August 2012 • Issue #422

AMSTATNEWS

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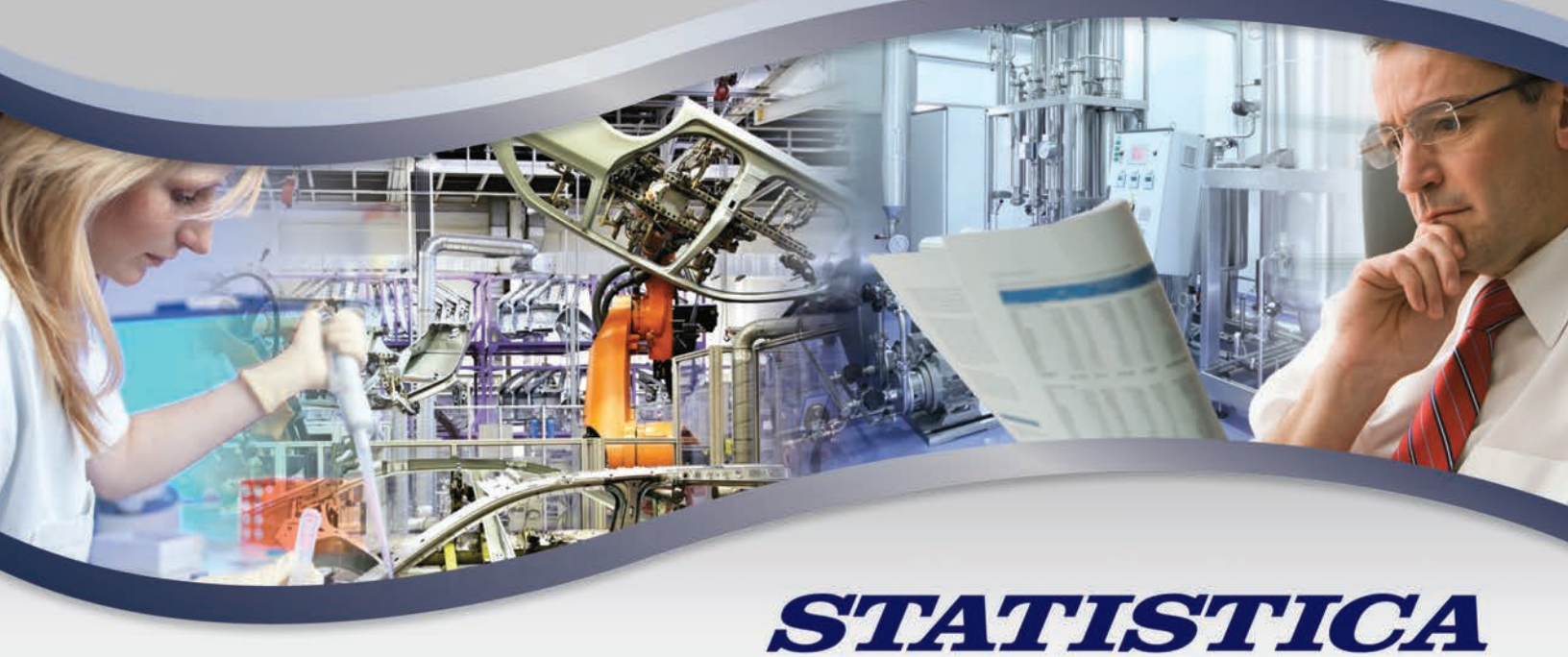
ALSO:

The ASA Fellow Award—Revisited

ASA Group Reviews *Mathematical Education of Teachers II*



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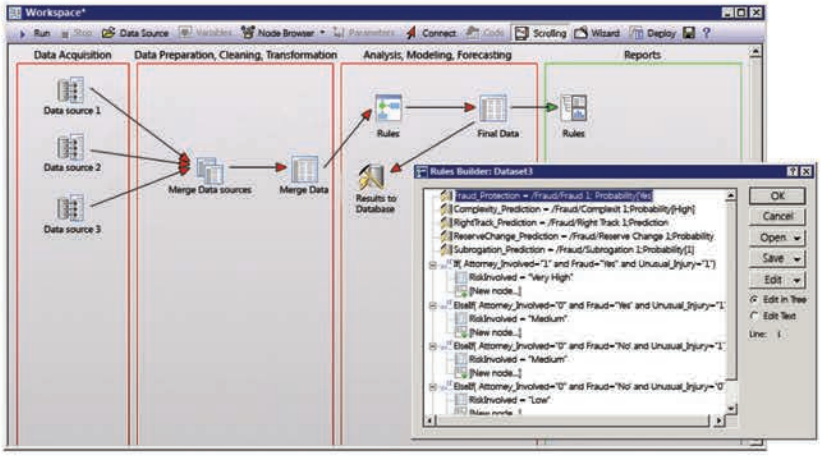

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Amstat News welcomes news items and letters from readers on matters of interest to the association and the profession. Address correspondence to Managing Editor, *Amstat News,* American Statistical Association, 732 North Washington Street, Alexandria 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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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

The ASA will celebrate its 175th anniversary in 2014. In preparation, column "175"—written by members of the ASA's 175th Anniversary Steering Committee and other ASA members—will chronicle the theme chosen for the celebration, status of preparations, activities to take place, and, best yet, how you can get involved in propelling the ASA toward its bicentennial.

Scheaffer

Contributing Editor

Richard L. Scheaffer, professor emeritus at the University of Florida, has dedicated much of his academic work to the improvement of statistics education throughout the school and college curriculum. He directed the first ASA Quantitative Literacy program and the task force that developed the Advanced Placement Statistics Program. He also has served on numerous education committees and advisory boards.

This column is written for statisticians with master's degrees and highlights areas of employment that will benefit statisticians at the master's level. Comments and suggestions should be sent to Megan Murphy, *Amstat News* managing editor, at *megan@amstat.org.*

Weng

Grady

Contributing Editors

Cindy Weng is a biostatistician II, who provides statistical consulting for pediatric clinical and translational research scholars and general pediatricians regarding statistical methods and the conduct of statistical analyses in support of the Study Design and Biostatistics Center at the University of Utah. She earned an MPH degree with an emphasis in biostatistics and epidemiology.

James Grady has many years of research experience as the lead biostatistician for numerous NIH-funded collaborative studies involving clinical and translational science in large-scale, population-based studies. He is a regular reviewer for the National Institute of Dental and Craniofacial Research and currently serves as the director of the biostatistics center for the Connecticut Institute of Clinical and Translational Science.

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*.

Albert

Contributing Editors

Jim Albert is professor of statistics in the department of mathematics and statistics at Bowling Green State University. His interests include Bayesian modeling, the statistical analysis of sports data, and statistical education. He is the editor of The American Statistician and writing a text on data analysis, probability, and statistics for prospective teachers.

Online Articles

The following articles in this issue can be found online at *http://magazine.amstat.org*.

The Council of Professional Associations on Federal Statistics (COPAFS) acts as the advocate for the development and dissemination of high-quality federal statistics. Member organizations include professional associations, businesses, research institutes, and others interested in federal statistics. Through COPAFS, members have an opportunity to review and have an effect on issues including timeliness, quality, confidentiality, and the relevance of data. To view the highlights of their June 1, 2012, meeting, visit *http://magazine.amstat.org/blog/2012/07/10/copafs-812*. Minutes and copies of the overheads used by the presenters can be found at *www.copafs.org*.

The following ASA members passed away recently: Kesar Singh, Earl S. Pollack, and Genichi Taguchi. Visit *http://magazine.amstat.org/blog/category/membernews/amstatpeople/obits* to read about their lives and careers. For a complete listing of the most recent members' obituaries, visit Statisticians in the News at *www.amstat.org/about/statisticiansinthenews.cfm*.

departments

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A Major Trend: The Rise of Undergraduate Programs in Statistics

Statistics majors in a class on statistical programming taught by Rebecca Ottesen in the department of statistics at Cal Poly San Luis Obispo

Photo courtesy of Rebecca Ottesen

During August, college students will flock to campus for the start of the academic year. You might be surprised to know that record numbers are registering as statistics majors. This column explains why—and what it means for these students and our profession.

What Has Changed?

Most statisticians of my vintage learned about statistics as graduate students, having earned an undergraduate degree in another field, such as mathematics. Although bachelor's degree programs in statistics existed as early as the 1940s, the number of degrees granted remained small for decades.

A landmark in the evolution of undergraduate statistics programs was a 1983 article in *The American Statistician* by Paul Minton, who pointed out that the lack of such programs diminished the recognition of statistics as a discipline. However, it was not until 15 years ago, when more high-school students began taking Advanced Placement (AP) Statistics, that the numbers of college majors and minors in statistics began to climb. Today, that number is at an all-time high.

In 2001, our association endorsed a set of curriculum guidelines for BS degrees in statistics (*www.amstat.org/education/pdfs/BS-curriculum.pdf*). These guidelines make up one of many ways the ASA statistical education community has strengthened the teaching of statistics at the undergraduate level.

What Trends Are Departments Seeing?

To learn more, I contacted statistics departments with large numbers of majors. Although their programs vary in emphasis, their stories paint an exciting picture for our profession. I'll start with two departments that have historically focused on training undergraduate majors.

Robert Rodriguez

At Cal Poly San Luis Obispo, Bob Smidt has seen a dramatic increase in the caliber and number of students applying as statistics majors—from five in the late 1990s to 60 in the last two years. Smidt credits this to AP Statistics, noting that "high-school students who have had a good experience in this class are more likely to apply."

In response to this increase, the Cal Poly program has evolved. It now emphasizes writing and communication skills, statistical programming, senior projects, and a capstone class that exposes students to working with clients. Graduates are highly employable, often receiving multiple offers

from companies that value the statistical contributions they make as analysts and programmers. Of these graduates, 30% to 50% go to graduate school and 20% to 30% earn a PhD.

At Brigham Young University, Del Scott reports an increase from 139 majors six years ago to 240 this year. To accommodate freshmen who have taken AP Statistics, his department developed a new introductory course that focuses on experimental design and is taken concurrently with calculus. A strong background in mathematics is essential for majors considering graduate school in statistics or biostatistics.

The department now offers three undergraduate degrees with distinct goals: statistical science as preparation for graduate work, actuarial science as preparation for an actuarial career, and applied statistics/analytics as preparation for corporate environments in which strong programming skills are in demand.

What About Majors in PhD-Granting Departments?

Growth is also the story in the department of statistics at Purdue, where the number of majors has doubled from 200 to 400 in the past five years. Rebecca Doerge notes that the undergraduate program in statistics emphasizes a strong theoretical foundation and computational skills. Most graduates either head to graduate school or work in pharmaceutical companies and other businesses with strong data-related needs.

At Purdue, another option for undergraduates is a program in actuarial science offered jointly by the departments of statistics and mathematics. An emerging career opportunity for these students is health care engineering, the specialization of Purdue's Regenstrief Center.

I found yet another example of rapid expansion at Carnegie Mellon University (CMU), where the department of statistics has 150 majors, up from 40 in 2006. Rebecca Nugent explains, "Exposure to statistics in AP courses is one reason why 17-year-olds now decide to major in statistics, along with a growing recognition that statistical skills are crucial in today's market." In addition to a major in statistics, CMU offers a major that combines economics and statistics.

The CMU program emphasizes working on research problems by using both classical methodology and newer, computationally intensive methods. Students participate in design competitions, work in groups, and are required to write reports and give presentations. Thirty to forty percent of students go to graduate school, and many find employment in banking, financial services, and insurance.

What Are Graduates Saying?

For a student perspective on these trends, I asked CMU graduates why they decided to major in statistics. Nora Albert, currently at the U.S. Census Bureau, answered with one word: versatility. She elaborated, "I knew that by majoring in statistics I would have a lens through which I could view any industry."

Daniel Frank, now a quantitative finance analyst at Bank of America, replied, "I decided that the possibilities with a solid statistics background are virtually limitless. Every field, from in-depth science to industry-focused jobs, requires statisticians in one way or another. The beauty of this degree is that you can move anywhere and do anything because your skills will always be in demand."

I also asked students what aspects of their undergraduate studies best prepared them for success. Hon Ming Quek, who is entering graduate school this fall, cited practical applications, proficiency in statistical software, and practice in writing reports. For Hannah Pileggi, now in graduate school, "the opportunity to participate in research was invaluable."

Major and Minor Conclusions

There are three points to glean from these stories. First, the number of students majoring or minoring in statistics is soaring because of positive experiences in AP Statistics courses. The word is out that statistics is a "must."

Second, successful undergraduate programs anticipate and deliver the training their students will require when they move into employment or graduate studies, whether in statistics or another field. For business-minded students, graduate programs in analytics are an increasingly attractive option.

Third, the growing on-the-job contributions of majors and minors are making statistics more visible and more valued by employers, colleagues, and society.

In view of the strong demand for skills needed to analyze Big Data—in business, government, and scientific research—we should update the ASA curriculum guidelines for BS degrees to reflect these needs. Defining appropriate statistical training is one way our association can take a leading role in the arena of Big Data.

Wherever our majors and minors land after graduation, we should make sure they see themselves as members of our profession. The best place for this to begin is the classroom. "As a teacher," says Nugent, "the most fun is watching students get excited about what they are doing and turning into members of the statistics community."

ASA–SIAM

How Do I Write a Book Proposal?

You've decided to write a book, or you already have a draft, and now you need to find a publisher. Between you and a publishing contract lies the book proposal form. Every publisher has one, and most of the information included is standard. Here's what you can expect to be asked when proposing a book to the ASA-SIAM Series on Statistics and Applied Probability.

The Basics

To start, you'll need to supply the full names and addresses of all authors, editors, or contributors, along with the title you're planning to use. Don't worry if you haven't entirely settled on a title yet. Provide one that's workable, and you can always revise it with help from reviewer and/or publisher suggestions.

Production Information

Next, you'll need to estimate how many pages the finished book will be and note whether you'll need color art so we can get an idea of whether we can produce your book at an affordable price for customers. We'll also want to know when you expect to finish the manuscript, so we can budget the book for the appropriate publication year.

Content

Now, it's time to talk about the technical content of the book. Briefly describe the focus of the book and your motivation for writing it. How do you expect people will use it, and why is there a need for it? What specific topics have you chosen to address? If there are related topics that you've purposely omitted, explain why. Be prepared to talk succinctly about how your book will differ from other books already on the market in the same topic area.

For example, have you included full proofs, case studies, extensive exercises, or new material not yet published elsewhere? Will you be offering supplementary online material such as data sets, code for particular software, or slides?

Purpose and Audience

What will the main purpose of your book be? Is it a monograph for researchers and practitioners? Is it an introductory book for people seeking to learn about a new area? Is it a textbook that provides exercises and problems for students to solve as homework or for self-study purposes? If it's a textbook, for what level of course is it intended, and what are the names of courses for which it would be reasonable to expect instructors to use it?

Competition

To help us get an idea of the place your book would have in the market, you'll be asked to mention competing books from other publishers and describe how your book differs from each. We'll also ask you to list titles from our catalog that are complementary to your book and which could be marketed with it.

The book proposal form encapsulates critical information about your book project and conveys it clearly to publishing staff, editorial board members, and reviewers. It also can help you, as the author, to think more deeply about the specifics of the book you'd like to write. Taking the time to answer the questions thoroughly and thoughtfully is an important step in finding the right home for your project.

If you're interested in submitting a proposal to the ASA-SIAM Series on Statistics and Applied Probability, please contact series acquisitions editor Sara Murphy at *murphy@siam.org*. ■

SAMSI Announces 2013–14 Programs

Richard Smith, director of the Statistical and Applied Mathematical Sciences Institute (SAMSI), recently announced that the two programs for the 2013–2014 year will be Computational Methods in Social Science and Low-Dimensional Structure in High-Dimensional Systems.

Like many areas of research, the social sciences have experienced a data explosion. Social scientists are examining statistical and computational methodology more these days for handling social science data sets. Many statisticians and applied mathematicians also are focusing on social sciences in applications of their work, including looking at social networks and causal inference.

Computational Methods in Social Science will focus on social networks, agent-based models, and new methodology for censuses and surveys. Program leaders include Robert Axtell of George Mason University, Elena Erosheva of the University of Washington, Doyne Farmer of Oxford University and the Santa Fe Institute, Steve Fienberg of Carnegie Mellon University, Krista Gile of the University of Massachusetts-Amherst, Mark Handcock of the University of California at Los Angeles, and Tian Zheng of Columbia University. Smith is the directorate liaison.

Low-Dimensional Structure in High-Dimensional Systems (LDHD) is devoted to the development of methodological, theoretical, and computational treatment of high-dimensional mathematical and statistical models. Possibly limited amounts of available data pose added challenges in high dimensions. This program will address these challenges by focusing on low-dimensional structures that approximate or encapsulate given high-dimensional data. Cutting-edge methods of dimension reduction will be brought together from probability and statistics, geometry, topology, and computer science. These techniques include variable selection, graphical modeling, classification, dimension reduction in matrix estimation, empirical processes, and manifold learning. Working groups will include theoretical discussions of these tools and applications to image and signal analysis, graphs and networks, genetics and genomics, dynamical systems, and machine learning.

Program leaders for LDHD include Florentina Bunea of Cornell, Peter Hoff of the University of Washington, Chris Holmes of Oxford University, Peter Kim of Guelph, Vladimir Koltchinskii of Georgia Tech, John Lafferty of The University of Chicago, Gilad Lerman of the University of Minnesota, Sara van de Geer of ETH Zurich, Marten Wegkamp of Cornell, and Bin Yu of Berkeley. Ezra Miller is the directorate liaison.

There are several opportunities for people to participate in either of these programs. Financial support is available for visiting researchers to be residents at SAMSI for one month to one year. Young researchers have special opportunities to participate that typically have a one-year appointment. Several postdoctoral positions also will be funded for each program.

Workshops and working groups give many the opportunity to collaborate with others on research projects and network with their peers. Dedicated workshops will allow graduate and upper-level undergraduate students to learn about the latest research and applications in the statistical and mathematical sciences. All involved researchers will receive chances to broaden their interests and skill sets, participate in cutting-edge interdisciplinary projects, and make new connections. New researchers and members of under-represented groups are especially encouraged to participate.

For more information or to apply, visit *www.samsi.info.* ■

STAFF SPOTLIGHT

Naomi Friedman

Hello, my name is Naomi Friedman, and I am the ASA's newest meetings planner. As a member of the meetings department, I will be working on the annual JSM and planning additional conferences throughout the year. I am excited to be part of the team and wanted to take a moment to introduce myself.

Although I grew up in the Washington, DC, area, I originally hail from New York (City) and consider myself a New Yorker at heart. I graduated from George Mason University with a degree in communications and recently earned my Certified Meeting Professional designation from the Convention Industry Council.

I've been in the meetings industry for several years, starting my career on the hotel side before making the shift to planning. Most recently, I was with the Hearth, Patio, and Barbecue Association, where I worked on meetings such as the HPBExpo—an annual trade show—and with their education program. Let's face it, how can you go wrong with fireplaces and grills?

When not at work, I can usually be found spending time with my two crazy dogs, wandering around town, or planning my next trip with friends. In addition to making my way around the United States, I love collecting stamps on my passport. So far, they include the United Kingdom, France, Greece, Israel, Turkey, and Canada. I can't wait to see where I will go next!

I look forward to meeting many of you at JSM in San Diego and this fall during H2R 2012 in New Orleans! If you have any questions or need assistance, please feel free to contact me at *naomi@amstat.org*. ■

Statistics Without Borders Participates in Science Diplomacy Program

Statistics Without Borders (SWB), the ASA all-volunteer group, will provide pro-bono instructors for the Pyongyang Summer Institute (PSI) in Survey Science and Quantitative Methodology in North Korea this summer. The PSI is an intensive, international teaching program at the Pyongyang University of Science and Technology (PUST), the first and only private and international university, which was launched in North Korea in the fall of 2010.

PSI is the first program of its kind in North Korea, which has now approved visas for 15 visiting faculty. PSI students are expected to be upper-level undergraduates and graduate students whose academic credentials are comparable to those students in Ivy plus schools.

The summer institute is jointly administered by the International Strategy and Reconciliation Foundation (ISRF), PUST, and SWB. The ISRF is a nonprofit organization recognized by the U.S. Treasury and Commerce departments for its humanitarian and educational programs in the Democratic People's Republic of Korea. The PSI will begin as a three-year pilot program that will take place from July 2012 to July 2014.

For four weeks, SWB members will provide both fundamental and advanced courses in sampling, statistics, survey methods, census methods, questionnaire design, and computer-assisted data collection and analysis. The courses were modeled after those of the 65-year-old Michigan Summer Institute, a renowned international survey training program. ■

Member Spotlights WANTED

The managing editor of *Amstat News* is searching for ASA members who are willing to put themselves in the spotlight and write a brief article about their life, to be published in an upcoming issue.

The article should be 1,200 or fewer words and contain professional and personal information. Please include a photo of yourself and email it to *Amstat News* Managing Editor Megan Murphy at *megan@amstat.org*.

The ASA Fellow Award—Revisited

Robert Starbuck

The 2012 ASA Fellow awards were presented recently at JSM in San Diego, California. Here, I present a brief update to previous articles about this award appearing in *Amstat News*.

Employment Sector

In the range of years shown, the percentages of ASA members by employment sector have remained relatively stable: 42% Academe, 47% Business/Industry, and 11% Government.

The counts of ASA Fellow awards given by employment sector since 2004 are presented in Table 1 and Figure 1.

Table 1—Counts and Percentages of ASA Fellow Awards by Employment Sector

	Employment Sector			
Year	Academe	Business/Industry	Government	Total
2004	36 (64.3)	11 (19.6)	9 (16.1)	56
2005	38 (67.9)	8 (14.3)	10 (17.9)	56
2006	50 (83.3)	5 (8.3)	5 (8.3)	60
2007	37 (62.7)	11 (18.6)	11 (18.6)	59
2008	32 (60.4)	13 (24.5)	8 (15.1)	53
2009	36 (63.2)	15 (26.3)	6 (10.5)	57
2010	43 (81.1)	5 (9.4)	5 (9.4)	53
2011	45 (77.6)	8 (13.8)	5 (8.6)	58
2012	37 (77.1)	7 (14.6)	4 (8.3)	48

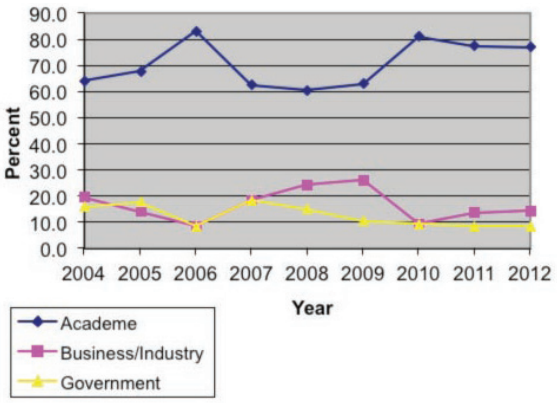

Figure 1. Counts of ASA Fellow awards given by employment sector since 2004

The percentages of Fellows awarded by employment sector relative to the percentages of ASA membership by sector are shown in Figure 2.

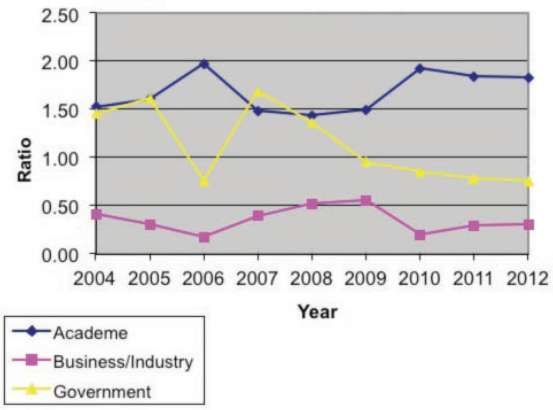

Figure 2. Percentages of Fellows awarded by employment sector relative to the percentages of ASA membership by sector

The counts and percentages of Fellow nominations by employment sector are shown in Table 2. The total number of nominations was the lowest this year since 2004 and was noticeably lower than last year in all employment sectors. The number of nominations from government was considerably lower this year than in the other eight years included in this report, and the number of nominations from business/industry was the second-lowest in the nine years included in this report.

Table 2—Counts and Percentages of ASA Fellows Nominations by Employment Sector

	Employment Sector			
Year	Academe	Business/Industry	Government	Total
2004	44 (58.7)	16 (21.3)	15 (20.0)	75
2005	51 (57.3)	22 (24.7)	16 (18.0)	89
2006	81 (73.0)	19 (17.1)	11 (9.9)	111
2007	79 (65.8)	22 (18.3)	19 (15.8)	120
2008	60 (64.5)	18 (19.4)	15 (16.1)	93
2009	59 (62.1)	23 (24.2)	13 (13.7)	95
2010	71 (72.4)	13 (13.3)	14 (14.3)	98
2011	76 (72.4)	18 (17.1)	11 (10.5)	105
2012	62 (75.6)	14 (17.1)	6 (7.3)	82

So, how have the nominations fared in each of the employment sectors? As shown in Table 3 and Figure 3, nominations submitted this year from the business/industry and government sectors fared better than those in the previous two years, and those from academe were similar to those submitted in the previous three years.

Table 3—Percentages of Successful ASA Fellows Nominations by Employment Sector

	Employment Sector		
Year	Academe	Business/Industry	Government
2004	81.8	68.8	60.0
2005	74.5	36.4	62.5
2006	61.7	26.3	45.5
2007	46.8	50.0	57.9
2008	53.3	72.2	53.3
2009	61.0	65.2	46.2
2010	60.6	38.5	35.7
2011	59.2	44.4	45.5
2012	59.7	50.0	66.7

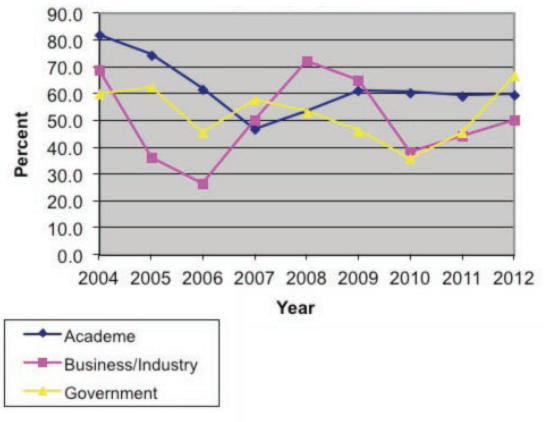

Figure 3. Percentages of successful ASA Fellows nominations by employment sector

Gender

The membership of the ASA has changed significantly in the percentages of females and males, as illustrated in Table 4 and Figure 4. This table looks at the current ASA membership and subsets that joined the ASA in ranges of previous years.

Assuming the number of departures from ASA membership has been proportional to gender (i.e., females and males are equally likely to discontinue or retain ASA membership), there has been a noticeable increase in the percentage of female members.

Table 4—Percentages of ASA Membership by Gender

Current ASA Members	Female	Male
Joined ASA ≤ 1985	17	83
Joined ASA ≤ 1990	20	80
Joined ASA ≤ 1995	22	78
Joined ASA ≤ 2000	23	77
All	32	68

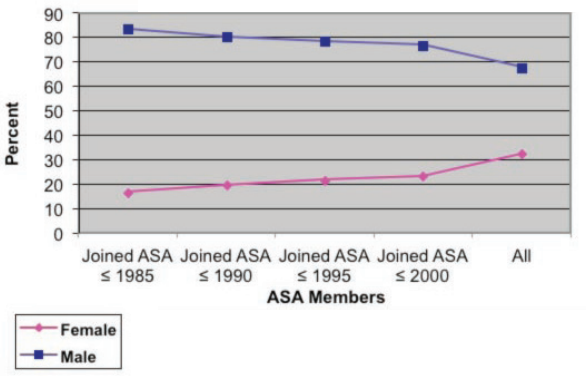

Figure 4. Current ASA members by gender

The ASA Fellow award is almost always given to ASA members who have reached mid-career, and as such, the gender percentages of ASA membership that are appropriate reference points for years 2004–2012 are those reflecting members who joined the ASA on or before 1994–2000. Thus, the relevant reference percentages for females for Fellow nominations and awards are in the 20% to 23% range.

The counts and percentages by gender of ASA Fellow nominations in 2004–2012 are presented in Table 5.

Table 5—Counts and Percentages of ASA Fellow Nominations by Gender

Year	Female	Male	Total
2004	14 (18.7)	61 (81.3)	75
2005	24 (27.0)	65 (73.0)	89
2006	25 (22.5)	86 (77.5)	111
2007	22 (18.3)	98 (81.7)	120
2008	16 (17.2)	77 (82.8)	93
2009	12 (12.6)	83 (87.4)	95
2010	24 (24.5)	74 (75.5)	98
2011	19 (18.1)	86 (81.9)	105
2012	19 (23.2)	63 (76.8)	82

The percentage of female nominees in 2012 was consistent with the reference percentages.

The counts and percentages by gender of ASA Fellow awards in 2004–2012 are presented in Table 6, and the percentages are presented in Figure 5.

Table 6—Counts and Percentages of ASA Fellow Awards by Gender

Year	Female	Male	Total
2004	13 (23.2)	43 (76.8)	56
2005	15 (26.8)	41 (73.2)	56
2006	11 (18.3)	49 (81.7)	60
2007	14 (23.7)	45 (76.3)	59
2008	11 (20.8)	42 (79.2)	53
2009	7 (12.3)	50 (87.7)	57
2010	17 (32.1)	36 (67.9)	53
2011	12 (20.7)	46 (79.3)	58
2012	13 (27.1)	35 (72.9)	48

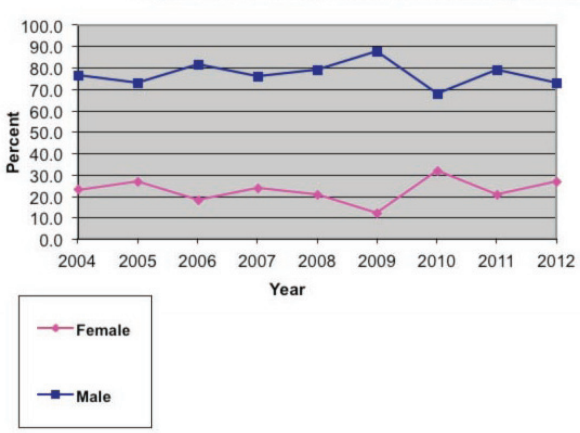

Figure 5. Percentages by gender of ASA Fellow awards in 2004–2012

The percentages of female Fellow awardees have been generally reflective of the reference percentages. As shown in Table 7 and Figure 6, the decline in the percentage of female Fellow awardees in 2009 was due simply to the lower percentage of female Fellow nominations. For nominees, the average chance of success is somewhat higher for females.

Table 7—Percent of Successful ASA Fellow Nominations by Gender

Year	Female	Male
2004	92.9	70.5
2005	62.5	63.1
2006	44.0	57.0
2007	63.6	45.9
2008	68.8	54.5
2009	58.3	60.2
2010	70.8	48.6
2011	63.2	53.5
2012	68.4	55.6
Mean	65.8	56.5

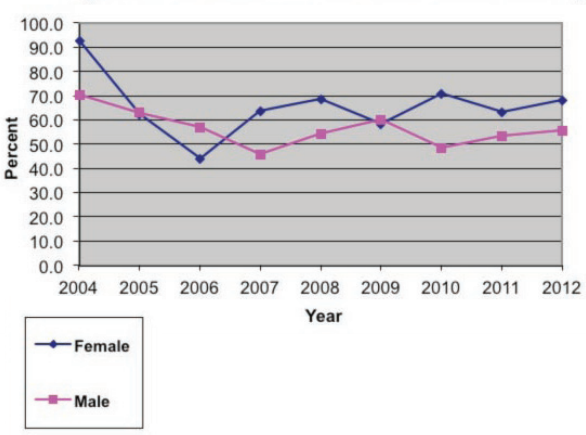

Figure 6. Percent of successful ASA Fellows nominations by gender

Conclusion

The number of Fellow nominations from a given employment sector or gender is a key factor in determining the number of awards from that sector. The other obvious key factor is the quality of the nominations. To increase the number of Fellow awards in an employment sector or gender to achieve parity in the percentages of awards relative to the percentages of ASA membership (see figures 2 and 5), the number of nominations from that sector or gender needs to increase, and these nominations need to be of good quality.

The ASA Fellow award is a significant recognition of contributions to the statistics profession, and one that should reflect the constituency of the ASA membership. If you or others you know are deserving of this award, please participate in and encourage others to participate in the award nomination process. ■

New Approach to Analysis of Cancer Clinical Trials in June *JASA*

The June 2012 issue of the *Journal of the American Statistical Association* features an article describing novel strategies for the analysis of sequentially randomized clinical trials in the Applications and Case Studies (A&CS) section, along with comments from experts in that research area. Other A&CS articles include contributions in ecology, economics, and brain imaging. The Theory and Methods section contains important contributions on model selection in high-dimensional problems and the theory behind portfolio selection in finance, as well as many other contributions.

Applications and Case Studies

Cancer therapy is usually conducted in stages. A physician chooses an initial treatment based on the patient's disease severity and perhaps other patient characteristics. That treatment will be continued if successful, but may be altered if the initial treatment does not lead to a favorable response or if it has intolerable side effects. Multistage strategies are known as dynamic treatment regimes, or adaptive treatment strategies. In "Evaluation of Viable Dynamic Treatment Regimes in a Sequentially Randomized Trial of Advanced Prostate Cancer," authors **Lu Wang**, **Andre Rotnitzky**, **Xihong Lin**, **Randall Milliken**, and **Peter Thall** present a new statistical analysis of data from a two-stage clinical trial of advanced prostate cancer treatments. The initial analysis of the data in 2007 identified the best treatments in stage one and the best treatments in stage two separately, but did not directly address the question of the best two-stage dynamic treatment regimes. This reanalysis carefully defines the full set of viable treatment regimes, constructs a new compound endpoint incorporating both treatment effectiveness and treatment toxicity, and addresses the patients who did not comply with their assigned viable treatment regime.

Estimation is carried out using an inverse probability of censoring weighted estimator. Two comments provide additional insight into the analysis of sequential randomized trials. **Daniel Almirall**, **Daniel Lizotte**, and **Susan Murphy** contribute important points regarding the design of multistage trials and alternative approaches to accommodating multiple outcomes in the data analysis. **Paul Chaffee** and **Mark van der Laan** describe an alternative inference approach for such studies: targeted minimum-loss–based estimation. The article and comments shed light on an important class of trials for evaluating cancer treatments.

Mid-study changes of a different type are considered in a second *JASA* A&CS paper. **Lane Burgette** and **Jerome Reiter** consider the case when the technique used to measure important study variables is changed in the middle of the study. The Healthy Pregnancy Healthy Baby Study is an observational study focused on identifying causes of adverse birth outcomes. Blood samples from expectant mothers were sent to a laboratory to measure exposure to several pollutants, including lead. Midway through the study, the investigators changed from one lab to another because the second could provide more finely quantitated exposures. When investigators began to analyze the data, they noticed there were differences in the distribution of the measurements from the two labs; the differences were larger than could be explained by chance. Unfortunately, no samples were analyzed at both labs, which makes calibrating the two sets of measurements challenging.

In "Nonparametric Bayesian Multiple Imputation for Missing Data Due to Mid-Study Switching of Measurement Methods," Burgette and Reiter develop a set of methods that allow imputing the later measurements for those measured only using the earlier protocol. They treat the later measurements as "missing" data. Their imputation approach for these missing data is based on the reasonable assumption that the two labs accurately rank samples, although they score them on different scales. The rank preservation assumption (i.e., the same ranking would be obtained in each lab) leads to three imputation strategies. The strategies work well in simulation and are then used to estimate quantile regressions relating the distribution of infant birth weights to the level of maternal exposure to environmental contaminants.

Theory and Methods

Model selection in linear regression models is an important problem with an extensive literature. The problem has become increasingly important in modern high-dimensional problems in which there are many predictor variables from which to choose. Many Bayesian and frequentist approaches have been proposed. The standard assumptions incorporated in Bayesian model selection procedures have resulted in procedures that are not competitive with commonly used penalized likelihood methods.

In "Bayesian Model Selection in High-Dimensional Settings," **Valen Johnson** and **David Rossell** propose

modifications of the Bayesian methods by relying on nonlocal prior densities on model parameters to improve performance. The authors show that model selection procedures based on nonlocal prior densities reliably find the correct model in linear model settings when the number of possible covariates is bounded by the number of observations. The key to the improved performance is that Bayesian approaches based on standard local prior densities (which are nonzero for null values) assign positive probabilities to incorrect models that include some coefficients that are truly zero. The nonlocal prior densities avoid this behavior. In addition to consistently identifying the true model, the proposed Bayesian procedures based on nonlocal prior distributions provide accurate estimates of the posterior probability that each identified model is correct. Simulation studies demonstrate that the new model selection procedures perform as well as or better than commonly used penalized likelihood methods in a range of simulation settings.

A different type of "selection" problem is the focus of another Theory and Methods paper, "Portfolio Selection with Gross-Exposure Constraints" by **Jianqing Fan**, **Jinjjin Zhang**, and **Ke Yu**. Portfolio selection and optimization have been fundamental problems in finance ever since the development of Markowitz's portfolio theory, which proposes choosing one's portfolio (the amount of each asset to purchase/sell) to maximize the expected return of the portfolio subject to a constraint on the variability of returns. Though Markowitz's proposal represented a significant theoretical breakthrough, it turns out there are practical problems in applying the theory because the optimal Markowitz portfolio is sensitive to errors in estimating/forecasting the expected returns and the covariance matrix of the returns. The problems are especially important in situations where there are a large number of assets from which to choose.

Fan, Zhang, and Yu develop an extension of the usual Markowitz formulation by introducing a constraint on the total amount of investment at risk (which includes money used to buy assets and also the risk in short sales of assets). The so-called "gross exposure constraint" allows the authors to investigate the circumstances under which constrained portfolio selection has good properties relative to the unconstrained solution. They show that for a range of values of the constraint parameter, the constrained approach leads to optimal portfolios that have smaller actual risk than the globally optimal portfolios while at the same time allowing for more accurate estimation of the risk.

There are many other informative articles in both sections of the June issue, as well as a set of book reviews. The full list of articles and a list of the books under review can be viewed at *http://amstat.tandfonline.com*. ■

TECHNOMETRICS HIGHLIGHTS

Computer Experiments Motivate New Approach to Bayesian Computation

Hugh Chipman, *Technometrics* Editor

Simulation-based techniques for Bayesian computation have seen widespread application over the last two decades. Although flexible, they can be time consuming in some problems. This is especially true when the likelihood may be expensive to evaluate. Approximation methods, such as variational Bayesian inference, have shown promise, but may not provide sufficient accuracy. In "Bayesian Computation Using Design of Experiments-Based Interpolation Technique," **V. Roshan Joseph** develops a new approximation method for posterior inference that is quick, accurate, and adaptive.

By leveraging ideas from the design and analysis of computer experiments, a kriging model is fit to the posterior distribution, giving highly accurate approximations in a variety of applications. The techniques are general, easy to implement, and applicable to many complex Bayesian problems. By using sequential design of experiments, the approximation can be further improved though adaptive addition of basis functions.

The article is accompanied by several excellent discussions and a rejoinder by the authors, which explore a number of extensions of the method. The discussants are **Björn Bornkamp**, **Tirthankar Dasgupta**, **Xiao-Li Meng**, **Herbert K. H. Lee**, **John T. Ormerod**, **M. P. Wand**, **David M. Steinberg**, and **Bradley Jones**. The directions explored in the discussions suggest DoIT will provide fertile ground for further research into the use of tools from computer experiments for Bayesian computation.

The remainder of the issue includes articles about reliability, process monitoring, time series, and compliance testing. This latter topic is studied in "Compliance Testing for Random Effects Models with Joint Acceptance Criteria," by **Crystal D. Linkletter**, **Pritam Ranjan**, **C. Devon Lin**, **Derek R. Bingham**, **Richard A. Lockhart**, **Thomas M. Loughin**, and **William A. Brenneman**. For consumer protection, many governments perform random inspections on goods sold by weight or volume to ensure consistency between actual and labeled net contents. Motivated by a problem from a real manufacturing process, the paper provides an approximation for the probability of sample acceptance that is applicable for processes with one or more known sources of variation via a random effects model. This approach also allows the assessment of the sampling scheme of the items.

In "An improved Bayesian Information Criterion for Multiple Change-Point Models," **Alexis Hannart** and **Philippe Naveau** use a meteorological application to motivate the problem of identification of change-points in a time series. In that problem, the removal of systematic shifts due to changes in measurement systems is an important step before the series can be used. Prior information is used in a Bayesian analysis, with a closed-form form of a BIC-like expression for identification of the change-points.

The remainder of the issue is devoted to papers involving process monitoring. In "Monitoring Warranty Claims with Cusums," by **Jerald F. Lawless**, **Martin Crowder**, and **Ker-Ai Lee**, the monitoring of reliability is considered. Using data from warranty claims on North American vehicles, the paper develops practical monitoring methods designed to allow changes in claim rates to be detected in as timely a manner as possible.

In "Posterior Distribution Charts: A Bayesian Approach for Graphically Exploring a Process Mean," **Daniel W. Apley** develops a Bayesian approach for monitoring and graphically exploring a process mean and informing decisions related to process adjustment. Observations are represented as a process mean plus a random error term, and the mean process can follow any Markov model. This includes a mean that wanders slowly, that is constant over periods of time with occasional random jumps, or combinations thereof. This exploratory approach is illustrated using an example from automobile body assembly.

Matthias Tan and **Jianjun Shi** also develop Bayesian methods for process monitoring in their paper, "A Bayesian Approach for Interpreting Mean Shifts in Multivariate Quality Control." The focus here is on identification of the important factors that led to an out-of-control signal when monitoring multivariate quality characteristics. An adaptation of Bayesian variable selection methods from linear regression provides both a probabilistic framework for diagnosis and a mechanism for incorporating expert knowledge.

The issue closes with "Outlier Detection in Functional Observations with Applications to Profile Monitoring," by **Guan Yu**, **Changliang Zou**, and **Zhaojun Wang**. Monitoring of profile data (also known as functional data) is becoming increasingly common with available sensor technology. To use such data for profile monitoring, outliers must be removed first. This paper proposes a new testing procedure based on functional principal component analysis. After deriving the appropriate null distributions, the test statistic is demonstrated in a real-data example from a manufacturing process. ■

Maintaining Quality in the Face of Rapid Program Expansion

Rebecca Nugent, Carnegie Mellon University

My, how times have changed. Many of today's senior faculty and leading industry statisticians probably didn't take nonintroductory statistics courses until graduate school. Now, incoming freshmen have not only placed out of introductory statistics and calculus, but they've already selected statistics as their major, applied for their first data analytics summer internship, and declared their undying allegiance to big data. What on Earth do we do with this new generation?

In the department of statistics at Carnegie Mellon University, we've been asking ourselves this very question. CMU has an undergraduate enrollment of nearly 6,000 students; recently, the department of statistics has been teaching about 1,000 undergraduates per semester from across the campus. Even with our high service demand, one pressing problem is the rapid expansion of the undergraduate statistics program. In the last five years, the number of statistics and economics-statistics majors has quadrupled to around 150 students. Given the department's focus on groundbreaking research and strong commitment to high-quality vertically integrated education, we are faced with redesigning our curriculum to satisfy demand while maintaining our high standard of statistical training for both industry and graduate school. Not an easy task.

Program Overview

Our program combines a solid theoretical background with thorough exposure to methodology, both traditional and modern. After introductory courses and mathematics prerequisites, majors take a year sequence in probability and statistical inference. Doing well prepares them for the subsequent methodology sequence—a thorough treatment of linear regression followed by a semester of advanced data analysis methods including bootstrap simulation, kernel smoothing, splines, generalized linear and additive models, causality, and Markov models. The enrollment in this sequence has increased by 400% over the past five years, not solely due to the majors. As other programs such as mathematical sciences, business administration, and computer science embrace the importance of understanding modern statistical methods, more and more students are showing up in our classrooms.

Lower-level electives in statistical graphics and visualization, sampling and survey methods, experimental design, and statistical computing help students gain programming skills and "data sense" before the advanced methodology classes. Advanced electives are offered in stochastic processes and "special topics." The special topics courses are offered every semester with rotating topics that include statistical methods in epidemiology, statistical learning, multivariate analysis, multilevel and hierarchical models, and data mining. Given our flexible—but stable—rotation design, most of our majors take at least two or three special topics courses. Weekly seminars are occasionally offered on topics such as statistics in sports or statistics and the law. Qualified students also are allowed to take first-year graduate courses, most commonly statistical inference or methodological courses like parallel computing or machine learning.

Undergraduate Research

Carnegie Mellon University is fully committed to undergraduate research; the statistics program is no exception. In response to the overwhelming growth of our capstone methodology courses, we created an invitation-only research course that pairs small groups of students with faculty clients across campus (and occasionally industry) for a semester-long research project. Accepted students learn the basic principles of research, including literature reviews, methodology comparisons and critiques, and presentation of results. Each team presents their final project in an oral defense, a poster session, and a written report.

While enrollment tends to favor the more qualified seniors, we encourage promising junior statistics majors to apply, knowing that participation in this course will prepare them for a senior honors thesis the following year. Our thesis students meet as a group during the year to give updates on their research and receive feedback from faculty and peers. We have found that, rather than isolating the student and adviser, the group dynamic has increased the quality of the completed theses.

Research projects are also available to other interested students. The department has a long history of supporting undergraduate research internally and with outside grant support. Each semester, there are four or five students working on National Science Foundation (NSF)–sponsored research projects, typically as members of research

groups that include faculty and graduate students. Our summer programs have included participation in Morehouse College's Project IMHOTEP, a program designed to increase minority participation in statistics (also a feature of our current NSF Research Training Group (RTG) grant), and this year's group of 13 undergraduates sponsored by both the RTG and our NSF Census Research Node grant. If students do not qualify for NSF funding (due to citizenship), they are offered course credit or department-funded stipends. Independent studies are also available. In all cases, students are expected to present their research to the department and at the annual Carnegie Mellon undergraduate research symposium. This year, we had around 50 students competing in the statistics research competition—a record number.

The department also has funds earmarked for undergraduate support in the form of two endowments, the DeGroot Memorial and Frederick Sorensen Memorial in Statistics funds. These contribute to awards and travel subsidies for undergraduates to attend and/or present their work at conferences.

Program Challenges

One of our primary challenges has been the simultaneous preparation of students for both industry and graduate school. The general CMU population skews toward the quantitative analysis job market and, as such, needs to be well versed in methods, but also oral and written communication. These skills are, of course, part of a successful graduate school experience, as well. Every upper-level course in our department includes writing and presentation skills. For example, in linear regression, students are required to analyze large data sets from real, interdisciplinary research problems and present their findings in scientific reports. These projects and reports build in complexity over the semester, culminating in something similar to a master's-level qualifying exam experience. All students receive individual report feedback (including grammar and spelling). Students are required to regularly defend their work to faculty and other students in poster sessions, class presentations, or one-on-one conversations. Students also are taught to critically analyze their work and suggest possible improvements without prompting.

Almost every assignment, exam, or project is grounded in a real, ongoing research problem. In upper-level courses, all data sets are large, messy, and complicated. It is not uncommon for sophomores to be working with thousands of observations with missing values. Students are presented with background material on a research problem and then asked to address specific scientific questions. They quickly become accustomed to the need to integrate the statistical analysis and the research problem at hand.

Given the large number of students in both the program and our classes, building a sense of community has never been more important. We pride ourselves on providing personal feedback and a welcoming, nurturing environment. However, as numbers grow, the feasibility of this approach fades. Students who struggle often feel isolated in large classes; students who chafe under the necessarily stricter large class framework feel stifled. Oddly enough, we have found that fostering friendly competition has been enormously helpful in building a community of creative, motivated undergraduate statisticians. For example, students might be given a set of training data and a week to design an algorithm that optimizes a given error criterion. Students can work in teams or on their own; they then present their approach and test their algorithms live in class on a set of test data. The winners might receive extra credit, but also bragging rights. We have held these types of competitions in several classes and they have yet to disappoint.

One surprising result is that the winners are not always the top students in class. Some struggling students will completely devote themselves to the competition, learning additional advanced material on their own. The day of the competition is easily the most energetic day of the semester; the classroom is filled with cheers, groans, high-fives, and even dancing. Even in our statistical inference class, our version of "Theory Jeopardy" had more than 80 students in a large auditorium frantically trying to solve inference problems in teams while judges checked their work. When faced with the "Daily Doubles," the cheers from the teams able to double their scores were deafening. Who knew statistics could be so cool?

We think the best way to manage our growing program is to build a community in which the statistics majors feel they are more than a name on a file. We advocate group collaboration and engagement in departmental activities. Our seniors lead by example, both in the classroom and in the larger CMU community. Anecdotally, we hear stories of upper-class statistics majors "adopting" newer majors in campus social organizations. The majors also have a student advisory committee to represent the departmental undergraduate interests; this committee sponsors both professional development activities (e.g., interview preparation seminars) and social events (e.g., a human histogram to celebrate World Statistics Day). This year's CMU undergraduate statistics sweatshirt says "Statistics majors are always right … probably." Sounds about right to us. ■

Misuse of Statistics a National Problem

I was greatly interested and pleased to learn that ASA is now giving a course, "Stats for Staffers." I cannot think of a more important group to get lessons in statistical literacy than those who are in the corridors of power. The course seems excellent, but I think that there are even more basic needs in the area of statistical literacy, which I'm not sure are being met. I'm referring to distortions that occur in the media. CNBC's May 7 article, "The Inflation of Life - Cost of Raising a Child Has Soared," (*http://finance.yahoo.com/news/inflation-life-cost-raising-child-145736881.html*) is an excellent recent example.

This media story says, "The cost of raising a child from birth to age 17 has **surged** 25 percent over the last 10 years, due largely to the rising cost of groceries and medical care, according to the Department of Agriculture, which tracks annual expenditures on children by families." Even more misleading is the headline, which says, "The Inflation of Life - Cost of Raising a Child Has **Soared**" [bolding is mine]. The words "surged" and "soared" are not found in the Department of Agriculture report, which can be downloaded from *www.cnpp.usda.gov/Publications/CRC/crc2010.pdf*.

The words surged and soared are obviously misleading, because a 25% increase over 10 years represents an annual rate of inflation of 2.26% (compounded). This is just about the overall rate of inflation in the United States. What we see here is verbal distortion of statistical facts, which happens frequently in the public arena.

I'm not sure whether the misuse of statistics is best addressed through education in statistical literacy, some watchdog function such as *www.factcheck.org*, or something else. But we do have a national problem, which I think should be of interest to ASA and its members.

Sincerely,
Morris Olitsky

Statistician, USDA, FNS,
Mid-Atlantic Regional Office

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Broadening and Deepening Statistical Thinking: Educating for 2014 and Beyond

Richard Scheaffer

As I write this column, the debate about the future of the American Community Survey is taking place in Congress, with one member stating, "We're spending $70 per person to fill this out. That's just not cost effective, especially since, in the end, this is not a scientific survey. It's a random survey." How better to state the need for expanded statistics education for all?

The ASA has a history of leaders with a penchant for education, such as 1944 president Helen Walker, who, from at least a decade earlier, pushed for more and better statistics education at the college level and encouraged adding statistics to the school (K–12) curriculum. Fred Mosteller, 1967 president and a phenomenal educator, established the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability, influential in expanding statistics in the schools ever since. That committee developed the quantitative literacy projects of the 1980s, which led to the inclusion of statistics in NCTM mathematics standards and, later, provided support for the AP Statistics program. These efforts to build statistics into school mathematics have led to such programs as the Meeting Within a Meeting Statistics Workshop for Mathematics and Science Teachers and Beyond AP Statistics Workshop for AP Statistics teachers.

The *Journal of Statistics Education* and *Significance* provide valuable resources for both school and college statistics education, while the GAISE report (*www.amstat.org/education/gaise*) provides guidelines for statistics teaching in both venues. The latter has become a standard reference wherever standards in statistics teaching are being addressed and will continue to carry the mark of sound statistics education into the future. In light of its primacy, the ASA should consider updating this report.

Today, the future of statistics education in the schools is intimately connected to the future of the Common Core State Standards (CCSS) in mathematics, an effort coordinated by the National Governors Association and the Council of Chief State School Officers. Even though the standards were released some time ago, there are numerous support activities open to contributions from interested parties such as the illustrative tasks project *http://illustrativemathematics.org*. Progress on the all-important assessments being developed for these standards can be viewed (and periodically critiqued) at *www.smarterbalanced.org* and *www.parcconline.org*.

How can colleges aid the CCSS project to improve statistics education? The statistics and probability standards of grades 6–12 are well beyond what one finds in current state standards, with few exceptions, and beyond what many mathematics teachers have experienced in any deep way. Thus, a central task of colleges and universities is to improve the education of prospective teachers.

Guidelines on what is needed and how it may be provided can be found in a soon-to-be-released report of the Conference Board of the Mathematical Sciences, titled "The Mathematics Education of Teachers II." This report challenges mathematics and statistics departments to work with colleges of education to develop sound courses for future teachers that emphasize the topics they will actually teach.

Typically, statistics departments are not engaged with education departments in any productive way; this will have to change if statistics education at the school level is to make any pronounced improvement. Otherwise, the statistics standards will be sidestepped or, perhaps worse, taught poorly.

As expected, total enrollment in the typical college introductory statistics course is low in statistics departments as compared to mathematics departments across four-year and two-year colleges, with the most rapid expansion taking place in the latter. So, statisticians (and the ASA) need to reach out to improve statistics teaching from this wider perspective. More alarming, though, is that enrollments in second statistics courses drop dramatically across the board. Greater emphasis must be placed on developing useful second courses in statistics to serve the needs of many students who need to think statistically at a deeper level, including future K–12 and college teachers and, perhaps, even future politicians.

With the support of the ASA, statistics educators are making progress in developing sound curricula, informative assessments, and innovative materials for both schools and colleges. This progress must continue and expand to include ever-widening domains of students. Such would provide a worthy tribute to the first 175 years of the ASA and bode well for the second. ■

The Carl Morris Honorary Symposium on
LARGE-SCALE DATA INFERENCE

INTERSECTION OF STATISTICS AND DATA VISUALIZATION

OCTOBER 18, 2012 • AFI THEATER, SILVER SPRING, MARYLAND

KEYNOTE SPEAKER

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Harvard University

DIANNE COOK
Professor
Department of Statistics & Statistical Laboratory
Iowa State University

MARK H. HANSEN
Professor
Department of Statistics
University of California—Los Angeles

ROBERT KASS
Professor
Department of Statistics
Carnegie Mellon University

CHRIS VOLINSKY
Director
Statistics Research Department
AT&T Labs-Research

The goal of this symposium is to provide a forum for discussion on the role of statistics in data visualization. Speakers and panel members—Eleanor Feingold, Vicki Ann Lancaster, Martin McIntosh, and Naji Younes—invite you to this 1-day event for breakfast, lunch, and great discussion!

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MASTER'S NOTEBOOK

Experiences as a Biostatistician at an Academic Health Center

Cindy Weng, University of Utah, and Jamie Grady, University of Connecticut

Take a glance at any published medical article and you will likely see that statistical methods, in terms of study design and analyses, play a major role in its success. Medical research heavily relies on the application of appropriate statistical methods. In addition to the technical aspects of a statistical analysis lays another crucial element: the human element. An effective collaboration between clinical researchers and biostatisticians is an essential aspect of a successful statistical analysis. Here, Cindy Weng and James Grady share how they learned to collaborate, prioritize, and appreciate their work as consultants at academic health centers.

Cindy Weng's Perspective

When I began working at the Study Design and Biostatistics Center (SDBC), I was fortunate to have mentors who were experienced biostatisticians in medical research. They collaborated effectively with medical researchers—by using innovative research techniques—in various aspects of medicine, basic science, study design, statistical methods, epidemiology, and causal inference in diversified medical areas. At that time, I thought I was well prepared to take on the responsibilities of my new job; however, I was quickly surprised by how little I knew about certain aspects of statistical methodology and design, particularly sample size and power analysis. We seemed to cover little of this in my graduate statistics program. In addition, nonstatistical skills such as consulting, effective nonverbal and verbal communication, and business and management knowledge are essential to the employed biostatistician today.

My first assigned project had to do with sample size and power determination for a tiny study, around five patients. The study used a crossover design to compare the effect of noninvasive cortical stimulation among children with hemiplegic cerebral palsy (CP) in an intervention to several sham groups. A paired t-test to determine power of the study seemed to be an elementary statistical problem to solve for most biostatisticians, but at that time, was difficult for me. Therefore, I sought out my mentors' guidance on not only how to approach this specific problem, but on research study methodology as well so I could further educate myself. I continue to learn and expand my knowledge on this topic where I can. In fact, I recently discovered a book titled *Sample Size Calculations in Clinical Research*—written by Shein-Chung Chow, Jun Shao, and Hansheng Wang—that has proven to be useful.

I think continually expanding your skill set is necessary in today's competitive world.

Since earning my MPH degree with an emphasis in biostatistics, I have developed expertise while assisting in statistical analyses of epidemiologic and observational studies. There are many rewards that come from my career, including direct interaction with physician scientists, contributing statistical concepts to studies, and seeing results from these studies published in prestigious journals, regardless of my authorship status. I will continue developing my expertise by taking additional education courses at JSM and my local university.

In fact, I expect to earn a comparative effectiveness research certificate in the summer of 2013. Comparative effectiveness research (CER) compares existing health care interventions to determine the benefit and harm of each and the most effective intervention to treat patients on an individual basis. The promise of CER to biostatisticians is that it enables us to best assist researchers in designing studies that can support patients, physicians, policymakers, and resource planners to make practical medical decisions. Through this certificate, I hope to continually develop professionally and would like to fulfill my goal of becoming a CER expert.

To broaden my experience as a biostatistician, I am an active member of the ASA Section on Statistical Consulting. I also have been enjoying volunteering for Statistics without Borders (*http://community.amstat.org/statisticswithoutborders/home*). My first project with this organization considered the effect of humanitarian aid given by the International Rescue Committee at Pakistan refugee camps. The objective was to compare U5 mortality of children born to women ages 15–49. With the number of volunteers and amount of statistical expertise at SWB, the SWB New Projects Committee would like to contact nonprofit organizations in need of statistical consulting. I am a member of the SWB New Projects Committee and am assigned to the CharityFactors organization. Through these activities, I hope to gain more experience in communicating, collaborating, and working with nonprofit organizations.

Jamie Grady's Perspective

Beginning with graduate school, I have 25 years of experience consulting at academic health centers. Projects have been both big and small, and the variety of clients fit my personality, as I enjoy juggling many activities at once. Success in this environment requires flexibility—client investigators don't always plan things perfectly—and you need to be accommodating.

Interact: One rewarding aspect for biostatisticians at academic centers is being involved in the educational mission of a university and interacting with other medical faculty, students, and postdocs. The many projects that come about from basic science and clinical research studies at a health science center allow you to use many of the statistical methods learned in graduate school. Sometimes, I feel like a generalist on the job; I am on the surface of many statistical applications, but not deep into any of them. However, in my experience, what may seem like a quick consult is usually much appreciated by the client.

Write: Another challenge in academia is being asked to write a statistical section of a manuscript or grant proposal, sometimes without extensive background information or knowledge of the subject area. These investigators might only use statisticians sporadically, every few years when they need to submit a new grant. This is the reality of the consulting statistician. Of course, it is not the preferred arrangement for an ongoing collaboration, but it can be the beginning of one. Consulting statisticians can provide assistance when planning studies, an exercise that is often quite rewarding.

Prioritize: Experience will give you the ability to prioritize. You might need to go the extra mile for the highly funded senior investigator's grant; maybe not for the fellow who needs a 'quick analysis' for a poster submission to a conference. Experience on the job gives you confidence in making these decisions and prioritizing your effort.

Reward: An ongoing challenge is getting credit for consultations and collaborations on grants. Some universities are changing their tenure and promotion criteria to reflect the value of collaborators. Be sure to understand how your institution views and/or rewards collaborations when planning your career.

Statistical consulting and collaboration will continue to play a major role for some statisticians, and may be the basis of their jobs. Having good mentors when you enter the field of statistical consulting can help foster a successful career. Becoming a person with strong statistical training who also can communicate effectively to nonstatisticians will be a strong asset to any business, industry, or academic workplace. Last but not least, continuing education and attending conferences help tie this all together by allowing you to stay current, develop collegial relationships, and improve your skill set.

For more information about consulting and the statistician-client relationship, please visit *www.amstat.org/sections/cnsl/brochures.cfm* for a brochure published by the Section on Statistical Consulting. You can give a copy to your clients as well. ■

STAT*tr@k*

Preparing for a Career as a Sports Statistician: Two Interviews with People in the Field

Jim Albert, Bowling Green State University

Many students are fascinated with statistics and sports and ask about a possible career working as a sports statistician. To help them understand this career, Jim Albert contacted Ben Alamar and Keith Woolner, who are actively working as statisticians with professional sports teams. Each was asked a similar set of questions, and their answers shed light on the background, academic skills, statistical methods, and people skills that are important for a person in this vocation.

Interview with Ben Alamar

Ben Alamar earned a BS in economics from the University of Minnesota and an MA and PhD in economics from the University of California at Santa Barbara. Currently, he is a professor of sports management at Menlo College and works part time as a sports statistician for the Oklahoma City Thunder. Alamar founded the *Journal of Quantitative Analysis of Sports*—an ASA journal dedicated to the statistical analysis of sports data—in 2005.

JA: When were you first interested in statistics applications in sports?

BA: I wrote my first paper on modeling the probability that an NFL team would make the playoffs during my third quarter in graduate school. I liked the paper, but never got it published. I didn't return to stats in sports until I was a post doc at UCSF. I did some consulting work for a start-up company in the field and decided that it was the area I wanted to concentrate on.

JA: What are your professional duties as a sports statistician?

BA: I provide analysis on players and team strategy, as well as tackle larger research projects.

JA: Is your position as a sports statistician a full-time or part-time position?

BA: I work part time with the Oklahoma City Thunder and do a variety of other consulting work in the field, but I am also a professor of sports management at Menlo College.

JA: What skills and academic training (e.g., college courses) are valuable to sports statisticians?

BA: High-level statistics courses of all types are valuable, as are acquiring advanced data management skills such as SQL.

JA: Are there specific statistical tools or topics that you find especially helpful in your work? If a person had to take, say, three courses in statistics to help them in your work, what courses would they be?

BA: Some important tools include basic regression analysis, logistic regression, Monte Carlo simulation, classification, and hierarchical regression. Just as important as the technical tools though is the skill of effectively communicating the analysis to nontechnical audiences.

JA: Is there specific statistics or data-management software that you find helpful?

BA: R and SQL are very useful

JA: What are the first steps in entering the sports industry as a statistician?

BA: There is no clear path. I recommend that aspiring sports analysts try to answer a question they think a general manager or coach would find interesting, then find a way to get that work into the hands of people who might be interested. There is no shortage of people interested in working in the field, but there is a shortage of people who have actually done good work in the field.

JA: In "Moneyball," there was some resistance to the use of statistical methods to learn about players, especially by people who were not part of the baseball establishment. Do you think there is a similar resistance to the use of statistical methods in basketball?

BA: I would not classify it as resistance, but I think there is a natural skepticism of employing any new tool when you have had success previously without it. As decisionmakers gain more exposure to information that analysis can provide, they tend to become more interested.

JA: Do you think there will be an increasing demand for statisticians in your particular sport?

BA: Yes, I do. Data sets are becoming more complex (motion capture technology is being used to track everything that moves on the court 25 times a second) and the general concept of using statistics is gaining more acceptance; these factors will lead to more teams employing large analytics groups.

JA: Are there particular websites for the interested student to visit to learn about the current work in basketball analytics?

BA: Hoopdata.com, basketballvalue.com, and apbr.org.

JA: Do you have other general advice for high-school or college students who are interested in a career as a sports statistician?

BA: The advice I give to anyone interested in basketball statistics is to read *Basketball on Paper*, by Dean Oliver, try to start thinking like a GM/coach instead of a fan (think about how analysis can actually be used to inform decisionmaking), and work on communicating complex analyses to people who do not know linear algebra.

Interview with Keith Woolner

Keith Woolner earned two bachelor's degrees from MIT—one in mathematics with computer science and one in management from the MIT Sloan School of Management. He then earned a master's degree in decision analysis from Stanford University. While he was employed as a software developer, he regularly contributed to *Baseball Prospectus* (*www.baseballprospectus.com*). In 2007, Woolner left *Baseball Prospectus* to join the front office of the Cleveland Indians professional baseball team.

JA: When were you first interested in statistics applications in sports?

KW: I've always had an affinity for both baseball and math, and I memorized many of the statistics on the backs of baseball cards as I child, but it wasn't until I was an undergrad at MIT in the late 1980s that I discovered the Usenet newsgroup rec.sport.baseball on the Internet and learned about the emerging field of sabermetrics and the work researchers like Pete Palmer and Bill James were doing. I was fascinated by it, eventually started tinkering around with my own methods, and began publishing my own invented stats in the mid to late 1990s. That led to my involvement with *Baseball Prospectus* and set me on the path to an eventual career in sports statistics. But, I didn't seriously think a career in sports was an option for me until just a couple of years before I joined the Indians.

JA: What are your professional duties as a sports statistician?

KW: My title is director of baseball analytics, and in that role, I manage a team of analysts and

programmers who support baseball decisionmaking by organizing, analyzing, and presenting information. We help baseball operations put the best possible team on the field. In many cases, that involves developing statistical models to measure player value, forecast future performance, and answer questions about game strategy and tactics.

JA: Is your position as a sports statistician a full-time or part-time position?

KW: My current role with the Indians is a full-time position. When I was with *Baseball Prospectus*, it was part-time and mostly a hobby.

JA: What skills and academic training (e.g., college courses) are valuable to sports statisticians?

KW: I would say there are three sets of skills you need to be a successful sports statistician:

Quantitative skills—the statistical and mathematical techniques you'll use to make sense of the data. Most kinds of coursework you'd find in an applied statistics program will be helpful. Regression methods, hypothesis testing, confidence intervals, inference, probability, ANOVA, multivariate analysis, linear and logistic models, clustering, time series, and data mining/machine learning would all be applicable. I'd include in this category designing charts, graphs, and other data visualizations to help present and communicate results.

Technical skills—learning one or more statistical software systems such as R/S-PLUS, SAS, SPSS, Stata, Matlab, etc. will give you the tools to apply quantitative skills in practice. Beyond that, the more self-reliant you are at extracting and manipulating your data directly, the more quickly you can explore your data and test ideas. So being adept with the technology you're likely to encounter will help tremendously. Most of the information you'd be dealing with in sports statistics would be in a database, so learning SQL or another query language is important. In addition, mastering advanced spreadsheet skills such as pivot tables, macros, scripting, and chart customization would be useful.

Domain knowledge—truly understanding the sport you want to analyze professionally is critical to being successful. Knowing the rules of the game; studying how front offices operate; finding out how players are recruited, developed, and evaluated; and even just learning the jargon used within the industry will help you integrate into the organization. You'll come to understand what problems are important to the GM and other decisionmakers, as well as what information is available, how it's collected, what it means, and what its limitations are. Also, I recommend keeping up with the discussions in your sport's analytic community so you know about the latest developments and what's considered the state of the art in the public sphere. One of the great things about being a sports statistician is getting to follow your favorite websites and blogs as a legitimate part of your job!

JA: What are the first steps in entering the sports industry as a statistician?

KW: My path into sports was atypical, so it's hard to use that as a basis for a strategy to get into the industry. There are more opportunities in sports now than there were years ago, but also greater competition due to the increased awareness of sports analysis as a career path from the popularity of "Moneyball" and the like.

What I usually tell people who ask me that question is that the best way to break into baseball analysis is to just start doing it on your own. Build up a base of knowledge so you're aware of the state of the art and complement that with the technical skills you need to answer your own questions well. Write, write, and write some more. Your body of work is your résumé, and if you demonstrate your capabilities and develop expertise in a particular area, teams will notice. The more you can show that you both have the quantitative skills and the baseball knowledge to help a team, the better off you will be.

JA: What kinds of data do you collect and analyze beyond team and individual performance?

KW: There's a tremendous amount of detailed data being collected during every game. The basic outcome data (how many hits, walks, runs, errors, homers, etc.) are the most obvious example, but we also

collect information about where on the field each ball was hit, what kinds of pitches were thrown, and what situations each batter and pitcher faced.

There are cameras installed in every MLB ballpark that track the path of the pitch in flight to the plate, so we know how fast each pitch was thrown, how much each curve ball curved, where each pitch was released and crossed the plate, whether the batter swung, and how hard he hit it if he made contact.

Beyond the data collected in-game, we have many years' worth of scouting reports, physiological tests, medical histories, psychological profiles, coaching assessments, contract data, service time records, arbitration case histories, negotiation records. We also have thousands of hours of recorded video. All these sources can be useful in analyzing and forecasting both team and player performance.

JA: How have statisticians influenced the operations of your team?

KW: Although I can't get into specifics, I think where we have had the most influence is on improving the consistency of our decisionmaking process. The clarity that comes from performing the same analyses and running the same models every time we evaluate a different scenario provides some balance against being swayed by emotional reactions, or unduly influenced by the loudest voice in the room. At the same time, you will always have a need for the knowledge and intuition of experts like coaches, scouts, and executives, because every situation is unique. There's no one-size-fits-all approach that works every time, and no computer can evaluate every possibility. But having that consistent evaluation process as a starting point helps ground your thinking so you avoid making mental mistakes as you work through a decision.

JA: Do you believe there will be an increasing demand for statisticians in your particular sport?

KW: I think there will be an increasing demand for statisticians who both understand their sport's unique characteristics and can identify the right statistical methods to apply to a problem.

More and more, teams are even looking beyond their sports operations department and employing statistical techniques on their ticketing, marketing, ballpark/stadium operations, personnel scheduling, food and beverage, and merchandising data. There are many ways an analyst could help a club in these areas, too, so they shouldn't be overlooked.

Because baseball was ahead of the curve in adopting statistical analysis, we may be closer to the saturation point than other sports. Eventually, there is an upper limit to how many jobs there could be with major league teams, as the number of clubs is pretty small and it's unlikely that a team would need hundreds of analysts to meet their needs. The number of opportunities may be even greater in other sports than in baseball. But, even now, baseball teams are still hiring and expanding their analytic departments, so we're not at that point yet. There's still room for growth.

JA: Do you have some other general advice for high-school or college students who are interested in a career as a sports statistician?

KW: Don't neglect the soft skills. Being successful in sports analysis is not just about having the most data or the best algorithm. Many brilliant analysts have struggled because they couldn't get others to listen and buy into their ideas. It's not enough to be right; you also have to be persuasive. Communication skills, both spoken and written, are important and under-rated. If you can't explain what you've analyzed to someone who doesn't have the same statistical training, you'll have a hard time influencing the decisions they make.

Also realize that choosing a career in sports means spending a lot of time and long hours with your coworkers. How you are perceived by your colleagues determines how much they like you, respect you, and trust your judgment. Optimism, humility, open-mindedness, and a sense of humor go a long way toward building the foundations of good working relationships. ■

First eCOTS Claims Success

The first biennial Electronic Conference on Teaching Statistics (eCOTS) was hosted by the Consortium for the Advancement of Undergraduate Statistics (CAUSE) from May 13–18. The conference was presented over the Internet and showcased three themes: Debating the Big Ideas of Teaching Statistics, Statistics for the Modern Student, and Commercial Resources for Teaching Statistics.

A total of 420 statistics educators and students registered to participate live in the eCOTS program offerings. The week began with a series of 30-minute breakout sessions. Sessions covered a variety of topics, including interactive teaching of probability distributions and theory, using advertisements to teach statistical literacy, the second course in statistics, teaching bootstrapping and randomization-based methods, data visualization on the iPad, teaching in the online environment, using games to teach statistics, statistical computing, simulation and audience response systems in the statistics classroom, and what students need to know about statistics in the 21st century.

Twenty-two virtual poster presentations were pre-recorded and available throughout the week. Posters provided five-minute audio-visual presentations on teaching statistical bioethics online to involving undergraduates in statistical consulting to understanding the beguiling coincidences seen in big data. Participants could view posters and leave feedback on a special discussion board set up for each poster.

A short workshop was held on May 17 about the CATALST project at the University of Minnesota (*www.tc.umn.edu/~catalst*). This workshop was led by three graduate students from the statistics education program at the University of Minnesota: Rebekah Isaak, Laura Le, and Laura Ziegler. The fully subscribed workshop gave participants a two-hour introduction to the CATALST curriculum.

The final day of eCOTS began with a keynote presentation by Hans Rosling, who talked about using a fact-based worldview to engage statistics students. This was followed by a series of panel presentations in which the leaders of breakout sessions reconvened to respond to audience questions and discuss their work in more detail. The conference culminated in a keynote presentation by Webster West, who focused on the effect of technology on the teaching of statistics.

Those interested in learning more about eCOTS and viewing recordings from breakout sessions, posters, keynote talks, and panel presentations are encouraged to visit *www.causeweb.org/ecots*.

Upcoming Workshop

CAUSE is pleased to announce "Identifying and Addressing Difficult Concepts for Students in the Introductory Statistics Course," a one-day workshop geared toward instructors at two-year colleges or instructors who are new to teaching statistics. The workshop will be led by Marjorie Bond of Monmouth College on September 15 in Monmouth, Illinois, and November 7 in Jacksonville, Florida, as a pre-AMATYC conference workshop. There is no registration fee to attend. Details and registration information are available at *www.causeweb.org/workshop*. ■

ASA Announces 2012 Statistics Poster and Project Competition Winners

The American Statistical Association is pleased to announce the winners of the 2012 Poster Competition and Project Competition. First-place winners received $200, a plaque for themselves and their school, and grade-appropriate graphing calculators for themselves and their advisers provided by Texas Instruments. Second-place winners received $100 and a plaque; third-place winners received $50 and a plaque; and honorable mentions received certificates.

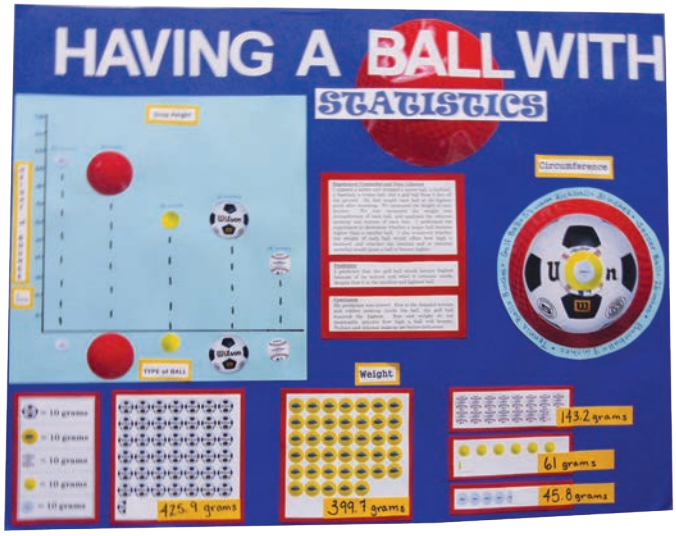
The poster and project competitions are directed by the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability, with Linda Quinn of Cleveland State University serving as the poster competition leader and Jamis Perrett of Texas A&M University serving as the project competition leader. K–12 posters are due every year on April 1. Projects (written reports) for grades 7–12 are due every year on June 1. Visit the competitions web page at *www.amstat.org/education/posterprojects* for information about previous winners and how to enter. Also access instructional webinars and a rubric of how the posters and projects are judged.

2012 National Project Competition Winners

Each year, the statistical project competition attracts a wide variety of submissions in which students from grades 7–12 conduct creative studies. This year, the submission deadline for the project competition was changed to June 1 to enable participation from high-school students who may have been preparing for the AP Statistics exam administered in mid-May. The new deadline also made it possible for teachers who might otherwise be busy at the AP reading to assist with the competition judging. The statistical project competition was especially useful for these students because it provided them with opportunities to apply all the statistical skills they had acquired throughout the school year to solve real-world problems of interest to them. Motivation to participate in the competition included monetary awards, plaques, and new Texas Instrument calculators. Results of the project competition and a list of the judges can be found at *http://magazine.amstat.org*.

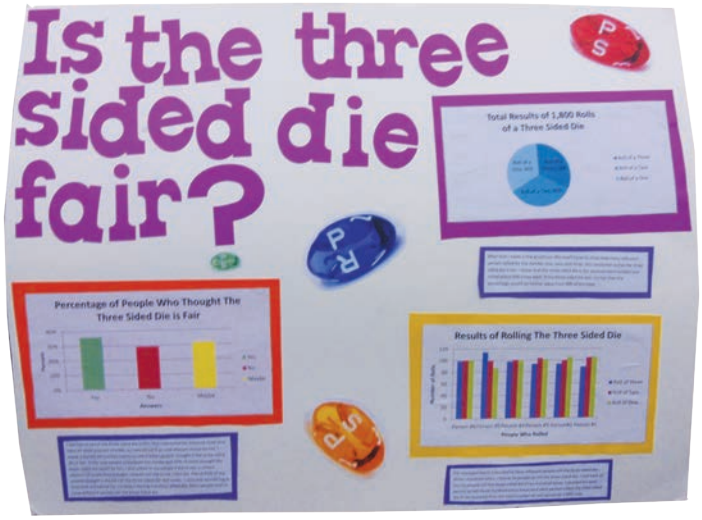
2012 National Poster Competition Winners

Grades K–3

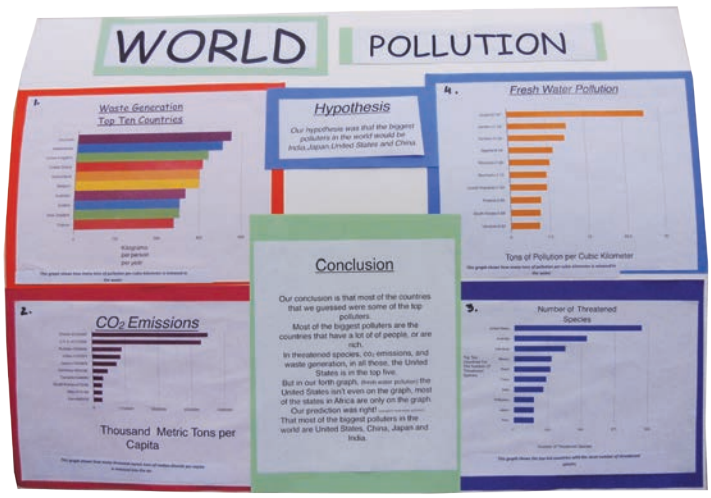


First Place
Brandon Samuels
"Having a Ball with Statistics"
Manatee Bay Elementary
Weston, FL

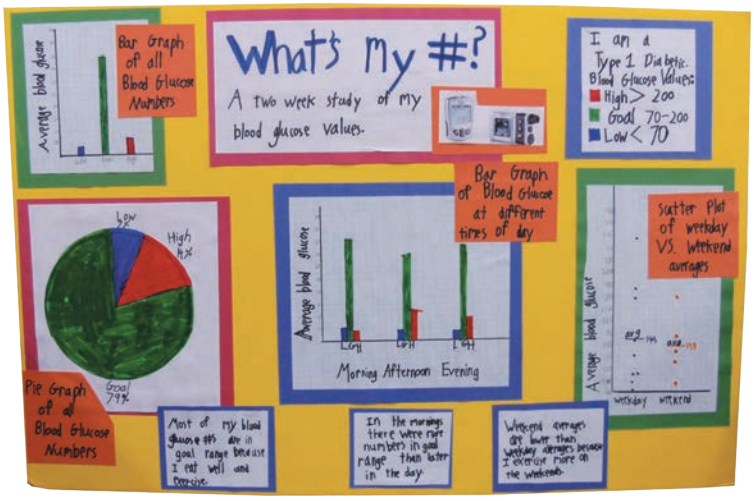
Second Place
Adva Oshri and Sophia Zapata
"Look Who's Talking"
Manatee Bay Elementary
Weston, FL



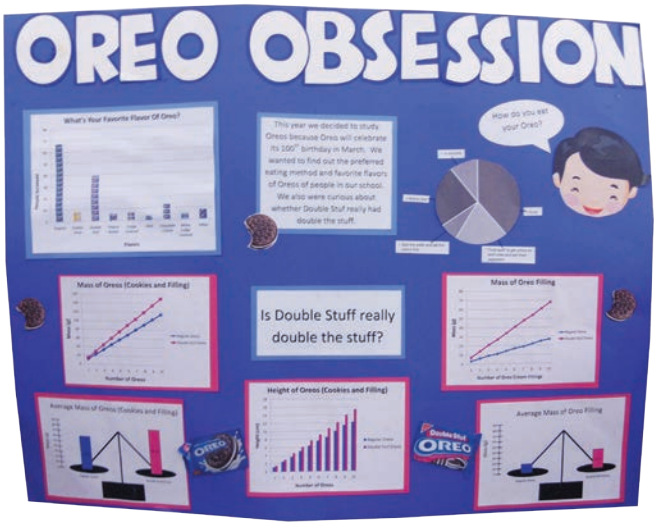
Third Place (tie)
Joyce Huang
"Is the Three-Sided Die Fair?"
Worthington Park Elementary
Westerville, OH



Third Place (tie)
Oren Aviad, Peter Berganross, Iesa Khanji, Kabir Khwaja, Victoria McNelis, Arnav Paliwal, Ava Pfannenbecker, and Cole Wissink
"World Pollution"
Beecher Road School
Woodbridge, CT

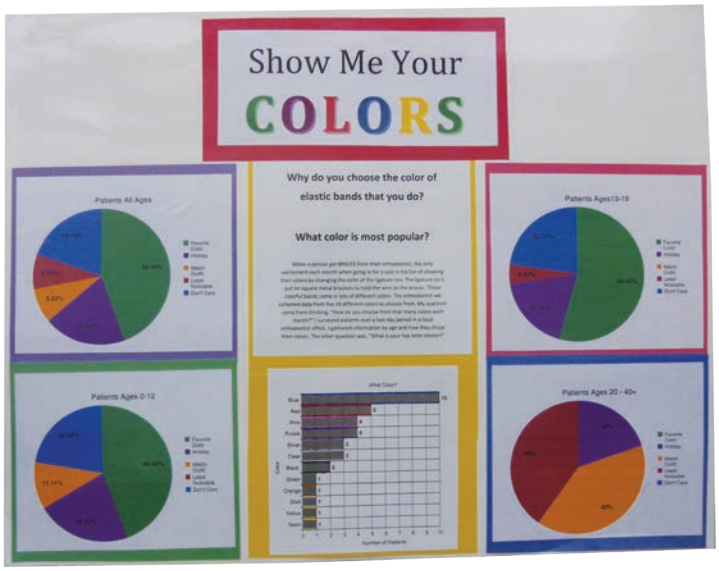


Honorable Mention
Joseph McClelland
"What's My Number? Blood Glucose Values"
Ada Vista Elementary
Ada, MI

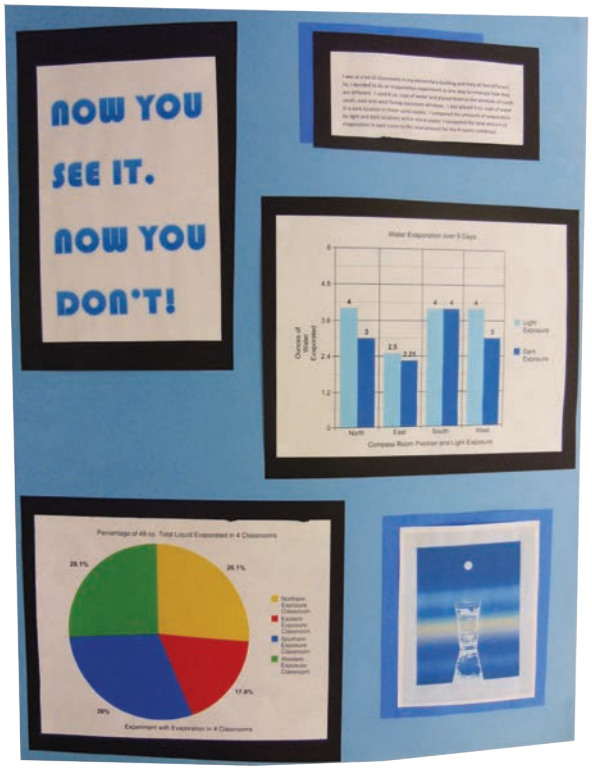


Honorable Mention
Brooke Shirley, Anthony Aronson, Gino Bartolini, and Madison Prenni
"Oreo Obsession"
Saltsburg Elementary School
Saltsburg, PA

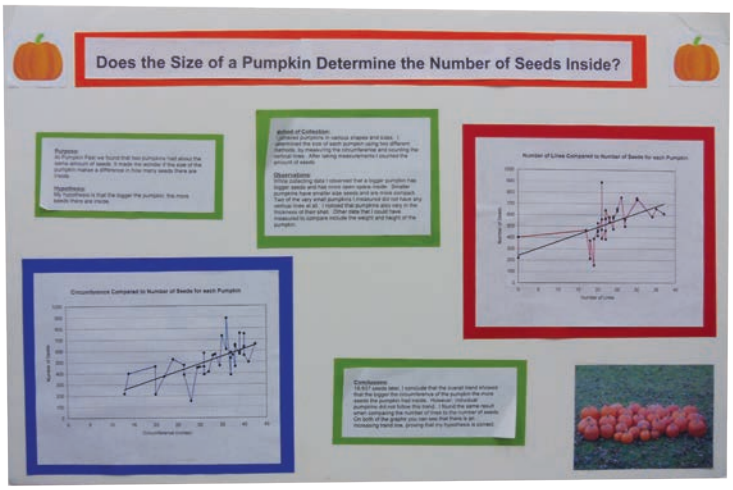
Grades 4–6



First Place
Andrew Wyatt
"Show Me Your Colors"
Lied Middle School
Las Vegas, NV

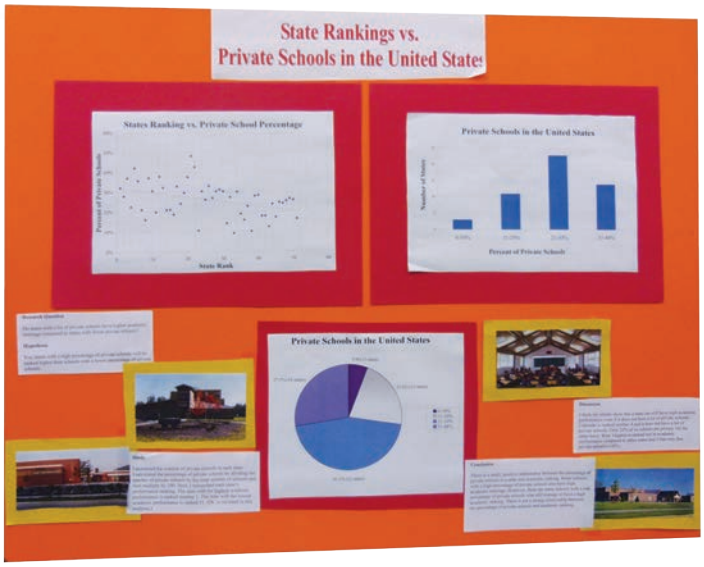


Second Place (tie)
Jonathon Price
"Now You See It, Now You Don't"
Edgewood Elementary
Fruitport, MI



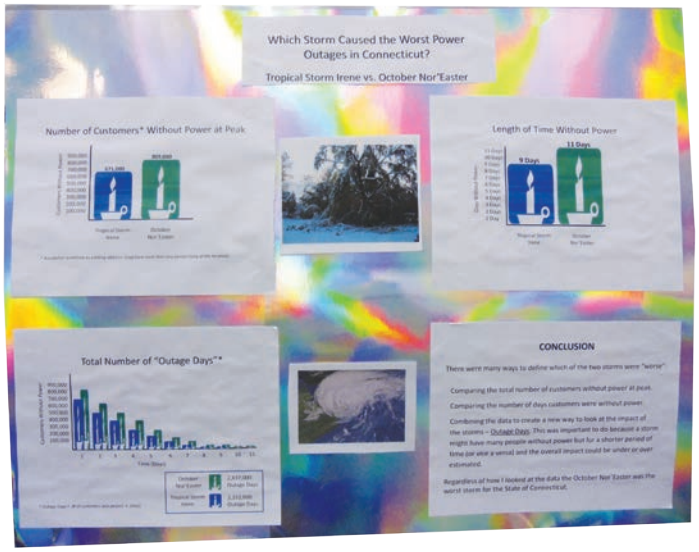
Second Place (tie)
Carter Gates
"Does the Size of a Pumpkin Determine the Number of Seeds Inside?"
Rydal Elementary
Huntingdon Valley, PA

Honorable Mention
Tyler Pearson and Wyatt Hinkson
"Favorite Pet?"
Grace Christian School
Bowie, MD

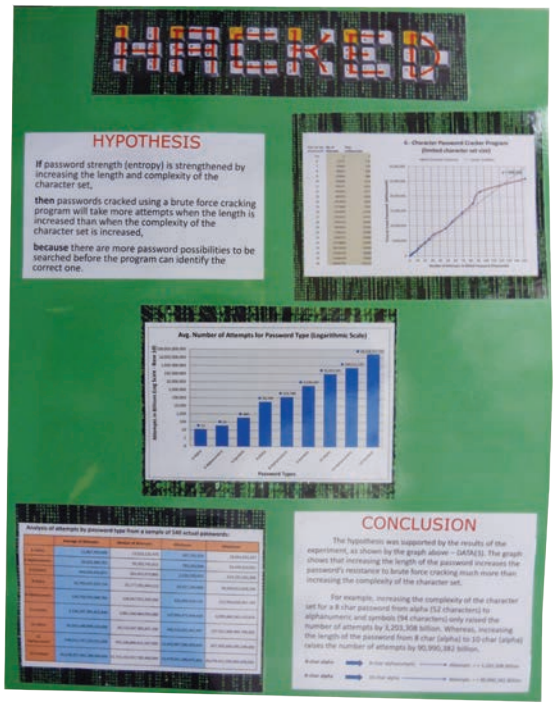


Honorable Mention
Kayla Scott
"State Rankings vs. Private Schools in the United States"
Grace Christian School
Bowie, MD

Grades 7–9

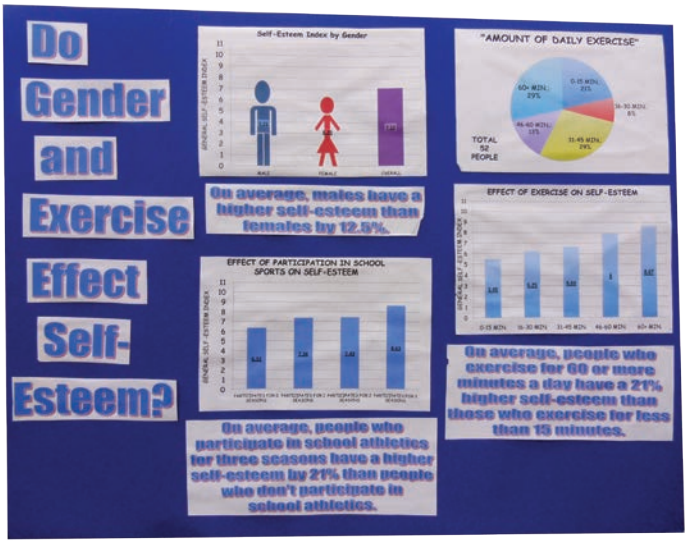


First Place
Benjamin Townson
"Which Storm Caused the Worst Power Outages in Connecticut?"
Jockey Hollow Middle School
Monroe, CT



Second Place
Jahnik Kurukulasuriya
"Hacked"
Campus School of Carlow University
Pittsburg, PA

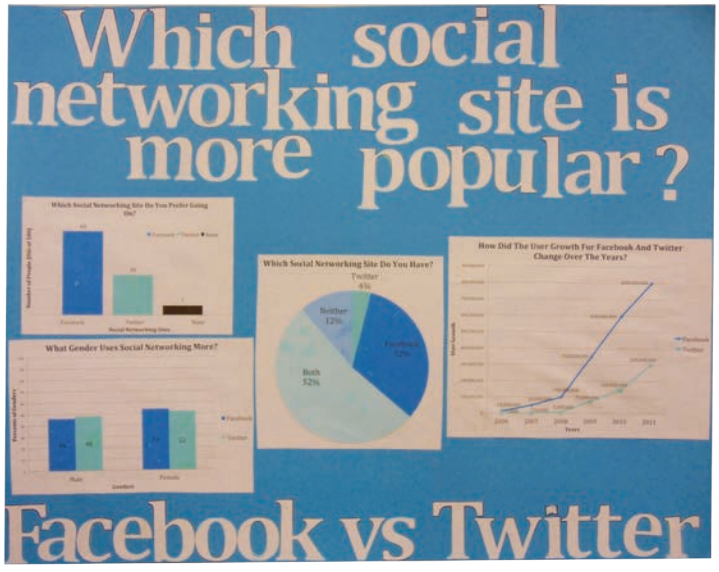
Third Place
Sarah Schultheis, Taylor Carroll, and Lizzy St. Clair
"Sizzlin' Relaxin' Summer Getaway"
Palmyra Area Middle School
Palmyra, PA



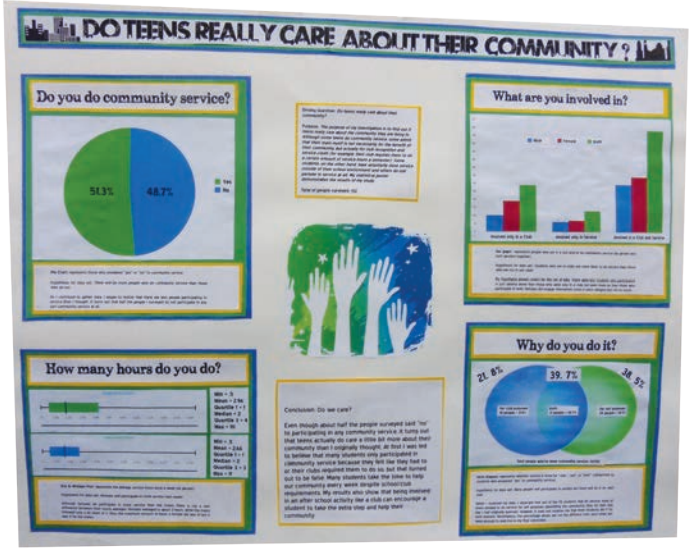
Honorable Mention
Peter O'Neill
"Do Gender and Exercise Affect Self-Esteem?"
Clarkstown High School South
New City, NY

Grades 10–12

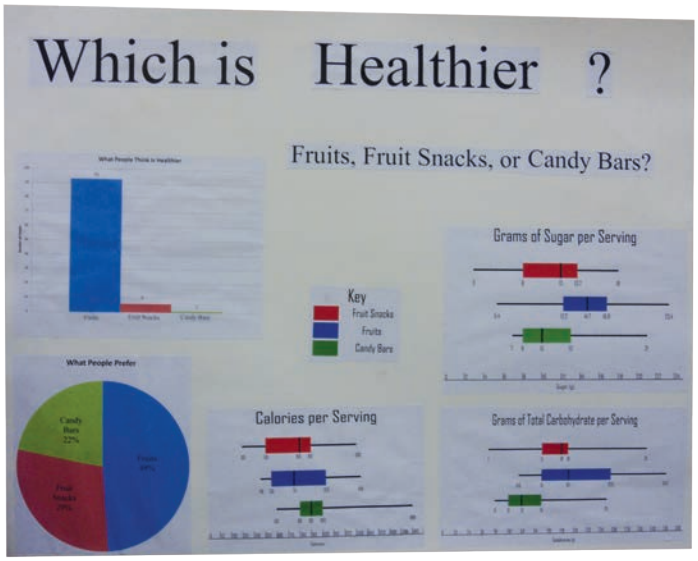
First Place
Julia Benyo, Kacie Moore, Erika Shores, Laura Sierko
"Dangerous Debt: What Is the Perceived Impact of Credit Card Debt in the United States?"
Cuyahoga Valley Christian Academy
Cuyahoga Falls, OH



Second Place
Sonya Tran and Bridget Kilbane
"Which Social Networking Site Is More Popular? Facebook vs. Twitter"
St. Joseph Academy
Cleveland, OH



Third Place
Layla Barati
"Do Teens Really Care About Their Community?"
East Career and Technical Academy
Las Vegas, NV



Honorable Mention
Yan Ting Cheung and Erin Bator
"Which Is Healthier? Fruits, Fruit Snacks, or Candy Bars?"
St. Joseph Academy
Cleveland, OH

2012 Regional Poster Competition Leaders

Connecticut Chapter Statistical Poster Competition
Marianne E. Messina, Bristol-Myers-Squibb
www.amstat.org/chapters/Connecticut/home/Poster/poster_index.htm

Michigan Statistics Poster Competition
Dan Frobish, Grand Valley State University
www.gvsu.edu/stat/mspc-home-30.htm

Nevada K–12 Statistics Poster Competition
David Thiel, Clark County School District
www.amstat.org/chapters/nevada/k12postercompetition.html

Ohio Statistics Poster Competition
Jerry Moreno, John Carroll University
www.bio.ri.ccf.org/ASA/poster.html

Pennsylvania Statistics Poster Competition
Pete Skoner, Saint Francis University
www.francis.edu/paposter.html

Washington Statistical Society Poster Competition
Barnali Das, Westat
www.amstat.org/education/posterprojects

Other Region/ASA National Poster Competition
Leader: Linda Quinn, Cleveland State University
Contact: Rebecca Nichols, ASA Director of Education, *rebecca@amstat.org*
www.amstat.org/education/posterprojects

Students outside the regional competition areas submit their posters directly to the ASA office to be judged separately 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.

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 *http://magazine.amstat.org/blog/2011/07/01/poster-comp-how-to*. You can download a flyer about the ASA poster and project competitions and other K–12 statistics education programs and resources to share with your local schools at the bottom of *www.amstat.org/education*. For additional information or questions regarding how to get involved in the poster or project competitions, contact ASA Director of Education Rebecca Nichols at *rebecca@amstat.org*. ■

ASA Group Reviews *Mathematical Education of Teachers II*

Review Group

Nancy Boyton
Christine Franklin
Amy Froelich
Robert Gould
Bradley Hartlaub
Patricia Humphrey
Henry Kranendonk
John McKenzie
Jerry Moreno
Rebecca Nichols
Chris Olsen
Mary Sullivan
Roxy Peck
Michael Posner
Iwan Praton
Amy Wagaman

Following the Common Core State Standards (CCSS) Initiative in Mathematics, the Conference Board of the Mathematics Sciences (CBMS) released a draft of *The Mathematical Education of Teachers II* (*MET2*) as an update to the original document published in 2001. The report focuses on the mathematics and statistics preparation of K–12 teachers with the primary audience intended for college and university mathematics and statistics departments and individual mathematicians and statisticians responsible for educating K–12 mathematics/statistics teachers.

Because *MET2* will influence the statistical preparation of teachers and the teaching of statistics at the K–12 level, the American Statistical Association established a *MET2* review group consisting of K–12 statistics teachers and university-level statistics educators with strong ties to K–12 statistics education. With statistics taking a more prominent role in the CCSS, especially at the middle- and high-school levels, the review group generally focused on recommendations regarding statistics education for pre-service teachers and on the need for professional development opportunities for in-service teachers. Successful implementation of the CCSS will require statistics content that focuses on the conceptual understanding necessary for the development of sound statistical reasoning.

The ASA review of *MET2* was well received by CBMS. The *MET2* draft report is available at *www.cbmsweb.org*. The ASA review of the *MET2* draft report is available at *www.amstat.org/outreach/pdfs/MET2ASAResponse.pdf*. ■

C. R. and Bhargavi Rao Prize

C. R. Rao

Members of the Rao Prize Committee are accepting nominations for the C. R. and Bhargavi Rao Prize for Outstanding Research in Statistics. The prize, awarded by Penn State University's department of statistics, was established to recognize outstanding and influential innovations in the theory and practice of mathematical statistics, international leadership in directing statistical research, and pioneering contributions by a recognized leader in the field of statistics.

The Rao Prize is awarded every two years (odd-numbered years) to an individual working in the United States. The awardee receives a medal, cash prize, and invitation to visit Penn State and give a talk.

Nominations should include a letter describing the nominee's outstanding contributions to leadership and research in statistics, a current curriculum vita, and two supporting letter. Submissions are due by December 3 and should be sent to Rao Prize Selection Committee Chair, 326 Thomas Building, Penn State University, University Park, PA 16802-2111.

C. R. Rao held the Eberly Chair in Statistics at Penn State University from 1988–2001. He now serves as Holder Emeritus of the Eberly Chair in Statistics. He was the founding director of the Center for Multivariate Analysis. A President's National Medal of Science Laureate, Rao is recognized worldwide as a pioneer of modern statistical theory and one of the world's top five statisticians, with multifaceted distinctions as a mathematician, researcher, scientist, and teacher. His contributions to mathematics and statistical theory and applications have become part of undergraduate and graduate courses in statistics, econometrics, and electrical engineering at universities throughout the world.

For additional information, see *www.stat.psu.edu/news/awards/raoprize.html*. ■

Harvard Statistics Department Presents First Dempster Prize

Matthew McClellan, Harvard Staff Writer

Editor's Note: This article originally appeared in the Harvard Gazette on May 23. We have reprinted it with permission.

"I'm not very good with numbers," said Arthur Dempster, professor emeritus of theoretical statistics, while pondering the founding year of the American Statistical Association.

On May 11, generations of students and faculty celebrated the inauguration of the Arthur P. Dempster Award and the 55th anniversary of the Harvard Statistics Department. Of course, the large turnout gave lie to Dempster's claim; he's been quite good with numbers, shown by the many who attended.

Stephen Blyth, professor of the practice in statistics and managing director at the Harvard Management Co., established the Dempster fund to recognize promising graduate students in the department, especially those working in theoretical and foundational statistics. "I'm happy for the award to support 'deep thinking' about uncertainty, broadly defined, rather than simply rote or 'procedural' application of statistical machinery," said Blyth, who hosted the event at the Federal Reserve, where the fund is located.

Blyth, who studied under Dempster and earned his PhD in 1992, sees the award as a commemoration of his experience as a student and recognition of the support he received from the faculty and the rest of the department. Dempster's influence has only grown with time. "I know my argument is not strong enough if I cannot convince Art of its validity," said Blyth.

The practical applications of statistics have always driven Dempster, so it is no surprise that he spent a year working at Bell Telephone Laboratories before he joined the department in 1958. Or that he has inspired students who work not only in academia, but in finance, technology, and elsewhere.

Much of Dempster's work has been on integrating logical and probabilistic reasoning beyond the established Bayesian framework, which requires quantification of prior information. Dempster's rule of combination established a method to combine evidence from different sources and Dempster-Schafer Theory, or the theory of belief functions, which provides a framework for quantifying ignorance.

"I am not pessimistic about the future," said Dempster, "but I am pessimistic about what we can do with limited data."

And this is where inaugural award winner Alexander Blocker picks up. His research deals with the problems of preprocessing data: To make reams of data comprehensible to an investigator, the raw data is typically calibrated, smoothed, or otherwise simplified before being analyzed. Information is necessarily reduced, or even destroyed. Retaining more information through preprocessing would allow for stronger conclusions, but scientists want to focus on processes of interest without getting stuck in low-level details of observation.

Xiao-Li Meng (left), Whipple V. N. Jones Professor of Statistics, speaks with Arthur P. Dempster before the event that celebrated the inauguration of the Arthur P. Dempster Award and the 55th anniversary of the Harvard Statistics Department.

Photo courtesy of *Harvard Gazette*

Blocker's work finds inspiration and application in biology. Expression microarrays measure the level of gene expression in cell samples, allowing analyses of thousands of genes in parallel. They can be used to study changes in gene expression in response to pathogens in comparison with uninfected samples. "Millions of dollars are now invested in building huge collections of genomic data," said Blocker. "For example, some hospitals are now routinely collecting microarray data on incoming cancer patients."

As hospitals build massive databases to catalog the genetic profiles of tumors, improving preprocessing techniques could allow researchers to make better use of data they are already

collecting. It also could identify relevant supplementary information that would allow investigators to reinterpret data later. "Handled improperly, preprocessing could compromise the utility of these endeavors, wasting effort and delaying scientific progress," said Blocker.

Blocker's ultimate goal is to establish principled guidelines for data preprocessing. The ambition was betrayed by a few nervous laughs and one sincere "good luck" from the crowd.

From the example of Dempster and the founding faculty, this kind of ambition has become a departmental tradition. Blocker also enjoys the department's tradition of strong advising. Even the title of his presentation betrayed its influence: "The Potential and Perils of Preprocessing: A Multiphase Investigation."

"By the amount of alliteration," said Blocker, "you all know one thing: I am Xiao-Li's student."

Xiao-Li Meng, chair of the department, said that when Blocker first came to the department (after studying economics at Boston University), he quickly produced research results that had eluded some of Meng's existing PhD students and continues to produce strong research results. But, said Meng, Blocker and his research, very much like the department, are still great works in progress.

"When I first started, Xiao-Li would give me advice, and I would figure out how right he was two months later," said Blocker. "Four years later, I've shortened that cycle to two weeks. If I get it down to one week, I think I'll be ready to graduate." ■

Two PhD Candidates Take Home Natrella Scholarships

Will Guthrie, Natrella Scholarship Selection Committee Chair

Anis

Megahed

The Quality and Productivity Section awarded two Mary G. and Joseph Natrella scholarships during the 2012 Quality and Productivity Research Conference, which was held June 4–7 in Long Beach, California.

The recipients for 2012 are Mohammed Zafar Anis, a PhD candidate in the department of mathematics at the Bengal Science and Engineering University, and Fadel Mounir Megahed, a PhD candidate in the Grado Department of Industrial and Systems Engineering at Virginia Tech.

Anis was recommended for the award by Murari Mitra and Tirthankar Dasgupta. His presentation at the conference was titled "A Review of Process Capability Indices."

Megahed was recommended for the award by William Woodall and Jaime Camelio. The title of his presentation was "From Fault Detection to Diagnosis: An Investigation Using Statistical Process Control and Visual Analytics in High-Density Data Environments."

The winners were chosen for their outstanding teaching, community service, mentoring, leadership, scholarship, and commitment to the pursuit of quality improvement through the use of statistical methods. Each winner gave a research presentation at the conference and received a $3,500 scholarship, plus $500 for travel expenses and complimentary registration for the conference and preconference short course.

The scholarships are funded from the ASA Natrella Scholarship Fund and the Quality and Productivity Research Conference.

Bruce Lindsay, Willaman Professor of Statistics and head of the department of statistics at Penn State University, was recently appointed as holder of the Eberly Family Chair in Statistics, one of the highest honors awarded to faculty members in Penn State's Eberly College of Science. The appointment was made by the Office of the President of the University based on the recommendations of colleagues and the dean in recognition of Lindsay's national and international reputation for excellence in research and teaching.

Lindsay also has played a leading role in the creation of the nation's policy regarding statistical data. In 2002, he was chair of the National Science Foundation Workshop on the Future of Statistics and served as one of the co-editors of the resulting advisory report to the National Science Foundation. From 1995 to 1997, he served on the National Research Council Committee on Fish Stock Assessment Methods.

Lindsay has supervised 30 PhD degree recipients during his time at Penn State and was honored in 1998 by the university chapter of the scientific research society, Sigma Xi. He was named a Fellow of the Institute of Mathematical Statistics in 1987 and the American Statistical Association in 1998. He was the 2010 Fisher Lecturer.

Royal Statistical Society Toasts Queen

Staff members of the Royal Statistical Society stand in front of their offices on Errol Street in London, England, to celebrate the Queen's Jubilee Anniversary. From left: Teresa Dewane, Nicola Emmerson, Jack Beeby, Mawreen Chapman, Toni Young, Anna Mair, Charlotte Stovell, Andrew Garratt, Abdel Khairoun, Roeland Beerten, and Paul Gentry

Bin Yu has been selected as president-elect of the Institute of Mathematical Statistics (IMS). She will serve a three-year term—one year as president-elect (2012–2013), one year as president (2013–2014), and one year as past-president (2014–2015).

Yu is a professor and chair of the department of statistics at the University of California at Berkeley and a founding co-director of the Microsoft Statistics and Information Technology Laboratory of Peking University in Beijing, China. Previously, she was a professor at the University of Wisconsin-Madison; visiting professor at Yale, ETH, INRIA, and the Poincare Institute; and a member of the technical staff in the math center at Bell Labs. Her major research interests include statistical inference, machine learning, information theory, data problems from remote sensing and atmospheric science, networks, neuroscience, and text documents. Jointly with others, she holds three U.S. patents: time-varying network tomography, combined LMS prediction for lossless compression of audio signals, and approximation lasso methods for language modeling.

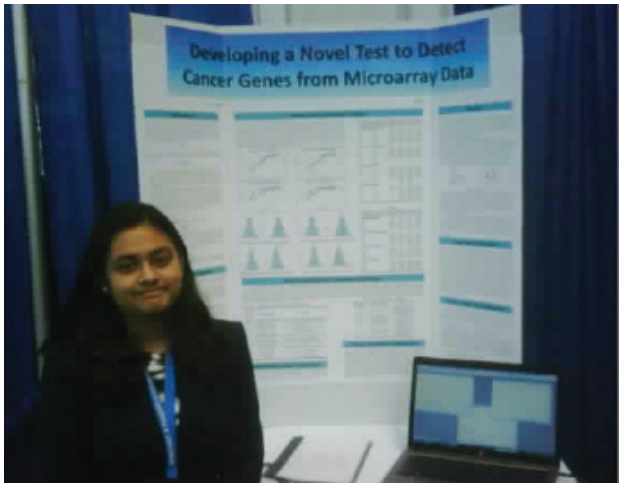
Yu has published more than 70 papers in refereed journals, as well as more than 30 refereed conference papers and book chapters. Yu is the action editor for the *Journal of Machine Learning* and an associate editor for *Technometrics*, *Sankhya*, and *Statistics Survey*. She has served as an associate editor of the *Journal of the American Statistical Association*, *Annals of Statistics*, and *Statistica Sinica*.

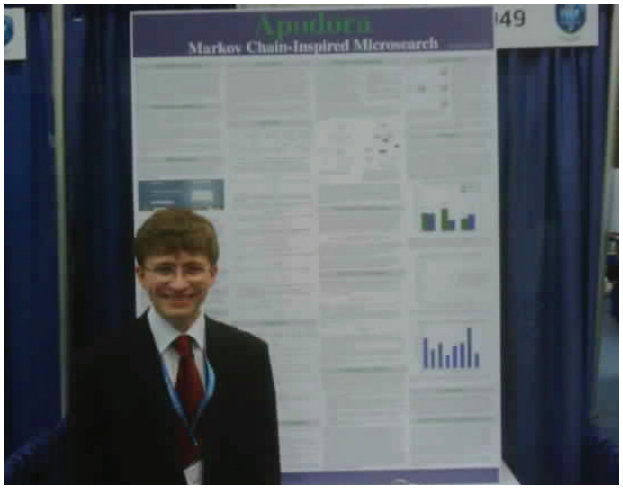
During the 8th World Congress in Probability and Statistics (the quadrennial joint conference of the Bernoulli Society and IMS) in July, Yu delivered the 2012 Tukey Memorial Lecture in Statistics. The Tukey Lecturer is one of the highest academic honors on a statistician bestowed by the Bernoulli Society.

Yu earned her BS in mathematics from Peking University in 1984 and her MA and PhD in statistics from UC Berkeley in 1987 and 1990, respectively. She was a 2006 Guggenheim Fellow and is a Fellow of the ASA, IMS, IEEE, and the American Association for the Advancement of Science.

For a complete list of IMS election results, visit *http://imstat.org/news/2012/06/19/1340124690475.html*.

High-School Students Show Poise, Maturity in Pittsburgh Competition





More than 1,500 high-school students from about 70 countries presented projects to judges from a variety of disciplines during the Intel International Science and Engineering Fair in Pittsburgh, Pennsylvania, May 13–18.

The American Statistical Association sponsors special awards for the best use of statistics. The ASA Pittsburgh Chapter hosted a large team of local statisticians, who reviewed the statistical content and merit of all the presented projects.

During the first day of review, the judges narrowed the field to around 50 projects that showed a sophisticated level of statistical analysis. Of those, 15 were selected for final interviews the following day with multiple teams of judges. The judges eventually selected three winners and four honorable mentions. In general, the judges were impressed with the quality and variety of the students' research, as well as their poise and intellectual maturity during the interview process.

The first-place award of $1,500 went to Shreya Mathur, 15, from Oxford High School in Oxford, Mississippi, for "Developing a Novel Test to Detect Cancer Genes from Microarray Data." Mathur developed her own statistic and wrote code in R to implement her simulations and analysis.

The second-place award of $500 went to Henry Lin, 16, from Caddo Parish Magnet High School in Shreveport, Louisiana, for "A Generalized Holographic Model of Cosmic Accelerated Expansion." Lin demonstrated his MCMC/Metropolis-Hastings approach with dynamic visualization tools that the judges agreed could be used in any university-level astrostatistics course.

A third-place award of $250 went to Nicholas Schiefer, 17, of Holy Trinity School in Richmond Hill, Ontario, Canada, for "Apodora: Markov Chain-Inspired Microsearch," a text-mining tool with several convergence properties.

Honorable mentions were awarded to the following:

Mingsha Zhou, 18, from Marianopolis College in Westmount, Quebec, Canada for "Rapid Evolution of Brown Trout in the Kerguelen Islands"

Travis Sigafoos, 18, from Champlin Park High School in Champlin, Minnesota, for "A Spectrum of Triangulation: ADHD, Circadian Rhythmicity, and Bipolar Symptoms"

Emily Hu, 16, from Lexington High School in Lexington, Massachusetts, for "The Effects of Mindful Decision Making on Post-Decision Regret"

Madison Chakoumakos and Zibo Zhuang, both 17, from Oak Ridge High School in Oak Ridge, Tennessee, for "Characterizing the Elements of Earth's Radiative Budget: Applying Uncertainty Quantification to Climate Models"

Pittsburgh Chapter President Rebecca Nugent, from the department of statistics at Carnegie Mellon University, presented the awards to the winners. All winners and honorable mention awardees also received one-year subscriptions to *Significance* and *CHANCE* magazines. ■

sectionnews

Biometrics

Edited by Songthip Ounpraseuth, Biometrics Section Publications Officer

The Biometrics Section recently chose Yang Ning of The Johns Hopkins University as the David P. Byar Young Investigator Award winner for "Reducing the Sensitivity to Nuisance Parameters in Nonstandard Likelihood."

The David P. Byar Young Investigator Award is given annually to a new researcher in the Biometrics Section who presents an original manuscript at the Joint Statistical Meetings. The award commemorates David Byar, a renowned biostatistician who made significant contributions to the development and application of statistical methods during his career at the National Cancer Institute. This year, the committee received a record-setting 62 submissions of high-quality papers and chose the following additional travel award winners:

Huaihou Chen of Columbia University for "A Marginal Approach to Reduced-Rank Penalized Spline Smoothing with Application to Multilevel Functional Data"

Shuo Chen of Emory University for "A Bayesian Hierarchical Framework for Modeling Brain Connectivity of Neuroimaging Data"

Jeff Goldsmith of The Johns Hopkins University for "Corrected Confidence Bands for Functional Data Using Principal Components"

Min Jin Ha of The University of North Carolina for "Testing and Estimation of Partial Correlation Networks"

Peisong Han of the University of Michigan for "Conditional Empirical Likelihood Inference for Unbalanced Longitudinal Data"

Yen-Tsung Huang of Harvard University for "Joint Analysis of SNP and Gene Expression Data in Genome-Wide Association Studies"

Han Liu of The Johns Hopkins University for "The Nonparanormal Skeptic"

Jennifer Sinnott of Harvard University for "Omnibus Risk Assessment via Accelerated Failure Time Kernel Machine Modeling"

The Byar award comes with a $1,500 prize, while the travel awards include $800 to go toward the winners' travel to JSM so they can present their papers.

Quality and Productivity

Members of the Quality and Productivity Section (Q&P) invite you to attend this year's Fall Technical Conference (FTC) in St. Louis, Missouri, from October 4–5. The conference is a premier forum in which to discuss topics at the interface of statistics and quality, leading to a more effective use of statistics to improve quality.

The theme for this year is "Statistics and Quality: Expanding the Horizon." The program includes a range of talks about subjects such as experimental design, reliability analysis, data mining, and statistical process control. Highlights include a plenary address by Connie M. Borror from Arizona State University and the W. J. Youden Memorial Address by C. F. Jeff Wu from Georgia Tech.

The Q&P invited session on computer experiments features William Myers from the Proctor and Gamble Company, who will give a talk titled "The Unique Challenges of Computer Experiments: An Industrial Perspective," and Roshan Joseph from Georgia Tech, who will give a talk titled "Composite Gaussian Process Models."

Q&P also is sponsoring a short course on October 3, titled Methods and Applications of Generalized Linear Models, which will be taught by Douglas Montgomery. This short course describes and illustrates the use of generalized linear models and shows how this approach is an attractive alternative to more traditional analysis.

For more information and the complete program, visit *http://cba.ua.edu/ftc2012*.

To view section news in its entirety, visit *http://magazine.amstat.org.*

Survey Research Methods

John Finamore, SRMS Publications Officer

The Survey Research Methods Section (SRMS) webinar series was developed in response to a desire to provide members with the opportunity to obtain information about the latest trends in statistical methodology.

The inaugural SRMS webinar occurred in November of 2009, when Mike Brick gave a talk titled, "Dual Frame Theory Applied to Landline and Cell Phone Surveys." Since that time, SRMS has sponsored 10 additional webinars on the following topics:

The Psychology of Survey Response (Roger Tourangeau)

Surveys, Data, and Indicators from the NSF (Nimmi Kannankutty)

Small-Area Estimation (Partha Lahiri)

Address-Based Sampling (Michael Link)

Sampling for Nonstatisticians (Safaa Amer)

Reconsidering Mail Survey Methods in an Internet World (Don Dillman)

Nonresponse Bias Analysis (Kristen Olson and Jill Montaquila)

Modern Methods for Missing Data (Paul Allison)

The Calibrated Bayes Approach to Sample Survey Inference (Rod Little)

Paradata to Monitor and Analyze Survey Processes (Frauke Kreuter)

If you have an idea for a webinar, email your suggestions to Marilyn Seastrom, SRMS education officer, at *Marilyn.Seastrom@ed.gov* or John Finamore, SRMS publications officer, at *jfinamor@nsf.gov*. More information about the SRMS webinar series, including registration details and presentation slides from previous webinars, is available at *www.amstat.org/sections/srms/webinar.cfm*.

The section also seeks applicants for the student travel award in doctoral programs in statistics, survey methodology, or allied disciplines. Support is offered for students to attend the Joint Statistical Meetings, to be held in Montréal, Québec, from August 3–8, 2013.

Preference will be given to students presenting a paper or poster at the conference. In addition, applications must be supported by a current member of SRMS. Approximately three awards will be granted to cover conference expenses up to $600. Winners are expected to attend JSM sessions and the SRMS business meeting.

Application forms are available at *www.amstat.org/sections/SRMS/index.html*. The deadline for applications is December 3. If you have any questions, contact Jill A. Dever at *jdever@rti.org*. Previous student travel award winners and JSM 2013 student paper competition winners are not eligible for this award.

Biopharmaceutical Applied Statistics Symposium

The 19th annual biopharmaceutical applied statistics symposium, BASS XIX, will be held November 5–9 at the Mulberry Inn Suites in historic Savannah, Georgia. At least 16 one-hour tutorials on diverse topics pertinent to the research, clinical development, and regulation of pharmaceuticals will be presented from November 5–7 by speakers from academia, the pharmaceutical industry, and the U.S. Food and Drug Administration (FDA). Four parallel two-day short courses will be presented November 7–9. Highlights of the symposium include the keynote address and reception on November 5 and the FDA biometrics session on November 7.

BASS is a nonprofit entity, sponsored by the department of biostatistics at Virginia Commonwealth University and the Jiann-Ping Hsu College of Public Health at Georgia Southern University. Its purpose is to raise funds for graduate fellowships in biostatistics.

Registration is now open at *www.bassconference.org*.

For more information, contact Karl Peace at *bassxix2012@gmail.com* or *peacekarl@frontier.com*.

California

■LABioMed seeks a PhD statistician to join UCLA CTSI to direct biostatistics at a research institute in a teaching hospital. The successful candidate will be expected to provide support for grant proposals, design protocols, perform data analyses, review CTSI proposed studies and participate/organize biostatistical seminars for investigators and trainees. Mentoring early investigators and fellows is a priority. Faculty appointment possible at UCLA School of Medicine. Los Angeles Biomedical Research Institute is proud to be an Equal Employment/Affirmative Action/Drug-Free Employer. Applicants will be considered without regard of sex, race, color, religion, ancestry, national origin, pregnancy, age, sexual preference, marital status, veteran status, medical condition or disability (reasonable accommodations will be provided upon request).

Connecticut

■The Babson College Mathematics and Science Division invites applicants for a tenure-track assistant professor position starting September 1, 2013. The ideal candidate will possess a terminal degree in statistics, analytics, or related field or expect to complete the requirements for the degree by September 1, 2013, a proven teaching record with the desire to deliver statistics and analytics courses, and a strong research agenda. *www.click2apply.net/gqgy77n.* EOE.

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.*

Massachusetts

■Harvard University Statistics Department seeks a preceptor for 2012–2013. Applicants should have a minimum of a Master's degree in statistics, biostatistics, or closely related field, and demonstrated excellence in teaching statistics at the introductory level. For details and link to the Harvard University academic positions website, go to *https://academicpositions.harvard.edu/postings/4105*. Position will remain open until filled. Harvard University is an Affirmative Action/Equal Opportunity Employer.

Missouri

■Department of statistics/division of biological sciences at University of Missouri invites applications for a joint mid-level tenured position in stochastic modeling. We're interested in candidates who use Bayesian approaches to

model biological problems. A PhD in statistics/biostatistics is required. Apply online at *http://hrs.missouri.edu/find-a-job/academic*.Include cover letter, vita, statement of research/teaching interests and contact information for three references. August 27, 2012 deadline. *hrs.missouri.edu/find-a-job/academic.* MU is an Equal Opportunity-Affirmative Action Employer.

Nebraska

■Associate Professor or Professor. Collaborative research (including campus and inter-campus partnerships to pursue external grant funding), teaching, curriculum development and advising in graduate programs in public health. Commitment to scholarly growth is expected. Preferred areas of emphasis include: statistical analysis of high dimensional (genomics/proteomics) data and statistical methodology for clinical trials or observational studies. PhD in biostatistics/statistics or equivalent. We encourage applicants to visit *jobs.unmc.edu.* UNMC is an EO/AA Employer.

Ohio

■The department of quantitative health sciences at Cleveland Clinic is recruiting for faculty, postdoctoral, and master's-level positions. Many areas are being sought, including biostatistics, data mining, health economics, health status measures, and analysis of population-based registries. Details for all positions, as well as application instructions, are on our website: *www.lerner.ccf.org/qhs/jobs.* Cleveland Clinic is a AA/EOE.

International

■Faculty position in mathematical statistics or stochastics. KU Leuven (University of Leuven, Belgium) invites applications for a full-time tenured academic position in statistics at the department of mathematics. We are looking for a dynamic and motivated individual with an excellent research

record in mathematical statistics or stochastics. Details and online application tool: *www.kuleuven.be/personeel/jobsite/vacatures/science.html#2013_2014* Applications accepted until September 27, 2012. Starting date October 1, 2013. EOE.

■We are recruiting for senior and principal statisticians at Statistics New Zealand (*www.stats.govt.nz*), in its statistical methods division to strengthen technical leadership and expertise in several areas related to the production of official statistics. Fixed term positions will be considered, and financial assistance for relocation is available. For more information go to the following link: *http://careers.stats.govt.nz/detail.aspx?jobId=106830&CoId=1379&rq=1*. Questions, contact John Lopdell, Manager, Methodology Development Unit (*john.lopdell@stats.govt.nz*). EOE.

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To apply, please send cover letter, curriculum vitae and professional references to: sshete@mdanderson.org

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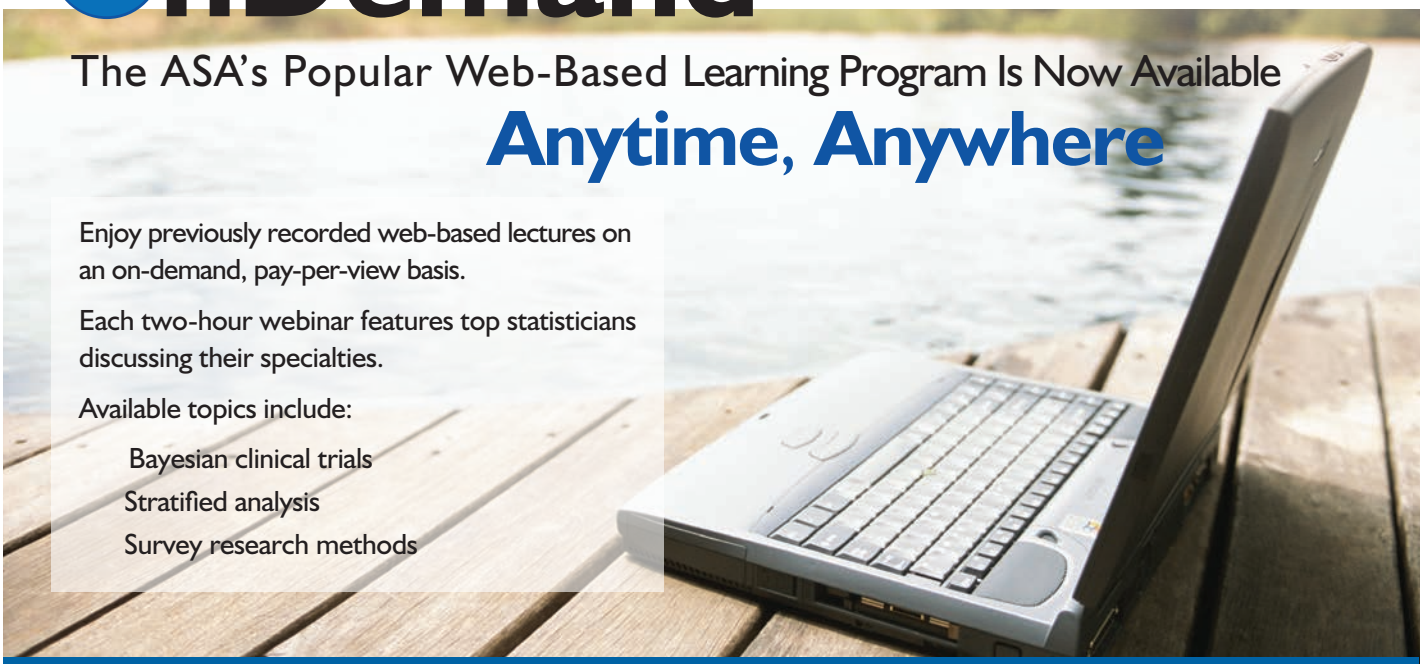

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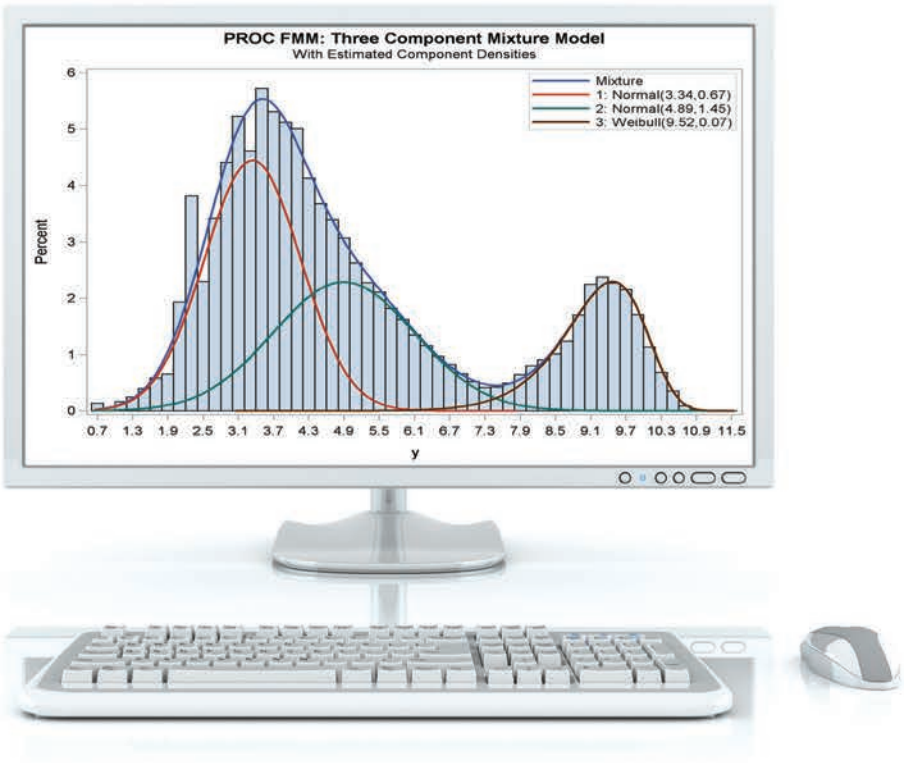

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