FROM THE CHAIR DR. WILLIAM F. CHRISTENSEN

As we conclude another academic year and look forward to the future, there is much to be optimistic about. Our number of majors is still growing strong. Only five years ago we broke a department record by having 62 B.S. degrees for the year. At the April 2018 graduation program, we had over 125 graduates listed. To adapt in this era of rapid growth, we are endeavoring to use teaching resources as efficiently as possible, relying on our accomplished adjunct faculty to provide their expertise to our students where appropriate, and increasingly utilizing online teaching platforms.

As our existing programs grow, we are also excited about a new statistics emphasis in Data Science that just received final approval by the university. This program makes use of the same statistics core that is used by our other programs, but will also provide focused training in statistical computing, data structures and algorithms, and statistical methods in data science. We anticipate that with only a modest change in our existing educational offerings, this will open doors to many jobs for our graduates.

We are pleased that so many of our graduates are opting to support our students by donating the department’s student scholarship funds. Thank you so much. Our collective work in teaching and blessing the students’ lives is dramatically amplified with your financial support.

An exciting development here on campus is our anticipated move to a new building in 2020. With rapid growth and increasing needs for teaching and mentoring space, the university has been given a tentative go-ahead to plan for a new structure on campus. We look forward to this opportunity and are grateful for the support of BYU and the Board of Trustees for working towards meeting our students’ needs.

Associate Professor Dave Engler and Assistant Professor Brad Barney have recently accepted positions at the University of Utah. Each of them embodies a commitment to excellence in scholarship and to the development of the students and colleagues around them. We are saddened to lose them as faculty, but wish them the very best and look forward to collaborating with them in their new positions. We are now looking to fill vacant faculty positions and can only hope to recruit faculty as dedicated.

I’d like to thank our dedicated and talented faculty who educate so many majors and service-course students AND succeed in scholarship and leadership in the profession. They continue to publish in top venues, are awarded research grants from highly competitive funding programs, and excel in teaching and advising students. Below are a few of the projects and success stories that are associated with our faculty.

Dr. Candace Berrett continues her work on spatio-temporal models for environmental and health applications. Working with Drs. Heaton and Hartman, as well as Dr. Chantel Sloan (BYU Public Health), they have developed a model to relate infant national RSV incidence with pollutants such as PM$_{2.5}$ and SO$_2$ accounting for the various sources of uncertainty present in the data. Additionally, she has published papers this year examining speed and first-year law student grades (with Professors Kif Augustine-Adams and Jim Rasband, BYU Law) and efficient aid allocation within Malawi (with former student Phil White, Dr. Tass, and Dr. Mike Findley of UT-Austin). She also continues her work on spatio-temporal factor analysis and signal processing (with many collaborators from around the world).

Dr. William Christensen continues to work on NASA-funded research on climate modeling in Antarctica and the Himalayan Plateau. He is also collaborating with students and faculty in statistics, mechanical engineering, and exercise science on using novel piezoelectric sensor technologies to model human performance characteristics, and continues to collaborate with colleagues at Columbia University on latent modeling of psychiatric symptom batteries.

Dr. David Dahl develops Bayesian methodology for flexible modeling, including clustering and feature allocation. He teaches the graduate Bayes course and various undergraduate courses. Dr. Dahl also has several projects in statistical computing and is advising several students.

Dr. Dennis Eggett has been busy this year with the Consulting Center and projects involved therein. He has been working with the IACUC committee on campus.

Dr. Gilbert Fellingham continues his work in sports analytics. This year he’ll be working with the football team to determine the risk associated with certain play-types to help solidify the coaching staff’s offensive philosophy. Also, he will have students working with football, men’s and women’s basketball, women’s volleyball, men’s and
women’s tennis, and men’s and women’s soccer teams. In addition, he is working on a project to help identify ideal team makeup in beach volleyball. He continues to work on the value of nonparametric Bayesian methods in prediction of performance. He will also be working as the volunteer assistant coach with the women’s volleyball team this year.

Dr. Scott Grimshaw spent the last year working on modeling viral viewing and binge watching with Drs. Blades and Berrett, modeling MLB All-Star Games with the objective of identifying player allocation and game characteristics that increase the TV audience, and predicting the GRAMMY winners. He also modified Stat 330 to provide students interested in data science exposure to machine learning methods and used authentic data experiences to practice data skills.

Dr. Brian Hartman continues to work on the interface between statistics and insurance. This year he published papers in health insurance, P&C loss reserving, and electric utility risk management and was invited to speak at the ILTCI Conference, the SOA Health Meeting, the SOA Annual Meeting, and the Joint Statistical Meetings. He is working with a team of nine students producing reports jointly sponsored by the CAS, PCI, and SOA on auto insurance trends. Additionally, he is currently working on projects in health insurance, loss reserving, and ratemaking.

Dr. Matthew Heaton’s research focuses on the application of spatial methodology to applications in disease, agriculture, remote sensing, and forestry. He was awarded a BYU interdisciplinary research grant (IDR) this past year for his work in spatio-temporal models for agriculture which is in collaboration with researchers in the Department of Plant and Wildlife Science. His research, along with student support, is currently funded by the National Institute of Environmental Health Science and the National Science Foundation.

Dr. John Lawson has continued to work with post doc students in Chemistry using mixture experiments to develop polymer fits for packed columns. He has two papers in review that were submitted this spring. One titled “Phase II Monitoring of Variability Using Individual Observations” was submitted to Quality Engineering, and the second titled “Application of Mixture Response Surface Methodology for Combination Chemotherapy in PC-3 Human Prostate Cancer Cells” was submitted to Molecular Pharmacology in collaboration with faculty members and a grad student from the Department of Nutrition Dietetics and Food Science. He also wrote a lab manual for Stat 201, and is developing a supplemental workbook “Acceptance Sampling and SPC using R” for Stat 462.

Dr. Lynne Nielsen continues to manage the Statistics 121 course and train the undergraduate teaching assistants needed to teach the Stat 121 labs. She obtained her PhD in Instructional Psychology and Technology this year. A paper with her faculty collaborators from the School of Education entitled “The Impact of a Flipped Classroom Model of Learning on a Large Undergraduate Statistics Class” was published this May in the Statistics Education Research Journal. She continues to be involved in BYU’s WomanStats project and a book with her WomanStats collaborators titled “The First Political Order: Sex, Governance, and National Security” will be published by Columbia University Press later this year.

Dr. Garrett Page continues working on dependent random partition models, functional (and derivative) clustering, value-added models, sports analytics, and general Bayesian modeling. The projects are collaborations with individuals at BYU (Department of Statistics and Exercise Science) and with individuals in South America and Europe.

Dr. Shane Reese’s current research program centers around three broad areas: Bayesian Spatial Processes for Glacier mass balance estimation in Antarctica and Estimation of Climate in High Mountain Asia, functional data analysis for biomechanics and integrated modeling of physical, and experimental data for estimation of nonlinear slush in booster tanks. In May of 2017, he was named the new dean of the College of Physical and Mathematical Sciences. To view the article announcement, see: https://news.byu.edu/news/new-dean-byu-college-physical-and-mathematical-sciences

Dr. Robert Richardson has spent the past year formalizing stable processes to be used in spatial and spatio-temporal applications. Additionally, he has spent time working on other applications in actuarial finance and lab research fields.

Dr. Del Scott has been teaching at BYU for 41 years. This past year, he has been helping with the development of three new computer courses: Unix, Python and SQL.

Dr. Shannon Tass continues to collaborate on research projects in autism and planetary geology. This year, she began a collaboration with several faculty members in Counseling and Psychological Services, working on a several projects looking at mental distress and ethnicity, mental distress around certain events (such as elections), and clustering of students based on counseling trajectories. One paper that was published this year found that counseling can help students diagnosed with Autism Spectrum Disorder (ASD) but it usually takes twice as long to achieve the same results as students without that diagnosis. She also does research on the spatial patterns and shapes of geological formations on Io and Titan.

Dr. Dennis Tolley’s research this last year has focused on the application of statistical methods to chemical processes. The primary application has been in stochastic process associated with transport of analytes down a capillary. This physical process which represents a fundamental component of analytic chemistry produces stochastic processes that have non-Gaussian marginal distributions represented by nonlinear stochastic differential equations. Working with Dr. Robert Richardson, initial method of solving these equations have been developed. This next year will be used to integrate this solution methodology in statistical estimation and modeling in both Bayesian and frequentist paradigms. A second application of statistical methods in Chemistry entails extending the basic model of thermodynamic entropy into biological systems. Foremost in this application is developing a parallel between information theory and entropy for application into statistical modeling and measurements of cell processes.

**ADJUNCT FACULTY**

David Arthur is a graduate of the Master’s in Statistics Program at BYU. David taught Stat 240 during the Spring 2018 term. He will begin his PhD, Fall 2018, at Purdue University. David’s research interests are applications of statistical and machine learning as well as consulting in the fields of technology and business.

Lindsay Florence joined our faculty as an adjunct instructor in March 2018. She currently teaches our online class Stat 124 (Intro to SAS Programming).
Carly Pendleton, in the past year, has been teaching the online suite of statistics courses: 121, 123, and 124. Recently she has begun collaborating with Dr. Scott and some students on developing a new SQL course. Her primary focus is on improving the online experience for all students and finding ways to reach more students with fewer resources without compromising their education.

Taylor Redd has held statistician and data science positions at various start-up companies (Qcue and Qualtrics). He is currently a Data Scientist at Adobe Systems in Lehi where he works with Adobe’s clients to better understand their web traffic data. His areas of interest are Bayesian methods, big data analysis, data visualization, and statistical programming. He is currently working with Dr. Grimshaw on a ranking algorithm for MCLA Lacrosse teams.

Dr. Greg Snow teaches our statistical computing course (Stat 381) every winter semester and an evening section of Stat 121. He has been with us since September 2003.

Dr. Jie Wang has been working on some projects as part of developing her teaching for our survival analysis course, Stat 538. These projects covered general survival data modeling, survival models with time-dependent variables, and model selection and assessment methods, etc. This work will help the students to understand survival data modeling more deeply and thoroughly.

Jared Ward is currently teaching our advanced SAS programming courses.

Dan Williams has been an adjunct faculty member since fall 2003. He teaches our Methods of Survey Sampling each fall.

AWARDS

Dr. Dennis L. Eggett received the Karl G. Maaer Professional Faculty Excellence Award, which recognizes outstanding achievement in fulfilling professional faculty responsibilities. Since 1997, Dr. Eggett has directed the Center for Statistical Consultation and Collaborative Research. He provides statistical consulting to on-campus researchers, teaches data analysis courses, advises students in quantitative research, and mentors statistics majors. He is the coauthor of 180 peer-reviewed articles, with more than 270 of those coauthors being BYU students.

Dr. Matthew J. Heaton will receive the Early Investigator Award from the American Statistical Association’s section on Statistics and the Environment. The honor was bestowed for substantive methodological contributions to the analysis of spatially and temporally correlated data, for important collaborative work studying environmental impacts on public health, for excellence in the mentoring of students of statistics in their early careers, and for service to the profession.

Dr. William F. Christensen was awarded the ASA Award for Outstanding Chapter Service “for exceptional and long-standing service to the Utah Chapter as president, treasurer, and education outreach coordinator.”

OPPORTUNITIES TO TEACH

Ever thought it would be nice to contribute to the teaching mission at BYU? We regularly need adjunct professors to teach daytime and evening classes. If you think you might be interested in teaching classes, let us know. We are particularly in need of adjunct faculty to teach on campus, but there are periodically opportunities to run online courses such as Unix Shell Programming, Python programming, and SQL. We generally need persons with at least an M.S. in statistics, biostatistics, or a related field. To get on our list of potential teachers, send an email to Ruth Dauwalder at ruth@stat.byu.edu.

43RD ANNUAL SUMMER INSTITUTE OF APPLIED STATISTICS

We had a great turnout at our 43rd Annual Summer Institute of Applied Statistics. Presenting at this institute, we were honored to have Dr. Christopher Paciorek from the University of California, Berkeley.

His workshop provided a hands-on introduction to using, programming, and sharing Bayesian and hierarchical modeling algorithms using NIMBLE.

He opened with an overview of creating a hierarchical model and fitting the model using a basic MCMC, similarly to how one can use WinBUGS, JAGS, and Stan. He discussed how NIMBLE allows the user to modify the MCMC – changing samples and specifying blocking of parameters. He showed how to extend the BUGS syntax with user-defined distributions and functions that provide flexibility in specifying a statistical model of interest. With this background we could explore the NIMBLE programming system which allows one to write new algorithms not already provided, including new MCMC samples, using a subset of the R language.

He demonstrated the functionality in NIMBLE that allows one to fit Bayesian nonparametric models and spatial models. He closed with a discussion of how NIMBLE enables sharing of new methods and reproducibility of research. The workshop included a number of breakout periods for participants to use and program MCMC and other methods. Participants were able to see NIMBLE’s flexibility in action in several real problems.

We would like to thank Dr. Christopher Paciorek and all those who attended. Next year’s SIAS will be held June 19-20, 2019. We look forward to seeing you next summer.

Dean’s List 2017

Winter 2017

Allison Bellows
Jeffrey Carter
Jenna Jackson
Andrew Sutton
Rachel Lanning
Adam Ott
Emily Birrell
Jacob Ferrell
Todd Hacking
Elijah Harmon
Bradley Hill
Thomas Jensen
Brandon Kasparian
Chad Larson
Tanner Muhlestein
Lee Pixton
Jonathan Scharr
Jorgen Sumsion
Shelby Taylor
Cason Wight
John Yoo
William Horton
Michael McPeters
Nathan Andrews
Rylan Bateman
Elizabeth Bingham
2017-2018 SEMINAR SPEAKERS

During Fall ’17 and Winter ’18 semesters, we were pleased to have many great presenters at our Thursday Seminar series.

Those who presented during Fall 2017 included Dr. Brian Hartman (Bayesian Multivariate Regime-Switching Models: an Application in Correlated Assets), Dr. Todd Ogden (Precision Medicine in Psychiatry: Towards Selecting Optimal Treatments Based on Complex Data), Dr. Elizabeth Juarez-Colunga (Recurrent Event Processes with Applications to Health Care Outcomes), Dr. Jared Whitehead (Qualifying Historical Indonesian Seismicity via Bayesian Statistical Inversion), Dr. Josh Andersen (Life and Death Decision Making Within the Tumor Cell: Protein-Protein Communication and Tumor Cell Adaption to Stress), Dr. Howard Chang (Data Fusion Methods for Environmental Exposures), Professor Lynne Nielsen (The Impact of a Flipped Classroom Model of Learning on a Large Undergraduate Statistics Class) and Dr. Kevin Seppi (So Much Text and So Little Time).

Those who presented during Winter 2018 included Dr. Bradley Barney (Growth Curve Methodology with Application to Neonatal Growth Curves), Dr. Larry Baxter (Structure in Prior PDFs and Its Effect on Bayesian Analysis), Dr. Chris Groendyke (Bayesian Inference for Contact Network Models using Epidemic Data), Dr. Timothy Hanson (A Unified Framework for Fitting Bayesian Semiparametric Models to Arbitrarily Censored Spatial Survival Data), Dr. Matthew Heaton (Methods for Analyzing Large Spatial Data: A Review and Comparison), Dr. Daniel Nettleton (Random Forest Prediction Intervals), Dr. Robert Richardson (Non-Gaussian Translation Processes), Dr. Jeffery Tessem (How to Make More Beta Cells: Exploring Molecular Pathways that Increase Functional Beta Cell Mass as a Cure for Type 1 and Type 2 Diabetes), Dr. Dennis Tolley (What’s the Likelihood?), and Dr. Christian Tomasetti (Cancer, Etiology, Evolution and Early Detection).

It is always wonderful to have experts come and share their knowledge and experiences with our faculty and students. Our students look forward to and appreciate their presentations. We would like to thank all of those who participated in our Thursday Seminars.

MASTERS GRADUATES AND PROJECTS

Beginning in 2018, those graduating with MS degrees either produced a portfolio of all the class projects completed during their graduate studies and defended three of those projects; or, if selected by a graduate faculty member, they could defend a research project in an area of interest of that faculty member.

April 2018

David Arthur

- A Bayesian Spatio-Temporal Change Point Model for Identifying Urban Heat Islands in Utah

Wyatt Clegg

- Predictive Crash Severity Distribution for Utah State Roadways Based on Facility Type

Micaela Johnson

- Tackling America’s Obesity Epidemic: A Case Study on Obesity Rate in the Southeast

Katie Larson

- Optimal Scaling of Random Walk Metropolis Algorithms with Complex Target Distributions

David Lowe

- Measuring the Performance of Information Criteria in Identifying Covariance Structures

Brent Mabey

- Gaussian Processes for Precipitation Model Validation

Sierra Pugh

- Estimating Seasonal Onsets and Peaks of Bronchiolitis with Spatially and Temporally Uncertain Data

Angela Teuscher

- Predicting House Prices Using Gamma Regression and Spatial Information

June 2018

Chris Dixon

- Building League-to-League Performance Curves for Professional Basketball Players

August 2018

Gavin Collins

- Spatio-temporal, Multi-resolution Modeling to Infill Missing Areal Data and
Enhance the Temporal Frequency of Infrared Satellite Images

Floidy Gilbert

-Jsr223: A Java Platform Integration for R with Programming Languages Groovey, JavaScript, Jruby, Jython, and Kotlin

**UNDERGRADUATE MENTORING**

This year we had many students mentored by our faculty. Below is a description of some of the projects they worked on.

**Brandon Allen (Dr. Hartman, mentor)** analyzed auto-insurance data from all over the nation to recognize what factors have important impacts on the frequency or severity of automobile claims. Among the benefits of this research included insurance companies having a greater understanding of what factors impact their states’ specific auto claims and how they can plan for those factors.

**Ryan Ball (Dr. Fellingham, mentor)** worked on an offensive rating for the BYU men’s basketball team. Using a rating pioneered by Jazz radio, they found that the offensive ratings as a team was very indicative of wins and losses. They also found that a couple of the more popular players were less efficient than some that didn’t play as much. They believe this rating can be used to determine which players to play in order to be a more efficient offensive team.

**Lincoln Bangerter (Dr. Fellingham, mentor)** worked with other students in collecting and analyzing data on BYU’s football team as well as many other university football teams. They did this in an effort to determine statistical differences in performance between BYU and other teams. They discovered what individual play types performed best and which of these play types provided the highest probability of scoring for BYU. This data can assist the football team in gaining statistical insights that they can investigate and discover ways to improve.

**Elizabeth Bingam (Dr. Hartman, mentor)** researched the Auto Loss Costs group, studying the effects of different explanatory variables on collision frequency. They found that congestion variables were strongly correlated with collision frequency. These findings could make an impact for legislators and others in understanding how to reduce collision frequency. It can also assist insurance companies in making predictions regarding the collision frequency of their policy holders.

**Dayne Bloxham (Dr. Tolley, mentor)** conducted research on Medicaid data regarding the use of a specific set of drugs prescribed to diabetic patients. This project will have the potential to see if the set of drugs have had interesting effects on patients in comparison to those who did not.

**Michael Christensen (Dr. Reese, mentor)** is on a NASA-funded team using Bayesian spatial statistical models to address problems related to climate change in the regions of High Mountain Asia and Antarctica. Examining different approaches to Gaussian process modeling as a way of performing climate model validation is valuable work for other scientists who wish to use computer models in order to understand regional trends in the climate of vulnerable regions.

**Jackson Curtis (Dr. Warr, mentor)** has been doing research that involves estimating system reliability using a Bayesian non-parametric approach that allows for integration of data between components, subsystems, and full systems. There are many features and benefits to this method including the production of a closed-form posterior estimate of the reliability, which allows for fast computation regardless of the size of the data or the number of components.

**Trevor Dahl (Dr. Tolley, mentor)** focused on narrowing down factors that were best able to predict whether a child suffered from rheumatic heart disease. They created a preliminary model based on data gathered from children in Samoa that would help them decide which symptoms presented by a child would cause physicians to conduct more tests. The overall goal is to create a more efficient way to diagnose and treat RHD.

**Joseph Drapeau (Dr. Tass, mentor)** studied how to use areal statistics to model sand dunes on Jupiter’s moon, Titan. His focus was to correct auto-correlation and appropriately model sand dune elevation based on sand dune height, volume, width, and location. Through this study, researchers may be able to gain insight into how sand dunes form in general by understanding how these predictors are related to sand dune elevation.

**Kaylee Dudley (Dr. Hartman, mentor)** used the association rule learning to find groupings of conditions as found in a major health insurance provider’s claims information over the course of one year. This can be helpful in identifying new medical connections, potentially exposing fraudulent or suspicious claims, and strengthening known medical knowledge.

**Clarissa Farmer (Dr. Tass, mentor)** researched Transthyretin Amyloidosis (ATTR), searching for differences in gene expression levels between males and females to see if treatments for this disease need to be tailored by gender. Building a linear model from the factors of gender, age and type, they sought to correctly classify their type. They are hoping to find enough evidence to convince people to engineer treatments based on gender. This concept could be applied to almost any genetic disease as they learn more about how target disease might affect the two differently.

**Zoe Gibbs (Dr. Hartman, mentor)** used actuarial science to predict which policyholders in healthcare are likely to be high cost to reduce the risk of loss for those patients who incur disproportionate amount of total healthcare expenditures. This allows insurance companies to maximize profits while minimizing healthcare expenditures.

**Emma Hanks (Dr. Hartman, mentor)** looked at the frequency, severity, and loss costs for each different car insurance coverage and state. She worked with another student to create ARIMA models for each metric, coverage, and state to forecast their third quarter values. They compared forecasted values with the true values. With their time series plots, they were able to create heat maps that indicated the prediction interval that their true value fell into with respect to their forecasted value. This code could be used to predict future values, as well as help identify values that differ from the forecast so that greater attention can be given to those particular values.

**Elijah Harmon (Dr. Hartman, mentor)** used his research to try to explain developments in the auto insurance industry of increasing collision frequency trends in the last 8 years following 25 years of dropping rates. They found that collision insurance claim frequency in most strongly correlated with road congestion variables and bodily injury claim frequency is positively correlated with rural commute time and congestion variables. The impact this research could have is to open up a
conversation about drivers of auto insurance costs with an analytical basis.

Zach Horton (Dr. Page, mentor) researched better methods of performing curve registration or warping. Their research sought to incorporate template priors into the model, which will reduce variability, thus requiring fewer MCMC draws and increasing speed. This type of research could benefit many areas of science, particularly the sports medicine field. These methods will allow researchers to more easily compare movement patterns in experiments.

Easton Hutch (Dr. Richardson, mentor) created a package for the R programming language for fitting dynamic spatio-temporal models. These flexible models allow researchers to fit a wide variety of data with both spatial and chronological components. This package will make it easier for researchers to use DSTMs, eliminating hours of tedious, error-prone programming and allowing them to focus on their particular research problems.

Madeline Jackson (Dr. Scott, mentor) helped prepare new coding classes for the coming semesters. Her work has been to prepare a course that will teach Linux. This required researching online materials that teach Linux and then building off that material to create homework assignments and quizzes that will correspond with those lessons. They hope to teach students how to use Linux and show how it can improve their coding and simplify their work.

Van Johansen (Dr. Fellingham, mentor) worked in data analytics for the BYU men's tennis team. They dealt with and measured points in correlation to rally length. Such a study and further applications can result in coaches creating playbooks on different techniques to help players win the short rally length. This can include a combination of different serving techniques and serve and volley skills.

Shad Karlson (Dr. Fellingham, mentor) followed and recorded data for the BYU Hockey team. He input player and goalie stats from the past four years in the data base and was able to standardize the stats to find per-game averages of players and see which players perform the strongest in various categories. He has been able to present his findings before a conference, his team and his successor to insure team improvement for the future, benefiting both coaches and players.

Sam Kim (Dr. Fellingham, mentor) researched combinations of tennis shots that can lead to more winners and less unforced errors. They found that the overhead shot leads to the highest probabilities in a winner whereas the lobs and slices had the highest probabilities in hitting an unforced error. As they gain more data, they hope to fit this model with individual players. This can greatly improve player performance because they are able to see what shot types they can work on.

Michael McPeters (Dr. Tolley, mentor) helped develop a method of population matching for data enumeration and created a matching algorithm. Using a specified method, they obtained information that could allow health insurance companies to share data with one another and compute accurate risk measures and population mean differences.

Jeremy Meyer (Dr. Warr, mentor) researched the Indian buffet process (IBP), which is a non-parametric Bayesian method for modeling problems with a high number of predictors and few observations. Specifically, they tested a new extension to the IBP, the Attraction Indian buffer distribution (AIBD) which will allow for pairwise distance information to influence the feature allocations a priori. If they are able to successfully produce better results with the AIBD, this may help statisticians work with data where getting many test subjects is unfeasible.

Josh Meyer (Dr. Tolley, mentor) has been working on analyzing matching techniques. Through analyzing different matching techniques, they determined whether or not these measurements from matches were biased. These studies potentially impact our ability to imply 'causal' inference from observational data.

Matt Oehler (Dr. Fellingham, mentor) worked on a project that researched data from the 2016 Olympics to discover which sets of skills help beach volleyball players combine and reach their maximum potential. They quantified the performance of all players, ranking them in different skill categories. Once they compared their skills rankings with their actual performance, they could trade players among teams and simulate games to look for trends and patterns in successful and unsuccessful teams.

Shelby Taylor (Dr. Heaton, mentor) furthered her analysis of heat-related diseases in Houston, TX. Using metropolis-hastings, they are in the process of creating intensity distributions over this city with the goal of comparing intensity distributions for various diseases and identifying areas of the city most at-risk for disease. This project could potentially impact Houston residents in informing the community where more resources are needed.

Ben Tingey (Dr. Heaton, mentor) finished work on the bayesian hierarchical regression model for the PM{sub 10} exposure for children in Utah County. They found a general positive trend between stationary covariate and what the actual PM{sub 10} was picking up. Further studies will allow epidemiologists to know if implementation methods need to be taken to reduce the amount of PM{sub 10} in the home.

Lynsie Warr (Dr. Christensen, mentor) studied the precipitation and its relation to other climate impacts in High Mountain Asia. They combined multiple sets of data concerning precipitation to create the best possible model. Being able to better predict precipitation with these models will help local populations prepare for these situations better.

Cason Wight (Dr. Warr, mentor) studied Semi-Markov models. There are a few ways to solve Semi-Markov models and in continuous cases, the method for solving these models is slow and computationally intensive. There is a much faster method using a discrete Fourier transform instead of a Laplace transform, which uses summation instead of integration. The problem with this method is that it introduces some error. They are studying how to track the error so that people can use this faster method and be confident in the error introduced.

Allen Zhou (Dr. Richardson, mentor) focused on the distributions of stock prices, using t, skew, normal, and stable distributions as potential models. From this they built likelihood functions and maximized their log likelihood to get the estimates for different statistical distributions. From the comparisons of the AIC score of these models, they found that T distribution outperforms the others. The goal is to get the parameter estimates using a different method and will record all of these results and potentially implement these estimates to predict future prices of stocks.
Keep Us Posted

We want to know about what’s new with our Alumni. Let us know about any new achievements that you may have by emailing us at acetz@stat.byu.edu. You may also visit our website at statistics.byu.edu for more information about the Department.

Recruit an Intern or a Graduate

Send an email to ruth@stat.byu.edu with the job description, qualifications, and how to apply for the position. The information you provide will be forwarded to students and/or recent graduates of the Department of Statistics and posted on our website.

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3. Donate using a credit card on our website, statistics.byu.edu. Select “alumni & friends” then “donate online.” This will take you to a secure website to complete your donation.

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