graduates 2008–2009

December 2008

Thomas Gordon Stewart

April 2009

Michelle L. Allan
Andrea Lundrigan Thomas
Claire Bangerter Owen

August 2009

David Morris Edward Burk
Rachel L. Poulsen
Jonathan P. Prasad
Michael D. Ulrich
Richie Wyss

Jan Horton, Timpview High School, Provo, UT, spent a sabbatical year with the Department of Statistics. In addition to sharing her AP Statistics teaching expertise in Stat 301, Jan took courses within the department to learn advanced statistical methods and assisted with the training of Stat 221 TAs. ♦

Graduate Internships

Erika Hernandez is in Denver working with professors Sam MaWhinney and Jeri Harwood in UC Denver's Biostatistics and Informatics Department. They are working on a grant that assesses the effect of drug use on clinical HIV outcomes and risk and prevention-oriented outcomes. Erika will be managing the database and conducting sensitivity analyses on the new method that they are using to account for non-ignorable dropout, namely the natural spline varying-coefficient method.

Scott Morris is interning at Pacific Northwest National Laboratory in Richland, Washington in the National Security Internship Program with former BYU master's graduates. Scott will be working on a Bayesian spatial model to analyze how biotoxins move around buildings and interior structures. As part of his work, he will write R packages to use with the model and the other research he is working on.

Tomohiko Funai is working in the Department of Statistics Consulting Center. His responsibilities are to analyze the data given by the clients and to interpret the results for clients. They also include giving advice on sampling methods and analytic methodology. All of his analyses are primarily done in, but not limited to, SAS. These responsibilities allow him to apply and expand his statistical knowledge and computing repertoire. Tomohiko's projects range from determining the effect of a supplement on muscle size for a nutrition supplement company to identifying important factors for language acquisition.

Tommy Leininger is doing research with Dr. Reese and is involved in mentoring the IMPACT lab's summer bootcamp. Tommy's research involves dose-response modeling and analyzing biological agent detector data from Dugway's government testing grounds.

IMPACT—Interdisciplinary Mentoring Program in Analysis, Computation, and Theory—is an interdisciplinary cooperative of research groups and laboratories committed to mentoring BYU students in high-quality research in the pure and applied sciences. Graduate students like Tommy mentor undergraduate students, allowing them to prepare for the pursuit of a graduate degree.

Serena Baker is working with Dr. David Engler to analyze survival data of ovarian cancer patients from a clinical study at Massachusetts General Hospital. They are currently conducting marker-by-marker analyses to find the genomic regions associated with overall and progression-free survival. Before summer term, she worked in the Statistics Department Consulting Center assisting graduate students from various departments with the analysis of their data in SAS and with the interpretation of the results.

Brenda Ginos is working on her master's project with Dr. Grimshaw as her advisor. Her work includes estimating the parameters of the lognormal distribution and applying her findings to various data sets and applications from the real world, including the prediction of rainfall. ♦

Former BYU Master's Student Takes Part in Ghanaian Health Project

Stephen Manortey, a former master's student in the Department of Statistics is making his mark on his native country. Now a doctoral candidate at the University of Utah, Stephen is working with the Barekuma Collaborative Community Development Project, which is based on creating self-sustaining communities



U. students Erin Brown, and Stephen Manortey interview a Ghanaian mother in the village of Adankwame last month.

in Ghana.

Stephen came to the US five years ago to obtain his master's degree in Statistics from BYU. He is now part of the doctoral program for public health at the U, and intends to return to Ghana to work on community health after obtaining his degree.

According to a recent article in the Salt Lake Tribune, Stephen and other students from the U are working on different aspects of the project to make Ghana self-sufficient in the areas of health care, schools, and the country's census. The majority of Stephen's work is with the census. Along with his own work, Stephen is also training local Ghanians to work on the census. This includes gathering basic information about each household, such as ages, number of children and whether they have electricity, as well as gathering fingerprints.

As stated by Dr. Steven Alder, the goal of this project is to move their community forward in a way that they would not only become masters of their future, but also be a resource to others."

To read more, go to www.sltrib.com/news, "U. project is helping Ghanians help selves," by Brian Maffly ♦

Student Information

The Department of Statistics had 153 undergraduate majors in 2008. There were 69 Actuarial Science majors and 84 Statistics majors. The Business Analysis emphasis had 40 majors, Statistical Science had 19, Biostatistics had 16, Quality Science had 4, Information Systems had 3, and the Applied Statistics and Analytics emphasis (which is new this year) had 2 majors. There were 23 B.S. graduates, with 9 Actuarial Science graduates and 14 Statistics graduates (8 Business Analysis, 3 Biostatistics, and 3 Statistical Science). Two students earned Cum Laude designation. Six students earned their master's degree in 2008. 17 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 19 Actuarial Exams. 4456 students were enrolled in service classes taught by the department. 3856 students were enrolled in Statistics 221. Approximately 850 students registered for Stat 221 Independent Study. 791 students enrolled in our major courses. ♦

Deans List

Fall 2008

Brandon Todd Crowther
Storm Brandon Dixon
Owen Eric Francis
Edward G. Law
Andrew Nolan Olsen
Cheryl Quist
Patrick Christian Staples
Rachel Lee Teh
Andrea Michelle Thomas
Douglas Nielsen VanDerwerken
Adam T. Zimmerman

Winter 2009

Kyle Robert Davis
Owen Eric Francis
Andrew Nolan Olsen
Richard Daniel Payne
Robert Alan Richardson
Colin M Rogerson
Patrick Christian Staples
Theresa Antoinette Tardiff
Lindsey N Thomsen
Richard K Wilde
Emily Lyn Wilson

Undergraduate Mentoring

In the 2008–09 school year, 30 students were mentored by several faculty members. William Christensen mentored students in Environmental Statistics, Shane Reese mentored students in Bayesian Computation, Evan Johnson mentored students in Statistical Genetics, Scott Grimshaw mentored students in Predictive Analytics, and John Lawson mentored students on projects involving Utah Transit Authority and the State Department of Education.

Alvin C. Rencher Mentoring Awards

The 2008–09 Alvin C. Rencher Mentoring Awards were given to Andrea Thomas and Tommy Leininger. Andrea has been working with Dr. William Christensen on a collaborative research project along with Dr. Summer Rupper (BYU Geology) characterizing the statistical properties and global distribution of Dansgaard-Oeschger events. Tommy has been working with Dr. Shane Reese on adaptive clinical trials.

Students Pass ASQ Certified Quality Process Analyst Exam

The American Society for Quality is the leading authority on career-boosting certifications for quality professionals, with more than 60 years of experience. An ASQ certification demonstrates an individual's dedication to quality. Fall 2008 semester in the Statistics 462 class (Quality Control and Industrial Statistics), nine senior students prepared for the ASQ Certified Quality Process Analyst exam. This is one of the only two ASQ certifications that does not require job experience; it does require a college degree. All nine students passed the exam and will be awarded their certificate at the time of graduation later this year. This certificate will give the graduates a definite advantage in the job market. The students passing the exam this year were: Mindy Browning, Michael Hammer, Lindsay Hunt, Johnny Ma, Scott Merrell, Hanna Westover, Cameron Willden, Phillip Witt and Roman Zakharov. ♦

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 and 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. ♦

Please keep us up-to-date on your contact information!

**To update your address, visit:
http://statistics.byu.edu/address_change.php**

