THE OHIO STATE UNIVERSITY
dept of STATISTICS NEWS

Discovery is My Bliss *by Joe Verducci*


Joe Verducci

Statistical methods have many uses: inference about parameters of nature or engineering, quantification of uncertainty, and prediction. My research stresses their use in discovery, mostly in the areas of chemo-genomics and business.

First some examples from the (chemo) genomics side: Which structural features of chemical compounds make them evoke particular biologic responses? Do cancers utilize any common mechanisms in becoming resistant to chemotherapy? Are there signature profiles of gene expression in blood that can be used for very early detection of breast cancer? What internal systems take over when fish are environmentally stressed? Are there likely pathways that HIV could follow to become more transmittable? All of these questions involve discovering unknown mechanisms based on the clues left behind. I'll provide some background and describe four new statistical tools to help make sense of the clues: RPSA, SCOOP, tau-Path, and PhyloPTE.

Pharmaceutical companies maintain libraries of millions of chemical-compounds with potential medical application. For each compound, the library provides details of its chemical structures and lists several hundred thousand properties, including reactions that occur in thousands of biological contexts. These are enormous databases. Recent strategies for drug discovery look for potentially multi-purpose drugs, which will extend their patent protection. By discovering which pharmacophores (3-d structures that act as biological keys) are associated with specific reactions, chemists can construct entirely new drugs with multiple pharmacophores attached to a common, orientable scaffold. Recursive Partitioning with Simulated Annealing (RPSA) provides a method for identifying alternative structures that characterize different types of activity from these large databases. RPSA has been implemented in Leadscope software used by several large pharmaceutical companies. This was work I did with Paul Blower, a recently retired Research Professor from OSU Pharmacogenetics, and Mike Fligner, recently retired from our Department, and a few colleagues from Leadscope.

Another project that I did with Paul was to investigate microRNA expression in 60 cancer cell-lines curated by the National Cancer Institute (NCI-60). MicroRNA consists of small (22-nucleotide) pieces of RNA that inhibit translation of targeted RNA into proteins. We did some basic work that linked microRNA expression to the development of chemo-resistance in a certain type of cancer cell-line. We wondered if the same mechanism extended to other cancer cell-lines and/or other classes of chemicals. The first experiment was very expensive, and cost prohibited a full set of experiments. This constraint led to the birth of the tau-Path method, where we could link the association of microRNA to chemo-resistance over a subpopulation of cancer types. Li Yu wrote her dissertation on methods for implementing the tau-Path, investigating the statistical properties of the methods. Li now works for MedImmune. David Gerrard will start working with me next quarter on further refining the tau-Path into a precise

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2011-2012 Graduate Student Co-Presidents Erin Leatherman and Katie Thompson have moved the CMOOL newsletter to a more frequently updated blog format: go.osu.edu/cmool Be sure to check out CMOOL 2.0 for the latest information on our graduate students, their fun activities, and quirky sense of humor.

Letter From the Chair *by Mark Berliner*

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Volume 19, 2011

Department of Statistics
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Chair: Mark Berliner
Vice Chair: Bill Notz
Vice Chair for Graduate Studies: Elizabeth Stasny

The Department of Statistics News is an annual publication of the Department of Statistics at The Ohio State University compiled by the department Communications Committee.

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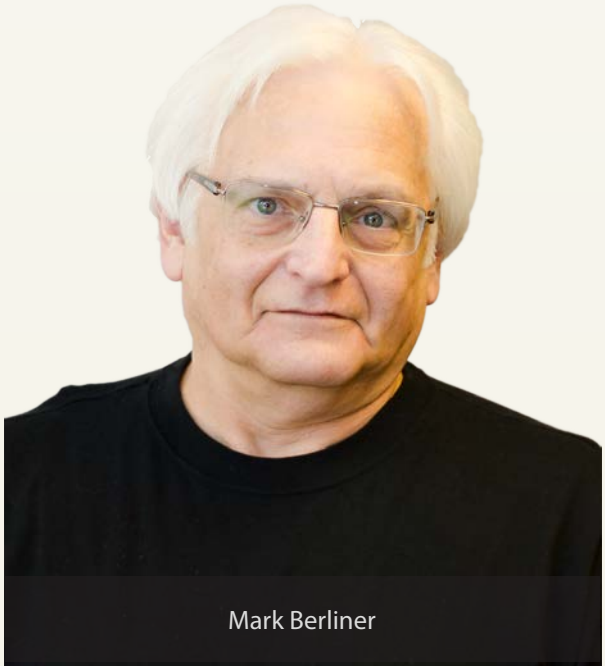
Greetings to all our friends and alumni! Some major changes occurred this year. First, **Doug Wolfe** has retired. Doug has played a central role in the department's activities and progress. His contributions to research, education, and administration have been numerous and profound. I am not sufficiently talented as a writer to express the depth of respect and gratitude to Doug that so many of us share. Fortunately Doug continues his work and will remain an active spokesman for our graduate program and department. **Angela Dean** and **Michael Browne** have also retired. Angela served as an outstanding faculty member. Her leadership in research and education in experimental design and her dedication to her PhD students have been extraordinary. Angela continues her research and will be in the department often. Michael Browne's research in multivariate statistics and his contributions bridging the disciplines of psychology and statistics are outstanding.

I began a four-year appointment as Chair on July 1, 2011. I will do my best to live up to the confidence shown in me. The challenges are numerous. First, we have been hit by a roughly 5% budget cut. Second, the three retirements noted above are the first in what we anticipate to be a series of retirements over the next few years. However, such challenges are also opportunities. We will review and adjust our courses and programs to provide the highest quality education in an environment of increasing demand and limited resources. Further, the strength of our department will enable us to attract excellent new faculty. We are currently recruiting two new Assistant Professors. With everyone's help, I believe we will continue to develop our ability to educate, to discover, and to serve as a leading department.

The state of the department is strong. The faculty continues our strong and balanced research program. The excellence of our methodological and collaborative research is demonstrated by our strong publication record and our ability to attract external support. Our graduate education and training also remains strong; I am extremely proud of our faculty's dedication to education. We continue our cooperative degree program (**biostatprograms.osu.edu**) with the Division of Biostatistics of the OSU College of Public Health.



Mark Berliner

I am pleased to announce that **Chris Hans** and **Tao Shi** have both been promoted to Associate Professor with Tenure. Statistical Consulting Service Director **Chris Holloman** has been promoted to Auxiliary Associate Professor. **Deborah Rumsey** has been promoted to Auxiliary Professor. Congratulations to all of them for these well-deserved promotions.

As Doug always wrote in his letters, please keep us informed about your professional and personal activities. Your support in hiring our graduates and providing financial gifts are critical and much-appreciated.

Faculty and Staff Awards, Honors, Appointments and Other Good Stuff

Elizabeth Stasny was appointed by U.S. Attorney General, Hon. Eric Holder, to serve on the newly created Office of Justice Programs Science Advisory Board.

Noel Cressie has been appointed by the Director of the U. S. Census Bureau, Dr. Robert Groves, to serve on the Census Bureau Scientific Advisory Committee for the period 2011-2014.

The Nationwide Center for Advanced Customer Insights (NCACI) has been selected as the recipient of the prestigious 2011 Statistical Partnerships among Academe, Industry, and Government (SPAIG) award from the American Statistical Association.

Peter Craigmile received the 2011 El-Shaarawi Young Researcher's Award given by the International Environmetrics Society. This award is in recognition of having made outstanding contributions to the field of environmetrics.

Lisa Van Dyke received the College of Arts and Sciences Outstanding Staff Award.

Kate Calder was elected to the Board of the International Society for Bayesian Analysis (ISBA).

Steve MacEachern was elected Chair of the Bayesian Nonparametrics Section of ISBA. Steve is also Program Chair of the 2011 Joint Statistical Meeting in San Diego.

Through the efforts of **Kate Calder** and **Peter Craigmile**, our department was selected to be a node of the NSF-funded Research Network for Mathematical Sciences: Statistical Methods for Atmospheric and Ocean Sciences.

Tom Santner spent the Autumn of 2011 as a visitor to the Uncertainty Quantification Program of the Newton Institute at Cambridge University.

Radu Herbei was a semi-finalist for the Alumni Award for Distinguished Teaching.

Laura Kubatko was a finalist for the College of Arts and Sciences Outstanding Teaching Award.

Welcome to New Staff (see their profiles on page 11)

Elizabeth Mannshardt joined the department as Assistant Director of The Program in Spatial Statistics and Environmental Statistics. Elizabeth received her PhD in Statistics from the University of North Carolina.

Christine Bishop is our new Accountant and Grants Administrator. Christine comes to us from Battelle. ❖

If you have personal and professional updates that you would like to share with our readers, we encourage you to submit them to:

news@stat.osu.edu

Statistics Receives Exclusive University Grant *by Mark Risser*

Dr. Jackie Miller, Department of Statistics Education Specialist, was awarded a Departmental Impact Grant in January, 2011 from the Office of the Chief Information Officer (OCIO) for her proposal "Too Many Students, Too Little Time." The project involves piloting a new curriculum for Statistics 145, one of the department's introductory courses, to address challenges imposed by the upcoming semester conversion.

The OCIO awards two Impact Grants per academic year across the entire university, and the focus of these grants is to assist implementation of technology-based classroom initiatives. General Education Courses (GEC) serving a large number of students receive special consideration, and the grant funding includes both financial and personnel resources.

After Ohio State switches to semesters in summer 2012, student enrollment in Statistics 145 is expected to increase from 350 per quarter to over 500 per semester. Time in lecture will increase by about 7%, while recitation time will decrease by 20%. The solution suggested in the project is to provide options for both face-to-face and online synchronous "attendance" and transition recitation time spent on lecture review into an out-of-class venue, such as online review quizzes through Carmen.

However, "Too Many Students" suggests much more than a switch to the common online class format. Many students will attend class as usual, and those who choose not to attend face-to-face will be able to experience the lecture synchronously: Miller's lecture slides and notes, along with an audio stream, will be broadcast live for simultaneous viewing. The recording will be then archived for future student viewing and review.

Ideally, the course will follow a "HyFlex" model, one that allows students to choose how they attend class each day. "The HyFlex model falls in line with other initiatives in our introductory courses and is particularly well-suited to today's technology-driven student," Miller comments. Technology will be utilized further through in-class polls (using text messaging instead of clickers) and creation of a "backchannel," an online site where students attending remotely can participate and ask questions during the lecture. These implementations will extend to students attending class traditionally, allowing greater opportunity for contribution to the class discussion.

Miller reports that the project grew from collaboration with former staffer Kythrie Silva after Miller attended a Lilly Conference on College Teaching in Oxford, OH. Overall, the project aims to increase student participation and engagement, specifically through a process that would be scalable to a larger lecture size. An additional initiative is to formalize this hybrid curriculum to extend its application to other university departments. Miller explains, "Many courses taught with the lecture/recitation format will have similar time and space issues. There are exciting opportunities to extend our findings from this project to these other courses."

As a pilot study, "Too Many Students, Too Little Time" will be a work in progress throughout the 2011-2012 academic year. Miller expects the methods and technologies used to evolve recursively, and student feedback will be constantly solicited and incorporated. Updates on the progress of the project can be viewed through Ohio State's Digital Union blog at **digitalunion.osu.edu/blog/**. ❖

Mark Risser (L) moderates student questions via the "backchannel" while Dr. Miller lectures during Statistics 145.

A New Approach To Lecturing

For nearly thirty years Professor Dennis Pearl has made a wager with his Statistics 135 students: if more than 10% of the class got perfect papers on an exam, he would teach for a class while riding a unicycle! That's a pretty high bar for a class to pass and in all of this time, the wager has never been met. That is, until Winter Quarter 2011. In March of 2011, Dr. Pearl's students met the challenge on the second midterm, and he fulfilled his promise by teaching a lecture while riding the unicycle across the very small and crowded stage in EA 170. While he would occasionally pause to advance a slide or make a salient point, Dr. Pearl remained on the unicycle presenting his lecture for about twenty minutes until it was time for an in-class activity. After the class he commented, "I really thought I would retire before I met a unicycle-worthy class. But OSU students are an impressive group - smart enough to ace my exam and smart enough not to sit in the first row." ❖

OSU Statistics on Facebook

These days, a social media presence plays a vital role for many organizations, and the Department of Statistics is no exception.

Overseen by the Communications Committee led by Dr. Tao Shi, The "Department of Statistics at The Ohio State University" is now a part of the Facebook community. All are welcome to "Like" our page and stay updated on upcoming events, announcements, news, pictures and more.

For more information, please visit our Facebook page: **facebook.com/osustat.** ❖

In Memoriam: Satya Mishra, PhD Alumnus

(Obituary courtesy of Alabama Live.)

Dr. Satya Narayan Mishra was born in Varanasi, India and moved to the United States in 1972. He died on Friday, October 22, 2010 at the family home. He was a Professor of Statistics at the University of South Alabama for over 30 years; received his PhD from Ohio State, three Masters Degrees in Applied and Theoretical Mathematics from UMASS and MIT. He had a triple major in college at Benares Hindu University in Mathematics, Physics and Chemistry. He organized twelve international conferences including one at the University of South Alabama. Dr. Mishra was also a Hindu Priest to the local Indian community and an avid Tabla player and a Greco Roman Wrestler in college. He is survived by his wife, Dr. Nutan Mishra; children, Dr. Prashant (Angela) Mishra and Dr. Pallavi Mishra; two grandchildren, Dru Mishra, Marley Mishra and his three brothers who live in India. ❖

Gary Koch Receives Professional Achievement Award from Alumni Association

(taken in part from The Ohio State University Alumni Association website)

In October 2011, Professor Gary G. Koch, University of North Carolina - Chapel Hill, received the Professional Achievement Award from The Ohio State University Alumni Association. Highly regarded as a researcher, author, instructor, and mentor, Gary Koch is the embodiment of professional achievement in the field of statistics. After receiving his bachelor's and master's degrees from Ohio State, Koch earned a PhD in statistics from the University of North Carolina at Chapel Hill in 1968. His research has focused on clinical trials methodology, analysis of categorical data, and nonparametric multivariate inference. Koch is one of the most frequently published statistical researchers, having authored or co-authored more than 400 papers, a textbook, and many textbook chapters. Koch has received numerous honors in recognition of his contributions to the field of statistics, including the Spiegelman Award from the American Public Health Association and the Outstanding Service Award from the Drug Information Association. Koch established and supports the Alumni/Friends & Gary Koch & Family Graduate Student Travel Award Endowment for doctoral students in Ohio State's Department of Statistics. He has returned to campus to teach several short courses during the Summer Program on Applied Statistical Methods. In accepting the award, Dr. Koch remarked "My educational experiences at The Ohio State University have had an invaluably central role for my teaching and research activities in biostatistics at the University of North Carolina, as well as for my professional collaborative contributions to a broad range of environments in the health sciences, particularly those for health promotion, disease prevention, and the development of new medicines to manage the illnesses that cannot be prevented."

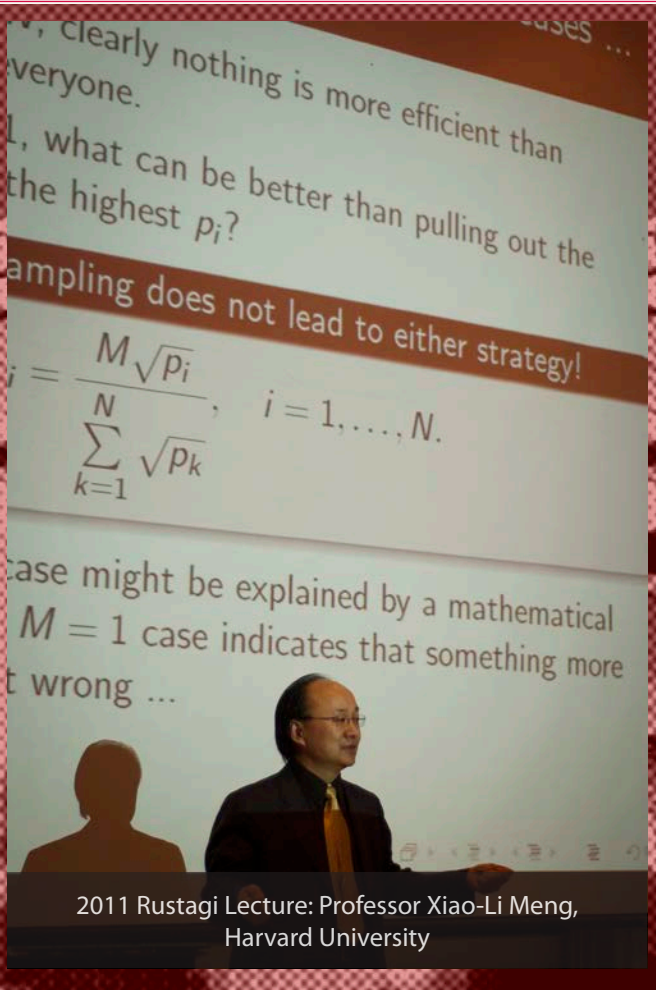
2010-2011 Department Highlights

2011 JSM Alumni Breakfast

STATMOS poster session

Department Picnic

New Graduate Student Reception



2011 Rustagi Lecture: Professor Xiao-Li Meng, Harvard University

A Conversation with Dr. Angela Dean by Mark Risser and Shasha Bai

This past summer, Dr. Angela Dean retired from her faculty position in the Department of Statistics after 31 years of service. The newsletter staff caught up with the busy retiree to hear some reflections on her tenure at The Ohio State University.

Dr. Angela Dean (center) with students Erin Leatherman and Fangfan Sun.

What did you enjoy most about being on the faculty here at Ohio State?

"Without question, the best thing about the department is the people. When I was hired in 1980, I only expected to stay at Ohio State for a few years. However, the students, staff and faculty have been such good colleagues over the past thirty years that I never wanted to move anywhere else. The research atmosphere here is wonderful; the staff is enormously helpful.

"In particular, I have enjoyed the open atmosphere and being able to work with faculty who are not necessarily in my own research area. Joint work has led to papers with six faculty members within the Statistics department and three faculty members in other departments. Not surprisingly, this has enabled me to learn many new things. I've enjoyed attending reading groups on a wide range of topics and have had the great fortune to work with wonderful and interesting students. I even found some students who wanted to do some extra research unrelated to their dissertations for fun! Additionally, the students that I've had in class have made teaching extremely pleasurable. I specifically appreciated the project groups in the 600-level design class who made me laugh with the outlandish fictional settings chosen for their projects! Several of these projects will find their way into the upcoming revision of the Dean and Voss design book.

> "Without question, the best thing about the department is the people."

"I am glad to have this opportunity to thank all those who have uncomplainingly worked with me over the past years."

How has the OSU Statistics department changed since you started here?

"The department was very small in 1980, maybe half its current size. All staff and faculty had offices on the ground floor of Cockins Hall, but the students' offices were spread around campus in various buildings (including rooms over a bagel shop on High Street!). Having everyone under the same roof makes a huge difference. Also, the computer system back in 1980 was unrecognizable: we still had to use punch card machines in the basement of Cockins Hall, then run the cards over to Baker Systems Lab to run the program (then back to Cockins to fix a small error, then back to Baker, etc., etc.). Thankfully the computers were brought "up-to-date" soon after I arrived. Today's system is a luxury and our tech support people are first rate."

What accomplishments of your students are you most proud of?

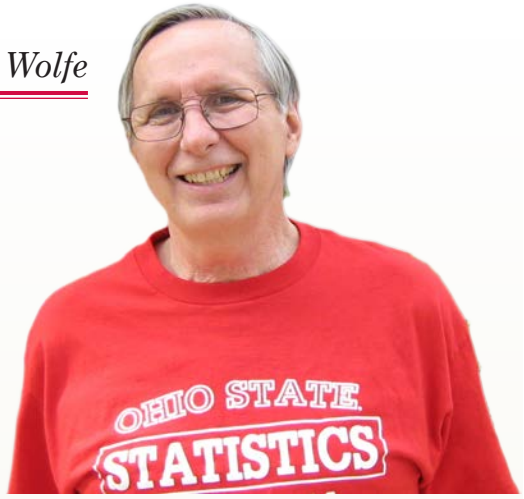
"I have enjoyed working with every single one of my PhD students (fifteen past and two current, half of them co-advised by other faculty members) and am extremely proud of them all. Several are now acting as officers in sections of the American Statistical Association; many have presented talks and posters at major conferences. Seven have gone on to excellent academic careers (the early students all now have tenure, and of these, four have been department chairs and one an associate dean). Others have moved into exciting research careers in government and industry, such as Battelle Memorial Institute, General Motors, the Food and Drug Administration, Chase Bank, Aerospace Corporation, and Bank of Korea. It has been a pleasure for me to work with each of these students and I enjoy staying in touch."

How has the field of Statistics changed since you started your faculty career?

"As in many other areas of statistics, the biggest changes in experimental design research have been brought about by the enormous increase in computing power. When I began research in this field, combinatorics, algebra and some graph theory were the basic tools we used. Designs produced for use in agriculture or industry had to be easily analyzed, and therefore needed a well-understood mathematical structure. Orthogonality between treatment structures and block structures was important. Nowadays, there is major interest in being able to obtain information about a large number of factors (treatments) from a very few observations, and screening methods are currently an important research topic. The underlying mathematical structures are still there as the starting point (for example, orthogonal arrays), but orthogonality is not necessarily the only goal.

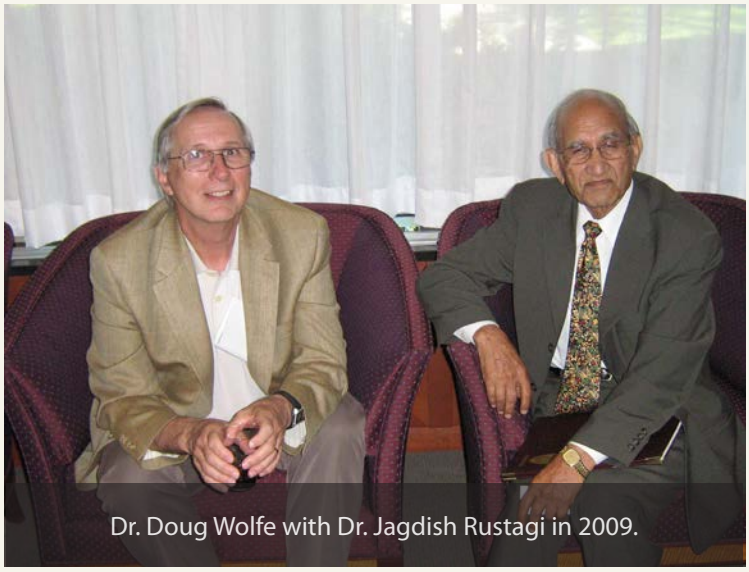
(continued on page 9...)

Forty Years—Seems Just Like Yesterday…Almost…. by Doug Wolfe



In the summer of 1971 my family of four packed up our belongings and headed north out of Tallahassee, Florida, to take up a new position as an Assistant Professor in the Division of Statistics, within the Department of Mathematics, at The Ohio State University. I was the fifth member of the Division, joining Professors D. Ransom Whitney, Jadgish Rustagi, Tom Willke, and Ramesh Srivastava. My new office was on the first floor of venerable old (even at that time) Cockins Hall and the first months in that office were marked by regular patrolled marching of the Ohio National Guard along Neil Avenue outside my window following the Vietnam War protests that had erupted on Ohio college campuses, leading to the sad shooting deaths of students on the Kent State campus in Spring 1970. Things were still in turmoil at Ohio State, with continued demonstrations swirling around the Vietnam War and the Civil Rights and Women's Rights movements (some of our own graduate students were injured by rubber bullets—"knee knockers"—and tear gas and even a few of them were temporarily detained by the police for "watching" the demonstrations….), reminding me much more of my final years at the University of Iowa in 1968 and 1969 than of the two intervening years as a Post Doc at much more subdued Florida State University in Tallahassee (although the Civil Rights movement was in full bloom in the South at that time).

When I joined the Department we were so proud of our bank of "modern" Marchant and Friden calculators, as well as card punches and an "impressive" card sorter, which shook the hallway when it was running! All of these devices were housed in the Statistics Laboratory (now our Statistical Consulting Service) in the basement of Cockins Hall (now part of MSLC). We wrote our computer programs in Fortran and, as Angela Dean noted in her earlier conversation, had to take our decks of cards across Neil Avenue to the Baker Systems Building to have a program run. There were always lines to get a program submitted and lines to pick up your output when it was completed, perhaps in just a few HOURS if you were lucky!


Dr. Doug Wolfe with Dr. Jagdish Rustagi in 2009.

By 1974 our faculty number had grown to eight and we were granted the privilege of leaving the "protection" of the Department of Mathematics to become our very own Department of Statistics, chaired by Ransom Whitney. The latter part of the '70s and early '80s saw rapid growth in the Department. Based on the recommendations of both internal and external review committees during that period of time, our Department was designated as a "central discipline with high potential to achieve excellence" and we were provided with resources to expand both our teaching mission and graduate program—one of the few times when an internal University review committee correctly understood the important role of our discipline. The rest is history, as the Department has grown to 25 faculty members (and authorized to hire two more), three auxiliary faculty members, a full time staff of 15, and more than 125 graduate students. We now rank among the top twenty statistics departments and graduate programs in the country—and are proud of it! As with all good things, we have had our growing pains and there have been budget bumps and bruises, but the Department has persevered and its future is very bright. The University made a wise decision to invest in us in the 70s and 80s and more recently again in the early years of the new millennium!

The Department has changed in many ways since 1971. The research emphasis has moved from a primary emphasis on mathematical statistics when I came to the modern current emphasis on statistical modeling most often involving collaborations with scientists from other disciplines. It has morphed from full emphasis on classical and nonparametric statistics when I joined the Department to a balanced program of Bayesian methodology, statistical genetics, and data mining/statistical learning/nonparametric modeling, with a heavy emphasis on statistical computing across all of these categories. I am also most pleased by the fact that both the faculty and graduate student collectives have become considerably more gender and ethnically diverse, although there is still an opportunity for further improvement in both of these areas.

Angela Dean noted in her comments about the historical wanderings of our graduate students over the years. Let me add a bit to those musings. We did, indeed, have some of our graduate students housed in a room over a bagel shop on High Street—but what Angela forgot to tell you was that the room was completely full of desks and chairs, so that students who had desks in the rear of the room had to crawl on all fours across the first set of desks to get to their stations—and, as you can imagine, meeting with their own students in that room was interesting! The other issue surrounding the odyssey of our graduate students is that the University seemed to

have a penchant for assigning them to buildings that had been (or would soon be) condemned—this included the old Sawtooth Laboratory (now torn down), the old Lord Hall (now torn down), the old Buckeye Bargains Building (now torn down), and Brown Hall (now torn down)—and for a short time we even had graduate students in the football stadium! (The interesting thing about the old Buckeye Bargains Building is that the University had decided that it was unsafe for Sociology graduate students (the majority of them at the time were women) because of the leaking asbestos in the building, so they were moved elsewhere. Oddly enough, however, it was soon—with no changes to the building in the meantime—acceptable to assign our graduate students to the very same space because the majority of them at that time were male and, hence, I guess, immune to the effects of asbestos!) This condemned building trek for our graduate students became so legendary that when I was chair I received a call from a faculty member in the College of Biological Sciences who jokingly wanted to know if we could get our graduate students assigned to one of their buildings so that it could be torn down in the next couple of years and replaced by a new building for their laboratories! As Angela noted, it is a delight to have all of our current graduate students in either Cockins Hall or the older Mathematics Building (but not the oldest still standing Mathematics Building—that would be Cockins Hall!).

There have been many positive changes for our Department since I first came to Ohio State. Unfortunately, the one constant that has virtually not changed in that period of time is venerable, same old, same old Cockins Hall. We do have a new roof, but this is the one major disappointment that I have with my time as Department Chair—not being able to convince the upper administration to improve our home—hopefully Mark Berliner will be able to win that battle!

I enjoyed my forty years in our Department, directing or co-directing 25 PhD students who have all gone on to successful careers (yes, I am proud of each and every one of them!) and working on collaborative research with many faculty colleagues in the Department. It was a privilege to serve the Department as Graduate Chair and Chair for more than ten years each. Hopefully, I was able to make a few positive contributions to the program during at least one of those decades (or, at worst, do minimal harm). Of course, the thing that I enjoyed the most during my time on the faculty was teaching bright young graduate students about some of the aspects of our wonderful discipline. I will most surely miss (already do!) that opportunity during my retirement years.

GO BUCKS —
long reign the M&M (Matta and Meyer) combo! ❖

(Dean, Cont.)

"In addition to the theoretical work, we can now use the mathematics to guide enormous searches within huge spaces of designs to find the best designs under any criterion needed to solve a particular problem.

"The entire field of computer experiments has also become an important research area, where computer simulators are used to implement complicated mathematical models of physical processes. The design problems arise in the task of selecting where to run the simulator in order, for example, to fit a statistical predictive model (emulator) for examining the response surface, or for finding optima on the surface."

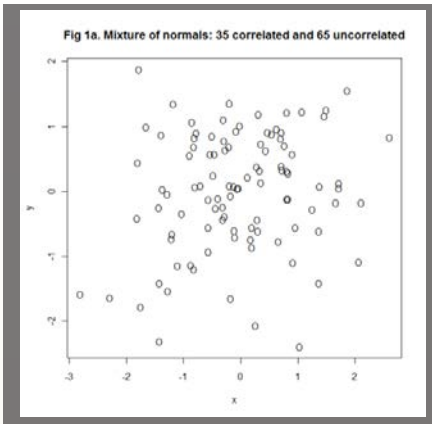
What are your plans for the coming year?

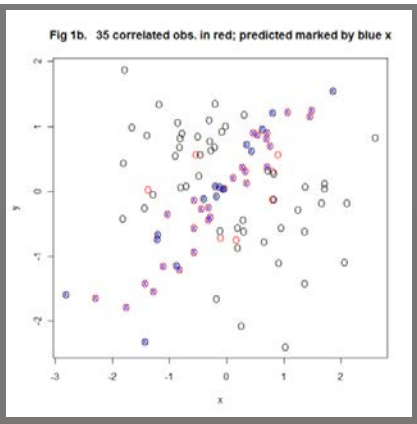
"I am spending much of the 2011 autumn term at the Isaac Newton Institute in Cambridge, UK, for a 6-month research workshop on the design and analysis of experiments. I have a number of editorial projects, including being a co-editor for a new Handbook in Statistics focusing on the design of experiments. I am trying to finish quite a large number of half-written papers, as well as working on the second edition of the Dean and Voss experimental design book.

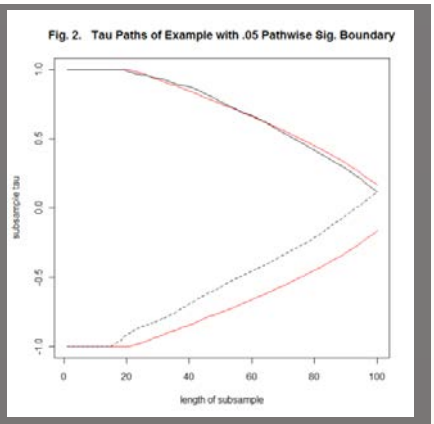
"In January 2012, I am becoming Chair of the Section on Physical and Engineering Sciences (a section of the ASA). I think I will be keeping quite busy!" ❖

Cockins Hall, circa 1935 — Long before Doug and Angela's time!

Verducci (continued from cover)







Here is a quick example of how the tau-Path works. Suppose X and Y both have standard normal distributions. In population 1 they are independent, but in Population 2, they have correlation .9. Figure 1a shows a mixed sample of 100 observations, 65 from Population 1 and 35 from Population 2. It is difficult for the eye to detect any pattern. Figure 1b reveals the Population 2 pattern (in red), with tau-Path estimates of inclusion marked with x. Here the tau-Path correctly identified 80% of the observations from Population 2 with a false positive rate of 23%.

Figure 2 illustrates how Kendall's tau decreases when the sample is appropriately reordered. The top path reorders to find positive association, and the bottom reorders to find negative. If either path breaks the red boundary, the two-sided test is significant at the .05 level: only 5% of all such paths break either boundary under independence. The speed of the tau-path makes it particularly useful as a screening device, capable of screening millions of pairs of variables in a few minutes.

tool for implementation in a software product being developed by Myatt and Johnson.

Studying the time course of gene expression has led to numerous discoveries about how genes signal various processes to initiate, accelerate and decelerate, all in complex networks. Together with colleagues from OSU Pharmacy, Battelle Pacific Northwest and the University of Idaho, Yushi Liu and I developed a gene selection method, SCOOP (Shrunken Centroid Ordering by Orthogonal Projections) designed to select genes that not only would explain patterns in the reproductive cycle of female trout, but also reflect the natural biological processes underlying the common patterns of variation. The fact that Yushi already had a PhD in biochemistry before working on a PhD in statistics with me helped greatly in unraveling the systems and discovering whole system changes induced by stressing the trout with a compressed photoperiod. Yushi now works at the Lovelace Research Laboratories. We are currently comparing SCOOP to other gene-selection methods in an effort to develop a reliable early biomarker for breast cancer based on the body's early immune reactions as detected by expression levels of select genes in blood samples.

Over the past few years, I've had the great pleasure of interacting with colleagues at the Ohio State University Mathematical Biosciences Institute (MBI). Currently I am working with Sam Handelman, a post-doc at the MBI, on a general procedure called PhyloPTE (Phylogenetic Path to Event; also the name of a character in a play by George Gascoigne). This is joint work with Dan Janies from OSU Bioinformatics, Jesse Kwiek from OSU Virology, and Raghu Machiraju from OSU Computer Science. It arises from "next generation sequencing" which allows for rapid and efficient sequencing of samples of DNA or RNA. The statistical idea is to generalize time-to-event methods into path-to-event methods by conditioning on a phylogenetic tree constructed to explain the evolution of a very large number of samples. For example, we can (with reasonable funding) sequence millions of strains of HIV as the virus evolves in humanized mice (whose immune systems have been knocked out and replaced by a human one), and trace back which earlier mutations were highly likely to have accelerated the rate of later ones. Putting all the information together could give a picture of alternative evolutionary paths to virulence and suggest interventions that would avert the next pandemic.

Although business environments may change rapidly, relationships among key economic variables often remain stable, and it is possible to profit through an understanding of these relationships. Tau-Path techniques are a key tool for discovering stable associations in marketing and investment data. The Nationwide Center for Advanced Customer Insight, directed by Tom Bishop, is interested in identifying subpopulations that may be particularly receptive to certain products and promotions. Steve Bamattre is doing his dissertation on extending the tau-Path method to large samples. This work brings in very interesting asymptotic distribution theory with connections to combinatorics. Srinath Sampath, who has spent the last 15 years building up an incredibly successful bond portfolio at Nationwide, is now back with us to finish his PhD He is working on data mining methods, including top-K analysis of information in rankings, with applications to investment and marketing.

OSU is a wonderful place to work, study, collaborate and discover. Discover the heart of Columbus: OSU. ❖

Elizabeth Mannshardt
Assistant Director, SSES

I began my life in Yuba City, CA – twice voted the worst place to live in the United States (1985, 1995 - Rand McNally). Never fear, we're improving – we jumped from last-place ranking 379th to ranking 362nd in 2007! It's not so bad – we boast the smallest mountain range in the world, the Sutter Buttes. And while we may not have a professional sports team, any youth from Yuba can climb a grain silo or tip a cow like a pro!

In 1995, I ventured out of Yuba City and into college at Sonoma State University, in the heart of Sonoma-Napa valley wine country. Despite the lure of wine-tasting and grape-stomping, I managed to complete my BS in Mathematics. From SSU I headed across the country and down south, to the University of North Carolina at Chapel Hill. It was immediately apparent that I was born to be a southerner – warm weather, good manners, and frying any food you can think of – what's not to love? At UNC I completed my MS and PhD in Statistics under Richard Smith. Staying in the South after grad school, I was a Postdoctoral Fellow at the Statistical and Applied Mathematical Sciences Institute (SAMSI) from 2008-2010, and a Visiting Assistant Professor in the Department of Statistical Science at Duke University from 2008-2011. It was confusing to know who to root for in basketball, but there's something about being a Tar Heel that really sticks with ya.

This fall I left behind big basketball of the South to head to football country - and immediately embraced being a proud Buckeye here at OSU. I am now the Assistant Director of the SSES program and have jumped right in to all of the excitement of SSES. My research interests include methodology and applications in extreme value analysis and environmental statistics, with applications in climate change and paleoclimate.

In my free time, I play volleyball. A lot. Indoor, outdoor, grass, beach – it's all good fun. I also enjoy hiking, am an avid indoor cycler and am a hobbyist runner. (It's important to make that classification of "hobbyist" for running, because otherwise people try to convince me to do crazy things like train for marathons with them.) I also love traveling to new places. It's hard to pick a favorite, but Cinque Terre was astoundingly beautiful and it was amazing to have a chance to explore Paris. My favorite places to visit in the US include Colorado and California, for the gorgeous scenery as well as the fantastic friends and family. One day soon I will make it to the Grand Canyon, and perhaps somewhere tropical.

Not-so-random facts about me: People I'd like to meet include Jon Stewart and Lisa Ling. I can eat an entire half-gallon of ice cream in one sitting. I was mentioned in an Emmy-award winning documentary about a Shaman from Thailand. My parents are two of the most fantastic people on earth.

My life pretty much consists of statistics and volleyball, with maybe a movie or some karaoke, and perhaps a little traveling. I hope Jessi and I really will train for the 1/2 marathon (but frankly, nobody hold their breath for my 1/2). ❖

Christine Bishop
Accountant and Grants Administrator

It is great to be working at The Ohio State University and returning to my alma mater where I earned a Bachelor of Science in Business Administration. In my current position as Accountant and Grants Administrator, I work with a wonderful group of people and provide accounting, business and grant administration services for the Department of Statistics. My primary responsibilities include reviewing and reconciling OSU and OSURF fiscal and HR statements, maintaining financial accounting records, maintaining spreadsheets for faculty budgeted funds, supporting research faculty in creating research grant budgets, coordinating monthly payroll certifications and serving as ProCard Manager.

Prior to working at The Ohio State University, I worked at Battelle Memorial Institute in Columbus, Ohio, first as a Contract Closeout Analyst and then as a Project Control Analyst. I was fortunate to be exposed to a wide variety of projects, including environmental restoration, national security, health and life sciences, and transportation. Many of the responsibilities and knowledge I learned such as billing, closeout calculations, budgeting and cost projections, monitoring and reporting, advising PIs and project control translate well to my current position. My goal is to utilize my prior experience and skill sets to help the department meet the accounting/administrative business needs and to support the PIs by providing budgets for grant submission, advising PIs on project status and budgets and providing other support. Prior to working at Battelle, I worked at several banks in both auditing and accounting roles.

I am a lifetime Columbus, Ohio resident and share my home with Sierra, my cat (also known as "Queen of the Household"). I am an avid reader and enjoy reading fiction and biographies. On the weekends, I enjoy volunteering for the Capital Area Humane Society, which is an organization that advocates for the well-being of homeless animals by providing them shelter and food and placing them up for adoption in new homes. As a volunteer, I work in cat care and socialization, dog walking and perform various other tasks that need to be completed. I'm a little surprised I only have one pet at this point….so far.

Graduate Student Corner

We are proud to have another excellent group of Statistics PhD graduates this year. Below are the titles of these graduates' dissertations and the positions they have accepted:

PhD in Statistics

Candace Berrett – "Bayesian probit regression models for spatially-dependent categorical data," Assistant Professor, Brigham Young University

William Darnieder – "Bayesian methods for data-dependent priors"

Lori Hoffman – "Disease Gene Mapping Under the Coalescent Model"

Yushi Liu – "Properties of the SCOOP method of selecting gene sets," Biostatistician (Associate Scientist), Lovelace Respiratory Research Institute

Mallikarjuna Rettiganti – "Statistical models for count data from multiple sclerosis clinical trials and their applications," Assistant Professor, Department of Pediatrics and ACHRI Biostatistics, University of Arkansas for Medical Sciences

Joshua Svenson – "Computer experiments: multiobjective optimization and sensitivity analysis," Senior Statistician, JP Morgan Chase & Co.

Joshua Svenson receives his PhD in Statistics

Student Presentations

The Department was represented at the 2011 Joint Statistical Meetings in Miami Beach this summer by 13 of our graduate students. Thanks to all the presenters for helping us show what impressive students we have. The students and their topics are listed below:

Jonathan Bradley†, joint with N. Cressie and T. Shi: "Selection of Rank and Basis Functions in the Spatial Random Effects Model"

Jenny Brynjarsdottir, joint with M. Berliner: "Downscaling Temperatures Over the Antarctic Using a Dimension-Reduced Space-Time Modeling Approach"

Tian Chen†, joint with E. Stasny: "Judgment Post-Stratification for Estimating Success Probability with Nonresponse"

Jinguo Gao (Nonparametric Section Student Paper Competition), joint with O. Oztur: "Two-Sample Distribution-Free Inference Based on Partially Rank-Ordered Set Samples"

Matthias Katzfuss, joint with N. Cressie: "Bayesian Hierarchical Spatio-Temporal Smoothing for Massive Data Sets"

Hang Joon Kim, joint with S. MacEachern: "The Generalized Multiset Sampler"

Lira Pi†, joint with H. Nagaraja: "Fisher Information in Censored Samples from the Block-Basu Bivariate Exponential Distribution and Its Applications"

Aritra Sengupta†, joint with N. Cressie: "Empirical-Bayesian Inference for Count Data Using the Spatial Random Effects Model"

David Spade†, joint with R. Herbei and L. Kubatko: "Mixing Times for a Class of Markov Chains on Phylogenetic Tree Spaces"

Szu-Yu Tang, joint with Y. Liu (Millennium: The Takeda Oncology Company), and J. Hsu: "Testing for broad efficacy and efficacy in genomic subgroups using partitioning principle"

Katherine Thompson†, joint with S. Lin: "A Robust and Efficient Statistic for Detecting Heterogeneous Cancer Samples"

Ruoxi Xu†, joint with C. Hans: "Regression Model Stochastic Search via Local Orthogonalization"

Dunke Zhou†, joint with T. Shi: "Statistical Inference Based on Distances Between Empirical Distributions"

† These students received the Alumni/Friends & Gary Koch & Family Graduate Student Travel Award to help support their travel to present their research.

In addition, Koch Awards were given to **Szu-Yu Tang** to attend the 7th International Conference on Multiple Comparison Procedures in Washington, D.C. and **Fangfang Sun** and **Erin Leatherman** to attend workshops on computer experiments at the Isaac Newton Institute for Mathematical Sciences in Cambridge, UK. ❖


Erin Leatherman and Fangfang Sun visit King's College in Cambridge, UK

Graduate Student Profiles

Sarah Koster

When I think how I became interested in Statistics I am always reminded of my very first Stats class – STAT 428 with Jackie Miller. At the time, I knew I loved math, but I didn't know what I wanted to do with it. Being in my junior year of undergrad, I was panicking that I had just a year left of school and I still had no clue what I wanted to do for the rest of my life. It didn't take long listening to Jackie's Zombie word problems before I realized I had found my niche. Just a year later, in the summer of 2009, I started my graduate studies toward earning an MAS degree with the OSU Department of Statistics.

Before starting graduate school, the one thing I dreaded most was teaching. I had never been a fan of public speaking nor I did I have much experience with it. As a math major, I was never required to speak in front of anyone and I could probably count on one hand the number of times I had to give a presentation in high school. How was I going to stand up in front of 30 people for 50 minutes straight when my longest presentation had only lasted 5 minutes? I will not lie – I hated teaching my first quarter. But teaching got easier little by little each quarter after. I came to love building relationships with my students and seeing the 'Aha!' moment in their faces when they finally mastered something. It is ironic that the one thing I dreaded most is what I now miss the most about graduate school.

This past March, I graduated a second time as a Buckeye and the very next day I started at Huntington National Bank as a Portfolio Risk Specialist. Within my first week, I was already pulling out my textbooks and applying what I had spent the previous two years learning to find solutions to REAL business problems! I have now been here for seven months and every day has confirmed that I made the right choice in choosing the OSU Statistics MAS program.

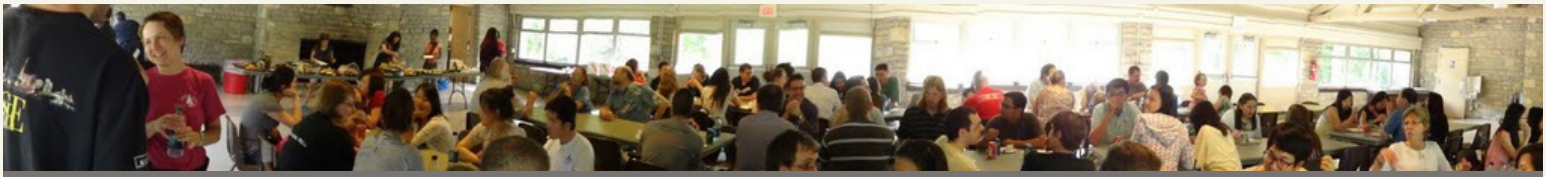
Thank you to all the professors, staff, and classmates. And of course…. Go Bucks! ❖

Matthias Katzfuss

After five semesters of undergraduate studies in Statistics at the University of Munich, Germany, I joined The Ohio State University Department of Statistics in the fall of 2007. My original intention was to stay at OSU for at most a year and finish my studies in Munich, but I quickly decided to get my master's degree at Ohio State. In spring 2008, when Dr. Noel Cressie offered me a research associateship on a NASA grant regarding the global mapping of CO_2, it wasn't hard to decide on staying at OSU for my PhD as well. After completing my dissertation on spatial and spatio-temporal modeling for very large datasets in June 2011, I returned to Germany to fulfill my two year home-residency requirement due to a Fulbright scholarship. During these two years, I have been and will continue to be working as a postdoc at the Department of Applied Mathematics at Universität Heidelberg in beautiful Heidelberg, Germany.

I tremendously enjoyed my time at the OSU Statistics Department. While its outer shell, Cockins Hall, has its fair share of problems (including severe heating and cooling issues in my office of three years), its core, the students, faculty, and staff, are what make the department great. The atmosphere was always so friendly that the department sometimes almost felt like one big family. I remember good times with fellow students at student gatherings and at football games. I had the pleasure to serve as president of the department's student body for two years. The professors make for an academically stimulating environment, with their diverse research interests and by offering a wide variety of classes, but they were also always up for a chat in the hallway. The grand finale of my time at OSU was a successful dissertation defense and winning the Whitney Research Award (together with Jenný Brynjarsdóttir) in June 2011.

I would like to thank everybody at the department for a great four years. A special thanks goes out to my advisor, Dr. Cressie, for his generous support, guidance, and mentorship. I hope to visit the department again some time, and to meet professors, current students, and alumni at many conferences around the world. ❖



Our Students, Faculty and Staff mingle at the 2011 Department Picnic

Departmental Awards

Congratulations to Our Award Winners!

POWERS TEACHING AWARDS

The Thomas and Jean Powers Teaching Awards are presented each year in two categories: (1) the best TAs teaching either recitations or lectures, and (2) an outstanding professor in the Department. These awards were instituted in 1986 through a generous gift to the Statistics Development Fund by Tom and Jean Powers.

The department is lucky to have a large number of excellent Graduate Teaching Associates. The selection of the best TAs is never an easy task, and there are always a number of extremely good teachers who are runners-up for the award. In 2010-11, the awards for best TA were presented to **Robert Ashmead**, **Michele Josey**, **Sungmin Kim**, **John Stettler**, and **Douglas Tirmenstein**. The faculty award was presented to Professor **Peter Craigmile.**

Matthias Katzfuss and Jenný Brynjarsdóttir, awarded the 2011 Whitney Research Award

UNIVERSITY FELLOWSHIPS

For 2010-11, single-year University Fellowships were awarded to **Brittney Bailey** from Messiah College, **David Kline** from Messiah College, **Brooke Rabe** from the University of Arizona, **Mark Risser** from Eastern Mennonite College, **Agniva Som** from the Indian Statistical Institute, **Jaime Speiser** from Elon College, **Yuzhou Tang** from The Ohio State University, **Jared Wasserman** from the University of the Sciences in Philadelphia, **Ran Wei** from Zhejiang University, and **Fangyuan Zhang** from Beijing Normal University. Two-year Distinguished University Fellowships were awarded to **Jing Li** from the University of Minnesota-Morris and **Elizabeth Petraglia** from the University of Notre Dame.

WHITNEY AWARDS

In 1992, Professor Emeritus Ransom Whitney and his wife Marian Whitney made a generous gift to the Statistics Department Fund to institute several awards for graduate students. They added to this gift in 2008, allowing us to increase the number of awards as our graduate enrollment increases. In 2010-11, there were a large number of deserving students and determining the best was difficult. The winner of the best consultant award in the Statistical Consulting Service was **Jiangyong (Matthew) Yin**. The awards for the best research associate was given to **Liang Niu**. The awards for best research leading to the PhD were awarded to **Matthias Katzfuss** and **Jenný Brynjarsdóttir.** We congratulate these students and thank them for their hard work.

CRAIG COOLEY MEMORIAL PRIZE

The Craig Cooley Memorial Prize for 2010-11 was awarded to **Josh Svenson**. Each year this award is presented to a graduate student in the department demonstrating exceptional scholarly excellence and leadership abilities. Craig embodied these two qualities throughout his graduate career. Tragically, he was killed just before receiving his PhD in 1996. To honor his memory the department created the Craig Cooley Memorial Prize. For additional information about contributing to this fund, please see page 15 of this newsletter.

OUTSTANDING STAFF AWARD

This award was instituted this year to recognize outstanding work by our staff. We are fortunate to have a superb group of staff in the Department of Statistics. This year's winner, determined by a vote of the Graduate students, is Patty Shoults.

INDUSTRIAL AND DEPARTMENTAL FELLOWSHIPS

Each year the Department is able to offer special recruitment fellowships to some of the very best new applicants to our graduate programs. These fellowships are funded through the generous support of sponsoring industrial organizations, for which the department is always grateful. The sponsoring organizations, their Fellowship stipend amounts and the 2010-11 student recipients are as follows:

Battelle Fellowships

An award in the amount of $5,000 was provided by Battelle. The 2010-11 recipient was **Elizabeth Petraglia** from the University of Notre Dame.

Capital One Fellowship

An award in the amount of $5,000 was provided by Capital One. The 2010-11 recipient was **Brooke Rabe** from the University of Arizona.

Lubrizol Foundation Fellowships

Seven awards were provided by the Lubrizol Foundation. The 2010-11 recipients of $1,500 awards were **Kevin Donges** from Miami University, **Jaime Speiser** from Elon College, and **Staci White** from Shawnee State University. The 2010-11 recipients of $3,000 awards were **Brittney Bailey** from Messiah College, **David Kline** from Messiah College, **Mark Risser** from Eastern Mennonite College, and **Zachary Thomas** from Otterbein College.

We appreciate the support from the Battelle, Capital One, and Lubrizol. ❖

Sincere Thanks to Our Donors

We wish to recognize those alumni, friends, students, staff, and faculty members who have helped the Department financially over the past year. Your donations, no matter the amount, make it possible to continue to attract, train, and reward our excellent graduate students. Not listed are the members of our faculty and staff who donated to the Department this year, as that would require giving an almost complete roster of the Department. Many thanks to the following donors:

Cockins Hall Renovation and Improvement Fund
Xiaoyi (Crystal) Dong
Marcie Naber
Ramzi Nahhas (donation in memory of Prof. Robert Bartoszynski)
Amy (Ruppert) Stark
Yuying Zhang
Jing Zhu

Craig Cooley Award Fund
Marcie Naber

Alumni/Friends & Gary Koch & Family Graduate Student Travel Award Fund
Darla DeJong
Richard DeJong
Edward Gbur Jr.
Carolyn Johnson Koch
Gary Koch
Jun Li
Xiuhong Li
Qing Liu
Youlan Rao
Christopher Sroka

Graduate Fellowship Fund
Tom Bishop
Victoria Bishop
Deborah Dukovic
Lin Fei
Weimin Gai
Kevin Hou
Greg Mack
Donald Turchany
Robert Vierkant

Rustagi Memorial Lectureship Fund
Madhu Anderson
Patrick Anderson
Carol Ordille

Statistics Support Fund
Patti Costello
Xiaoyi (Crystal) Dong
Juan Du
Mary Ellen (Smircich) Frustaci
Nader Gemayal
Agatha Clara Henry-Mabry
Douglas Holly
Howard Kaplon
Carolyn Johnson Koch
Gary Koch
Justin Kubatko
Xiao Lin
Charles Locke Jr.
Glenn Miller
Gary Phillips
Barbara Burton Potter
Randall Potter
Robert George Rashid
Gail Santner
John Skillings
Michael Starsinic
Rebecca Trempel
Neal Wallingford
Brian D. Wynne
Yonggang Yao
Shen Zhang

Thomas E. and Jean D. Powers Award Fund
Robert Abel
Parthena (Tena) Katsaounis

Whitney Endowed Fund
Hal Bogart
Walter Hoy
John Jacobowitz
Roberta Whitney Jacobowitz
Charles Locke Jr.
Charles Oprian
Maria Ines Pangilinan

Supporting Current and Future Students

As you can tell from the reports in this newsletter, we have an excellent group of graduate students in the Department. To continue to attract and support these students is, of course, expensive. For example, we pay for outstanding potential students to come visit the Department. We recognize excellence in teaching, research, consulting, and service by graduate students through annual awards. We support students traveling to present their work at national conferences. We ask you to consider helping support our current and future students through a contribution to one of the Departmental funds for graduate students:

http://www.stat.osu.edu/dept/giving

Craig Cooley Fund #06940-601434
Gary Koch Student Travel Fund #06940-480697
Graduate Fellow Fund #06940-310567
Powers Award Fund #06940-605898
Statistics Support Fund #06940-307669
Whitney Scholarship Fund #06940-607689

This is an excellent way for alumni to give something back to the Department. Your gift, in any amount, is important and appreciated. ❖

DEPARTMENT *of* STATISTICS
NEWS

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06940.011000.61801

Address Service Requested

CONGRATULATIONS TO OUR GRADUATES!

The following students earned degrees in the 2010-2011 academic year.

Master of Applied Statistics

SUMMER 2010
- Marko Samara
- Xin Yu

AUTUMN 2010
- Jared Lee Martin
- Chunhui Ren
- Yang Yang

WINTER 2011
- Emily A. Bayer
- Jin Ho Jung
- Sarah Elizabeth Koster
- Jun Li
- Shweta Singh
- Yaou Wang
- Lizhi Zhang

SPRING 2011
- Brooke Nicole Biller
- Yufang Cai
- Shuhong Guo
- Sanggyu Kang
- Jei Young Lee
- Joon Ho Lim
- Dylan Michael Stagner
- Chang Wang
- Yun Zhang
- Shi Zhao

Master of Science

SUMMER 2010
- Jonathan Ray Bradley
- Katherine Leigh Thompson
- Meng Wang
- Yufang Zhang

AUTUMN 2010
- Catherine Marie Albright
- Di Cao
- John Charles Christensen
- Durrel Lynn Fox
- John Robert Lewis

WINTER 2011
- Tian Chen
- Steven Russell Penzenik
- Taylor R. Pressler
- Johanna Waiyee Tam
- Hugh Minor Williams III

SPRING 2011
- Younathan Abdia
- Robert Douglas Ashmead
- Shasha Bai
- Jian Chen
- Nicole Ann Dobmeier
- Jonathan Franklin Joseph
- Michele Jeron Josey
- Katherine Leanne Sanders
- Ashley Marie Westra

Doctorate

SUMMER 2010
- Lori A. Hoffman
- Yushi Liu

AUTUMN 2010
- Candace Berrett
- Mallikarjuna Rao Rettiganti

SPRING 2011
- William F. Darnieder
- Joshua Svenson