July 2015 • Issue #457

AMSTATNEWS

The Membership Magazine of the American Statistical Association • *http://magazine.amstat.org*

EPA's Barry D. Nussbaum Elected 112th ASA President

Rice University professor ***Katherine B. Ensor*** *elected vice president*

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ASA Leaders Reminisce: William B. Smith

ASA Experts Make Meaningful Contribution

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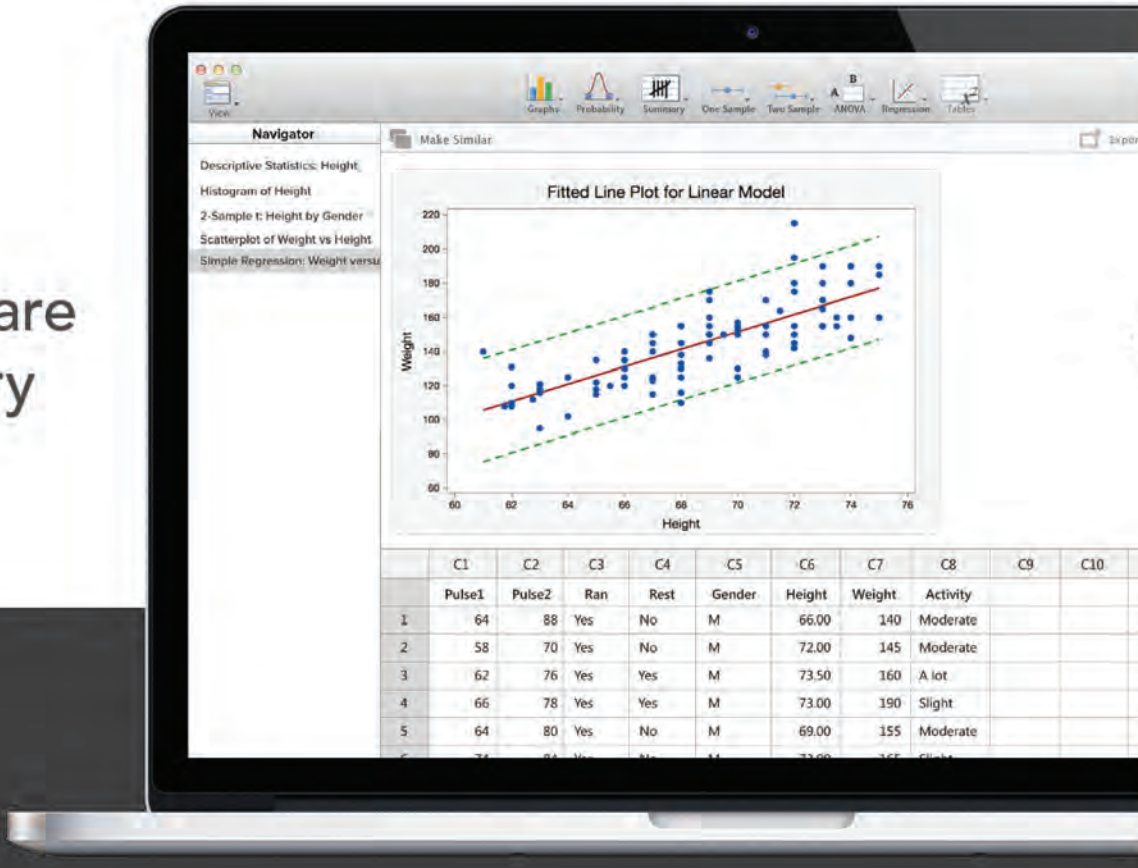

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
	Pulse1	Pulse2	Ran	Rest	Gender	Height	Weight	Activity		
1	64	88	Yes	No	M	66.00	140	Moderate		
2	58	70	Yes	No	M	72.00	145	Moderate		
3	62	76	Yes	Yes	M	73.50	160	A lot		
4	66	78	Yes	Yes	M	73.00	190	Slight		
5	64	80	Yes	No	M	69.00	155	Moderate		

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AMSTATNEWS

JULY 2015 • ISSUE #457

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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Promoting the Practice and Profession of Statistics®

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

New Toolkit Will Help Statisticians Promote Profession, Page 14

Online Articles

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

IN MEMORIAM Sadly, Peter William Meredith John, Todd Gary Nick, Bruce Lindsay, and Frederick Walter Leysieffer passed away recently. To read these members' obituaries, visit *http://magazine.amstat.org*. To read about other ASA members in the news, visit our Statisticians in the News web page at *www.amstat.org/newsroom/statisticiansinthenews.cfm*.

Murray Aitkin responded to **Mark van der Laan's** piece, "Statistics as a Science, Not an Art: The Way to Survive in Data Science." He agrees with van der Laan's first issue—the role of consulting statisticians—but cites a different view on the role of statistical theory in the kinds of analysis statisticians use. Read his letter and van der Laan's response at *http://magazine.amstat.org*.

The National Institute of Statistical Sciences announced that ASA members **Gabriel Huerta** and **Ray Bain** were selected to serve on the organization's board of trustees. The new board members began their terms July 1 and will serve a three-year term. Read more about these new board members at *http://magazine.amstat.org*.

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columns

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*.


Kincaid

Contributing Editor

Chuck Kincaid is the senior engagement director for the Business Intelligence and Analytics Practice of Experis. He manages analytics professionals in their Kalamazoo Center of Excellence, which has been providing business intelligence and analytics services to almost every industry since the early '90s. His professional interests are in analytics talent, data science, analytics infrastructure, education, and visualization.

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*.


Kalicin

Contributing Editor

Sarah Kalicin is a senior statistician at Intel Corporation. For the last 15 years, she has led many career development efforts within various companies and created the workshop Developing Successful Career Relationships: Leveraging Mentoring, Coaching, and Sponsorship.

departments

member news

Meet the President's Invited Speaker, Learn About This is Statistics

I am very pleased that Christine Fox has accepted our invitation to deliver the President's Invited Address in Seattle. Christine is the assistant director of policy and analysis at the Johns Hopkins University Applied Physics Laboratory (JHUAPL).

Early in her career, Christine developed tactics for the defense of aircraft carriers. She was president of the Center for Naval Analyses (CNA) for four years. Her other responsibilities included serving as director of the Office for Cost Assessment and Program Evaluation in the Office of the Secretary of Defense. Former Secretary of Defense Chuck Hagel named her as acting U.S. Deputy Secretary of Defense. In this role, Christine was the *highest-ranking woman ever to work in the Pentagon*.

She is widely known for her experience in program management and evaluation, systems engineering, and strategic leadership. She has great interest and experience in professional mentoring, one of this year's ASA presidential initiatives. Christine studied applied mathematics at George Mason University. In short, she is an excellent person to review ways we can use statistics to address the theme for JSM 2015: *Making Better Decisions.*

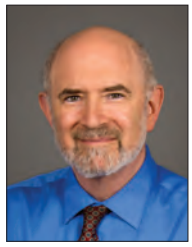
Christine's talk is titled "The Role of Analysis in Supporting Strategic Decisions." It will draw from her extensive experience working at CNA, the Department of Defense, and JHUAPL. Among the keys to being successful in supporting strategic decision-making, she will mention being timely, relevant, and able to communicate clearly. I join Christine in identifying clear communication as an important skill and have spoken about it as vital to being successful in our profession.

I understand you have an interest in professional mentoring. As you may know, that is a presidential initiative within the ASA. What can you tell us about your experiences mentoring or being mentored?

I have been extremely lucky to have many wonderful mentors in my career. All of them have been successful people, and all of them have been very generous to take their time to teach, connect, and advise me. In my experience, the best mentoring relationships form naturally. I have never found a person I admired unwilling to serve as a mentor, but I have never asked them, "Will you be my mentor?" Rather, I have just asked them questions and took every opportunity to observe them. They, in turn, noticed and took more time to explain and reach back to me. I hope I have done some of that myself for others as I have grown in my own career. I would like to add a point on gender here. All of my treasured mentors have been men, and I believe I have been a mentor to both men and women. I think gender is less important in a mentoring relationship than people may think.

What advice would you offer a statistician early in their career that might help them in their professional development or in expanding their professional network?

I think we all do our best work when we are engaged in problems we find interesting and rewarding and we are in an environment that brings out the best in us. It is too easy to continue doing work that is okay. I think it is critically important to find work that you love. The people you work with, your



David Morganstein

Christine Fox

current and future network, are vital components of a rewarding work environment. Don't settle; strive to find the best fit for you.

What do you think the ASA can do to increase the visibility of our profession?

I think associations like the ASA are vital to creating spaces in which people can connect to find new opportunities, share common challenges, and serve as support and encouragement. The most important challenge we face these days is the challenge of how to encourage young people to pursue a career in mathematics and science. We also need greater diversity in these fields. Associations like the ASA are key to bringing focus to these issues and creating new opportunities. I think the ASA has been serving these roles for many years and is constantly striving to do more.

What do you think are the most exciting opportunities for mathematicians and statisticians in the next few years? How can we best prepare ourselves for those opportunities?

This is a very, very exciting time to be a mathematician and, particularly, a statistician. The last several years have brought huge breakthroughs in our ability to generate and gather data. We're all dumping huge amounts of data into clouds, whether they are personal data or professional. More recently, we are inventing autonomous vehicles that can go deep into the ocean or space, generating incredible amounts of new scientific data that we have never had before. And there are the growing opportunities to use data in tailoring medical treatments to combat any number of diseases. My colleagues at Johns Hopkins call it "precision medicine." What are we going to do with all of this data, and who is going to figure that out? Statisticians, of course. We need creative statisticians now more than ever. I'm convinced that new statistical methods that can unlock the vast amount of knowledge buried in these enormous quantities of new data will define our future.

This is Statistics

At JSM 2014 in Boston, the ASA announced a public awareness campaign—This is Statistics—aimed at high-school juniors and seniors and college undergraduates, as well as their parents, instructors, and counselors. The goal is to interest students in statistics as their future career (*http://magazine.amstat.org/blog/2014/10/01/this-is-stats*). The following is a brief update on the impact of the campaign, measured by a few metrics used by our public relations firm, Stanton Communications.

Stanton assesses media hits and tracks articles quoting the ASA in various outlets, such as the following:

A *Washington Post* article about women in statistics, *http://wapo.st/1v5EtlG*

A *Fortune* article about the growth of the statistics profession, especially when compared to other STEM fields, *http://for.tn/1AUx3dn*

A *Chicago Sun Times* article about women in the data analytics work force, pointing out that data mining is a rapidly expanding field, *http://bit.ly/1KDqNMo*

A *USA Today College* article, "Statistics Might Be the Most Important Class You Take in College," *http://usat.ly/1PHUJa9*

Stanton also measures social media impact. It found the campaign's Facebook page is receiving some 2,600 hits a month (*www.facebook.com/ThisisStats*), the Twitter account has more than 1,600 followers (*https://twitter.com/ThisisStats*), and the video titled "Why You Need to Study Statistics" topped 10,000 views in only six weeks (*www.youtube.com/user/ThisisStats*). While these are the usual measures for an ad campaign, it seemed to me other input might be useful.

I thought it might be interesting to ask a few high-school AP Statistics students how they reacted to our This is Statistics website and whether they were even aware of it. I was thinking about how to locate some when I read a post on the ASA Community from Rachel Braun. She said she was an AP Statistics teacher at the Edmund Burke School trying to find statisticians in the DC area that her students might shadow or who would know about internship opportunities for them. After contacting Rachel, I learned she was planning a class field trip to the Washington Statistical Society and Westat-sponsored Annual Morris Hansen Lecture! I was both surprised and delighted to learn of her interest in doing this. This was a teacher after my own heart. After announcing other distinguished attendees at the lecture, we arranged for the emcee to also introduce Rachel and her talented students.

Rachel is especially interested in helping students understand that the practice of statistics is its own kind of storytelling and that the nation collects data it needs to tell its story. When the AP Statistics curriculum teaches descriptive data analysis, Rachel has her students choose a national data set (e.g., teen pregnancy, housing starts per capita, literacy rates, disease incidence) and create a poster using the techniques she's taught them (e.g., boxplots, stemplots, summary statistics). She gives them this project so

they will have some exposure to the broad range of available federal data resources. Six of their posters were honored in the ASA spring poster competition.

Subsequently, I asked Rachel if she or some of her students would be willing to attend an ASA Board meeting, joining us for lunch to get acquainted. She was unavailable, but one of her students, Cole Miller—an intelligent young man—did attend. We learned about his interests in math and statistics, and we asked him how we might best connect with other young men and women his age. His responses are included below, along with feedback Rachel gathered from many of her students. Their thoughtful and detailed responses were sent to ASA Public Relations Coordinator Jeff Myers, who is forwarding them to Stanton Communications. Among their reactions, I found useful ideas to consider incorporating into the website.

The comments from Rachel's 14 students were positive, and the students offered a number of suggestions. Their messages were mostly consistent. At the same time, not surprisingly, there were different reactions to certain messages, particularly the effect of messages suggesting statistics could be a lucrative profession. While some thought this added to the attraction, others suggested it was not as important as the messages about contributing to society.

Positive reactions:

"The website really highlighted the importance of statistics, and even made it seem like it was the most important class to take. … Erdman's video was intriguing because of her enthusiasm and her application of statistics to the real world."

"I am immediately aware of the financial security that comes with a job in statistics. However, what caught my attention was the section labeled *Make a Difference*."

"While the idea of profit is always appealing, I am more captivated by the ways in which a statistician benefits his or her community."

"People want to know they are doing something meaningful, so my advice is to highlight the ways in which statistics is necessary as well as a rewarding path to follow."

"The Roger Peng video was great!"

"… [T]he option of working anywhere in the world instead of having to stay in one particular place where the job is a niche market certainly sparks interest in the subject."

"Genevera also talked about how statistics is very different from every other math course. … I will definitely look into taking more stat courses in college."

Suggested changes:

"Provide more specific information about jobs and career opportunities."

"The beginning phrase, 'the coolest job you've never heard of,' is not the way to inspire students to pursue statistics."

"I didn't like their 'statistics isn't as bad as you think' approach, because it planted the idea in my head that statistics was a bad career choice."

"It would be good if they added links to more content that gives a taste of what studying stats is like."

Talented and creative AP Statistics teachers like Rachel Braun, with a passion for statistics, are key to encouraging high-school students to consider our profession. The ASA has a number of programs that support these teachers, providing training and connections with members of our community. One such program is Meeting Within a Meeting, a statistics workshop for K–12 teachers held during JSM. Receiving feedback from more teachers and their students is one way to sharpen our This is Statistics message and increase the impact of the campaign.

One of President-elect Jessica Utts' initiatives for 2016 directly targets this issue. In 2014, she became the chief reader for the AP Statistics program. She proposes to "develop methods for ensuring that information and resources about careers in statistics are made widely available in high schools, especially for AP Statistics students and teachers. Provide easy access so teachers and others can effectively deliver this career information to high-school students. Provide feedback regarding ongoing career information efforts…"

The ASA's This is Statistics campaign is off to a strong start. Look for more to come!

EPA's Barry D. Nussbaum Elected 112th ASA President

Rice University professor Katherine B. Ensor elected vice president

Nussbaum

Ensor

Barry D. Nussbaum, chief statistician at the Environmental Protection Agency (EPA), was elected the 112th president of the American Statistical Association by the membership.

Nussbaum will serve as president-elect on the ASA Board of Directors for one year starting January 1, 2016, and will become ASA president January 1, 2017.

ASA members also elected **Katherine B. Ensor,** Rice University professor of statistics and director of the school's Center for Computational Finance and Economic Systems, as an ASA vice president. She will begin her three-year term January 1, 2016.

"As the ASA president-elect, I respect, value, and embrace the diversity within the ASA community. The membership crosses cultures, ethnicities, age groups, genders, and geography," said Nussbaum, while sharing his excitement for the positive effect ASA members and the profession are making and will continue to make on health, transportation, security, economy, justice, education, environment, and a host of other areas. "Now is the time to be more than the sum of the parts. With our talents, we will make our mark on society. Let's do it; let's not be bashful about our contributions and let's move significantly onward."

Nussbaum joined the EPA in 1975 and was named to his current position in 2007. At the agency, he founded and chairs the EPA Statistics Users Group. During his tenure, he has achieved many successes using statistical analysis to promote health, determine environmental policy, and enforce regulations. For instance, he was the branch chief in charge of the successful drive to eliminate harmful lead from gasoline.

As an ASA member, Nussbaum served as chair of the Statistics and the Environment Section in 2000. In 2007, he was recognized for his contributions to statistics by being elected an ASA Fellow. Since 2011, he has chaired the association's Statistical Partnerships Among Academe, Industry, and Government Committee.

Nussbaum was awarded a bachelor's degree from Rensselaer Polytechnic Institute and a master's and doctorate from The George Washington University. He also has taught graduate statistics courses for The George Washington and Virginia Tech universities.

Ensor joined the Rice University Statistics Department as an assistant professor in 1987 and was instrumental in establishing statistics at the university as the department chair from 1999 to 2013. Also, she was a co-primary investigator of a National Science Foundation 10-year, $10 million Vertical Integration of Research and Education in the Mathematical Sciences award at the university. Ensor works in dependent data, addressing applications in finance, risk, energy, environment, and epidemiology.

She is an active ASA member at the national, regional, and local levels. She helped establish the Committee on Federally Funded Research and Council of Academic Representatives. Ensor served as elected leader of several ASA sections such as Statistics and the Environment, Business and Economics Statistics, Statistics in Defense and National Security, Bayesian Statistics, and Computing and Graphics. She currently is serving on the National Academies Committee on Applied and Theoretical Statistics.

At the regional and local levels, she was president, president-elect, and secretary of the Southern Regional Council on Statistics (SRCOS); ASA's representative to SRCOS; and a member and president of the Houston Area Chapter of the ASA.

Ensor was awarded a bachelor's and master's in mathematics from Arkansas State University and a doctorate in statistics from Texas A&M University. She is a fellow of the ASA and American Association for the Advancement of Science. Among her many honors, she was presented the 2014 Paul Minton Service Award by SRCOS for her many contributions to the statistics profession.

ASA members also elected two new representatives to the board of directors for terms starting January 1, 2016:

- **Paula Roberson,** professor and chair of the department of biostatistics at the University of Arkansas for Medical Sciences, was elected the Council of Chapters Governing Board (COCGB) representative
- **Eileen King,** research associate professor for biostatistics and epidemiology at Cincinnati Children's Hospital Medical Center, was elected the Council of Sections Governing Board (COSGB) representative

Also, **Marianne Messina** and **Fred Hulting** were elected 2016 chairs-elect of the COCGB and COSGB, respectively. Messina is senior associate director of immuno-oncology at Bristol-Myers Squibb, and Hulting is the director of global knowledge services at General Mills, Inc. Both will serve one year as chair of their respective governing board beginning January 1, 2017.

2015 Election Results

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ASA LEADERS REMINISCE

William B. Smith

Jim Cochran

In the seventh installment of the Amstat News *series of interviews with ASA presidents and executive directors, we feature a discussion with 2001–2007 ASA Executive Director William B. (Bill) Smith.*

William B. Smith is professor emeritus of statistics at Texas A&M University. While there, he served as department chair for nine years and in the college of science dean's office for an additional nine years. Prior to his tenure as executive director of the American Statistical Association, Bill was program director in statistics at the National Science Foundation.

Bill has received several professional recognitions and awards during his career as a statistician. He is a Fellow of the American Statistical Association, received a university-level distinguished teaching award at Texas A&M, was awarded membership in the Texas A&M College of Science Academy of Distinguished Students, and received the H. O. Hartley and Don Owen awards. Since semi-retirement, Bill has continued teaching graduate-level statistics courses at Texas A&M, given one-day Continuing Education courses at the Joint Statistical Meetings, and served as an expert witness in criminal cases.

Bill also has held visiting positions on three continents. He had two lengthy JSPS-funded visiting research appointments in Japan and two OAS-sponsored teaching assignments in Argentina. He also was a visiting professor in France.

Bill's research interests are multivariate analysis and statistical ethics, particularly with regard to applications to industrial, educational, and legal processes. He has co-authored two books and more than 50 articles about statistics. He was editor-in-chief for *Communications in Statistics* for 10 years.

Q Bill, thank you for taking time for this interview. You earned your BS and MS degrees in mathematics from Lamar University and Texas A&M University, respectively, before earning your PhD in statistics from Texas A&M University. Did any courses that you took in pursuit of your mathematics degrees motivate your future studies in statistics?

A In 1964–66, graduate statistics and computer science programs were still rare. My background had been 'pure' mathematics, focusing on analysis. I studied a wide range of mathematical areas, but real and complex variables as well as numerical analysis interested me most. While the complex variables side was not terribly important to my statistics training, the real analysis/measure theory was very helpful. The most important part my mathematical background was acquiring an understanding of what constituted a 'proof.'

Q You have worked extensively with a diverse set of organizations, including the Texas Agricultural Experiment Station, Instituto Nacional de Tecnologia Agropecuaria (INSTA, Argentina), Lower Colorado River Authority (LCRA), Scott and White Hospital and Clinic, and Texas A&M University Medical College. What particular projects were most interesting or challenging?

A Each of these projects was interesting and challenging. Ag Station projects ranged from minimized bruising when harvesting peaches to dietary studies on race horses (see *Growth Curves* question). Renal and ophthalmology repeated measures studies with the medical groups; teaching multivariate and time series at INSTA; and examining corrosion on wall panels at a coal-fired power plant for LCRA. Usually accepted statistical practices and methods were adapted to fit the problems posed. For example, the LCRA project used an adaptive sampling procedure to examine randomly selected external wall panels, using both an indicator variable for the presence/absence of significant corrosion and continuous measurements of the extent or the corrosion.

Q **Relatively early in your career you worked with H. O. Hartley on a pair of projects for NASA. What impact did those experiences have on your career in statistics?**

A HOH was a wonderful mentor and friend. He was totally into his research and consulting projects, and our NASA collaboration was no exception. At the time of these grants, spaceflight was in its infancy with lots of data gathering and interpretation issues, including astronaut health monitoring, LANDSAT imagery, etc. These projects were ones with Big Data for the times, missing and partial records, and thus were multivariate by their very nature. I have spent most of my career with these types of problems.

Q **You and Anant Kshirsagar coauthored the book *Growth Curves*. What specifically motivated you and Kshirsagar to write this book?**

A Anant Kshirsagar and I have been fast friends for many years. His expertise in multivariate analysis is unsurpassed, so I could not refuse when he approached me with this project. Applications of multivariate methods, and particularly repeated measures experiments, had come to me from many venues, including as examples from salary discrimination studies and USDA food inspection quality control instruction to research projects on dietary studies for racing quarter horses and ocular drug studies with veterinary ophthalmologists. So, in the book, I provided some chapters and the applied/experimental input, Kshirsagar the theoretical.

Q **You spent more than 40 years as a faculty member with the statistics department at Texas A&M University (TAMU), during which time you were recognized as a TAMU Outstanding Teacher. You then moved into administrative roles, first at TAMU and then the NSF and ASA. What motivated you to move from teaching into administration? What do you miss about teaching?**

A I still teach in the graduate program at TAMU, and I did so while doing TAMU administration. I am now involved with the TAMU analytics MS degree. My administrative work began some 42 years ago when the statistics department successfully initiated an undergraduate mathematical sciences degree with the mathematics department. The college of science dean noticed my involvement in this lengthy degree-approval process and asked me to serve as his assistant dean. This invitation led me into coordinating research efforts through the college and supervising the construction of a science laboratory and lecture hall building, as well as continuing my work in the statistics department. By the way, my campus construction experience aided greatly in the ASA headquarters building project.

William B. Smith

Q **What recent challenges do you feel the ASA and our discipline have successfully confronted? What challenges do you see in the near future?**

A In recent years, the ASA successfully met the fiscal challenges to the organization caused by the impact of open access and virtually freely available publications. It has created a certification process, bought and renovated a headquarters building, improved continuing education efforts both at JSM and online, organized and conducted smaller, more focused meetings, and improved JSM. None of this would have happened without active membership input and participation—the membership, ASA leadership, and ASA staff can give each a collective pat on the back for these successes. Some present and future challenges include the following:

- Big Data
- Data mining by statistically untrained computer scientists
- Decisions by industry and government using poor information and analyses

I think the ASA is in good hands—both the board and ASA staff are open minded and dedicated to the society. I wish for them the same support I had at the ASA. ■

COMING UP
Please return to this column next month, when we will feature an interview with 2010 ASA President Sastry G. Pantula.

Staff Spotlight: Donna LaLonde

In the past, I've not made New Year's resolutions, but the opportunity for success was too great to pass up this year. My resolution was to spend time engaged in new endeavors. Success was guaranteed.

In January, rather than beginning the new semester as I had done for the preceding 23 years, I began my new position as ASA director of programs. I was fortunate to work with amazing colleagues as a faculty member and administrator at Washburn University. Also, the work with talented undergraduates as they pursued their capstone projects was extraordinary. I also enjoyed teaching the courses that were part of the university mathematics requirement and, on occasion, hearing from students that they saw both the value and the beauty of the subject.

Donna LaLonde

I grew up in Bath, New York, and attended Colgate University, but after 23 years in Kansas, the transition to life in Virginia is clearly captured by the line, "Toto (aka Charlotte and Cowboy), we are not in Kansas anymore." Charlotte and Cowboy are my two rescued dogs who share a Kansas heritage with Toto, but are on the other end of the size spectrum. They use all their considerable dog persuasion techniques to ensure we walk at sunrise (or before). I've learned there is indeed order out of chaos if I just do what they want. Their persistence keeps my running program on track and guarantees we are home in time to pursue my passion for puzzles with Will Shortz on Weekend Edition Sunday. I am also enjoying being a Metro ride away from Busboys and Poets and Politics and Prose Bookstore.

Although I was aware of the work accomplished by the ASA, I spent time viewing videos of the JSM presidential addresses and rereading a number of the President's Corner columns to complement my knowledge. This reinforced the unique contributions of each of the presidents and the shared vision of championing initiatives that support, encourage, and enhance the professional practice of the members. I look forward to working with all of you, and my talented staff colleagues, to advance these initiatives and investigate other opportunities. Linus Pauling said, "The best way to have a good idea is to have a lot of ideas." It will be great to see you at JSM and learn about your ideas. ■

ASA EXPERTS Make Meaningful Contribution

Abigail Kirchman, Mathematics Teacher at The James Baldwin School

"New York Lottery: Hey, You Never Know" signs stick to the windows of bodegas and grocery stores. Coins etch at scratch-off cards on the train. This is what my students and I see every day in New York City.

At The James Baldwin High School, we are encouraged to learn and teach using relevant contexts. This semester, my students and I studied probability and statistics grounded in the lottery scene. We calculated the probability of winning the Powerball, determined the best scratch-off ticket in New York, and considered whether the lottery hurts or harms communities.

Student inquiry is central to our learning and teaching philosophy. When studying the Powerball, students created a list of questions. They were curious about the history of the game and wanted to know what to do if they won. Some wanted to compare the chances of winning to other unlikely events, and others were fascinated by the sheer size of the calculated numbers. Based on their questions, the students worked in groups to research and create infographics to share their findings.

During our study of the Powerball, I assigned an article for homework: "A Statistician's View: What Are Your Chances of Winning the Powerball Lottery?" On the off chance that he would respond, I emailed the author—ASA Executive Director Ron Wasserstein—asking that he might provide additional information about the lottery for my class and give feedback on our projects. One month later, Wasserstein was Skyping into our classroom and sharing thoughts on our infographic project. Days of editing and revising ensued as students worked to incorporate this feedback and convey their understanding of the Powerball.

Often, school work ends here. The project is graded and we move on to a new topic. At James Baldwin, however, we hope to share our work and celebrate our learning. My class had the opportunity to present at the NYC Social Justice Expo. The Social Justice Expo brings high-school students from around New York City together to share projects related to social justice issues. Here, students shared science experiments related to water quality, sold buttons to raise money for Nepal disaster relief, and participated in debates about stop-and-frisk. Thanks to donations from the American Statistical Association, my students were able to screen print lottery T-shirts with their own design and give them out to crowds of teenagers. I watched as my students explained their work to students, teachers, and advocates, building awareness about the lottery. Students felt the importance of their work. Our learning had relevancy.

From Left: Abby Kirchman, Amari Wilder, Zoie Rodgers, Michael Camarena, Mario Serrano and Mikayla Cardinali

Students come to The James Baldwin High School for a variety of reasons, but they all have one thing in common: It is their second chance at high school. As a teaching community, we design engaging classes that spark curiosity and demand critical thinking. Students do not sit passively, fill a notebook with teacher-created notes, or do problem sets of 58 problems. Rather, students are writers, artists, mathematicians, and scientists.

We work to connect students with experts in our fields and seek authentic audiences for our projects. It is impossible to engage in this work without the support of the greater community. Our networks—New York City Outward Bound Schools and the Consortium—provide philosophical grounding and instructional guidance. Donors choose funded classroom supplies such as notebooks. But perhaps the most visible and meaningful contributions for the students are the connections we make with experts in the field. Thank you from my class to Ron Wasserstein, Donna LaLonde, and The American Statistical Association! ■

New Toolkit Will Help Statisticians Promote Profession

Jeffrey A. Myers, ASA Public Relations Coordinator

"Build it and they will come." That's the message Kevin Costner's character heard in the movie "Field of Dreams" that persuaded him to build a baseball field and brought the long-deceased players of the 1919 Chicago White Sox back to life on his transformed Iowa cornfield.

Employing that same logic, the ASA built a new resource for its members, only it's not a sports playing field. Instead, this resource is expressly designed to help statisticians promote their profession to high-school and college students.

It's called the "This is Statistics Promotional Toolkit," and it empowers ASA sections and chapters, college statistics departments, and individual members to carry the message about the rewarding career opportunities in statistics to young individuals at a time when they are pondering their future.

The toolkit was created to respond to the many inquiries the ASA has received from members about how they can contribute to the This is Statistics campaign.

Its promotional items are easy-to-implement and effective methods for communicating the key messages about statistics career opportunities with various audiences, including the ASA public awareness campaign's primary audience of students and its secondary audiences of parents, statistics instructors, and high-school and college counselors.

Whether ASA members actively seek opportunities to talk about statistics careers with students or an opportunity presents itself, they will find the sources in this promotional toolkit valuable. They can use an individual toolkit item or combine items to maximize impact on their audience.

The promotional toolkit includes the following:

A PowerPoint presentation—ASA members can use this informative presentation at speaking engagements, such as school career days and talks to groups of students. It lays out the case for why a career in statistics is a great choice by introducing statistics, explaining its impact, and showcasing its wealth of opportunities.

Talking Points—If a speaker cannot use the PowerPoint presentation at a speaking opportunity, he or she can use these talking points to convey the same messages as those in the slides.

Fact sheets on careers in statistics—There are two-page and one-page handouts that make a strong case for why students should give serious thought to pursuing a career in statistics. Members can use them at events such as a statistics department open house or local career fair.

Guide to promoting statistics—This brief guide explains the type of opportunities at which each of the promotional toolkit items can be used and how to make the most impact with each resource.

This is Statistics Videos—At this online center, ASA members can download any of the statistician-profile videos produced for the public awareness campaign. This resource enables statisticians to select the video that best fits their presentation and/or audience.

By using the promotional toolkit, members will help perpetuate the important message that statistics is the career choice for students of today and tomorrow. And it will deliver well-timed critical insight about the profession to students and those who help them decide a future career.

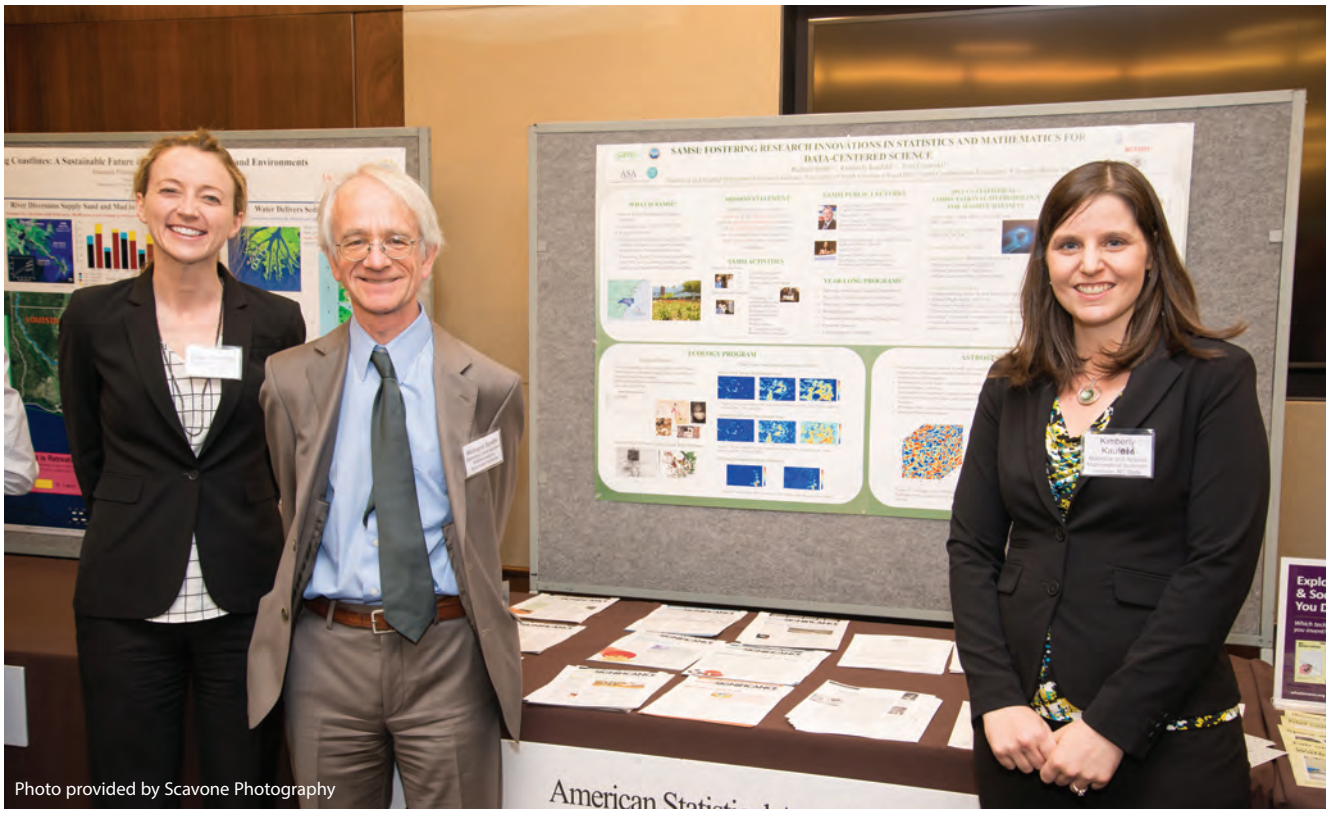
By using the promotional toolkit, members will help perpetuate the important message that statistics is the career choice for students of today and tomorrow.

Members also can support the ASA's public awareness campaign by following it on Twitter (*https://twitter.com/ThisisStats*), liking it on Facebook (*www.facebook.com/ThisisStats*), and sharing its social media messages with their professional and personal networks.

Email recommendations for new toolkit items to *jeffrey@amstat.org*. ■

MORE ONLINE
The toolkit is accessible at *www.thisisstatistics.org*.

ASA Capitol Hill Booth Features SAMSI



From left: SAMSI collaborator Jessi Cisewski of Carnegie Mellon University, SAMSI Director Richard Smith, and SAMSI postdoc Kimberly Kaufeld stand in front of the ASA's poster during the Capitol Hill Exhibition of the Coalition for National Science Funding.

For the 21st annual Capitol Hill Exhibition of the Coalition for National Science Funding (CNSF), the American Statistical Association featured the Statistical and Applied Mathematical Sciences Institute (SAMSI) with a booth titled "SAMSI: Fostering Research Innovations in Statistics and Mathematics for Data-Centered Science."

Representing SAMSI were its director, Richard Smith, SAMSI postdoc Kimberly Kaufeld, and SAMSI collaborator Jessi Cisewski of Carnegie Mellon University. The poster highlighted the work of SAMSI—one of the eight NSF-funded mathematical sciences institutes—focusing on Kaufeld's ecology work and Cisewski's astrostatistics work. During the evening exhibition, the trio discussed their research with members of Congress or their staff members, officials of the National Science Foundation (NSF)—including its director, France Cordova, and director of the Division of Mathematical Sciences, Michael Vogelius—and other attendees of the reception.

The event is held to highlight to Congress the important research being funding by the NSF and is attended by hundreds of people, including 10–12 members of Congress. This year marked the ASA's sixth straight year of participation.

SAMSI Director Richard Smith talks with NSF Director France Cordova while Jessi Cisewski of Carnegie Mellon University and SAMSI postdoc Kimberly Kaufeld discuss their poster with attendees.

SAMSI Director Richard Smith shakes hands with Rep. Eddie Bernice Johnson.

MORE ONLINE
View more photos of the event at *http://bit.ly/1CtljuM*

Prior to the exhibit, Smith, Kaufeld, and Cisewski met with staff of the North Carolina Congressional Delegation and the office of Pennsylvania Sen. Pat Toomey to voice their support for the NSF's budget and discuss NSF's importance to each state. North Carolina and Pennsylvania were ranked 7th and 12th, respectively, for the states receiving the most NSF funding in fiscal year 2014 (FY14). Seven of North Carolina's 13 representatives are in their first or second term in Congress, and Sen. Thom Tillis is newly elected. The staffers, which included the daughter of a high-school statistics teacher, also were receptive to the ASA team's request of support for the NSF's budget in the FY16 deliberations and appreciated the information provided for the institutions in each state receiving NSF support.

CNSF is a coalition of 130 professional societies, universities, and other stakeholders who work together to support the budget of the NSF. If you are interested in having NSF-funded research from your department/institution represent the ASA at a future CNSF event, please contact ASA Director of Science Policy Steve Pierson. (Note that preference is given to those in states whose federal delegation include members of the Commerce, Justice, and Science Appropriations Subcommittee, the panel that determines the NSF budget.) ■

FIFTH SEATTLE SYMPOSIUM IN BIOSTATISTICS:
Biomarkers for Diagnosis, Prognosis, and Therapy Guidance

NOVEMBER 21-24, 2015

GRAND HYATT
Seattle, Washington

SHORT COURSES: November 21-22

Saturday: ***High-Dimensional Statistical Learning***

Sunday Track 1: **Basic Statistics of Biomarkers and Clinical Trials**
Morning: ***Statistical Evaluation of Biomarkers***
Afternoon: ***Roles of Biomarkers in Clinical Trials Design***

Sunday Track 2: **Technology of Omics Data**
Morning: ***Overview of Omics Data***
Afternoon: ***Nuts and Bolts of Omics Data, and Reproducible Research"***

SYMPOSIUM: November 23-24

Monday, November 23, Morning: Development/Discovery of Candidate Biomarkers

Charles Perou (keynote): *Development and Validation of Genomic Biomarkers for the Clinic*
John Quackenbush: *Can We Use Inferred Networks to Discover Biomarkers?*
Rob Tibshirani: *Assessment of Internally Derived Predictors Using Selective Inference*
Holly Janes: *Methods for Evaluating Biomarkers for Guiding Therapy*
Rafael Irizarry: *Overcoming Bias, Systematic Error and Unwanted Variability in High Throughput Measurement*
Invited Panel: *"What Makes a Discovery Study Compelling?"*
Panelists: Steve Friend, Frank Harrell, Dan Hayes, and Bruce Weir

Monday, November 23, Afternoon: Clinical Trials for Diagnosis, Prognosis, and Intervention

David Parkinson (keynote): *Clinical Trials for Diagnosis, Prognosis, and Intervention: Challenges and Opportunities*
Rich Simon: *Genomics Driven Clinical Trials*
Dan Hayes: *Clinical Trials for Biomarkers in Breast Cancer*
Qi Xia: *A Retrospective Look at Development of MetMAb with Companion Diagnostic*

Tuesday, November 24, Morning: Related Issues: Regulatory Considerations, Responsible Parties, and Ethics

Lisa McShane (keynote): *Best Practices to Promote Reproducibility and Ensure Integrity of Omics Research*
Gail Geller: *Trust, Integrity and Ethics in Omics*
Thomas Fleming: *Insights from IOM Omics and the Duke Experience*
Michael Pacanowski: *Regulatory Considerations for Targeted Drug Development*
Elizabeth Daley: *Public Perception and Use of Genomic Tests*
Invited Panel: *"Responsible Parties."*
Panelists: Gil Omenn, Hank Greely, Wylie Burke, Jane Fridlyand, and Michael Pacanowski

Register for the Symposium & Short Courses online at:
symposium.biostat.washington.edu
ssbiost@uw.edu

DEPARTMENT OF BIOSTATISTICS
SCHOOL OF PUBLIC HEALTH
UNIVERSITY of WASHINGTON

THE AMERICAN STATISTICIAN

Special Section in *TAS* Celebrates 175th Anniversary of ASA

Nicole Lazar, *TAS* Editor, and Jessica Utts, ASA President-Elect

What is the ASA's 175th birthday paradox? Why should genealogists thank Lemuel Shattuck, the leading founder of the ASA? What did a coalition of past ASA presidents do in 1997 to save the integrity of the United States census? What are the 11 countries (other than the United States) with the largest ASA membership?

The answers to these questions and more can be found in a collection of articles in the May issue of *The American Statistician,* which is devoted to a celebration of the ASA's 175th anniversary. Many of the articles are adapted from presentations given at the 2014 Joint Statistical Meetings as part of the 175th anniversary celebration. The remaining papers were chosen to chronicle important events in the recent history of the statistics profession and the ASA, in keeping with the 175th anniversary theme of "Celebrate Our Past, Energize Our Future."

The 11 papers cover a variety of topics, including recent and early history of the ASA, predictions of what's to come, challenges that have faced the statistics profession and how to address them, and targeted histories such as the influence of biostatistics at the NIH's National Heart, Lung, and Blood Institute and the development of the Advanced Placement Statistics program in the United States. Two of the papers include interviews and a panel discussion with leaders of the statistics profession. Many of the papers suggest actions that ASA members can take to advance our profession. We hope you enjoy reading about our history and some of our current and future challenges and opportunities. We also hope you are inspired to help propel our profession forward to an even brighter future at the 200th anniversary in 2039. ■

MORE ONLINE
The special section will be freely available at *http://amstat.tandfonline.com/toc/utas20/current* for 60 days after publication.

Meet Barry Johnson, Head of the IRS Statistics of Income Division

Amstat News *invited Barry Johnson, head of the IRS Statistics of Income Division, to respond to a few questions so readers could learn more about him and the agency he leads.*

Barry Johnson began his career with the Statistics of Income Division (SOI) of the IRS in 1987 and worked extensively on studies of the federal transfer tax system; the distribution of U.S. personal wealth; and issues related to data quality, data access privacy protection, and the use of administrative data for statistical purposes. Barry is a longtime member of the ASA and was active in committee work for more than a dozen years.

The Statistics of Income Division (SOI) is the nation's premier source of information about the tax system. Unlike many federal statistical agencies, most SOI data are derived from administrative records (tax returns), rather than surveys. SOI collects data from stratified random samples of these returns and adds to the analytical usefulness of the data, including augmenting information reported on tax returns with supporting information provided by taxpayers in attachments, coding demographic data, and standardizing information to improve consistency and accuracy across records. Data collected by SOI are used to formulate the federal budget, evaluate current and proposed tax laws, and assist in economic studies.

What about this position appealed to you?

I have worked in SOI for much of my professional career and I've seen firsthand the important work the division does on behalf of the American public. I've also seen how the organization has adapted as technology, data availability, and public expectations have evolved. Like all federal statistical agencies, SOI is again facing a changing environment—tight budgets; new technologies for disseminating and accessing data; and changing customer demands with regard to data content, timeliness, and presentation. I sought this job so I could work with our talented staff to help the organization adapt and thrive in this new environment. SOI will celebrate its 100th birthday next year. My goal is to ensure its health and relevance for at least another 100 years.

Describe the top 2–3 priorities you have for the SOI.

First, I am working with the SOI communications team to redesign our strategy for reaching a wider audience. This includes more engaging written reports, greater use of visualizations and infographics, and an improved web design.

Second, I hope to expand the information value of the statistics the division produces by augmenting our current portfolio of tax return–based statistics with new statistical products and reports that combine data from multiple sources to more completely describe larger sectors of the economy. In doing this, we will need to adopt some Big Data techniques so we can better leverage the millions of administrative records provided annually to the IRS.

Third, I am committed to supporting a robust research program that enables the use of SOI data by qualified researchers outside the federal government who work in partnership with SOI staff.

What do you see as your biggest challenge(s) for the SOI?

The current budget environment is a challenge to all statistical agencies. The IRS commissioner recently cited statistics highlighting the effects of recent hiring freezes on the age distribution of our staff. Our inability to hire and train new employees increases the risk of losing important institutional knowledge as our experienced staff members reach retirement eligibility. To help mitigate that, we have introduced tools to capture and preserve knowledge for future employees. Still, as our staff levels and budgets decline, we have become more constrained in our ability to meet customer expectations.

What kind of support from the statistical community do you look for?

One of the benefits of my new position is the opportunity to participate in monthly meetings with the leaders of the other major federal statistical agencies. In these meetings, we address current challenges facing the agencies and map out strategies for modernizing and improving the ways we all collect, produce, and disseminate information. I see this collaboration as essential for each of the agencies as we modernize our processes and products. I look forward to learning from the best practices of the other agencies and working collaboratively to tackle the common opportunities and challenges we face.

Prior to your tenure, what do you see as the biggest recent accomplishment of the agency?

SOI did a fantastic job transforming its processes and products to take advantage of the growth in electronic filing of some tax-return data. This was a major change in terms of how samples are drawn, data edited, and products made available to the public. This transformation yielded huge benefits to the public: releasing SOI products more timely, expanding the content of many releases, and, importantly, saving resources that we were able to reinvest in new work. ■

JOURNAL OF QUANTITATIVE ANALYSIS IN SPORTS HIGHLIGHTS

Baseball, Soccer, Volleyball, Cycling Featured in June Issue

Mark E. Glickman, *JQAS* Editor-in-Chief

The June 2015 issue (volume 11, issue 2) of the *Journal of Quantitative Analysis in Sports* (*JQAS*) features four articles with applications to baseball, soccer, volleyball, and cycling. The issue showcases a variety of sports applications, as well as a diverse set of statistical and modeling approaches typical of *JQAS* manuscripts.

"openWAR: An Open Source System for Evaluating Overall Player Performance in Major League Baseball" by **Benjamin Baumer, Shane Jensen**, and **Gregory Matthews** is the Editor's Choice article for this issue and available for free download for 12 months. The article describes an alternative and more principle approach to WAR (wins above replacement), a proprietary measure used for baseball player evaluation. The authors develop the openWAR measure through a model for conservation of runs, which tracks the changes in the number of expected runs scored and actual runs scored resulting from each in-game hitting event. The procedure is demonstrated on recent major league baseball data to measure player performance.

"Multi-Day Bicycle Tour Route Generation" by **Katherine Payne** and **Moshe Dror** describes a procedure for constructing bicycle routes based on cyclists' perceived exertion. The authors propose to construct multi-day bicycle routes by converting potential routes into strongly connected directed graphs representing the topology of the road map. A heuristic is proposed to solve the combinatorial optimization problem for identifying the optimal path based on minimizing perceived exertion. The procedure is demonstrated on an example multi-day tour route in California.

"Prediction of Major International Soccer Tournaments Based on Team-Specific Regularized Poisson Regression: An Application to the FIFA World Cup 2014" by **Andreas Groll, Gunther Schauberger,** and **Gerhard Tutz** introduces an approach to inferring soccer team strengths based on penalized Poisson regression. In addition to exploring models with ordinary ridge and Lasso penalties for team covariate effects, the authors consider group Lasso penalties that shrink team-specific attack and defense parameters to zero. The authors demonstrate their approach on predictions in the 2014 FIFA World Cup.

Finally, "A Linear Model for Estimating Optimal Service Error Fraction in Volleyball" by **Tristan Burton** and **Scott Powers** examines strategic elements for optimal volleyball serves. The authors build a model of a server's aggressiveness as a function of the server's ace probability, error probability, and the probability the opponent wins a point when receiving conditional on the serve being nonterminal. From this model, the authors construct an algorithm to optimize a server's aggressiveness that would lead to greatest point-scoring potential. The approach is demonstrated on two volleyball data sets. ■

MORE ONLINE
These articles are available on a subscription basis from the *JQAS* website, *www.degruyter.com/view/j/jqas*. Prospective authors can find the jou nal's aims and scope, as well as manuscript submission instructions, there also.

New Undergraduate Data Science Programs

MORE ONLINE
To view a list of universities and colleges creating new undergraduate statistics (and related) programs, visit the ASA Community site at *http://bitly/1dGsBFw.*

The number of undergraduate statistics degrees has nearly doubled in the last four years—making it the fastest growing STEM degree—and master's degrees are also growing quickly. Further, the number of universities granting undergrad statistics degrees has increased from the 74 in 2003 to more than 110 last year.

In the April issue of *Amstat News,* we profiled five of the largest and fastest-growing undergraduate U.S. statistics programs. This month, we look at new undergraduate data science programs.

Northern Kentucky University

Mark J. Lancaster is an assistant professor of statistics and data science at Northern Kentucky University. His research interests include the application of statistics to forensic science, computer vision, and pattern recognition. He has membership in the ASA and ACM.

James W. McGuffee is associate professor and chair of the department of computer science in the college of informatics at Northern Kentucky University. His research interests include networks and computing for the social good. He is a senior member of the ACM.

Bachelor of Science in Data Science

http://datascience.nku.edu

Number of students currently enrolled: 23

First students expected to graduate: Spring 2017

Partnering departments: Computer Science, Mathematics and Statistics, and Business Informatics

How do you view the relationship between statistics and data science?

Statistics is an extremely valuable (and possibly undervalued) component to data science. Statisticians have been aware for quite some time that it is not necessary to have or use every scrap of data to make good decisions in the presence of randomness. Data science is an art of balancing the desire to use the maximum amount of information against the computational resources needed to work on that information, and statistical methodology can usually reduce both sides to manageable levels.

Statistics is an integral component of the data science program at Northern Kentucky University (NKU). We approach data science as a transdisciplinary challenge that requires the cooperation from computer science, statistics, and business informatics. The challenge of Big Data goes beyond the scope of one academic area and requires the full engagement of various areas.

What are the basic elements of your data science curriculum, and how was it developed?

Our expectation is that the graduates of the data science program at Northern Kentucky University will be able to understand the mathematical and statistical foundations of data science and understand the business context in which data science functions. We also expect students to be able to implement algorithms for data aggregation, cleaning, and analysis; select and apply appropriate data analysis techniques to a variety of tasks; and communicate data analysis findings with appropriate visualizations.

What was your primary motivation(s) for developing an undergraduate data science program? What's been the reaction from students so far?

The origin of NKU's data science program was in a suggestion in 2011 from the NKU administration that the university consider developing a program in systems and information engineering, taking some ideas from the curriculum at the University of Virginia. The NKU College of Informatics leadership brought together a team of faculty from computer science, mathematics, statistics, business informatics, and physics. Inspired by a growing interest in Big Data computing, the group shifted the emphasis of the program and eventually its name to "Data Science," sending it out for approval at the state level in October 2012. A key motivation was to take advantage of the undergraduate context, which favors broad integration with general education rather than narrow specialization, together with the informatics context, in which we pay special attention to the communication of information (How do you tell a story with a billion pieces of data?).

Response has been enthusiastic, both by students, with an enrollment of 23 by the end of the second year since launch, and by area employers, who are eager to hire students from this rare undergraduate program in data science.

From the faculty perspective, joining a program in its infancy at NKU has provided me with an incredible opportunity to create and develop new courses at the start of my academic career. Additionally, the ASA has published several articles indicating the need for statisticians to engage with data scientists, so I view this as an important service to the statistical profession. The reaction from students has been positive, with student enrollment into the degree program increasing every year.

Describe the reception you received from the partnering departments, other departments, and those at the university who had to approve the program.

AT NKU, the data science degree is creating something new and original. There have been a few times when someone has asked, "Well, how do we do that?" To everyone's credit, we have always found a way to make it happen and everyone has been supportive and creative in finding workable solutions.

What advice do you have for students considering a data science degree versus a computer science degree, statistics degree, another degree, or some combination of the above (e.g., a double major of statistics and computer science)?

If a student is majoring in data science, we recommend courses in communication studies such as public speaking, small group communication, and/or cross-cultural communication. The reasoning is that most likely a data scientist will be working as part of a team on a project, and being comfortable in communicating statistical and computer science methodology will be invaluable in business and consulting settings.

As for students trying to decide whether to major in data science, every student should choose a degree that best fits his/her needs. For those students who welcome a challenge, are excited about the possibilities of Big Data, and want a truly novel approach to studying data science, then NKU is the place to be. To properly address the challenges in Big Data takes knowledge and experience in more than one area, and that's what an integrated, comprehensive undergraduate degree in data science can do for you.

University of California, Irvine

Stacey Hancock is an assistant teaching professor in the department of statistics at the University of California, Irvine. Her research is primarily in statistics education, with additional interests in time series analysis and environmental statistics.

Padhraic Smyth is a professor in the department of computer science with a joint appointment in the department of statistics at the University of California, Irvine. He is also director of the UCI Data Science Initiative. His research interests are primarily at the intersection of machine learning and statistics.

Bachelors of Science in Data Science

www.stat.uci.edu/ugrad/datascience

Year in which first students expected to graduate: 2019

Number of students currently enrolled: None (yet!). The major starts in fall 2015.

Partnering departments: Statistics (lead) and Computer Science

How do you view the relationship between statistics and data science?

Stacey: One of my favorite definitions of a data scientist is a statistician who understands the principles of computing. As a statistician, my view of the relationship between statistics and data science is constantly changing, ranging from the pessimistic outlook that statisticians are being left behind in this new wave of data science to the optimistic approach of, aren't we all data scientists? A quick Google search of "statistics" yields the following definition: "Statistics is the study of the collection, analysis, interpretation, presentation, and organization of data," which sounds like data science! A Google search of "data science" does not produce such an easily found definition. That being said, I do feel statisticians need more training in data management and organization, data visualization, predictive modeling/machine learning, and communicating results, areas that are all emphasized in data science. In fact, the recently revised *ASA Curriculum Guidelines for Undergraduate Programs in Statistical Science* (*www.amstat.org/education/curriculumguidelines.cfm*) recommend these data science skills as an important part of undergraduate programs in statistics. Other data scientists would benefit from learning how to think like a statistician: When can you generalize your results to a larger population?

What assumptions are we making when using statistical methods? How can we inherently understand and quantify variability and uncertainty? As the field of data science emerges and evolves, the best data scientists will be those of us with solid foundations in both statistical thinking and computational skills.

What are the basic elements of your data science curriculum, and how was it developed?

Stacey: The idea for a major in data science came about very recently, ignited by the UCI Data Science Initiative. The Data Science Initiative aims to bring together researchers and students from all areas of campus involved in data science, broadly defined. An undergraduate major in data science, merging the core disciplines of computer science and statistics, was at the heart of the undergraduate plans for the Data Science Initiative. UCI is somewhat uniquely positioned to become a leader in the training and mentoring of future data scientists because the departments of computer science and statistics are both housed in the Donald Bren School of Information and Computer Sciences and already work closely in both research and training graduate students.

Our BS degree in data science curriculum includes core statistics and computer science courses, including one-year sequences in mathematical statistics and in statistical methods for data analysis, Bayesian statistics, statistical computing and exploratory data analysis, data management, machine learning and data mining, and information visualization. There are four newly developed courses unique to the major. Current researchers and practitioners of data science introduce students to topics at the forefront of the discipline in a first-year seminar in data science, both in terms of foundational methodologies (e.g., in statistics, machine learning, databases) and domain-specific applications (e.g., in climate science, astronomy, social science). We have developed a new course in statistical computing and exploratory data analysis that majors take in their second year. In their senior year, students take a two-quarter team-based project course, which provides a capstone experience to the major. The project course solidifies the connections between statistics and computer science, develops written and oral communication and presentation skills, and exposes students to the types of problems they will encounter as a practicing data scientist.

What was your primary motivation(s) for developing an undergraduate data science program? What's been the reaction from students so far?

Padhraic: We and many of our colleagues have seen a rapid increase in demand for "statisticians that know computing" and "computer scientists that know statistics" in industry, in academic research, in government, and so on. Our primary motivation in proposing the major is to try to help meet this need—and rather than "retraining" students (e.g., in a data science master's program) after they get their primary degree, we believe there are significant benefits to training students to think as data scientists from the beginning of their undergraduate education. The goal is not to produce students who will compete directly with computer science majors or with statistics majors: We are confident data science majors will successfully occupy their own niche between the two existing disciplines and there will be significant continued demand for students with skills that lie at the intersection for many years to come.

We conducted some informal surveys in large undergraduate statistics classes and computer science classes while writing the proposal for our major and consistently found subsets of students who were enthusiastic about the idea (and who wanted to sign up straight away!). In addition, we have also recently been getting inquiries from incoming freshmen (and their parents!) about when the major will start—perhaps a reflection of the fact that the term "data science" has seen considerable exposure in the public media in the past year.

Describe the reception you received from the partnering departments, other departments, and those at the university who had to approve the program.

Padhraic: The reception to date has been very positive. As mentioned earlier, we are very fortunate at UCI to have the department of computer science and the department of statistics in the same school (and indeed in the same building). The recently founded UCI Data Science Initiative has also played an important role in getting the new major established. The initiative is cross campus in scope, but with "roots" in our departments, making it relatively easy for us to build bridges to other departments to get support and input for the major. Yet another helpful factor has been the fact that our school dean is a statistician (Hal Stern), whose own research as a Bayesian statistician relies heavily on computational methods. All of these factors have made planning and organization of the major much easier than it would have been if our departments were located in different schools across campus and if we did not have higher-level support from the dean's office and Data Science Initiative. This has allowed us to present a unified voice to the rest of campus in terms of our vision for the program—and with the statistics and computer science departments leading the way, the other departments and schools on campus have been happy to support the new major.

What advice do you have for students considering a data science degree versus a computer science degree, statistics degree, another degree, or some combination of the above (e.g., a double major of statistics and computer science)?

Stacey and Padhraic: If you love exploring data, manipulating data, visualizing data, and learning from data, then a data science degree is for you. Data science has emerged as a field at the intersection of statistics and computer science, and there is a high demand for individuals trained in this area—a demand that will only increase. Ultimately, we would like to be able to train students who are comfortable in doing something like the following: designing and implementing a data analysis project in which they have to write code to gather large amounts of data from the web, processing and storing this data in a database, visualizing and exploring the data, fitting a statistical model to the data in collaboration with a domain expert, and then communicating the results.

In terms of other degrees compared to a degree in data science, a statistics degree will likely have more mathematics, more theoretical training in statistical methods, and will better prepare you for graduate study in statistics. Compared to a degree in computer science, our data science degree will emphasize many of the "algorithmic components" of a traditional computer science degree (algorithms, data structures, programming, data management, software engineering), but will be combined with a large number of courses in statistics and machine learning (to a much more significant degree than would be in a traditional computer science degree).

A question we sometimes get is "how is the data science major different from doing a major in computer science and a minor in statistics" (or vice versa)? The answer is that the course requirements of a typical computer science (or statistics) major are demanding enough that students typically can only sample a relatively small number of courses in the "other" major. In contrast, the course load of the data science major is spread roughly 50-50 across courses from computing and statistics (for required courses), ensuring students are immersed in the cultures of both disciplines. One could also ask "how is the proposed major different from a degree in computational statistics?" One answer to this is "perhaps not that different"—but by engaging both statistics and computer science in the design and teaching of our data science degree program, we will be able to encourage students to both "think like a statistician" and "think like a computer scientist," rather than thinking like one or the other—which we hope will give them a useful perspective when faced with challenging data analysis problems over the course of their careers.

Winona State University

Chris Malone is a professor of statistics and data science at Winona State University who has been pivotal in the development and improvement of curriculum at the undergraduate level for more than 15 years.

Brant Deppa is professor of statistics and data science at Winona State University. Deppa has spent more than 20 years developing dynamic and modern undergraduate curriculum for statistics. He serves as the chair for the department of mathematics and statistics.

Narayan Debnath is a professor of computer science at Winona State University. He has made substantial contributions to the computer science program for more than 20 years and is the chair of the department of computer science.

Data Science

www.winona.edu/data-science

Year in which first students expected to graduate: Fall 2015

Number of students currently enrolled: 10–15

Partnering departments: Mathematics and Statistics and Computer Science

How do you view the relationship between statistics and data science?

Data science is not statistics. Data science is the melding of computer science and statistics. There is a sense of friction between these two disciplines, which is understandable as ownership of this new discipline is at stake. This friction likely stems from academic departments that are frantically developing curriculum before another department or by one segment of a company that gains approval to hire a data scientist before another segment. The development of a successful data science program requires departments to reduce their differences so that an appropriate balance in curriculum can be achieved.

There are several institutions offering data science degree programs that are housed in computer science. The data science program at Winona State University is housed in the Department of Mathematics and Statistics, but includes a set of computer science courses as a major component of the curriculum. A data science major should be comprised of curriculum from computer science, statistics, and supporting courses from other departments as the practice of doing data science requires discipline-specific knowledge.

What are the basic elements of your data science curriculum, and how was it developed?

The data science program at Winona State consists of three components: analytical knowledge, computational knowledge, and a discipline-specific area of application. Analytical knowledge consists mostly of content from data science (9 credits) and statistics (9 credits). Computational knowledge is comprised of 14 credits from computer science. The discipline-specific component requires 12 credits of upper-division coursework from any discipline with the exceptions of data science, statistics, and computer science.

The development of this program began with a poster at United States Conference on Statistics 2011. This development continued with posters and presentations at JSM 2012 and JSM 2013. The undergraduate data science programs at the College of Charleston (which developed the first undergraduate data science in the U.S.) and the University of Warwick UK were influential in the development of the data science program at Winona State.

What was your primary motivation(s) for developing an undergraduate data science program? What's been the reaction from students so far?

Motivation for our program stemmed from the most recent program review in statistics. A substantial proportion of our statistics majors attend graduate programs upon completion of their degree. The program review highlighted that additional focus should be placed on students seeking employment. In the summer of 2012, several working professionals and hiring managers were interviewed by a core group of faculty at Winona State. This process revealed that the skill set being sought could not be attained by simply tweaking our existing undergraduate statistics program. Thus, the decision was made to create a separate data science program.

Students were excited about the launch of this new program. The launch of our program has received considerable attention from faculty and administrators across our campus and system-wide personnel. Employers in the region were invited to take part in the launch of this new program. The data science program at Winona State will significantly enhance employment opportunities for our students.

Describe the reception you received from the partnering departments, other departments, and those at the university who had to approve the program.

Collaboration with the department of computer science was necessary for the development of our program. This collaboration extended beyond the determination of which computer science courses to incorporate and was vital to finding the correct balance between the three components of the program. The collaboration between the departments was sincere and not forced upon us by administrators.

There was little resistance to the approval of the data science program at Winona State University. The submitted curriculum package was thorough and the motivation and need were clearly defined. One obstacle was that curriculum package required information regarding the anticipated employment opportunities for graduates. This proved to be somewhat difficult as employment potential could not be directly connected to a data science degree as there is currently no CIPS code for data science.

What advice do you have for students considering a data science degree versus a computer science degree, statistics degree, another degree, or some combination of the above (e.g., a double major of statistics and computer science)?

The data science and statistics programs at Winona State University teach students how to extract information from data. These degree programs have differences in the types of data being considered, the procedures and methods in which information is extracted, and what inferences can be made from data.

We strongly encourage our students who plan to attend graduate school in statistics to double major in statistics and mathematics. A student who is seeking employment as a data analyst upon graduation should consider a degree in data science over statistics.

The data science program at Winona State has very strong connections with computer science. Thus, computer science majors are encouraged to consider a major or minor in data science.

University of Nottingham

BSc (Hons) Data Science

www.nottingham.ac.uk/ugstudy/courses/computerscience/bsc-data-science.aspx

Year in which first students expected to graduate: 2018

Number of students currently enrolled: 10–15 are expected to start

Partnering departments: School of Computer Science and School of Mathematical Sciences. Computer Science is the host school, although it is an equal partnership.

How do you view the relationship between statistics and data science?

We see data science as the newborn sister in the family of mathematical and computational sciences, with statistics being a much older sibling. Clearly, there is much excitement about the new arrival, which has generated a lot of ideas and attention, but there is also plenty to learn from older members of the family.

What are the basic elements of your data science curriculum, and how was it developed?

This course is one of the first undergraduate courses of its kind and covers an integrated portfolio of topics unique to Nottingham—including data capture, data mining, statistical analysis, machine learning, and large-scale cloud computing—while teaching an understanding of the human issues surrounding the analysis of personal data. It produces graduates with the core statistical and computer science knowledge and skills needed to present, analyze, and ultimately understand large data sets in an ethical manner.

The course content is split equally between mathematical sciences and computer science modules with an emphasis on statistical and computational data analysis methods, many the result of work in artificial intelligence. The curriculum in year 1 consists of computer science fundamentals, mathematics (linear algebra, calculus, analytical and computational foundations), programming and algorithms, databases and interfaces, probability, and statistics. Years 2 and 3 then offer advanced modules in statistics and computer science (e.g., further probability and inference, machine learning, and operations research).

The schools of mathematical sciences and computer science have long offered joint honors courses, primarily in pure mathematics and theoretical computer science. Times have changed, though, and it seemed the right time to focus on data science, given the strong market demand for the skills of the graduates and the broad interdisciplinary expertise in our schools.

Uwe Aickelin is a professor and head of the school of computer science at the University of Nottingham. His research interests are data modeling and analysis in the health, security, and digital economy domains using artificial intelligence and machine learning methodologies.

Ian Dryden is head of the school of mathematical sciences at the University of Nottingham and is a professor of statistics. His research interests include shape analysis, object data analysis, medical image analysis, and high-dimensional data analysis.

David Hodge is the course director in mathematical sciences for data science. He is a lecturer in the probability and statistics group at the University of Nottingham and works in areas related to mathematics of operations research.

Christian Wagner is the computer science admission tutor. He is an associate professor and researches the capture, modeling, interpretation, and processing/aggregation of uncertain data in particular in multidisciplinary contexts.

What was your primary motivation(s) for developing an undergraduate data science program? What's been the reaction from students so far?

We have strong research connections between the two schools, particularly in the analysis of highly complex data in the Statistics and Probability Research Group in mathematical sciences, the Intelligent Modelling and Analysis Group in computer science, and the Horizon Digital Economy Research Institute. We have a strong role in the University of Nottingham's Big Data Initiative, and we are jointly leading its new data-driven discovery research priority area, so our partnership is a natural one.

With these unique teaching and research strengths from the schools of computer science and mathematical sciences, students can expect to gain the knowledge and skills needed to present, analyze, and ultimately understand large and complex data sets. These are supported by a strong software development theme, providing the competency needed to understand and apply key techniques. The final-year project provides an opportunity to bring these complementary capabilities together to address real data analysis problems in a rich and supportive environment.

The course will start later this year, so it is a bit early for a student reaction. However, it is clear from our existing courses that students are voting with their feet and demand for data analysis options, projects, and dissertations is very high.

Describe the reception you received from the partnering departments, other departments, and those at the university who had to approve the program.

Everyone has been very positive, clearly recognizing how important it is to train the next generation of data scientists.

What advice do you have for students considering a data science degree versus a computer science degree, a statistics degree, another degree, or some combination of the above (e.g., a double major of statistics and computer science)?

Students are often conservative when choosing degree courses, with a natural tendency to choose a familiar subject that they took in high school. However, we would recommend students think further, considering which degrees will lead them to exciting employment opportunities. This is happening more and more, but given the immense demand in data science, it will be some time until the number of graduates from degrees like ours becomes anywhere near close to meeting the market's requirements.

BSc in Data Science

http://warwick.ac.uk/datsci

Year in which first students expected to graduate: 2017

Number of students currently enrolled: 7*

Partnering departments: Statistics, Computer Science (with Statistics as lead department)

** The first cohort of seven students entered the program in September 2014. We expect this number to grow over subsequent intakes as awareness of the program increases. Meanwhile, we have a small but highly motivated inaugural cohort.*

How do you view the relationship between statistics and data science?

The new undergraduate program in data science at Warwick complements two long-established programs organized by the department of statistics: MORSE (mathematics, operational research, statistics, and economics) and MathStat (mathematics and statistics). Together, those two existing programs graduate 160–180 students a year—a large group of "statistics majors," almost half of whom come from outside the UK.

Our data science degree program builds on this existing strength to diversify the statistics undergraduate provision further in the specific direction of computer science. Like the more established statistics programs at Warwick, BSc Data Science is designed for students who are motivated to acquire deep, mathematically based skills that are directly relevant in the modern world. Statistical theory and methods are absolutely central in Warwick's data science curriculum, as are the relevant parts of computer science and mathematics.

What are the basic elements of your data science curriculum, and how was it developed?

The basic elements of Warwick's three-year BSc in data science are the following:

- Rigorous foundations in relevant areas of mathematics such as analysis and linear algebra
- Foundational modules in computer science (programming, information structures, algorithms, etc.), in statistics (probability, statistical computing, statistical theory, linear models, stochastic processes, etc.), and in management science (linear programming, etc.)
- A wide range of options in the third year in computer science, statistics, and more broadly
- In the third year, a major data science project (25% of final-year credit) designed to give each student a personalized experience of data-analytic consulting and/or research

The program was developed during 2012–2013 by a working group of faculty members from the statistics and computer science departments. Essential components of the development process were to identify which existing modules in statistics and computer science would be most relevant to the new program and to plan additional modules needed to complete a well-rounded data science curriculum (such as advanced use of R for computational problems and the final-year project).

What was your primary motivation(s) for developing an undergraduate data science program? What's been the reaction from students so far?

Our main motivations were the following:

- Clear external signals seen over several years of the large and still-growing demand for graduates who are highly skilled in both statistics and computer science.
- Correspondingly clear demands from students in our existing MORSE and MathStat degree programs, for additional higher-level

program modules in areas such as programming, databases, machine learning, etc. (Our students, too, had noticed that such computing skills when combined with their statistical knowledge would make them even more attractive to major employers!)

- To diversify our existing portfolio of undergraduate courses in an interesting new direction.

Current Warwick students gave us positive feedback on plans for this new program (some wished it had been available when they enrolled at the university). The attractiveness of a new degree program to potential applicants inevitably builds slowly over a period of years, though. Branding the program as data science, rather than a more familiar combination of statistics and computer science is a calculated risk, as this has limited name recognition from high-school students and business. Warwick faced this before in the 1970s when the MORSE degree was introduced and the rather radical idea of "BSc in MORSE" was unfamiliar to employers. MORSE grew steadily over time and now has 150–160 graduates each year—putting it among the largest statistics degree programs in the world. We hope data science will follow a similar trajectory.

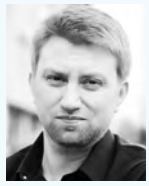
Describe the reception you received from the partnering departments, other departments, and those at the university who had to approve the program.

The program proposal was joint between statistics and computer science, and it was enthusiastically approved by the university. The initial suggestion came from statistics, and its merits were appreciated immediately by computer science colleagues; the two departments collaborated closely over 4–5 months to prepare the formal proposal for university-level approval. Although the program is formally led from the statistics department, it has a named program director in both departments and computer science leads the development and organization of the third-year projects that form such an important part of each data science student's experience at Warwick.

Warwick Data Science Program

David Firth is professor of statistics and director of the Warwick Data Science Institute. He worked previously at the universities of Oxford and Southampton, Imperial College London, and the University of Texas at Austin.

Anthony Lee is assistant professor of statistics and program director for data science in the statistics department. He has BSc and MSc degrees in computer science from the University of British Columbia and a DPhil in statistics from Oxford.



Graham Cormode is professor of computer science and program director for data science in the computer science department. Previously he was a researcher at Bell Labs and AT&T Labs.

What advice do you have for students considering a data science degree versus a computer science degree, statistics degree, another degree, or some combination of the above (e.g., a double major of statistics and computer science)?

Warwick does not offer a straight statistics degree at undergraduate level, in part because the subject is not always well regarded by high-school students. In the UK, students apply directly for admission to a named degree program, rather than declaring a major later on. The main competitor programs to data science for prospective students are MathStat and MORSE, as mentioned above, along with computer science and discrete mathematics. (Discrete mathematics is a joint BSc program run by computer science and mathematics at Warwick.)

We aim to be clear, through our web pages and open-day presentations to prospective students, what the differences are between these various programs that have (necessarily) overlapping core material. Indeed, the first item on the data science FAQ page (*http://warwick.ac.uk/datsci/faq*) is "Why would I choose data science, rather than MathStat, MORSE, mathematics, or computer science?" Our answers to such questions typically aim to inform, rather than persuade. Above all, we want our students to follow a program they know is right for them! ■

MASTER'S NOTEBOOK

Applied JSM

Chuck Kincaid, Senior Engagement Director, Business Intelligence and Analytics Practice of Experis.

A cursory search found more than 50 papers that appear applied, but that's just a starting point.

I am a new member of the Committee on Applied Statisticians (CAS), and I have to say I'm excited about it. The committee realizes the need to help statisticians who are more applied than theoretical broaden their knowledge and advance their careers. As part of that effort, I am writing this column to help applied statisticians attending JSM in Seattle make the best use of their time. No, this article is not about the Fish Market or the Mariners, though I do plan to watch them play the Rangers.

JSM ONLINE PROGRAM
Many committees and sections offer applied sessions at JSM. Search by sponsor name online at *www.amstat.org/meetings/jsm/2015/onlineprogram.*

The first thing to realize is that what one person considers applied might be too theoretical for another, so look over the abstracts to help you make your decision about which sessions to attend. A cursory search found more than 50 papers that appear applied, but that's just a starting point.

One way to find more applied sessions is to look at who is sponsoring the sessions when you're using the online program (*www.amstat.org/meetings/jsm/2015/onlineprogram*). CAS and the Section on Statistical Consulting are good places to start, but many of the other sections and committees have applied sessions. Your own sections may have applied sessions that pertain to your interests and/or professional needs. Unfortunately, searching with the keyword "applied" doesn't show everything.

There are "Added Fee" events that help applied statisticians develop their careers. These can be found in the online program by selecting the options under Professional Development. A couple of examples are CE_02C, Applied Longitudinal Analysis, and CE_03C, The Art and Science of Data Visualization Using R.

There is a particular gem in the search results I would like to point out. On Sunday, there is a free event—CE_43P, Career Development: Discovering Secrets of a Successful Statistical Career. This session, from 2-4 p.m., is specifically for those "interested in exploring potential career opportunities outside academia (e.g., industry, government, research organizations)." If you want to become a more applied statistician, this panel may be valuable.

The "regular" sessions also have a good range of subject matter. Some of the more applied sessions are the following:

Statistical

- Spatial Statistics Applied to Environmental Health Problems
- Calibration
- Value Added Models – A Primer and Discussion

Data-Focused

- Data Quality
- Imputation of Missing Data
- Privacy, Confidentiality, and Sensitive Data

Cutting-Edge

- Big Data in Seattle
- Making Better Decisions with Data Science

Applied Sessions

(All information subject to change. Please double check the program when you arrive.)

Activity Number	Title	Day	Time
#11	Big Data in Seattle	Sun, 8/9	2:00 p.m. – 3:50 p.m.
#116	Spatial Statistics Applied to Environmental Health Problems	Mon, 8/10	8:30 a.m. – 10:20 a.m.
#137	Calibration	Mon, 8/10	8:30 a.m. – 10:20 a.m.
#212	P.M. Roundtable: Statistical Consulting: The Personal and the Professional (fee event)	Mon, 8/10	12:30 p.m. – 1:50 p.m.
#217	Preparing Students to Work in Industry	Mon, 8/10	2:00 p.m. – 3:50 p.m.
#212202	Mentoring Workshop - For New and Seasoned Mentors and Mentees	Tue, 8/11	10:00 a.m. – 12:30 p.m.
#340	Value Added Models – A Primer and Discussion	Tue, 8/11	10:30 a.m. – 12:20 p.m.
#405	From Consulting to Collaboration to Leadership: Increasing the Impact of Statistical Practice (W. J. Dixon Award Winners)	Tue, 8/11	2:00 p.m. – 3:50 p.m.
#426	Data Quality	Tue, 8/11	2:00 p.m. – 3:50 p.m.
#517	Making Better Decisions with Data Science	Wed, 8/12	10:30 a.m. – 12:20 p.m.
#605	Imputation of Missing Data	Wed, 8/12	2:00 p.m. – 3:50 p.m.
#665	Professionalism, Professional Identity, and Training for Ethical Statistical Practice	Thu, 8/13	10:30 a.m. – 12:20 p.m.
#689	Privacy, Confidentiality, and Sensitive Data	Thu, 8/13	10:30 a.m. – 12:20 p.m.

Career-Oriented

- Preparing Students to Work in Industry
- From Consulting to Collaboration to Leadership: Increasing the Impact of Statistical Practice (W. J. Dixon Award Winners)
- Professionalism, Professional Identity, and Training for Ethical Statistical Practice

I also encourage you to network with other applied statisticians at the business meetings and mixers. CAS, the Statistical Consulting and Physical Engineering and Sciences sections, and others have great opportunities to get together. These can be found by selecting "Business/Cmte Meeting and ICW" in the bottom right of the advanced search feature of the online program. The CAS mixer and business meeting is at 3:00 p.m. on August 11, jointly held with the Career Development and Member Retention and Recruitment committees.

I hope you will take advantage of the many activities at JSM that help applied statisticians. I also encourage you to present applied papers in the future that will help your colleagues. If there's a topic you are passionate about, there are probably others who are, too. See you in Seattle! ■

STAT*tr@k*

Career Development: Creating Career Circles

Sarah Kalicin, Intel Corporation

As we advance our careers and make bigger impacts on our organizations, we must gain new knowledge and perspectives, develop specific skills, and embrace beneficial experiences. We learn "what got you to your current position will not get you to your next one." As with any new role, we all face different challenges, have barriers to overcome, and enter into unknown territory we must successfully maneuver.

When I started a previous position, this became abundantly clear. It was the first time I was not in a statistics group or reporting to another statistician. This created many situations I did not realize were a big deal and, at the time, was not equipped to handle. How do you convince an organization (or manager) that part of your role should be to lead the organization to improve decision-making, as opposed to the expectation of merely rubber-stamping the status quo? This was the first time I was responsible for defining my role and setting expectations for the use of statistical applications to benefit the organization. Anyone challenging an organization's culture knows this is more an art than a science—one they do not teach in technical university; it is gained through experience.

A major lesson for me was that I had to gain new skills to be successful in my job. As time went on,

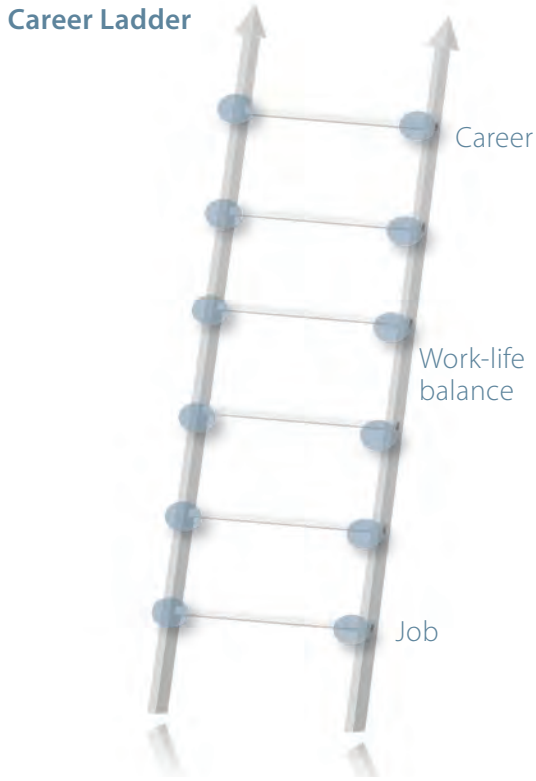


Figure 1. Anatomy of the career ladder

I started to think about a new role and what new skills and experiences would make me successful. Moving up the career ladder is more about creating significant organizational impact than getting promotions. In fact, as our lives and careers evolve, we need to think about three aspects: our current

job, our career direction, and our work-life balance.

The Career Ladder

A ladder is made up of three parts: the rungs, rails, and rung/rail connectors, which provide the structural integrity of the ladder. The career ladder is a metaphor for moving up the ranks, but the ladder components can also be a metaphor. Assume each rung of the ladder represents a job, the rails are the career, and the rung/rail connectors are work-life balance (See Figure 1). To move up a ladder, you need to ensure the rails are long enough to support more rungs. Likewise, to advance up a career ladder, you need to ensure you have the right knowledge, experience, and skills to transition to the next job (or rung). If you are successful in developing these skills, the rails should support you. If not, you could fall or be unsuccessful.

The ladder needs to have structural integrity for it to be functional, same with a career ladder. Spending too much time working, your personal life will suffer or burn out; being too focused on your personal life, your career will suffer. The connectors need to support the rungs and rails to allow the ladder to function. Work-life balance supports your job so you can have a career. As we go through our careers and our life, work and life demands will change. The manner in which we handle these demands will also need to change for us to be successful. The more effective we are at making these transitions, the more rewarding both our lives and careers will be.

Career Circles

Career circles represent the new skills, experiences, and knowledge you need to gain for that new position to have more impact or for you to move up rungs on your career ladder. They entail the ladder's components to support your career growth. As shown in Figure 2, for each job or stage in your career, the circles will be different based on your development needs. They also will be different for everyone, since career paths are as unique as individuals are.

Here are career ladder component definitions and examples; together they make a career circle:

Current Job: Gain skills and behaviors that enable success in daily job duties. Examples include streamlining tasks to be more productive, building teams to gain more group efficiency, and learning information or methods allowing for success.

When I started in my previous position, many of my colleagues viewed me as an analyst, sending me data and expecting me to deliver the data conclusions. Many times, I had to respond detailing data-collection issues—basically, the results they were seeking were not achievable from their data design. I tried to explain that I could have helped them if they came to me before they collected data. After a while, people stopped asking for my support with their data needs and I realized I had to change my approach. Through training sessions, I was able to teach others how to benefit most from my services. I also started to showcase the accomplishments of others when I was engaged

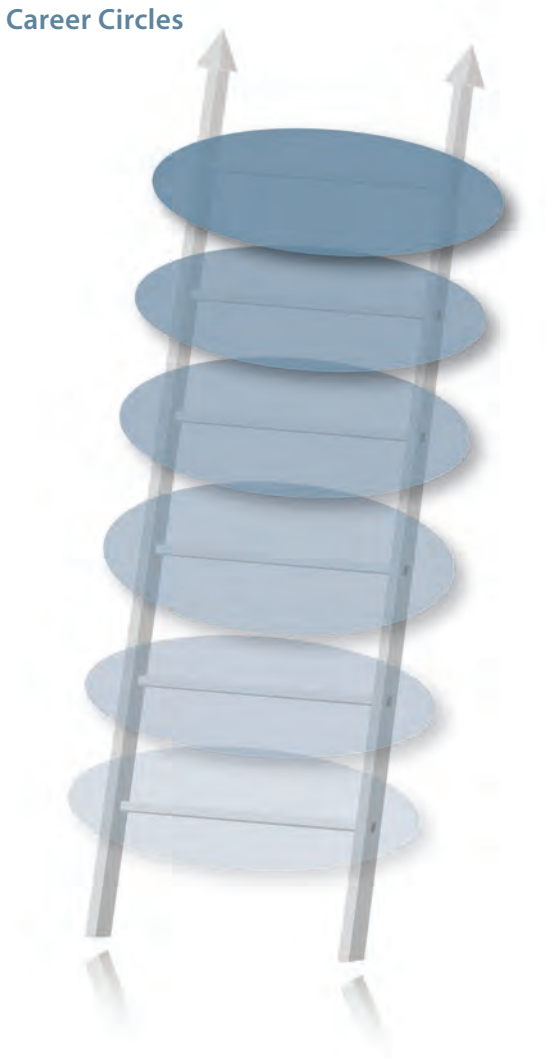


Figure 2. How various career circles differ as one moves up the career ladder

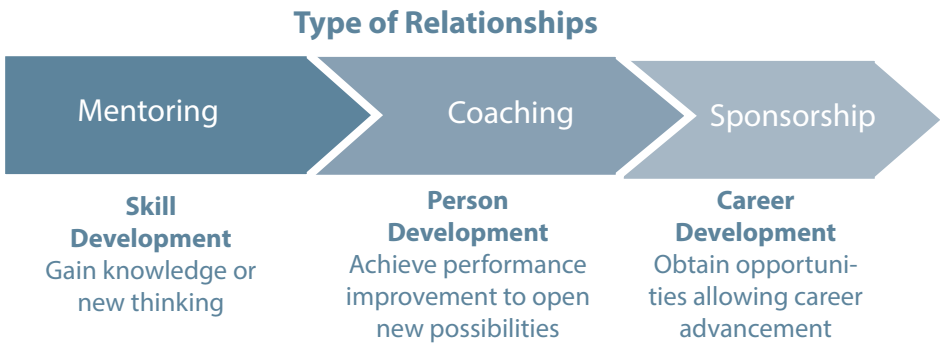


Figure 3. The three types of career development relationships

I had to learn how to most effectively communicate with others, set expectations, and be my own PR agent.

from the beginning of a project. Through these activities, I became more successful in my role, but I had to learn how to most effectively communicate with others, set expectations, and be my own PR agent.

Career: Identify opportunities and gain experiences to advance on the professional track. Examples include developing skills or experiences required for your next position, gaining knowledge or perspectives that allow you to lead teams or drive higher-impact projects, and building and executing meaningful organizational strategies.

One advantage of working for a large company is that they are frequently hiring for various positions. Using this to my advantage, I would scroll through the jobs online for positions that interested me. For any interesting opportunities (even if I was unqualified), I would schedule a half-hour meeting with the hiring manager to ask questions about their organization, the position, and which skills and experiences I would need to be successful in that role. Hiring managers were often open to meeting, providing many great suggestions, and considering what experience and skills I could learn within my current job or what other positions I could take to make the leap. It helped me identify the experience and skills I needed, and then seek out opportunities to develop in these areas.

Work-Life Balance: Gain awareness and skills to achieve greater work and life effectiveness. Examples include becoming a new or more engaged parent, maintaining a healthy lifestyle, and feeling successful equally at work and in life.

As a former triathlete, I found it difficult to get back into training when I had increased demands at work. After several attempts to get back into "training mode," I struggled to maintain the consistency of training. I was disappointed because I lacked a fitness regimen and I thought I would not be able to balance work and fitness. It was a change in perspective that finally made me more at ease—doing something was better than nothing, even if that meant a 20-minute walk one day or swimming another day instead of an hour run every other day.

With these career circles, we should always be asking ourselves about what is holding us back from excelling in our position, getting to the next step in our career, or better balancing our responsibilities between work and life. Once I started to acknowledge what was holding me back, I was empowered to make the necessary changes.

Mentoring, Coaching, and Sponsorship

Through informational interviewing, I was able to identify people who already had the knowledge and experience I was looking for. Many people would suggest finding a mentor, and I think mentoring is one of the three relationships we need to incorporate into career development. Consider finding

Table 1—A Career Circle

Aspect	What I Need to Learn?	Who
Work-Life Balance	How to incorporate fitness into my busy schedule?	Mentor-Sally
	As a new parent, how to I handle career demands with a new baby?	Mentor-Molly
Job	How do I build better team alignment?	Coach-Mary
	What do I need to learn about microprocessors and their functions?	Mentor-Scott
	How do I sell high impact projects?	Coach-Rob
Career	How do I get to my next position?	Coach /Sponsor-Andy
	How can I improve my business knowledge?	Mentor/Coach-Donna

coaches and sponsors to augment career development opportunities (see *http://magazine.amstat.org/blog/2013/11/01/mastersnov2013*).

Figure 3 defines the differences among mentoring, coaching, and sponsorship. Also consider the following analogy: *Give a person a fish, she can eat for a day; teach a person to fish, she can eat for a lifetime.*

- Mentoring is telling someone how to fish, what tools she might need and how it is done. *To get a fish, go down to the edge of the water with a fishing pole with bait and wait for a bite.* The mentor provides awareness about how to fish.
- Coaching is instructing the person, providing feedback and the opportunity to fish better. *Use these lures, cast the lure out beyond the rocks, try snapping your wrist, tug on the line, etc.* The coach allows for better fishing performance.
- Sponsorship is giving the person a boat, so *she can fish in deeper water where there are more and bigger fish.* Now the person is getting enough fish for herself to eat and she is able to sell the extra fish. She would not have been capable of obtaining the boat on her

In Summary

WSS, George Mason Sponsor Mock AP Statistics Exam

Teachers prepare for the mock AP exam.

Students from area high schools take a break during the mock AP exam.

Students from area high schools, accompanied by their teachers, met April 25 to take an exam hosted by the George Mason University Department of Statistics and proctored by members of the George Mason University Stem Education Club. More than 160 students from eight schools practiced their statistical knowledge by taking a mock Advanced Placement (AP) statistics exam, which served as real-time practice for the test that will be administered in early May by the College Board.

Assistant professor Beth Johnson of the Volgenau School of Engineering's Department of Statistics, who organized the session, said, "This event was a wonderful way for the university to make connections with the local community. Not only did it provide the students with valuable practice as they prepared for the actual exam, it also allowed teachers the opportunity to meet and discuss issues related to the AP Statistics curriculum."

As the students answered the free-response and multiple-choice sections of the practice exam, their teachers discussed issues related to the AP Statistics curriculum and the scoring of exams.

Meta Smith, a mathematics teacher and department chair at Herndon High School, was excited about the opportunity and said she learned a great deal from the workshop. She hopes to recruit additional teachers and students for next year.

The event was cosponsored by the Washington Statistical Society, and the American Statistical Association provided promotional materials. Johnson—who has experience leading similar events at the University of South Carolina, The College of New Jersey, and Wilkes University—hosted the event. ■

JSM 2016 Invited Session Proposals Sought

Jeff Morris, 2016 JSM Program Chair

The 2016 Joint Statistical Meetings (JSM) will take place in Chicago, Illinois, from July 30 to August 4. The program committee is soliciting proposals for invited sessions, which disseminate some of the most innovative, impactful, and cutting-edge work in our profession while drawing some of the highest session attendance at our meeting. Most invited sessions originate from proposals assembled by members of the sponsoring societies—and we encourage you to consider putting together a session!

The theme for the 2016 meetings—announced by 2016 ASA President Jessica Utts—is "The Extraordinary Power of Statistics." Quantitative analysis increasingly undergirds decisions made in nearly all sectors of society—government, education, health care, marketing, business, finance, and even entertainment and sports—and statistics is fundamental to the success of these endeavors. Our discipline has extraordinary power to extract information and inform decisions based on data, and consequently has the potential to greatly affect all aspects of life. This theme emphasizes the opportunity presented by the JSM program to highlight and promote the power of our methods, as well as to illustrate how powerful statistical results can inform and benefit society.

The sessions can be oral presentations or panel discussions. An invited paper session consists of two to six people, including speakers and discussants. For an invited panel, the session consists of three to six people who provide commentary, discussion, and engaging debate on a particular topic of contemporary interest. The ideal session involves fresh, important work that many JSM attendees will find interesting. Many of the most stimulating sessions present diverse viewpoints and strategies on a common topic, with speakers coming from different institutions and taking different approaches toward similar problems.

To organize a session, you should first set a theme of broad interest and identify and contact potential participants. Once these are arranged, you should write a proposal consisting of the title, a brief abstract/rationale, a list of participants, and tentative titles for the talks (titles can be changed later). When planning an invited session, please note that JSM has strict guidelines for participation (see *www.amstat.org/meetings/jsm/2016/guidelines.cfm*). Talk to potential speakers to ensure they are not committing to multiple invited proposals.

Once written, you need to submit the session proposal via the online system at *www.amstat.org/meetings/jsm/2016/invitedsessions*, indicating type of session and proposed sponsor. You are encouraged to contact a member of the program committee before submitting to see if they are willing to sponsor the session. If you are a member of an ASA section or another sponsoring society, going through the corresponding representative is often a good way to proceed. They may accept the session outright for one of their allocated spots, or they may enter it into a general competition in which selection is decided by a consensus vote of the entire program committee. In either case, *only sessions submitted via the online system will be considered.* Session proposals must be submitted online by September 3, and decisions about the invited program will be made by the end of September. I urge you to contact program committee members well ahead of the September deadline.

The program committee (*see the next page*) includes the program chairs for the ASA sections and committees and representatives from the partner societies.

If you have ideas but are not sure which sponsor to choose, you may contact me (*jefmorris@mdanderson.org*) or one of the associate program chairs—Veera Baladandayuthapani (*veera@mdanderson.org*) or Scott Holan (*holans@missouri.edu*)—for invited papers or panels. Although we have little discretion to accept a session, we can steer your proposal to appropriate program committee members for consideration.

Given the limited number of sessions and increasing attendance, the process is competitive and many strong sessions are not selected for the invited program. If your session is not chosen, you can submit it to be considered as a topic-contributed session at a later date.

I also am soliciting ideas for introductory overview lectures (IOLs), which are high-quality introductions to timely and important statistical topics of interest to large numbers of JSM attendees. Note that IOL speakers also can present an invited or contributed paper, panel, or poster. If you have good ideas for topics or speakers, please let me know.

Additionally, there will be an invited poster session consisting of 20 electronic posters at the opening mixer, so if you have ideas for this session, you can email them to the poster chair, Genevera Allen (*gallen@rice.edu*).

On behalf of all program committee members, I thank you in advance for your participation and efforts in making the JSM 2016 a stunning success. See you in Chicago! ■

Submit your session proposal online at *www.amstat.org/meetings/jsm/2016/invitedsessions*. Ultimately, the JSM 2016 invited program is only as good as the quality of the submitted proposals, so your input is essential!

JSM 2016 PROGRAM COMMITTEE ROSTER

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The 2015 Don Owen Award, given by the ASA San Antonio Chapter, was presented to **Nitis Mukhopdhyay** by chapter president Jesus Cuellar Fuentes April 10 at the Conference of Texas Statisticians.

Mukhopdhyay is a professor in the department of statistics at the University of Connecticut, Storrs. He earned his doctorate from the Indian Statistical Institute in 1975, and then taught for six years in the department of statistics at Oklahoma State University in Stillwater. He joined the University of Connecticut in 1985.

The Don Owen Award is presented annually by the ASA San Antonio Chapter and sponsored by the Taylor and Francis Group. Read more about Mukhopdhyay online at *http://magazine.amstat.org*. ■

Brent Moulton, associate director for national economic accounts of the Bureau of Economic Analysis (BEA), was selected recently to receive the 2015 Julius Shiskin Memorial Award for Economic Statistics. The award recognizes unusually original and important contributions to the development of economic statistics or the use of statistics in interpreting the economy. Moulton is recognized for his leadership in implementing major innovations into the U.S. national accounts, international standards for national accounts, and expanded integration of U.S. statistical programs. He also is recognized for his work at the Bureau of Labor Statistics in developing innovations that improved the reliability of the Consumer Price Index.

Moulton, who is the 43rd recipient of the award, will be honored at events hosted by the three sponsors of the award: the Washington Statistical Society, National Association for Business Economics, and ASA Business and Economics Section. To read more about Moulton and his accomplishments, visit *Amstat News* online at *http://magazine.amstat.org*. ■

The Senior Statisticians Society held its bimonthly meeting at Maggiano's Restaurant in Washington, DC, May 11. The meeting was attended by 29 statisticians from academia, the federal government, and the private sector.

The goals of the society, which was founded more than five years ago, are to provide an opportunity for eminent members of the retired statistical community to meet on a regular basis, to keep in touch with each other, to provide a forum for exchanging ideas, and to keep abreast of the latest developments in the statistical community.

Since its founding, the society has grown from a few participants to more than 70 members. If you are interested in attending a future meeting, contact Mel Kollander at *mellk@erols.com* or Mike Fleming at *charles.fleming@bhox.com*. Each meeting is limited to 35 attendees, and the next meeting is scheduled for September. ■

ASA Members Visit Ethiopia

ASA members **Abera Wouhib** of the National Institutes of Health, **Solomon Harrar** of the University of Kentucky, and **Malick Mbodj** of the U.S. Food and Drug Administration organized a weeklong visit to Ethiopia March 16–20 that included a conference, meetings, and seminars.

The international conference in applied statistics took place in Jimma per an invitation by Jimma University. With the theme "Theory to Practice," it aimed to foster the exchange of ideas among statisticians at various stages in their careers at educational, government, and private institutions throughout Ethiopia. Wouhib and Harrar gave invited talks.

Jimma University hosted the conference in view of its status as one of the pioneering universities in East Africa to run graduate programs in applied statistics. Currently, the university offers a master's program in biostatistics and will soon launch a PhD program in various fields of statistics.

On March 19 and 20, some of the conference participants were invited to the Central Statistical Agency (CSA) in Addis Ababa for informal discussions with agency directorates, the director general, and the deputy director. They spoke about improving statistical inferences based on small sample sizes and addressing some of the technological and computational issues at CSA.

CSA is the primary statistical agency in Ethiopia, conducting regular and ad hoc sample surveys, executing a decennial population census, and providing population projections. The visiting team also shared their ideas about producing national statistical data and showed their willingness to help CSA with its future capacity-building efforts. Additionally, Wouhib and Mbodj gave talks about adjusting sample survey weights and the application of R in sample surveys. These talks were attended by agency experts at all levels.

Ann Arbor, Detroit Chapters Motivate Statistical Applications in Science Fair Projects

Karry Roberts, Detroit Chapter Secretary

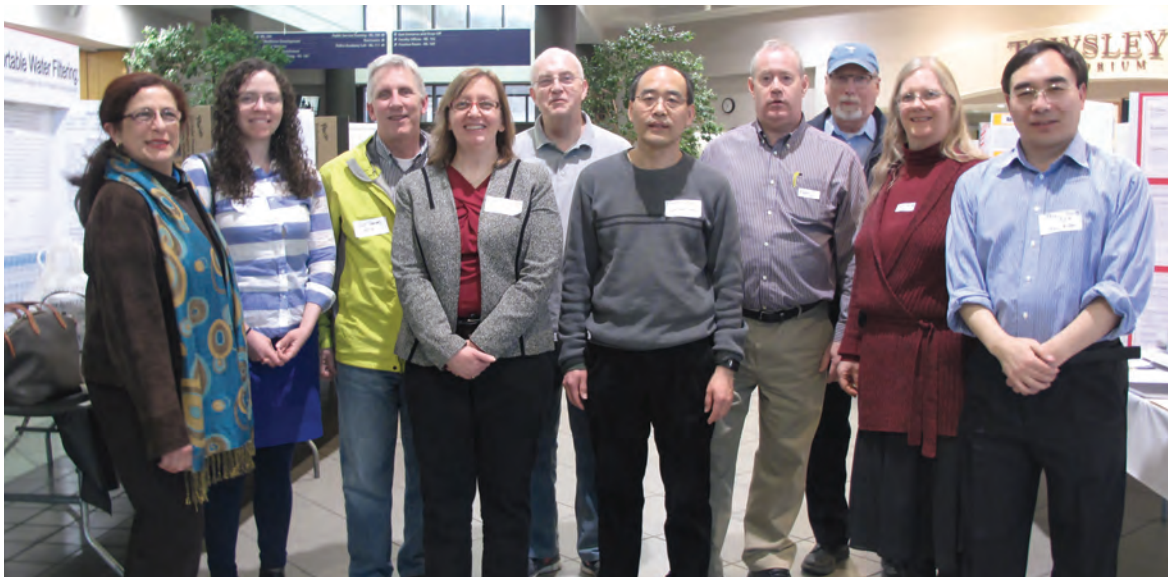

Photo by Huiyong (Thomas) Zheng, Ann Arbor Chapter

From Left: Anamaria Kazanis, Ruth Cassidy, Bob Thomas, Karry Roberts, Lance Heilbrun, Harvey Qu, Barry DeCicco, Frank Murdock, Ellen Barnes, and Huiyong (Thomas) Zheng

Members from the Ann Arbor and Detroit Chapters served together as judges on a special awards committee at the Southeast Michigan Science Fair on March 13.

The team of judges from academia, industry, and medicine included five members from the Ann Arbor Chapter and five from the Detroit Chapter. They judged 250 middle-school and high-school posters for their level of statistical content. At increasing levels of application, they awarded 42 certificates of recognition, 12 certificates of merit, and six awards of excellence. The Award of Excellence winners received a certificate signed by the judges and a statistical book. Merit and excellence recipients received *Significance* magazine.

This year's Award of Excellence went to the following projects:

- "The Effect of Music on Brain Waves"
  Skyline High School, Ann Arbor
- "The Ebola Epidemic in West Africa: Developing a Transmission Model to Compare the Effectiveness of Interventions"
  Father Gabriel Richard High School, Ann Arbor
- "Penicillin and Bacterial Growth"
  Skyline High School, Ann Arbor
- "What Heats Up Faster, Sand or Soil?"
  Clague Middle School, Ann Arbor
- "Impact Craters"
  Saline Middle School, Saline
- "When Is Weather a Hot Topic?"
  Saline Middle School, Saline ■

sectionnews

Biometrics

Edited by Sheng Luo, Biometrics Section Publications Officer

The Biometrics Section will sponsor two Continuing Education courses and six invited sessions at the 2015 Joint Statistical Meetings in Seattle, Washington. To view the list of courses and invited sessions, as well as the winner of the travel awards and Byar Young Investigator Award, visit *http://bit.ly/1EXsH5y*. Make sure to check the JSM online program at *www.amstat.org/meetings/jsm/2015/onlineprogram* for Biometrics Section–sponsored sessions.

Travel Award

The section is also accepting applications for an award to cover up to $3,000 in travel costs to attend a workshop for imagers in La Jolla, California, January 9–15, 2016.

The workshop is for PhD-level biostatisticians interested in conducting methodological or collaborative research in radiology/imaging clinical trials. It presents an opportunity for a biostatistician to gain experience collaborating with radiologists and imaging specialists.

The intensive one-week workshop held by the Radiology Society of North America (RSNA) provides hands-on training in the design, conduct, analysis, and interpretation of clinical trials in radiology and imaging through didactic sessions, one-on-one mentoring, small discussion sessions, self-study, and protocol development workgroups. A special curriculum infused with statistical and methodological concepts and examples was developed for the workshop, which is led by 20 MD and PhD faculty members (including five PhD biostatisticians) with extensive experience in radiology clinical trials, providing a student to faculty ratio close to 1:1. The biostatistician attendee will shadow biostatistics faculty members to observe the collaborative process of developing clinical trials in radiology in addition to learning the methodological aspects of this field.

Interested applicants should email a one-page letter of interest, CV, and letter of support from their department head to Diana Miglioretti at *dmiglioretti@ucdavis.edu* with "RSNA CTMW Biostatistics" in the subject line. The deadline for receipt of applications is August 15; an announcement of the award will be made by October 1.

JSM 2016

It's also time to start thinking about invited sessions for next year's Joint Statistical Meetings, which will be held July 30 to August 4 in Chicago, Illinois. Anyone who is interested in organizing an invited session or who has ideas for one should contact the section's 2016 program chair, Dipankar Bandyopadhyay, at *dbandyop@umn.edu.*

A typical invited session consists of three 30-minute talks followed by a 10-minute invited discussion and 10 minutes of floor discussion. However, other formats are possible. The 2015 program is a good source for examples.

Remember, the most mature ideas will have an advantage in competing for the limited number of slots, so it's best to have your ideas in final form now. The Biometrics Section will have at least four invited sessions, but if we generate enough good ideas, we will be able to compete for additional slots.

Also, if you have ideas for short courses, submit them to the section's 2015–2016 Continuing Education chair, Andrea Troxel, at *atroxel@mail.med.upenn.edu.*

For more information about the section, read its latest news and updates at *www.bio.ri.ccf.org/Biometrics.* ■

Biopharmaceutical

Networking can be challenging, but it is beneficial. Meeting others in our profession can help us quickly learn the ropes, improve our careers, and contribute to the statistical profession. Finding a mentor has its challenges and, keeping that in mind, the Biopharmaceutical Section has created a mentoring program based on the mentoring blueprint created by the Committee on Applied Statisticians. In 2014, 34 people participated.

Mentor Allison Florance said the ASA Biopharmaceutical Section "did a great job in matching me to a mentee. It has been a win-win for both of us!"

Mentee Nobuhle Mpofu said "The biopharmaceutical mentoring program has proved to be

invaluable to me. Through my countless conversations with my mentor, I chose to focus on a thesis topic that is of high interest to me, and yet highly relevant to the pharmaceutical industry and other settings."

The goal of this program is to help members further enhance their professional experience through achieving personal and professional goals. This may occur through sharing of knowledge and experience between a professional practitioner and someone entering the profession.

A constructive mentorship relationship can take many forms and may occur at any stage of one's career with benefits for both the mentor and the mentee. We will provide hands-on resources for mentors and mentees to facilitate their interactions. Information related to the mentoring activities and additional resources for mentors and mentees is available at *http://community.amstat.org/biop/aboutus/subcom/mentoring*.

Currently, we are looking for mentors and mentees for the 2015–2016 mentoring program. Are you interested in becoming a mentor to a statistician and helping fellow biopharmaceutical statisticians? Are you a potential mentee, or can you nominate a statistician who may be looking for a mentorship program? If so, email your contact information to *biopharmmentoring@gmail.com* with the subject "Biopharmaceutical Section Mentoring Program." It would be helpful if you also send a résumé to help us match mentors and mentees.

For additional information, contact Amarjot Kaur at *amarjot_kaur@merck.com* or Jennifer Gauvin at *jennifer.gauvin@novartis.com.* ■

CALL FOR NOMINATIONS

Best Nonclinical Statistical Application Paper Award

The Nonclinical Biostatistics Leaders' Forum (NCBLF) announces a call for nominations for best nonclinical statistical application paper published during 2011–2014. The NCBLF seeks to recognize excellence in nonclinical statistical science.

Papers must have been published in a peer-reviewed scientific journal and demonstrate an important statistical application in any pharmaceutical or biopharmaceutical nonclinical subject context. Nonclinical context is defined as the following:

- Discovery/biomarkers/-omics
- Preclinical toxicology/safety/pharmacology
- Chemistry manufacturing and controls (CMC)
- Medical devices

Submissions will be evaluated based on innovation, influence on statistical practice, or impact on the interface of regulatory and statistical considerations. The winner(s) will be recognized at the NCB2015 conference in October.

Nominations, including a nomination letter and the publication, should be submitted to the NCB2015 conference website at *www.NCB2015.org* by August 15.

Government Statistics

The JSM Program Committee has been working hard for the past year, putting together an outstanding set of sessions. Be sure to mark your calendars and plan to attend the GSS General Membership Business Meeting that will take place August 11 at 6:00 p.m. at the Sheraton in room Jefferson A.

Session highlights we want to point out include the following:

Invited Sessions

Poverty, Government Program Receipt, and Measurement Using Administrative and Survey Data: Sunday, 4:00 p.m.

Bayesian Approaches to Record Linkage: Monday, 8:30 a.m.

Utilizing Administrative Records and Adaptive Design in the 2020 Census: Wednesday, 10:30 a.m.

Topic-Contributed Sessions

The Census Bureau's Quest to Make Better Research-Driven Decisions for Economic Surveys: Monday, 10:30 a.m.

Crowdsourcing Big Data from Smartphone Apps for Transportation Research: Role of Statistics and Challenges: Monday, 2:00 p.m.

Small-Area Estimation: New Methods and Applications to Epidemiology: Tuesday, 10:30 a.m.

Protecting Privacy While Maximizing the Utility of Government Data: Evaluating Current Approaches and Exploring New Alternatives: Tuesday, 2:00 p.m.

2015 Student Paper Award (GSS/SSS/SRMS): Wednesday, 8:30 a.m.

GSS Data Challenge 2015: Wednesday, 2:00 p.m.

Data Presentation Standards within the Federal Statistical System: Thursday, 10:30 a.m.

Roundtable Discussions

Monday – AM: Issues in Implementing Adaptive Survey Design, Peter Miller

Monday – PM: Applications of Regression Trees in Survey Data Analysis, Daniell Toth

Tuesday – PM: Writing for Publication, Ingegerd Jansson

Finally, don't forget the poster and contributed sessions! There will be many excellent research papers presented on topics such as missing data and imputation, data privacy, sampling design, and statistical inference. Consult the JSM online program at *www.amstat.org/meetings/jsm/2015/onlineprogram* for times and locations. ■

Physical and Engineering Sciences

Stephanie DeHart, SPES Chair

Making plans to attend JSM in Seattle? Don't miss the SPES/Q&P mixer Tuesday at 6:30 p.m. at the Sheraton in Grand Ballroom D. Also, consider donating door prizes. If you have something in mind, register your donation at *www.surveymonkey.com/s/2015_SPES_QP_Mixer_Prizes.*

FTC 2015

Zhen Wang, FTC Program Chair

The Fall Technical Conference takes place October 8–9 in Houston, Texas, with sessions based on the theme "Solving Problems Today and Tomorrow," including statistical process control, reliability, data mining, and applied statistics. William Q. Meeker—professor of statistics and distinguished professor of liberal arts and sciences at Iowa State University—is the keynote speaker, and ASA Vice President Jim Rosenberg will give a talk during lunch.

There will be three journal invited sessions: *Technometrics, Journal of Quality Technology,* and *Quality Engineering.* Four sponsor sections and divisions will have invited sessions: SPES, Q&P, CPID, and STAT. The talks will include topics such as design of experiments, Big Data, reliability, and dimensional analysis. SPES also will present an interactive panel discussion: "Success! How Is It Defined and Achieved?" In addition, there are one-day short courses on October 7: Data Visualization, Definitive Screening Designs, Time Series Methods for Forecasting, and Split-Plot Design and Analysis. For information about the conference and Houston, visit *https://asq.org/conferences/fall-technical.* ■

Quality and Productivity

The ASA's Quality and Productivity (Q&P) invited session for JSM 2015 is Preparing Students to Work in Industry. Representatives from a diverse range of academic programs at Virginia Tech, Carnegie Mellon, and The Ohio State University will share creative aspects of their programs that train students for interdisciplinary research, collaboration, and statistical practice in industry. The academic presentations will be followed by comments from industry discussants, including representatives from P&G (consumer products), Lubrizol (chemical company), and Exponent (consulting company).

There will be time reserved at the end of the session for questions and comments from the audience.

In addition to the invited session, Q&P is sponsoring the following topic-contributed and contributed sessions this year:

Statistical Methods for Remote Sensing Data, organized by Amy Braverman, Jet Propulsion Laboratory

Modeling, Analysis, and Visualization of Q&P Data, chaired by Abdel-Salam Gomaa, Qatar University

Product Reliability and Life Testing, chaired by William Q. Meeker, Iowa State University

Statistical Process Control and Quality Assurance, chaired by Vaneeta Kaur Grover, The Chemours Company

Quality and Productivity Research Conference

This year, the 32nd Quality and Productivity Research Conference (QPRC) sponsored by Q&P was held at the College of Textiles, North Carolina State University, June 10–12. On June 9, Q&P offered a short course, titled "Experiences and Pitfalls in Reliability Data Analysis and Test Planning," instructed by William Q. Meeker of Iowa State University. This short course presented the analyses of many life data analysis applications in product reliability and materials evaluation. The analyses illustrated the use of a mix of proven traditional techniques, enhanced and brought up to date with modern computer-based methodology. Methods used in the analyses included nonparametric estimation, probability plotting, maximum likelihood estimation of parametric models, analysis of data with multiple failure modes, likelihood-based confidence intervals, acceleration models, accelerated life testing, Bayesian methods, accelerated degradation testing, and the analysis of recurrence data from repairable systems. Details can be found at *https://asq.org/conferences/fall-technical.*

Fall Technical Conference

The 59th annual Fall Technical Conference (FTC) will take place October 8–9 in Houston, Texas. On October 7, Q&P will sponsor a short course, titled "Split-Plot Design and Analysis," instructed by Peter Goos of the University of Antwerp and Erasmus University Rotterdam. This course provides a thorough introduction to the design of split-plot experiments, the evaluation of split-plot experimental designs, and the analysis of data from split-plot experiments. Extensions to the split-plot design such as the strip-plot design and split-split-plot design are discussed, as well. The course emphasizes industrial applications, involving full and fractional factorial two-level designs and response surface designs, and uses a regression approach to the data analysis. Based on the insights acquired concerning the data analysis, a flexible approach to the design of split-plot (and related) experiments is introduced. Throughout, various diagnostic tools will be used to evaluate the quality of alternative design options. The importance of simulating data will be highlighted. Registration is open for both the short course and conference; for details, visit *https://asq.org/conferences/fall-technical.* ■

Maryland

■ The Emmes Corporation in Rockville, MD, a full-service Contract Research Organization, has openings for PhD-level statisticians to serve on and lead multidisciplinary project teams supporting clinical research with great public health impact across a range of disease areas. Requirements: Solid background in statistical methods with a PhD in biostatistics/statistics/epidemiology, strong oral and written communication skills, and leadership potential. Apply directly online at *www.emmes.com.* EOE.

New Hampshire

■ Postdoctoral Training Program, Quantitative Biomedical Sciences in Cancer, Geisel School of Medicine at Dartmouth invites applications for a multidisciplinary program preparing quantitative scientists for careers in cancer research. Candidates are appointed 2 yrs/min, stipends provided. Applicants must possess a PhD or MD degree and be citizens, non-citizen nationals or permanent residents of the U.S. Send applications to: *Vicki.Sayarath@Dartmouth.edu.* Dartmouth is an affirmative action/equal opportunity employer.

Texas

■ Biostatistics Department. The University of Texas MD Anderson Cancer Center, Houston, Texas, seeks motivated Senior Statistical Analyst for collaborative cancer research. Required: Master's degree in biostatistics, bioinformatics, or related field; 4 yrs experience in clinical trial design and complex statistical analyses (2 years if PhD); excellent programming and communication skills; experience writing biomedical statistical reports. Send letter, CV, and 3 references (with contacts) to *dqs-stat-job@mdanderson.org.* MD Anderson Cancer Center is a smoke-free, drug-free, equal opportunity employer and does not discriminate on the basis of race, color, national origin, gender, sexual orientation, age, religion, disability, or veteran status except where such distinction is required by law. All positions are security sensitive and subject to examination of criminal history record information.

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.*

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10 jobs where millennials are finding work (spoiler alert, one of them is #statistics!) http://cbsn.ws/1GiW8Mm

Jessica Holzbert • @jlholzberg
And related fields too-there's that "data scientist" again http://cbsn.ws/1GiW8Mm

CCHS AP Statistics • @StatPack2015
I spy a good job for a promising young statistician like @HolySmokkes http://cbsn.ws/1GiW8Mm

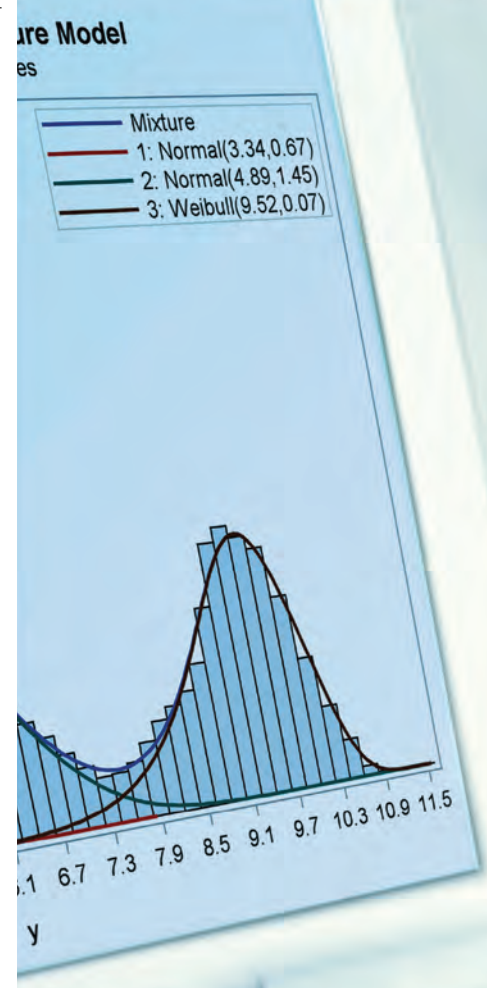
Dave Giles • @DEAGiles
Invitation to Longterm Members function at 2015 meetings of @AmstatNews reminds me I've been a member of Am. Stat. Assoc. for 42 years now.

Yossi Levy • @yoslevy
What statisticians do, and how

ASA • @AmstatNews • **Jun 13**
Statistician born today: William Sealy Gosset

Amy Hogan • @alittlestats
Thanks to beer & Wm Gosset, we have the t-distribution. Cheers!

Kelly Boles • @KLBoles
Mr. Gosset, thanks for the t-distribution. Happy Birthday, old man



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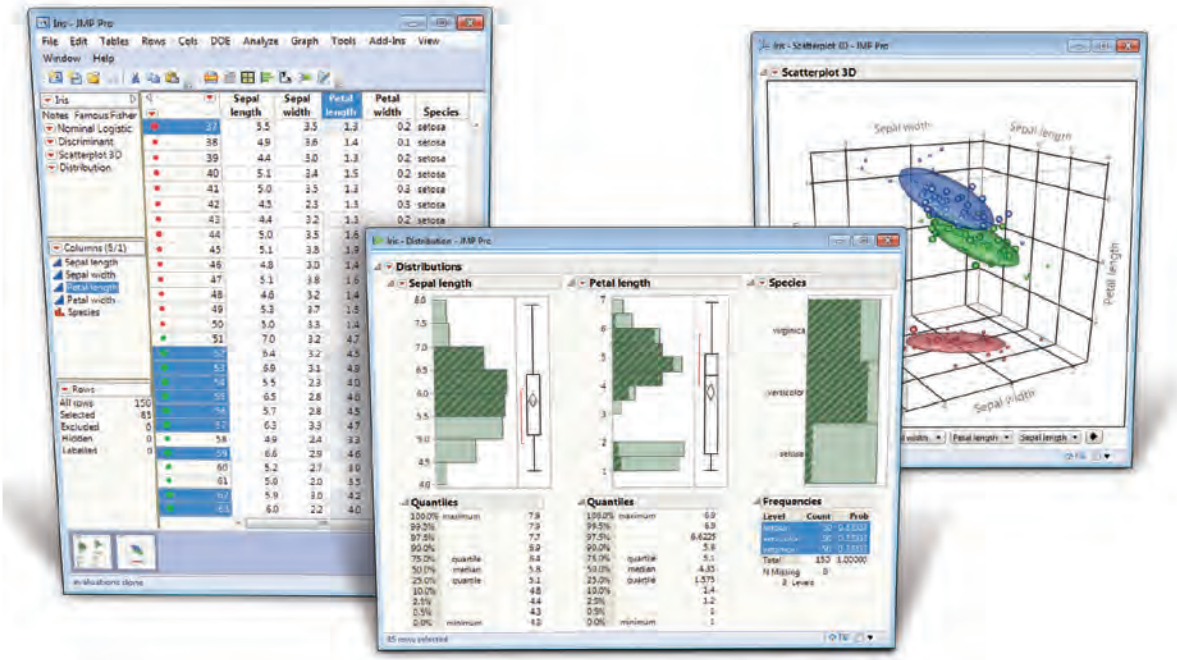

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