June 2019 • Issue #504

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AMSTATNEWS

JUNE 2019 • ISSUE #504

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

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

features

columns

This column is written for those interested in learning about the world of Data for Good, where statistical analysis is dedicated to good causes that benefit our lives, our communities, and our world. If you would like to know more or have ideas for articles, contact David Corliss at *davidjcorliss@peacework.org*.

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*.

Professionals and students from academia, industry, and the government working in statistics and data science will gather and find unique opportunities to grow their influence, community, and knowledge. Register today at *ww2.amstat.org/wsds*.

What's Your Pastime?

Do you have a hobby outside of work you would like to share? If so, let us know and we'll feature it in an upcoming Pastimes of Statisticians column. Email Megan Murphy, *Amstat News* managing editor, at *megan@amstat.org* to receive a short questionnaire to complete. Return your answers along with photos of you participating in your leisure activity and we'll publish your story in an upcoming issue. View previous columns at *https://magazine.amstat.org/blog/category/columnnews/pastimes*.

Coffee Break

Want to share pet pictures? Chat about a good book you've read that's not stats related? Coffee Break is the place for you! Join this discussion group if you'd like to get to know your fellow ASA members in a casual environment. Just log in and then opt in to comment: *https://community.amstat.org/coffee-break*.

departments

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member news

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Statistics and Unintended Consequences

Many years ago, Allan Wilks spoke about the experiences he and Richard Becker and John Chambers (co-developers of *S*, the progenitor of *S-Plus* and R) encountered among users. One of his remarks has remained with me all these years. He was surprised at the ways *S* was being used, ways they never imagined. "For example, one person called to say that *S* was incredibly slow. All he wanted was an identity matrix and it took a half hour. I was puzzled; the command `diag(1000)` takes a fraction of a second. It turns out that he was creating the matrix with for loops: `for (i in 1:1000) {for (j in 1:1000) {if (i == j) then A[i,j]=1 else A[i,j]=0}}`. It never occurred to us that people would use our package in this way."

Recently, at chapter meetings, conferences, and other events, I've had the good fortune to meet many of our members, many of whom feel queasy about the effects of differing views on *p*-values expressed in the March 2019 supplement of *The American Statistician (TAS)*. The guest editors—Ronald Wasserstein, Allen Schirm, and Nicole Lazar—introduced the ASA Statement on *P*-Values (2016) by stating the obvious: "Let us be clear. Nothing in the ASA statement is new." Indeed, the six principles are well-known to statisticians. The guest editors continued, "We hoped that a statement from the world's largest professional association of statisticians would open a fresh discussion and draw renewed and vigorous attention to changing the practice of science with regards to the use of statistical inference."

The authors of the March 2019 supplement of *TAS* offered change. Yet, as the editors noted, "The voices in the 43 papers in this issue do not sing as one. … To us, these are all the sounds of statistical inference in the 21st century, the sounds of a world learning to venture beyond $p < 0.05$."

A healthy debate about statistical approaches can lead to better methods. But, just as Wilks and his colleagues discovered, unintended consequences may have arisen: Nonstatisticians (the target of the issue) may be confused about what to do. Worse, "by breaking free from the bonds of statistical significance" as the editors suggest and several authors urge, researchers may read the call to "abandon statistical significance" as "abandon statistical methods altogether."

We agree with the editors' hope that "statistics in science and policy will become more significant than ever." Since this recent *TAS* supplement appeared, its guest editors have been busy traveling around the country and fielding phone calls to discuss and clarify the issues with *p*-values, the term "statistical significance," and "alternatives to *p*-values."

But we may need more. How exactly are researchers supposed to implement this "new concept" of statistical thinking? Without specifics, questions such as "Why is getting rid of *p*-values so hard?" may lead some of our scientific colleagues to hear the message as, "Abandon *p*-values"—despite the guest editors' statement: "We are not recommending that the calculation and use of continuous *p*-values be discontinued."


Karen Kafadar

Brad Efron once said, "Those who ignore statistics are condemned to re-invent it." In his commentary ("It's not the *p*-value's fault") following the 2016 ASA Statement on *P*-Values, Yoav Benjamini wrote, "The ASA Board statement about the *p*-values may be read as discouraging the use of *p*-values because they can be misused, while the other approaches offered there might be misused in much the same way." Indeed, *p*-values (and all statistical methods in general) can be misused. (So may cars and computers and cell phones and alcohol. Even words in the English language get misused!) But banishing them will not prevent misuse; analysts will simply find other ways to document a point—perhaps better ways, but perhaps less reliable ones. And, as Benjamini further writes, *p*-values have stood the test of time in part because they offer "a first line of defense against being fooled by randomness, separating signal from noise, because the models it requires are simpler than any other statistical tool needs"—especially now that Efron's bootstrap has become a familiar tool in all branches of science for characterizing uncertainty in statistical estimates.

Conceptually, likelihood ratios (LRs) and hierarchical Bayes models and probability distributions (on which LRs and Bayesian models are based) are useful additions to *p*-values. But they have uncertainty, too. Moreover, try explaining those statistical concepts to nonstatisticians. (I've tried. And so have we all when we work with nonquantitative scientists. The bootstrap is a lot easier to explain.) Our challenge continues to be to effectively explain these concepts to nonstatisticians.

In the March 2019 *TAS* supplement, Ronald Fricker and his colleagues looked at 31 articles published in a 2016 issue of *Basic & Applied Social*

Psychology (BASP) one year after its editors banned the use of inferential statistics. "We found multiple instances of authors overstating conclusions beyond what the data would support if statistical significance had been considered. Readers would be largely unable to recognize this because the necessary information to do so was not readily available." They conclude, "In our opinion, the practices we have observed in the papers published in *BASP* post-ban will not help to solve this problem [proper inference]; in fact, we believe they will make it worse." Fricker et al. also recall the recommendations of the American Psychological Association's Task Force on Statistical Inference (1999), which included Donald Rubin, Frederick Mosteller, and John Tukey: "Some had hoped that this task force would vote to recommend an outright ban on the use of significance tests in psychology journals. Although this might eliminate some abuses, the committee thought that there were enough counterexamples … to justify forbearance."

Where will moving to a world beyond $p < 0.05$ take us? Will "statistics in science and policy become more significant than ever" as the *TAS* authors propose? Or will it lead to more confusion, less interpretable studies, and more associations claimed to be important, but maybe no more than one would expect from having calculated thousands of Pearson correlation coefficients? If other journals cite peer-reviewed publications in ASA journals as justification for revising their editorial policies to banish *p*-values, the core of our profession will be threatened, and we may not see "statistics in science and policy become more significant than ever."

It is reassuring that "*Nature* is not seeking to change how it considers statistical evaluation of papers at this time," but this line is buried in its March 20 editorial, titled "It's Time to Talk About Ditching Statistical Significance." Which sentence do you think will be more memorable? We can wait to see if other journals follow *BASP*'s lead and then respond. But then we're back to "reactive" versus "proactive" mode (see February's column), which is how we got here in the first place.

Indeed, the ASA has a professional responsibility to ensure good science is conducted—and statistical inference is an essential part of good science. Given the confusion in the scientific community (to which the ASA's peer-reviewed 2019 *TAS* supplement may have unintentionally contributed), we cannot afford to sit back. After all, that's what started us down the "abuse of *p*-values" path. (See the April column.)

In an unpublished manuscript that he kindly shared with me while I was preparing this column, Stephen Stigler suggests "A Novel Solution to the 'Crisis' in Significance Testing: Read Fisher!" Quoting from Fisher's classic, *The Design of Experiments*:

> In order to assert that a natural phenomenon is experimentally demonstrable we need, not an isolated record, but a reliable method of procedure. In relation to the test of significance, we may say that a phenomenon is experimentally demonstrable when we know how to conduct an experiment which will rarely fail to give us a statistically significant result."

Stigler concludes, "It is clear that Fisher would not have considered a different threshold, even one as small as 0.005, as a solution to a problem. It is also clear that Fisher was an ardent advocate of reproducible science." And that—reproducibility—is the real heart of the problem. (See the recently released report from the National Academy of Science, *Reproducibility and Replication in Science*.) As Benjamini said, "It's not the *p*-value's fault."

Tukey wrote years ago about Bayesian methods: "It is relatively clear that discarding Bayesian techniques would be a real mistake; trying to use them everywhere, however, would in my judgment, be a considerably greater mistake." In the present context, perhaps he might have said: "It is relatively clear that trusting or dismissing results based on a single *p*-value would be a real mistake; discarding *p*-values entirely, however, would in my judgment, be a considerably greater mistake."

We should take responsibility for the situation in which we find ourselves today (and during the past decades) to ensure that our well-researched and theoretically sound statistical methodology is neither abused nor dismissed categorically. I welcome your suggestions for how we can communicate the importance of statistical inference and the proper interpretation of *p*-values to our scientific partners and science journal editors in a way they will understand and appreciate and can use with confidence and comfort—before they change their policies and abandon statistics altogether. Please send me your ideas!

STAFF SPOTLIGHT

Kristin Mohebbi

Mohebbi

Hello, I am Kristin Mohebbi, the newest member of the ASA's meetings department. I thought it would be appropriate for me to introduce myself to you in the language you probably use the most: numbers. I'll make it easy and start with the number one.

By far, my number-one happiest place to be is curled up with a good book, an even better cup of coffee, and a perfect view of a gigantic body of water. I like to credit my Native-American ancestors for why I find peace near water. Hundreds of years ago, our small tribe settled on Long Island Sound and has remained there ever since. So originally, I am from New York, but I only remember living in Maryland; I am a Maryland girl through and through.

The number of minutes I have spent at the most incredible concerts is 3,983. I have had the privilege of seeing many of the greats: Britney, Beyoncé, and even Sir Elton John. There's nothing quite like being so close to the stage that you can actually see Adele's eyelashes.

My combined grade point average for the three statistics classes I've taken in my lifetime is 87.6. I took two of those while earning my master's degree at The George Washington University and focusing on meeting and event management. While I am not a statistics expert, I can pinpoint a few key words and decipher a chart or two—just don't go too hard on me.

The number of countries I've visited so far is 10, and I hope to make that list even longer. I love fully immersing myself in other cultures, and there is no better way to do that than through the local cuisine. In my most recent adventure to Iceland, I tried shark, whale, and even puffin. Next year, I plan to tackle the Middle East, so wish me luck!

The number of additional members in my household is two. One being my new husband; we just celebrated our one-year anniversary this April. The other being my fur baby, Shiva, who is our Bengal cat. He looks like a baby tiger, so we befittingly named him after the tiger in *The Walking Dead*. We are a happily self-proclaimed nerdy family. I couldn't possibly count the number of hours we have spent, Shiva included, rewatching the *Star Wars Saga*—skipping episodes I, II, and III of course.

The number of associations I have simultaneously managed events for prior to moving to the ASA is nine. To say I juggled a million balls at once while working at an association management company would be an understatement. I learned the art of successfully multitasking while managing associations for broadcast media professionals, lawyers, and even federal judges. Throughout my career, I've planned appearances for athletes and coordinated marketing events, weddings, and special events at the White House and Walt Disney World. With that in mind, I wanted to apply my experience in a more impactful way. By focusing on one association like the ASA, I have the opportunity to really get to know the members. This allows for me to perform at a higher level and spend more time being strategic and innovative.

This summer will be my first time at JSM, and I look forward to meeting a lot of you. If I don't get a chance to meet you in Denver, I will be at the ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop this fall and Conference on Statistical Practice next year, so please stop by and say hello. It's what makes my job so amazing. ■

FY19 Budget Finalized; FY20 Budget Deliberations Underway

Steve Pierson, ASA Director of Science Policy

Just before President Donald Trump's FY20 budget request was released in March, the budget for the entire federal government was fully finalized after the longest government shutdown in US history. The highlights of the FY19 federal budget finalized in February include a four percent increase for the National Science Foundation (NSF) over the prior year and a 36 percent increase for the US Census Bureau as it ramps up for the 2020 Decennial Census.

As seen in Table 1, the budgets for the federal statistical agencies were generally flat, though the Bureau of Justice Statistics (BJS) was cut 10 percent. The 10 percent cut for the National Agricultural Statistics Service (NASS) was mostly a reflection of an increase in FY18 for its quinquennial Census of Agriculture.

Table 1—FY15–FY19 Budgets and FY20 Requests for NIH, NSF, AHRQ, FDA, and the 13 Primary Federal Statistical Agencies

					FY19		FY20	
	FY15	FY16	FY17	FY18	Final	Change from FY18	Request	Change from FY19
Research Agency (amounts in millions of dollars)								
NIH	30,311	32,311	34,229	37,084	39,084	5.4%	34,767	-11.0%
NSF	7,344	7,463	7,472	7,767	8,075	4.0%	7,472	-7.5%
AHRQ	364	334	324	334	338	1.2%	256	-24.3%
FDA	2,597	2,720	2,759	2,964	3,068	3.5%	3,524	14.9%
Statistical Agency (amounts in millions of dollars)								
BEA	96.3	105.1	103.8	99.0	101.0	2.0%	108.0	6.9%
BJS	41.0	41.0	45.5	48.0	43.0	-10.4%	48.0	11.6%
BLS	592.2	609.0	609.0	612.0	615.0	0.5%	615.0	0.0%
BTS	26.0	26.0	26.0	26.0	26.0	0.0%	26.0	0.0%
Census	1,088.0	1,370.0	1,457.0	2,814.0	3,821.4	35.8%	7,200.0	88.4%
EIA	117.0	122.0	1,22.0	125.0	125.0	0.0%	118.0	-5.6%
ERS	85.4	85.4	86.8	86.8	86.8	0.0%	61.0	-29.7%
NASS	172.4	168.4	171.2	191.7	174.5	-9.0%	163.0	-6.6%
NCES	232.1	261.0	258.5	258.5	260.5	0.8%	259.0	-0.6%
NCHS	155.4	160.4	160.4	160.4	160.4	0.0%	155.0	-3.4%
NCSES	58.3	58.3	59.7	62.4	60.2	-3.6%	57.7	-4.1%
ORES	29.0	25.9	24.0	27.0	30.0	11.1%	32.0	6.7%
SOI	36.8	37.8	34.3	33.7	35.2	4.6%	34.7	-1.5%

The continued flat funding for many of the federal statistical agencies is concerning when one looks at their loss of purchasing power since FY09. As seen in figures 1 and 2, the majority of the 13 primary federal statistical agencies have lost purchasing power since FY09, several on the order of 15–20 percent.

As one example, the Bureau of Labor Statistics (BLS) has lost $85 million in purchasing power since FY09. As a result, like other statistical agencies in a similar budget situation, BLS is challenged to keep up with changing dynamics of what it is tracking. For BLS, this means fully accounting for the changes in our workforce and economy due to the gig economy, AI, robotics, automation, and other factors. BLS also needs resources to modernize its programs to address declining response rates and take advantage of technological and methodological advances and big data, all of which could reduce respondent burden.

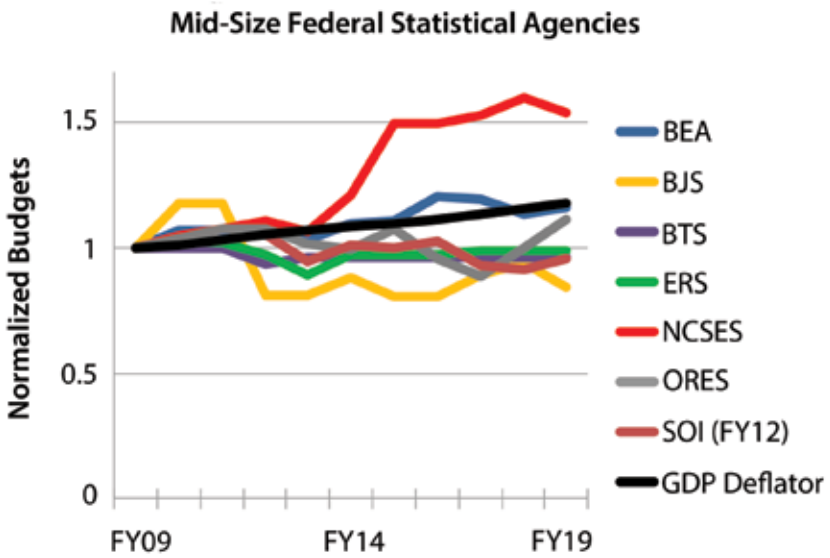

Figure 1: The budgets of the seven mid-sized statistical agencies normalized to their FY09 levels, along with the GDP deflator to account for inflation. Budget restructuring for ERS in FY15 is accounted for in the graph to allow for comparison over this time period. One-time moving costs in FY16 for BEA area also omitted.

The president's FY20 request is similar to past requests of this administration, proposing large cuts for the NSF, National Institutes of Health (NIH), and Agency for Healthcare Research and Quality (AHRQ) and modest cuts for many federal statistical agencies. There are a few notable exceptions. The budget requests an 88 percent increase for Census, a 7 percent increase for the Bureau of Economic Analysis (BEA), and a 12 percent increase for BJS.

The Census Project points out FY20 is $1 billion short of what Commerce Secretary Wilbur Ross said he would need to carry out the decennial census and possibly $2 billion short of what is needed overall (see *https://bit.ly/2HhmHwr*). The percent increase for the BEA would be used for its agency's work to implement the Foundations of Evidence-Based Policymaking Act (FEPA), provide GDP info to Puerto Rico, and plan the proposed move of BLS to the Department of Commerce. The BJS request would restore BJS to its F18 level after a 10 percent cut in FY19.

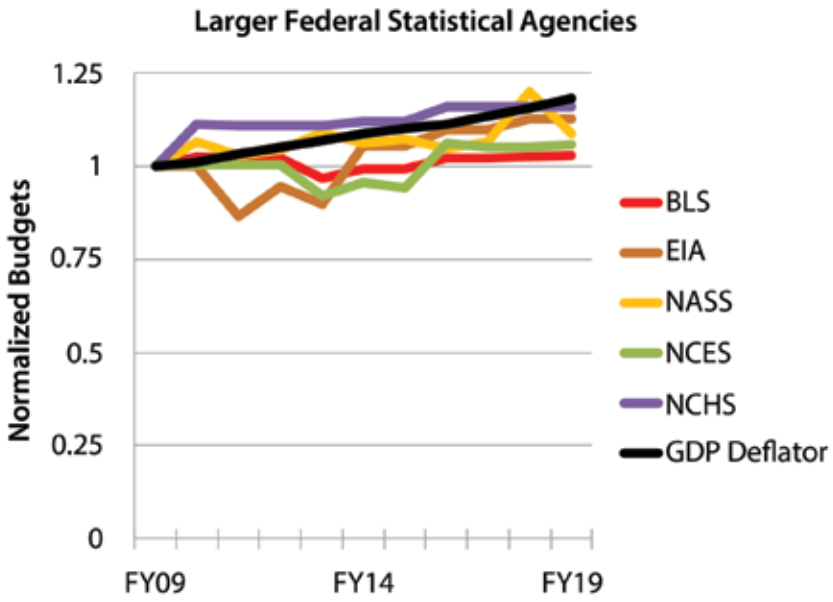

Figure 2: The budgets of five larger statistical agencies normalized to their FY09 level, along with the GDP deflator to account for inflation. Census is omitted because of the large changes in the decennial census cycle. Budget restructuring for NASS and NCHS in FY15 is accounted for in the graph to allow for comparison over this time period.

The US Department of Agriculture (USDA) again proposes to slash the Economic Research Service (ERS) program budget, this time by 48 percent, through cuts to research and analysis for the following areas:

1. Farm, conservation, and trade policy
2. Food assistance, nutrition, and diet quality
3. Rural economy and well-being
4. Food safety

The cutting of the food and nutrition programs is particularly concerning because two-thirds of the USDA's $140 billion budget goes to nutrition assistance programs. While it is unlikely Congress would approve such cuts, they are troubling because of how much they would undermine evidence-based policymaking for the key programs.

The USDA also has $16 million to fund its controversial relocation of the ERS outside of Washington, DC, that the ASA has actively opposed.

The FY20 request also supports the Federal Data Strategy, implementation of FEPA, and advancement of the Trump administration's proposal announced last year to administratively move BLS from the Department of Labor to the Department of Commerce to be more closely aligned with the other two federal economic statistical agencies, Census and BEA. The BLS request also includes a $40 million request over three years—not shown in Table 1—for the physical move of BLS from its location in downtown, where its lease is expiring, to Suitland, Maryland, where it will be co-housed with Census and BEA.

In May, two House Appropriations subcommittees marked up their FY20 bills, providing increases of $51 million for BLS programs (and $10 million for its physical move), $4.6 billion for the US Census Bureau, $8 million for the National Center for Education Statistics, $590 million for the NSF, and $2 billion for NIH. Such increases being enacted are only possible if a new budget deal is reached and the Senate agrees to prioritize these agencies. Currently, discretionary nondefense funding is capped under the sequestration budget caps implemented earlier this decade.

To follow the FY20 budget developments, visit *https://bit.ly/2vRPfpP* and *https://bit.ly/2VXYOCn*. Also, follow @ASA_SciPol on Twitter. ■

Speed, One-Time Mentoring Offer Quick Connections

Elizabeth Mannshardt

Mentoring is an opportunity for networking, professional development, and learning from others' career paths. Traditional matched-mentor programs can be successful, but often require long-term commitments and abundant effort in up-front organization. Speed and one-time mentoring are alternatives that can provide students and young professionals a chance to quickly connect with more advanced career professionals in informal, small-group settings. Events can be designed as one-time offerings—ideal for workshops or conferences—or held multiple times within a section or chapter with different participants and varying structures.

The North Carolina Chapter (NC ASA) recently completed its first speed mentoring event, and the Section on Statistics and the Environment (ENVR) has successfully held one-time mentoring sessions at JSM. These can provide models for sections and chapters looking to offer similar mentoring opportunities.

Feedback from mentees and mentors highlights the need among students and young professionals for mentoring in general and indicates speed and one-time mentoring as effective platforms.

Gabe Farkas (right) chats with two students during the speed mentoring program.

Breda Munoz and Rishi Chakraborty answer students' questions during the speed mentoring program.

Speed Mentoring

During NC ASA's speed mentoring event, participants mingled over light refreshments before taking part in an informal program. The program began with one-minute elevator speeches by each of the mentors and proceeded with five-minute speed mentoring rounds. Mentors sat at their tables for the entire event, while mentees rotated between tables for each round.

Mentees were offered the opportunity to practice their own elevator speeches. At the start of the program, they were asked to write down their career goals. They then added structure or action items based on advice and lessons learned from mentors. A speed panel finale allowed the moderator to pose targeted questions to mentors.

Participants were provided optional questions to stimulate discussion. A moderator kept time and announced the start/end for each round. For the speed panel, mentors remained at their tables.

Details—including an example schedule, questions for mentor/mentees rounds, and mentor/mentee feedback—can be found on the NC ASA blog (*https://bit.ly/2LF2G7p*).

One-Time Mentoring

ENVR hosted mentoring sessions at JSM 2017 and 2018 via breakfast roundtables. Activities and topics were similar to speed mentoring. Details for offering this type of event can be found on the ENVR website (*https://community.amstat.org/envr/events/mentoring*).

Based on ENVR's successful JSM mentoring roundtables, the Government Statistics Section will offer one at JSM 2019. For details, visit *https://bit.ly/2vSGvQr*. ■

Highlights of the April 5–6, 2019, ASA Board of Directors Meeting

ASA President Karen Kafadar convened the initial ASA Board meeting of 2019 at the ASA headquarters in Alexandria, Virginia. The highlights of the meeting follow.

Discussion Items

- The board heard presentations by teams of students from North Carolina State University, Purdue University, and Vanderbilt University. The presentations represented the students' work in the ASA Leadership Challenge, part of 2018 ASA President Lisa LaVange's Leadership Institute. Each team created a business plan with ideas to grow ASA membership. The board was thoroughly impressed with the thoughtfulness of the teams' ideas and the quality of their presentations.

- Publications Representative Scott Evans updated the board on discussions being held by the ASA's Committee on Publications about issues such as the Contributor Roles Taxonomy (CRediT) plan for multiauthor paper recognition and Plan S, a European open-access initiative.

- As it does annually, the board discussed the status of committees in the Membership Council. This council serves as the connection between these committees and the board. The board expressed gratitude for the great work these committees do on behalf of the profession and association.

2019 Board of Directors

Karen Kafadar, President

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Mark Glickman, 1st-Year Council of Sections Representative

Cynthia Bocci, International Representative

Scott Evans, Publications Representative

Amarjot Kaur, Treasurer

Ron Wasserstein, Executive Director and Board Secretary

- The board discussed ways to improve involvement with the data science community through the ASA's Symposium on Statistics in Data Science (SDSS) and our sponsorship of the Data Science and Advanced Analytics (DSAA) Conference.

- The board received the final report of the ad hoc Task Force on Sexual Harassment and Assault and final summary of the questionnaire distributed to membership. The board thanked the task force for its excellent work in developing a new policy and in making other key recommendations. A report of the task force work and board discussions will appear in the July issue of *Amstat News*.

Action Items

- The board approved new editorial appointments for *Journal of the American Statistical Association (JASA)* Theory and Methods (Ian McKeague, Marina Vannucci, and Jane-Ling Wang), *JASA/The American Statistician Reviews* (Adrian Dobra), and *Statistics in Biopharmaceutical Research* (Toshimitsu Hamasaki), effective next year.

- The board accepted the ASA's audited financial statement for 2018 and congratulated ASA Associate Executive Director and Director of Operations Steve Porzio for another successful audit.

- The board increased institutional rates for journals by 6% to offset cost increases. (Members get free electronic access to journals as part of their membership dues.) An additional increase to institutional rates for *JASA* and *Journal of Business & Economic Statistics* was approved to increase the number of pages in these journals to reduce the backlog of papers.

Reported Items

- Porzio updated the board on ASA financials for 2018, which included a higher-than-expected net operating income for the fiscal year.

- ASA Treasurer Amarjot Kaur updated the board on the status of the ASA's investments. 2018 was a year of ups and downs for the market. Investments were down at the end of 2018 over the start but had nearly regained all those losses by the end of February 2019. Kaur said the Investment Committee continues to review the ASA's long-term investment policy.

- The board received progress reports on the strategic initiatives launched by ASA President Karen Kafadar. In addition, ASA President-elect Wendy Martinez introduced the board to her ideas for 2020.

- The Council of Chapters Governing Board (COCGB) and Council of Sections Governing Board (COSGB) reported on their recent activities. The COCGB reviewed many matters, including plans for JSM, virtual mentoring workshops, the chapter visitation program, and the traveling course. The COSGB reported on initiatives for increasing diversity and inclusion, leadership development, and improving the annual section reporting system. Both councils also made modifications to their charters.

- ASA Science Policy Director Steve Pierson updated the board on the decennial census citizenship question, the status of proposed changes to the Economic Research Service and National Institute of Food and Agriculture of the US Department of Agriculture, ongoing issues at the Puerto Rico Institute of Statistics, the realignment of the Bureau of Transportation Statistics within the Department of Transportation, status of science and statistical agency budgets, and the latest on the continued persecution of Greek statistician Andreas Georgiou.

The board met June 7 in Alexandria, Virginia, to discuss the 2020 budget and will meet again July 26–27, 2019, in Denver, prior to JSM. ■

Brittany Ange and Varghese George of the Medical College of Georgia at Augusta University and Donna LaLonde and Ron Wasserstein of the ASA

The 2018–2019 academic salary survey includes both faculty and nonfaculty statisticians and biostatisticians. We received responses from 66 institutions in the United States. The data include 996 faculty and 208 nonfaculty statisticians, with gender information. The quartiles and 90th percentile for relevant categories are provided in the summary tables.

Faculty Data

The faculty data set, comprised of 640 males and 356 females, include faculty members in 20 statistics departments (N=360), 28 biostatistics departments (N=496), and 18 math sciences departments (N=140). Departments classified as both math and statistics were included with the mathematical sciences departments.

Table 1 summarizes salary information for full-time academic faculty in statistics departments by rank and years in rank, based on nine-month salary. Table 2 provides similar information for full-time academic faculty in biostatistics departments, but is based on 12-month salary. Table 3 summarizes salary information on full-time academic faculty in the mathematical sciences departments by rank, based on nine-month salary. The salaries of all statistics and mathematical sciences faculty with contracts other than nine-months were adjusted appropriately to a nine-month salary. Similarly, the salaries of all biostatistics faculty with contracts other than 12-months were adjusted appropriately to a 12-month salary. Tables 4, 5, and 6 provide similar percentiles for the groups in Tables 1, 2, and 3, respectively, stratified by gender. Tables 8, 9, and 10 provide salary information by tenure status.

Nonfaculty Data

The nonfaculty data set includes 208 observations from 22 institutions, with 48 observations at the doctoral level and 160 at the master's level. Of the 208 individuals, there are 198 from biostatistics departments, 18 from statistics departments, and two from mathematical sciences departments. Departments classified as both math and statistics were included with the mathematical sciences departments.

Table 7 provides their salary distribution, stratified by highest degree (master's or doctorate), and years since obtaining the highest degree.

Table 1. 2018–2019 Academic Faculty in Statistics Departments by Rank and Years in Rank, Based on Nine-Month Salary

Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0–2	17	$123,013	$129,106	$150,000	$167,644
	3–5	20	$117,597	$130,239	$155,000	$185,875
	6–9	16	$128,169	$145,134	$206,000	$260,100
	10–16	30	$133,337	$159,397	$182,400	$214,816
	17+	39	$146,250	$162,509	$177,309	$222,342
	All	122	$128,087	$149,750	$174,225	$212,000
Associate Professor	0–1	11	$92,942	$101,247	$112,953	$115,000
	2–3	17	$97,050	$107,291	$112,873	$150,000
	4–6	25	$99,346	$103,945	$109,701	$114,893
	7+	27	$84,560	$98,432	$107,767	$125,000
	All	80	$91,337	$102,111	$110,399	$126,487
Assistant Professor	0–1	35	$75,000	$90,000	$98,500	$100,500
	2–3	40	$76,653	$91,910	$97,155	$104,000
	4–5	21	$84,335	$93,220	$101,000	$108,489
	6+	15	$81,425	$97,320	$105,100	$112,000
	All	111	$79,660	$93,000	$98,756	$105,000
Instructor	All	47	$53,000	$61,690	$73,047	$81,000
All Ranks	**All**	**360**	**$81,948**	**$101,082**	**$135,623**	**$169,306**

Table 2. 2018–2019 Academic Faculty in Biostatistics Departments by Rank and Years in Rank, Based on 12-Month Salary

Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0–2	36	$166,584	$187,772	$205,073	$218,515
	3–5	38	$183,000	$204,029	$227,975	$265,940
	6–9	35	$187,200	$208,771	$238,931	$264,108
	10–16	46	$204,468	$229,812	$264,581	$311,783
	17+	31	$208,845	$249,491	$296,004	$307,091
	All	186	$189,000	$210,841	$243,423	$287,209
Associate Professor	0–1	29	$136,793	$148,973	$155,250	$180,000
	2–3	43	$128,594	$141,537	$153,300	$158,129
	4–6	48	$135,530	$148,433	$160,577	$176,709
	7+	36	$136,933	$151,401	$171,856	$186,333
	All	156	$133,298	$146,316	$158,349	$176,709
Assistant Professor	0–1	39	$103,690	$110,000	$115,000	$130,000
	2–3	43	$107,000	$112,000	$121,245	$132,304
	4–5	35	$110,592	$116,321	$131,566	$138,843
	6+	29	$110,064	$119,446	$131,581	$153,600
	All	146	$107,100	$113,412	$125,000	$135,000
Instructor	All	8	$65,520	$84,289	$98,160	$109,030
All Ranks	**All**	**496**	**$121,128**	**$150,040**	**$199,732**	**$240,598**

Table 3. 2018–2019 Academic Faculty in Mathematical Sciences Departments by Rank, Based on Nine-Month Salary

Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	45	$94,273	$109,970	$122,484	$180,400
Associate Professor	39	$79,508	$89,843	$100,070	$130,741
Assistant Professor	43	$68,000	$73,000	$82,646	$111,500
Instructor	13	$48,197	$50,196	$58,119	$63,171
All Ranks	**140**	**$72,159**	**$84,972**	**$105,789**	**$129,584**

Table 4. 2018–2019 Academic Faculty in Statistics Departments by Rank, Years in Rank, and Gender, Based on Nine-Month Salary

Rank	Years in Rank	Gender	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0–6	Female	13	$115,188	$124,582	$129,244	$153,500
		Male	29	$124,231	$142,283	$156,353	$198,750
	7+	Female	10	$170,000	$215,294	$226,050	$268,675
		Male	70	$138,997	$157,831	$175,000	$201,629
	All	Female	23	$117,113	$129,244	$212,000	$226,050
		Male	99	$133,337	$150,000	$173,390	$199,677
Associate Professor	0–2	Female	7	$101,247	$109,273	$115,000	$140,000
		Male	14	$92,942	$105,694	$112,953	$150,000
	3+	Female	24	$78,945	$100,919	$108,171	$110,713
		Male	35	$90,228	$101,021	$113,387	$122,532
	All	Female	31	$86,954	$101,946	$108,715	$115,000
		Male	49	$92,446	$102,275	$112,953	$127,974
Assistant Professor	0–2	Female	15	$74,000	$88,200	$97,887	$100,000
		Male	40	$81,604	$94,035	$98,756	$105,000
	3+	Female	21	$77,141	$92,919	$96,048	$102,181
		Male	35	$81,949	$93,220	$102,000	$106,225
	All	Female	36	$76,653	$88,850	$96,989	$100,000
		Male	75	$81,947	$93,700	$101,000	$105,623
Instructor	All	Female	24	$51,179	$60,022	$73,593	$81,159
		Male	23	$56,814	$62,597	$68,310	$73,555

Table 5. 2018–2019 Academic Faculty in Biostatistics Departments by Rank, Years in Rank, and Gender, Based on 12-Month Salary

Rank	Years in Rank	Gender	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0–6	Female	32	$178,586	$201,000	$218,806	$237,617
		Male	56	$173,890	$198,910	$221,324	$261,249
	7+	Female	34	$198,121	$224,181	$254,475	$285,351
		Male	64	$204,139	$232,707	$274,640	$309,891
	All	Female	66	$190,062	$209,802	$240,229	$264,581
		Male	120	$188,561	$211,859	$251,045	$298,002
Associate Professor	0–2	Female	22	$126,687	$146,587	$154,500	$158,570
		Male	30	$136,793	$146,231	$153,300	$174,090
	3+	Female	42	$131,950	$144,515	$156,907	$166,700
		Male	62	$136,247	$148,544	$169,493	$180,000
	All	Female	64	$128,994	$144,515	$155,476	$166,700
		Male	92	$136,520	$147,277	$165,577	$178,995
Assistant Professor	0–2	Female	26	$106,499	$110,485	$118,821	$130,810
		Male	34	$104,808	$111,228	$117,045	$129,024
	3+	Female	41	$111,214	$121,245	$133,302	$139,250
		Male	45	$107,000	$111,684	$120,618	$135,000
	All	Female	67	$107,742	$117,415	$127,948	$137,452
		Male	79	$105,100	$111,684	$120,401	$134,163
Instructor	All	Female	5	$80,325	$88,253	$92,820	$109,030
		Male	3	$65,520	$65,520	$103,500	$103,500

Table 6. 2018–2019 Academic Faculty in Mathematical Sciences Departments by Rank and Gender, Based on Nine-Month Salary

Rank	Gender	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	Female	9	$78,804	$80,691	$99,180	$124,146
	Male	36	$97,307	$112,586	$132,064	$182,100
Associate Professor	Female	11	$75,000	$89,210	$130,741	$154,200
	Male	28	$80,537	$90,035	$99,420	$105,900
Assistant Professor	Female	15	$70,626	$73,000	$77,000	$86,618
	Male	28	$59,125	$73,914	$91,982	$114,300
Instructor	Female	5	$49,698	$50,196	$51,273	$58,176
	Male	8	$45,353	$50,765	$60,645	$69,065

Table 7. 2018–2019 Academic Nonfaculty Statisticians* by Highest Degree and Years Since Highest Degree, Based on 12-Month Salary

Highest Degree	Years Since Highest Degree	N	1st Quartile	Median	3rd Quartile	90th Percentile
Master's	0–2	28	$60,000	$63,500	$77,000	$83,187
	3–5	33	$63,036	$67,626	$73,000	$82,782
	6–9	17	$73,251	$78,266	$81,133	$92,770
	10–15	32	$75,025	$87,596	$102,168	$117,167
	16+	50	$97,182	$118,067	$126,400	$138,457
	All	160	$68,142	$82,013	$103,355	$123,736
Doctorate	All	48	$65,125	$72,132	$90,304	$106,751

**Includes 198 from biostatistics, 18 from statistics, and two from mathematical sciences departments*

Table 8. 2018–2019 Academic Faculty in Statistics Departments by Tenure Status, Rank, and Years in Rank, Based on Nine-Month Salary

Tenured or Tenure Track

Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0–3	17	$115,188	$127,420	$150,000	$167,644
	4–7	23	$123,374	$140,680	$170,000	$198,750
	8–14	27	$133,337	$160,000	$197,022	$256,100
	15–20	21	$126,766	$157,588	$199,677	$222,342
	21+	27	$147,209	$162,509	$175,016	$195,818
	All	115	$129,244	$150,000	$175,000	$218,589
Associate Professor	0–2	19	$97,050	$109,273	$115,000	$150,000
	3–5	24	$97,811	$103,102	$109,255	$113,655
	6+	31	$84,792	$99,346	$107,767	$122,532
	All	74	$92,942	$102,507	$110,713	$125,000
Assistant Professor	0–2	39	$90,000	$97,000	$100,000	$105,000
	3+	44	$86,561	$94,762	$101,881	$106,225
	All	83	$87,526	$96,048	$101,000	$105,623
All Ranks	**All**	**272**	**$96,695**	**$108,761**	**$146,425**	**$175,016**

Non-Tenure Track (All Years)

Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	7	$102,739	$129,106	$167,100	$182,400
Associate Professor	6	$67,258	$81,000	$107,291	$135,000
Assistant Professor	28	$68,772	$74,764	$81,948	$89,500
Instructor	47	$53,000	$61,690	$73,047	$81,000
All Ranks	**88**	**$57,599**	**$69,772**	**$80,500**	**$107,291**

Table 9. 2018–2019 Academic Faculty in Biostatistics Departments by Tenure Status, Rank, and Years in Rank, Based on 12-Month Salary

Tenured or Tenure Track

Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0–3	32	$170,553	$197,410	$207,255	$228,609
	4–7	35	$188,184	$210,000	$232,655	$250,000
	8–14	38	$206,929	$235,955	$265,000	$311,783
	15+	31	$208,845	$245,176	$295,197	$307,091
	All	136	$195,100	$214,981	$249,746	$295,197
Associate Professor	0–2	27	$131,560	$146,846	$153,300	$171,301
	3+	49	$133,875	$148,336	$161,457	$186,333
	All	76	$132,681	$147,573	$159,172	$180,000
Assistant Professor	0–2	36	$107,250	$114,157	$120,851	$130,810
	3+	32	$109,631	$112,005	$122,768	$135,000
	All	68	$108,724	$113,850	$121,749	$134,734
All Ranks	**All**	**280**	**$128,271**	**$168,251**	**$214,981**	**$264,097**

Non-Tenure Track

Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0–5	21	$170,725	$188,491	$218,515	$227,975
	6+	29	$190,550	$211,396	$240,599	$292,287
	All	50	$185,400	$200,066	$229,624	$265,260
Associate Professor	0–2	25	$127,635	$145,617	$155,250	$181,288
	3+	55	$136,119	$146,000	$158,993	$174,092
	All	80	$135,530	$145,809	$157,738	$174,594
Assistant Professor	0–2	24	$99,500	$107,122	$112,740	$126,000
	3+	54	$108,212	$118,170	$131,566	$141,843
	All	78	$105,287	$113,103	$126,309	$138,843
Instructor	All	8	$65,520	$84,289	$98,160	$109,030
All Ranks	**All**	**216**	**$114,215**	**$140,184**	**$170,712**	**$211,396**

Table 10. 2018–2019 Academic Faculty in Mathematical Sciences Departments by Tenure Status and Rank, Based on Nine-Month Salary

Tenured or Tenure Track

Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	44	$91,637	$108,009	$122,484	$180,400
Associate Professor	36	$78,805	$89,527	$101,626	$130,741
Assistant Professor	25	$61,634	$71,000	$101,200	$116,163
Instructor/Lecturer	1	-	$58,119	-	-
All Ranks	**106**	**$78,102**	**$95,809**	**$114,300**	**$135,700**

Non-Tenure Track

Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	1	-	$146,775	-	-
Associate Professor	3	$89,024	$93,212	$96,308	$96,308
Assistant Professor	18	$71,571	$74,695	$79,038	$86,618
Instructor/Lecturer	12	$46,988	$49,947	$55,755	$63,171
All Ranks	**34**	**$53,334**	**$72,200**	**$79,038**	**$89,024**

Statistics Surveys: An Open-Access Review Journal

Wendy Martinez

Statistics Surveys is an online, open-access refereed journal publishing overview or introductory articles on topics in statistics and data science. Articles can focus on theoretical, computational, and/or applied aspects of the topic and be broad or narrow in scope.

The journal does not impose a page limit because the articles are published online. However, authors should keep in mind that longer articles take more time to review. Online supplemental materials such as data sets, computer code, and animations also can be included with articles.

Statistics Surveys was founded in 2007 by Jim Pitman, Wendy Martinez, and David Aldous as part of the Mathematics Surveys Project (*mathsurvey.org*) and is sponsored by several societies, including the American Statistical Association, Bernoulli Society, Institute of Mathematical Statistics (IMS), and Statistical Society of Canada (SSC). The editorial board has one representative from each of these four societies and a coordinating editor.

Do not be fooled by the word "surveys" in the title. This is not a journal publishing papers on survey methodology. Rather, it is one that seeks to publish overview articles or surveys of the current state-of-the-art in statistics and data science. The editors are always looking for good submissions to the journal and are willing to work with authors to get their papers ready for acceptance.

So… Do you have a white paper or technical report describing a topic in data science or statistics? How about the literature review you did for a research grant or the first chapter of your dissertation? Consider turning it into an article and submitting it to *Statistics Surveys*. The journal's website is *http://imstat.org/ss* and it contains instructions for accessing papers, submitting papers and supplementary material, and refereeing papers. ■

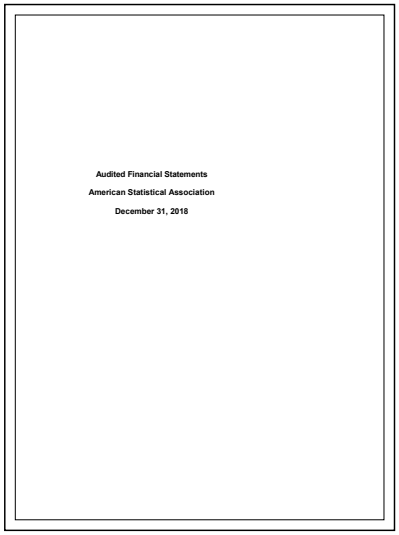
How Can We Help?

We want to help you share your own news with colleagues and showcase your latest successes.

It is important to us that everyone knows about your research, recent awards, and promotions!

If you have any news you would like to share, email *megan@amstat.org*.

2018 Audit Report for the American Statistical Association



Audited Financial Statements

American Statistical Association

December 31, 2018

American Statistical Association

Contents

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Independent Auditor's Report

To the Board of Directors
American Statistical Association

Report on the Financial Statements

We have audited the accompanying financial statements of American Statistical Association (the Association), which comprise the statements of financial position as of December 31, 2018, and 2017 and the related statements of activities and cash flows for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Association's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Association's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of American Statistical Association as of December 31, 2018 and 2017, and the changes in its net assets and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Adoption of Accounting Standards Update 2016-14

As described in Note A to the financial statements, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update 2016-14, *Presentation of Financial Statements of Not-for-Profit Entities* (ASU 2016-14). As required by the FASB, the Association adopted the provisions of ASU 2016-14 during the year ended December 31, 2018. In addition to changes in terminology used to describe categories of net assets throughout the financial statements, new disclosures were added regarding functional expenses and the liquidity and availability of resources. There was no change in the Association's previously reported change in net assets as a result of the adoption of the ASU. Our opinion is not modified with respect to this matter.

Tate & Tryon

Washington, DC
March 18, 2019

2018 Audit Report for the American Statistical Association Continued

American Statistical Association

Statements of Financial Position

December 31,	2018	2017
Assets		
Cash and cash equivalents	$ 224,709	$ 314,414
Investments	18,902,069	20,810,361
Accounts receivable, net	628,502	571,989
Prepaid expenses	180,760	201,716
Equity in joint venture	84,463	40,897
Property and equipment, net	6,423,043	6,755,595
Total assets	**$ 26,443,546**	$ 28,694,972
Liabilities and Net Assets		
Liabilities		
Accounts payable and accrued expenses	$ 932,447	$ 937,097
Due to joint venture	111,925	44,014
Deferred revenue	2,239,991	2,421,141
Bonds payable, net	3,607,569	3,934,437
Total liabilities	6,891,932	7,336,689
Net assets		
Without donor restrictions	17,996,888	19,685,838
With donor restrictions	1,554,726	1,672,445
Total net assets	19,551,614	21,358,283
Total liabilities and net assets	**$ 26,443,546**	$ 28,694,972

See accompanying notes to the financial statements.

American Statistical Association

Statements of Activities

Years Ended December 31, 2018 and 2017

	2018			2017		
	Without Donor Restrictions	With Donor Restrictions	Total	Without Donor Restrictions	With Donor Restrictions	Total
Operating Activities						
Revenue and Support						
Meetings	$ 3,999,037	$ -	$ 3,999,037	$ 3,698,589	$ -	$ 3,698,589
Membership	2,112,976	-	2,112,976	2,131,415	-	2,131,415
Publications	1,736,969	-	1,736,969	1,805,413	-	1,805,413
Programs	741,704	117,188	858,892	676,798	93,693	770,491
Section income	1,046,712	-	1,046,712	702,068	-	702,068
Education	346,727	-	346,727	396,371	-	396,371
Administration	859,059	-	859,059	610,194	-	610,194
Grants and awards	283,967	-	283,967	341,175	-	341,175
Net assets released from restrictions	82,182	(82,182)	-	41,457	(41,457)	-
Total operating revenue and support	11,173,773	65,006	11,240,779	10,403,480	52,236	10,455,716
Expense						
Program Services						
Meetings	2,710,431	-	2,710,431	2,488,936	-	2,488,936
Publications	1,226,642	-	1,226,642	1,182,246	-	1,182,246
Programs	2,287,242	-	2,287,242	2,261,933	-	2,261,933
Section expenses	994,117	-	994,117	787,585	-	787,585
Education	575,113	-	575,113	544,350	-	544,350
Grants and awards	283,599	-	283,599	333,780	-	333,780
Total program services	8,077,144	-	8,077,144	7,598,830	-	7,598,830
Supporting services						
Membership development	958,098	-	958,098	961,167	-	961,167
Management and general	1,469,673	-	1,469,673	1,385,983	-	1,385,983
Fundraising	259,315	-	259,315	221,525	-	221,525
Total supporting services	2,687,086	-	2,687,086	2,568,675	-	2,568,675
Total expense	10,764,230	-	10,764,230	10,167,505	-	10,167,505
Change in net assets from operating activities	411,543	65,006	476,549	235,975	52,236	288,211
Nonoperating Activities						
Unrealized (loss) gain on investments	(2,100,483)	(182,725)	(2,283,218)	1,748,220	146,352	1,897,572
Change in net assets	(1,688,940)	(117,719)	(1,806,669)	1,984,195	201,588	2,185,783
Net assets, beginning of year	19,685,838	1,672,445	21,358,283	17,701,643	1,470,857	19,172,500
Net assets, end of year	$ 17,996,888	$ 1,554,726	$ 19,551,614	$ 19,685,838	$ 1,672,445	$ 21,358,283

See accompanying notes to the financial statements.

American Statistical Association

Statements of Cash Flows

Year Ended December 31,	2018	2017
Cash flows from operating activities		
Change in net assets	$ (1,806,669)	$ 2,185,783
Adjustments to reconcile change in net assets to net cash (used in) provided by operating activities:		
Depreciation and amortization	385,867	399,308
Amortization of bond issuance costs	6,637	6,637
Equity in earnings from joint venture	(43,566)	(40,897)
Contributions restricted for investment in perpetuity	(24,980)	(10,000)
Unrealized and realized loss (gain) on investments	1,703,623	(2,245,056)
Changes in assets and liabilities:		
Accounts receivable	(56,513)	(67,598)
Prepaid expenses	20,956	(10,722)
Accounts payable and accrued expenses	(4,650)	(56,618)
Deferred revenue	(181,150)	122,666
Total adjustments	1,806,224	(1,902,280)
Net cash (used in) provided by operating activities	(445)	283,503
Cash Flows From Investing Activities		
Purchases of investments	(10,104,504)	(6,575,694)
Proceeds from sale of investments	10,309,173	6,375,431
Purchases of property and equipment	(53,315)	(47,442)
Net cash provided by (used in) investing activities	151,354	(247,705)
Cash Flows From Financing Activities		
Principal payment on bonds payable	(333,505)	(324,469)
Contributions restricted for investment in perpetuity	24,980	10,000
Equity distribution from joint venture	-	34,195
Due to joint venture	67,911	11,615
Net cash used in financing activities	(240,614)	(268,659)
Net (decrease) in cash and cash equivalents	(89,705)	(232,861)
Cash and cash equivalents, beginning of year	314,414	547,275
Cash and cash equivalents, end of year	$ 224,709	$ 314,414
Supplemental disclosure of cash flow information:		
Income taxes paid	$ 80,000	$ 60,150
Interest paid	$ 129,551	$ 115,777

See accompanying notes to the financial statements.

American Statistical Association

Notes to Financial Statements

A. Organization and Summary of Significant Accounting Policies

Organization: The American Statistical Association (the Association) was founded in 1839 and incorporated in 1841 under the not-for-profit laws of the Commonwealth of Massachusetts as a professional association serving statisticians and all individuals interested in the study and/or application of statistics. The Association's objectives are to foster statistics and its applications, to promote unity and effectiveness of effort among all concerned with statistical problems, and to increase the contribution of statistics to human welfare. The Association conducts meetings, produces publications devoted to statistical methodology and its applications, makes available information concerning the science of statistics and its contributions, cooperates with organizations in the advancement of statistics, stimulates research, promotes high professional standards and integrity in the application of statistics to problems of science and of public policy, fosters education in statistics, and, in general, makes statistics of service to science and society.

New accounting principle: The Financial Accounting Standards Board (FASB) issued Accounting Standards Update 2016-14, Presentation of Financial Statements of Not-for-Profit Entities (ASU 2016-14). The Association adopted the provisions of ASU 2016-14 during the year ended December 31, 2018. In addition to changes in terminology used to describe categories of net assets throughout the financial statements, new disclosures were added regarding functional expenses and liquidity and availability of resources. There was no change in the Association's previously reported change in net assets as a result of the adoption of the ASU.

Basis of presentation: The Association is required to report information regarding its financial position and activities according to two classes of net assets: net assets without donor restrictions and net assets with donor restrictions.

Basis of accounting: The financial statements are prepared on the accrual basis of accounting. Revenue is recognized when earned and expense when the obligation is incurred.

Use of estimates: The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Actual results could differ from estimates.

Cash and cash equivalents: For financial statement purposes, all highly-liquid investments with a maturity of three months or less at the time of purchase are considered to be cash equivalents, except for money market funds held in the investment portfolio. Cash and cash equivalents also include funds held in a bank account on behalf of a joint venture.

Accounts receivable: Accounts receivable consist of amounts due from the sale of subscriptions, publications, and conferences. Accounts receivable are presented net of an allowance for doubtful accounts. The allowance for doubtful accounts is provided based upon management's judgment, including such factors as prior collection history and type of receivable. As of December 31, 2018 and 2017, the allowance for doubtful accounts was $10,000. The Association writes-off receivables when they become uncollectible, and payments subsequently received on such receivables are credited to the allowance for doubtful accounts.

Equity in joint venture: The Association has an investment in a joint venture to produce a journal called Technometrics. The Association accounts for its investment using the equity method due to its lack of control over the joint venture. Under the equity method, the original investment is recorded at cost and adjusted by the Association's share of undistributed earnings or losses of the joint venture. Distributions of $0 and $34,195 were received during the year ended December 31, 2018 and 2017, respectively.

American Statistical Association

Notes to Financial Statements

A. Organization and Summary of Significant Accounting Policies - Continued

Net assets: Net assets are classified with donor restrictions or without donor restrictions based on the existence or absence of donor-imposed restrictions. A description of each net asset group is as follows:

Without donor restrictions: Net assets without donor restrictions include those net assets whose use is not restricted be donors, even though their use may be limited in other respects, such as by board designation. See Note H for details on board-designated net assets.

With donor restrictions: Net assets with donor restrictions include those net assets whose use is subject to donor-imposed restrictions. Donor restrictions may be for a specified time or purpose limitation or the donor may specify that the corpus of their original and certain subsequent gifts are to be maintained in perpetuity. Donor-imposed restrictions are released when a restriction expires, that is, when the stipulated time has elapsed, when the stipulated purpose for which the resource was restricted has been fulfilled, or both. See Notes I and J for details on net assets with donor restrictions.

Revenue recognition: Membership dues are recognized ratably over the applicable membership period to which they apply. Payments for memberships, subscription sales, product sales, or services to be rendered and received in advance are deferred to the appropriate period.

Publication revenue is recognized upon delivery of the material.

All donor-restricted revenue is reported as an increase in net assets with donor restrictions. When a restriction expires (that is, when a stipulated time restriction ends or purpose restriction is accomplished), the net assets with donor restrictions are reclassified to net assets without donor restrictions and reported in the statements of activities as net assets released from restrictions.

Functional allocation of expenses: The costs of providing various programs and supporting services have been summarized on a functional basis in the statements of activities. Note M to the financial statements summarizes the Association's allocation methods and presents schedules of expenses by both nature and function for 2018 and 2017.

A description of the Association's programs and supporting services is as follows:

Meetings: The Association provides for various meetings and workshops that serve as a forum for the latest developments in statistical theory and application. These meetings offer a concentrated opportunity for the exchange of ideas and discussion of research findings among colleges.

Publications: The Association produces various publications and magazines. These publications represent the Association's commitment to the ongoing enhancement of statistical education and the public's understanding of statistics.

Programs: Various projects undertaken to further statistics among the public. This includes expenses for various awards presented, which increase the visibility of statistics and its methods with the general public, including science policy, various statistical outreach programs, a public awareness campaign, and online job advertising for statistics positions.

Section expenses: Represent the Association's organization in groups by professional subject matter. These sections facilitate professional interchanges and research opportunities in statistics.

American Statistical Association

Notes to Financial Statements

A. Organization and Summary of Significant Accounting Policies - Continued

Education: The Association offers a wide range of continuing education opportunities, which represent a forum for emerging statistics research. These programs include workshops, lectures, and expenses related to the production and sale of educational materials. Additionally, the Association advocates and provides materials for statistics education at the K-12, community college undergraduate, and graduate levels, and provides leadership in the education community about statistics and data science.

Grants and awards: Represent expenses related to providing advice and technical assistance, which enhance statistical education through the support of federal, state, and local government agencies.

Membership development: Costs related to member service maintenance.

Management and general: Includes the functions necessary to secure proper administrative functioning of the Board of Directors, maintain an adequate working environment, and manage financial and budgetary responsibilities of the Association.

Fundraising: The expenditures associated with the Association's fundraising activities mainly consist of staff compensation and other costs associated with inducing potential donors to contribute to the Association's programs.

Income taxes: The Association is generally exempt from Federal income taxes under the provisions of Section 501(c)(3) of the Internal Revenue Code. In addition, the Association has been classified as an organization that is not a private foundation under Section 509(a)(2) of the Internal Revenue Code. However, the Association is required to report unrelated business income to the Internal Revenue Service and the state of Virginia, as well as pay certain other taxes to local jurisdictions. The Association incurred approximately $77,000 and $90,000 in income tax expense on unrelated business income related to qualified transportation benefits and net income earned on advertising sales for the years ended December 31, 2018 and 2017, respectively.

Measure of operations: The Association does not include unrealized gains and losses on investments in the change in net assets from operating activities.

Reclassifications: The Association reclassified membership expense from program expense to supporting services expense for the year ended December 31, 2017 to match the current year change in presentation.

Subsequent events: Subsequent events have been evaluated through March 18, 2019, which is the date the financial statements were available to be issued.

2018 Audit Report for the American Statistical Association Continued

B. Concentrations

Credit risk: The Association maintains demand deposits with commercial banks and money market funds with financial institutions. At times, certain balances held within these accounts may not be fully guaranteed or insured by the U.S. federal government. The uninsured portions of cash and money market accounts are backed solely by the assets of the underlying institution. As such, the failure of an underlying institution could result in financial loss to the Association.

Market value risk: The Association also invests funds in various marketable securities. Such investments are exposed to market and credit risks. Thus, the Association's investments may be subject to significant fluctuations in fair value. As a result, the investment balances reported in the accompanying financial statements may not be reflective of the portfolio's value during subsequent periods.

C. Investments and Fair Value Measurements

The Association has implemented the accounting standards topic regarding fair value measurements which establishes a framework for measuring fair value in accordance with accounting principles generally accepted in the United States of America and expands disclosures about fair value measurements. This standard uses the following prioritized input levels to measure fair value. The input levels used for valuing investments are not necessarily an indication of risk.

Level 1 – Observable inputs that reflect quoted prices for identical assets or liabilities in active markets, such as stock quotes;

Level 2 – Includes inputs other than level 1 that are directly or indirectly observable in the marketplace, such as yield curves or other market data;

Level 3 – Unobservable inputs which reflect the reporting entity's assessment of the assumptions that market participants would use in pricing the asset or liability, including assumptions about risk such as bid/ask spreads and liquidity discounts.

Investments valued using Level 1 inputs include mutual funds, the fair values for which were based on quoted prices for identical assets in active markets. Investments valued using Level 2 inputs include corporate and government bonds which were based on the fair values of the underlying investments as determined by the fund managers. Management believes the fund managers' estimates to be reasonable approximations of the fair value of the investments. Investments recorded at cost include money market funds. Investments at cost are not required to be classified in one of the levels prescribed by the fair value hierarchy.

C. Investments and Fair Value Measurements - Continued

The following is a summary of investments at December 31,:

	2018	2017
Investments, at fair value		
Mutual funds - equities (Level 1)	$ 10,947,577	$ 12,963,640
Mutual funds - fixed income (Level 1)	5,333,229	5,449,846
Corporate bonds (Level 2)	913,965	752,122
Government bonds (Level 2)	1,336,333	1,368,287
Investments, at cost		
Money market funds	370,965	276,466
	$ 18,902,069	**$ 20,810,361**

Investment (loss) income, exclusive of amounts held in cash accounts, consists of the following for the years ended December 31,:

	2018	2017
Unrealized (loss) gain	$ (2,283,218)	$ 1,897,572
Interest and dividends	473,300	424,720
Realized gain	579,595	347,484
Investment fees	(77,961)	(74,488)
	$ (1,308,284)	**$ 2,595,288**

D. Property and Equipment

Property and equipment are stated at cost and depreciated on a straight-line basis over the estimated useful lives of the assets: 30 years for the building and improvements and 3 to 5 years for furniture and fixtures, equipment, and software. Equipment purchased through capital leases is amortized based on the straight-line method over the lesser of the estimated useful life of the equipment or the life of the lease. The Association capitalizes all property and equipment purchased with a cost of $5,000 or more.

D. Property and Equipment - Continued

Property and equipment consists of the following at December 31,:

	2018	2017
Building and improvements	$ 8,541,220	$ 8,541,220
Furniture and fixtures	211,869	211,869
Office equipment	202,772	202,772
Software	512,773	512,773
Computer equipment	219,636	166,321
Land	1,286,000	1,286,000
	10,974,270	10,920,955
Less: accumulated depreciation	(4,551,227)	(4,165,360)
	$ 6,423,043	**$ 6,755,595**

E. Joint Venture

The following schedule presents summarized financial information from the joint venture Technometrics, in which the Association has a 60% equity ownership, as of and for the years ended December, 31:

	2018	2017
Condensed income statement information		
Revenues	$ 130,754	$ 129,937
Expenses	58,144	61,775
Net income	**$ 72,610**	**$ 68,162**
Condensed balance sheet information		
Total assets	$ 165,062	$ 89,877
Total liabilities	24,290	21,715
Net equity	**$ 140,772**	**$ 68,162**

The Association also has a maintenance agreement with the joint venture in which it provides management and collection services, office space, and editorial and administrative support. Amounts due to the joint venture as of December 31, 2018 and 2017, which were comprised of the joint venture cash held within the Association's cash account, were $111,925 and $44,014, respectively. Maintenance agreement revenue earned by the Association was $34,996 and $32,785 for the years ended December 31, 2018 and 2017, respectively.

F. Bonds Payable

On August 1, 2005, the Association entered into an agreement with the Industrial Development Authority of the City of Alexandria to issue $6,500,000 of Industrial Development Revenue Bonds (the Bonds) on behalf of the Association to finance the purchase and renovation of a new headquarters building. During the year ended December 31, 2013, the Association refinanced its outstanding Industrial Development Revenue Bonds (the Bonds) that were due to mature on May 31, 2030. The Association paid the balance due on the Revenue Bonds and issued Revenue Refunding Bonds (the Bonds) for $5,398,000 with SunTrust Bank, the holder of the Bonds, which have a maturity date of August 1, 2030. The Bonds are callable on May 1, 2028, by the bondholder with 120 days' notice. Interest on the Bonds is calculated at a fixed rate of 2.75% and 3.42% for the years ended December 31, 2018 and 2017, respectively. The Bonds are collateralized by the land and building owned by the Association. In connection with the Bonds, the Association must be in compliance with certain specified covenants.

Interest expense incurred for the years ended December 31, 2018 and 2017, was $129,551 and $115,777 respectively. Annual principal payments on the bonds at December 31, 2018, are due in future years as follows:

	Amount
2019	$ 342,793
2020	352,340
2021	362,152
2022	372,238
2023	382,605
2024-2028	1,857,939
	$ 3,670,068

Bonds are recorded on the statements of financial position net of the unamortized discount and debt issuance costs. Bonds payable consist of the following as of December 31,:

	2018	2017
Principal amount	$ 3,670,068	$ 4,003,573
Less: unamortized debt issuance costs	(62,499)	(69,136)
	$ 3,607,569	**$ 3,934,437**

G. Liquidity

The Association strives to maintain sufficient cash to cover all operating expenditures during its annual business cycle. Cash in excess of amounts needed for operating activities is invested in mutual funds and is available to convert back to cash if needed. While the Association's investments may be quickly converted to cash to cover operating expenditures, the Association does so infrequently. In 2018 the Association made a one-time transfer of $600,000 from its investments to its commercial checking account to cover an expected temporary cash shortfall.

The following table reflects the Association's financial assets as of December 31, 2018 and 2017, reduced by amounts that are not available to meet general expenditures due to donor restrictions or internal board designations (see Notes H, I and J). In the event the need arises to utilize the board-designated funds for liquidity purposes, the reserves could be drawn upon through board resolution.

	2018	2017
Cash and cash equivalents	$ 224,709	$ 314,414
Investments	18,902,069	20,810,361
Accounts receivable (net)	628,502	571,989
Financial assets available	19,755,280	21,696,764
Less those unavailable for general expenditures within on year due to:		
Donor-imposed restrictions	(1,554,726)	(1,672,445)
Board-designations	(1,461,007)	(1,381,407)
Financial assets available to meet cash needs for general expenditures within one year	$ 16,739,547	$ 18,642,912

H. Board Designated Net Assets

Board designated net assets represent funds designated by the board. These funds are without donor restrictions and are available for the use of the Association at the direction of the Board. Board designated net assets consisted of the following at December 31,:

	2018	2017
Section	$ 1,325,989	$ 1,239,508
Education	135,018	141,899
	$ 1,461,007	$ 1,381,407

I. Net Assets With Donor Restriction

Net assets with donor restrictions consisted of the following at December 31, 2018:

	Balance December 31, 2017	Restricted Contributions	Investment Income (Loss)	Released	Balance December 31, 2018
Perpetual in nature					
Endowment funds*	$ 798,526	$ 24,980	$ -	$ -	$ 823,506
Specified Purpose					
Cox Scholarship	156,040	4,372	(10,166)	(2,000)	148,246
Waksberg Award	94,308	-	(5,681)	(4,000)	84,627
Youden Award	81,306	-	(8,981)	(1,733)	70,652
Deming Lecture Fund	58,574	-	(7,901)	(1,865)	48,808
Bernard Harris Fund	44,255	5,200	(3,054)	-	46,401
EC Bryant Award	51,852	-	(6,983)	(2,500)	42,369
Griffith Award	43,471	1,250	(2,634)	(3,539)	38,548
Noether Memorial	62,456	-	(16,564)	(9,316)	36,576
Wray Smith Scholarship Fund	37,304	-	(2,316)	(1,000)	33,988
Dixon Award	33,823	-	(2,127)	(500)	31,196
MG Natrella Scholarship Fund	32,168	-	(1,995)	(1,000)	29,173
Chambers Award (ACM)	22,729	-	(1,389)	(1,000)	20,340
Wilks Memorial	25,872	-	(4,548)	(1,806)	19,518
Marquardt Memorial	19,030	-	(2,858)	(492)	15,680
Karl E. Peace Award	18,821	-	(3,290)	(1,035)	14,496
Lester R. Curtin Award	14,439	-	(2,302)	(2,411)	9,726
Lingzi Lu Award	13,932	-	(3,443)	(1,300)	9,189
Waller Fund	13,739	-	(3,625)	(2,000)	8,114
Links Lecture	10,000	2,500	(2,014)	(1,914)	8,572
Akaga Fund	5,992	-	-	(1,000)	4,992
Sirken Award	19,898	-	(10,527)	(5,097)	4,274
Student & Early Career Travel	1,558	736	-	-	2,294
Other short-term restricted	2,102	-	-	-	2,102
International Prize in Statistics	732	-	-	-	732
Bartko Award	4,458	-	(2,177)	(1,674)	607
Judea Pearl Prize	5,000	-	-	(5,000)	-
	$ 1,672,445	**$ 39,038**	**$ (104,575)**	**$ (52,182)**	**$ 1,554,726**

* See Note J for detail of endowment funds.

2018 Audit Report for the American Statistical Association Continued

I. Net Assets With Donor Restrictions - Continued

Net assets with donor restrictions consisted of the following at December 31, 2017:

	Balance December 31, 2016	Restricted Contributions	Investment Income	Released	Balance December 31, 2017
Perpetual in nature					
Endowment funds*	$ 788,526	$ 10,000	$ -	$ -	$ 798,526
Specified Purpose					
Cox Scholarship	138,189	405	19,446	(2,000)	156,040
Wakisberg Award	82,626	-	11,682	-	94,308
Youden Award	64,652	-	17,714	(1,000)	81,366
Noether Memorial	37,370	-	33,944	(8,858)	62,456
Deming Lecture Fund	44,439	-	15,706	(1,571)	58,574
EC Bryant Award	40,325	-	14,027	(2,500)	51,852
Bernard Harris Fund	34,099	5,200	4,956	-	44,255
Griffith Award	38,727	1,000	5,412	(2,168)	43,471
Wray Smith Scholarship Fund	33,614	-	4,690	(1,000)	37,304
Dixon Award	30,099	-	4,224	(500)	33,823
MG Natrella Scholarship Fund	29,119	-	4,049	(1,000)	32,168
Wilks Memorial	16,832	-	9,046	(6)	25,872
Chambers Award (ACM)	20,845	-	2,884	(1,000)	22,729
Sirken Award	3,614	-	21,389	(5,005)	19,898
Marquardt Memorial	14,305	-	5,725	(1,000)	19,030
Karl E. Peace Award	12,826	-	8,554	(558)	18,821
Lester R. Curtin Award	10,830	-	4,909	(1,300)	14,439
Lingzi Lu Award	8,427	-	6,864	(1,359)	13,932
Waller Fund	8,326	-	7,413	(2,000)	13,739
Links Lecture	-	10,000	-	-	10,000
Aliaga Fund	6,911	-	81	(1,000)	5,992
Judea Pearl Prize	-	10,000	-	(5,000)	5,000
Bartko Award	1,791	-	3,667	(1,000)	4,458
Other short-term Funds	3,734	-	-	(1,632)	2,102
Student & Early Career Travel	-	1,558	-	-	1,558
International Prize in Statistics	732	-	-	-	732
	$ 1,470,857	$ 38,663	$ 204,382	$ (41,457)	$ 1,672,445

* See Note J for detail of endowment funds.

J. Endowment

The Association's endowment funds have been established for the purpose of awards and grants supporting education and research in the field of statistics. The Association's policies for making appropriations for expenditures are to follow the directives of the donors and to comply with the regulations in the state laws for endowments. Under accounting principles generally accepted in the United States of America, net assets associated with endowment funds are classified and reported based on the existence or absence of donor-imposed restrictions.

Though management of the Association has not conducted a formal analysis of its compliance with the Uniform Prudent Management of Institutional Funds Act (UPMIFA), it has established policies regarding the preservation, investment and expenditure of permanently restricted net assets. Consistent with generally accepted accounting principles management believes that funds that are perpetual in nature require the preservation of the fair value of the gifts, and that earnings on those funds should be classified in accordance with the donor's stipulations, if any, as net assets with donor restrictions until the donor stipulation is met.

J. Endowment - Continued

In accordance with UPMIFA, the Association considers the following factors in making a determination to appropriate or accumulate donor-restricted funds: (1) duration and preservation of the fund; (2) purposes of the Association and the donor-restricted endowment fund; (3) general economic conditions; (4) possible effect of inflation and deflation; (5) expected total return from income and the appreciation or depreciation of investments; (6) other resources of the Association; (7) investment policies of the Association.

The Association has adopted investment and spending policies for endowment assets that attempt to provide a predictable stream of funding to programs supported by its endowment while seeking to maintain purchasing power of the endowment assets. All earnings of the endowment are reflected as net assets with donor restrictions until appropriated for expenditure based on donor restrictions by the various Committees of the Association. The Board of Directors has assigned a Committee to each program for the purposes of selecting and recommending individuals for awards or grants.

From time to time, the fair value of assets associated with individual donor-restricted endowment funds may fall below the level that the donor or UPMIFA requires the Association to retain as a fund of perpetual duration. In accordance with GAAP, there were no deficiencies of this nature that are reported in net assets with donor restrictions as of December 31, 2018 and 2017.

Endowment net assets consisted of the following at December 31,:

	2018			
		With Donor Restrictions		
	Without Donor Restrictions	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Noether Memorial	$ -	$ 36,576	$ 206,506	$ 243,082
Sirken Award	-	4,274	150,000	154,274
Youden Award	-	70,652	61,082	131,734
Deming Lecture Fund	-	48,808	67,275	116,083
EC Bryant Award	-	42,369	60,000	102,369
Wilks Memorial	-	19,518	47,143	66,661
Waller Fund	-	8,114	45,000	53,114
Lingzi Lu Award	-	9,189	41,270	50,459
Karl E. Peace Award	-	14,496	34,000	48,496
Marquardt Memorial	-	15,680	26,250	41,930
Links Lecture	-	8,572	29,980	38,552
Lester R. Curtin Award	-	9,726	25,000	34,726
Bartko Award	-	607	30,000	30,607
	$ -	$ 288,581	$ 823,506	$ 1,112,087

J. Endowment - Continued

	2017			
		With Donor Restrictions		
	Without Donor Restrictions	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Noether Memorial	$ -	$ 62,456	$ 206,506	$ 268,962
Sirken Award	-	19,898	150,000	169,898
Youden Award	-	81,366	61,082	142,448
Deming Lecture Fund	-	58,574	67,275	125,849
EC Bryant Fund	-	51,852	60,000	111,852
Wilks Memorial	-	25,872	47,143	73,015
Waller Fund	-	13,739	45,000	58,739
Lingzi Lu Award	-	13,932	41,270	55,202
Karl E. Peace Award	-	18,821	34,000	52,821
Marquardt Memorial	-	19,030	26,250	45,280
Lester R. Curtin Award	-	14,439	25,000	39,439
Bartko Award	-	4,458	25,000	29,458
Links Lecture	-	10,000	10,000	20,000
	$ -	$ 394,437	$ 798,526	$ 1,192,963

For the years ended December 31, 2018 and 2017, the Association had the following endowment-related activities:

	With Donor Restrictions			
	Without Donor Restrictions	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Endowment assets, January 1, 2018	$ -	$ 394,437	$ 798,526	$1,192,963
Contributions	-	2,500	24,980	27,480
Net investment (loss)	-	(75,213)	-	(75,213)
Appropriation of endowment assets for expenditure	-	(33,143)	-	(33,143)
Endowment assets, December 31, 2018	$ -	$ 288,581	$ 823,506	$1,112,087

	With Donor Restrictions			
	Without Donor Restrictions	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Endowment assets, January 1, 2017	$ -	$ 263,636	$ 788,526	$1,052,162
Contributions	-	10,000	10,000	20,000
Net investment income	-	146,958	-	146,958
Appropriation of endowment assets for expenditure	-	(26,157)	-	(26,157)
Endowment assets, December 31, 2017	$ -	$ 394,437	$ 798,526	$1,192,963

K. Retirement Plans

The Association has a 401(k) profit sharing plan and a money purchase plan. Both plans cover substantially all full-time employees from date of hire. Under the terms of the 401(k) profit sharing plan, the Association will match 100% of the participating employee's contributions, up to 3% of the employee's salary. Under the terms of the money purchase plan, the Association contributes 6% of an eligible employee's compensation to the plan. Contributions to the plans were as follows for the years ended December 31:

	2018	2017
Money purchase plan	$ 202,440	$ 193,899
401(k) profit sharing plan	94,155	94,147
	$ 296,595	$ 288,046

L. Commitments and Contingencies

Hotel space: The Association reserves hotel space for its conventions several years in advance. The contracts stipulate the number of rooms to be reserved and the time period for which they are to be reserved. As of the date of this report, contracts for hotel space had been entered into through 2023. However, due to the numerous variables involved, the Association's potential liability under these contracts cannot be determined.

Legal matters: From time to time, the Association may be subject to various legal proceedings, which are incidental to the ordinary course of business. In the opinion of management, there are no material legal proceedings to which the Association is a party.

Employment agreement: The Association has an employment agreement with its Executive Director, whereby, if the Association were to terminate the agreement without cause, the Association would be required to make certain payments to the Executive Director. The latest extension of the agreement is set to end in August 2021 unless further extended.

M. Expenses by Both Nature and Function

The financial statements report certain categories of expenses that are attributable to one or more program or supporting functions of the Association. Most expenditures of the Association are directly traced to programs and supporting services through a process of coding invoices and expense reports to the appropriate cost centers. Salaries and benefits are similarly traced to programs and supporting service cost centers using a timesheet reporting system. Through these processes, costs that are directly related to a single program or supporting activity are assigned to that program or supporting activity.

Costs related to more than one program or supporting activity, or to a combination of programs and supporting services are allocated among the appropriate functions. Costs and overhead expenses are allocated to the various functions of the organization based on total direct salaries traced to each function. Overhead includes common-use supplies and maintenance, such as copier toner, paper, routine building maintenance, and other costs that benefit all or nearly all programs.

M. Expenses by Both Nature and Function - Continued

Expenses by both nature and function are as follows for the years ended December 31,:

	2018 Program Services							2018 Supporting Services				
	Meetings	Publications	Programs	Section Activity	Education	Grants and Awards	Program Services Total	Membership Development	Management and General	Fundraising	Supporting Services Total	2018 Total
Salaries & Benefits	$ 865,945	$ 412,734	$1,036,370	$146,843	$ 112,021	$ 9,468	$2,583,381	$ 577,005	$ 1,062,756	$ 164,509	$1,804,270	$ 4,387,651
Meeting Expenses	627,385	164,114	106,405	573,979	30,706	3,199	1,505,788	125,117	56,189	11,178	192,484	1,698,272
Non-Employee Compensatior	58,735	153,985	176,667	23,062	273,678	52,105	738,232	45,212	36,368	-	81,580	819,812
Overhead & Occupancy	155,243	71,143	186,071	25,456	18,509	1,776	458,198	98,785	229,246	27,791	355,822	814,020
Supplies & Equipment	613,247	9,454	8,883	88,659	34,546	575	755,364	889	10,710	2,386	13,985	769,349
Travel	99,890	2,539	105,871	60,087	55,072	214,921	538,380	3,502	41,494	9,943	54,939	593,319
Other Expense	112,581	34,919	154,951	19,711	11,399	1,379	334,940	67,810	2,829	799	71,438	406,378
Professional Services	-	73,592	398,447	-	-	-	472,039	-	24,576	-	24,576	496,615
Printing / Publishing	74,959	129,135	624	11,655	12,975	-	229,348	10,421	158	7,420	17,999	247,347
Postage & Shipping	88,093	90,830	1,470	2,404	4,386	-	187,183	19,589	956	9,719	30,264	217,447
Taxes & Fees	14,353	84,197	17,979	2,524	1,821	176	121,050	9,768	24,391	5,570	39,729	160,779
Contributions	-	-	93,504	39,737	20,000	-	153,241	-	-	-	-	153,241
	$ 2,710,431	$ 1,226,642	$2,287,242	$994,117	$ 575,113	$283,599	$8,077,144	$ 958,098	$ 1,489,673	$ 239,315	$2,687,086	$10,764,230

	2017 Program Services							2017 Supporting Services				
	Meetings	Publications	Programs	Section Activity	Education	Grants and Awards	Program Services Total	Membership Development	Management and General	Fundraising	Supporting Services Total	2017 Total
Salaries & Benefits	$ 817,528	$ 409,759	$1,130,032	$147,331	$ 142,865	$ 2,745	$2,650,260	$ 595,449	$ 981,140	$ 166,827	$1,743,416	$ 4,393,676
Meeting Expenses	551,975	205,613	183,517	429,490	47,204	-	1,417,799	111,321	47,286	5,605	164,212	1,582,011
Overhead & Occupancy	138,777	66,426	198,192	20,967	24,966	218	449,546	93,786	200,126	26,344	320,256	769,802
Non-Employee Compensatior	46,014	143,296	97,557	12,500	189,853	163,812	653,032	57,826	34,692	2,060	94,578	747,610
Supplies & Equipment	582,731	416	18,479	52,946	35,245	-	689,817	642	16,926	1,992	19,560	709,377
Travel	128,450	1,795	92,760	49,891	48,608	166,980	488,484	3,856	45,403	8,869	58,128	546,612
Professional Services	-	4,741	285,285	-	-	-	290,026	-	32,000	-	32,000	322,026
Other Expense	87,836	34,660	95,760	15,916	9,584	-	243,756	56,339	2,802	1,246	60,387	304,143
Printing / Publishing	52,952	123,582	1,104	9,097	10,455	-	197,190	9,913	23	737	10,673	207,863
Contributions	-	-	135,223	45,881	25,841	-	206,945	-	-	-	-	206,945
Postage & Shipping	68,131	94,673	1,581	1,221	6,941	-	172,547	21,559	934	1,831	24,324	196,871
Taxes & Fees	14,542	97,285	22,443	2,345	2,788	25	139,428	10,476	24,651	6,014	41,141	180,569
	$ 2,488,936	$ 1,182,246	$2,261,933	$787,585	$ 544,350	$333,780	$7,598,830	$ 961,167	$ 1,385,983	$ 221,525	$2,568,675	$10,167,505

Study Provides Insight into Emotions, Perspectives of School Counselors

Anna Yu Lee

The American Statistical Association hosted a booth at the annual American School Counselor's Association (ASCA) conference in Los Angeles July 14–17, 2018, to promote the practice and profession of statistics among a group of approximately 3,000 K–12 school counseling professionals.

The booth was staffed by three ASA representatives who provided visitors with recent ASA publications and resources. Distributed materials provided information about the rising importance of statistics as a career option, a list of undergraduate and graduate majors requiring coursework in statistics, and a list of career fields available to students with statistical education/training. Counselors were offered follow-up visits and consultations with ASA representatives.

During the first two days of the conference, ASA representatives generated booth traffic and initiated conversations with apparent school counselors (most of whom were identified by their lanyards) by pointing to a feline faces chart and asking potential participants, "How are you feline?"

The feline faces chart is a visual tool sporting 16 faces of cats with various facial expressions and captioned emotions. It can be used alongside open-ended or multiple-choice questions as a tool for initiating and facilitating communication regarding emotions and mental health.

The wording of the survey question was a homophonous play on the words "feeling" and "feline," as well as a play on the use of cat expressions in the visual.

The ASA booth at the American School Counselor's Association conference offers promotional literature, infographics, survey questions, and a feline faces chart.

If school counselors asked for clarification of the meaning of this question, they were told the question was intended to assess what emotion they were feeling most at that particular moment.

School counselors who responded to the question were then asked if they would be willing to participate in a survey that would include an additional two questions. If school counselors answered the first question but declined to participate in the remainder of the survey, their answers to the first question were not recorded.

The second question in this survey was, "How do you remember feeling while taking your college undergraduate or graduate-level statistics classes?" Responses to questions 1 and 2 were collected as follows:

> School counselors were asked to look at the feline faces and point to and state the emotions they felt most accurately represented their responses to given questions (one emotion per question). After hearing participants' responses, ASA representatives repeated participants' responses to verify they heard participants correctly. The third question was, "Do you feel that your college statistics experience would have been improved if you had taken statistics in high school?" Responses to this question included, "yes," "probably," "maybe," "probably not," "no," and "other." School counselors who responded, "other" were asked to explain their thoughts in response to this question. In response to this prompt, many school counselors volunteered richly emotive memories of studying statistics, as well as thoughts about the long-term benefits of K–12 statistical education for their own students.

Quantitative responses to questions 1–3 are described in figures 1–2.

Responses indicated the majority of school counselors recalled experiences of studying statistics in college that they described with words associated with more unpleasant affect (i.e., alarm, anger, distress, fear, misery, gloom, depression, sadness, and tiredness; n = 93; 66%). By contrast, a majority of counselors reported same-day (i.e., current) emotions that appeared to be associated with more pleasant affect (i.e., pleasure, happiness, excitement, astonishment, sleepiness, satisfaction, and calm; n = 123; 88%).

Both recalled emotive experiences and current emotional states appeared approximately balanced on dimensions of arousal: recalled experiences associated with lower arousal (i.e., pleasure, misery, gloom, depression, sadness, tiredness, sleepiness, satisfaction, and calm, n = 65, 46%); recalled experiences associated with higher arousal (i.e., happiness, excitement, astonishment, alarm, anger, distress, fear, n = 70, 50%); current emotions associated with lower arousal (n = 60, 43%); current experiences associated with higher arousal (i.e., n = 79, 56%).

A majority of counselors indicated they felt having taken statistics in high school would have improved their experiences with taking college statistics by answering "yes" to the question, "Do you feel that your college statistics experience would have been improved if you had taken statistics in high school?" (n = 76; 54%).

This experience provided evidence for the following:

- A preponderance of negative personal memories associated with studying statistics in college among school counselors
- Perceived benefits of prior K–12 statistical education on subsequent undergraduate- and graduate-level statistics studies among school counselors
- Potential benefits of including the feline faces chart in participant recruitment and data collection efforts

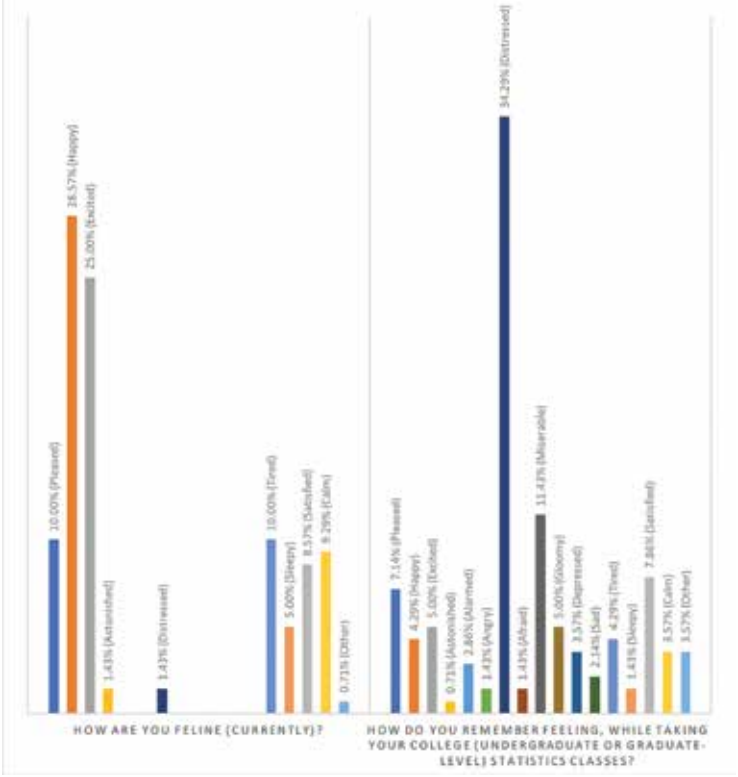


Figure 1. Current emotions versus recalled emotive experiences of studying statistics in undergraduate or graduate university, among 140 school counselors

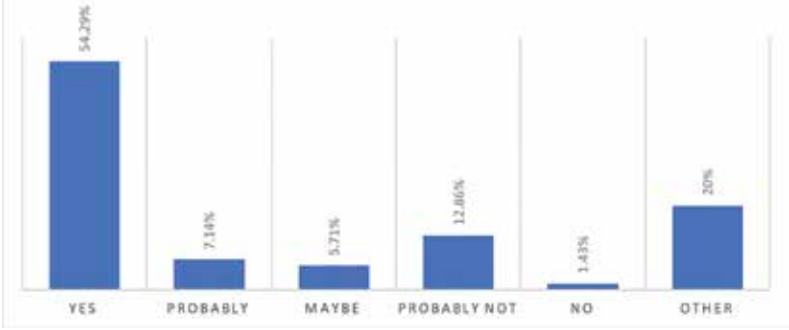
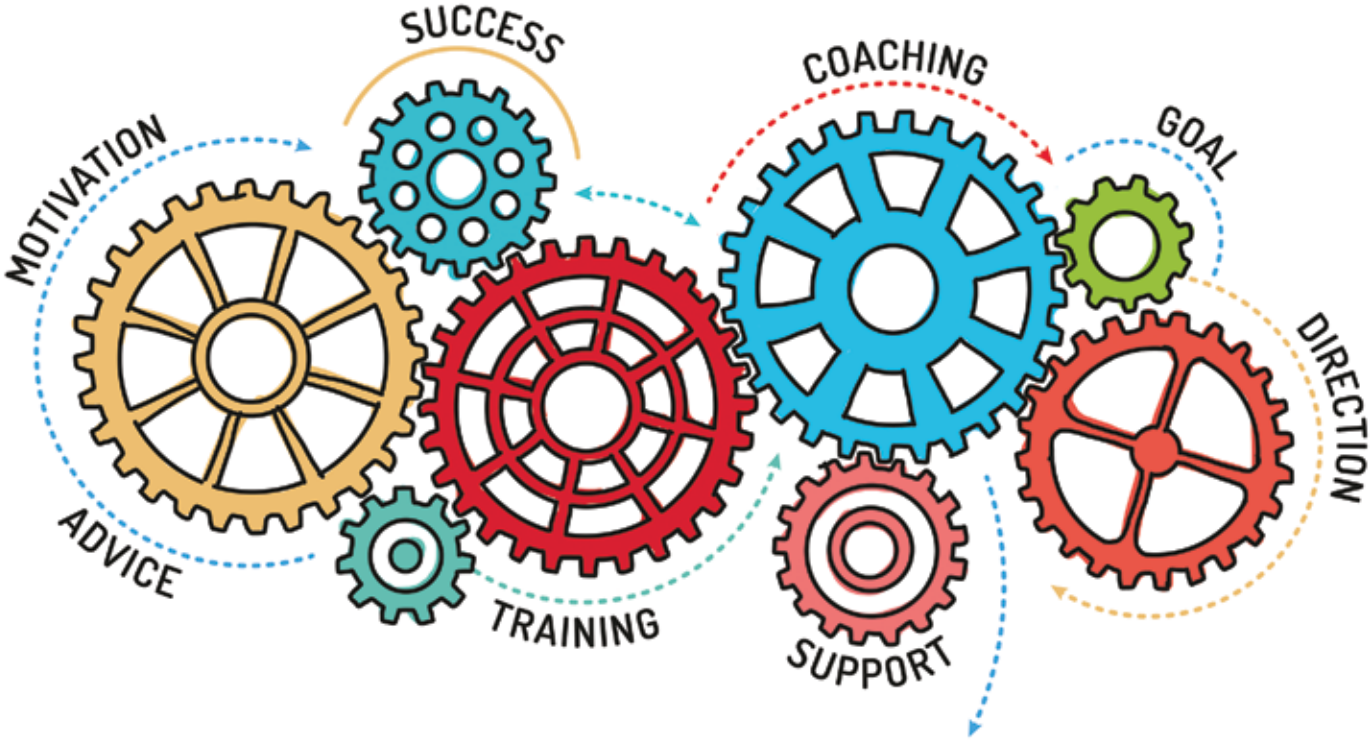


Figure 2. Responses to question, "If you had taken a statistics class in high school do you think that your college experience in statistics would have been any better than what it was?"

The responses of the participants in this study were informative, as they contextualized and provided insight into the emotions and perspectives of school counselors—a group particularly positioned for shaping the content and direction of early education curricula. ■



Mentoring and Early Career Development Workshop: Takeaways

Elizabeth Mannshardt

The North Carolina Chapter of the ASA recently offered its first Mentoring and Early Career Development Workshop for students and early-career professionals. The one-day workshop was designed to provide a variety of viewpoints and considerations for developing professional statistical careers. It included mentoring in small-group settings and an opportunity to hear presentations from advanced career statisticians and a professional panel. Presenters and panelists discussed topics such as how to build your network for success and next steps for your career path, as well as types of careers statisticians can develop and how to best prepare yourself for the job market. Interactive sessions on goal-structuring and professional development were designed to engage participants.

Workshop Activities

The workshop was designed to approach career development from different angles. Presentations from advanced career statisticians offered insights into topics such as how to be successful, best practices for presentations, promoting statistics, and building a career. A professional panel included moderated and audience questions. And speakers and panelists served as mentors during matched small-group mentoring sessions.

Workshop organizers also developed a series of modules: Branding, Networking, Goal-Structuring, and The Imposter Syndrome. These were designed to take 15–20 minutes and were interspersed throughout the traditional presentations. Associated with each module were workbook activities that allowed participants to reflect on and consider career goals and advice gleaned throughout the workshop.

Parallel tracks offered the opportunity for material targeted to different career stages. Break-out sessions for young professionals considered leadership and career next-steps as well as mentor versus sponsor, with student sessions on résumés and interviews and peer mentoring—a student initiative organized by the NC ASA Scholastic Council.

Organization

The schedule was designed to build on career development concepts introduced throughout the

North Carolina Chapter workshop participants
Photo Credit: Rick Scroggins, SAMSI

The professional panel included Artin Armagan (SAS), Heather Kopetskie (RhoWorld), Kelci Miclaus (JMP), and Kristen Foley (EPA). It was moderated by North Carolina Chapter 2018 Vice President Emily Griffith.

2018 ASA President Lisa LaVange speaks to workshop participants
Photo Credit: Kisha Armstrong

workshop while fostering engagement via different platforms. The minimal fee charged for the workshop covered meals, with further costs including the NC ASA dinner subsidized by NC ASA, ASA, and other sponsors. Details, including the schedule and workshop logistics, can be found on the NC ASA blog at *https://community.amstat.org/northcarolina/blogs/2018/careerdevelopmentworkshop*.

The success of the workshop was due to the many volunteers. NC ASA Mentoring and Early Career Development Workshop mentors came from the NC ASA community. Bob Starbuck (Wyeth/USDA), Sonia (Davis) Thomas (RTI/UNC-CH), Richard Zink (TargetPharma), and David Banks (Duke/SAMSI) served as presenters. Panelists were Artin Armagan (SAS), Heather Kopetskie (RhoWorld), Kelci Miclaus (JMP), and Kristen Foley (EPA). Additional mentors included Emily Griffith (NCSU) and Ryne Vankrevelen (Elon), members of the NC ASA Board. Workshop participants also had the opportunity to talk with 2018 ASA President Lisa LaVange in a small-group setting.

Future professional development events have been planned based on suggestions from participants. A mini workshop organized by graduate students at UNC Chapel Hill Biostatistics this fall will include the NC ASA career development modules and a professional panel.

Organizer Takeaways

Participants were excited and engaged. Feedback was overwhelmingly positive, with 100% of participants saying they would recommend a similar workshop to a friend or colleague. There is a clear need among students and young professionals in the statistics community for this type of event and an appreciation for opportunities to learn from established career professionals. ■

STATS4GOOD

2018 Stewardship Report: A Big Impact on Data for Good

With a PhD in statistical astrophysics, **David Corliss** leads a data science team at Fiat Chrysler. He serves on the steering committee for the Conference on Statistical Practice and is the founder of Peace-Work, a volunteer cooperative of statisticians and data scientists providing analytic support for charitable groups and applying statistical methods in issue-driven advocacy.

The American Statistical Association's annual stewardship report (*www.amstat.org/asa/files/pdfs/2018StewardshipReport.pdf*), published in April, serves a necessary function in reporting how the ASA spends the money members have contributed to programs and the causes we care about. While this fiduciary role makes it come across as a financial report, it also shines a light on some of the most important ASA Data for Good activities. When individual programs and projects are seen through the lens of Data for Good, focus is given to the ASA's beneficial effect on statistical science and society as a whole.

The report is filled with inspiring examples of statistics making a difference. One highlighted program is the inaugural Florence Nightingale Day. While most people justly remember Nightingale as a pioneering nurse, her story also is a powerful example of using statistics to save lives. When it comes to Data for Good, surely Nightingale is the mother of us all.

This event was especially important because it provided role models for women in STEM—especially statistics—through the participation of ASA 2018 and 2020 presidents, Lisa LaVange and Wendy Martinez, carrying forward Nightingale's statistical vision and dedication to serving humanity to a new generation.

Another program playing a vital role in securing the future of Data for Good is ASA support for student chapters. This resource means more students becoming connected to D4G at the start of their career, providing the examples, role models, and opportunities needed to make Data for Good a regular part of their entire career—maybe even the focus of it!

Hand-in-hand with support for student chapters are ASA travel awards for students and early-career statisticians. These awards, supported by ASA donors, provide opportunities to attend and present at conferences, learn new skills, and jump-start a network of connections to help their careers prosper.

The report also brings us up to date with many of the wonderful ASA programs. The Leadership Challenge from the Leadership Institute works with students to develop future leaders. Education programs are creating materials for the classroom, including the video "Why Students Need Statistical Literacy" from *This*IsStatistics. The ASA's advocacy for better use and understanding of statistics in public policy led to the launch of the Count on Stats program in 2018, creating a nonpartisan voice for statistics—and, by extension, all of science—so needed in today's highly polarized political climate.

The ASA's vision and mission statements, printed on the right-hand side of the stewardship report, struck me right away. I have written before that the mission of the ASA can be summed by (1) do good statistics, (2) do good *for* statistics, and (3) do good *with* statistics. These three points distil a complete picture of the important work we share as members.

Get Involved

Kaggle competitions have addressed a number of Data for Good issues, including services for schools, policing equity, poverty research, and environmental projects. The search engine on Kaggle's site does a good job of connecting with current and past projects in a particular area of interest. In most cases, the data from past competitions are still there, making Kaggle a great place to get data and connect to D4G projects.

Have you ever wished Kaggle would feature a competition in your particular area of interest? Here's your chance. Go to Kaggle's Data Science for Good page (*kaggle.com/data-science-for-good*) to check out how to get started with your own Kaggle event to foster data-driven solutions for the causes that matter to you most.

The ASA's official vision and mission statements are good as far as they go, but don't go far enough. They overlook #3, making no mention of our calling to have a beneficial impact. The stewardship report makes clear what we do, and that a dollar donated to the ASA is a dollar well spent. We would do well to consider adding a few words to the end of the mission statement underscoring our calling to use statistics for the betterment of society.

Of course, adding a few words to the mission statement wouldn't change the substance of what we do—D4G is in our DNA—but it would better describe what we do and what inspires us in our actions. No science is an island, separated from its impact on humanity. Because of this, advocacy for and with statistics is as much a part of what we do as the mathematics itself.

The stewardship report is so much more than fiduciary reporting. By lifting up just a few outstanding examples of analytics making a difference, the report helps us brainstorm about our own, personal work going forward. For the D4G community, it's really an inspiration report, full of opportunities to get connected, programs to support, and projects for emulating elsewhere. In this way, the ASA's stewardship report is an annual look back that helps us better see how and where we can move forward. ■

Gearing up for JSM?
Next month's column will be all about Data for Good at the conference, with ideas for sessions and other activities to attend.

BAPS

BEYOND AP STATISTICS

WEDNESDAY, JULY 31, 2019 • 8:00 A.M. - 6:00 P.M. • DENVER, COLORADO

A WORKSHOP FOR EXPERIENCED TEACHERS

Sponsor: ASA-NCTM Joint Committee on Curriculum in Statistics and Probability

The **Beyond AP Statistics (BAPS)** workshop is for AP Statistics teachers and consists of enrichment material just beyond the basic AP syllabus. Organized by Roxy Peck (Cal Poly), the course is divided into four sessions led by noted statisticians. Topics in recent years have included experimental design, topics in survey methodology, multiple regression, logistic regression, what to do when assumptions are not met, and randomization tests.

COST

The course fee for the full day is $50.

PROVIDED

- Refreshments
- Handouts
- A pass to visit the JSM exhibit hall
- Certificate of participation from the American Statistical Association certifying professional development hours
- Optional graduate credit available

PROGRAM

The 2019 program will be posted when available.

SCHOLARSHIPS

The ASA/NCTM Joint Committee will provide some registration scholarships. For more information, contact Rebecca Nichols.

LOCATION

Joint Statistical Meetings (JSM)*
Denver, Colorado

REGISTRATION

Course attendees do not need to register for the Joint Statistical Meetings* to participate in this workshop. Online registration is available at *www.amstat.org/education/baps*.

QUESTIONS

Contact Rebecca Nichols at *rebecca@amstat.org*.

***The Joint Statistical Meetings is the largest annual gathering of statisticians, where thousands from around the world meet to share advances in statistical knowledge.*

ASA

STAT*tr@k*

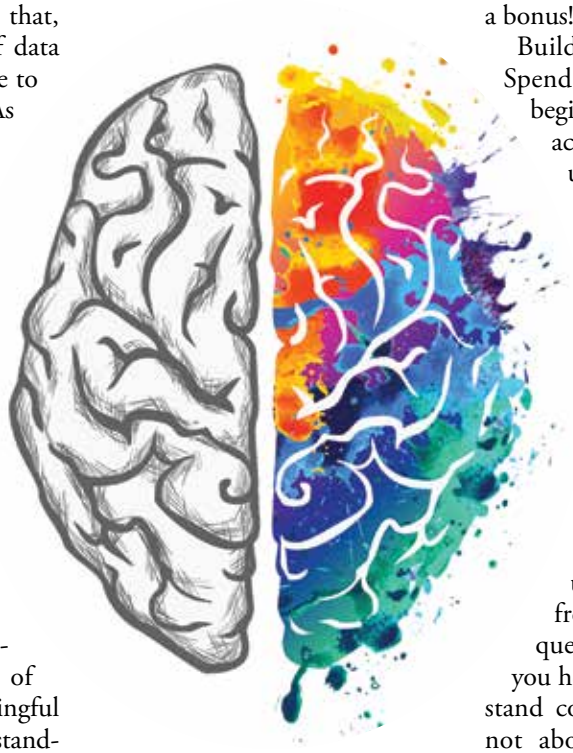
Advice to a Novice Statistician

Jillian Payne with Contributions from Sandy Steiger

Statistics is one of the fastest-growing fields today. In the age of information, it seems like almost every organization is looking to hire more data scientists to help them manage the ever-increasing stockpiles of customer data.

I remember hearing a prediction eight to 10 years ago that, before long, the supply of data scientists would not be able to keep up with the demand. As a hiring manager of data scientists, I can say this prediction has come true. Besides the sheer demand, it is also a challenging and rewarding field I would recommend to anyone with a knack for numbers to pursue. However, the continued success of our field doesn't rely solely on understanding the latest models or programming language—it's about being able to communicate the takeaways of our findings to effect meaningful change to sometimes longstanding business practices.

Working in statistics is unique because, while it is technically a science, there is a degree of art required to execute your responsibilities properly. I recently moderated a panel discussion on business applications of machine learning and AI and noticed a consensus from other hiring managers. Their ideal candidates weren't just well-versed in data science; they also had a background/hobby in art or music, which demonstrates creativity. These managers found that these candidates were able to provide more creative ideas about how to approach a problem, visualize a solution, and deliver functional results. Just because a model gives you an answer doesn't mean it always makes sense. When you think about the situation you're applying insights to, there is a lot of art and creativity that goes into developing the perfect solution.



The main advice I would give to someone starting a career in statistics fresh out of school would be to *take a step back and understand that the rules are different in the business world*. Most of the people we hire don't have business degrees. They enter into our organization full of excitement to build and apply the highly sophisticated models they learned about in school but often fail to first do the more mundane work that shows the value of what the models do. As an employee of a business, instead of a researcher for a university, you have to remember your core function is to drive value for your organization. And if you get to use really cool statistical models along the way, then that's a bonus!

Build your business skills. Spend a lot of time at the beginning of your career just actively listening to really understand the business context of what you're being asked to accomplish. With our training, it's easy for us to understand the very technical issues facing us but not always the specific business objectives. Many times, when we miss the mark on a deliverable, we didn't understand the context from the beginning. Ask questions and repeat what you hear to ensure you understand correctly. Remember, it's not about using tech jargon; it's about speaking in words business leaders understand.

Statistics alone will not do all the work for you. As a statistician, it's up to you to make the connections. And you won't always have actual output at the end of the day. Sometimes, you have to think more holistically and strategically to continue to advance underlying statistical models used by your organization. And don't be afraid to use the artistic side of your brain to find solutions that might be outside the box. ■

Jillian Payne is director of data science at 84.51°. She holds a Bachelor of Science in business, marketing, and decision sciences from Miami University, Ohio.

MWM
Meeting Within a Meeting
a statistics workshop for math and science teachers

www.amstat.org/education/mwm

Based on the Common Core State Standards for Mathematics (***corestandards.org***)
and *Guidelines for Assessment and Instruction of Statistics Education (GAISE): A Pre-K–12 Curriculum Framework* (***www.amstat.org/education/gaise***)

Dates:	Tuesday, July 30, and Wednesday, July 31, 2019, 8:00 a.m. to 4:00 p.m.
Place:	Joint Statistical Meetings, Denver, Colorado (meeting room TBD)
Audience:	Middle- and high-school mathematics and science teachers. Multiple mathematics/science teachers from the same school are especially encouraged to attend.
Objectives:	Enhance understanding and teaching of statistics within the mathematics/science curriculum through conceptual understanding, active learning, real-world data applications, and appropriate technology
Content:	Teachers will explore problems that require them to formulate questions and collect, organize, analyze, and draw conclusions from data and apply basic concepts of probability. The MWM program will include examining what students can be expected to do at the most basic level of understanding and what can be expected of them as their skills develop and their experience broadens. Content is consistent with Common Core standards, *GAISE* recommendations, and *NCTM Principles and Standards for School Mathematics*.
Presenters:	*GAISE Report* authors and prominent statistics educators
Format:	Middle-school and high-school statistics sessions Activity-based sessions, including lesson plan development
Provided:	Refreshments Handouts Certificate of participation from the ASA certifying professional development hours Optional graduate credit available
Cost:	The course fee for the two days is $50. **Please note:** Course attendees do not need to register for the Joint Statistical Meetings* to participate in this workshop.
Follow up:	Follow-up activities and webinars (***www.amstat.org/asa/education/K-12-Statistics-Education-Webinars.aspx***) Network with statisticians and teachers to organize learning communities
Registration:	More information and online registration is available at ***www.amstat.org/education/mwm***. Space is limited. If interested in attending, please register as soon as possible.
Contact:	Rebecca Nichols, ***rebecca@amstat.org***; (703) 684-1221, Ext. 1877

* The Joint Statistical Meetings are the largest annual gathering of statisticians, where thousands from around the world meet to share advances in statistical knowledge. The JSM activities include statistics education sessions, posters sessions, and the exhibit hall.

Sponsored by

ASA

Late-Breaking Session Focuses on Future of Statistics

Most JSM technical sessions are organized six to 12 months before the meeting. This smooths the organizing process but does not allow coverage of breaking developments of keen public interest in which statistical issues are highly relevant. To fill this gap, space is reserved for late-breaking sessions at JSM each year.

This year, members of the Committee on Meetings chose a panel session reporting on the NSF workshop, "Statistics at a Crossroads: Challenges and Opportunities in the Data Science Era."

Late Breaking Session #1

Monday, July 29, 2:00 p.m. – 3:50 p.m.

Statistics at a Crossroads: Who Is for the Challenge?

Organized by Xuming He, University of Michigan

Sponsored by the National Science Foundation, about 50 members of the statistics and data science community participated in the workshop "Statistics at a Crossroads: Challenges and Opportunities in the Data Science Era" in October 2018. The workshop brought together leading researchers and educators to develop a 10–20-year vision for the statistics field, taking advantage of the unprecedented opportunities and challenges in the era of data science. Two pre-workshop webinars included additional participation by hundreds of online participants. The primary goal of the webinars and workshop was to seek broad community input in the following:

- Identifying emerging research topics that will require new statistical foundations, methodology, and computational thinking
- Engaging with important data-driven challenges in different application domains and fostering interdisciplinary collaborations to address important scientific challenges
- Creating a vibrant research community and maintaining an appropriate balance between different sub-fields of statistics, including investments in the foundations

This exercise is important for the statistics community, because we all understand the field of statistics is at a crossroads. We either flourish by embracing and leading data science or we decline and become irrelevant. In the long run, we must redefine, broaden, and transform statistics to thrive. We must evolve and grow to be the transdisciplinary science that collects and extracts useful information from data.

With the fast establishment of various data science entities across campuses, industry, and government, there is a limited window of opportunity for a successful transformation. We must not miss this window. We must effect this change now by reimagining our educational programs, rethinking faculty hiring and promotion, and accelerating the required cultural change. We must identify and embrace big research challenges so our work will have greater impact on science and society in the coming years.

Join the discussion during this panel session, which will include steering committee members who will present and discuss the major findings and recommendations from the workshop and seek further community input. ■

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Harvard Biostatistics Welcomes Two Assistant Professors

Rachel Nethery
Assistant Professor of Biostatistics

What led to your decision to join Harvard biostatistics?
I was fortunate enough to join the department two years ago as a postdoc with Francesca Dominici, and during this time, I have developed a strong connection to and appreciation for this department. The faculty, staff, and students in the department are not only brilliant and passionate about their work but also have great attitudes and really make day-to-day life in the department pleasant and fun. Both within the department and across the university, Harvard offers unparalleled opportunities for collaboration with researchers doing groundbreaking work in all areas of health and medicine, making it one of the most exciting places in the world to work.

Because I don't want to mislead you into thinking that all of my ideals are lofty, I should acknowledge that my love for the department is not independent of the high frequency of pizza parties (and other social events with food) that occur here.

Having formed this connection to the Harvard biostats environment as a postdoc, I was delighted and humbled to receive the opportunity to join this department as faculty, and I look forward to continuing to work (and chat by the coffee machine and enjoy leftovers in the kitchen) with you all.

Where did you grow up? Can you point to something in your life that may have influenced your decision to study biostatistics?
I grew up on a farm in rural Kentucky. Although few people there had any post-secondary business or mathematical training, most of the farmers managed their own finances and emphasized to me the importance of quantitative skills. My fantastic high-school calculus and physics teachers, Mrs. Parritt and Mr. Cox, get credit for my inspiration to pursue a quantitative career. Their enthusiasm about math was contagious, and their classes got me excited about using math to solve real-world problems.

During college, a professor (Mahlet Tadesse, a Harvard biostats alum) encouraged me to attend SIBS, a summer biostatistics program offered at several universities across the US. I went to SIBS at Emory University, where I was introduced to spatial modeling by Lance Waller and infectious disease modeling by Michael Haber. The incredible experience I had there motivated me to pursue a graduate degree in biostatistics.

What was your previous educational and work experience before joining the department?
Fun fact: My first "real" job was as a cashier at Walmart. Moving on to more relevant experiences, I went to undergrad at Georgetown University, majoring in math and political science. Afterward, I went directly into

This article originally appeared in *Biostats Briefing*, a weekly newsletter from the department of biostatistics at the Harvard T.H. Chan School of Public Health. Both women will start their new positions on July 1.

DeVeaux Gives Talk at West Point

From left: Lt. Col. Nicholas Clark, Lt. Col. Tim Sikora, Maj. Dan Baller, Dick DeVeaux, Lt. Col. Kevin Cummiskey, Maj. David Delcuadro-Zimmerman, and Maj. Bryan Adams

In April, Dick DeVeaux visited the department of mathematical sciences at West Point. He observed an introductory statistics course and even "marched" into the mess hall for lunch with the West Point cadets. He participated in a small group discussion of the curriculum, including the academy's new applied statistics and data science major, and gave a talk titled, "Data Science for All!! Sure! But When, Where, How, and Why?"

the biostatistics PhD program at The University of North Carolina at Chapel Hill. I completed my PhD there in 2017 and then came to Harvard to do a postdoc with Francesca Dominici.

What do you enjoy most about your job so far, and what research directions are you planning to pursue?

Hands down, the best part of my current job is the incredible people that I get to work with in Francesca Dominici's group. During my postdoc, I have primarily worked on causal inference methods for environmental health. Because environmental health studies are observational, drawing causal conclusions from them typically requires strong assumptions. Yet, in order for our science to inform environmental regulatory policy or to help bring justice to those impacted by pollution/contamination, it is critical that our results rely on as few untestable assumptions as possible. My research is focused on developing methods to assess and relax those assumptions across a variety of study types and research questions. I enjoy working on this topic due to its potential for direct policy and social impact. Moving forward, I hope to develop better methods to investigate relationships between disease clusters and contaminant exposures and to evaluate the health impacts of environmental regulatory policy.

What do you enjoy outside of work?

I spend much of my free time traveling to visit family and friends in the southeast. When I am in Boston, I enjoy exploring the city and surrounding areas and trying out new restaurants. I love bluegrass/folk/Americana music, and I try to go to live shows regularly. I also enjoy participating in politics, knitting, riding horses, and playing card games.

Briana Stephenson

Assistant Professor of Biostatistics

Briana had an affinity for mathematics and science since she was very young. Having matriculated through the public schools in her hometown of Columbia, Maryland, Briana attended the Massachusetts Institute of Technology (MIT), where she earned a Bachelor of Science degree in mathematics. At MIT, Briana was a member of the varsity volleyball team and an avid leader of both the Black Students' Union and Delta Sigma Theta Sorority—a national public service organization.

Briana's interest in biostatistics was not a linear one. Majoring in math and pre-med in college, she wrestled with how to mesh her two passions that would best augment her interests. As a first-year medical student, during a biostatistics seminar, it became painstakingly clear to Briana that she was in the wrong place. She abruptly withdrew from medical school and shifted her focus to biostatistics. While Briana needed to come to this discovery on her own, it was right under her nose the whole time. Both her mother and late aunt had careers in public health and were also biostatisticians. The apple had not fallen far from the tree.

While pursuing a Master in Public Health (MPH) degree in biostatistics at The George Washington University Milken Institute School of Public Health, Briana worked as a mathematical statistician at the Food and Drug Administration. She worked as an ORISE biostatistics research fellow for the Department of Defense in psychological health and strategic operations after earning her MPH. As a fellow, her interest in population health awakened. The methodological challenges encountered with large population data motivated her to increase her knowledge in the field and return to school. She enrolled in the biostatistics program at The University of North Carolina at Chapel Hill.

As a PhD student, Briana worked with Amy Herring. Briana's research focused on Bayesian nonparametric clustering approaches to nutritional epidemiology. Her work earned her both national and international recognition, as well as the UNC Gillings' Dissertation Award for Public Health Impact.

Currently, Briana is completing her postdoctoral research at the UNC Collaborative Studies Coordinating Center, working on the Hispanic Community Health Study/Study of Latinos with Jianwen Cai and Daniela Sotres.

Having enjoyed teaching both undergraduate and graduate students, a career in academia was a natural fit for Briana, providing her the unique opportunity to merge her interests in mentoring students with research and collaboration across myriad fields. The intersection of these areas is what captivated Briana's interest in Harvard's biostatistics department. Briana describes this intersection as an "all-you-can-eat buffet" of public health opportunities. On joining the biostatistics department, Briana said, "I am humbled to join the Harvard T.H. Chan family and call this amazing group of world-renown faculty and researchers my colleagues."

At Harvard, Briana plans to continue her work creating innovative model-based clustering techniques that will accommodate the complexities

of continually diversifying populations such as the United States. She is excited to return to the Boston area and work "on the other side of the river," where her educational journey began.

In her spare time, Briana leads a high-school girls empowerment program through her sorority and serves as an assistant superintendent and teacher in her local church school. She also enjoys playing volleyball, practicing yoga, binge-watching TV, and, most recently, playing Settlers of Catan with her family. ■

Roger Tourangeau

The 2020 recipient of the Waksberg Award is Roger Tourangeau, who will receive an honorarium and publish his paper in *Survey Methodology*.

The journal *Survey Methodology* established an annual invited paper series in honor of Joe Waksberg to recognize his contributions to survey methodology. Each year, a prominent survey statistician is chosen to write a paper that reviews the development and current state of an important topic in survey methodology and reflects the mixture of theory and practice that characterized Joe Waksberg's work.

The author of the Waksberg paper is selected by a four-person committee—Mike Hidiroglou, Bob Fay, Jean Opsomer, and Elizabeth Stuart—appointed by *Survey Methodology* and the American Statistical Association.

To view a list of previous honorees, visit the Survey Research Methods Section website at *https://bit.ly/2HflxS2*.

Courtney Kennedy Receives Cox Award

The Washington Statistical Society (WSS) and RTI International recently selected Courtney Kennedy, director of survey research at the Pew Research Center, as the 2019 recipient of the Gertrude M. Cox Award.

Before and since earning her PhD in 2010 from the University of Michigan, Kennedy has contributed substantially to the survey research profession. After helping to pioneer the inclusion of cellphones in telephone surveys and developing the dual-frame concept, she turned her focus to online surveys and helped develop the Pew Research Center's online panel. Her research interests include the impact of survey nonresponse, measurement error, mode effects, and nonprobability sampling.

Kennedy's influence goes beyond the statistical community as she applies her theoretical research to social issues. For example, she was chair of AAPOR's Ad Hoc Committee on 2016 Election Polling. Furthermore, she has built bridges between the survey research and journalism communities, helping the media understand and more effectively disseminate polling data and results. To quote from her nomination, "Although her career path has been very different from Gertrude Cox's, Cox would recognize a kindred spirit in Courtney Kennedy."

Kennedy will deliver the Cox Award talk at the Bethesda, Maryland, NORC office June 26 at 4 p.m., preceding the WSS Annual Dinner. The award includes a $1,000 honorarium, travel expenses to attend the WSS Annual Dinner, and a commemorative plaque.

Courtney Kennedy will deliver the Cox Award talk at the Bethesda, Maryland, NORC office June 26 at 4 p.m.

Testing for Bots and Other Suspect Data in Online Surveys: A Multi-Panel Comparison

The Gertrude M. Cox award was established in 2003 through a joint agreement between the Washington Statistical Society and RTI International to recognize statisticians in early to mid-career who have already made significant contributions to statistical practice.

The award is in memory of Gertrude M. Cox (1900–1978). In 1945, Cox became director of the Institute of Statistics of the Consolidated University of North Carolina. In the 1950s, as head of the department of experimental statistics at North Carolina State College, she played a key role in establishing mathematical statistics and biostatistics departments at the University of North Carolina. Upon her retirement from North Carolina State University in 1960, Cox became the first head of the Statistical Research Division at the newly founded RTI. She was a founding member of the International Biometric Society (IBS) and, in 1949, became the first woman elected into the International Statistical Institute. She served as president of both the American Statistical Association (1956) and IBS (1968–1969). In 1975, she was elected to the National Academy of Sciences. ■

MORE ONLINE
For details about the award, including a list of past recipients, visit *http://washstat.org/awards/cox_award_2019.html.*

Raymond Carroll Young Investigator Award

Nominations for the 2019 Raymond J. Carroll Young Investigator Award are being accepted. This award is presented biennially by the department of statistics at Texas A&M University to an outstanding young researcher in statistical science.

The candidate must have completed his/her PhD within the past 10 years and have demonstrated outstanding scholarly contributions in statistical methodology and applications. Nominations must be written and include a curriculum vita.

Nominators are encouraged to supply supporting documents such as letters of recommendation. Self-nominations are invited and encouraged. Correspondence by email is preferred but not required.

Nominations and supporting documents should be sent by August 15 to Thomas Wehrly, Raymond J. Carroll Young Investigator Award, Department of Statistics, Texas A&M University, 3143 TAMU, College Station, TX 77843-3143. Wehrly can be contacted at *twehrly@stat.tamu.edu*.

For more information about the Raymond J. Carroll Young Investigator Award, visit *www.stat.tamu.edu*. ■

Be a Role Model by Serving as AAAS IF/THEN Ambassador

The AAAS IF/THEN Ambassadors program brings together 100 women from a variety of science, technology, engineering, and mathematics careers to serve as high-profile role models for middle-school girls. The program provides the ambassadors with a national platform to tell their stories and inspire the next generation of STEM pioneers.

Candidates who are selected as ambassadors will have access to skill-building, media, and engagement opportunities from August 2019 until February 2021 and receive an award of $5,000.

Apply to be an ambassador by July 21 at *https://ifthen.aaas.org*. The announcement of selected ambassadors will take place in early September.

Details are available on the AAAS website at *www.aaas.org/page/ifthen-ambassadors*.

Deadlines and Contact Information for Select ASA National Awards, Special Lectureships, and COPSS Awards

Program	Deadline	Nominations	Questions
Lester R. Curtin Award	Oct. 15, 2019	*awards@amstat.org*	Ronald L. Wasserstein *ron@amstat.org*
Lingzi Lu Memorial Award	Oct. 15, 2019	*awards@amstat.org*	Victoria Sides *victoriasides16@gmail.com*
Monroe. G. Sirken Award in Interdisciplinary Survey Methods Research	Oct. 15, 2019	*awards@amstat.org*	John L. Czajka *jczajka@mathematica-mpr.com*
Deming Lecturer Award	Nov. 15, 2019	*awards@amstat.org*	Roger W. Hoerl *roger.hoerl@gmail.com*
John J. Bartko Scholarship Award	Dec. 2, 2019	*awards@amstat.org*	Donna LaLonde *Donna@amstat.org*
Elizabeth L. Scott Award	Dec. 15, 2019	*community.amstat.org/copss/home*	

sectionnews

Biometrics

The following JSM 2019 short courses are cosponsored by the Biometrics Section:

Saturday, July 27

Reproducible Computing, led by Colin Rundel

Success in statistics and data science is dependent on the development of both analytical and computational skills. This workshop will cover the following:

- Recognizing the problems reproducible research helps address
- Identifying pain points in getting your analysis to be reproducible
- The role of documentation, sharing, version control, automation, and organization in making your research more reproducible
- Introducing tools to solve these problems, specifically R, RStudio, RMarkdown, git, GitHub, and make
- Strategies for scaling these tools and methods for larger, more complex projects

Workshop attendees will work through several exercises and get first-hand experience with using relevant tool-chains and techniques, including R/RStudio, literate programming with R Markdown, automation with make, and collaboration and version control with git/GitHub.

Statistical and Computational Methods for Microbiome and Metagenomics Data Analysis, led by Curtis Huttenhower and Hongzhe Lee

High-throughput sequencing technologies enable individualized characterization of the microbiome composition and functions. The human microbiome, defined as a community of microbes in and on the human body, affects human health and risk of disease by dynamically interacting with host diet, genetics, metabolism, and environment. The resulting data can potentially be used for personalized diagnostic assessment, risk stratification, disease prevention, and treatment.

Microbiome has become one of the most active areas of research in biomedical sciences. New computational and statistical methods are being developed to understand the function of microbial communities. In this short course, we will give detailed presentations on the statistical and computational methods for measuring various important features of the microbiome based on 16S rRNA and shotgun metagenomic sequencing data and how these features are used as an outcome of an intervention, mediator of a treatment, and covariate to be controlled for when studying disease/exposure associations. The statistics underlying some of the most popular tools in microbiome data analysis will be presented—including bioBakery tools for meta'omic profiling and tools for microbial community profiling (MetaPhlAn, HUMAnN, Data2, DEMIC, etc.)—together with advanced methods for compositional data analysis and kernel-based association analysis.

Sunday, July 28

Regression Modeling Strategies, led by Frank Harrell

All standard regression models have assumptions that must be verified for the model to have power to test hypotheses and for it to be able to predict accurately. Of the principal assumptions (linearity, additivity, distributional), this course will emphasize methods for assessing and satisfying the first two. Practical but powerful tools are presented for validating model assumptions and presenting model results. This course provides methods for estimating the shape of the relationship between predictors and response using the widely applicable method of augmenting the design matrix using restricted cubic splines. Even when assumptions are satisfied, overfitting can ruin a model's predictive ability for future observations. Methods for data reduction will be introduced to deal with the common case in which the number of potential predictors is large in comparison with the number of observations. Methods of model validation (bootstrap and cross-validation) will be covered, as will auxiliary topics such as modeling interaction surfaces, variable selection, overly influential observations, collinearity, and shrinkage. A brief introduction to the R rms package for handling these problems also will be discussed. The methods covered will apply to almost any regression model, including ordinary least squares, logistic regression models, ordinal regression, quantile regression, longitudinal data analysis, and survival models.

Functional Data Analysis for Wearables: Methods and Applications, led by Vadim Zipunnikov and Jeff Goldsmith

Technological advances have made many wearable devices available for use in large epidemiological cohorts, national biobanks, and clinical studies. This opens up a tremendous opportunity for

Government Statistics

The Government Statistics Section (GSS) will host a mentoring roundtable at JSM 2019. GSS mentoring is designed to encourage diverse participation and engage young professionals and students who may not normally have access to or interaction with more senior, advanced-career members of the GSS community.

The GSS mentoring session will provide an opportunity for an informal "meet and greet" between GSS mentors and mentees, as well as organized mentor/mentee activities. Exercises—based on a professional mentoring program—provide small-group, face-to-face time; opportunities for career discussions; and targeted coaching on "professional small talk."

Students and young professionals within five years of their degree are eligible to apply by June 30. Visit *https://bit.ly/2vSGvQr* for details.

2019 GSS Mentors

Wendy Martinez
ASA President-Elect
Bureau of Labor Statistics

Barry Nussbaum
ASA Former President
Environmental Protection Agency (Retired)

Stephanie Shipp
Deputy Director
and Professor
University of Virginia

clinical and public health researchers to unveil previously hidden but pivotal physiological and behavioral signatures and relate them to disability and disease. Therefore, understanding, interpretation and analysis of complex multimodal and multilevel data produced by such devices becomes crucial.

The main goal of this workshop is to present an overview of the functional data analysis methods for modeling physical activity data, review their strengths and limitations, and demonstrate their implementation in R packages refund and mgcv. We will also examine several nonfunctional approaches for extracting informative and interpretable features from wearable data. We will discuss applications in epidemiological studies such as the Head Start Program and National Health and Nutrition Examination Survey and a clinical study of congestive heart failure.

Tuesday, July 30

Measuring the Impact of Nonignorable Missing Data, led by Daniel Heitjan and Hui Xie

The popular but typically unverifiable assumption of ignorability greatly simplifies analyses with incomplete data, both conceptually and computationally. We say missingness is ignorable when the probability that an observation is missing depends only on fully observed information and nonignorable when the probability that an observation is missing depends on the value of the observation, even after conditioning on available design variables and covariates.

For example, in a clinical trial, the data are plausibly nonignorably missing when the subjects who drop out are those for whom the drug is either ineffective or excessively toxic. The possibility that the missing observations in a study are the result of a nonignorable mechanism casts doubt on the validity of conclusions based on the assumption of ignorability. Unfortunately, it is generally impossible to robustly assess the validity of this assumption with just the data at hand.

One way to address this problem is to conduct a local sensitivity analysis. Essentially, recompute estimated parameters of interest under models that slightly violate the assumption of ignorability. If the parameters change only modestly under violation of the assumption, then it is safe to proceed with an ignorable model. If they change drastically, then a simple ignorable analysis is of questionable validity.

To conduct such a sensitivity analysis in a systematic and efficient way, we have developed a measure we call the index of local sensitivity to nonignorability (ISNI), which evaluates the rate of change of parameter estimates in the

neighborhood of an ignorable model. Computation of ISNI is straightforward and avoids the need to estimate a nonignorable model or to posit a specific magnitude of nonignorability. We have developed a suite of statistical methods for ISNI analysis, now implemented in an R package named isni.

In this half-day short course, we will describe these methods and train users to apply them to inform evaluations of the reliability of empirical findings when data are incomplete.

An Introduction to the Joint Modeling of Longitudinal and Survival Data, with Applications in R, led by Dimitris Rizopoulos

In follow-up studies, different types of outcomes are typically collected for each subject. These include longitudinally measured responses (e.g., biomarkers) and the time until an event of interest occurs (e.g., death, dropout). Often, these outcomes are separately analyzed, but on many occasions, it is of scientific interest to study their association. This type of research question has given rise in the class of joint models for longitudinal and time-to-event data. These models constitute an attractive paradigm for the analysis of follow-up data mainly applicable in two settings: when focus is on a survival outcome and we wish to account for the effect of endogenous time-dependent covariates measured with error and when focus is on the longitudinal outcome and we wish to correct for nonrandom dropout.

This full-day course is aimed at applied researchers and graduate students and will provide a comprehensive introduction to this modeling framework. We will explain when these models should be used in practice, which are the key assumptions behind them, and how they can be used to extract relevant information from the data. Emphasis is given on applications. At the end of the course, participants will be able to define appropriate joint models to answer their questions of interest.

This course assumes knowledge of basic statistical concepts such as standard statistical inference using maximum likelihood and regression models. Also, basic knowledge of R would be beneficial but is not required. Participants are required to bring their laptop with the battery fully charged. Before the course, instructions will be sent for installing the required software.

Adaptive Treatment Strategies: An Introduction to Statistical Approaches for Estimation, led by Erica Moodie

Evidence-based medicine relies on using data to provide recommendations for effective treatment decisions. However, in many settings, response is heterogeneous across patients. Patient response may also vary over time, and physicians are faced with the daunting task of making sequential therapeutic decisions having seen few patients with a given clinical history.

Adaptive treatment strategies (ATS) operationalize the sequential decision-making process in the precision medicine paradigm, offering statisticians principled estimation tools that can be used to incorporate patient's characteristics into a clinical decision-making framework so as to adapt the type, dosage or timing of treatment according to patients' evolving needs.

This half-day course will provide an overview of precision medicine from the statistical perspective. We will begin with a discussion of relevant data sources. We will then turn our attention to estimation and consider multiple approaches—and their relative strengths and weaknesses—to estimating tailored treatment rules in a one-stage setting. Next, we will consider the multi-stage setting and inferential challenges in this area. Relevant clinical examples will be discussed, as well available software tools. ■

Statistics in Epidemiology

The Section on Statistics in Epidemiology (SIE) honored M. Elizabeth (Betz) Halloran with the 2019 Nathan Mantel Lifetime Achievement Award for her landmark contributions to statistical methods for infectious disease epidemiology, for her applications of those methods to important scientific problems, and for her service to the statistics in epidemiology community.

Halloran is a longtime leader in statistical methods for infectious disease epidemiology and has profoundly influenced this field. She has earned international recognition for her work on study designs for estimating the efficacy and effectiveness of vaccination. She has spearheaded the analysis of numerous vaccine studies, which have provided evidence to drive key policy decisions. In addition, Halloran's work has led to advances in causal inference for infectious disease transmission dynamics and vaccine effects, and more generally to causal inference under interference.

Halloran is a fellow of the American Statistical Association, Royal Statistical Society, and American Association for the Advancement of Science. In 2010, she was awarded the NIH/NIAID MERIT Award for methods for evaluating vaccine efficacy. In addition to having authored numerous articles in peer-reviewed journals, Halloran is the first author of the book *Design and Analysis of Vaccine Studies*—a leading resource on statistical methods

chapternews

GMU Student Chapter Members Attend DataFest

From left: Eleanor Johnson, Anushka Pratavadhi, and Marcus Williams

The 2019 DC DataFest, a weekend-long data competition designed to find new insights and useful applications from a single data set and inspire undergraduate students with an interest in data science to participate in real-life applications involving unknown data, was held at Summit LLC Consulting April 5–7.

Although graduate students, faculty, and industry professionals are available throughout the weekend for assistance, these undergraduate students—representing the universities in the Washington area—do all the work themselves. Each team is allowed no more than five minutes and two or three PowerPoint slides to impress a panel of judges after two days of intense data wrangling, analysis, and presentation design.

The undergraduate members of George Mason University attended this year's DataFest with a team comprised of statistics major and GMU Student Chapter President Eleanor Johnson, Computational and Data Science major Anushka Pratavadhi, and GMU Student Chapter Treasurer Marcus Williams, who is pursuing a degree in government and international politics.

The George Mason team was awarded the Best Insight Award for their work during the competition, which was sponsored by Summit Consulting, the University of Maryland Alumni Association, The Joint Program in Survey Methodology, Google, Pew Research Center, the American Association for Public Opinion Research, Mathematica Policy Research, and the Washington Statistical Society.

for vaccine studies. Halloran is the founder and director of the Summer Institute in Statistics and Modeling in Infectious Diseases, a three-week summer course that both introduces infectious disease researchers to modern methods of statistical analysis and mathematical modeling and introduces statisticians and mathematical modelers to the statistical and dynamic problems posed by modern infectious disease data.

Halloran earned her MD from the Freie Universitat Berlin in 1983 and her DSc in population sciences from the Harvard School of Public Health in 1989. She is a full member of the Vaccine and Infectious Disease Division and Public Health Sciences Division of the Fred Hutchinson Cancer Research Center. She is also a professor in the departments of biostatistics and epidemiology at the University of Washington.

2019 Young Investigator Awards

The section also grants an annual Young Investigator Award to new researchers for the best papers in statistics in epidemiology presented at JSM. Among the Young Investigator Award winners, the Breslow Award further recognizes the top paper.

The section honored the following individuals with the 2019 Young Investigator Award:

Tat-Thang Vo, Ghent University **(Breslow Award Winner)**

Jaffer Zaidi, Harvard University

Nicole Butera, The University of North Carolina at Chapel Hill

Bo Zhang, University of Pennsylvania

Lianne Siegel, University of Minnesota

Prosenjit Kundu, The Johns Hopkins University

An awards ceremony will be held at this year's JSM in Denver for the presentation of the Nathan Mantel Award and 2019 Young Investigator awards. The date and location for the ceremony will be announced on the section's website at *https://community.amstat.org/sie/home* once available. ■

Quality and Productivity

The Quality and Productivity Section will host two contributed sessions at JSM 2019. The first will take place at 10:30 a.m. on Tuesday, July 30, on the topic of quality, reliability, and measurement. The second will be held at 8:30 a.m. on Thursday, August 1, on the topic of statistical process control. Details, including the list of speakers and individual presentation topics, can be found in the online program at *ww2.amstat.org/meetings/jsm/2019/onlineprogram*. ■

Physical and Engineering Sciences

Brad Evans, SPES JSM Program Chair

The Physical and Engineering Sciences Section (SPES) will sponsor three invited and two topic-contributed sessions at JSM in Denver. SPES is also co-sponsoring multiple invited, topic-contributed, poster, and speed sessions, as well as continuing education courses.

Invited Sessions

Combinatorial Testing: Using Covering Arrays to Maximize the Impact of Testing, organized by Michael Crotty with speakers Raghu Kacker, Dennis Lin, Ryan Lekivetz, and Caleb King

Experimental Design Applications in the Pharmaceutical Industry, organized by Stan Altan with speakers Brad Evans, Jose Ramirez, Jyh-Ming Shoung, Yia Hu, and Stan Altan

Statistics Impacting Challenges Within Academia, Industry, and Government, organized by Claire McKay Bowen with speakers Evercita Cuevas Eugenio, Suzanne Marie Neidhart, Lois Keller Smith, and Amanda Koepke

Topic-Contributed Sessions

Data Fusion: An Exploration of Practical Aspects, organized by Emily Casleton, Los Alamos National Laboratory

Less Can Be More: Smart Sampling in Data and Engineering Sciences, organized by Xinwei Deng, Virginia Tech, and C. Devon Lin, Queen's University

Co-Sponsored Invited and Topic-Contributed Sessions

Beyond the VAR: Advances in Spatial and Spatio-Temporal Modeling for Climate and Environmental Data, with Section on Statistics and the Environment and National Research Center for Statistics for the Environment

Uncertainty Quantification in Various Applications, with ASA Advisory Committee on Climate Change Policy and Section on Statistics and the Environment

Climate Networks and Extremes, with Section on Risk Analysis and Section on Statistics and the Environment

Filtering Methods for Spatio-Temporal Big Data Applications, with Section on Statistics and the Environment and Section on Statistical Computing

Quantitative Inference for the Global Carbon Cycle, with Section on Statistics and the Environment and WNAR

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NC ASA Career Fair a Success

The Career Information Fair followed a "speed" format in which the fair opened with a series of two-minute elevator speeches from each organization.

After opening introductions, attendees visited individually with various companies and universities.

More than 75 statistics professionals and students attended the inaugural North Carolina Chapter Career Information Fair in April. The fair enabled attendees to learn more about the variety of careers and opportunities available to statisticians and data scientists at different organizations. More than a dozen companies and universities in The Triangle were represented.

This was the first time NC ASA has organized a career fair and, based on the strong turnout and positive feedback received from both attendees and organization representatives, it was a success.

In an online survey after the fair, a student participant wrote, "It was not a huge fair, but it had a great lineup of employers for data analysts. I attended … a much bigger fair, but there were fewer companies there that were relevant. This fair was quality instead of quantity."

The NC Chapter looks forward to holding more events like this in the coming years.

chapternews

Philadelphia Chapter's Annual Gathering Filled to Capacity

Randall H. Rieger, Philadelphia Chapter president, with student members Olawasola Oyeniran, Ronald Kamusiime, Joseph Kakyomya, and Eric Terkpertey

The Philadelphia Chapter's Annual Spring Welcome Gathering was held March 29 in the Sedgeley Club, a historic boathouse dating back to 1903 and sitting along the famous Boathouse Row on the Schuylkill River. The event—featuring a social hour, dinner, keynote address, and the famous boathouse dessert: bananas foster—is a highlight for chapter members, and the room was filled to capacity.

This year's keynote speaker was Barry Nussbaum, former chief statistician of the Environmental Protection Agency and the 112th president of the ASA. Nussbaum presented an enlightening and humorous talk titled, "It's Not What We Said, It's Not What They Heard, It's What They Say They Heard." Included were interesting examples from his career of communicating statistical concepts, including those used in court cases, executive documents, and material presented to the US president.

In addition, this year's event featured the chapter's inaugural Award for Excellence in Teaching, presented to Ned Wolff from Arcadia University. The Philadelphia Chapter plans to also give annual awards for the practice of statistics and research in statistics starting next year.

It is an exciting time for the Philadelphia Chapter, as it has launched many new initiatives and programs in the past two years. A new mentorship program has been successful and continues to expand. Last year, a one-day big data symposium was held. The event was well-received, and there are plans for making it an annual event. The chapter's membership has increased, student chapters have been created in the area, and several educational outreach events have taken place.

Decision-Making in Tech Giants Through A/B Testing, Prediction, and Optimization, with Quality and Productivity Section and Section on Statistical Learning and Data Science

Co-Sponsored Continuing Education Courses

Big Data, Data Science, and Deep Learning for Statisticians, with ASA and Quality and Productivity Section
Instructors: Ming Li, Amazon, and Hui Lin, Netlify

Design and Analysis of Experiments That Incorporate Simulator Platforms, with ASA
Instructors: Thomas Santner, The Ohio State University, and Brian J. Williams, Los Alamos National Laboratory ■

Survey Research Methods

The Survey Research Methods Section (SMRS) will have a full program at the Joint Statistical Meetings while sponsoring or co-sponsoring 13 invited sessions, 18 topic-contributed sessions, seven contributed sessions, and three speed sessions. We have so many sessions that some compete with others. Prioritize the sessions you wish to attend by looking over the following list and then checking the online program at *ww2.amstat.org/meetings/jsm/2019/onlineprogram* for up-to-date times and locations.

Sunday, July 28

Invited

- Challenges and Breakthroughs in Analyzing Big Survey Data
- Multinational, Multiregional, and Multicultural Surveys (3MC): A Burgeoning Sub-Discipline in Survey Research Methods

Speed
Survey Methods, Transportation Studies, Socioeconomics, and General Statistical Methods

Contributed
Nonprobability Sample and Probability Sample Matters Under What Context?

Topic-Contributed

- Cryptocurrency Surveys: Challenges and Results from Central Banks
- Improving Data Collection: Challenges in Survey Practice

Monday, July 29

Invited

- The Multiple Adaptations of Multiple Imputation
- Administrative Income Data, Survey Data, and Inequality
- Developing Multi-Purpose Imputed or Synthetic Data for Official Statistics
- Evolving Survey Inference in the Big Data Era: Challenges and Opportunities

Speed

Improving Survey Data Quality with Multiple Data Sources, Administrative Data, and Nonresponse Bias Control

Contributed

Modeling Applications for Backcoding, Nowcasting, and Forecasting

Topic-Contributed

- Statistical Data Editing Modernization
- Big Survey Meets Big Data: Integrating Administrative Data into the American Community Survey
- Inference with Nonprobability Sample Through Data Integration
- Linked Data to Advance Evidence Building in Public Policy (Panel)

Tuesday, July 30

Invited

Achieving Adequate Representation When Surveying Rare Populations

Speed

Big Data, Small-Area Estimation, and Methodological Innovations Under Development

Topic-Contributed

- Probabilistic Record Linkage and Inference with Merged Data
- Assessing the Quality of Integrated Data
- Providing Access to Useful Data While Preserving Confidentiality
- Adaptive Survey Design: Recent Advances and New Potential
- SRMS/SSS/GSS Student Paper Competition
- Connecting Parallel Universes
- Scientific and Public Affairs Advisory Committee Poster Competition

Contributed

- Nonresponse Errors and Fixes
- SRMS-Submitted Posters

Wednesday, July 31

Invited

- Missing Data Issues in Public Health Studies and Survey Sampling in the Era of Data Science
- State-of-the-Art Inferential Approaches for Nonprobability Samples
- Data Fabrication and Falsification: Protecting the Credibility and Impacts of Surveys (Panel)
- Total Survey Errors in the Combination of Probability and Nonprobability Samples
- A Historical Perspective on the Application of Sampling Theory and Methods (Panel)

Topic-Contributed

- Differential Privacy Research and Applications at the US Census Bureau
- Propensity Score Methods to Conduct Observational Studies Using Complex Survey Data
- Small-Area Estimation with Relaxed Modeling Assumptions
- Time Series in Government and National Statistics

Contributed

- Survey Sampling and Variance Estimation: Recent Innovations
- Sampling, Variance Estimation, and Advancements with Auxiliary Data

Thursday, August 1

Invited

Small-Area Estimation: Producing Estimates for Small Areas from Sampled Data

Topic-Contributed

Address-Based Frame Enhancement: Recent Experience and Developments

Contributed

Statistical Modeling: Benefits and Drawbacks ■

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.

These listings and additional information about the 65-word ads can be found at *ww2.amstat.org/ads*.

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 *https://jobs.amstat.org/jobseekers*.

Indiana

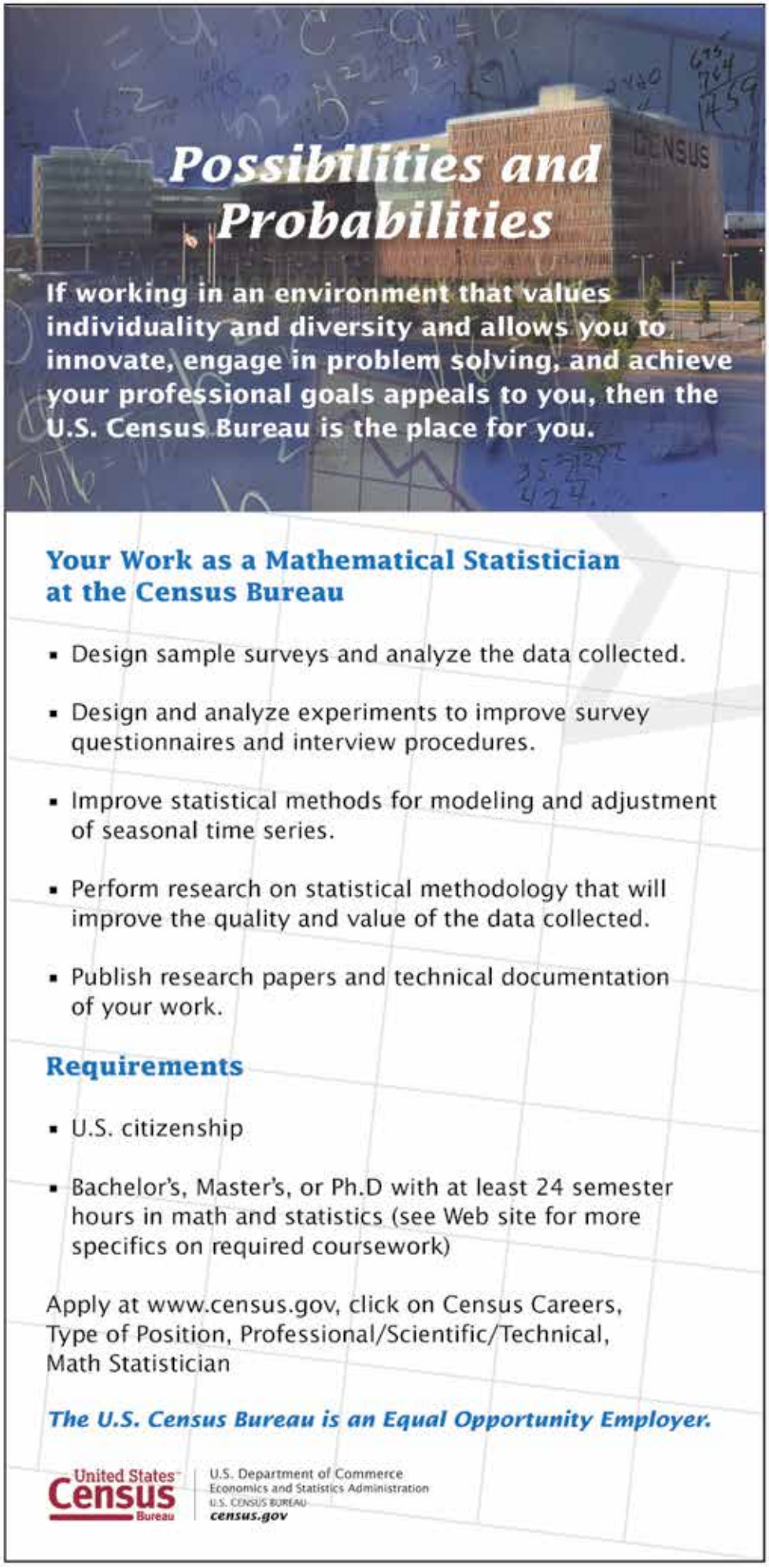
■ The Department of Statistics at Indiana University, Bloomington, anticipates a Visiting Assistant Professor position for 2019-2020. One year, with possible renewal for a second. Teaching load of 2 courses per semester. See *www.stat.indiana.edu* for department information. Apply by April 29, 2019 to ensure consideration. Apply electronically at PeopleAdmin *http://indiana.peopleadmin.com/postings/7705*. Indiana University is an equal employment and affirmative action employer and a provider of ADA services.

Massachusetts

■ The Department of Data Sciences (DS) at the Dana-Farber Cancer Institute seeks an experienced and motivated PhD biostatistician to engage collaboratively with investigators on basic science, animal model, and human research activities in multiple areas of adult oncology and HIV disease. PhD and at least 2 years of collaborative experience are required. Prior experience in oncology and/or HIV is a plus. Please contact *Liz@jimmy.harvard.edu*. EOE.

New Mexico

■ The Department of Mathematics and Statistics at the University of New Mexico is hiring a full-time lecturer beginning August 2019. Duties include developing and coordinating two new statistics courses, "Statistical Literacy" and "Statistics for Research", and developing a formal training for statistics teaching assistants. Preference given to candidates with experience implementing and evaluating evidence-based and innovative pedagogy. Apply online at *unmjobs.unm.edu* underReq8225. EOE. ■



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"Statistical significance was never meant to imply scientific importance."
From Moving to a World Beyond "*p*<0.05," *The American Statistician*

Lucy::postdoc • @LucyStats
Uncertainty!

Simina Boca • @siminaboca
Study design and confounding

Maria Tackett • @MT_statistics
How the data was originally collected, especially when using datasets found online.

Bryan Satchmo McComb
The importance of getting a statistician involved in a study BEFORE the analysis to help/improve study design and data collection.

Ted Lystig
The difference between absence of evidence and evidence of absence.

Whitney Johnson
Every statistician I know worries too much…now I know why?

Ramona Lee Paetzold
P-values and replication

Stephan Arndt
Whether numbers they saw or heard made sense.

TELL US

Next month, we'll ask our followers:
"What is a good theme song for statisticians?"
Share your answers with us on social media.
Be sure to tag @AmstatNews.

Statistics

The latest release of SAS/STAT® is now available. SAS/STAT 15.1 provides new methodology and new capabilities:

SAS/STAT 15.1 Highlights

Bayesian generalized linear mixed models.

Graphical causal models.

Regression for time-to-event data based on restricted mean survival time.

Counterfactual analysis using quantile regression.

Semiparametric proportional hazards model for interval-censored data.

Recent SAS/STAT Additions

Casual mediation analysis.

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Fast quantile process regression.

Cause-specific proportional hazards analysis for competing-risks data.

Variance estimation by the bootstrap method for survey data analysis.

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