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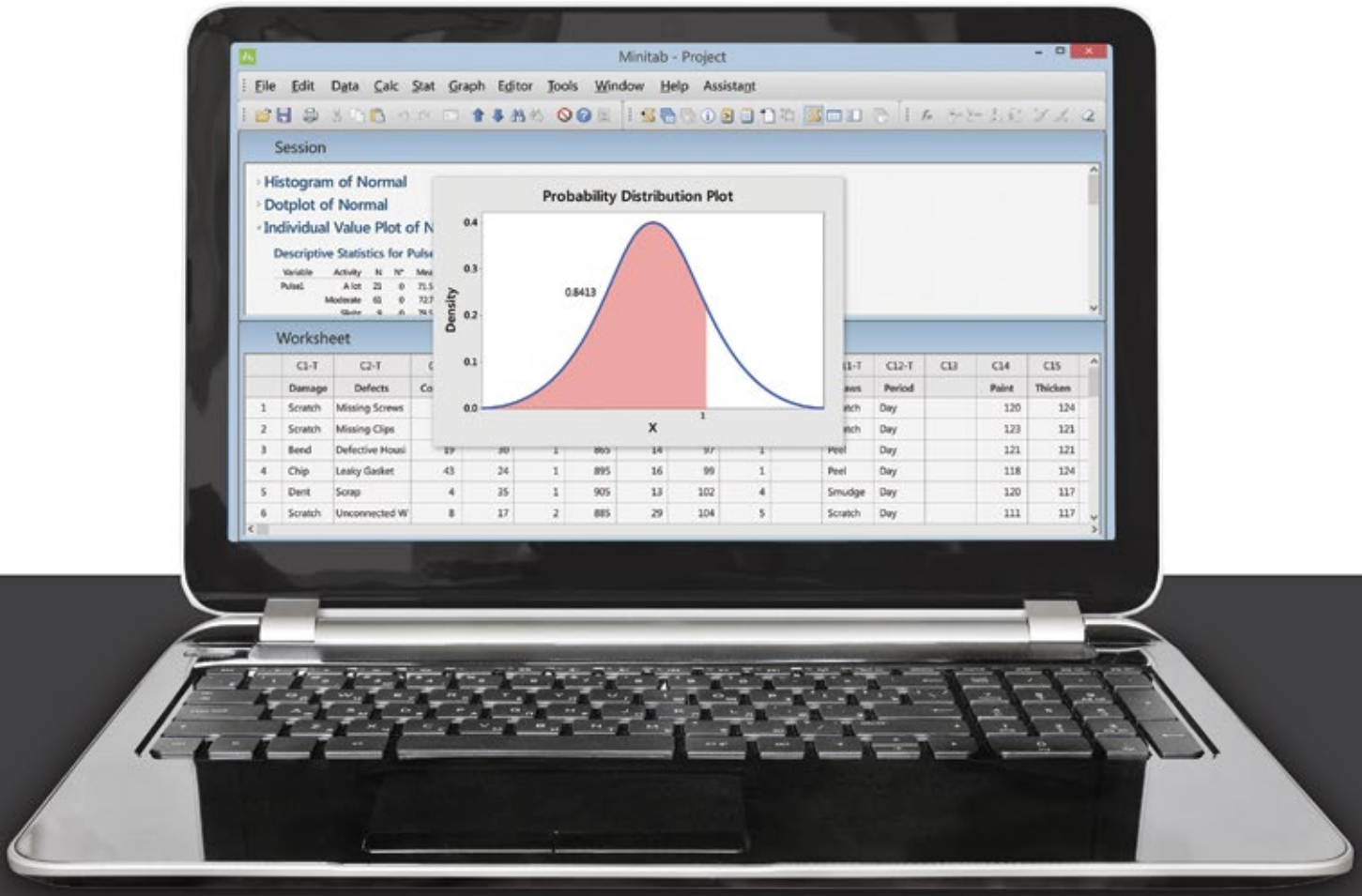

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AUGUST 2017 • ISSUE #482

Amstat News welcomes news items and letters from readers on matters of interest to the association and the profession. Address correspondence to Managing Editor, *Amstat News,* American Statistical Association, 732 North Washington Street, Alexandria VA 22314-1943 USA, or email *amstat@amstat.org*. Items must be received by the first day of the preceding month to ensure appearance in the next issue (for example, June 1 for the July issue). Material can be sent as a Microsoft Word document, PDF, or within an email. Articles will be edited for space. Accompanying artwork will be accepted in graphics file formats only (.jpg, etc.), minimum 300 dpi. No material in WordPerfect will be accepted.

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American Statistical Association
732 North Washington Street
Alexandria, VA 22314–1943 USA
(703) 684–1221
ASA GENERAL: *asainfo@amstat.org*
ADDRESS CHANGES: *addresschange@amstat.org*
AMSTAT EDITORIAL: *amstat@amstat.org*
ADVERTISING: *advertise@amstat.org*
WEBSITE: *http://magazine.amstat.org*

The American Statistical Association is the world's largest community of statisticians. The ASA supports excellence in the development, application, and dissemination of statistical science through meetings, publications, membership services, education, accreditation, and advocacy. Our members serve in industry, government, and academia in more than 90 countries, advancing research and promoting sound statistical practice to inform public policy and improve human welfare.

features

columns

STAT*tr@k* is a column in *Amstat News* and a website geared toward people who are in a statistics program, recently graduated from a statistics program, or recently entered the job world. To read more articles like this one, visit the website at *http://stattrak.amstat.org*. If you have suggestions for future articles, or would like to submit an article, please email Megan Murphy, *Amstat News* managing editor, at *megan@amstat.org*.

This column focuses on what statisticians do when they are not being statisticians. If you would like to share your pastime with readers, please email Megan Murphy, *Amstat News* managing editor, at *megan@amstat.org.*

This column is written for anyone engaged in or interested in statistical consulting. It includes articles ranging from what starting a consulting business would entail to what can be taught in a consulting course. If you have ideas for articles, contact the ASA's Section on Statistical Consulting publications officer, Mary Kwasny, at *m-kwasny@northwestern.edu.*

SIDEBAR

Lawrence Lesser of The University of Texas at El Paso repurposed Paul Simon's 1977 top-five hit "Slip Slidin' Away" to teach regression to the mean.

SLIP SLIDIN' TO THE MEAN

CHORUS: Slip slidin' to the mean,
slip slidin' to the mean:
when there's imperfect correlation,
you know you're slip slidin' to the mean.

Well parents have daughter or son—
their heights were all observed by England's
Francis Galton:
extreme parents he did see
had kids that regressed toward mediocrity!
(Repeat CHORUS)

And I know a teacher who gave high praise
to the students whose midterms were the highest A's;
those failing badly received rebuke—
but the next test showed those extremes were a
partial fluke!
(Repeat CHORUS)

And I know a rookie who made the All-Star team
and the cover of *Sports Illustrated* magazine.
You can imagine what the coach thinks
when the star has sophomore slump as if there was a jinx!
(Repeat CHORUS)

departments

Pat Hopfensperger, a director of the Wisconsin Mathematical Education Foundation and former ASA/NCTM Joint Committee chair, visited Odyssey Elementary School in Appleton, Wisconsin, to congratulate the school's two national winners, Rachel Zhu and Maya Lemery. See Page 26.

member news

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JSM offers a great opportunity to interact with others in the statistics field, ASA President Barry Nussbaum says.

Summertime and the Living Is …

Roll out those lazy, hazy, crazy days of summer

Those days of soda and pretzels and beer.

It's August, but despite what Nat King Cole may have thought, the days are hardly lazy for the statistics profession. Of course, the main event for me is the huge assemblage of statisticians at the Joint Statistical Meetings in Baltimore. I suspect you will be reading this either in the middle of, or just after the conclusion of, JSM. I hope it is, or was, a truly rewarding experience.

While the agenda is full of technical sessions, continuing education courses, workshops, committee meetings, section meetings, mixers, receptions, and more, it serves as the golden opportunity for me to interact with others in the field. This is the time when those people you have heard of, read about, purchased books by, or listened to are there in person. Meet the person, match the name with the face, discuss ideas, and forge ahead with new collaborations.

Of course, you can make a vacation around JSM. My late wife and I used to do exactly that. We would fly the three kids to Chicago, where their aunt and uncle would spoil them. I would attend JSM sessions, and Debbie would sight see (okay, me too.) It was truly a win-win-win situation.

This gathering, with all its different topic areas, always reminds me of John Tukey's famous line about the statistician getting to play in everyone's sandbox. This also reminds me of Lenore Skenazy's delightful opinion piece in the June 21 *Wall Street Journal*, "If You're a Kid, the Experts Want You to Have a Fun-Free Summer" (*https://goo.gl/Sehwov*). She cites Karl Neuman of the American Academy of Pediatrics, who said, "… [T]he risk of illness increases … digging wet sand." However, he adds, "Dry sand presents problems, too." The article also notes that the website KidsTravelDoc.com states that only with a lot of do's and don'ts is frolicking in the sand a healthy activity. This is attributed to the U.S. Environmental Protective (sic) Agency. So in addition to messing up summer and mangling the name of the EPA, they attribute this incorrectly to the EPA—my former workplace for more than 40 years. By the way, neither Skenazy nor I could find the EPA's caveats on sandbox activities. I'll stick with Tukey.

But back to JSM, I am reminded of a former Environmental Protection Agency (EPA) colleague, Ron Shafer. A few weeks before JSM 1993 in San Francisco, I was telling Ron this would be a huge assembly of thousands of statisticians. What would occur if the unthinkable happened: a major earthquake? (Just four years earlier, the World Series was interrupted by the major Loma Prieta earthquake moments before the third game was to start.) Without a moment's hesitation, Ron responded, "Ah, a return to certainty!"

Barry D. Nussbaum

I remember taking one of the courses offered, Rank Set Sampling. What impressed me was not only the quality of the instruction (Thank you, Dick Gilbert and Bimal Sinha.), but also the questions and interaction from the enrollees in the course. It was truly an interactive affair. Fondly, I also remember taking a metadata course from the late Ingram Olkin. Wasn't it wonderful how this elderly scholar was full of energy and so proficient in this new and burgeoning field?

I also remember the standing-room-only session regarding sports statistics with a speaker who had stalked general managers of several Major League Baseball teams to get a job doing statistical analysis for the club. Yes, this was the golden age of *Moneyball.* If you follow this column, you know my thoughts about statistics and baseball from the April issue. Incidentally, because I can't resist, *The Wall Street Journal* carried a story on the "new" strategy of the Houston Astros (*https://goo.gl/2eW8V9*). Apparently from 2012 through 2016, the Astros had more strikeouts than any other team—and by quite a margin. This year, with some acquired new players, they are last in strikeouts. So, what is the difference? The Astros now tell their players to hit a pitch if it looks good, thereby contradicting the conventional wisdom of working the counts and trying to tire out the pitchers. (This worked for the kind of ball I played where the pitchers were not that good, so waiting for a base on balls was not a bad suggestion.) But back to the majors, I could never really understand that conventional strategy since the relief pitchers are generally pretty good at what they do, so exhausting the starter may not yield much. Looks like it is working. As I write this, the Astros are also leading the majors in home runs.

I also want to throw a pitch (Catch the segue?) to activity in JSM committees and sections. In prior years, I have served as both the program chair and general chair of the Statistics and the Environment Section. I also served five years as chair of the Statistical Partnerships Among Academe, Industry, and Government (SPAIG) Committee. It is quite true that the more you put into ASA efforts, the more you get out. It is truly rewarding to be an active participate in the activities of the sections, chapters, and committees. So, get involved and help your profession grow!

As you might imagine, arranging and coordinating all the activities of JSM require considerable work. Hats off to the ASA staff who does this so well year after year. There are an awful lot of i's to dot and t's to cross, and the meetings staff stay on top of it all. My thanks to them for all these efforts.

But it is not just the ASA that keeps busy in summer. I have been fortunate enough to travel to various campuses to see firsthand some excellent activities that go on during the (not so) off time. In June, I visited the University of Iowa and addressed the Iowa Summer Institute in Biostatistics. This is a research education program funded by the NIH with the goal of exposing undergraduate and graduate math majors to the field of biostatistics. The program involves having students from universities that may not even have formal statistics departments come to Iowa City to be exposed to biostatistics topics that spur their interest. I understand there are similar NIH-supported programs at five other universities.

I also attended a STEM boot camp at George Mason University. The students were high-school graduates with analytical aptitude about to enter their undergraduate studies at Mason. The boot camp exposed them to a glimpse of what exciting areas exist in the STEM fields. It was my personal pleasure to present some of the areas in which proper statistical analysis made an impact on health. I hope I won over some students in the statistical direction.

At a recent trip to Purdue University, I observed the Statistics Living-Learning Community program, which is geared toward undergraduate sophomores. One told me he can hardly wait for summer so he will have more time for research. Hmmm, why let course time bog you down? Clearly, priorities have changed since my sophomore summer. Although I was a waiter that summer and suspect I learned more about people and human nature than could ever be taught in a class or by doing research. Hardly a wasted summer for me!

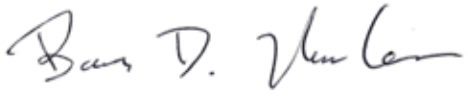
And, of course, many of you may have attended the International Statistical Institute meeting in Marrakech, Morocco. As I write this, I am preparing to go there, but as you read this, I will already have been there! So what tense do you use to describe this?

Enjoy summer, but keep busy.

Roll out those lazy, hazy, crazy days of summer

Dust off the sun and moon and sing a song of cheer

Significantly forward,



Update from the Division of Mathematical Sciences

Michael Vogelius, DMS Director; Tie Luo, DMS Deputy Director; and Henry Warchall, DMS Senior Advisor

With this article, the management team of the Division of Mathematical Sciences (DMS) at the National Science Foundation would like to provide an update about recent program activities from DMS and an outlook for the future. DMS plays a critical role in providing about 64 percent of all U.S. federal support for basic research at the frontiers of discovery in the mathematical sciences. DMS also supports training through research involvement of the next generation of mathematical scientists, conferences and workshops, and a portfolio of national mathematical sciences research institutes.

Here we call attention to four recent funding opportunities we find particularly newsworthy. Two are calls for development of large-scale interdisciplinary research centers/institutes that involve collaboration between mathematical scientists and researchers from other scientific areas, and two are calls for activities to enhance and broaden graduate education in the mathematical sciences.

Transdisciplinary Research in Principles of Data Science

The Transdisciplinary Research in Principles of Data Science (TRIPODS) program aims to bring together the statistics, mathematics, and theoretical computer science communities to develop the theoretical foundations of data science through integrated research and training activities. Phase I will support the development of small collaborative institutes. Phase II (to be described in an anticipated future solicitation, subject to availability of funds) will support a smaller number of larger institutes, via a second competitive proposal process. All TRIPODS institutes will involve significant and integral participation by all three communities.

The TRIPODS program is a part of the NSF initiative "Harnessing Data for 21st-Century Science and Engineering," one of the "Ten Big Ideas for Future NSF Investments." The TRIPODS program is co-funded equally by the NSF Division of Computing and Communication Foundations (CCF) and DMS. These investments are augmented by funds from the initiative "Growing Convergent Research at NSF" and the Office of Multidisciplinary Activities of the Mathematical and Physical Sciences Directorate.

It is the hope of DMS that the TRIPODS program will emphasize to academic institutions forming programs in data science that such efforts naturally involve computer scientists, mathematicians, and statisticians. The TRIPODS Phase I proposals are under review, and it is anticipated that up to 12 three-year awards of approximately $500,000 per year will be made.

NSF-Simons Research Centers for Mathematics of Complex Biological Systems

The NSF-Simons Research Centers for Mathematics of Complex Biological Systems is a new program that expects to fund centers of five-year duration from a one-time call for proposals.

The program focuses on research to understand emergent properties in biological systems. It welcomes proposals to establish centers at which sustained collaborations are facilitated between mathematical scientists and biologists to develop novel mathematical, computational, and statistical approaches to advance fundamental understanding of how and why emergent properties arise in molecular, cellular, and organismal systems. The program strongly encourages projects aimed at developing predictive frameworks for understanding phenotype.

Projects are expected to include plans for significant effort in cross-disciplinary training of cohorts of future scientists, such as postdoctoral research associates, graduate students, and/or undergraduates from mathematical sciences and the areas of the biological sciences that are the focus of this activity. Each center also is envisaged to conduct convening activities, including short-term and/or long-term visitors' programs, workshops, and/or outreach activities.

Resources

Division of Mathematical Sciences (DMS) Programs
https://goo.gl/C6YQLM

Transdisciplinary Research in Principles of Data Science (TRIPODS)
https://goo.gl/WK7MB81

Ten Big Ideas for Future NSF Investments
https://goo.gl/viG2np

NSF-Simons Research Centers for Mathematics of Complex Biological Systems
https://goo.gl/pSCKKg

Mathematical Sciences Graduate Internships
https://goo.gl/fgByPJ

Improving and Supporting the Transition to Graduate School in the Mathematical Sciences
https://goo.gl/kfbV72

DMS Mathematical Sciences Research Institutes Update
https://goo.gl/RdL5zv

Annual Survey of the Mathematical Sciences
https://goo.gl/ZdJfjd

NSF FY2018 Budget Request to Congress
https://goo.gl/YUA9xG

Mathematical Sciences Research Institutes
https://goo.gl/6EL9DS

The NSF-Simons Research Centers for Mathematics of Complex Biological Systems program is part of the NSF initiative "Understanding the Rules of Life: Predicting Phenotype," another of the "Ten Big Ideas for Future NSF Investments." The program is co-funded equally by the Simons Foundation and NSF, with 30% of the total investment furnished by DMS and 20% furnished by the NSF Directorate for Biological Sciences.

Letters of intent and proposals are due August 10 and September 29, respectively. It is anticipated that three centers devoted to collaboration between mathematicians, statisticians, and biologists will be funded. Each center will be funded for a five-year duration with an annual budget of $2 million.

Mathematical Sciences Graduate Internships

By means of this activity, DMS aims to provide opportunities to enrich the training of doctoral students in the mathematical sciences through summer research internships in nonacademic settings. DMS has partnered with the Oak Ridge Institute for Science and Education (ORISE), which is managed by Oak Ridge Associated Universities (ORAU) for the Department of Energy, to establish the Mathematical Sciences Graduate Internships program.

The immediate goal of the program is to arrange and support internships for approximately 40 students annually, primarily at the U.S. National Laboratories. The program is intended to introduce doctoral students in the mathematical sciences to important applications of mathematical or statistical theories outside of academia. The internships are aimed at students who are interested in learning about such applications, regardless of whether they plan to pursue an academic or nonacademic career.

Not only will interns gain experience in the diverse uses of advanced mathematical tools at national laboratories, they will also become aware of the additional skills required for success in employment outside the traditional academic setting. The program is equally intended for students in pure and applied areas. It is planned to continue this collaboration with ORISE in 2018.

Improving and Supporting the Transition to Graduate School in the Mathematical Sciences

The NSF Directorate for Education and Human Resources (EHR) and DMS in collaboration invite proposals for projects designed to encourage and prepare U.S. students to pursue and succeed in graduate doctoral study in the mathematical sciences. Particular emphasis is placed on broadening participation of students from under-represented populations, including racial/ethnic groups under-represented in mathematics and statistics, individuals with disabilities, and women.

The activity aims to support projects that are scalable to serve large numbers of students without large increases in cost and that are sustainable, that is, have continued impact without ongoing large influxes of grant funding. Projects are expected to involve mathematical sciences research as part of student training and/or educational research that produces new knowledge to help the community understand for whom and under what circumstances proposed activities are effective in preparing a diverse population of students to be successful in graduate school.

About These New Initiatives

DMS considers the first two activities to be parts of the DMS research institutes portfolio, which constitutes approximately 12% of the annual DMS investment. These new opportunities represent the continued evolution of the DMS institute portfolio, which the division aims to keep current, dynamic, and responsive to emerging needs of the mathematical sciences community. Both new programs were developed in close consultation with the communities involved, in particular through workshops that provided insight into current activity in these areas and perceived future needs. Both new programs are centered on an intellectual partnership between the mathematical sciences and another discipline, matched by significant financial investment from the other disciplinary partner. This arrangement reflects the worth of the interdisciplinary activity from a scientific viewpoint, in that it certifies the importance of these activities to both disciplines, and it also greatly leverages DMS investments.

DMS considers the last two activities to be parts of the DMS workforce program portfolio, which constitutes approximately 10% of the annual DMS investment. These new opportunities address two distinct community needs in support of the development of the next generation of mathematical scientists.

First, employment data show the majority of mathematical sciences PhD recipients take employment other than conventional academic tenure-track positions, yet many U.S. graduate programs in the mathematical sciences do not provide students with needed information about potential nonacademic career paths. The Mathematical Sciences Graduate Internships program is an early step toward raising doctoral students' awareness of potential rewarding nonacademic careers.

Second, despite substantial efforts by the mathematical sciences community and investment by funding agencies, current data indicate both the percentage of women and percentage of students from under-represented groups entering doctoral programs and receiving doctoral degrees in the mathematical sciences have remained relatively constant since 2004, and these levels are well below the representation of these groups in the general population. The activity in Improving and Supporting the Transition to Graduate School in the Mathematical Sciences aims to catalyze cost-effective community projects based on proven techniques to address this under-representation.

Outlook for the Future

The congressional appropriation for the fiscal year 2017 budget had not been finalized. The expected fiscal year 2017 budget for DMS is $233,512,000, which represents a small decrease of approximately $400,000 from the 2016 level. The president's fiscal year 2018 budget request to Congress for the NSF will result in a decrease in the DMS budget of approximately $24,000,000, roughly a 10% reduction. The highest priorities for DMS in this challenging budgetary climate are to maintain, to the extent possible, investments in its core activities, namely the disciplinary programs that fund unsolicited proposals for research by individual investigators and the research institutes portfolio.

Looking further into the future, the Mathematical Sciences Research Institutes program will hold an open competition [in fiscal year 2019]. Proposals are invited for new institute projects from U.S. sites, as well as renewal proposals from any of the currently supported U.S.-based Mathematical Sciences Research Institutes. Awards from this competition are anticipated to begin in fiscal year 2020. DMS is committed to maintaining investment in its research institutes portfolio at a level of 12–14% of the total DMS investment over the long term. ■

Conference participants surround Adrian Coles, a statistical research scientist at Duke Clinical Research Institute, during StatFest 2016.

StatFest 2017 Will Be Held in Atlanta

Emory University Rollins School of Public Health to Host

From left: Rodrigue Djikeuchi, Turayo Tijani, Alexandria Hinds, Dana Browne, Jeffen Stubbs, Paulin Yannick Mbiakeu Ngueamba, and Adrian Coles attended StatFest 2016.

StatFest 2017—a free one-day event aimed at encouraging undergraduate students from under-represented groups to consider graduate studies and careers in the statistical sciences—will be held September 23 in Atlanta, Georgia. This will be the 17th annual StatFest conference, which rotates throughout the country to cover different geographic regions.

StatFest includes keynote addresses from noted statisticians that motivate how statistics and data science are being used to extract meaning from data. The program also includes interactive panels on statistics careers in industry, government, and academia, along with a discussion for students about the graduate student experience. Undergraduates can present posters on quantitative or computational research projects or related work. Multiple opportunities are built into the program to allow participants to meet each other, interact, and network.

Conference participants take a break during StatFest 2016.

The conference is an ongoing initiative of the American Statistical Association through its Committee on Minorities in Statistics. The committee's efforts have been focused on increasing participation and inclusion of U.S. students in graduate programs in the statistical sciences and supporting these graduates as they move into the workforce and throughout their careers. Ensuring that the statistics profession reflects the diversity of society is one of the ASA's strategic planning goals.

StatFest 2017 will be hosted by the department of biostatistics and bioinformatics at the Emory University Rollins School of Public Health. Emory University is a top-ranked research university. The biostatistics and bioinformatics department works to improve methodological approaches and carry out collaborative research with a focus on infectious diseases, analysis of large-scale epidemiologic studies, next-generation sequencing, the analysis of biomedical imaging data, and the design and analysis of clinical trials.

Committee chair and Emory biostatistics professor Reneé Moore says, "StatFest brings the community together to demonstrate the excitement of statistics and the opportunities that students have to make sense of the world around them via data. We're looking forward to hosting this event at Emory this fall."

Co-organizer Jesse Chittams of the University of Pennsylvania added, "StatFest is important because it brings interested undergraduates together with established professionals, academic leaders, and current graduate students to help understand routes for success in the field."

More than 100 participants attended last year's event at Howard University: approximately 7% were high-school students; 52% undergraduate students; 14% graduate students; and 27% professionals from academia, government, or industry.

While the conference is free, registration is required (see *http://tinyurl.com/statfest*). Contact Moore at *renee.moore@emory.edu* or Chittams at *chittams@nursing.upenn.edu* with questions or for information regarding sponsorship. ■

MORE ONLINE
Register for StatFest 2017 at *http://tinyurl.com/statfest.*

JBES HIGHLIGHTS

Editor's Introduction: Regime Switching and Threshold Models

Kung-Sik Chan of the University of Iowa, Bruce E. Hansen of the University of Wisconsin-Madison, and Allan Timmermann of the University of California, San Diego

This special issue of the *Journal of Business & Economic Statistics* (April) on regime switching and threshold models is motivated by the mounting empirical evidence of important nonlinearities in regression models commonly used to model the dynamics in macroeconomic and financial time series. Commonly cited examples include the very different behavior of second moments for many macroeconomic time series before and after the Great Moderation in the early eighties, the different behavior of U.S. interest rates during the Federal Reserve's Monetarist Experiment from 1979–1982, and the behavior of a variety of risk indicators during the more recent global financial crisis. These are episodes that can be difficult to model in the context of standard linear regression models.

The key difference between Markov switching models and threshold models is that the former assume that the underlying state process that gives rise to the nonlinear dynamics (regime switching) is latent, whereas threshold models commonly allow the nonlinear effect to be driven by observable variables but assume the number of thresholds and the threshold values to be unknown. However, it is often overlooked that the general formulation of the threshold model includes the Markov switching model. Thus, these two classes of models share many common features. From an econometric perspective, both classes of models are affected by the presence of unidentified parameters under the null, which poses challenges to inference, including the number of thresholds (or regimes) and their location. Empirically, both types of models can, by design, allow for discrete, nonlinear effects.

The papers brought together in this special issue highlight both similarities and differences for threshold- and regime-switching models, offering many novel insights along methodological, computational, and empirical lines.

Luc Bauwens, Jean-Francois Carpantier, and **Arnaud Dufays**, in "Autoregressive Moving Average Infinite Hidden Markov Switching Models," study a class of Markov switching models in which regime switches only affect some parameters, while other parameters remain the same across regimes. Limiting regime switches to a subset of the parameters can lead to simpler models with fewer unknown parameters and better out-of-sample forecasting performance. In particular, the authors propose to decouple the regime switching dynamics for the mean and variance parameters.

The methodology—developed by Bauwens, Carpantier, and Dufays—allows the number of regimes to be determined as part of the estimation process and so has no need to use extraneous criteria for selecting the number of regimes. Detailed empirical applications to quarterly U.S. GDP growth and monthly U.S. inflation show that the new class of "sticky infinite hidden Markov switching autoregressive moving average" models can lead to better forecasts than more conventional models. These findings are corroborated on a set of 18 additional macroeconomic variables.

In their paper "Forecasting Macroeconomic Variables Under Model Instability," **Davide Pettenuzzo** and **Allan Timmermann** compare a range of methods in common use in macroeconomic forecasting for handling parameter instability. Specifically, the paper focuses on comparing and

contrasting approaches that assume small but frequent changes to the model parameters (time-varying parameter models) versus models that assume rare, but large (discrete) breaks to the model parameters. The paper considers breaks in the parameters of both the first and second moments of the modeled process and studies their impact using predictive accuracy measures that focus on either the conditional mean or the entire probability distribution of the outcome.

In an empirical out-of-sample forecasting exercise for U.S. GDP growth and inflation, the authors find that models that allow for parameter instability generate more accurate density forecasts than constant-parameter models. Conversely, such models fail to produce better point forecasts. Overall, a model specification that allows for both time-varying parameters and stochastic volatility is found to perform best. Model combination methods also deliver gains in the performance of density forecasts, but fail to improve on the predictive accuracy of the time-varying parameter model with stochastic volatility. These results suggest that accounting for model instability can deliver better probability forecasts for key macroeconomic variables, whereas gains in predictive accuracy for traditional point forecasts are harder to come by.

Jesus Gonzalo and **Jean-Yves Pitarakis**, in "Inferring the Predictability Induced by a Persistent Regressor in a Predictive Threshold Model," introduce a predictive regression model with threshold effects and use it to construct tests that have power to detect episodic predictability arising from a persistent predictor. The null hypothesis being tested in the paper is one of no predictability versus the alternative of predictability triggered by threshold effects associated with a particular predictor variable. The tests developed are easy to implement and robust to possible threshold effects for auxiliary predictors not of interest to the forecaster. Moreover, the proposed test statistic is robust to the presence of certain unidentified nuisance parameters. An empirical application to predictability of stock market returns by means of valuation ratios finds evidence that the predictive power of these variables is stronger around recessions and reveals state-dependence in return predictability.

Kung-Sik Chan, in "Testing for Threshold Diffusion," studies continuous time diffusion processes that assume piece-wise linear drift and diffusion terms and develops a test for threshold nonlinearities in the drift of the process. In particular, Chan develops a quasi-likelihood test under the assumption that the diffusion term is constant, thus side-stepping the problem that, in general, the functional form of the diffusion term is unknown. A test for a single threshold is shown to have an asymptotic null distribution, which is a distribution of a functional of centered Gaussian processes. Chan develops ways to efficiently compute the p-value of the test statistic by bootstrapping its asymptotic null distribution. He also shows that the test statistic is consistent, derives its local power function, and extends the test to allow for multiple thresholds. Finally, simulations and empirical analysis of the term structure of U.S. interest rates are used to demonstrate the performance and usage of the test statistic.

Bruce Hansen, in "Regression Kink With an Unknown Threshold," develops methods for estimation and inference in regression kink models that can have an unknown threshold. The class of regression kink models explored are threshold regressions required to be everywhere continuous, but can have a kink at an unknown threshold. Hansen develops a toolkit for inference and estimation, including ways to test for the presence of the threshold and for estimating model parameters and conducting inference on the regression parameters and, more broadly, on the regression function. Inference on the regression function is shown to be non-standard due to the nondifferentiability of the regression function with respect to the model parameters. Empirically, the paper applies its methods to the study of the possibly nonlinear (threshold) relationship between growth and debt using a long-span time-series for the United States.

Young-Joo Kim and **Myung Huan Seo** develop a procedure for testing for jumps in smooth transition processes in the paper, "Is There a Jump in the Transition?". The null model under the proposed test methodology is a threshold regression, while the alternative model is a smooth transition model. To conduct the test, the authors develop the asymptotic distribution of a quasi-Gaussian likelihood ratio statistic. The asymptotic distribution is defined as the maximum of a two-parameter Gaussian process that has a non-zero bias term. Kim and Seo show that asymptotic critical values can be tabulated and

MORE ONLINE

View the entire special issue online at *www.tandfonline.com/toc/ubes20/current.*

these depend on the transition function employed. Empirical critical values can be computed through simulations. The authors evaluate the finite sample performance of the test by means of Monte Carlo simulations and provide an empirical illustration through a model for the dynamics of racial segregation within cities across the United States.

The paper, "Sharp Threshold Detection Based on Sup-Norm Error Rates in High-Dimensional Models," by **Laurent Callot, Mehmet Caner, Anders Bredahl Koch**, and **Juan Anders Riquelme** develops a high-dimensional threshold regression model. The authors propose a new threshold-scaled Lasso estimator suitable for this class of models. The authors' main theoretical contribution is a new sup-norm bound on the estimation error. This bound can be used to provide sharper insights into variable selection properties. The authors also provide an empirical investigation into the impact of debt on GDP growth using a multi-country data set.

The paper, "Status Traps," by **Steven Durlauf, Andros Kourtellos**, and **Chih Ming Tan** is an empirical application of threshold regression methods to study intergenerational mobility. The authors explore nonlinearities in children's outcomes based on parental education and skills. The uncovered threshold processes imply persistent dynastic effects, which are interpreted as "status traps." The empirical investigation is conducted with three distinct U.S. data sets (the PSID, NLSY, and administrative data), and the consistent findings across these data sets indicate the threshold effects are quite robust.

Biqing Cai, Jiti Gao, and **Dag Tjostheim**, in "A New Class of Bivariate Threshold Cointegration Models," study nonlinear cointegration effects in the context of cointegrated vector autoregressive processes with threshold effects. The paper only imposes cointegration between the processes outside a compact region and shows cointegrating parameters converge at the conventional rate (T). In addition, the authors establish a faster convergence rate for the estimators of the remaining in the cointegrated region ($T^{1/2}$) than in the non-cointegrated region ($T^{1/4}$). The authors study the finite sample properties of the estimators in a Monte Carlo simulation. In an empirical application to a two-state bivariate model consisting of the federal funds rate and the three-month treasury bill rate, the authors show the cointegrating coefficients are identical across regimes, while the coefficients determining the short-run dynamics differ across regimes.

In "On Mixture Double Autoregressive Time Series Models," **Quodong Li, Qianqin Zhu, Zhao Liu**, and **Wai Keung Li** study a class of mixture double autoregressive models whose mixing probabilities are allowed to vary over time. Double autoregressive processes allow autoregressive dynamics to affect both the conditional mean and the conditional variance as the heteroscedasticity of such processes are driven by past squared values of the process. Such processes resemble autoregressive models with ARCH dynamics. Li, Zhu, Liu, and Li establish stochastic properties for this class of processes, including conditions guaranteeing the existence of their moments. Further, they discuss methods for maximum likelihood estimation and inference with particular attention to the logistic mixture double autoregressive model. A simulation study and empirical example are used to illustrate the properties of the proposed model.

In the paper, "Inference for Heavy-Tailed and Multiple-Threshold Double Autoregressive Models," **Yaxing Yang** and **Shiqing Ling** develop methods for conducting inference on a class of multi-threshold double autoregressive models that can have heavy tails. Specifically, the authors establish consistence and convergence properties of the estimators of the thresholds. Other (nonthreshold) parameter estimators are shown to be asymptotically normal. Methods for determining the number of thresholds and diagnostic tools are developed in the paper. Finally, Yang and Ling illustrate their approach in an empirical application for daily crude oil prices.

In "Threshold Estimation via Group Orthogonal Greedy Algorithm," **Ngai Hang Chan, Ching-Kang Ing, Yuanbo Li**, and **Chun Yip Yau** develop a computationally efficient algorithm for estimating a self-exciting threshold autoregressive model with known autoregressive order and delay, but unknown number of thresholds. It is a three-step procedure that first uses a group orthogonal greedy algorithm (GOGA) to compute a solution path for screening potential thresholds, then applies a new high-dimensional information criterion and trimming procedure to eliminate spurious thresholds. The proposed method is shown to achieve consistent estimation of the thresholds at the rate of convergence, where is the sample size. Simulation experiments reported in the paper indicate the GOGA outperforms the group LASSO for estimating the thresholds. The authors illustrate their approach by revisiting the analysis of the U.S. real GNP data. ■

ASA EARLY CAREER PROFILES:

Bachelor's-Level Graduates in Statistics and Data Science

Organized by the ASA Section on Statistical Education

What can you do with an undergraduate degree in statistics or data science? Take a look at what these individuals are doing. They are employed at the early stages of their careers after graduating from a bachelor's degree program that included training in statistics or data science. Other profiles are available at *http://stattrak.amstat.org/2017/01/01/early-career-profiles.*

Kurt Bembridge

Statistics and Data Science at Work

I do not analyze data in my job, but data science is used to track children's progress and monitor students.

Favorite Undergraduate Statistics Class

Econometrics and Numerical Analysis

Advice for Students

Learn how to use software in your classes. Although software isn't a main focus of most undergraduate students, please learn SAS, R, Java, Python, or any language.

BIOGRAPHY

Undergraduate School: Howard University

Graduation Year: 2006

Position: Para-Professional

Company: District of Columbia Public Schools

Sector: Government/Education

BACKGROUND

MS in data analytics in progress

JOB DESCRIPTION

Assist teachers with daily classroom needs such as completing attendance, communicating with parents, and maintaining a positive and clean classroom environment.

Lead small-group and individualized educational activities with students.

Provide support with behavior management.

Engage students throughout various times of the day with multiple ways to access information and learning.

Sergio E. Betancourt

BIOGRAPHY
Undergraduate School: University of Toronto

Graduation Year: 2015

Position: Senior Technology Analyst

Company: Citigroup

Sector: Financial/ Banking

BACKGROUND
HBSc with Distinction from the University of Toronto, St. George—Specialization in statistical sciences, major in mathematics, and minor in economics

Interests and extracurriculars include being a data strategist with Toronto's Hispanotech Professional Association (March 2017 – Present), a dance performer with Steps Dance Studio's Performance Team (January 2016 – Present), and a steering committee member of Citilife Canada (November 2015 – Present)

Twelve-month internship at Ericsson Canada as a pricing and bid and proposal coordinator (August 2013 – August 2014)

Extracurricular involvement while in school: President of the Statistical Sciences Association of Students (September 2014 – May 2015), co-president of the Economics Students' Association (September 2012 – May 2014)

JOB DESCRIPTION
I have been a technical applications and business analyst for different technology groups at Citigroup, currently Equities Electronic Execution. Before this, I worked with Global Data Services and Prime Finance. My team and I provide the tools and capabilities to access markets, execute efficiently, and trade algorithmically and electronically. The technologies I use the most are MongoDB, Python, UNIX, Perl, R, Elasticsearch, VBA, SQL, ITRS Geneos, and Cloud.

Statistics and Data Science at Work

The focus of my role is on data availability, integrity, and fast transmission. Although this does not require an extensive knowledge of statistical practices, it relies on technology and algorithms to enable movement and preserve integrity. My background in statistics and mathematics has proven incredibly useful in picking up technologies and programming quite quickly—I script with ease and deal with complex systems daily.

Favorite Undergraduate Statistics Class

STA490–Statistical Consultation, Communication, and Collaboration: This class provided valuable exposure to the role of a statistician in experiment design and analysis. We collaborated with investigators from other departments to perform both elementary and sophisticated analysis. This meant access to a real-world data set, as well as a number of issues that come up in empirical research.

Moreover, the communication techniques we learned, and the opportunity to employ them through numerous presentations, improved our ability to digest complex issues quickly and communicate knowledge using different levels of complexity.

STA414–Statistical Methods for Machine Learning and Data Mining: Valuable course on the mathematical and statistical foundations of data mining and pattern recognition. Not only was this course incredibly challenging and stimulating, but also useful in understanding how to practice statistics in the modern world. We undertook several eye-opening projects that shed light on the foundations of some of the modern world's greatest advancements.

Advice for Students

- Do not neglect your extracurricular activities, and pick up as much computer science while you are still in school.
- Try to get as much professional and research experience while in university to motivate your journey into the statistical sciences.
- Take up classes and projects outside of the quantitative sciences to increase your creativity (vital in all aspects of life) and adaptability.

Dylan Quantz

BIOGRAPHY
Undergraduate School: Pomona College
Graduation Year: 2016
Position: Baseball Operations Trainee
Company: Atlanta Braves
Sector: Sports

BACKGROUND
MS in data analytics (in progress)

Statistics and Data Science at Work

Analytics

Favorite Undergraduate Statistics Class

Clinical Trials

Advice for Students

If you want to work in sports, don't ever give up. It may seem hard to get your foot in the door, but all it takes is that one team to take a chance on you.

Elizabeth Miller

BIOGRAPHY

Undergraduate School: Florida State University

Graduation Year: 2014

Position: Senior Analyst

Company: Momentum Consulting Corp.

Sector: Consulting

BACKGROUND

I graduated with three degrees: Statistics (BS), Actuarial Science (BS), and Applied Mathematics (BS). I also interned with an agriculture biotechnology company in the R&D department, serving as a data scientist, in Research Triangle Park, North Carolina.

JOB DESCRIPTION

Versatile business intelligence professional who uses her strong communication skills and hands-on experience working with various data analysis projects to provide effective results for clients

Proficient in requirements gathering, data analysis, data quality assessment, machine learning, database management, and statistical analysis

Bilingual (English/Spanish) and comfortable working with people at all levels of a business, from technical teams to key stakeholders

Statistics and Data Science at Work

Depending on the nature of the project, I use statistics building models that serve as the business solution. I also provide education to the client regarding statistical analysis in an applied manner.

Favorite Undergraduate Statistics Class

Time Series was my favorite course, partially due to how engaging the professor was, but also to how much application I could see with it besides gaining theoretical knowledge.

Advice for Students

Ask questions always. Do not limit yourself when applying for internships or jobs, even though you may not have job experience or the desired education level. It takes hard work and persistence to get either an internship or a job, and that does not end once you get it, either. Also, immerse yourself in learning new technologies and language; you become more marketable in the field.

TELL US MORE

If you are a bachelor's-level statistician interested in sharing your profile, please visit *www.surveymonkey.com/r/careerprofiles.*

Eunice Yeh

BIOGRAPHY

Undergraduate School: The University of North Carolina at Chapel Hill

Graduation Year: 2015

Position: Statistical Analyst/Programmer

Company: Harvard T.H. Chan School of Public Health

Sector: Health/Medicine

BACKGROUND

Bachelor of Science in Public Health from UNC Gillings School of Global Public Health

Biostatistics major, Mathematics minor

Relevant UNC courses: Linear Algebra, Real Analysis, Problem Analysis and Algorithm Design in Scientific Programming, Data Management in Clinical Trials, Statistical Computing, Probability and Inference, Regression Analysis, Sample Survey Methods

Assisted lab at UNC Department of Anesthesiology as a statistical analyst and SAS programmer

College Reading and Learning Association certified tutor in math and science at the University Tutorial Center at NC State University

JOB DESCRIPTION

SAS programming, Unix environment, ODS RTF outputs, clinical trials, AIDS/HIV research

Statistics and Data Science at Work

My job is to provide statistical analysis with SAS programming support for studies involved in the AIDS Clinical Trials Group. This includes all aspects of work, from prediction models during study development through monitoring; descriptive statistics and hypothesis testing during interim, primary, and secondary analyses; and inference during the final dissemination of results.

Favorite Undergraduate Statistics Class

Intro to Biostatistics (BIOS500H) was my absolute favorite within my undergraduate experience at UNC. On top of being the optimal transitional course from the general education courses during my first years to the core requirements for my biostatistics degree, it was also a unique honors-level course that implemented the flipped-classroom style of learning. My professor presented the course materials in a very organized manner that supported our understanding of each topic and its relation with one another and then challenged our understanding not only through practice problems by hand, but also by programming in SAS. We left the course with fundamental knowledge of all statistical concepts useful in public health research and were prepared to dive deeper into each concept through the subsequent biostatistics courses in the program.

Advice for Students

You will find that statistics can be relevant to any career field you seek. As long as you are capable of generating and interpreting statistics, you will be able to exceed in any field of interest. ■

Photos by Jenny Saville

Ben Saville competed in "America Ninja Warrior" in San Antonio. He works for Berry Consultants and is a fitness enthusiast outside of work.

Sons Inspire 'Stats Ninja' Run at 'American Ninja Warrior'

Ben Saville is a statistical scientist for Berry Consultants, where he specializes in the design of innovative Bayesian adaptive clinical trials. Away from work, he is a fitness enthusiast who loves to tackle obstacle courses. He recently competed in NBC's television reality show "American Ninja Warrior" in San Antonio as the "Stats Ninja."

Approximately 77,000 applicants nationwide sent in video applications with hopes of competing this season, and Saville was one of only 600 athletes in the country to receive the invitation.

When asked how he became interested in "American Ninja Warrior," Saville said, "My two sons love the show, and they inspired me to send in an audition video. In my audition, I emphasized my family, my unique biostatistics background, and my dedication to fitness, and the producers liked what they saw."

His competition aired June 19, but NBC did not showcase his run. Of the 100 athletes who competed in San Antonio, only about 20 were chosen to be shown on TV.

Saville put in his best effort, but failed on "Tick-Tock," the second of six obstacles. Despite not advancing in the competition, he remains optimistic. "It was an amazing experience, and I'm so grateful for the opportunity. I love challenging myself, whether it's hard statistical problems or seemingly impossible ninja obstacles. I'll use this year's experience as a building block to train and hopefully compete again next year!" ■

Master of Science in Biostatistics: Theory and Methods at Mount Sinai

Icahn School of Medicine at Mount Sinai

Graduate School of Biomedical Sciences

The distinctive design of this one-year, full-time, MS in Biostatistics Program allows for:

- Rigorous and comprehensive training in fundamental skills required for conducting high-quality clinical and translational research
- A curriculum emphasizing strong quantitative training, critical thinking skills, and practical strategies for addressing complex challenges of novel, clinical research
- A stimulating environment in which students apply statistical tools to real data and collaborate with clinical and translational scientists

The Theory and Methods track in the MS in Biostatistics curriculum consists of at least 34 credits, to be completed in one year, of which 31 are core credits and at least 3 are elective credits.

Sample Theory and Methods Track Curriculum

FALL TERM	SPRING I TERM	SPRING II TERM
Introduction to Advanced Biostatistics	Theory of Linear & Generalized Linear Models	Analysis of Longitudinal Data
Fundamentals of Epidemiology	Analysis of Categorical Data	Survival Analysis
Probability and Inference I	Probability and Inference II	Drug Development Process (Elective)
Introduction to R Programming	Applied Biostatistics in Clinical Trials	Race and Causal Inference Seminar (Elective)

Priority application deadline: January 15, 2018

For more information, go to: *www.icahn.mssm.edu/msbiostat*

Inquiries: *mary.sandre@mountsinai.org*

STAT*tr@k*

BECOME A SUCCESSFUL STATISTICIAN IN A COLLABORATIVE RESEARCH ENVIRONMENT

Graduate students often find themselves in an environment requiring skills not taught in a classroom.

Statistics is perhaps one of the few professions to see steady job growth in the past 30 years or so, and the demand for statisticians continues to grow, partly because of the data science initiative.

Due to the applied nature of statistics, graduate students often find themselves landing a job in a highly collaborative research environment (e.g., medicine, public health) that requires not only good training in statistics, but also a fair understanding of subject matter and, perhaps more important, the skills needed to collaborate as a team member with nonstatisticians. Most likely, these important skills are not taught in classrooms, which could potentially hinder the career growth of a statistician in such an environment.

I earned a bachelor of science in mathematics and a master of science in mathematical statistics from the department of mathematics at the University of Science and Technology of China, one of the most prestigious universities there. At that time, I saw no apparent distinction between mathematics and statistics, viewing the latter as just one branch of the former.

Only after I became a graduate student in the department of statistics at the University of Rochester in 1993 did my view and understanding of statistics change. I had the good fortune to work on my dissertation under the supervision of the late W. Jack Hall, who was then the principal statistician on the Multicenter Automatic Defibrillator Implantation Trial (MADIT). Considered by many to be a mathematical statistician, he was studying whether prophylactic therapy with an implanted cardioverter-defibrillator, as compared to conventional medical therapy, would improve survival in high-risk patients. Many statistical problems arose from that trial; some were mathematically challenging. With such a clear connection between statistics and real-world applications, I felt motivated and energized, completing my doctoral dissertation and addressing and answering a number of problems. The unsolved problems later became my research focus for many years.

Over the years, many PhD students have asked me for advice about choosing an adviser and thesis topic. I often share with them my experiences from the University of Rochester. Worth considering are the extent of self-interest in the topic, the ability to solve the problems (*What skills might be needed to solve the problems? Are the problems too easy or too difficult to solve?*), the research portfolio and personality of the professor (*Has the professor been an active researcher in the area? Is the professor a role model for you to follow as both a researcher and future colleague?*), and the continuity of research stemming from the thesis (*Will this work extrapolate for at least a few years after graduation?*)

The job of a biostatistician in biomedical research is not just data analysis. It involves all aspects of the study—study design, implementation, interim monitoring of data quality and study compliance, data analysis and interpretation, and manuscript preparation. Even during the very early stage of conceptualization, statisticians can make substantial contributions by helping the biomedical investigators formulate and refine their scientific questions.

All these study components require communication skills, a fair knowledge of the subject matter (e.g., breast cancer, genetics, and human reproduction), a good personality, people skills, and the ability to bridge statistical and biomedical topics in addition to a profound understanding of various statistical topics. While many of these skills will not be learned in the classroom, some programs do provide courses/workshops on statistical consulting, building collaborations, or communicating effectively. I strongly encourage graduate students to explore opportunities that will help them become better scientists and collaborators. ■

MORE ONLINE

This essay first appeared on the University of Rochester's URBEST blog (*https://goo.gl/DjdSYz*). BEST (Broadening Experiences in Scientific Training) is an effort by 17 institutions to explore ways of improving biomedical career development. Read more about this effort at *www.nihbest.org*.

Aiyi Liu is a senior investigator who has been a member of the Biostatistics and Bioinformatics Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development since 2002. He earned his doctorate from the University of Rochester.

PASTIMES OF STATISTICIANS

What Does George Milliken Do When He Is Not Being a Statistician?

Photos courtesy of George A. Milliken

George A. Milliken grew up on a farm and is an avid gardener. He finds that having a shop with tools and tractors keeps him busy.

Milliken

Who are you, and what is your statistics position?

I am George A. Milliken, emeritus professor of statistics at Kansas State University. I also have a small consulting business where I help research groups design studies, analyze their data, and write statistical reports. The consulting keeps me "doing" statistics as well as solving problems. I keep active in the ASA, my sections, and my local chapter. I have also continued writing. Dallas Johnson and I wrote a second edition of *Analysis of Messy Data: Designed Experiments Vol 1* and now a third edition of *SAS for Mixed Models* that will be out later this year. I also try to give a presentation or two to the statistical community.

Tell us about what you like to do for fun when you are not being a statistician.

I have several hobbies that have evolved over the years. My first hobby is "statistics." I am fortunate to have statistics as my hobby and my profession.

I love playing golf with my wife, as we plan most of our travels around being able to play golf.

I am an avid gardener. We have a little more than a half hectare of garden where we plant tomatoes,

George A. Milliken grows pumpkins, as well as peppers, tomatoes, watermelon, cantaloupe, sweet corn, popcorn, luffa, and zucchini.

peppers, watermelon, cantaloupe, pumpkins, sweet corn, popcorn, luffa, and zucchini. We also have a small strawberry patch. We eat some of our produce, but we give away most to our friends and neighbors. In past years, I have given a truck load of pumpkins to the children of our church and provided popcorn for a local charity auction. It is great to see their eyes as they try to select the pumpkin that is best for them.

I also like to build things from wood and metal. I have a shop with wood-working tools and metal fabrication tools. I make simple things from time to time. I find it relaxing to plan a garden or project and then carry it out to the end.

What drew you to these hobbies, and what keeps you interested?

Gardening came from growing up as a farm kid. I helped feed and care for pigs and dairy cows, and I helped with tilling, planting, and cultivation by driving a tractor. As they say, "You can take the kid off the farm, but you can't take the farm out of the kid."

I greatly enjoy the gardening process and watching the plants grow to maturity. Some of the luffa we grow we send to our daughter in San Diego, who puts it into bars of soap she makes.

I was a member of 4-H and FFA as a youth, which is how I learned to run power tools and weld with a torch and sticks. I got welders after being out of high school for more than 40 years. But with a book and YouTube, you can recall and or learn to do most anything as long as you have proper tools.

I am a person who needs to be doing something. Having a shop with tools and tractors provides activities for me, whether it is gardening or making something. ■

CONSULTANT'S CORNER

Getting Paid: How to Determine Your Fee

Stephen Simon is a part-time independent statistical consultant and part-time faculty member in the department of biomedical and health informatics at the University of Missouri-Kansas City. He writes about statistics, evidence-based medicine, and research ethics. You can read his blog at *http://blog.pmean.com*.

If you are an independent statistical consultant, one of the earliest choices you must make is how to bill for your services. You can either bill by the hour or bill by the project. There are trade-offs between the two approaches.

I like billing by the hour. It doesn't require a lot of up-front planning. You don't have to worry about clients sneaking extra work in by changing the scope of the project. In fact, you are hoping your work is so impressive your client will want you to do even more.

A survey published in a 2006 newsletter of the Statistical Consulting Section (v23.1 at *https://goo.gl/J9mZGd*) put the median consulting rate at $130 per hour. In 2017, you should ask for more, especially if you have advanced degrees and/or specialized experience.

It is okay for you to add the time you travel to and from meetings with your clients to your total bill. I'll charge for travel if it is more than 15 minutes, but not if I can stop by easily on the way to or from my regular job.

General professional development is on your own dime. You can, however, charge for the time you spend learning new software and new statistical techniques if those are specifically required by your client and your client is aware of this and this is but a small fraction of your total hours. Don't use your client to get a head start on that data science certificate you want.

Your clients may not like the open-ended nature of billing by the hour, and you may end up having to place an upper bound on the number of hours you will need to complete the project. This combines the worst of hourly billing and flat billing. If you exceed your cap, you eat the cost, but if you finish early, you don't get a bonus.

I push for a soft ceiling, where I promise to not exceed a certain number of hours without checking first. It also helps to show your clients regular evidence of your progress so they don't think they're throwing money down a black hole.

You don't have to charge the same amount for each client. I offer a break for graduate students

because I remember how tight money was when I was slaving away on my own PhD. You can also offer discounts for clients who bring you a lot of business, because one client with 20 billable hours per week is a lot less work than 10 clients with two billable hours per week apiece.

You can also charge more for clients who make special demands. If your client insists on owning any programming code you produce or requires you to use a software program they love and you hate, a 25–50 percent hike in your standard consulting rate is not unreasonable.

Take some time at the beginning of each new year to think about increasing your hourly rate. Like a fine wine that gets better with age, the consulting you do gets more valuable as you acquire more experience. You might need a bit of negotiating with current clients. Or you can tell them they are getting a "long-term customer" discount and only charge the increased rate for new clients.

Billing by the project is more work up front, but you can make a lot more money this way if you play your hand well. Charging by the project encourages your client to perceive your services in terms of the value you provide.

It also doesn't hurt that your clients are likely to overestimate the amount of time they think you will need to do the work because they are thinking in terms how much time it would take them to do this work. You do become more efficient as you gain experience, so if you charge the same flat fee for a succession of similar projects, you are actually getting a pay raise with each project.

If you bill by the project, you must define the scope of your work in writing. This includes specifying reasonable expectations of the quality of data they deliver to you. When your client wants to add on, you need to renegotiate your fee.

You can probably get a good sense of the scope of a project after the first meeting. If you need to spend more time understanding all the requirements of a project, ask for that time, but put a cap (maybe five or 10 hours) on the amount of time you need to produce an accurate estimate of your fee.

The biggest risk to billing by the project is underestimating the amount of work required. It can't hurt to ask for more money if you realize halfway through the project you're in way over your head. Explain the unexpected developments that caused the extra work and hope for the best. You may just have to swallow your losses and try to estimate better in the future. Don't cry too much. Unless all your estimates are too optimistic, the money lost on projects where you underestimate your effort will be more than compensated by the projects in which you finish earlier than you expected.

When statistical consultants work at substandard rates, it is bad for the entire profession. If money is not important to you, consider pro bono work instead with a group like Statistics without Borders.

When billing by the project, you do not have to wait until the project is complete before getting paid. Negotiate for some of the money before you start the work (50% is not unheard of) and more as you complete key intermediate steps in the analysis.

There's an ethical concern with billing by the hour that has a flipped ethical concern with billing by the project. If you bill by the hour, you might be tempted to pad the analysis with unnecessary work just to get a few extra bucks. If you bill by the project, you might be tempted to finish early by skipping some of the quality checks and assessments of assumptions your client deserves to have. Your clients will often not recognize when you are padding or cutting corners, so you must be honest with yourself about the proper amount of work to put in.

One final word. You will find clients who expect you to work for an outrageously small rate. Please say no. When statistical consultants work at substandard rates, it is bad for the entire profession. If money is not important to you, consider pro bono work instead with a group like Statistics without Borders. ■

MORE ONLINE
Thinking of doing pro bono work? Get involved with Statistics without Borders at *https://goo.gl/NQQRjF.*

ASA Census at School Program Exceeds 50,000 Students

Access to Cleaned Data, Free Analysis Tool Now Available

Former ASA director of education Martha Aliaga directs middle- and high-school teachers participating in the Census at School pilot program in 2010.

The American Statistical Association's U.S. Census at School program (*www.amstat.org/censusatschool*)—a free international classroom project that engages students in grades 4–12 in statistical problem solving using their own real data—has exceeded the milestone of 50,000 students.

The program began in the United Kingdom in 2000 to promote statistical literacy in school children and has included participants from the UK, New Zealand, Australia, Canada, South Africa, Ireland, Japan, and the United States. The U.S. component of Census at School launched in 2010 and is hosted by the American Statistical Association. It has now reached 57,103 students with 2,119 registered teachers from all 50 states, plus the District of Columbia, Puerto Rico, the Virgin Islands, and Guam.

Census at School is a web-based project. Under the direction of his or her teacher, each student anonymously completes an online survey. Only the teacher can download the class census data via a

password, though others can take random samples of other participating students. Together, the students analyze their class data and compare those results with results from random samples of other participating students.

The online survey consists of 13 questions common to children in every participating country and a few questions specific to children in each country. The common questions are related to measurement—length (height, arm span, foot length), travel time to school, reaction time to an online applet, time to complete an online memory test—and category—favorite sport or activity. The U.S. questionnaire has additional questions about text messaging, hours of sleep, technology usage, future plans, allergies and preferences (i.e., foods, music, school subject, their ideal super power). All questions lead to a variety of categorical and quantitative responses teachers can use in teaching statistics concepts and students can explore.

Students engage in statistical problem solving using Census at School by formulating questions that can be answered with the data, collecting and selecting the appropriate data, analyzing the data, and making appropriate conclusions in context.

The Census at School program is self-contained and includes detailed instructions, instructional webinars, a PowerPoint presentation, lesson plans, and other resources. Teachers comfortable with statistical concepts, problem solving, and data analysis can begin using the program in their classes immediately.

Getting Involved

The ASA is seeking champions to expand the U.S. Census at School program. Champions can be teachers who use the program in their classes or statisticians and statistics educators who assist teachers who are not yet comfortable with statistics and statistical problem solving. There are a variety of ways to get involved, including sharing information about the program with local schools, writing lesson plans, and teaching local workshops for teachers. For those interested in teaching local workshops, the ASA will provide materials.

The ASA also is building online Census at School resources and seeking those interested in writing new U.S. Census at School lesson plans or adapting international Census at School lesson plans for U.S. data. Those teaching grades 4–12 pre-service teachers might consider encouraging them to create lesson plans using U.S. Census at School data and submit them to the STatistics Education Web (STEW, *https://goo.gl/ryjTh9*), an online bank of peer-reviewed lesson plans for K–12 teachers.

STEW lesson plans relating to Census at School will be published on the Census at School website in the resources area. Lessons or potentially related articles also may be published in *Statistics Teacher* (*statisticsteacher.org*), an online journal published by the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability for Grades K–12.

Educators teaching or advising undergraduate or graduate statistics students might consider encouraging or requiring them to get involved in service learning by working with grades 4–12 teachers and students to incorporate Census at School and enhance their statistical problem-solving skills.

Other ideas to enhance and expand the program are welcome. Contact Rebecca Nichols, ASA director of education, at *rebecca@amstat.org* about these or any efforts regarding service learning or other activities. ■

Random Samplers Offer Clean and Messy Data

Census at School New Zealand now hosts the random sampler (*https://goo.gl/rfdnMc*) for the international Census at School data, New Zealand data, and cleaned U.S. data. The online random sampler allows students and teachers to take random samples up to size 1,000 from the international, New Zealand, or U.S. database and either download the data or start up the free online iNZight Lite software with the data already loaded and ready for analysis. The international database includes data from Australia, Canada, New Zealand, the United Kingdom, and the United States.

U.S. Census at School also provides a random sampler (*https://goo.gl/NQcd1x*) to generate a sample from the entire messy U.S. database. Some teachers prefer to take samples of messy data to provide their students with practice cleaning and investigating uncleaned data. For other teachers, taking a random sample of clean U.S. data from the international random sampler makes the program more accessible for their students, especially in the younger grades.

For more information about the international random sampler, accessing cleaned U.S. data, or downloading data into iNZight Lite, read "Technology Insights" in *Statistics Teacher* at *https://goo.gl/MUc8ss*.

Two National Poster Competition Winners Hail from Same School

Photo courtesy of Jennifer Blattner, Odyssey Elementary School

Pat Hopfensperger, a director of the Wisconsin Mathematical Education Foundation and former ASA/NCTM Joint Committee chair, visited Odyssey Elementary School in Appleton, Wisconsin, to congratulate the school's two national winners, Rachel Zhu and Maya Lemery.

Rebecca Nichols, American Statistical Association, and Jennifer Blattner, Odyssey Elementary School

This year, there were two national poster competition winners from Odyssey Elementary School. Rachel Zhu won first place in the grades 4–6 category for her poster, "Sleep Stats," and Maya Lemery won second place in the grades K–3 category for her poster, "Do Favorite Colors Change as Kids Get Older?"

The ASA/NCTM Joint Committee oversees the ASA National Statistics Poster Competition. Pat Hopfensperger, a director of the Wisconsin Mathematical Education Foundation and former ASA/NCTM Joint Committee chair, visited Jennifer Blattner's class at Odyssey Elementary School in Appleton, Wisconsin, to congratulate the two national winners.

Here, Zhu and Lemery answer a few questions about their experiences participating in the poster competition.

Rachel Zhu

Poster Title: Sleepy Stats

First Place, Grades 4–6 National Poster Competition

How did you come up with this particular question of interest for your poster?

I picked the topic, "How long do students sleep at night (at my school)?" because, really, I just wanted to see if I was getting enough sleep.

How did you collect/find the data?

I went around the sixth- and third-grade populations, since I thought these two grades were far enough apart to make a difference in hours of sleep. I chose the two classes in my school and asked each student, "On average, how long do you sleep at night?" I wrote down their responses in a notebook.

What did you enjoy the most while working on the poster project?

My favorite part would be putting together the poster, since I actually made a nighttime background with some glitter glue. I also liked working on the graphs because it gave me a better view of the data, and they also helped me learn a lot about my topic.

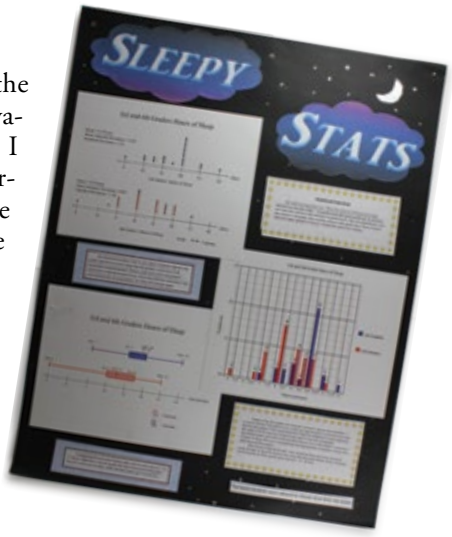
What did you find most surprising about the results?

I was really surprised to see that third and sixth graders only have (on average) a one-hour difference; I expected a lot more. And, like I said on my poster, "I was completely discombobulated that anyone, even a sixth grader, would get five hours of sleep."

What did you do when you found out you won first place in the national contest?

It was a little weird (and kind of creepy) when I found out I won, because I was thinking about the poster contest the day before. The people in my class probably caught a glimpse of my poster because they kept hinting that somebody (me) won. I got slightly agitated because my teacher wouldn't reveal who [won] before all the students had arrived. It was really confusing. But when we did find out, I was really surprised and excited. At first, I was kind of speechless, but then the shock passed and I was really happy and proud. I don't remember as much what I felt after I found out, except an overwhelming feeling of excitement. Maybe I was just too excited!

Did participating in this contest influence your dreams or goals?



I suppose participating in the contest did boost my motivation about statistics. I mean, I like math a lot, but not particularly statistics before the contest. I think my goals are still to learn as much as I can about math, but also a little more about statistics, too.

What are your plans for the future?

I have a lot of interests, with statistics adding on to the list, but I'm still not quite sure what my plans are for the future.

Photo courtesy of Jennifer Blattner, Odyssey Elementary School

Pat Hopfensperger answers questions such as, "What does a judge look for in this contest?"

Maya Lemery

Poster Title: Do Favorite Colors Change as Kids Get Older?

Second Place, Grades K–3 National Poster Competition

How did you come up with this particular question of interest for your poster?

I started with favorite color, but I decided that was too boring and I realized I could make it much more interesting without many more changes [if I asked], "Do favorite colors change as kids get older?"

How did you collect/find the data?

I made a Google form for the third and fourth graders and I walked down to the kindergarten classroom in my school and interviewed the kindergartners one by one.

What did you enjoy the most while working on the poster project?

I would say that putting together my poster was my favorite part.

What did you find most surprising about the results?

That I won second place in the contest when I doubted I would even win an honorable mention, even though I really hoped I would.

What did you do when you found out you won second place in the national contest?

I walked into my classroom and [practiced] cursive [while] feeling amazed.

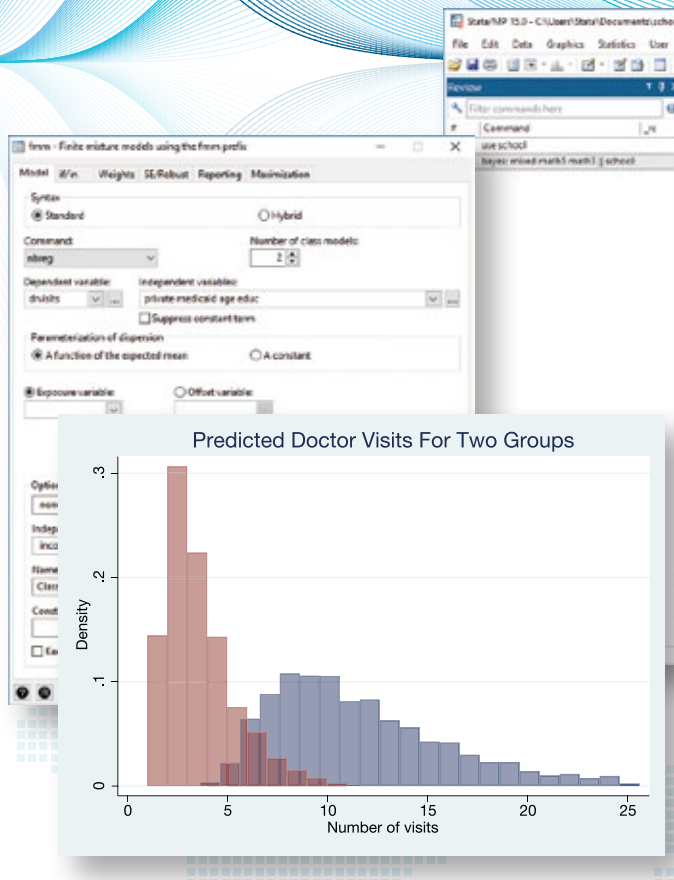
Did participating in this contest influence your dreams or goals?

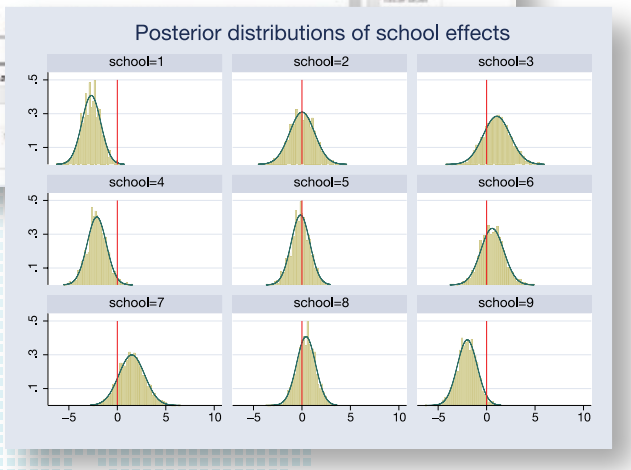
I still want to be an engineer when I grow up, but it was amazing that I won and now I know I am good at math.

What are your plans for the future?

Like I said before, I want to be an engineer, because I like building things. ■

Announcing Stata release 15

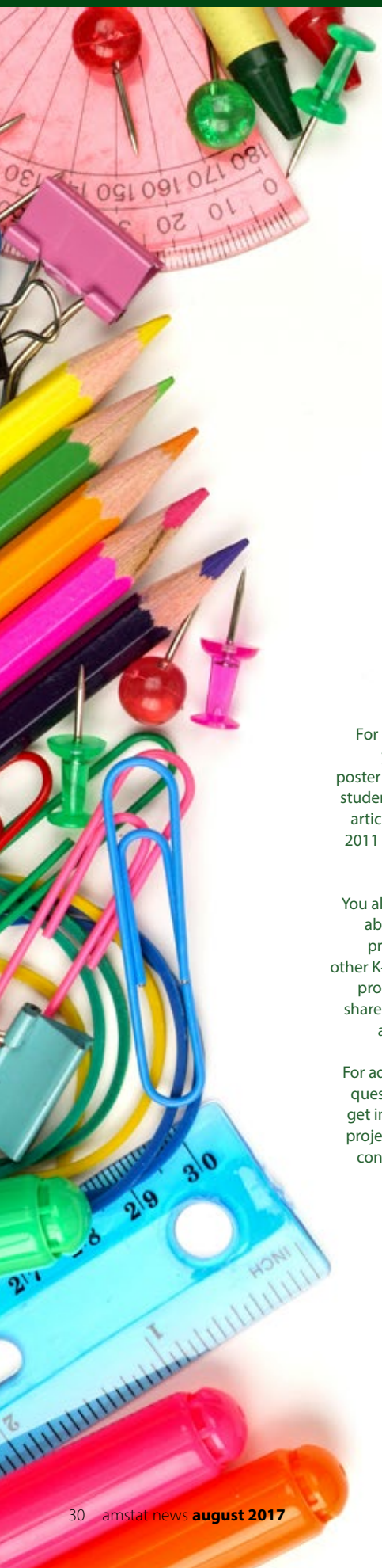




New in Stata 15

- Bayesian multilevel models
- **bayes:** prefix for easily fitting Bayesian regression models
- Finite mixture models
- Latent class analysis
- Spatial autoregressive models
- Treatment effects for MNAR outcomes
- Markdown—create webpages with Stata output, graphs …
- Power analysis for cluster randomized trials
- Interval-censored survival models
- Nonparametric regression
- Mixed logit models
- Word and PDF documents with Stata results and graphs
- Multiple-group multilevel SEM
- Threshold regression
- ICD-10-CM/PCS
- Nonlinear mixed-effects models
- Heteroskedastic regression
- Zero-inflated ordered probit models
- Poisson regression with sample selection
- Multilevel tobit and interval regression
- Panel-data cointegration tests
- Transparency on graphs
- Much more!

Find out more. Visit us online at **stata.com/amstat-stata15**.



2017 POSTER & PROJECT COMPETITION WINNERS

GET INVOLVED

For information about how you can start a regional poster competition or mentor students in your area, see the article appearing in the July 2011 issue of *Amstat News* at *https://goo.gl/wN73VE*.

You also can download a flier about the ASA poster and project competitions and other K–12 statistics education programs and resources to share with your local schools at *https://goo.gl/cv5zU5*.

For additional information or questions regarding how to get involved in the poster or project competitions, please contact Rebecca Nichols at *rebecca@amstat.org*.

The American Statistical Association is pleased to announce the winners of the 2017 Poster Competition and Project Competition. First-place winners received $300, a plaque, a plaque for their school, and grade-appropriate graphing calculators provided by Texas Instruments for them and their advisers. Second-place winners received $200 and a plaque; third-place winners received $100 and a plaque; and honorable mentions received plaques.

The poster and project competitions are directed by the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability. The 2017 poster competition was led by Rodney Jee of Discover Financial Services. Nathan Kidwell of Oaxaca Christian School in Oaxaca, Mexico, served as the head project competition leader, with Carrie Ketchem of Beaver Dam High School serving as associate project competition leader.

K–12 posters are due every year on April 1. Projects (written reports) for grades 7–12 are due every year on June 1. Visit *www.amstat.org/education/posterprojects* for information such as previous winners, entry forms, instructional webinars, and the rubrics used for judging the posters and projects.

2017 Regional Poster Competition Leaders

Students outside the regional competition areas submit their posters directly to the ASA office. They are then separately judged by the Washington Statistical Society as part of the Other Region. The best posters from each region are sent to the national judging. Information about regional poster competitions and winners is available on the individual regional poster competition websites.

Connecticut Chapter Statistical Poster Competition
Valerie Nazzaro, Wesleyan University
Jennifer McGinniss, Sunovion
https://goo.gl/3W9iym

Kansas/Missouri Statistics Poster Contest
Ananda Jayawardhana, Pittsburg State University
https://goo.gl/UrC6JS

Michigan Statistics Poster Competition
Dan Adrian, Grand Valley State University
https://goo.gl/p5TzM4

Nevada K–12 Statistics Poster Competition
Tia Price, Southern Nevada Regional Professional Development Program
https://goo.gl/b8Jngr

Ohio Statistics Poster Competition
Linda Quinn, Cleveland State University
Jerry Moreno, John Carroll University
https://goo.gl/B43hqV

Pennsylvania Statistics Poster Competition
Pete Skoner, Saint Francis University
https://goo.gl/56WF35

Pullman, Washington Statistics Poster Competition
Dean Johnson, Washington State University
dean_johnson@wsu.edu

Washington Statistical Society Poster Competition (DC Metro Area)
William Cecere, Westat
https://goo.gl/kRWozr

ASA National Poster Competition
Leader: Rodney Jee, Discover Financial Services

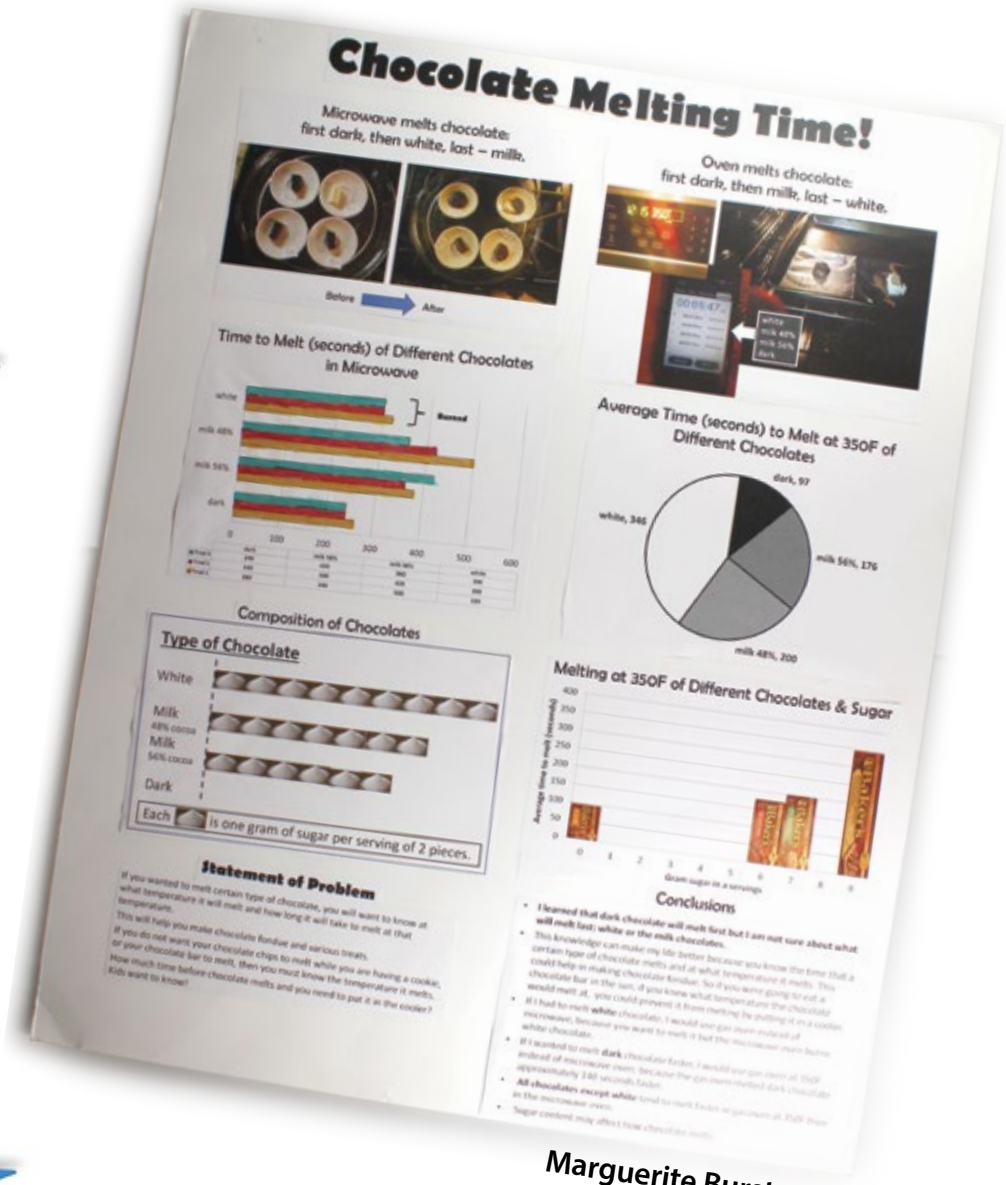
Contact: Rebecca Nichols, ASA Director of Education, *rebecca@amstat.org*
https://goo.gl/8Gj2bF

2017 National Project Competition Winners

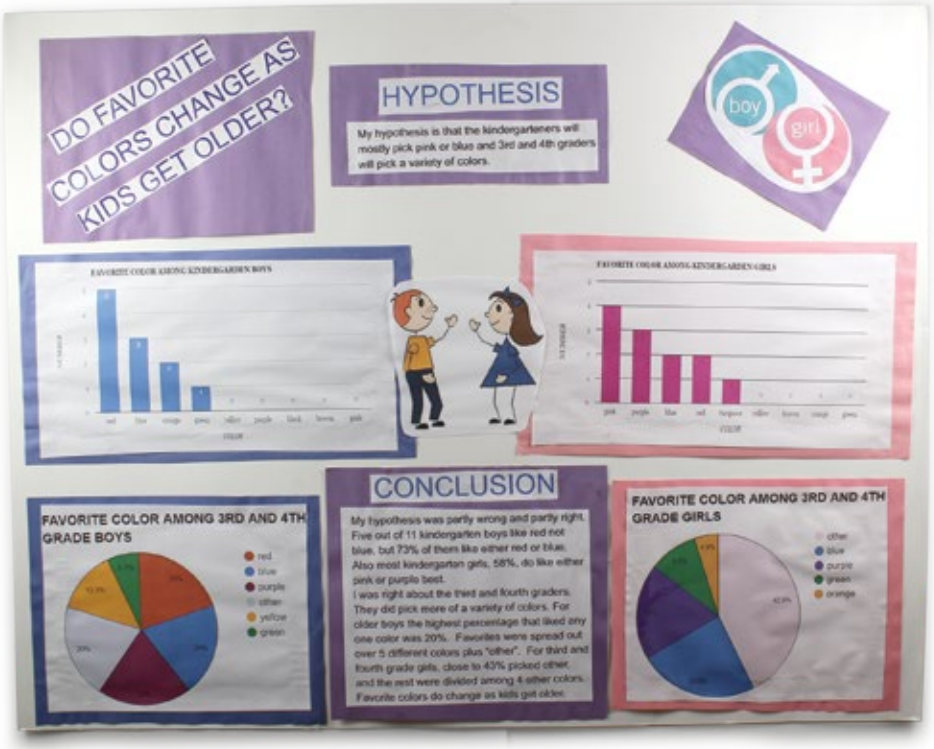
Each year, the statistical project competition attracts a variety of submissions in which students from grades 7–12 conduct creative studies. The submission deadline for the project competition is June 1 to enable participation from high-school students who may have been preparing for the AP Statistics exam administered in mid-May. This deadline also makes it possible for teachers who might otherwise be busy at the AP Reading to assist with the competition judging.

The statistical project competition is especially useful because it provides students with opportunities to apply the statistical skills they acquired throughout the school year to solve real-world problems of interest to them. Results of the project competition and a list of the judges can be found at *http://magazine.amstat.org*.

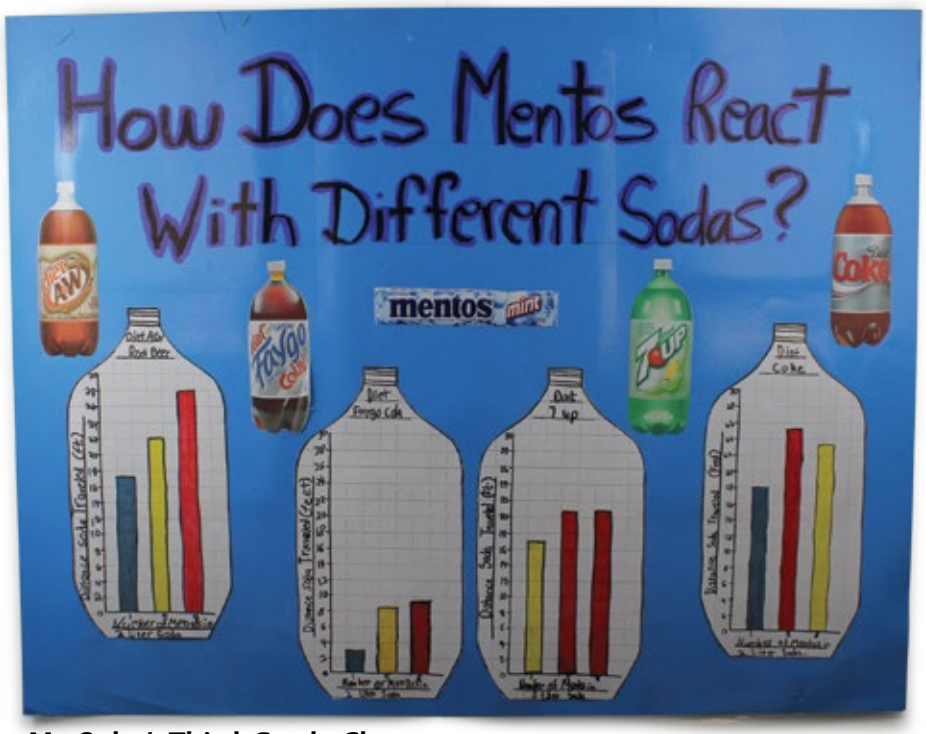
POSTER COMPETITION WINNERS GRADES K–3



Marguerite Burstyn



Maya Lemery



Mr. Suba's Third-Grade Class

FIRST PLACE

Marguerite Burstyn

Chocolate Melting Time

Highland Elementary School
Abington, Pennsylvania

SECOND PLACE

Maya Lemery

Do Favorite Colors Change as Kids Get Older?

Odyssey Elementary School
Appleton, Wisconsin

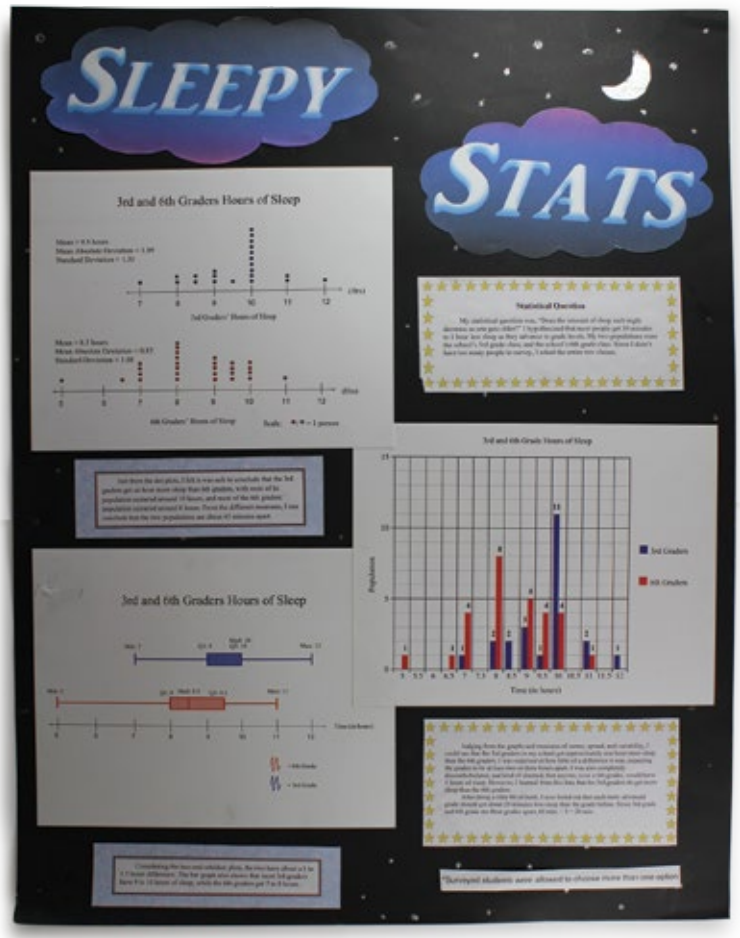
THIRD PLACE

Mr. Suba's Third -Grade Class

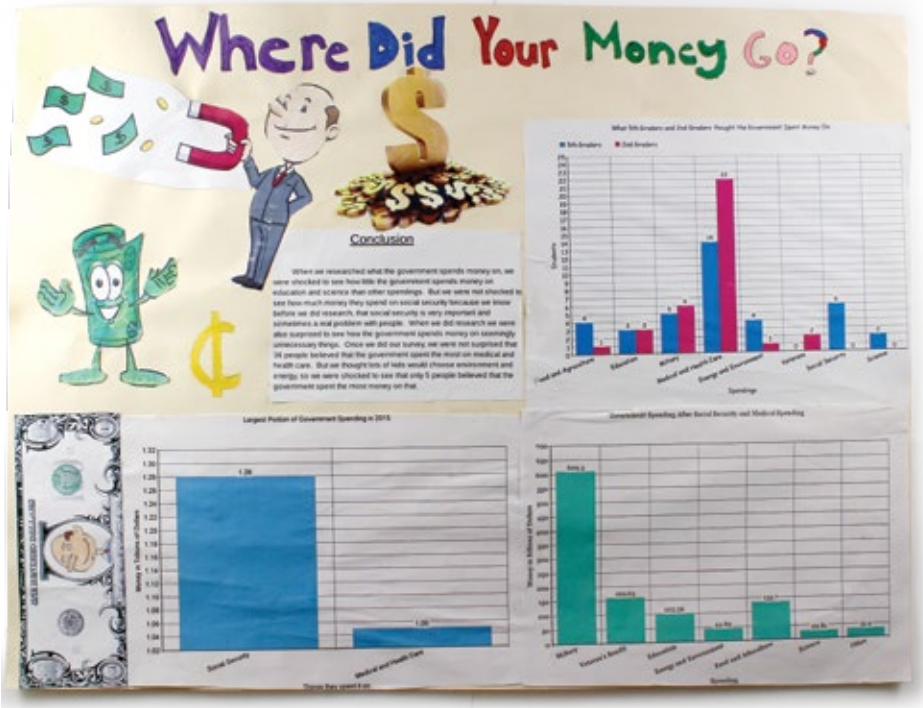
How Does Mentos React with Different Sodas?

Timmons Elementray School
Chagrin Falls, Ohio

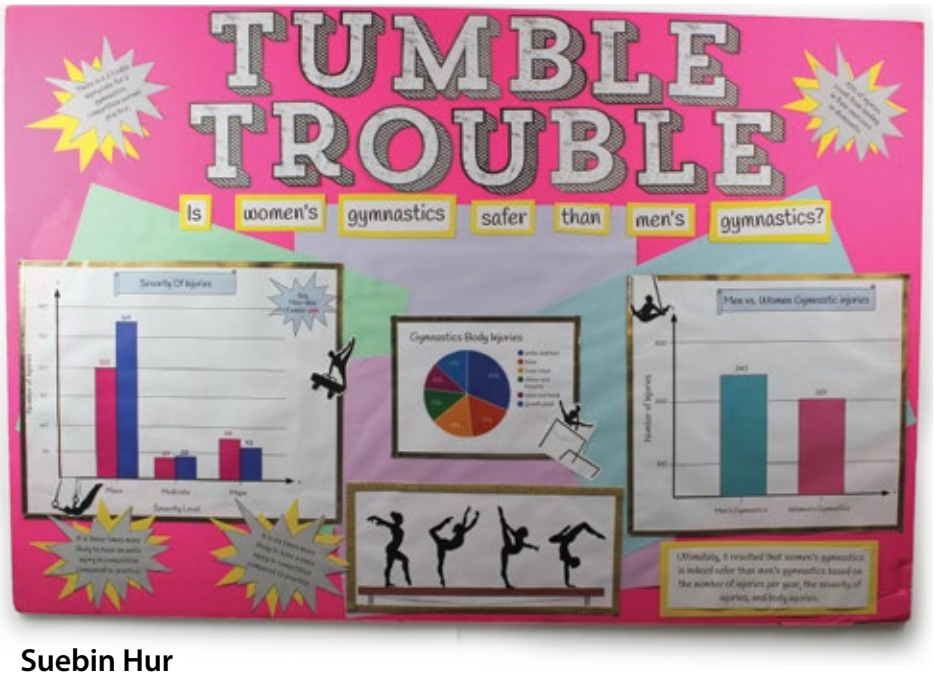
POSTER COMPETITION WINNERS GRADES 4–6



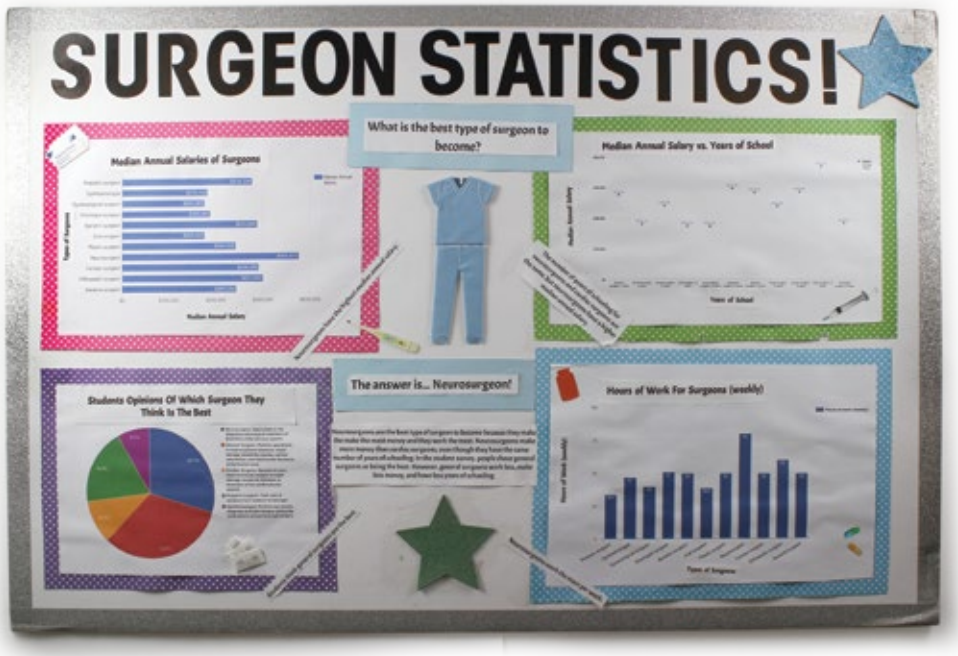
Rachel Zhu



Ashley Colberg and Ellie DeGeorge



Suebin Hur



Lynn Pham and Hannah Pham

FIRST PLACE

Rachel Zhu

Sleepy Stats

Odyssey Elementary School
Appleton, Wisconsin

SECOND PLACE

Ashley Colberg and Ellie DeGeorge

Where Did Your Money Go?

Stepney Elementary School
Monroe, Connecticut

THIRD PLACE

Suebin Hur

Tumble Trouble

Hyde Park Middle School
Las Vegas, Nevada

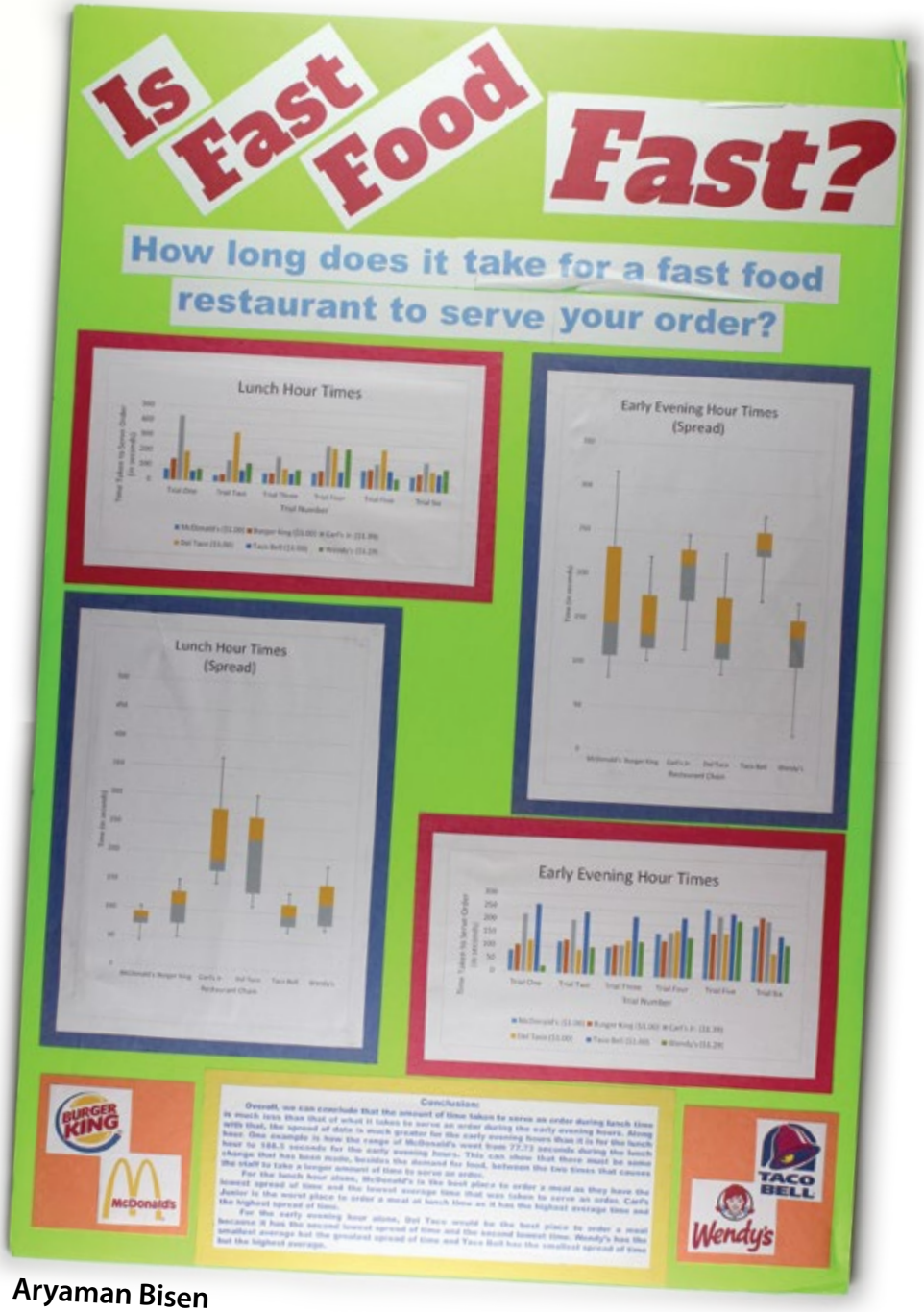
HONORABLE MENTION

Lynn Pham and Hannah Pham

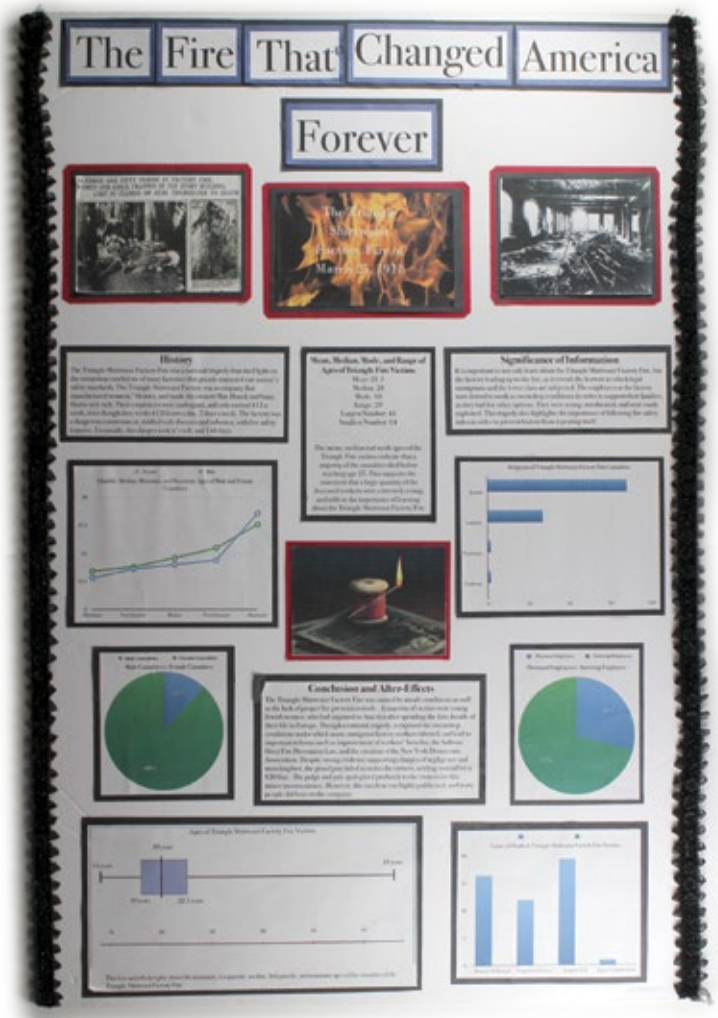
Surgeon Statistics

Hyde Park Middle School
Las Vegas, Nevada

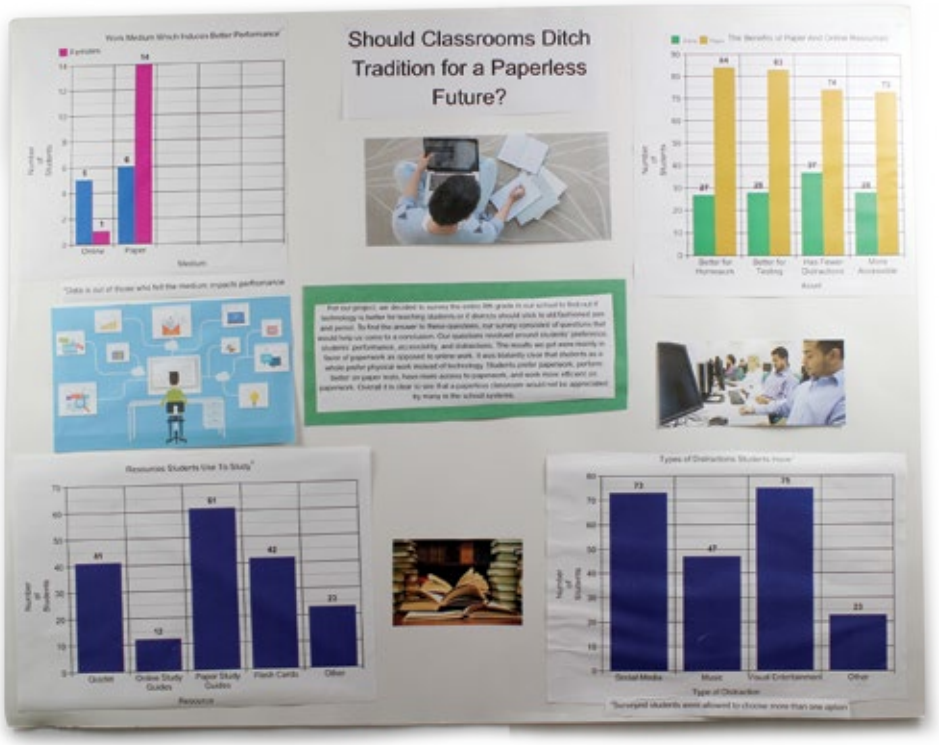
POSTER COMPETITION WINNERS GRADES 7–9



Aryaman Bisen



Jocelyn Lotterhos



Joe Gregory, Garrett Cheng, and Grace Xiong

FIRST PLACE

Aryaman Bisen

Is Fast Food Fast?

Hyde Park Middle School
Las Vegas, Nevada

SECOND PLACE

Jocelyn Lotterhos

The Fire That Changed America Forever

Southern Highlands Preparatory School
Las Vegas, Nevada

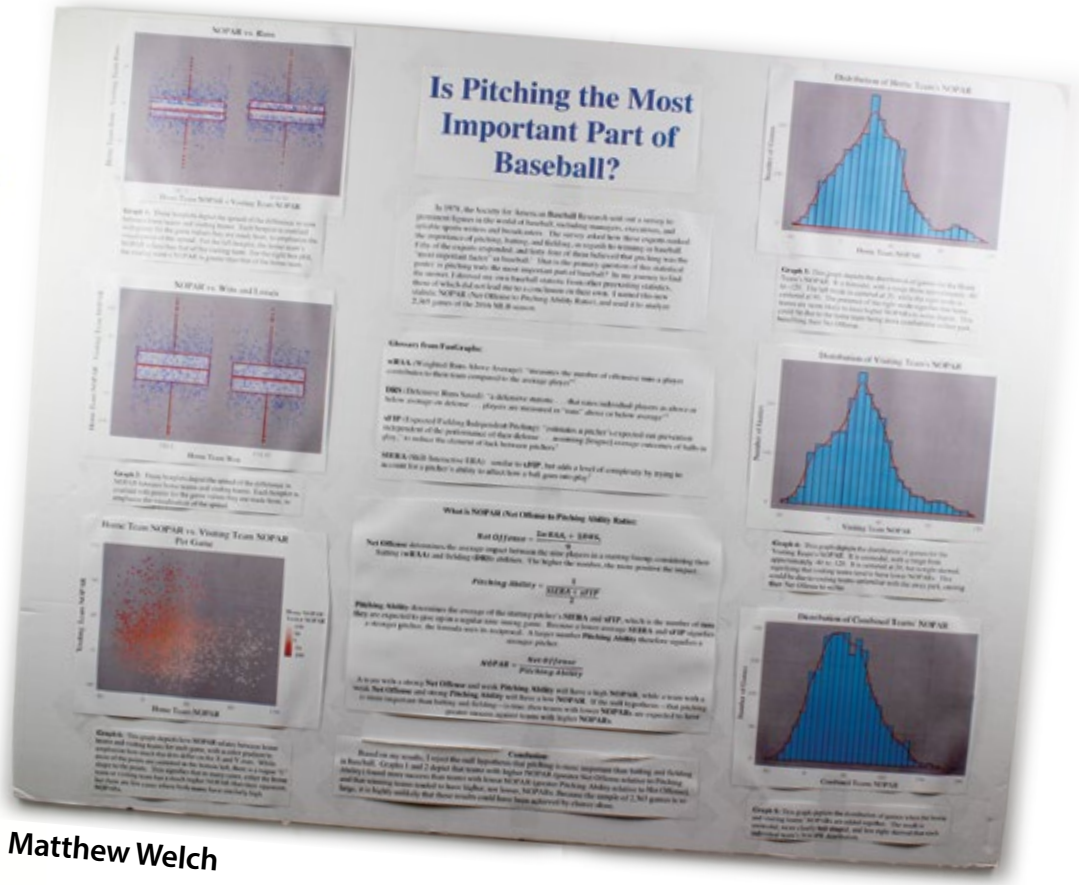
THIRD PLACE

Joe Gregory, Garrett Cheng, and Grace Xiong

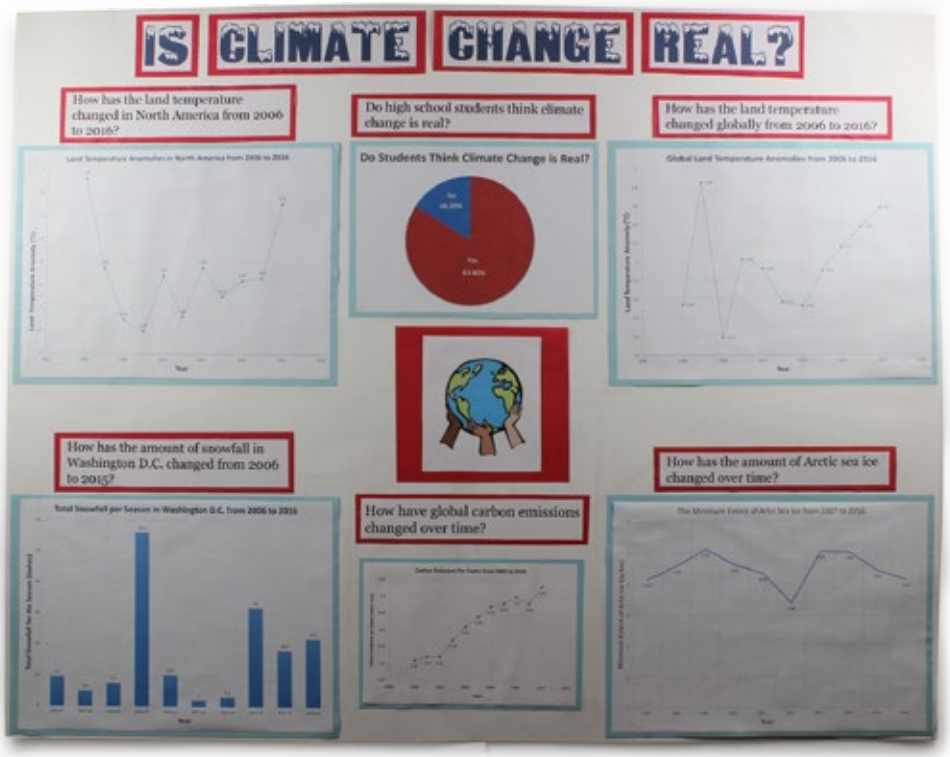
Should Classrooms Ditch Tradition for a Paperless Future?

Hillcrest Middle School
Trumball, Connecticut

POSTER COMPETITION WINNERS GRADES 10–12



Matthew Welch



Abby Votaw and Ingrid Cheung

Clare Martin

FIRST PLACE

Matthew Welch

Is Pitching the Most Important Part of Baseball?

Phillips Academy
Andover, Massachusetts

SECOND PLACE

Abby Votaw and Ingrid Cheung

Is Climate Change Real?

St. Joseph's Academy
Cleveland, Ohio

THIRD PLACE

Clare Martin

Which Supermarket Brand Is the Better Value?

Newton South High School
Newton, Massachusetts

David Allison to Head the Indiana University School of Public Health in Bloomington

David B. Allison, a renowned scientist and researcher, is expected to bring a cross-disciplinary approach to research in his new role as dean of the Indiana University School of Public Health in Bloomington. The appointment was approved in June by the IU Board of Trustees at its meeting in South Bend, and Allison will begin his new position August 15.

Allison, former associate dean for research and science in the school of health professions at the University of Alabama at Birmingham, is an elected fellow of the National Academy of Medicine. One of the most prestigious medical societies in the world, the academy serves alongside the National Academy of Sciences and National Academy of Engineering as adviser to the nation and the international community. Allison will be the third active National Academy of Medicine fellow at Indiana University Bloomington.


Allison

"David Allison will continue to propel the school of public health forward, advancing the school's research profile, positive impact on education, and community engagement," said IU Bloomington Provost and Executive Vice President Lauren Robel. "His research in the sciences and expertise in the areas of obesity and prevention align perfectly with our state's health mission and partnerships with organizations throughout Indiana."

In addition to his associate dean position at the University of Alabama at Birmingham, Allison is a distinguished professor, the Quetelet Endowed Professor, and director of the Office of Energetics and director of the Nutrition Obesity Research Center. He served as director of the Section on Statistical Genetics from 2001–2011.

His research includes a breadth of activity—including basic science using drosophila (fruit flies), rodent models, epidemiology, human clinical trials, statistical methodology, meta-analysis, mathematical models, and human behavioral research—which is helpful in cross-disciplinary collaborations with faculty from a range of academic backgrounds.

"I enjoy working and collaborating on nutritional questions with people in many disciplines—for example, psychology, my original discipline," Allison said, adding that he has collaborated with researchers in biostatistics, epidemiology, education, health economics, engineering, nutrition, mathematics, entomology, environmental health sciences, genetics, medicine, nursing, psychiatry, biology, kinesiology, and agricultural science.

As director of the University of Alabama's Section on Statistical Genetics, he developed a robust teaching program and suite of courses, increased grant funding, built National Institutes of Health–funded training programs, and brought the department recognition as a national presence in the field of genetics. Beginning in 2008, he conceived and successfully led the fundraising for the William "Student" Sealy Gosset Endowed Professorship in Biostatistics, the first endowed professorship in the University of Alabama at Birmingham's School of Public Health. He has since created three other endowed professorships in that school.

During his tenure as director of the University of Alabama at Birmingham's NIH-funded Nutrition Obesity Research Center, Allison secured funding over three competitive renewal cycles and expanded its scope. He obtained funding for both pre- and postdoctoral training grants in obesity research, increased philanthropic fundraising, expanded the breadth and depth of the science base of the center, and extended outreach and the center's local and national profile through a national conference series.

"Science is my abiding passion, and I never get tired of learning new things, exchanging ideas, and trying to figure things out," Allison said. "I really look forward to working with other researchers at IU and collaborating with our surrounding communities on projects to improve communities and support IU Bloomington's School of Public Health students in exploring bold new ideas and pursuing truth through science."

Allison earned his PhD in clinical and school psychology from Hofstra University in 1990, his master's degree in clinical and school psychology at Hofstra in 1987, and his bachelor's degree in psychology at Vassar College in 1985.

In 2006, Allison received a Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring—the nation's highest award for mentoring, given to no more than 10 individuals nationally each

year and selected through a peer-review process. In 2008, *Nature* listed Allison as one of the 22 scientists in the world with the most NIH grants. In 2012, he received a Transformative R01 grant from the NIH—a grant given to only 20 research groups in the country—to conduct seven interrelated experiments designed to test an integrated theory connecting adiposity, longevity, perceptions of "energetic insecurity," and disparities in social status.

Many of the tasks Allison enjoyed at Alabama will play some part in his role as school of public health dean at IU Bloomington, including school-level strategic planning, fundraising, school reaccreditation, faculty recruitment, grant acquisition, budgetary and fiscal management, representing the school on university-wide committees, and more.

Allison said he visited IU Bloomington several years ago and fell in love with the beautiful campus. "I have multiple colleagues at IU and in the school of public health, so I am familiar with the university's prestigious scholarly reputation," Allison said. "The school of public health in particular is known as a place of academic integrity, with a true commitment to diversity and inclusion and an expanding research profile. I look forward to helping expand research support for students and faculty."

You can read more about Allison at *https://goo.gl/TE1DWt*. ■

Jeff Wu Receives 2017 Box Medal from ENBIS

Georgia Tech's Stewart School of Industrial & Systems Engineering (ISyE) announces that Coca-Cola Chair in Engineering Statistics and Professor Jeff Wu has received the 2017 Box Medal Award from ENBIS, the European Network for Business and Industrial Statistics.

The Box Medal is named after George Box, the late British-American statistician who is considered one of the greatest statistical minds of our time. Box was extremely influential on Wu's work during his formative years as a young academic at the University of Wisconsin, Madison, where Box was also a professor.

In a 2015 interview with professor Hugh Chapman of Acadia University and professor Roshan Joseph of ISyE, Wu affirmed that Box was a tremendous influence: "[Box] was a great scholar and a great lecturer. His opinions and passion for work were contagious. … I respected him a lot."

According to the ENBIS website, the Box Medal honors the legacy of George Box and is awarded each year to "an extraordinary statistician who has remarkably contributed with his work to the development and the application of statistical methods in European business and industry."

Wu

The ENBIS press release announcing Wu as this year's Box Medal recipient stated that "with the medal, the link between two great statisticians is strengthened even further."

The press release also specified that Wu was chosen for his many contributions to the study of statistics, as well as "his ability to clearly explain complex concepts … and for systematically passing on his knowledge." Wu has supervised 45 PhD students in the course of his career, many of whom are active researchers in the statistical sciences.

Wu will accept the Box Medal at the ENBIS conference, held from September 9–14, in Naples, Italy. While there, he will also deliver a keynote speech on September 12.

Wu earned a bachelor of science in mathematics from National Taiwan University in 1971 and a PhD in statistics from the University of California, Berkeley in 1976. He has been a faculty member at the University of Wisconsin, Madison; the University of Waterloo; and the University of Michigan.

He is known for his work on the convergence of the EM algorithm; resampling methods; nonlinear least squares; and sensitivity testing and industrial statistics, including design of experiments, robust parameter design, and computer experiments. He also has been credited for coining the term "data science" as early as 1997.

Wu has received several awards, including the COPSS Presidents' Award (1987), the Shewhart Medal (2008), the R. A. Fisher Lectureship (2011), and the Deming Lecturer Award (2012). He is an elected member of Academia Sinica (2000) and the National Academy of Engineering (2004) and has received many other awards and honors, including an honorary doctorate from the University of Waterloo.

He has published more than 170 peer-reviewed articles and two books. He was the second editor of *Statistica Sinica*.

Obituary

Eleanor Singer

Submitted by Roger Tourangeau, AAPOR Past President

Eleanor Singer died on June 3, 2017. She was 87.

She was a research professor emerita at the University of Michigan's Survey Research Center, which is part of its Institute for Social Research (ISR). She had a long and distinguished career at the University of Michigan and Columbia University.

Eleanor was very active in the American Association for Public Opinion Research (AAPOR), serving as president from 1987–1988, as well as conference chair, standards chair, and counselor-at-large. In 1996, she received the AAPOR Award for Lifetime Achievement.

"Eleanor was a major figure in the field of survey methodology, and she will be greatly missed by all who knew her," said ISR Director David Lam. "We are fortunate that she spent the last decades of her illustrious career at ISR, where she made major contributions to research, training, and the intellectual life of the Institute." Eleanor joined ISR in 1994.

Among her many accomplishments was her 10-year tenure as editor of *Public Opinion Quarterly (POQ)*, in which she elevated survey methodology as an academic discipline, according to University of Michigan political scientist and past AAPOR president Michael Traugott. "Eleanor was editor of *Public Opinion Quarterly* at a time when survey research and public opinion research became established in the university setting," said Traugott. "By her selection of content and manuscripts, she—in a very important but subtle way—promoted and encouraged the study of academic survey methods. …"

Stanley Presser, another past president of AAPOR who also edited *POQ*, had this to say about Eleanor: "For nearly half a century, Eleanor Singer had a profound influence on both

Singer

AAPOR (no one comes close to her tenure as *POQ* editor) and research on public opinion and survey methods more generally. She worked on big problems in rigorous and imaginative ways and found joy in doing so—joy that she shared with 74 co-authors. She leaves us a rich legacy."

According to another past AAPOR president, Bob Groves, "Eleanor was one of those productive scientists who was also an incredible magnet for collaboration. She ended up collaborating with half of the people in the building and was known as a wonderful mentor and exquisite writer. Whenever I would get back articles I submitted to her that she had rewritten, I realized she made my pieces better. As a collaborator, you would discover that again and again."

In 2016, Eleanor received the Monroe G. Sirken Award in Interdisciplinary Survey Methods Research for "significant contributions in our understanding of survey participation, sources of nonresponse bias, and factors affecting survey responses; for pioneering research on the use and effects of incentives; and for leadership in developing awareness and understanding of ethical issues in survey research." Her work continues to play an important role in the study of survey methodology.

Singer was born in Vienna, Austria, in 1930. When she was 8 years old, her family fled the rise of Nazi Germany in Europe and settled in Astoria, New York. She completed a BA in English at Queens College in 1951, where she met her late husband, Alan Singer. In her early career, Singer worked as a book editor at various publishing houses and increasingly specialized in books about social science. She remained a superb editor throughout her career.

In 1959, Eleanor decided to pursue graduate school at Columbia University. She earned a PhD in sociology in 1966. There, she met and worked with illustrious mentors, including Paul Lazarsfeld and Robert Merton, and her dissertation sponsor, Herbert H. Hyman, who introduced her to public opinion research and survey methodology. She went on to conduct research at Columbia University, The University of Chicago, and the U.S. Census Bureau.

In 2011, Eleanor, along with five co-authors of the textbook *Survey Methodology*, donated an estimated $60,000 in royalties to benefit graduate student education and research in survey methodology at ISR.

Eleanor touched my own career in a number of ways. She was the editor of *POQ*, which accepted my first methodological paper. We went on to collaborate on six papers and a book. I agree with Bob Groves that she was a superb writer and with Stanley Presser that no one came close to her as an editor. Bad prose went in and good prose came out.

Eleanor described herself as a contrarian, and I can attest that she could sometimes be prickly, but this quality made her abundant warmth and kindness all the sweeter. I'm one of the many people who will miss her sorely.

Eleanor is survived by her children, Emily and Lawrence, and her grandchildren. Memorial donations can be made to the American Civil Liberties Union, the Survey Research Center's Junior Faculty Fund at the UM Institute for Social Research, or the UM Cancer Center.

ISR has a more detailed obituary (from which I borrowed liberally) at *https://goo.gl/iyJDWw*.

International Conference on Health Policy Statistics

January 10–12, 2018
Charleston, South Carolina

REGISTRATION AND HOUSING OPEN
September 15, 2017

Health
Statistical Science
Care | Policy | Outcomes

PLENARY SPEAKER
Suchi Saria
The Johns Hopkins University

KEYNOTE SPEAKER
Robert M. Califf
Duke University

ww2.amstat.org/meetings/ichps/2018

2017 Causality in Statistics Award Winner Announced

The American Statistical Association will award the fifth Causality in Statistics Education Prize to Ilya Shpitser, John C. Malone Assistant Professor of Computer Science at The Johns Hopkins University, at the 2017 Joint Statistical Meetings in Baltimore.

Established in 2013 to "encourage the teaching of basic causal inference methods in introductory statistics courses" from a donation by Judea Pearl—recipient of the 2012 Turing Award and professor of computer science and statistics at the University of California, Los Angeles—the annual award recognizes the work of an individual or team that enhances the teaching and learning of causal inference in introductory statistics coursework. This year, the $5,000 award is being funded by Microsoft Research and Google.


Shpitser


Pearl

"While the study and practice of statistics is growing in popularity and demand in both academia and professional occupations, there remains a glaring gap when it comes to causal inference," said Pearl, who is co-chair of the prize-selection committee. "Even with the recent development of causal inference tools, which are currently sweeping new insights and application areas, most statistics educators and textbooks do not provide any information on these tools," he continued. "In giving this award, we not only recognize the dynamic efforts of renowned scholars, but also show other researchers and scientists that teaching causal inference can be fun and formative."

MORE ONLINE
These winning materials and those of previous Causality in Statistics Education Award winners are available to download from *www.amstat.org/education/causalityprize.*

Nominations for the 2018 award are being accepted until February 15, 2018. For additional information, see *www.amstat.org/education/causalityprize.*

2017 Prize Committee Members

Onyebuchi Arah, University of California, Los Angeles

Maya Petersen, University of California, Berkeley

Dennis Pearl (co-chair), Penn State University

Judea Pearl (co-chair), University of California, Los Angeles

Felix Elwert, University of Wisconsin-Madison

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Michael Posner, Villanova University

Arvid Sjölander, Karolinska Institutet

Tyler VanderWeele, Harvard School of Public Health

Ilya Shpitser has developed master's-level graduate course material that takes causal inference from the ivory towers of research to the statistics student with a machine learning and data science background. It combines techniques of graphical and counterfactual models and provides both an accessible coverage of the field and excellent conceptual, computational, and project-oriented exercises for students.

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Biopharmaceutical Symposium on Tap for October in Savannah

The Biopharmaceutical Applied Statistics Symposium will be held October 23–27 in Savannah, Georgia.

The 24th meeting of the Biopharmaceutical Applied Statistics Symposium (BASS XXIV) will be held October 23–27 at the Hotel Indigo Savannah Historic District in Savannah, Georgia.

One-hour tutorials on diverse topics pertinent to the research, clinical development, and regulation of pharmaceuticals will be presented October 23–25 by speakers from academia, the pharmaceutical industry, and the U.S. Food and Drug Administration.

For the first time, BASS will offer a poster session. Also, two parallel two-day short courses will be presented October 25–27.

Popular features of BASS are the keynote address, reception dinner, and FDA/industry/academia session.

BASS is a nonprofit entity established to support graduate studies in biostatistics. It has supported more than 50 master's or doctoral students in biostatistics. For more information, visit *www.bassconference.org* or contact the BASS registrar at *rewhitworth@gmail.com* or BASS chair, Tony Segreti, at *segretia@bellsouth.net*. ■

Professional Opportunity listings may not exceed 65 words, plus equal opportunity information. The deadline for their receipt is the 20th of the month two months prior to when the ad is to be published (e.g., May 20 for the July issue). Ads will be published in the next available issue following receipt.

Listings are shown alphabetically by state, followed by international listings. Vacancy listings may include the institutional name and address or be identified by number, as desired.

Professional Opportunities vacancies also will be published on the ASA's website (*www.amstat.org*). Vacancy listings will appear on the website for the entire calendar month. Ads may not be placed for publication in the magazine only; all ads will be published both electronically and in print.

Rates: $320 for nonprofit organizations (with proof of nonprofit status), $475 for all others. Member discounts are not given. For display and online advertising rates, go to *www.amstat.org/ads*.

Listings will be invoiced following publication. All payments should be made to the American Statistical Association. All material should be sent to *Amstat News*, 732 North Washington Street, Alexandria, VA 22314-1943; fax (703) 684-2036; email *advertise@amstat.org*.

Employers are expected to acknowledge all responses resulting from publication of their ads. Personnel advertising is accepted with the understanding that the advertiser does not discriminate among applicants on the basis of race, sex, religion, age, color, national origin, handicap, or sexual orientation.

Also, look for job ads on the ASA website at *www.amstat.org/jobweb*.

Alabama

■ The department of biostatistics, school of public health at the University of Alabama at Birmingham invites applications for a tenure-track, assistant professor faculty position. This is a 12-month, full-time position. A doctoral degree in biostatistics, mathematics, or a related discipline is required. Interested applicants should apply online at *https://goo.gl/UjRJvB*. UAB is an equal opportunity/affirmative-action employer.

California

■ The Department of Pediatrics together w/the Quantitative Sciences Unit (QSU) in the Department of Medicine's Center for Biomedical Informatics Research at Stanford University School of Medicine seeks a biostatistician to join its faculty at the assistant or associate rank in the non-tenure research line. Interested candidates should send a copy of their curriculum vitae, a brief letter outlining their interests, and three references to: *qsusearch@stanford.edu*. Stanford University is an equal opportunity employer.

■ The department of statistics and biostatistics at California State University, East Bay seeks candidates for 2 tenure-track assistant professor positions. The areas of application we seek are data science, data visualization, computational statistics, and statistics education. Applicants must have a PhD by start date. Apply online at *http://apply.interfolio.com/42202*. Department information at *https://goo.gl/wrnSzT*. California State University, East Bay is an EOE.

Michigan

■ Tenure-system faculty positions in neuroepidemiology. The department of epidemiology and biostatistics invites applications for tenured or tenure-system positions (assistant, associate, full professor) in the area of neuroepidemiology. Multiple tenure-system appointments are now available with competitive salaries and generous start-up packages that are supported by state general funds (i.e., "hard-funded"). For full description and to apply, go to *http://careers.msu.edu* and search for posting #4975. Michigan State University is an AA/EOE.

Canada

■ The department of statistics and actuarial science, University of Waterloo, invites applications for 2 or more tenure-track or tenured position in statistics or biostatistics. A PhD in statistics, biostatistics, or data science is required. Apply through *www.mathjobs.org/jobs*. Include cover letter, CV, research/teaching statements, up to three reprints/preprints and three reference letters. Full advertisement *https://goo.gl/1vpPC5*. Closing: September 15, 2017. EOE.

International

■ SUNY Korea, a global campus of Stony Brook University, invites applicants for the position of chair starting spring 2018. Qualifications: American education experience, fluent English; PhD in statistics or a related field, tenured faculty. To apply, send the following items to *hongshik.ahn@stonybrook.edu*: cover letter, CV, teaching statement, research statement, list of five references. Applications will be accepted until the position is filled. Website: *www.suny korea.ac.kr*. EOE. ■

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Next month's question: Who was your favorite teacher, and how did they inspire you?

Stephen Sugrue Telling your kids they're average is just mean.

Vince Schiavone Hey girl, you can put that Bonferroni aside; there's just no comparison.

Amanda Bar What do statisticians talk about in bed? Goodness of fit.

Chris Lacke Q: Why did the statistician want to have the tallest grass in the neighborhood?

A: He wanted everyone to tell him that his lawn needs to be mode.

Robbie Emmet I've gotten a constant flow of chain letters over the past two years - now that's what I call a stationery time series!

Emran Khondokar Hussain You and I are independent. That is why our love is multiplied. :)

Kenneth Ganning Where do statisticians park their cars? Ans Sample Spaces. Also acceptable: Parking Bayes.

Golden Eagle Assume normal distribution even though your data is simulated from chi-square distribution

Max Bberg Max married Min. They had an average relationship.

Brandon Sherman The Python library "emcee: The MCMC Hammer."

William Armstrong Statisticians do it with maximum likelihood and minimum bias.

Tina Young I try to get to the point, but I regress.

Emran Khondokar Hussain What is your Poisson of choice? :)

Eric Kawaguchi I fell in love with you since the first E(X) I saw you

Divya Dwivedi Statistics is itself a mathematical theory of ignorance ;)

Ka Wong Deviations are standard

Himel Mallick Expectations do not exist (captioned against a figure of Cauchy densities)!

Stefanie Jacinto Deo • @stefjacinto
I've been told my own pun was "terrible":

What do you call a male statistician who falls off a ship?

MANOVAboard :)

Seneca Widvey • @SenecaWidvey
Statistician puts one hand in ice water the other in boiling, and states on average it feels comfortable.

THIS IS BIOSTAT • @THISISBIOSTAT
It's 2017 and JSM Docents apparently are not called Gradient Docents please fix this @AmstatNews it's what the New Millennials want and need.

Josh Jelin • @jjelin
If someone has two Statistician lovers, but neither knows about the other, what do you call them? Naive Baes.

Statistics

The latest release of SAS/STAT® is now available. SAS/STAT 14.2 enriches numerous analyses and adds two more procedures to your portfolio.

SAS/STAT 14.2 Highlights

Propensity score analysis.

Estimation of causal treatment effects.

Time-dependent ROC curves for Cox regression.

Two-stage fully efficient fractional imputation and fractional hot-deck methods for survey data.

Balanced bootstrap and sequential Poisson methods for selecting random samples.

Recent SAS/STAT Highlights

Generalized additive models by penalized likelihood estimation.

LASSO method for selecting generalized linear models.

Classification and regression trees.

Weighted GEE methods.

Proportional hazards regression models for interval-censored data.

Bayesian choice models.

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