



# The Y-Distribution

Brigham Young University

Department of Statistics

Vol. XVIII July 2013

## From the Chair

### Dr. H. Dennis Tolley



What a year! I wish to express gratitude to our faculty, staff, and students for making this a successful year. I appreciate our alumni who have volunteered their skills and resources to our department. The efforts and support of the alumni are key to the success of our department.

Several faculty members have been honored this year. Shane Reese was recently made an ASA Fellow. By our count, he is one of only five Fellows in the state of Utah. Shane remains an active ambassador for our program in many academic circles.

William Christensen has been honored with the Faculty Excellence in Teaching Award from the College of Physical and Mathematical Sciences. He is one of our "big section" Stat 121 teachers and has been a key player in the improvement of Stat 121. His success in teaching large sections, small sections, and a variety of other courses has greatly added to the educational experience of our students.

David Engler has been promoted to Associate Professor. He continues to work on multiple sclerosis research for his 2012-2014 NIH Grant. David is also involved in advising students on work within Business Analytics and Actuarial Science.

Candace Berrett passed her third-year review (granted candidacy for continuing status) this past semester. She is currently working on research with collaborators in the civil engineering department at BYU and electrical engineering department at USU.

This year Patti Collings retired after many years of work on our Stat 121 project. We

appreciate all that she has done for the department.

Bruce Collings has announced he will retire as well at the end of the December 2013. Bruce has been an integral part of our Actuarial program.

Matt Heaton joins our faculty this fall as a new Assistant Professor. He received his B.S. and M.S. degrees from BYU and his Ph.D. from Duke.

For those of you who have read the book *Money Ball*, you are aware of an increasing trend in using statistical methods for sports. One of the new initiatives we are putting together is the Sports and Performance database. Gil Fellingham is heading up this initiative to build an involved database for a variety of sports. Although this project is still in its foundational stage, we are noticing a great deal of interest among the undergraduate statistics majors.

Three of our statistics majors had remarkable athletic performances this year. Ziggy Ansah, a recent graduate, was drafted 5th in the NFL. Jared Ward, an integrated master's student, competed at the 2013 NCAA Division Outdoor Track and Field Championships. He ran the Men's 10,000 Meter and won 8th place in the finals. Ryan Roundy, a recent statistics graduate, was the team captain for the BYU rugby team. He led the team to another national championship. Ryan will be starting our master's program in the fall.

In February, the department went through a unit review of our program. This review entails an extensive examination of our curriculum, faculty, and students. Part of this examination is a self-study and the remainder is an assessment by faculty outside our department and university. We have identified areas of success and areas to improve. More importantly, the unit

review has provided us a basis for future directions. If you would like to contribute ideas, we would love to hear from you. Tell us about successes in applying your education or topics you would have liked to learn when you were a student.

As we begin the new academic year, we do so with a productive faculty and enthusiastic student body. We currently have 290 undergraduate majors. We also have 27 graduate students, 3 of whom are first-year students and 10 who are in our integrated program.

We are strengthening our network to better train and place graduates. To meet this goal, we are in the process of modifying our web page and making it more user-friendly and informative. Please take a look and offer any feedback that would improve the site.

In closing, I would like to thank all of you again for your support. We are proud of the work that you do, and grateful for the association we share.

Dennis Tolley ♦

## JSM 2013 Friends and Alumni Open House Breakfast

**MontréalCanada** If you are attending JSM 2013 in Montréal, Canada, please meet us at our annual Brigham Young University Friends and Alumni Open House Breakfast to be held Wednesday, August 7, 2013 at 7 am. We look forward to seeing you there!

**Room Name:** Saint-Laurent

### Location:

Intercontinental Montréal  
360 St Antoine St West

Across from the Convention Center ♦

## JSM 2013 in Montréal, Canada

**MontréalCanada** The Joint Statistical Meeting (JSM) will be held August 3-8, 2013 in Montréal, Québec, Canada at the Palais de congrès de Montréal. The following professors will present papers.



### William Christensen

“Missing Observations in Paired Comparisons: Assessing the Impact of Argumentative Threat in Written Opinions at the Supreme Court”



### David Dahl

“Statistical Computing: Software and Graphics”



### David Engler

“Assessment of Jointly Dependent Markov Processes Through Bayes Factors and Bayesian Variable Selection”

One of our students is presenting a paper at JSM that he wrote in conjunction with Dr. Scott Grimshaw.



### Paul Sabin

“Analysis of the NCAA Men’s Final Four TV Audience”

## 38th Annual Summer Institute of Applied Statistics

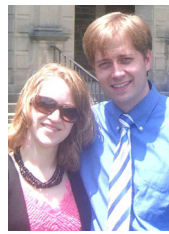


This year we were pleased to have **Dr. Gregory L. Snow** present the 38th Annual Summer Institute of Applied Statistics, held June 19-21, 2013. He presented a seminar entitled, “R, Beyond the Basics.”

Capable R users were able to learn more intermediate and advanced topics. Some topics covered, included the power of R scripts, batch processing, and writing your

own functions and packages. We’d like to thank all those who attended. ♦

## New Faculty



**Dr. Matthew J. Heaton** will be joining our faculty as an Assistant Professor. He received his B.S. and M.S. from Brigham Young University in 2006 and 2007. After which, he attended Duke University to pursue a PhD. After he received his PhD, he had a post-doctoral position at the National Center for Atmospheric Research (NCAR).

His research focused on both environment and public health, examples of his recent studies include investigating the impact of rising temperatures on 911 call volume and mortality rates, the impact of increased solar activity on plasma energy in the magnetosphere, and building statistical models for predicting mountain pine beetle infestations in Rocky Mountain National Forest. We are thrilled to have Dr. Heaton join our faculty. ♦

## Ziggy: NFL Bound



One of our actuarial science graduates, Ezekiel “Ziggy” Ansah, was the 5th pick in the NFL draft this year. Ziggy grew up in Ghana, where he joined the Church of Jesus Christ of Latter-day Saints. He received an academic scholarship to BYU and was on the BYU track team.

He walked into Coach Mendenhall’s office and asked to play football, with no previous experience. Mendenhall decided to let him go through spring practice. Ziggy proved talented and dedicated. He continued to excel as a defensive end throughout his college career. In April, Ziggy was chosen to further his football career professionally with the Detroit Lions on the same day he received his Actuarial Science degree. ♦

*Photo courtesy of Jaren Wilkey and Mark A. Philbrick.*

## Rugby Ryan Roundy



The BYU rugby team triumphed over rival California for their second straight national title. The team captain and senior, Ryan Roundy, led the team to an exhilarating victory of 27 to 24. Ryan is not only the Rugby team captain, but also one of our recent statistics graduates.

BYU was up in the first half 16 to 10. In the second half, California was able to break into BYU’s lead. With just over four minutes left, the score was tied 24 to 24. Freshman Johnny Linehan scored the game winning drop kick only seconds before the clock ran out. BYU has a total of three national titles and hopes to add a fourth. “It’s a great way to go out in the last game of my college career,” Roundy said. Ryan is planning on returning to BYU for his master’s degree in Statistics. ♦

*Photos courtesy of Chris Bunker.*

## Jared Ward Competes in 10,000 Meter NCAA Championship



Jared Ward, an integrated master’s student, competed in the NCAA Division I Outdoor Track and Field Championships on June 8, 2013 in Eugene, Oregon.

Jared ran the Men’s 10,000 Meter Race and was the 8th place runner. He had a time of 29 minutes and 51.59 seconds. Congratulations to Jared on making it to the NCAA Championships in Outdoor Track and Field. ♦

## Fall 2012 Seminar Speakers

For the fall series of our Thursday Seminars, we had over 10 presenters. They included Keith Vorkink, Allie Tomlinson, Lajos Horvath, Randy Larsen, David Dahl, Candace Berrett, Marina Vannucci, Matt Heaton, Sastry Pantula, Bo Li, Allen Izu, and Ciprian Crainiceanu.

Some of the topics spoken on included, “Neighborhood Effects on Speculative Behavior” by Keith Vorkink, “Investigating the Impact of Heat Exposure on Public Health” by Matt Heaton, and “Coming to our sensors: Why body language is more difficult to decode than natural language” by Ciprian Crainiceanu.

We'd like to thank all of those who participated in our Thursday Seminars. ◆

## Prestigious Faculty Awards



**Dr. Shane Reese** received the *Melvin W. Carter Professorship 2012-2014* and was named an *ASA Fellow*. The ASA President Marie Davidian said, “I congratulate the 59 members who are being honored as new ASA Fellows. Their collective accomplishments have contributed greatly to the advancement of statistical science and have rightfully earned them the respect and admiration of their ASA peers.”



**Dr. William Christensen** received the *Faculty Heritage Fellowship 2012-2013* and the *Faculty Excellence in Teaching Award*.



**Dr. H. Dennis Tolley** received the *Faculty Heritage Fellowship 2012-2013*. ◆

## MS Statistics Graduates

### December 2012

**Nathaniel Rohbock** successfully defended his project entitled, “An Integrated Screening and Optimization Strategy.”

### April 2013

**Megan Denison** successfully defended her project entitled, “Spatial Analysis of Surface Lineations of Io.”

**Ryan Eliason** successfully defended his project entitled, “Application of Convex

Methods to Identification of Fuzzy Subpopulations.”

### June 2013

**Devin Francom** successfully defended his project entitled, “Obtaining Optimal LFM-MIX Tuning Parameters Across Solar Storms.”

**Ariana Hedges** successfully defended her project entitled, “Assessment of Ordinal Transitional Data in Multiple Sclerosis Through Bayesian Hierarchical Poisson Models with a Hidden Markov Structure.”

**Brian Holt** successfully defended his project entitled, “Models for GC/MS Classification and Biomarker Identification.”

**Aleena Mosher** successfully defended her project entitled, “Nuclear System Confidence Bound Reliability Estimation.”

### August 2013

**Samuel Tolley** successfully defended his project entitled, “Area Estimation with Multiple Chromatograms with Different Separations.”

**Emily Wilson** successfully defended her project entitled, “Utilizing Linear Mixed Effects Models to Assess the Effect of Commercial Products on Demineralization and ATPase Activity.” ◆

## Faculty-Student Collaborations

Clement, N., **Shepherd, B.**, Bodily, P., Tumur-Ochir, S., Gim, Y., Snell, Q., Clement, M., **Johnson, W. E.** (2012) “Parallel Pair - HMM SNP Detection.” *IEEE International Workshop on High Performance Computational Biology*, 675-683. ◆



Department of Statistics Website:

[statistics.byu.edu](http://statistics.byu.edu)

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

To update your address, email [statsec@stat.byu.edu](mailto:statsec@stat.byu.edu)

## Undergraduate Mentoring

In 2012, over 25 statistics students benefitted from undergraduate mentoring provided by several faculty members, including Dr. William Christensen, Dr. David Dahl, Dr. David Engler, Dr. Gilbert Fellingham, Dr. John Lawson, Dr. Shane Reese, Dr. Bruce Schaalje, Dr. Del Scott, Dr. Shannon Tass, and Dr. Dennis Tolley. ◆

## Deans List

### Fall 2012

Trevor Alder  
Abigail Anderson  
David Arthur  
Matthew Bean  
Jackson Curtis  
Cameron Faerber  
Megan Francis  
Nathan Howell  
Merrick Johnson  
Zhang Meng  
Philip Munson  
Richard Payne  
Aaron Smith  
Brittany Spencer  
Brandon West  
Devyn Woodfield  
Tanner Yorgason  
Dylan Young

### Winter 2013

Matthew Bean  
Jeffrey Carter  
Jackson Curtis  
Kaylea Drake  
Anna England  
Nicholas Hales  
Nathan Howell  
Merrick Johnson  
Cameron Marsden  
Tanner Phillips  
Daniel Schwartz  
Jonathan Shumway  
Ammon Slade  
Christopher Smith  
Brittany Spencer  
Angela Teuscher  
Michael Warner  
Tanner Yorgason

## Bryce Cook Interviewed about Actuarial Science



Bryce Cook is currently one of our actuarial science majors. He was recently interviewed by ValuePenguin about BYU Actuarial Sciences for their “Future of Actuarial Science” series. He explained how he came to study Actuarial Science and his plans for the future. While Bryce was serving an LDS mission, he met a gentleman who was an actuary. Math, statistics and computer skills were an intriguing combination explained by the gentleman that led Bryce to study that field at BYU. This summer, Bryce has an internship with Farmers Insurance Group in Los Angeles, California. He plans to graduate in December 2013. ♦

For the full story visit:

<http://www.valuepenguin.com/BYU-Actuarial-Sciences-Bryce-Cook>

## Graduate Internships

**Nick Martineau** is interning with two companies this summer. He is an Analytics Intern with the Cleveland Cavaliers. The focus of this job includes player evaluation, team strategy, scouting, and recruiting. He is also working with Banyan Ventures, a multi-million dollar venture fund, in Salt Lake City, Utah. He models incomes, returns, and other financial aspects of the investments using pro forma analysis, Monte Carlo simulation, and other methods.

**Madeline Meng** currently has an internship with Pentara based in Salt Lake City, Utah. This company does research pertaining to Alzheimer’s Disease. Clients contact Pentara in order to obtain help with drug studies and clinical trials. As an intern, she predominately assists with creating tables and figures in SAS and assists with data standardization. She enjoys getting real life experience within the biostatistics field.

**Colin Montague** started working with Giuseppe Vinci this spring in his start-up volleyball consulting firm, VolleyMetrics. Based out of Provo, VolleyMetrics uses data

from match video to provide in-depth analysis of volleyball players, teams, and leagues. Currently, they are writing an article for Sports Performance and Tech Magazine highlighting their statistically driven approach to volleyball.

**Devyn Woodfield** is currently interning with Sewell District, an electronics shipping company in Orem, Utah. He designs experiments to maximize profit by testing what products to suggest based on customers’ buying behavior. He also predicts what inventory levels should be maintained at to best benefit the company.

**Bryan Whiting** is currently interning as an Investment Analyst for Beneficial Financial Group, in Salt Lake City, Utah. As an analyst, he reviews corporate filings and annual reports to assess the credit quality of companies. He analyzes complicated financial structures called mortgage-backed securities. It has been a unique experience to work with products that finance students don’t see in their undergraduate curriculum. ♦

## Career Placement and Internships

Thanks to those of you who have forwarded notices of internships and job openings at your companies as well as to those who have made recruiting visits to campus. We appreciate these leads! Students who complete internships remain very competitive when searching for positions upon graduation.

We continue to up our program in assisting top quality students to obtain internships and employment opportunities. Please contact Ruth Dauwalder at 801-422-4527 or email [ruth@stat.byu.edu](mailto:ruth@stat.byu.edu) with any information you may have regarding internships and career opportunities. ♦

## Student Information

The Department of Statistics had 470 undergraduate majors in 2012 consisting of 211 Actuarial Science majors and 104 Statistics majors. Within the Statistics Major, the Applied Statistics and Analytical Emphasis had 113 majors, Biostatistics had 41 majors, and Business Analysis had 1 major.

There were 48 BS graduates in 2012, with 22 Actuarial Science graduates and 11 Statistics graduates (5 Biostatistics and 10 Statistics and Analytics). Four students earned Magna Cum Laude, one student earned Summa Cum Laude, and two students earned Cum Laude. Eleven students earned their master’s degrees in 2012.

In 2012, thirty-one of our students made the Dean’s List (3.75 GPA with at least 14 credit hours per semester) at least one semester. 5,008 students were enrolled in service classes taught by the department. 4,374 students were enrolled in Statistics 121. 1,628 students enrolled in our major courses. ♦

## MS Statistics Graduates 2012-2013

### December 2012

Nathaniel Rohbock

### April 2013

Megan Denison

Ryan Eliason

### June 2013

Devin Francom

Brian Holt

Ariana Hedges

Aleena Mosher

### August 2013

Samuel Tolley

Emily Wilson

## Stephen Manortey Receives PhD



Stephen Manortey, a teacher from Ghana, knew that the best way to brighten his future was to seek advanced education, as he often admonished his students to do. In 2004, he

was admitted to BYU to pursue a master’s degree in Statistics. Christiana, his wife, was able to relocate to the United States after some time, but their young son Elias had to stay back with grandparents due to homeland constraints. After three and a half long

years of separation, they were able to secure their son a VISA to join them in the States.



Stephen graduated from BYU in 2006 and took a position as a Market Research Analyst with a company in Salt Lake City. He applied for a doctoral program in Public Health

and got accepted to the University of Utah in 2008. While at the U, Stephen had an opportunity to co-direct a Study Abroad Program to a local university and a teaching hospital in Ghana. Stephen graduated this summer with a PhD in Public Health with research interest in infectious diseases and mapping of spatial data.

Stephen accomplished many great things while adapting to a new environment and struggling to reunite his family. Their son graduated from East High in Salt Lake City and has been called to serve a mission for the Church of Jesus Christ of Latter-day Saints to the California, Los Angeles Mission. Stephen plans to return home to Ghana to teach at the university level and engage in further research to improve the quality of life in that region of the world. He is a great example of the importance of pursuing your dreams, even when all odds are against you. ♦

## 2013 Student Research Conference

The Department had five Session Winners in this year's Student Research Conference (SRC). The winners were Kerissa Poulson, Aleena Mosher, Matthew Heiner, Jared Fisher, and Brittany Spencer.



**Kerissa Poulson's** project was "Pioneer Mortality Project." Little statistical analysis and modeling of pioneer mortality has been done. This project

was an effort to consolidate the various sources of information and build a survival model of mortality for LDS pioneers. Using data collected from journals, newspapers and other historical sources mortality rates

were calculated. Future research will compare mortality across parties and transportation modalities.



**Aleena Mosher's** project was "Nuclear System Lower Confidence Bound Reliability Estimation." Assessment of missile defense system reliability is often complicated by the lack of subsystem and full system tests. In systems with perfect test results, standard confidence bound estimation techniques perform poorly. She considered the estimation of a lower bound on a four-component series system with binary and covariate-dependent failure data. A bootstrap and Bayesian methods was compared in simulation to evaluate which method performs best and yields appropriate coverage.



**Matthew Heiner's** project was "Skill Importance in Women's Soccer." Soccer analytics generally follow one of two approaches: 1) regression models on number of shots taken or goals scored to predict match winners, or 2) spatial analysis of plays for evaluation of strategy. Play by play data were collected on NCAA Division I Women's Soccer matches with a new skill notation system. He modeled play sequences as discrete absorbing Markov chains. Using posterior distributions, he estimated the probability of skills leading to a scored goal. Finally, skills were ranked according to calculated importance scores.



**Jared Fisher's** project was "Bayesian Semiparametric Modeling of Temporal Data: Career Home Run Performance of Major League Baseball Players." Using a binomial likelihood for each season, he assumed the log odds of hitting a home run expressed as a function of a player's age, home ballpark, year of play, and eras. He used Dirichlet process priors for the coefficients of orthogonal quartet polynomials to flexibly fit the performance curve. The resulting model clustered groups of players whose hitting

ability similarly developed.



**Brittany Spencer's** project was "A Model for the Classification of Supernova." Data collection projects such as the Dark Energy Survey are underway and data from distant supernovae are becoming increasingly available. As the quantity of information increases, the ability to quickly and accurately distinguish between Type Ia and core collapse supernovae has become essential to understanding the evolving universe. In this research she focused on the use of hierarchical Gaussian processes to model light curves both for individual supernova and across supernova type. ♦

## The International Year of Statistics 2013

The International Year of Statistics is a worldwide celebration and recognition of the contributions of statistical science. The goals of "Statistics2013" are to increase public awareness, nurture Statistics as a profession, and promote creativity and development in the sciences of Probability and Statistics. ♦

For more information visit:  
<http://www.statistics2013.org>

## 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. To make contributions to the BYU Department of Statistics, mail your check to:

Brigham Young University  
Department of Statistics  
223 TMCB  
Provo, UT 84602

Checks should be made out to BYU Statistics. You have the power to make an incredible difference in the lives of our students. ♦

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