

MAY 2018 • Issue #491

# AMSTATNEWS

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# WHAT'S GOING ON IN THIS GRAPH?

**What's Going On in This Graph?** is a new monthly activity from the ASA and *The New York Times*.

Students will answer the following questions:

- **What do you notice?**
- **What do you wonder?**
- **What's the story this graph is telling?**

On release **Tuesdays**, moderators will respond in real time to students' entries.

On reveal **Fridays**, moderators will reveal the graph and its article, summarize the responses with shout-outs, ask additional questions, and give three stat nuggets—definitions of statistical terms and where they are seen in the graph.

- WHO:** Grades 7–12 math, English, and social studies students
- WHAT:** A free, online feature of *The New York Times* in partnership with the American Statistical Association
- WHEN:** Second Tuesday of each month during the school year and in the archives thereafter
- WHY:** Using timely *New York Times* graphs that are compelling to students, learn how to critically think and write about all kinds of graphs
- HOW:** A class starter, which can take just 10–15 minutes

[www.amstat.org/NYTgraphchat](http://www.amstat.org/NYTgraphchat)



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*Amstat News* welcomes news items and letters from readers on matters of interest to the association and the profession. Address correspondence to Managing Editor, *Amstat News*, American Statistical Association, 732 North Washington Street, Alexandria VA 22314-1943 USA, or email [amstat@amstat.org](mailto: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.

*Amstat News* (ISSN 0163-9617) is published monthly by the American Statistical Association, 732 North Washington Street, Alexandria VA 22314-1943 USA. **Periodicals postage paid** at Alexandria, Virginia, and additional mailing offices. POSTMASTER: Send address changes to *Amstat News*, 732 North Washington Street, Alexandria VA 22314-1943 USA. Send Canadian address changes to APC, PO Box 503, RPO West Beaver Creek, Rich Hill, ON L4B 4R6. Annual subscriptions are \$50 per year for nonmembers. *Amstat News* is the member publication of the ASA. For annual membership rates, see [www.amstat.org/join](http://www.amstat.org/join) or contact ASA Member Services at (888) 231-3473.

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ADVERTISING: [advertise@amstat.org](mailto:advertise@amstat.org)

WEBSITE: <http://magazine.amstat.org>

Printed in USA © 2018  
American Statistical Association



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### 20 STATS4GOOD Data Resources for Data for Good Researchers

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@peace-work.org](mailto:davidjcorliss@peace-work.org).

### 22 STATtr@k Observations About Taking Control of Your Career Path

STATtr@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://statttrak.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](mailto:megan@amstat.org).

### 24 MASTER'S NOTEBOOK Early-Career Statistician Offers Language, Tools for Establishing Influence

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

### 26 PASTIMES OF STATISTICIANS What Does Wayne Nelson Like to Do When He Is Not Being a Statistician?

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

## Quality and Productivity Section Mentoring Program

### NOW OPEN!

Visit the section on the ASA Community (<https://bit.ly/2JHgl35>) for more information. (You'll have to log in first.) Details will also appear in next month's *Amstat News*.

## Online Articles

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

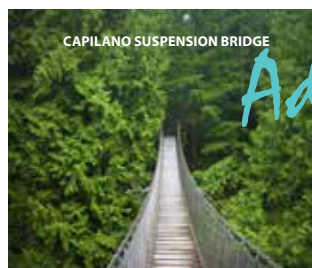
### NOMINATIONS SOUGHT for 2018

**William Hunter Award.** June 30 is the application deadline for the William G. Hunter Award, sponsored by the Statistics Division of the American Society for Quality. The award is presented at the Fall Technical Conference in October. Download award criteria and a nomination form from the ASQ site (<http://asq.org/statistics/about/awards-statistics.html>) or visit *Amstat News* online for details: <http://magazine.amstat.org/blog/category/membernews/awardnews>.

**IN MEMORIAM** Sadly, ASA member **Mary E. Reuder** passed away recently. In any era, she was remarkably well trained as a statistician, experimental psychologist, and licensed clinical psychologist, but particularly so at a time when women were not as active in academia as they are today. <http://magazine.amstat.org>

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# Leading Outside Our Comfort Zone

This month, I want you to meet Aarti Shah, another impressive member of the Leadership Institute Steering Committee. If you are reading the President's Corner because you are interested in leadership, then you may already know Aarti or have heard of her, because she has been a strong advocate of leadership training for many years and pioneered on-the-job training.

Aarti directed the statistical and analytics group at Eli Lilly, where she was instrumental in developing a comprehensive leadership training program for her staff. I remember walking past the Lilly reception at JSM shortly after I joined the FDA, and although I could not attend the reception as an FDA employee (conflict of interest), I was able to watch the slide show about the program from the doorway. I was so impressed. For a company to invest that much in developing their own staff's leadership capabilities was truly marvelous to see!

Aarti's own career has followed a steep leadership trajectory. From leading the statistics and analytics group, she was appointed to direct an entire drug development program, and—today—she sits in the C-suite as chief information officer (CIO) of Lilly, reporting to the CEO and serving on the executive team.

She shared with us her tremendously insightful views on what it means to be a leader in the pharmaceutical industry, and what it takes to do so successfully. Aarti emphasized the need for statistical leaders to develop confidence and move out of their comfort zone as they take on leadership



Aarti Shah  
Photo courtesy of Eli Lilly & Company

roles beyond statistics. Her own career is an example of doing just that. I asked Aarti to share a few thoughts, and here is what she had to say:

I am thrilled to see one of the presidential initiatives focused on leadership development and customized for the various stages of one's career. This is truly terrific, and I applaud Lisa for her efforts on this very important topic.

Who would have thought a statistician one day would be asked to serve as the CIO with responsibilities for information technology, information security, advanced analytics, and digital health? As I reflect on my 24-year career at Lilly, I have to say the company's and my investment in leadership development, along with access to superb mentors, have enabled me to take on both traditional and nontraditional roles as a statistician.

At Lilly, we developed a leadership program personalized for statisticians in partnership with our leadership training organization and, over the years, I have seen so many statisticians benefit from this program. Today's corporations need quantitative decision-makers and leaders who can bring immense business and customer value, and I truly believe statisticians are well-equipped for these roles if they take the time to invest in and develop their leadership skills.

With the ASA providing a breadth of leadership offerings, I hope many of you will take the opportunity and make the time to invest in yourself and always be a student of leadership.

The institute's master plan involves offering training opportunities at the pre-career, early- to mid-career, and mid- to late-career stages. You read about our pre-career training ideas in the March issue of this column. For the early- to mid-career opportunity, we are planning a follow-up experience for the JSM 2018 Preparing Statisticians for Leadership: How to See the Big Picture and Have More Influence course that will be open to course registrants and past participants. Our target audience is statisticians 5–10 years post-graduation who have an interest in leadership or already hold leadership positions and want to enhance their learning. During the year, we plan to hold several workshops, both in-person and web-based, focusing



Lisa LaVange

Photo by Jon Gardiner  
UNC-Chapel Hill

on a range of skills. Information can be found at <https://sites.google.com/view/leadershipinstitute/home>. One module will emphasize the importance of developing business acumen as a core leadership competency, and we plan to draw upon Aarti's expertise in building this module.

Another learning module we plan to build as part of the year-long experience involves diversity, considered from two aspects: (i) as statistical leaders, we need to recognize cultural differences among those we lead and to be aware of and learn to manage those differences for more effective leadership and (ii) as a society, we need to recognize there are cultural differences in our attitudes toward leadership and learn how to develop strong and effective leaders for our profession in light of these differences.

One of my good friends and colleagues who exemplifies what it means to be a leader in a global and diverse world is William (Bill) Wang. Bill traveled from China to Philadelphia to study for his PhD in statistics at Temple University and, after graduation, joined Merck, where he worked for many years. In 2007, he returned to China and built the statistical organization for Merck in Beijing. He became instrumental in developing the statistical community of the Drug Information Association (DIA) in China and served on the DIA Global Community Leadership Council. In 2017, Bill received the DIA Inspire Award for Global Connector, recognizing his "meritorious service through a leadership role that has advanced the mission of DIA and promoted global collaborations in order to advance health care products to patients." Here is what Bill has to say about statistical leadership from a global perspective:

We are living in a diverse and interconnected world.

The interconnections across functional or geographical boundaries are becoming key sources of innovation and collaboration. Speaking from my personal experience, innovation and collaboration are happening in the ASA Safety Working Group (of the Biopharmaceutical Section) through our close collaboration with the global DIA Safety Communities; they are happening in the multi-functional and multi-regional International Council of Harmonisation E17 expert working group.

[John] Tukey said statisticians can play in everybody's backyard. Our functional capabilities of dealing with uncertainty and ambiguity in diverse settings offer us tremendous leadership opportunities. Together, we can turn our backyard play into a whole block party!

When I thought about colleagues who could help develop the leadership and global diversity training module for the ASA, is it any surprise I turned to Bill? I am excited about building both leadership modules and look forward to the training they will provide for years to come.

Embracing diversity from a training standpoint is infinitely more enjoyable than having to react to a lack of sensitivity to diversity, but that is what I will talk about next.

Those of us coming of age during the 1960s are no strangers to the challenges that result from a lack of diversity in the workplace. For me, the challenge was being female in a field largely dominated by men. If someone told me early in my career we would still be facing sex discrimination or intimidation in this decade of this century, I would not have believed it.

But here we are. So, can we learn from our collective past to finally right this wrong? I hope so. The ASA hopes so. And we have a task force set up to do just that.

Last November, the ASA Board unanimously approved a task force on sexual harassment and asked Leslie McClure to chair. The task force was proposed in response to conversations among attendees at the 2017 Women in Statistics and Data Science conference. A month later, urgency was added to the process with a blog posting about misguided behavior at a professional statistical meeting.

In seeking members for the task force, my goal was to build a balanced group. We have representation from former board members, including a past ASA president, to speak from a governance standpoint; a survey research expert to guide data collection; statisticians working in each of our three major sectors to discuss differences in work environments; and women of different generations, reflecting different work experiences.

The task force has begun its work, and Leslie's report as chair will be featured in the June issue of *Amstat News*. In the meantime, I wanted you to be aware that the ASA is indeed responding to the disturbing reports of last winter and will do everything possible to ensure our members are, and feel, safe at all ASA events.

In developing leaders and taking leadership in addressing sexual harassment and other inappropriate behaviors, the ASA is following the advice of the JSM 2018 theme: #LeadWithStatistics.

Lisa LaVange

# Census, NIH, NSF Among Winners in FY18 Federal Budget

*FY19 Budget Process Just Underway*

Steve Pierson, ASA Director of Science Policy

After two short government shutdowns, a February deal between Congress and the administration raising the spending caps allowed the resolution of the fiscal year 2018 (FY18) budget in late March. Research-funding agencies and the US Census Bureau were among the entities benefitting most. Shortly after the deal, the administration released its FY19 budget request with hastily amended levels to account for the increased spending caps.

## FY18 Final Budget

The additional discretionary funding provided in the February deal allowed Congress to generally reject the widespread cuts proposed in the FY18 administration request (<https://bit.ly/2s2WMBQ>) and go above the levels approved in their summer 2017 bills.

The FY18 omnibus bill has a \$1.36 billion increase (93%) to \$2.81 billion for the US Census Bureau, a much-needed increase as

the bureau prepares for the decennial census in 23 months.

The amount is a welcome surprise because the House and Senate levels released last summer were only \$1.5 billion and the modified administration request was only \$1.7 billion. Advocates are praising the bipartisan effort—led by Sen. Richard Shelby (R-AL), Sen. Jeanne Shaheen (D-NH), Rep. John Culberson (R-TX), and Rep. Jose Serrano (D-NY)—to achieve this level at a crucial stage when

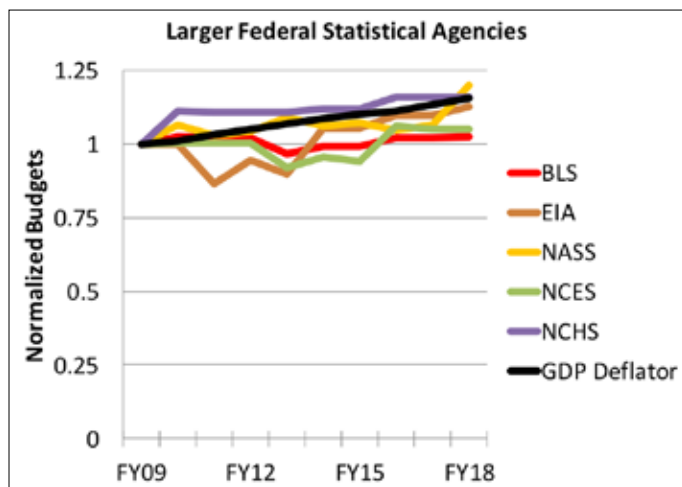
	FY15	FY16	FY17	FY18		FY19	
				Final	Change from FY17	Request	Change from FY18
<b>Research Agency (amounts in millions of dollars)</b>							
NIH*	30311	32311	34229	37084	8.3%	34767	-6.2%
NSF	7344	7463	7472	7767	4.0%	7472	-3.8%
AHRQ	364	334	324	334	3.1%	256	-23.4%
FDA	2597	2730	2771	2812	1.5%	3524	25.3%
<b>Statistical Agency (amounts in millions of dollars)</b>							
BEA	96.3	105.1	103.8	99.0	-4.9%	98.0	-1.0%
BJS	41.0	41.0	45.5	48.0	5.5%	41.0	-14.6%
BLS	592.2	609.0	609.0	612.0	0.5%	609.0	-0.5%
BTS	26.0	26.0	26.0	26.0	0.0%	26.0	0.0%
Census	1088.0	1370.0	1457.0	2814.0	93.1%	3797.0	34.9%
EIA	117.0	122.0	122.0	125.0	2.5%	115.0	-8.0%
ERS	85.4	85.4	86.8	86.8	0.0%	45.0	-48.1%
NASS	172.4	168.4	171.2	191.7	12.0%	165.0	-13.9%
NCES	232.1	261.0	258.5	258.5	0.0%	261.5	1.2%
NCHS	155.4	160.4	160.4	160.4	0.0%	155.0	-3.4%
NCSES	58.3	58.3	59.7			59.8	
ORES	29.0	25.9	24.0	31.0	29.2%	31.0	0.0%
SOI	36.8	37.8	34.3	33.6	-2.0%	35.2	4.8%

**Table—FY15–FY18 Budgets and FY19 Requests for NIH, NSF, AHRQ, FDA, and the 13 Primary Federal Statistical Agencies**

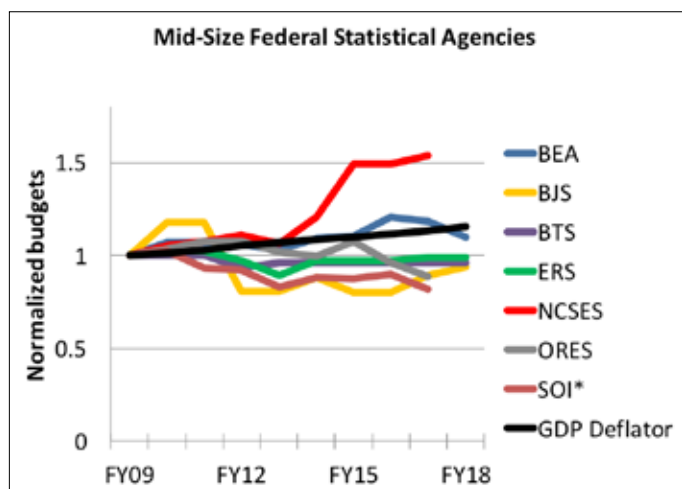
*\*The FY15, FY16, and FY17 levels for NIH are program levels.*



**Figure 1:** The budgets of five larger statistical agencies normalized to their FY09 levels, 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 period.



**Figure 2:** 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 period. One-time moving costs in FY16 for BEA are also omitted.



the advertising and partnership campaigns must begin.

The National Institutes of Health (NIH) is also a big winner, with a \$3 billion increase (8.8%) over FY17 to \$37 billion, exceeding the prior House and Senate increases of approximately \$1 billion and \$2 billion, respectively. The omnibus bill has a welcome 4% increase for the National Science Foundation (NSF) to \$7.87 billion in FY18, thanks to the afore-mentioned congressional leaders.

The omnibus bill flat funds the Bureau of Labor Statistics (BLS), National Center for Health Statistics (NCHS), National Center for Education Statistics (NCES), and Economic Research Service (ERS) and cuts the Bureau of Economic Analysis

(BEA) 7.5%—levels that are disappointing considering the role of these agencies to our data infrastructure, which is so critical to US economic prosperity and competitiveness.

The FY18 levels for BLS and NCHS are especially concerning because these two agencies remain at their FY10 levels (as shown in Figure 1), thereby jeopardizing their programs, ability to innovate, and capacity to keep up with the changing economy (e.g., effects of gig economy, AI, robotics) and societal trends.

Returning to more encouraging news, the omnibus bill provides a 12% boost to the National Agricultural Statistics Service (NASS) for the quinquennial Census of Agriculture and small boosts to the Bureau

of Justice Statistics (BJS) (5.5%) and Energy Information Administration (EIA) (2.5%).

Congress also rejected the administration's proposed FY18 cuts to forensic science research and programs at the National Institute of Standards and Technology (NIST) (<https://bit.ly/2GTk4bV>), adopting the Senate language to maintain these programs. The bill also funds the Agency for Healthcare Research and Quality (AHRQ) at \$334 million, restoring it to its FY16 level after a \$10 million cut in FY17 and attempts by the administration and House to cut its budget in FY18. Both AHRQ and NIST's forensic science work are slated for cuts in the administration's FY19 budget request.

Details are forthcoming for the FY18 budgets of the Internal Revenue Service Statistics of Income Division (SOI); National Center for Science and Engineering Statistics (NCSES); and the Social Security Administration Office of Research, Evaluation, and Statistics (ORES), though estimated FY18 budget levels were inserted at page proof stage as available.

The Bureau of Transportation Statistics (BTS) is not funded through the normal appropriations process—but by the Highway Trust Fund—and so is not influenced by either the FY18 budget deal or the FY19 request.

Turning to longer-term trends—already discussed for BLS and NCHS—one can see in Figures 1 and 2 that several other agencies have lost purchasing power since FY09, including BJS, BTS, ERS, NCES, ORES, and SOI. As pointed out last year, the FY17 SOI budget is off more than 20% in purchasing power since FY12, resulting in delayed release of some products, reductions of the content



of other products, and hampered efforts to modernize data dissemination practices.

## President's FY19 Requested Budget

The administration's fiscal year 2019 (FY19) budget was released February 12. Besides the increase proposed for the US Census Bureau and the 50% cut to the ERS, the proposal would generally cut or flat fund the federal statistical agency budgets as seen in Table 1. For NASS specifically, the quinquennial Census of Agriculture is fully funded, but the agricultural estimates programs are nearly \$15 million below what is needed to maintain current programs and continue critical modernization efforts.

The request holds the NSF and NIH close to their FY17 levels (<https://bit.ly/2HaucDQ>), which is relatively welcome news given the large cuts proposed for the two agencies in FY18 (<https://bit.ly/2IKFxtL>). The administration was on track to again request large cuts to the two agencies in FY19, but amended their request (<https://bit.ly/2HizzmT>) after the FY18 and FY19 budget deal with Congress that raised the budget caps.

The administration again proposes to cut substantially the budget for AHRQ and to fold AHRQ into NIH. The FY19 request has a 25% increase for the US Food and Drug Administration (FDA) discretionary budget authority, mostly for its medical product work.

Many federal statistical agencies are facing critical staffing, program, and other budget challenges because of years of stagnant budgets. As a result, it remains critical for the statistical and broader community to urge their members of congress to adequately fund these programs, the cornerstones of our data infrastructure and evidence-based policymaking. ■

## Years of Stagnant Funding Impact BLS, NCHS

Flat budgets for the National Center for Health Statistics (NCHS) over many years have affected the agency's ability to support existing and ongoing data collections that monitor the opioid epidemic, track change in health care use, and chart the prevalence of a wide range of health conditions and risk factors. Funding limitations have also resulted in staffing level cuts of almost 20%. Even more serious effects of the NCHS budgets will be felt in future years because NCHS's ability to invest in innovation has been severely curtailed such that the agency is not able to make advances in the collection of electronic health records, the use of portable health measurement devices, and the securing of more detailed information from our vital records.

Without careful methodical innovation, experts caution NCHS will not be able to provide critical information about health and health care in the coming years. To make this point to *Politico's* Danny Vinik in fall 2017, NCHS Director Charles Rothwell said, "It's like driving an Indy car. We keep messing around with the engine, but maybe we ought to replace the engine at some point."

The situation is equally troubling for Bureau of Labor Statistics (BLS), whose approximate loss in purchasing power is \$80 million since FY09 and whose budget also saw a 5% cut in the intervening years. As a result, BLS advocates in the business and economic sectors have been stating a much higher level of urgency when making the case for its budget. Erica Groshen, 2013–2017 BLS commissioner, recently summarized the situation for a forthcoming *Business Economics* article:

To adjust temporarily, the BLS has slowed improvements, delayed training, cut research, and left vacancies unfilled. The agency can recover from such adjustments if funding is restored in subsequent years. However, this underfunding is not sustainable:

- First, the BLS cannot devote enough staff, data purchases, IT hardware, and software to better cover emerging economic trends (including the growing service sectors and the gig and digital economies) and expand use of "big data." This is the path to *irrelevance*.
- Second, short staffing risks *serious errors or last-minute delays* in major statistical releases. Less training, outdated equipment and software, and fewer backups raise risks from mistakes and unforeseen events. This has not happened yet—thanks to BLS staff—but on this path it will, sooner or later.

If the decline in funding is not reversed, to avoid irrelevance and operational failures, the BLS must cut or shrink its existing programs. Across-the-board cuts generally do not work for the BLS, as this approach jeopardizes the quality of all BLS data. Instead, the BLS strategic approach is to eliminate specific product lines or entire surveys in order to maintain the quality and relevance of the remaining base programs. When deciding on program reductions, the BLS has protected its Principle Federal Economic Indicators (PFEI) and the programs that are written into or referenced by law for allocation or other purposes. Together, these prioritized programs account for more than 85% of the BLS budget. The remaining programs (the National Longitudinal Survey, JOLTS, American Time Use Survey, Census of Fatal Occupational Injuries, and Employee Benefits Survey) provide unique information on causes and effects of labor market outcomes and account for less than 10% of the budget. Cross program technical and management activities account for the remainder. In any event, even elimination of all the non-PFEI and non-legally required and referenced programs would be insufficient to fund the budget shortfall.

Other federal statistical agencies are also feeling the effect of flat budgets going back many years.

### MORE ONLINE

Follow the FY19 budget developments at <https://bit.ly/2HaucDQ> and <https://bit.ly/2GwaDbS>.

## CHANCE HIGHLIGHTS

# Special Issue Looks at Statistics Behind Defense and National Security

Scott Evans, *CHANCE* Magazine Executive Editor

**T**hreats to national security come in many forms. In 2016, Russians hacked the United States election. On September 11, 2001, 19 militants associated with the extremist group al-Qaeda hijacked four airplanes, killing nearly 3,000 people. In the 1990s, President Bill Clinton was convinced the global spread of AIDS was reaching catastrophic dimensions and formally designated HIV a threat to United States national security since it could threaten the stability of foreign governments, touch off ethnic wars, and undo recent advances in building free-market democracies abroad.

Defense and national security is the theme of *CHANCE* 31(2), a special issue. Six articles discuss various aspects of national security and how statistics is playing a key role in addressing various issues. **David Banks** and **Alyson Wilson** served as guest editors for this issue.

In the first article, **Laura Freeman** and **Catherine Warner** discuss implementing statistical design and analysis in the evaluation of the Department of Defense (DoD) operational systems in “Informing the Warfighter—Why Statistical Testing Methods Matter in Defense Testing.” **Ron Fricker** and **Steven Rigdon** then discuss surveillance methods applied to detecting and tracking deadly diseases such as influenza (swine flu or bird flu), Ebola, Zika, or SARS. Banks discusses how adversarial risk analysis, a modeling strategy that incorporates an opponent’s reasoning, can be applied to a

range of problems in counterterrorism. **Douglas Ray** and **Paul Roediger** then discuss adaptive testing of DoD systems with a binary response. The evolution of statistical modeling of military recruiting is the topic of an article by **Samuel Buttrey**, **Lyn Whitaker**, and **Jonathan Alt**. **Susan Sanchez** discusses the use of data farming, using tools and techniques for the design and analysis of large simulation experiments, as applied to defense problems.

In an independent article, **Beverly Wood**, **Megan Mocko**, **Michelle Everson**, **Nick Horton**, and **Paul Velleman** evaluate clarifications and updates to the six recommendations for teaching from the original, foundational *GAISE College Report*. They consider evolutions affecting the teaching and practice of statistics, including the rise of data science, an increase in the number of students studying statistics, increasing availability of data, and advances in science and technology. They discuss how the original recommendations can be clarified by acknowledging these developments.

In the Odds of Justice column, **Mary Gray** evaluates the death penalty and the role statistics is playing and can play in evaluating its appropriateness. In Visual Revelations, **Howard Wainer** and **Michael Friendly** take a historical look at visualization and the profound impact visual communication has had, going back to ancient civilizations.

All ASA members have access to *CHANCE* online by logging in to members only and clicking on ASA publications. ■



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# Princeton Graduate Student Awarded ASA/AAAS Mass Media Fellowship



Irineo Cabrerros

Irineo Cabrerros, a fourth-year PhD student at Princeton with John Storey, has been selected as the ASA's 2018 AAAS Mass Media Science & Engineering Fellow (MMF). He will spend 10 weeks this summer training as a science journalist with *Slate* in its NYC offices.

Cabrerros' primary research interests are in population genetics, causal inference, and the interplay between the two to harness genetic diversity to understand gene function. He earned a bachelor's degree in physics from Harvard University and a Master of Music degree from the New England Conservatory.

Among Cabrerros' passions is teaching science, both in the classroom and through writing. He has taught Namibian middle-schoolers, Ivy League undergraduates, prison inmates, and just



ADVANCING SCIENCE, SERVING SOCIETY

about everyone in between. He also contributes to the Massive Science Consortium, where he writes about the perils of statistical fallacy. Aside from science, he loves dancing, making and listening to music, playing sports, being outside, and watching "Planet Earth." As an indication of his musical talent, he is a recipient of the Jack Kent Cooke Young Artist Award and a two-time performer on NPR's "From the Top."

In his fellowship application materials, Cabrerros wrote that statistics and journalism have much to learn from each other; journalists require statistical literacy for faithful reporting while statisticians require journalistic skills to convey their work to the broad community that uses it. Noting that statistics is a notoriously confusing subject, he commented that many people who aren't experts in statistics—including scientists—need to understand statistics to do their jobs well and the possible consequences from mishandling

and misunderstanding statistics can be devastating. Cabrerros wrote that he would like to contribute to more "statistically minded journalism."

The ASA joined the AAAS Mass Media Fellowship sponsorship programs in 2017 to expand its efforts to promote statistical capacity in reporting and provide statisticians with more media experience. The ASA Committee for Excellence in Statistical Reporting evaluated candidates.

The ASA's 2017 fellow, Nick Thieme, also spent 10 weeks with *Slate* in its NYC and DC offices, publishing more than 20 pieces. He also wrote two engaging pieces for *ThisIsStatistics*, including "Stats in Action: 3 Data Journalism Skills I'll Take Back to Grad School" (<http://thisisstatistics.org/?s=thieme>).

A call for 2019 fellows will be issued this fall. Find out more about the ASA/AAAS Mass Media Fellowship by visiting the AAAS website at [www.aaas.org/page/about-1](http://www.aaas.org/page/about-1). ■



# 2017–2018 Academic Salary Survey

Patricia Hall, Medical College of Georgia; Varghese George, Augusta University; and Donna LaLonde and Ron Wasserstein, ASA

The 2017–2018 academic salary survey includes both faculty and nonfaculty statisticians and biostatisticians. We received responses from 68 institutions in the United States. The data included 1,289 faculty and 148 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 840 males, 448 females, and 1 who identified as transgender—included faculty members in 32 statistics departments (N = 629), 26 biostatistics departments (N = 537), and 17 mathematical sciences departments (N = 123).

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. A few cases of statistics and mathematical sciences faculty with 12-month salaries were adjusted down by a factor of one-fourth, and a few cases of biostatistics faculty with nine-month salaries were adjusted up by a factor of one-third. 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 included 148 observations from 22 institutions, with 24 observations at the doctoral level and 124 at the master's level. Of the 148 individuals, there were 133 from biostatistics departments, 14 from statistics departments, and 1 from mathematical sciences. Table 7 provides their salary distribution, stratified by highest degree (master's or doctorate) and years since obtaining the highest degree.

**Table 1—**  
2017–2018  
Academic Faculty  
in Statistics  
Departments  
by Rank and Years  
in Rank, Based on  
9-Month Salary

Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0-2	29	\$112,501	\$121,752	\$131,956	\$180,739
	3-5	42	\$118,647	\$135,908	\$166,100	\$203,165
	6-9	26	\$121,701	\$136,618	\$192,500	\$252,450
	10-16	51	\$127,800	\$154,700	\$181,505	\$236,346
	17+	86	\$140,403	\$163,191	\$198,326	\$263,566
	All	234	\$123,108	\$148,368	\$186,739	\$241,346
Associate Professor	0-1	28	\$94,734	\$106,884	\$118,950	\$140,000
	2-3	36	\$91,862	\$103,044	\$121,016	\$142,802
	4-6	42	\$93,959	\$101,805	\$105,000	\$126,466
	7+	39	\$85,125	\$97,495	\$110,241	\$126,902
	All	145	\$90,992	\$102,142	\$111,529	\$140,000
Assistant Professor	0-1	55	\$79,950	\$90,247	\$98,000	\$101,300
	2-3	61	\$77,450	\$90,366	\$100,000	\$109,250
	4-5	49	\$84,050	\$93,845	\$97,421	\$104,313
	6+	10	\$86,779	\$95,977	\$100,859	\$118,103
	All	175	\$81,947	\$92,004	\$97,992	\$105,500
Instructor	All	75	\$53,938	\$63,160	\$75,702	\$94,216
<b>All Ranks</b>	<b>All</b>	<b>629</b>	<b>\$87,125</b>	<b>\$102,687</b>	<b>\$137,700</b>	<b>\$181,505</b>

Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
<b>Professor</b>	0-2	32	\$163,165	\$184,135	\$197,410	\$240,000
	3-5	47	\$173,002	\$185,861	\$213,790	\$230,000
	6-9	28	\$177,155	\$185,000	\$206,970	\$253,900
	10-16	51	\$194,133	\$208,633	\$267,604	\$347,879
	17+	52	\$197,038	\$233,373	\$272,908	\$316,872
	All	210	\$177,576	\$198,435	\$233,513	\$279,545
<b>Associate Professor</b>	0-1	26	\$120,450	\$141,299	\$150,000	\$155,880
	2-3	36	\$132,443	\$139,571	\$153,216	\$170,424
	4-6	48	\$125,410	\$144,125	\$153,542	\$167,198
	7+	46	\$132,154	\$146,257	\$163,276	\$181,496
	All	156	\$129,016	\$143,091	\$153,542	\$167,199
<b>Assistant Professor</b>	0-1	46	\$105,000	\$110,000	\$116,000	\$129,000
	2-3	44	\$106,000	\$109,252	\$118,000	\$131,028
	4-5	32	\$107,875	\$113,570	\$123,076	\$131,028
	6+	31	\$102,090	\$114,348	\$127,749	\$133,587
	All	153	\$105,315	\$110,000	\$121,141	\$131,028
<b>Instructor</b>	All	18	\$72,100	\$81,765	\$96,968	\$98,838
<b>All Ranks</b>	<b>All</b>	<b>537</b>	<b>\$115,586</b>	<b>\$146,389</b>	<b>\$187,140</b>	<b>\$233,233</b>

**Table 2—**  
2017–2018 Academic Faculty in Biostatistics Departments by Rank and Years in Rank, Based on 12-Month Salary

Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
<b>Professor</b>	45	\$97,230	\$111,531	\$131,700	\$156,028
<b>Associate Professor</b>	39	\$78,742	\$87,105	\$96,073	\$103,100
<b>Assistant Professor</b>	29	\$69,923	\$78,460	\$92,175	\$108,200
<b>Instructor</b>	10	\$51,862	\$57,132	\$65,541	\$71,479
<b>All Ranks</b>	<b>123</b>	<b>\$76,752</b>	<b>\$89,854</b>	<b>\$107,810</b>	<b>\$131,700</b>

**Table 3—**  
2017–2018 Academic Faculty in Mathematical Sciences Departments by Rank, Based on 9-Month Salary

**Table 4—**  
2017–2018 Academic  
Faculty in Statistics  
Departments  
by Rank, Years  
in Rank, and Gender,  
Based on 9-Month  
Salary

Rank	Years in Rank	Gender	N	1st Quartile	Median	3rd Quartile	90th Percentile
<b>Professor</b>	0-6	Female	29	\$112,500	\$123,348	\$145,294	\$203,165
		Male	54	\$117,905	\$132,154	\$164,360	\$213,110
	7+	Female	15	\$134,720	\$155,508	\$218,000	\$252,450
		Male	136	\$133,611	\$159,497	\$191,000	\$253,588
	All	Female	44	\$114,651	\$130,432	\$185,688	\$220,000
		Male	190	\$125,987	\$152,824	\$186,739	\$242,167
<b>Associate Professor</b>	0-2	Female	15	\$89,500	\$101,247	\$112,695	\$120,000
		Male	34	\$90,750	\$106,884	\$123,586	\$140,000
	3+	Female	35	\$90,992	\$98,362	\$104,550	\$126,466
		Male	61	\$91,118	\$102,904	\$108,977	\$142,802
	All	Female	50	\$90,992	\$99,855	\$106,746	\$120,850
		Male	95	\$90,750	\$103,363	\$114,365	\$142,802
<b>Assistant Professor</b>	0-2	Female	33	\$72,000	\$85,000	\$95,000	\$110,000
		Male	57	\$80,800	\$90,366	\$97,000	\$100,511
	3+	Female	28	\$84,219	\$93,015	\$96,386	\$109,250
		Male	57	\$84,500	\$95,004	\$100,363	\$115,099
	All	Female	61	\$77,358	\$88,482	\$95,582	\$109,250
		Male	114	\$82,617	\$92,847	\$98,756	\$104,600
<b>Instructor</b>	All	Female	45	\$52,000	\$60,900	\$73,044	\$95,921
		Male	29	\$57,823	\$66,684	\$75,702	\$90,045
		Transgender	1	\$94,216	\$94,216	\$94,216	\$94,216

**Table 6—**  
2017–2018  
Academic Faculty  
in Mathematical  
Sciences Departments  
by Rank and  
Gender, Based on  
9-Month Salary

Rank	Gender	N	1st Quartile	Median	3rd Quartile	90th Percentile
<b>Professor</b>	Female	9	\$78,713	\$97,230	\$105,000	\$111,019
	Male	36	\$101,284	\$115,556	\$141,554	\$165,600
<b>Associate Professor</b>	Female	14	\$71,599	\$85,207	\$94,932	\$104,114
	Male	25	\$80,000	\$89,412	\$96,605	\$102,995
<b>Assistant Professor</b>	Female	10	\$70,000	\$79,230	\$89,000	\$105,384
	Male	19	\$69,923	\$77,357	\$96,500	\$108,200
<b>Instructor</b>	Female	7	\$56,473	\$63,256	\$67,851	\$75,106
	Male	3	\$50,000	\$51,000	\$51,862	\$51,862



Rank	Years in Rank	Gender	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0-6	Female	31	\$165,000	\$188,533	\$203,679	\$230,000
		Male	53	\$170,000	\$184,370	\$213,417	\$240,000
	7+	Female	33	\$180,000	\$196,368	\$230,205	\$254,475
		Male	93	\$187,483	\$211,737	\$269,940	\$325,333
	All	Female	64	\$175,375	\$189,313	\$222,853	\$240,000
		Male	146	\$178,110	\$201,751	\$244,333	\$294,023
Associate Professor	0-2	Female	20	\$123,522	\$133,500	\$146,318	\$149,700
		Male	26	\$137,572	\$144,769	\$153,972	\$163,000
	3+	Female	48	\$125,771	\$142,209	\$153,542	\$166,536
		Male	62	\$132,885	\$145,219	\$158,453	\$170,755
	All	Female	68	\$125,410	\$140,369	\$151,842	\$165,631
		Male	88	\$133,402	\$145,123	\$155,954	\$170,195
Assistant Professor	0-2	Female	26	\$105,060	\$108,884	\$116,000	\$129,000
		Male	46	\$105,000	\$110,000	\$118,450	\$129,000
	3+	Female	38	\$104,314	\$114,174	\$125,492	\$131,485
		Male	43	\$106,500	\$110,331	\$127,749	\$133,587
	All	Female	64	\$105,030	\$111,562	\$120,594	\$130,810
		Male	89	\$105,500	\$110,000	\$122,000	\$131,028
Instructor	All	Female	12	\$73,925	\$81,765	\$96,855	\$98,838
		Male	6	\$63,000	\$86,113	\$96,968	\$97,706

**Table 5—**  
2017–2018  
Academic Faculty  
in Biostatistics  
Departments  
by Rank, Years  
in Rank, and  
Gender, Based on  
12-Month Salary

Highest Degree	Years Since Highest Degree	N	1st Quartile	Median	3rd Quartile	90th Percentile
Master's	0-2	24	\$61,410	\$62,915	\$67,229	\$80,609
	3-5	20	\$60,704	\$65,713	\$72,250	\$82,553
	6-9	17	\$69,779	\$75,346	\$76,853	\$79,546
	10-15	29	\$72,576	\$81,588	\$86,940	\$97,920
	16+	34	\$83,121	\$91,616	\$113,689	\$126,085
	All	124	\$65,063	\$75,346	\$86,940	\$97,920
Doctorate	All	24	\$70,963	\$83,266	\$91,997	\$101,289

**Table 7—**  
2017–2018  
Academic  
Nonfaculty  
Statisticians\*  
by Highest  
Degree, Based on  
12-Month Salary

\*Includes 133 from  
biostatistics, 14  
from statistics, and  
1 from mathematical  
sciences departments.

**Table 8—**  
2017–2018  
Academic Faculty  
in Statistics  
Departments  
by Tenure Status,  
Rank, and Years  
in Rank, Based on  
9-Month Salary

Tenured or Tenure Track						
Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0-3	39	\$115,500	\$126,466	\$170,000	\$205,553
	4-7	40	\$119,453	\$133,596	\$173,075	\$229,428
	8-14	46	\$124,415	\$152,470	\$179,288	\$236,346
	15-20	38	\$142,531	\$167,393	\$200,000	\$241,346
	21+	60	\$139,431	\$161,865	\$200,413	\$267,125
	All	223	\$124,206	\$148,698	\$188,675	\$242,987
Associate Professor	0-2	43	\$93,396	\$106,000	\$121,700	\$135,323
	3-5	49	\$99,478	\$103,932	\$108,977	\$143,430
	6+	45	\$87,900	\$97,206	\$106,700	\$122,532
	All	137	\$92,203	\$102,153	\$112,695	\$140,000
Assistant Professor	0-2	62	\$87,125	\$92,886	\$100,000	\$109,250
	3+	73	\$89,375	\$95,553	\$100,363	\$111,650
	All	135	\$88,000	\$94,850	\$100,000	\$110,700
<b>All Ranks</b>	<b>All</b>	<b>495</b>	<b>\$95,723</b>	<b>\$111,803</b>	<b>\$146,697</b>	<b>\$192,708</b>

Non-Tenure Track (All Years)					
Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	11	\$90,545	\$112,500	\$163,000	\$164,360
Associate Professor	8	\$72,204	\$79,759	\$96,820	\$120,000
Assistant Professor	40	\$52,000	\$72,098	\$82,566	\$85,723
Instructor	75	\$53,938	\$63,160	\$75,702	\$94,216
<b>All Ranks</b>	<b>134</b>	<b>\$54,000</b>	<b>\$70,000</b>	<b>\$84,050</b>	<b>\$97,393</b>

**Table 9—**  
2017–2018  
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	29	\$174,173	\$185,861	\$198,038	\$240,000
	4-7	32	\$177,497	\$200,457	\$219,107	\$253,900
	8-14	31	\$198,289	\$211,473	\$269,940	\$350,000
	15+	55	\$198,492	\$233,513	\$279,912	\$330,289
	All	147	\$183,900	\$208,633	\$250,000	\$296,000
Associate Professor	0-2	24	\$133,427	\$144,650	\$153,000	\$155,880
	3+	57	\$128,750	\$145,008	\$157,166	\$170,755
	All	81	\$129,281	\$145,000	\$154,018	\$169,700
Assistant Professor	0-2	42	\$106,080	\$110,000	\$120,000	\$129,000
	3+	35	\$106,500	\$113,988	\$127,600	\$132,372
	All	77	\$106,500	\$110,000	\$120,000	\$130,810
<b>All Ranks</b>	<b>All</b>	<b>305</b>	<b>\$123,500</b>	<b>\$158,453</b>	<b>\$204,516</b>	<b>\$265,867</b>

Non-Tenure Track						
Rank	Years in Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	0-5	25	\$157,751	\$179,867	\$196,732	\$221,682
	6+	38	\$173,940	\$183,964	\$212,736	\$231,750
	All	63	\$165,000	\$180,000	\$212,736	\$228,786
Associate Professor	0-2	22	\$120,450	\$136,860	\$147,636	\$153,264
	3+	53	\$132,154	\$142,776	\$154,325	\$166,238
	All	75	\$128,354	\$140,000	\$153,264	\$165,631
Assistant Professor	0-2	30	\$101,000	\$108,691	\$115,586	\$127,850
	3+	46	\$103,779	\$112,949	\$125,529	\$131,506
	All	76	\$101,614	\$110,261	\$121,331	\$131,506
Instructor	All	18	\$72,100	\$81,765	\$96,968	\$98,838
All Ranks	All	232	\$110,261	\$132,520	\$164,751	\$194,690

**Table 9—**  
2017–2018  
(continued)

Tenured or Tenure Track					
Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	44	\$97,928	\$111,719	\$133,152	\$156,028
Associate Professor	37	\$80,000	\$89,412	\$96,073	\$103,100
Assistant Professor	28	\$69,962	\$78,461	\$93,288	\$108,200
All Ranks	109	\$78,713	\$93,012	\$110,200	\$139,508

**Table 10—**  
2017–2018  
Academic Faculty  
in Mathematical  
Sciences  
Departments  
by Tenure Status  
and Rank, Based  
on 9-Month Salary

Non-Tenure Track					
Rank	N	1st Quartile	Median	3rd Quartile	90th Percentile
Professor	1	\$67,214	\$67,214	\$67,214	\$67,214
Associate Professor	2	\$78,662	\$78,702	\$78,742	\$78,742
Assistant Professor	1	\$37,969	\$37,969	\$37,969	\$37,969
Instructor/ Lecturer	10	\$51,862	\$57,132	\$65,541	\$71,479
All Ranks	14	\$51,862	\$60,524	\$67,851	\$78,662





## Journal of Privacy and Confidentiality Moves to Cornell

*Editorial Board Accepting Papers from Multiple Disciplines*

The editorial office of the *Journal of Privacy and Confidentiality*—a multidisciplinary journal focused on the interface of social, computer, and statistical sciences—has migrated to Cornell University, where it is now managed by Lars Vilhuber at the Labor Dynamics Institute. The journal's new website can be found at [www.journalprivacyconfidentiality.org](http://www.journalprivacyconfidentiality.org).

In 2008, Cynthia Dwork of Harvard, Stephen Fienberg of Carnegie Mellon, and Alan Karr of RTI issued a call for papers on privacy and confidentiality to be published in a new journal—the *Journal of Privacy and Confidentiality*. The novelty of their call was that it was addressed to multiple, usually separate, constituencies. Statisticians, computer scientists, lawyers and social scientists, health researchers, and survey designers have all responded to the call over the years and been published in the journal.

In the editorial of the first issue, US Census Bureau Chief Scientist John Abowd, Kobbi Nissim of Georgetown University, and Chris Skinner of the London School of Economics noted that “Gargantuan online services gather petabytes of data on search queries, online purchases, email exchanges, [...] many data users from all of the fields listed above perform analyses that are conditioned on the privacy and confidentiality protections imposed on their work without all the means to assess the consequences of those measures on the inferences they have made.” Those concerns continue to resonate today.

For nearly seven years, Fienberg was the editor-in-chief of the journal. With his passing in 2016, the journal needed a new home. Vilhuber has assumed the role of managing editor and migrated the journal infrastructure to a new system (Open Journal System). Dwork, Karr, Nissim, and Abowd continue to serve on the editorial board. The Edmund Ezra Day Chair at Cornell University contributes funding to the journal's operating budget.

The journal is open access, and there is no submission fee. Academics and practitioners from all domains are invited to submit their papers at [www.journalprivacyconfidentiality.org/index.php/jpc/about/submissions](http://www.journalprivacyconfidentiality.org/index.php/jpc/about/submissions). ■



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STATISTICIAN'S VIEW

# Who Is the American Statistician? Or, Is It Data Scientist?

[John] Tukey started the statistics and data analysis reformation in his *Annals of Mathematical Statistics* publication, titled “The Future of Data Analysis.” More recently, David Donoho summarized the 50-year discussion of science and statistics, and the story of how data science was enabled through the marriage of technology in the form of the young discipline of computer science and the mature discipline of statistics was told by Gil Press in his *Forbes* piece, titled “A Very Short History of Data Science.” The name “data science” is now the discipline charged with utilizing Big Data. The role of statistics in data science is also an ongoing debate. Making sense of who is a Data Scientist and who is a Statistician has been debated by Scientists, Statisticians, Librarians, and Computer Scientists recently. However, after much debate, the definitions of Data Scientist, Statistician, Business Analyst, Master Data Manager, and Data Engineer—among others—are still in flux.

## Importance of Data Science to Job Growth

The economic importance of the emergence of data scientist as a job title is illustrated in LinkedIn’s 2017 US Emerging Jobs Report at <https://bit.ly/2IO3non>. Of the top 20 emerging jobs, Data Scientist is second on the list.

## What Skills Do Data Scientists Say They Have?

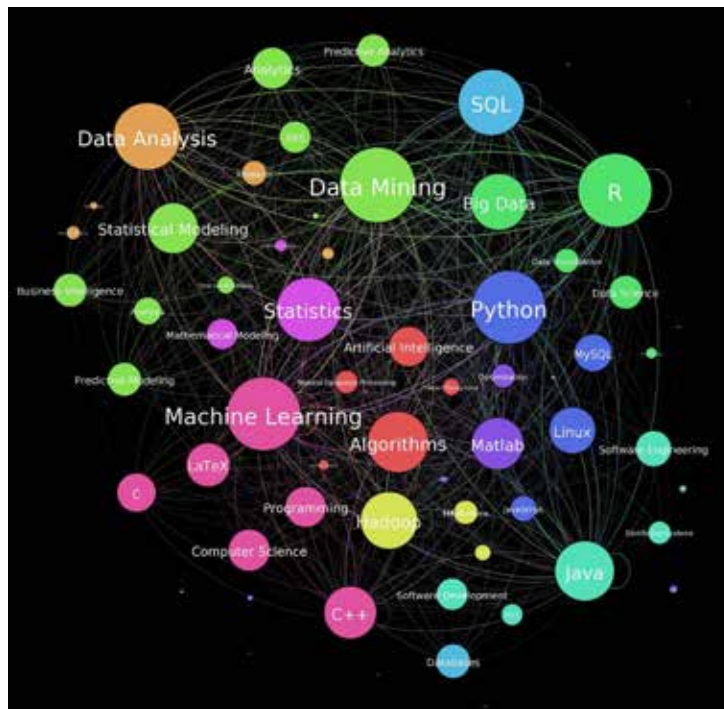
In an initial exploration of Data Science as a job title, Ferris Jumah looked at what skills people with the title “Data Scientist” have listed on their LinkedIn profiles and aggregated the top 10 skills by

occurrence after correcting the frequencies using TFIDF. In text retrieval, TFIDF is short for term frequency–inverse document frequency. It is a numerical statistic that reflects how important a word is to a document.

Jumah then created the top 10 frequency list in Table 1 and explored the relationships among these skills by representing and visualizing them as a network, shown in Figure 1.

**Table 1**—Top 10 Skills Listed by Data Scientists on LinkedIn

Most Popular Data Science Skills
Data Mining
Machine Learning
R
Python
Data Analysis
Statistics
SQL
Java
Matlab
Algorithms



**Figure 1:** Network of data scientist skills

Three themes common to the profiles are the following:

- Approach data with a mathematical mind set
- Use a common language to access, explore, and model data
- Develop strong computer science and software engineering backgrounds

In February 2015, Mark van der Laan wrote a “Dear *Amstat News*” letter taking the position that Statistics is a Science, not an art, and the way to survive is to realize that truth is at the heart of Data Science (<https://bit.ly/2GU9pDy>). In that position statement, van der Laan took exception to George Box’s well-known comment, “[A]ll

## ABOUT THE AUTHOR

**Michael Latta** holds a master’s degree and PhD in industrial and organizational psychology and statistics from Iowa State University. He is a professor in the department of marketing and hospitality, resort, and tourism in the Wall College of Business Administration at Coastal Carolina University. On the business consulting side, he is the executive director of YT MBA Research and Consulting, a firm specializing in new product development in international markets and predictive analytics.

models are wrong, but some are useful.” What Box actually wrote in the first iteration of this idea of scientific correctness was the following:

Since all models are wrong[,] the scientist cannot obtain a “correct” one by excessive elaboration. On the contrary[,] following William of Occam[,] he should seek an economical description of natural phenomena. Just as the ability to devise simple but evocative models is the signature of the great scientist[,] so overelaboration[,] and overparameterization is often the mark of mediocrity.”

What Box was really talking about in this classic article was the ideal balance between theory and practice, where the ‘Advancement of Learning’ involves ‘An Iteration Between Theory and Practice’ followed by ‘A Feedback Loop,’ which motivates true scientific discovery. However, the ideal balance was typically not in play and the real process showed flaws of imbalance. He named those flaws as follows:

The maladies which result may be called Cookbookery and Mathematistry. The symptoms of the former are a tendency to force all problems into the molds of one or two routine techniques, insufficient thought being given to the real objectives of the investigation or to the relevance of the assumptions implied by the imposed methods.

Mathematistry is characterized by development of theory for theory’s sake, which since it seldom touches down with practice, has a tendency to redefine the problem rather than solve it. Typically, there has once been a statistical problem with scientific relevance but this has long since been lost sight of.

Two responses to van der Laan’s letter also appeared as a “Dear *Amstat News*” letter, one from Michael Lavine and one from Christopher Tong (<https://bit.ly/2IKfEu8>). These letters were rebutted in a third letter by van der Laan. The real value of these three letters appeared in three comments that were later posted as part of a discussion.

One of these comments from Richard Browne describes a real-life legal situation, as follows:

One example from my experience comes to mind that points out the need for clarity, instead of perfection, in modeling. In an EEO litigation, the expert witness for those claiming racial discrimination in hiring (the plaintiffs) used simple regression and two-dimensional graphs. The defendant’s expert devised an exquisite regression model with over 50 parameters. In rendering his final judgement, the judge said (in simple words), “You, I understand (the plaintiff’s expert). You, I don’t understand (the defendant’s expert). I find for the plaintiffs.” In other words, a result that is truthful and useful to the client is often preferable to one that would charm our major professor, but leave the client confused.

Georgette Asherman made a second comment:

Statistics shouldn’t be an art, but it is definitely a craft. Most of us spend our time reducing complexity to simple techniques for people like the judge above who value simplicity, even when it might not be true. Yesterday, I spent an hour with a clinical researcher creating a graphic that would show the difference between a 2 x 2 contingency table and a ranking technique for blocked data. Our simple description was described as “too wordy.” Is either model

true? No. Is either useful? That is our current problem. Should we look to improve it? Yes.

The arguments about Statistics and Science may never end, but we already have jobs and professionals who define themselves as Data Scientists, which leads to a new question.

### Who Do Statisticians Say They Are?

One may legitimately ask, “Who do Data Scientists say they are?” At the 2017 Conference on Statistical Practice, this author presented a poster that was heavily discussed and commented upon there. In fact, it generated more traffic and discussion than most other posters at the conference.

That poster had the following purpose and goals. In August of 2015, the ASA published a statement on the Role of Statistics in Data Science. The purpose of that statement appears in its final sentence: “*The ASA aims to facilitate collaboration between statisticians and other data scientists and thus enable them to achieve more than they could on their own.*”

Ron Wasserstein, executive director of ASA, discussed the statement in his blog and outlined some of the ASA’s efforts to “*facilitate further collaboration between statisticians and other data scientists.*”

The poster was aimed at offering the audience an analysis of what Statisticians, Data Scientists, Data Engineers, and those practicing Predictive Analytics say about their jobs, relationships, and their roles. A further analysis of what ASA members say about these issues is summarized here.

### Data Collection

Data were collected from the ASA Connect Digest Online in a thread on the definition of Data Scientist posted from July 11, 2016, at 06:02 to July 28, 2016, at 09:04. There were 18



participants in the discussion, generating 35 posts. Two participants generated seven posts, five generated two posts, and 11 generated only a single post.

After collecting the data from the online blog, the analysis involved the usage of terms arising from recent controversies such as what are statistics, data science, predictive analytics, and data engineering being discussed at the time in the ASA Connect Digest Online. This online activity appeared in the ASA Blog Posts with the title *Data Science and Statistics*. The analysis was directed at learning about what the terms Data Science, Statistics, Analytics, and Data Engineering mean to facilitate 1) communication with clients, collaborators, and customers; 2) having a positive impact on clients and their business operations; and 3) having a positive impact on the organizations where those clients, collaborators, and customers live and work. The next step involved removing all capitalization and punctuation (with the exception of possessive apostrophes). The final step was to create a word cloud using the text and a program named Wordle ([www.wordle.net/create](http://www.wordle.net/create)).

### Data Visualization

The visualization of the text data is presented in Figure 2. Word clouds give greater prominence to the visualization of words that appear more frequently in the source text, where prominence is defined by size and location.

The participants in the blog typically signed off with only their names. However, some also named their identity with a title, as indicated in Table 2.

### It's All About the Data

Primarily, it's all about the data in both the ASA Connect Digest postings and the Data Science Network. Similarities between the ASA Connect Digest and the



Figure 2: Visualization of ASA blog posts

Data Science Network include the following:

- Data
- Big Data
- Data Mining
- Statistics

### Discussion

Tukey coined the term “bit,” which Claude Shannon used in his paper, “A Mathematical Theory of Communications.” In Tukey’s work, done for the Army Research Office and titled “The Future of Data Analysis,” Tukey foreshadowed the emergence of Data Science when he wrote the following:

For a long time[,] I thought I was a statistician, interested in inferences from the particular to the general. But as I have watched mathematical statistics evolve, I have had cause to wonder and doubt. ... I have come to feel that my central interest is in data analysis. ... Data analysis, and the parts of statistics which adhere to it, must ... take on the characteristics of science[,] rather than those of mathematics ... data analysis is intrinsically an empirical science. ... How vital and how important ... is the rise of the stored-program electronic computer? In many instances[,]

Table 2—Signature Identity Title

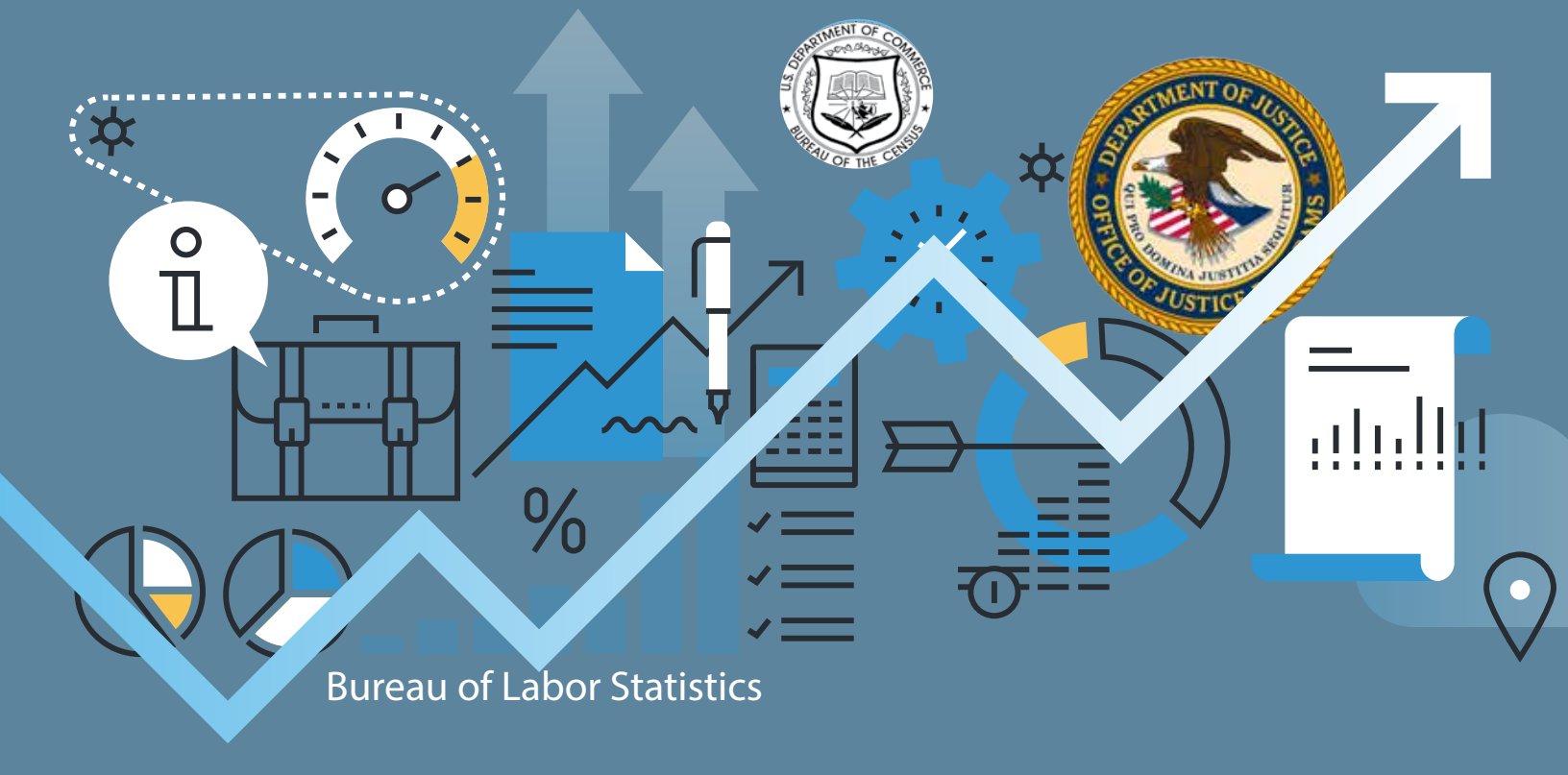
Student, M.S. in Applied Statistics
Director, Global Knowledge Services
Engagement Director Business Analytics
Statistician, Chemist
Consultant and Adjunct Associate Professor of Biostatistics
Principal Consultant
Senior Data Scientist
Principal Staff Scientist

the answer may surprise many by being “important but not vital,” although[,] in others[,] there is no doubt but what the computer has been “vital.”

Later, Tukey published his widely used text *Exploratory Data Analysis*, where he wrote the following:

[M]ore emphasis needs to be placed on using data to suggest hypotheses to test and that Exploratory Data Analysis and Confirmatory Data Analysis “can—and should—proceed side by side.”

It seems Data Scientists and Statisticians can coexist and work to advance methods of understanding data and perhaps practice science together. ■



Bureau of Labor Statistics



With a PhD in statistical astrophysics, **David Corliss** works in analytics architecture at Ford Motor Company while continuing astrophysics research on the side. He is the founder of Peace-Work, a volunteer cooperative of statisticians and data scientists providing analytic support for charitable groups and applying statistical methods to issue-driven advocacy in poverty, education, and social justice.

## STATS4GOOD

# Data Resources for Data for Good Researchers

**D**ata for Good research, of course, starts with data. Many projects begin with an existing relationship between the researcher and an organization that has data but needs statistical support to obtain the greatest good. As one becomes more familiar with the data and needs of the organization or cause, a natural progression in the analytical process is to consider, evaluate, and integrate data from other sources. While the researcher often begins with a paucity of useful data in-house, this can turn to an embarrassment of riches when other data sources are considered.

Many data sources are compiled by government agencies. While the federal government maintains a general-purpose search engine at [www.usa.gov](http://www.usa.gov), the data-focused website [Data.gov](http://Data.gov) is a more valuable resource, with a search engine for publicly available government data. More than 200,000 data sets can be searched.

One of the most important data sources for Data for Good researchers is the US Census Bureau. The main data page at [census.gov/data.html](http://census.gov/data.html) links to the main Census Bureau products. Census data can be

collected through the chief (decennial) census every 10 years, which collects a large amount of data of different kinds and tries to reach every person in the country. The American Community Survey (ACS) collects more detailed information than the decennial census, with a basic survey sample taken every year and a detailed survey taken every five years. The wealth of data in the ACS makes it an important source for Data for Good projects.

The American Fact Finder page ([census.gov/acs/www/data/data-tables-and-tools/american-factfinder](http://census.gov/acs/www/data/data-tables-and-tools/american-factfinder)) provides easy access to the ACS data sources. Both the decennial census and ACS are produced in a series of tables representing a particular area, such as demographics, economic data, and housing. The ACS also includes data on specific industries. Data can be downloaded free of charge, including whole tables, although some files may be broken into separate files by geographic characteristics such as “state.”

Census data is geocoded using FIPS codes for state, county, and census tract, so gaining a familiarity with these codes will facilitate use of the data. The FIPS codes can be separate fields, combined into a single

string as GEOID, or both. The Census Bureau strives to support many kinds of data consumers with different needs. This leads to some redundancy in the tables, so it's best to parse through it.

Most people may not think of the Census Bureau often, or they may only think of it in conjunction with its foremost commercial uses. As a person active in Data for Good projects, my colleagues and I have come to understand the Census Bureau data as a cornerstone of this important work. Learning to find, access, and manage government resources—especially Census Bureau data—is a valuable skill well worth cultivating, sharing with colleagues, and teaching to students.

State and local government agency sites also provide valuable data sources for local data. This is particularly true for crime data, as most localities have good data, not all of which is shared with the federal government. Data for good studies requiring crime data will do well to look at state and local sources. The same is true for environmental data and school- and district-level education data and outcomes. Data resources also exist for specific industries and areas of social concern. I am always surprised at what I can find, and data sources continue to grow in number and improve in quality.

Data for Good, of course, is more than the data. The software is available on an open source or free basis to support your work. Many people will be familiar with the open source analytic platform R. The base software and many packages can be accessed through the Comprehensive R Archive Network at [cran.r-project.org](http://cran.r-project.org). Because R is open source, it has been incorporated into many commercially available analytic packages. These offer the advantage of providing support through the maker of the commercial package and being integrated into other tools with which you may be familiar. However, proprietary platforms embedding R will only be able to support a limited number of packages; rarely used packages or those with specific uses may not be covered. RStudio ([rstudio.com](http://rstudio.com)) is a popular IDE, but is not open source for commercial purposes.

SAS offers University Edition ([sas.com/en\\_us/software/university-edition.html](http://sas.com/en_us/software/university-edition.html)), a free platform for professors, students, and non-commercial researchers. Some Data for Good researchers (including me) prefer SAS University Edition for its SAS environment and an end-to-end solution for data, analytics, and visualizations.

## Resources

### JSM Presentations

Going to JSM? Visit [ww2.amstat.org/meetings/jsm/2018](http://ww2.amstat.org/meetings/jsm/2018) and search for Data for Good to find 95 listings of presentations and other activities. On August 2 at 10:30 a.m., Jake Porway of DataKind will lead an invited session on data science for social good, with instructions and examples for setting up your own project.

### Student Instruction Packet

Peace-Work has developed a student instruction packet on gun violence research. Written for people in the first two years of a college or high-school AP Stats class, it describes a process for performing a local gun violence study. This is to support a number of local studies at the metro area, county, or state level investigating various dimensions of gun violence. Once a number of these studies are completed and published, meta-analysis can leverage them to contribute to a national picture of gun violence in the United States. The gun violence student instruction packet is available for free download at [peace-work.org/peace-work-studies](http://peace-work.org/peace-work-studies).

### Data Sources

- Bureau of Labor Statistics ([www.bls.gov](http://www.bls.gov)) for data on labor, employment, and unemployment and the Consumer Price Index and inflation
- Bureau of Economic Analysis ([www.bea.gov](http://www.bea.gov)) for macroeconomic data, including GDP and a wealth of industry-specific data
- National Weather Service ([www.ncdc.noaa.gov/data-access](http://www.ncdc.noaa.gov/data-access)) for weather data, including archival data
- Bureau of Justice Statistics ([www.bjs.gov](http://www.bjs.gov)) for crime data, though I have found these data difficult to work with at times

Getting started in Data for Good research can seem confusing at first, but good resources are available to help. Even experienced researchers can benefit from the variety of free and government data sources. Because data is a type property, public data should be considered public property. Data for Good uses the public data resources we own for the greater good of all. ■

STATtr@k

# Observations About Taking Control of Your Career Path



**Heather Kopetskie** is a senior biostatistician at Rho with experience in statistical planning, analysis, and reporting for clinical trials. She also serves as Rho's biostatistics operational service leader, an internal expert sharing biostatistical industry trends, best practices, processes, and training. She holds an MS in biostatistics from The University of North Carolina at Chapel Hill.

As a graduate research assistant in college, I knew exactly where I wanted my career to go. It was a vertical straight line to becoming a senior biostatistician. More than 10 years into my career, I've now become a senior biostatistician, but I've also done so much more than I ever could have imagined when I was a graduate research assistant.

Some of the new responsibilities I've taken on have been frightening, some I was sure I was going to fail at, and a few just seemed like fun. The one thing that was consistent throughout all my decisions was I thought I had control over the choices I made to shape the career I wanted, and the career I desired changed over time—and still changes now. In fact, I don't know where I want to be 10 years down the road; currently, I'm just enjoying the journey and making decisions as they come—and I'm perfectly comfortable with that plan, or lack thereof.

Below are seven observations from successful statistical colleagues and me to think about as you maneuver the career growth ladder.

## Find a great mentor.

I want to stress the word "great" here because a good mentor isn't enough. If you can't find a single great mentor, then recruit more than one person. There is no rule saying this has to be a single person, or even someone within your company (don't forget alumni resources and conference connections). What makes a great mentor? Someone who is going to fight for the opportunities you want, provide guidance and advice, help develop your leadership skills, and offer you new opportunities. When you meet with your mentor, make

sure to discuss your goals as they may be different from the goals they think you should have.

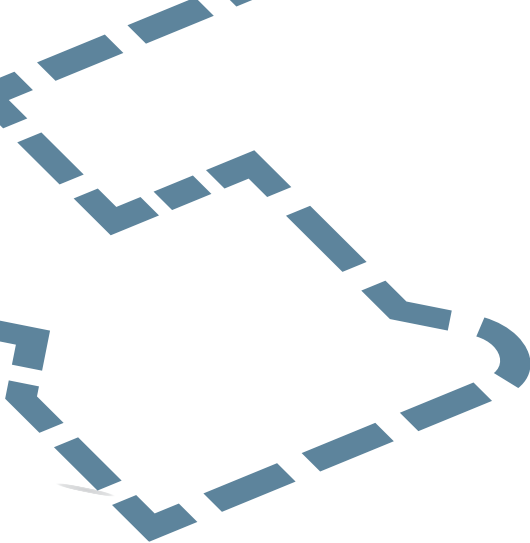
## Know your company/industry promotion requirements.

It's a lot easier to earn your next promotion when you know what you need to accomplish to be recognized. If you don't know what your company requirements are for promotion, talk to your mentor or someone in human resources. If they can't give you a clear answer, look at a job description of the next position you want. If you don't plan on staying with your company, make sure to look at several job descriptions for different companies as the skill sets may vary depending on each organization's expectations and values. Take these to your mentor or boss and ask for new opportunities to build the skill set required for the promotion you seek.

## Be empowered.

What is empowerment? Broadly, it's speaking up to ask for what you want, speaking up when you disagree, and taking initiative to do something that needs to be done. I like to think of it as being confident taking action. Why is this important? If you say yes to everything, you will be overcommitted and won't be able to excel at anything. You need to shine





to get that promotion. When you are asked to do something, don't respond immediately. Take a moment and think about how it could influence your career. The work may not be exciting, but it could help accelerate your career. If a new responsibility is going to spread you too thin, you may want to say no. Saying no is difficult at first, but it gets easier over time. And if you explain why your answer is no, people will usually respect your decision. If you are told—instead of asked—to work on a project, you can still have a discussion about why you think the work may not be a good fit. You may still need to perform the task, but your voice will have been heard.

### Step out of your comfort zone.

This is one you probably see a lot, but for good reason. If we stay in our bubble of comfort, we can't grow. If we don't grow, we can't get to the next level in our career. Don't be afraid to say yes to new opportunities. More importantly, speak up, volunteer, or talk to your mentor when you want to do new things outside your comfort zone. If you don't speak up, no one is going to know you want the opportunity.

### Know your strengths.

Know what your strengths are and what your company values. Then figure out how to leverage your strengths to maximize their effect on your organization. Our company uses the book *StrengthsFinder 2.0* by Tom Rath ([www.tomrath.org/book/strengths-finder](http://www.tomrath.org/book/strengths-finder)) to help employees identify strengths. This was a great resource for me, as it highlighted what my strengths were, what my weaknesses were, and what my colleagues' strengths were so I could best interact with them.

I will offer one example here, as I think leveraging your strengths is difficult to understand. My company values innovation. This is not one of my strengths. I like to develop close relationships, achieve goals, create routine and structure, and determine how to arrange tasks for productivity. There is nothing in there about innovation. Yet, if you ask my colleagues, they will probably say I'm innovative. This is because I've figured out who in my company is innovative and I've collaborated with them. They come up with the idea and I can run with executing it, because that's where my strengths lie. It ends up being a win for both of us. I just had to figure out how to align my strengths with my company's values.

### Continue learning.

Learning doesn't stop when you graduate from college. You need to keep up with new skills in your field to make sure you are still a desirable employee in the industry. Find something that interests

you and is a valuable knowledge area for your company and industry. The goal is to become recognized as a subject matter expert in this field so your colleagues start coming to you with their questions. This makes you valuable within your company, as well as marketable to others.

### Celebrate your victories.

It's a long career, and it's too easy to get stuck in the day-to-day grind and get worn out. Take a moment to celebrate your accomplishments, even the really small deliverables/victories. Celebrating breaks it all up and lets you feel rejuvenated for the next big task you tackle. Also remember to pass on accomplishments to your boss as they may be too busy to notice, but they likely have influence on how your career progresses within the company.

That concludes my seven observations for taking control of your career. I wish I had more room to share my experiences, but it's better to hear examples from individuals in your own industry. When you meet individuals in your company, ask them about hard decisions they had to make regarding their career path. Ask them how they've leveraged their strengths within the company. You'll learn more from that personal interaction, which could lead to a relationship with a new mentor. Good luck, and remember it's a long journey, so don't get discouraged. If it's not always going how you want, refocus your efforts and try again. ■



## MASTER'S NOTEBOOK

# Early-Career Statistician Offers Language, Tools for Establishing Influence



**Jessica Lavery** is a biostatistician in the Health Outcomes Research Group at Memorial Sloan Kettering Cancer Center in New York. She has an undergraduate degree in statistics from Loyola University Maryland and a master's degree in biostatistics from The University of North Carolina at Chapel Hill.

While statisticians are formally taught methodological skills, tactical project management and establishing credibility early on are less often taught, but equally important to successfully contributing to a team. In some settings, such as the medical field where traditional hierarchies drive authority, it may be particularly difficult as an early-career statistician to establish credibility and manage projects with confidence. To build expertise and command respect from the get-go, or to re-work the current dynamic on a project team, several subtle tactics may be used.

At the Women in Statistics and Data Science (WSDS) conference in October 2017, I shared tools picked up during my first few years as a statistician that have proven useful in being taken seriously by senior collaborators. I share them again with you here.

## Managing Expectations

At the beginning of collaboration, it is important to establish that the scope of a statistician's responsibilities often spans beyond producing analyses. The level of involvement by the statistician certainly varies across institutions and may vary across projects and investigators, as well. For this reason, it is most beneficial to establish what your skills are and how you expect to use them at the beginning of each project and on an ongoing basis so your collaborator is aware of how you expect to be involved. Do you expect to

be consulted at the beginning of a project, or on an ad hoc basis as the project progresses? Do you anticipate writing part of the manuscript, or to only review the methods and results sections? Do you want to be involved in all project meetings, or only meetings that are statistics oriented? These are examples of details the collaborator should be informed of from the beginning to set the stage for a successful collaborative relationship.

After you have explained your role, it is important to maintain respect for your expertise throughout the project. Often, intending to be seen as having mastered my role, I'm inclined to say, "Sure, no problem, this task will be *easy*." This was something I struggled with in my first job out of graduate school. *Of course I can tackle any task you present me with; I just got my master's degree!* Not only does this approach minimize the amount of effort required and results produced, resulting in unrealistic expectations in terms of how long it takes to complete a task, it also conveys the idea that anyone can do my job, devaluing my role on the team. Additionally, if a task comes easily, often that's only because I went through six years of school to learn how to master that skill.

Instead of saying something is easy, it is more beneficial to say something along the lines of, "This project will involve  $x$ ,  $y$  and  $z$ , and I'm looking forward to getting started on it." This conveys competence, confidence, and

enthusiasm without minimizing your contributions.

In addition to wanting to seem so skilled at my job that everything was easy, another challenge I encountered was figuring out the right time to send results to an investigator. Naively, my initial approach was to drop what I was doing if it was a quick request and to always send results the moment they were produced. Of course, this sense of urgency would be necessary in the presence of a deadline, but it can lead to setting up unreasonable expectations in the absence of one.

Like saying something is easy, constantly having a short turnaround time implies your job is quick and effortless and you are constantly on call, ready and waiting to immediately handle all requests. Even investigators with good intentions will learn they can wait until the last minute to ask for something, since it takes such a short time to produce. Instead of immediately replying with results, acknowledging you have received the request and intentionally delaying sending the results for a short time helps manage your collaborators' expectations and provides buffer time for you to digest the results before disseminating.

## Collaborating and Communicating

In the day to day, back and forth of collaborating, several subtle language modifications can be helpful in enforcing the idea that you are an integral part of the team.

As statisticians, we are often taught to speak the same language as our collaborators, and this cannot be emphasized enough. Giving an example or explaining an analysis in the same content area as the project prevents your clinical collaborator from having to translate from an abstract content area to statistics, and from statistics back to their content area. As an example, working in oncology, I would want to avoid explaining a methodology based on agriculture plots, even though this is how I was taught a lot of statistics. My oncologist collaborator is then translating ideas from agriculture to statistics to oncology, opening a lot of opportunity for things to get lost in translation. While this may sound obvious, it is something that serves us well to remember.

Using the term “we” instead of “you” ingrains you into the research team. Asking, “What question are *we* trying to answer?” conveys you are equally invested in the research.

I used to frequently insert “just,” as in, “I’m just emailing to ...” or “I just wanted to ...” The intention is to be polite and deferential, but what this does is indicate we are in a position of inferiority when we deserve to be an equal collaborator. If I am emailing to follow up with a collaborator who ignored my last email for a week, inserting “just” makes me feel like I am conveying understanding that they are assiduously working and may not have had time to respond. As equal members in the professional field, it is my collaborator’s responsibility to respond to an email, and I should not feel shy about reaching out. I now scan all emails after drafting them and

remove unnecessary instances of “just” (which is most of them) and re-read, noting how much clearer the email sounds.

Upspeak is something I only recently learned about, and I could not stop noticing how frequently I did it once I did. The term *upspeak* refers to ending what should be a statement as a question. As a simple example, if someone asks when a meeting is and you reply, “The meeting is Monday at noon?” Ending this in a question leaves the group with no more information than before you answered. It is especially important to avoid doing this when sharing results with a group, and to instead speak a sentence as a declaration, portraying more confidence in the answer. It is much easier for a collaborator to be dismissive of an idea or response if it is presented as a question.

Authorship can be a touchy subject, especially when the project team is large. Additionally, clinical collaborators are sometimes unaware that authorship is important to a statistician’s career. It is your responsibility to establish early on what your expectations are regarding any abstracts, as well as the final manuscript. Instead of presenting this as a question—“*Can I be listed as second author?*”—it is more effective to present a statement such as, “*Generally, when a statistician cleans the data, runs the analyses, and writes the methods and results, they are awarded second author.*” This politely establishes a norm and requires justification by your collaborator if there is going to be a shift.

Collaborating with medical doctors and doctoral-level health services researchers, I often felt

conflicted about how to refer to them. Dr. Jones? Ms. or Mrs. Jones? Jane? The trick that comes in handy here is to start formally and then mirror the way someone signs emails. If a collaborator signs off using his or her first name, I take that as an invitation to refer to them as such, connecting on a more personal level and further building a collaborative relationship. Always defaulting back to the more formal name reinforces the idea that you are a subordinate. With that said, if a collaborator indicates a preference for a more formal communication, then it is certainly appropriate to respect that preference.

Last, but certainly not least, it is important to remember that *silence is okay*. Often, when I present a result or explain a method and a collaborator is processing what I just told them, I continue nervous-talking—speaking rapidly and quickly trailing off into gibberish as I worry something I explained did not make sense. I often fall back on prematurely asking, “Did that make sense?”, pre-emptively suggesting I was incoherent. Instead, it is more constructive to give the collaborator a few moments to process, and then invite feedback by having the collaborator reiterate their understanding of what you communicated.

Thoroughly explaining your role and consistently communicating the value of your contributions both explicitly and implicitly increases your influence on the project team. Of course, not all tips will be applicable in all scenarios, but I hope you will find some helpful. This is an area in which I am constantly learning, and I look forward to hearing from others about tactics that have proven useful. ■

**Editor’s Note:**  
The views and opinions expressed here are Jessica Lavery’s and do not necessarily reflect those of Memorial Sloan Kettering.

## PASTIMES OF STATISTICIANS

# What Does Wayne Nelson Like to Do When He Is Not Being a Statistician?



Wayne Nelson dances with his tango partner, Cheryl Monti, who he calls an angel.

## Who are you, and what is your statistics position?

My name is Wayne Nelson. I am a semi-retired private statistical consultant and leading expert on reliability data analysis, recurrent events data analysis, and statistical methods for accelerated testing. I also give training courses for clients and professional societies. An employee of General Electric Corporation Research and Development for 24 years, I consulted across the company. As an adjunct professor at Union College and Rensselaer Polytechnic Institute, I taught graduate courses on the theory and application of statistics.

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

When I was 12, my grade school gave me ballroom dance lessons with girls. Now 81, I'm still dancing with them—but, today, it's Argentine tango, which is a three-minute romance. Seriously, dancing social ballroom at age 60, I discovered Argentine tango, became addicted, and now need a "tango fix" two or three times a week.

## What drew you to this hobby, and what keeps you interested?

Argentine tango has various charms. Few in number, tangueros are friendly and welcoming to all dancers. I've been warmly welcomed in dances all over the US and abroad, including Buenos Aires, Cairo, Mexico City, Bordeaux, and embargoed Havana (I went there as a wetback).

Used to dancing chest-to-chest (heart to heart) and cheek-to-cheek, tangueros warmly hug friends on greeting. No other dance has such intimate contact—chest, head, feet, calves, and, yes, thighs.

The women dance only on the balls of their feet and have gorgeous legs. It is the world's most difficult social dance, an enticing challenge that requires years to master. I've been working on tango for 20 years. Still humbly learning.

Tango music is romantic, beautiful, and expressive of feelings. Good social dancers express the feeling of the music using suitable "figuras" (dance patterns) and rhythms; that is, they spontaneously choreograph. Such musicality is rare in social ballroom dancing, which uses a simple repeating rhythm for each dance style. To hear the beautiful tango "Invierno" [Winter] and see charming professional choreography, view [www.youtube.com/watch?v=nfSWPO7uhpo](http://www.youtube.com/watch?v=nfSWPO7uhpo).

The best dancers have outstanding technique that feels wonderful to partners. Ballroom partners are performer wannabes and try to look good. Tangueros try to feel good to partners. My partners have ranged from clumsy sumo wrestlers to butterfly angels who are lighter and follow me better than my shadow. I always fall in love with the angels. A tango with an angel is three minutes in heaven. Such a tango dance is described in Buenos Aires as "one heart with four legs.

Now 81 and an advanced dancer, I am flattered when asked to dance by gorgeous young 60-year-olds I don't know. At a tango dance in the Catskills, Marilyn—a most attractive and skilled tanguera—invited me to dance with her in New York City. We've danced in Central Park, in the pavilion at the end of Pier 45 as the sun sets in New Jersey, in the UN Building, and in many tango clubs and dance halls. Tango brought me this much-treasured friend.

#### Some special tango moments for me include:

- Anne, my beloved dance partner and sweetheart of 27 years, took me on a tango cruise. It departed from Venice and stopped at various Greek ports (including Rhodes and the ancient Olympics site) and beautiful medieval Dubrovnik. Our group of 25 tangueros had classes every morning, an adventure ashore in a new place each afternoon, and a private tango dance at night. Our eight teachers put on a first-rate tango show in the ship's theater; it attracted 300 passengers just by word of mouth. The trip included memorable stays in Venice and Florence.
  - As a raw beginner, I went to tango boot camp in Buenos Aires for a week in 1997. In a class of 25 beginners, I was taught a figura by a maestro (master teacher) each afternoon, followed by a practice with five or six attentive teachers who drilled me on technique involving balance and delicate connection with partner that does not disturb the partner's balance and movement. Each evening, we went to a different dance club, struggled on a crowded floor, and also saw a tango show. Still needing boot camp, I repeated it the following year. Boot camp showed me what technique I needed to learn to dance well with a partner. I am still working on improving technique.
  - Buenos Aires is the Mecca for tangueros. Self-employed and having a good boss, I have spent five weeks there in March and April each year since 2000. A high point was my Fulbright Award to teach reliability statistics in Spanish to engineers there for three months. Of course, you know why I chose Buenos Aires and what I did in my free time.
  - Recently, for the first time, I attended the Stowe Tango Music Festival, where scores
- (no pun) of musicians improved their skills, instructed by maestros. For four days, 100+ tangueros participated in dance classes and danced to a live orchestra of 23 musicians who raised the hair on the back of my neck.
- There are customs at tango dances. You do not approach a tanguera and ask her to dance. In ballroom dancing, just asking is customary. To invite a tanguera, you must catch her eye (sometimes across the dance floor) and smile and nod. If she smiles back, you go to her and dance. If she ignores you, you're out of luck. The tangos are played in a tanda, a set of three or four tunes of the same style and by the same orchestra. On hearing the first notes of the music, you can invite a partner suited to the music and dance that tanda with her. Some tandas have other styles of music such as swing, Latin, polka, paso doble, etc. In Argentina, they do the chacarera folk dance. In Mexico, they dance traditional danzón, which is like rumba but more complicated. Most music at dances is by the famous orchestras of the Golden Age of Tango—the 30s, 40s, and 50s—and some is by more recent orchestras. We dance to three styles of Argentine music:
    - Traditional tango with a 2/4 or 4/4 (march) tempo
    - Waltz tango with 3/4 time (a three-beat measure), which is like a Viennese waltz but with a faster tempo
    - Milonga with a 2/4 or 4/4 (march) tempo, which is faster than traditional tango
- These dance styles have a common base, and each has some unique steps and customs. There are other styles of tango. In the US, ballroom dancers dance “American tango,” which is much like fox trot danced to music with a heavy drum beat, for example, “Hernando's Hideaway.” International tango is a studio-invented competition style with exaggerated stylized movement, such as head snapping, and the men wear tails and the women wear long ball gowns. In addition to the social Argentine tango, there is professional stage tango, called fantasy tango. It is athletic and complicated with high speed and lifts. ■



An aerial photograph of Vancouver, British Columbia, showing a dense urban skyline with numerous high-rise buildings. The city is situated on a peninsula, with a large marina filled with boats in the foreground. The background features a lush green forested hillside overlooking the water. The sky is clear and blue.

# JOIN US! IN VANCOUVER!

## Highlights of the JSM 2018 Program

Christian Léger, JSM 2018 Program Chair

Set in beautiful Vancouver, British Columbia, from July 29 through August 2, JSM 2018 promises to be a fantastic meeting. With your help, the JSM Program Committee ([www2.amstat.org/meetings/jsm/2018/programcommittee.cfm](http://www2.amstat.org/meetings/jsm/2018/programcommittee.cfm)) has prepared a wonderful program with a total of 681 sessions, including four plenary sessions, 178 invited sessions, 167 topic-contributed sessions, 181 contributed sessions, 26 speed sessions, 40 contributed poster sessions, and 76 roundtables for a total of 2,480 individual paper presentations, 509 speed presentations, 437 individual poster presentations, and more than 100 discussants. Although it is too early to tell, the number of submissions indicates JSM 2018 will be one of the largest JSM meetings ever.



Such a large meeting sometimes discourages potential participants. There are, after all, between 41 and 43 parallel sessions in each non-plenary time slot from Sunday, July 29, at 2 p.m. through Thursday, August 2, at 10:30 a.m. The flipside is that every participant is sure to find exciting sessions in all time slots from Sunday to Thursday! But to take full advantage of what JSM offers, it is important to plan which sessions to attend.

Consulting the online program at [www2.amstat.org/meetings/jsm/2018/onlineprogram](http://www2.amstat.org/meetings/jsm/2018/onlineprogram) is the best way to select the sessions of interest, since you can construct your own program and eventually use the mobile application to consult it. But to help you plan, I will highlight some sessions in the next few paragraphs.

### Plenary Sessions

Let me begin with the plenary sessions. The first one is the ASA President's Invited Address on Monday, July 30, at 4 p.m. On Tuesday, July 31, at 4 p.m., the Deming Lecture, **Improving the Quality and Value of Statistical Information: Fourteen Questions on Management**, will be delivered by **John L. Eltinge** of the US Census Bureau. Tuesday night at 8 p.m., **Lisa LaVange** will present the ASA President's Address. Finally, the COPSS awards will be presented on Wednesday, August 1, at 4 p.m., followed by the Fisher Lecture—**The Future: Stratified Micro-Randomized Trials with Applications in Mobile Health**—given by **Susan Murphy** of Harvard University.

### Opening Mixer

Sunday night, as you mingle with colleagues and friends during the JSM Opening Mixer, you won't want to miss the

opportunity to learn about various topics during the invited poster session, when 40 electronic posters will be presented near the vendors in the EXPO.

### Public Lecture

This year, JSM is innovating by presenting a public lecture to raise the profile of statistical sciences in the community hosting the meeting. **Jeff Rosenthal** of the University of Toronto will deliver the first JSM public lecture, **Born on Friday the Thirteenth: The Curious World of Probabilities**.

Held on Monday night to accommodate high-school math teachers and the general public—its principal audience—the public lecture is also open to JSM attendees who may be interested.

### Introductory Overview Lectures

Introductory overview lectures are among the most popular sessions at JSM. They are high-quality introductions to timely and important statistical topics of interest to broad JSM attendees. This year, JSM will host six. The first—**The Deep Learning Revolution**, taking place Sunday, July 29, at 2 p.m.—will explore this machine learning tool that has proven to be extremely

useful in several applications and has witnessed an absolute explosion of interest.

Then, Sunday, July 29, at 4 p.m., **Examining What and How We Teach at All Levels: Key Ideas to Ensure the Progress and Relevance of Statistics** will highlight changes in introductory-level material and both undergraduate and graduate programs in statistics, biostatistics, and data science at a time when demand for our profession continues to grow and the emergence of data science has invigorated both industry and academia.

On Monday, July 30, at 8:30 a.m., data science leaders from major technological firms will demystify real-world data science applications at scale and illustrate how to become an excellent data scientist, build a high-impact data science team, design data science curriculum, and lead with statistics in **Leading Data Science: Talent, Strategy, and Impact**.

**Multivariate Data Modeling with Copulas** on Monday, July 30, at 10:30 a.m., will focus on the fundamental principles of copulas and copula models, one of the most powerful and appealing ways to account for dependence in multivariate data, and provide concrete illustrations of its use in finance,

## THE FOUNDERS AWARD No Longer Top Secret

Since its inception nearly 30 years ago, the ASA Founders Award—our association's top award for service—has been presented behind a veil of secrecy. That is, no notice of or to the recipients was given and the recipients' pictures did not appear in the JSM Awards Booklet until the following year. Members of the Founders Award Committee have concluded this practice is not particularly helpful and does not provide JSM attendees, family, and friends the appropriate opportunity to congratulate new Founders.

Therefore, we'd like to announce the 2018 **Founders Award recipients: Marie Davidian, Alicia Carriquiry, and Dan Kasprzyk**. We hope you will join us at the 2018 President's Address and Founders & Fellows Recognition Tuesday, July 31, in Vancouver to recognize these outstanding individuals! More about the 2018 recipients is coming soon.

### CHILD CARE at JSM

Looking for child care during JSM? Register through KiddieCorp at [www.jotform.com/KiddieCorp/jsmkids](http://www.jotform.com/KiddieCorp/jsmkids).

## Rounding It Out

Following are other sessions you may find interesting:

**Medallion Lecture I: Statistical Inference for Complex Extreme Events**, by Anthony Davison (Sunday, July 29, 2 p.m.)

**The Good, the Bad, and the Ugly: The Future of Statistics and the Public** (Sunday, July 29, 4 p.m.)

**Theory vs. Practice** (Monday, July 30, 10:30 a.m.)

**Addressing Sexual Misconduct in the Statistics Community** (Monday, July 30, 2 p.m.)

**Statistical Leadership: Insights from Experiences of Prominent Leaders** (Tuesday, July 31, 10:30 a.m.)

**Worldwide Statistics without Borders Projects: Statistics, Data Visualization, and Decision-Making** (Wednesday, August 1, 8:30 a.m.)

**Noether Award with Jianqing Fan and Anirban Bhattacharya** (Wednesday, August 1, 10:30 a.m.)

**Sirken Award with Colm O'Muircheartaigh**, (Wednesday, August 1, 10:30 a.m.)

**Are We (Academia) Producing Leaders with Necessary Statistical Skills?** (Wednesday, August 1, 2 p.m.)

**The State of Peer Review and Publication in Statistics and the Sciences** (Wednesday, August 1, 2 p.m.)

**Medallion Lecture II: Statistical Analysis of Large Tensors**, by Ming Yuan (Wednesday, August 1, 2 p.m.)

**Theory at the Intersection of Machine Learning and Statistics** (Thursday, August 2, 8:30 a.m.)

**Data Science for Social Good** (Thursday, August 2, 10:30)

insurance, biostatistics, and environmental sciences.

On Tuesday, July 31, at 8:30 a.m., **Reproducibility, Efficient Workflows, and Rich Environments** will explore the need for reproducibility of results from modern data analysis and how getting the most of rich computing environments can help build efficient workflows and organize computations to encourage validity, reproducibility, and collaborative sharing.

Finally, on Wednesday, August 1, at 8:30 a.m., **The Statistical and Data Revolution in the Social Sciences** will highlight new statistical methods for three areas of social science—demography, social network analysis, and criminology—in which the impact of statistics has been expanding rapidly, spurred by a huge expansion in available social science data, new kinds of social science data, and the establishment of several interdisciplinary centers and institutes in US universities.

## Memorial Sessions

Every year, we remember the contributions and personalities of extraordinary statisticians who died in the recent past through memorial sessions. This year, we will salute **Stephen E. Fienberg** (Sunday, July 29, 2 p.m.), **Charles Stein** (Monday, July 30, 2 p.m.), **Ingram Olkin** (Tuesday, July 31, 2 p.m.), **Alastair Scott** (Thursday, August 2, 8:30 a.m.), and **Joseph Hilbe** (Thursday, August 2, 10:30 a.m.).

## Journal Sessions

Several journals have invited sessions to highlight some of the best papers they publish. This year, the following journals have sessions scheduled:

*Journal of Statistics Education*  
Sunday, July 29, 2 p.m.

*JASA Theory and Methods*  
Monday, July 30, 8:30 a.m.

*Annals of Applied Statistics*  
Monday, July 30, 2 p.m.

*Technometrics*  
Tuesday, July 31, 8:30 a.m.

*Journal of Agricultural, Biological, and Environmental Statistics*  
Tuesday, July 31, 2 p.m.

*Statistics Surveys*  
Wednesday, August 1, 8:30 a.m.

*Statistica Sinica*  
Wednesday, August 1, 10:30 a.m.

*JASA Applications and Case Studies*  
Wednesday, August 1, 2 p.m.

*CHANCE*  
Thursday, August 2, 8:30 a.m.

## Late-Breaking Sessions

Up to two late-breaking sessions may be added to the program for Monday, July 30, at 2 p.m. and Tuesday, July 31, at 10:30 a.m.

## Speed Sessions

One way to diminish the number of parallel sessions is to encourage researchers to present in a speed session. Such a presentation is delivered in two parts: a four-minute oral advertisement for the topic in a session with 19 others on a similar theme, followed by a 45-minute electronic poster in a later session. This year, we have increased the number of speed sessions from 18 to 26. I invite you to consider attending at least one such session. You may like them and consider submitting your research to a speed session next year.

The theme of the meeting is **#LeadWithStatistics** and, as you will discover throughout the program, our field is healthier than ever and full of energetic members ready to lead with statistics. On behalf of the JSM Program Committee, I wish you a wonderful JSM 2018 in Vancouver. We hope you will learn from and enjoy it as much as we did preparing it! ■



# Featured Speakers

## ASA President's Address and Founder & Fellows Recognition



Photo by Jon Gardiner  
UNC Chapel Hill

**Lisa LaVange**  
*The University of North Carolina*  
Tuesday, July 31, 8:00 p.m.

## ASA Deming Lecture



**John L. Eltinge**  
*US Census Bureau*  
*"Improving the Quality and Value of Statistical Information: Fourteen Questions on Management"*  
Tuesday, July 31, 4:00 p.m.

In his landmark book, *Out of the Crisis*, W. Edwards Deming presented "Fourteen Points for Management." Taken as a whole, his points reflected a profoundly humane and nuanced perspective on improved management of large and complex organizations. The exposition of those 14 points centered primarily on management of quality and productivity in manufacturing, but also was informed by Deming's extensive experience with sample surveys. In addition, his commentary on these points included substantial discussion of work by government agencies and other organizations that produce statistical information for public use.



## COPSS Awards and Fisher Lecture



Photo by Eliza Grinnell

**Susan Murphy**  
*Harvard University*  
*"The Future: Stratified Micro-Randomized Trials with Applications in Mobile Health"*  
Wednesday, August 1, 4:00 p.m.

Technological advancements in the field of mobile devices and wearable sensors make it possible to deliver treatments anytime and anywhere to users like you and me. Increasingly, the delivery of these treatments is triggered by detections/predictions of vulnerability and receptivity. These observations are likely to have been affected by prior treatments. Furthermore, the treatments are often designed to have an impact on users over a span of time during which subsequent treatments may be provided.

Here, I discuss work on the design of a mobile health smoking cessation study in which the above two challenges arose. This work involves the use of multiple online data analysis algorithms. Online algorithms are used in the detection, for example, of physiological stress. Other algorithms are used to forecast, at each vulnerable time, the remaining number of vulnerable times in the day. These algorithms are then inputs into a randomization algorithm that ensures each user is randomized to each treatment an appropriate number of times per day.

The stratified micro-randomized trial that involves not only the randomization algorithm, but a precise statement of the meaning of the treatment effects and primary scientific hypotheses, along with primary analyses and sample size calculations, is developed. Considerations of causal inference and potential causal bias incurred by inappropriate data analyses play a large role throughout.



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# Named Lectures

## IMS Medallion Lecture I

Photo by Claire Cullen Davison



### Anthony Davison

EPFL

*Statistical Inference for Complex Extreme Events*

Sunday, July 29, 2:00 p.m.

Statistics of extremes deals with the estimation of events that have low probabilities but potentially large consequences, such as stock market gyrations, flooding, and heat waves. Often, the events of interest have never been observed, and hence their probabilities must be estimated by extrapolation well outside any existing data. This area exhibits a beautiful interplay between probability and statistics and has a long history and rich tradition of applications, originally in insurance and engineering, but increasingly in the environmental sciences and in finance. Statistical methods for modeling scalar and multivariate extremes based on sample maxima and threshold exceedances are well-established, but the focus has turned to more complex settings, including spatial and space-time modeling of extremal phenomena. In this lecture, I shall survey recent work on the topic and then show how detailed modeling for high-dimensional problems can be undertaken using Pareto processes, generalized versions of threshold exceedances, and gradient scoring rules.

## IMS Medallion Lecture II



### Ming Yuan

Columbia University

*"Statistical Analysis of Large Tensors"*

Wednesday, August 1, 2:00 p.m.

A large amount of multidimensional data in the form of multilinear arrays, or tensors, arise routinely in modern applications from such diverse fields as chemometrics, genomics, physics, psychology, and signal processing. At the moment, our ability to generate and acquire them has far outpaced our ability to effectively extract useful information from them. There is a clear demand to develop novel statistical methods, efficient computational algorithms, and fundamental mathematical theory to analyze and exploit information in these types of data. In this talk, I will review recent progress and discuss some of the present challenges.

## Public Lecture



### Jeffrey Rosenthal

University of Toronto

*Born on Friday the Thirteenth: The Curious World of Probabilities*

Monday, July 30, 7:00 p.m.

This talk will use randomness and probability to answer questions such as the following: Just how unlikely is it to win a lottery jackpot? If you flip 100 coins, how close will the number of heads be to 50? How many dying patients must be saved to demonstrate the effectiveness of a new medical drug? Why do strange coincidences occur so often? How accurate are opinion polls? How did statistics help expose the Ontario Lottery Retailer Scandal? Should parents be convicted of murder if two of their babies die without apparent cause? Can statistics explain luck and superstition? Why do casinos always make money, even though gamblers sometimes win? And how is all of this related to Monte Carlo algorithms, an extremely popular and effective method for scientific computing? No mathematical background is required to attend. ■

## DATA ART SHOW

Explore the "art" in data art with this JSM exhibit featuring data artists. Located inside the exhibit hall, it will explore the relationship between data and art.



# Create Your Own Vancouver Adventure

The Vancouver Convention Centre is located at 1055 Canada Place in downtown Vancouver along beautiful Vancouver Harbor. The location makes it convenient to squeeze in a little “tourist time” to your busy JSM schedule. Check out a few attractions you may want to scout out while you’re in Vancouver.

## VANCOUVER AQUARIUM

845 Avison Way

[www.vanaqua.org](http://www.vanaqua.org)

Open daily. See website for hours and ticket prices. Strongly recommend purchasing tickets online in advance.

Penguins, sea otters, and 50,000 other aquatic creatures await your arrival at Canada’s largest aquarium. Enjoy the new sea lion exhibit, sea otter feeds, shark dives, and free-roaming animals found in the popular Amazon Gallery.

## DR. SUN YAT-SEN CLASSICAL CHINESE GARDEN

578 Carrall Street

[www.vancouverchinesegarden.com](http://www.vancouverchinesegarden.com)

Open daily. Check website for hours and ticket prices.

Named the World’s Top City Garden by *National Geographic*, Dr. Sun Yat-Sen Classical Chinese Garden was the first classical Chinese garden in all of Canada. The jade green pond, koi fish, collection of 150-year-old miniature trees, and tai hu rock imported from China are some of the delights the garden offers. Built in 1986 by 53 master craftsmen from China and 950 crates of traditional material, it was constructed using 14th-century methods—no glue, screws, or power tools were used.

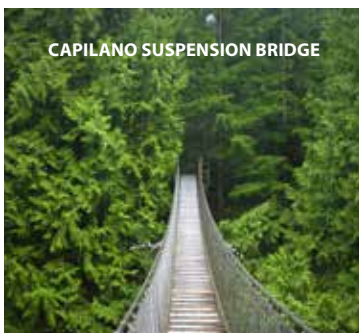
## CAPILANO SUSPENSION BRIDGE PARK

3735 Capilano Road North

[www.capbridge.com](http://www.capbridge.com)

Open daily, 8:00 a.m. – 8:00 p.m. See website for ticket prices.

The 450-foot-long (137m), 230-foot-high (70m) Capilano Suspension Bridge has thrilled visitors since 1889. While the wobbly bridge and stunning location is a Vancouver landmark, Capilano Suspension Bridge Park offers an all-encompassing BC experience.



## BILL REID GALLERY OF NORTHWEST COAST ART

639 Hornby Street

[www.billreidgallery.ca](http://www.billreidgallery.ca)

See website for hours and ticket prices.

The gallery is home to the Simon Fraser University Bill Reid Collection, alongside special exhibitions of contemporary Northwest Coast Art. Highlights include stunning gold and silver jewelry, monumental sculptures, and a towering totem pole by James Hart of Haida Gwaii.



Museum of Vancouver  
Photo courtesy of Tourism Vancouver

## MUSEUM OF VANCOUVER

1100 Chestnut Street

<https://museumofvancouver.ca>

Open Sunday–Wednesday, 10:00 a.m. – 5:00 p.m.; Thursday, 10:00 a.m. – 8:00 p.m.; Friday–Saturday, 10:00 a.m. – 9:00 p.m.

Spark your curiosity with the Museum of Vancouver’s inspiring collection of extraordinary treasures. MOV’s featured exhibit, *Haida Now*, presents a visual feast of innovation and tradition with an unparalleled display of Haida art that boasts 450 works created by carvers, weavers, photographers, and print makers from as early as the 1890s. While visiting MOV, experience permanent Vancouver history and neon galleries, support local artisans at the MOV gift shop, and enjoy a stroll through beautiful Vanier Park on English Bay, situated between Kitsilano Beach and Granville Island.

## GROUSE MOUNTAIN, THE PEAK OF VANCOUVER

6400 Nancy Greene Way North  
[www.grousemountain.com](http://www.grousemountain.com)  
 See website for hours and ticket prices.

Just 15 minutes from downtown, Grouse Mountain sits on the edge of wilderness and civilization. As Vancouver's most visited attraction, the resort's unique combination of soft adventure, sophisticated leisure, and rugged recreation truly make it a must-see destination.



Stanley Park Seawall  
 Photo courtesy of Tourism Vancouver

## STANLEY PARK

735 Stanley Park Drive  
<http://vancouver.ca/parks-recreation-culture/stanley-park.aspx>

Explore the 400-hectare natural West Coast rainforest and enjoy scenic views of water, mountains, sky, and majestic trees along Stanley Park's famous Seawall. Discover kilometers of trails; beautiful beaches; local wildlife; great eats; and natural, cultural, and historical landmarks. The park offers a wide range of unforgettable experiences for all ages and interests, including Canada's largest aquarium.

## Getting Around

### Landsea tours mini-bus

Photo courtesy of Tourism Vancouver



Be sure to check out Vancouver's public transportation system, Translink, to easily get around the city, including the easy and inexpensive SkyTrain Canada Line route with access from downtown to the airport.

## BC FERRIES

BC Ferries has two Vancouver ferry terminals, Tsawwassen and Horseshoe Bay, which provide access to Vancouver Island, the Gulf Islands, and the Sunshine Coast.

**Tsawwassen**, approximately 45 minutes south of downtown Vancouver, provides service to Victoria (90 minutes), Nanaimo (2 hours), and the Southern Gulf Islands (55 minutes – 3 hours).

**Horseshoe Bay**, about 45 minutes north of Vancouver, offers service to Nanaimo (100 minutes), Bowen Island (20 minutes), and the Sunshine Coast (40 minutes).

During peak months, ferries run every one to two hours, but schedules change dependant on the season. Reservations are available on some routes and recommended during peak season and holiday periods. Visit the BC Ferries website for current schedules, fares, and reservations or call (888) 223-3779 (in North America) or +1 (250) 386-3431 (international).

Extend your trip with one or more day trips, just a bit outside of Vancouver.

## DISCOVER BC WINE

Boasting about half of the more than 270 BC wineries, the Okanagan Valley is a five-hour drive east of Vancouver. Running from the Canada-US border, where the landscape is almost desert-like, and continuing

north 155 miles along a string of glacier-fed lakes, the region is divided into seven distinctive sub-regions, each with different climates and soil types. Along with producing excellent wines, the wineries are known for their picturesque surroundings.

## VISIT WHISTLER

Although acclaimed for its winter attractions, Whistler is a year-round destination, with festivals, activities, and fun for every season. A visit to the resort in the summer is the perfect time to try mountain biking, play 18 holes on one of Whistler's four golf courses, hike the many mountain trails, and enjoy al fresco dining. From May to September, skip the drive and take Whistler Air's float plane service from downtown Vancouver to Whistler and enjoy a view of the mountains from the air.

## BOWEN ISLAND

Looking to get away without spending a fortune? Just take a trip to nearby Bowen Island, which is a 20-minute ferry ride away from West Vancouver's Horseshoe Bay. Here, you can take in the laid-back vibe of rural island life while exploring small art galleries, cute shops, casual eateries, and waterfront patios along Snug Cove. This island also offers plenty of opportunities for outdoor recreation, including hiking through lush rainforests, swimming at serene beaches, and mountain biking along forested trails. ■

# JSM for **NEWBIES**

The largest congregation of statisticians in the world happens every August during the Joint Statistical Meetings (JSM). More than 6,000 people attend these meetings, which are sponsored by 11 statistical societies, including the American Statistical Association. The meetings offer a variety of activities such as attending research presentations, interviewing for jobs, taking professional development courses and workshops, and browsing the exhibit hall. With so many opportunities, new attendees can be overwhelmed easily by their first JSM experience.

Based on my familiarity with attending meetings over the last 18 years and the experiences of student groups I have led, I'm going to provide some tips on how to get the most out of JSM. If you would like to share your own recommendations, I encourage you to submit a comment at <http://stattrak.amstat.org>.

## Before JSM

Most new attendees who choose to present their research do so in a contributed session via an oral or poster presentation. The deadline to submit an abstract for acceptance into the program was in early February. For those who did this, additional proof of progress (e.g., drafts of a paper) for the presentation must be submitted by mid-May.

A preliminary program listing the presentation schedule

is now available at [www2.amstat.org/meetings/jsm/2018/program](http://www2.amstat.org/meetings/jsm/2018/program). Because there may be more than 40 concurrent presentations at any time, it is best to arrive at JSM with an idea of which to attend. This can be done by examining the session titles and performing keyword searches in the online program prior to JSM.

Oral presentations are separated into invited, topic-contributed, and contributed sessions, with each session lasting 1 hour and 50 minutes. Invited and topic-contributed sessions include groups of related presentations that were submitted together and selected by JSM Program Committee members. These presentations each last for 25 or more minutes for invited and 20 minutes for topic-contributed. Contributed sessions include groups of 15-minute oral presentations. Unlike invited and topic-contributed sessions, contributed presentations are submitted individually and then grouped by JSM Program Committee members.

Poster presentations are also separated into invited, topic-contributed, and contributed sessions, with the vast majority in contributed sessions. These types of presentations involve speakers being available for questions next to their displayed poster during the entire session. Most posters are of the traditional paper format. An increasing number now are in an electronic format paired with a short four-minute oral presentation. For

this combination of presentation types, the oral portion is given first in what is known as a "speed" session. A few hours later, the corresponding electronic poster presentation takes place.

Online registration for JSM begins around May 1. For members of a sponsoring statistical society, the cost is \$455 during the early registration period. The cost increases to \$555 if you register at JSM. Registration for student members is only \$120, and this rate is available at any time. Also starting around May 1, you can reserve a hotel room through the JSM website. A number of hotels near the convention center are designated as official conference hotels, and they discount their normal rates. However, even with a discount, you can expect to pay \$200 or more per night for a room.

Attending JSM can be expensive. Students have several options to reduce the cost burden. First, ask your adviser or department for funding. Many departments offer financial support for students who present their research at JSM. Students also may qualify for funding from the student activities office on their campus. For example, when I was a student, my department's statistics club received funding this way, which paid for most of my first JSM expenses.

In addition to school-based resources, many ASA sections sponsor student paper



**Christopher Bilder** is a Professor in the Department of Statistics at the University of Nebraska-Lincoln and a Fellow of the ASA.



**IMPORTANT LINKS****JSM 2018**[ww2.amstat.org/meetings/jsm/2018](http://ww2.amstat.org/meetings/jsm/2018)**Online Program**[ww2.amstat.org/meetings/jsm/2018/onlineprogram.cfm](http://ww2.amstat.org/meetings/jsm/2018/onlineprogram.cfm)**Job Seekers**[ww2.amstat.org/meetings/jsm/2018/careerservice.cfm](http://ww2.amstat.org/meetings/jsm/2018/careerservice.cfm)**Professional Development**[ww2.amstat.org/meetings/jsm/2018/professionaldevelopment.cfm](http://ww2.amstat.org/meetings/jsm/2018/professionaldevelopment.cfm)


**JSM  
DOCENT  
AND HERE  
TO HELP!**

Docents will be available throughout the meetings to answer any questions—look for the orange button.

competitions that provide travel support to award winners. For example, the Biometrics Section of the ASA sponsors the David P. Byar Young Investigators Award, with \$2,000 awarded to the winner and separate \$1,000 awards given to authors of other outstanding papers. Most competitions require a completed paper to be submitted many months prior to JSM.

**At JSM**

JSM begins on a Sunday afternoon in late July. Business casual clothing is the most prevalent attire, but some attendees wear suits and others wear T-shirts and shorts. When you arrive at JSM, go to the registration counter at the convention center to obtain your name badge (if not already mailed to you) and additional conference materials.

There is a significant online presence during JSM. A main resource is the JSM app and online program. Both contain all the information you will need, including a convention center map. Also, the ASA posts the most up-to-date news about JSM through its Twitter

(@AmstatNews) and Facebook accounts. Attendees at JSM can use #JSM2018 to tag their JSM-related posts.

To welcome and orient new attendees, the JSM First-Time Attendee Orientation and Reception is scheduled for early Sunday afternoon. At this reception, docents will be present (identified with a special orange button by their name badge) to answer any questions you may have about the meetings. These docents will be available throughout the conference as well.

Later on Sunday evening, the Opening Mixer will be held in the exhibit hall. This event is open to all attendees, and drinks and hors d'oeuvres will be served.

In between the orientation and the mixer, the ASA Awards Celebration and Editor Appreciation session is held. Many first-time attendees are honored during it due to being awarded a scholarship or winning a student paper competition.

The main sessions start Sunday at 2:00 p.m. Many of the research presentations are difficult to understand completely. My goal for a session is to have 1–2 presentations in which I learn something relevant to my teaching or research interests. This may seem rather low, but these items add up after attending many sessions.

For attendees who teach introductory courses, the sessions sponsored by the ASA Section on Statistical Education are often the easiest to understand. Many share innovative ideas about how to teach particular topics.

Introductory overview lectures are another type of session that has easier-to-understand topics. Recent lectures have included introductions to variable selection, statistical

learning, and quantile regression. There are also many Professional Development courses and workshops available for an additional fee. However, you can attend a course for free by volunteering prior to JSM to be a monitor. Monitors perform duties such as distributing and picking up materials during the course. As an added benefit, monitors can attend one additional course for free without any duties. Those who are interested should contact Rick Peterson at [rick@amstat.org](mailto:rick@amstat.org).

Featured talks at JSM are usually scheduled for late afternoon on Monday through Wednesday. On Tuesday evening, the ASA president's address is given, along with an introduction to the new ASA fellows and winners of the Founders Award. The fellows introduction is especially interesting because approximately 60 ASA members (<0.33% of all members) are recognized for their contributions to the statistics profession.

In addition to presentations, the JSM exhibit hall features more than 90 companies and organizations exhibiting their products and services. Many exhibitors give away free items (e.g., candy, pens, etc.). All the major statistics textbook publishers and software companies are there. Textbook publishers usually offer a discount on their books during JSM and often for a short time after. The exhibit hall also includes electronic charging stations and tables that can be used for meetings. Additionally, it's the location for the poster presentations.

The JSM Career Service provides a way for job seekers and employers to meet. Pre-registration is required, and the fee is discounted if you register before mid-July. The service works by providing an online message center for job



seekers and employers to indicate their interest in each other. Once a common interest is established, an interview can be arranged for during the meetings.

Other activities at JSM include the following:

- Shopping at the ASA Store to purchase a statistics-themed T-shirt or mug
- Attending an organized roundtable discussion during breakfast or lunch about a topic of interest (pre-registration is required)
- Taking a little time off from JSM for sightseeing or attending a sporting event

## After JSM

JSM ends in the early afternoon on Thursday. Don't let what happens at JSM stay at JSM! The first thing I do after the meetings is prepare a short review of my activities. Using notes I took during sessions, I summarize items from presentations I want to examine further. I also summarize meetings I had with individuals about research or other important topics. Much of this review process starts at the airport while waiting for my return flight.

If you give a presentation at JSM, you may submit a corresponding paper to be published in the conference proceedings. Papers are not peer-reviewed in the same manner as for journals, but authors are encouraged to have others examine their paper before submission. The proceedings are published online around December. Authors retain the right to publish their research later in a peer-reviewed journal. ■

## STUDENT OPPORTUNITIES AT JSM

Lara Harmon, ASA Marketing and Online Community Coordinator

Are you an ASA student member? We're hoping to see many of you at JSM 2018! This year, we go abroad to Vancouver. In addition to enjoying the program and the beautiful city, why not deepen your experience by volunteering? We have opportunities for a range of time constraints and interests!

### Attend a Continuing Education (CE) Course for Free

JSM's CE courses give conference attendees a chance to learn from experts they might not otherwise meet in person. As a volunteer CE monitor, you can attend a course for free! CE monitors help courses run smoothly and get to follow along with course content and meet the instructor and attendees. Interested? Contact Rick Peterson, the ASA's professional development and chapters and sections manager, at [rick@amstat.org](mailto:rick@amstat.org). Keep an eye on the JSM 2018 website for a list of CE courses, and then let Rick know which one you would most like to monitor when you contact him!

### Meet Presenters and Gain Experience Managing a Session

Session chairs introduce and support session presenters. These volunteers help keep sessions on topic and on time, plus they get to meet and work directly with session presenters! Session chair slots fill up, but don't give up if they're full—you can still volunteer as a backup. To learn more about what session chairs do and to apply, visit the JSM 2018 website, choose "Be on the Program," scroll down to the "Chairs" bar, and click to see the details.

### Learn More About Student Chapters

Over the past few years, the ASA's student chapter program has grown to almost 70 student chapters, spread all across the US. This year, we're hosting our second JSM student chapters meeting! If you're a student chapter officer, faculty adviser, member, or just interested in learning more about student chapters, join us for this chance to share ideas and plan for the future. We'll need a few helping hands to keep the meeting running smoothly! Contact me, Lara Harmon, at [lara@amstat.org](mailto:lara@amstat.org) if you're interested in helping with setting up and moderating the event. We'll let you know the time and place as soon as they're determined.

### Meet Fellow Student Members from Across the Country (and the World)

Will this be your first time at JSM? Don't miss the Student Mixer on Monday, July 30, from 6–8 p.m.! Enjoy free food and drinks, enter our free raffle, and mingle with other student attendees. Handing out raffle tickets before the mixer takes a few pairs of hands—if you're interested in helping out, contact me, Lara Harmon, at [lara@amstat.org](mailto:lara@amstat.org).

### Chill Out and Chat While Helping People in Need

Sometimes the blur of new faces and packed sessions can become a little much and you just need some time to relax and chat casually. Take a breather at the ImpACT Vancouver station in the exhibit hall! We'll have everything you need to make no-sew blankets for homeless and family shelters. Grab a few friends and do a good deed while giving your feet a rest!

## IMPACT VANCOUVER

Interested in giving back to the community while in Vancouver? Connect with other JSM attendees while making blankets (no sewing involved) to be donated to Blanket BC, a local nonprofit that provides blankets and warm clothes to area shelters. Meet in the exhibit hall Monday through Wednesday between 11:30 a.m. and 1:00 p.m. to participate.

## 2018 NISS Writing Workshop for Junior Researchers (at JSM)

The National Institute of Statistical Science (NISS) will hold a writing workshop for junior researchers in statistics and data science during the 2018 Joint Statistical Meetings in Vancouver, British Columbia, Canada.

### Objective

The goal of the workshop is to provide instruction for writing journal articles and grant proposals. Participants will be required to provide a recent sample of their writing, which will be reviewed by a senior mentor. The sample could be a current draft of an article to be submitted for publication or an early version of a grant proposal.

Senior mentors will be former journal editors and program officers, who will critique the submitted material and provide individual feedback.

Participants will be expected to initiate a revision in response with additional feedback from their mentors.

The deadline for application submissions is June 1, with notification of acceptances on a rolling basis until June 20.

### Content

The workshop consists of two sessions, plus a final meeting with mentors. The Sunday tutorial is an all-day session that covers scientific writing, as well as how to organize a paper. It also

discusses ethical issues, writing grant proposals, issues of journal choice, and understanding and responding to reviewers' comments. At the end of this session, each participant meets with the mentor who analyzed their paper.

The Tuesday session focuses on specific issues for participants whose native language is not English, covering the writing process and details of grammar, sentence structure, and word choice. A panel of senior researchers whose native language is not English will discuss their experiences with technical writing in English.

### Audience

The workshop is designed for researchers with a PhD awarded or anticipated during 2012–2018 in statistics, biostatistics, or a related field. Attendance at the writing workshop will be limited. Applicants within 0–3 years post-PhD and members of the participating societies will receive preference.

### Schedule

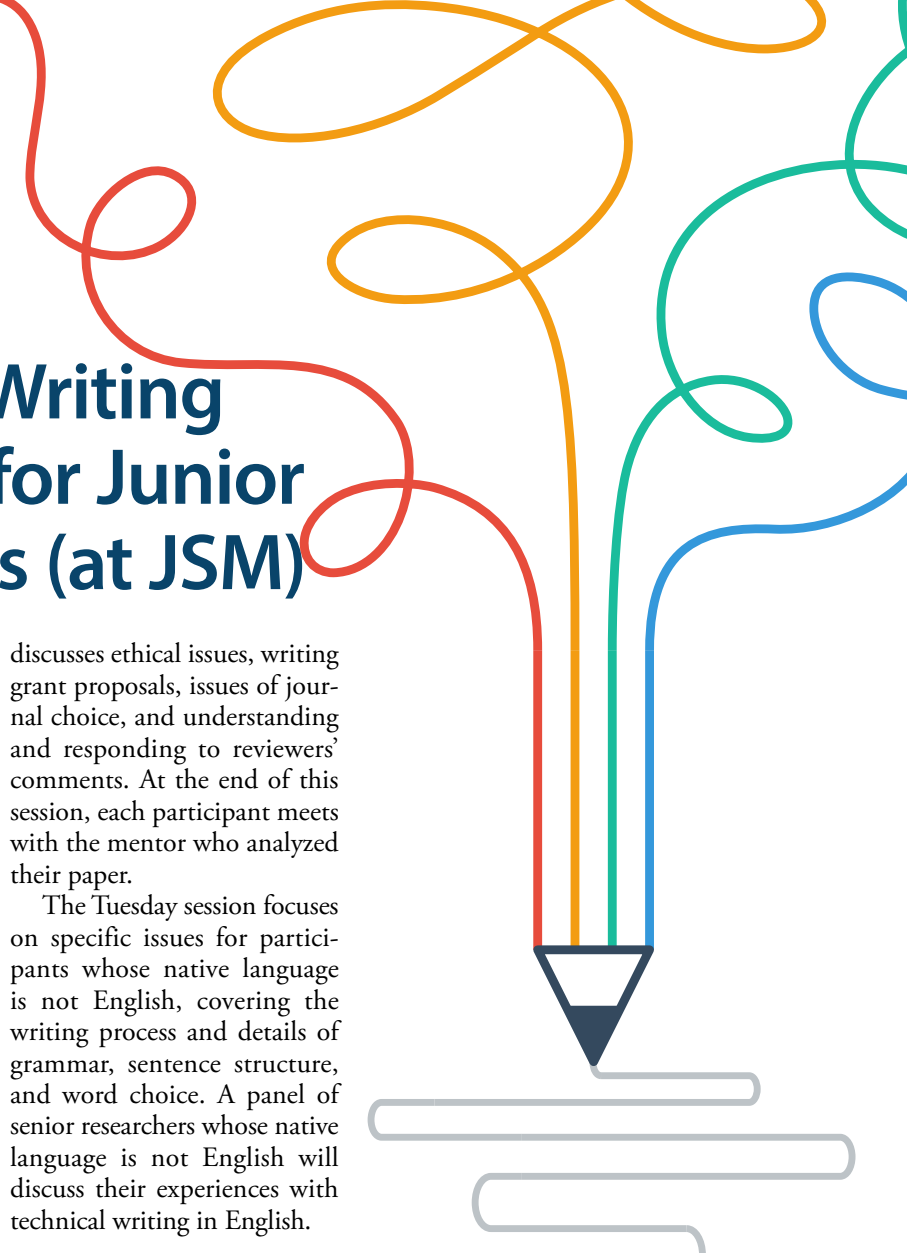
Part I: Sunday  
July 29, 2018  
7:30 a.m.–3:30 p.m.  
Convention Center

Part II: Tuesday  
July 31, 2018  
7:30 a.m.–10:30 a.m.  
Convention Center

### Registration

Workshop applicants are asked to register online, submit a writing sample, and confirm interest in participating by paying the \$100 registration fee (if the submission is accepted). Depending on the availability of funds, travel and housing costs will be partially reimbursed to those accepted. We **strongly** encourage workshop participants to also seek additional funding on their own.

If interested, register at [www.niss.org/events/2018-niss-writing-workshop-junior-researchers-jsm](http://www.niss.org/events/2018-niss-writing-workshop-junior-researchers-jsm). This includes a copy of your writing sample. All submitted material will be handled confidentially. ■



# Applications Now Being Accepted for the Diversity Mentoring Program at JSM



2017 Diversity Mentoring Program participants and mentors

Applications are being accepted for the JSM Diversity Mentoring Program, one of the initiatives of the American Statistical Association's Committee on Minorities in Statistics.

The program is designed to promote the statistics profession among under-represented minority populations in the US (African-American, Hispanic/Latino, Native American). Graduate students, post-doctoral scholars, and early-career professionals are brought together with senior-level statisticians/biostatisticians and faculty in academia, government, and the private sector in a structured program during the 2018 Joint Statistical Meetings.

This multi-day program (Sunday, July 29, through Wednesday, August 1) provides career information, mentoring, and networking activities.

Program activities include small-group discussions and one-on-one meetings between mentor-mentee pairs.

For more information and the mentee application link, visit <http://community.amstat.org/cmis/events/dwmp/dmp2018>. Preference will be given to applications received by May 31, 2018. For more information, contact Dionne Swift at [swift.dp@pg.com](mailto:swift.dp@pg.com). ■





# A Commitment to Community Reaches 10-Year-Old at StatFest

Adrian Coles and Renée Moore



From left: Nagambal Shah, Erica Dawson, Dawson Batemon, Brian Millen, and Renée Moore. Millen was the keynote speaker for this year's event.

Photo by Jesse Chittams

**B**uilding supportive communities within our broad field helps create pipelines through which talented individuals from all backgrounds can enter into our discipline. One such pipeline is StatFest, which is a one-day conference aimed at encouraging undergraduate students from historically under-represented groups to consider careers and graduate studies in statistics.

Organizers of StatFest typically endeavor to reach undergraduate and high-school students. However, they discovered their efforts to build community this year extended the pipeline to at least one person who is a bit younger.

This year's youngest attendee was 10-year-old Dawson Batemon, who accompanied his mother, Erica Dawson, as she balanced professional and family service.

Erica is an epidemic intelligence officer at the US Centers for Disease Control and Prevention. She was an invited panel speaker who has learned to use the often-unavoidable overlap between professional and personal life to her advantage.

She says, "I felt extremely comfortable bringing my son to the workshop. Everyone welcomed and embraced him. StatFest has a sense of community that enables participation from parents, like myself." Dawson has accompanied her to several events such as this year's StatFest and been exposed to the same guidance and wisdom used to motivate high-school and undergraduate students.

Dawson's favorite subject in school is mathematics, and he uses his mathematical skills as a member of the LEGO Robotics Team at his school. Erica believes her love for mathematics and the support she has received from this community has contributed to his enjoyment of mathematics.

She says, "He gets a lot of exposure to opportunities beyond high school and undergraduate studies. This normalizes the notion that people from under-represented groups can successfully earn advanced degrees in mathematical sciences."

## Program Summary

This year's StatFest brought 150 students and professionals to Emory University to connect to and learn from graduate students; early career professionals; and established leaders in academia, industry, and government.

In addition, participants benefited from panel discussions that addressed topics such as careers in statistics and the graduate student experience. Participants also took advantage of structured activities that helped enhance their networking skills.

Former ASA President Sastry Pantula provided a special presentation that highlighted student opportunities within the ASA while former ENAR president F. Dubois Bowman provided insight into how to prepare for graduate school admission.

A special presentation was held in honor of Nagambal Shah, founder of StatFest. She was presented with flowers and a plaque to honor her initiation of this annual event and her continued contributions to the ASA's Committee on Minorities in Statistics (CMS).

The chair of this year's StatFest Planning Committee was Renée Moore, chair of the ASA's CMS.

StatFest 2018 will be held at Amherst College on September 23. Check the Committee on Minorities in Statistics website at <http://community.amstat.org/cms/home> for more information if you are interested in participating in the next StatFest or the CMS's other key initiative, the Diversity Mentoring Program. ■



# Arizona Chapter Members Participate in DataFest

The Arizona Chapter concluded its first ASA DataFest competition on March 25 with excellent participation from students of Arizona State University's Tempe and West campuses. A total of 15 teams comprised of 49 students finished the weekend-long competition.

Referred to as a data hackathon, ASA DataFest challenges undergraduates to analyze a large data set from industry over a weekend and present their results before judges.

Many of the students began learning R for the competition, but at least one of the teams relied heavily on their training in SAS for their data preparation and analyses. Visualization was one of the judging criteria, yet teams were seen learning to use a commercial package like Tableau on the spot for their analyses and presentations. A few teams ventured into building quick models, ranging from logistic regressions, to time series, to machine learning. Clearly, many of the students took up the challenges and used the competition as a way to strengthen their technical skills while conducting data analyses.

More than 30 mentors signed up to help the students overcome DataFest's challenges. Most of the mentors were graduate students and faculty at ASU, but members of the Arizona Chapter saw many data professionals from local business and industry participating, too. An attempt was made to find mentors who could help



From left: Arizona Chapter officers Jie (Jane) Pu, Yongzhao Peng, Shuo Jiang, and Rodney Jee; district vice chair Ji-Hyun Lee; and Jennifer Broatch of ASU-West Campus

with specific languages or software tools and such effort was not wasted. Python and Tableau experts were announced upon arrival and immediately found teams seeking assistance in applying those tools to their analyses.

The competition finished Sunday afternoon with student presentations of their key findings. The ASU site was fortunate to have a representative of the data donor among the panel of five judges. A senior analyst from the health care sector provided another perspective on judging. ASA members Steve Robertson of Southern Methodist University, John Stufken of ASU, and Ji-Hyun Lee of The University of New Mexico rounded out the panel. Lee, who is also the current Council of Chapters district vice chair, not only judged, but also was present for the entire event. Besides working with the

students, she took time to talk with members about the needs and opportunities for leadership roles in the chapters and ASA. ■

## chapternews

### North Carolina

The North Carolina Chapter offered the ASA's statistical leadership course to its members in March. Gary Sullivan from the ASA's ad-hoc leadership committee came to the Research Triangle Park area to lead a course that included personal reflection, group discussions, and targeted exercises to develop a greater awareness of leadership.

Local leaders involved in the courses included David Banks of Duke University and Abie Ekangaki of biopharmaceutical company UCB. Banks spoke of his personal leadership development, from working in his role in government to his current position as director of the Statistical and Applied Mathematical Sciences Institute. Ekangaki explained the differences between leadership and leaders and the implications of those differences inside an organization's structure. ■

# sectionnews

## Biometrics

The Biometrics Section will sponsor seven continuing education courses at the 2018 Joint Statistical Meetings in Vancouver. This month, we highlight the following two:

### Introduction to Bayesian Nonparametric Methods for Causal Inference

*Instructors: Jason Roy and Michael Daniels*

Have you ever thought about trying more innovative approaches to causal inference, but you don't know how to begin? Bayesian nonparametric methods (BNP) could be exactly what you are looking for! In this short course, these experts will review BNP methods and illustrate their use for causal inference in the setting of point treatments, dynamic (longitudinal) treatments, and mediation. The BNP approach to causal inference has several possible advantages over popular semiparametric methods, including efficiency gains, the ease of causal inference on any functionals of the distribution of potential outcomes, the use of prior information, and capturing uncertainty about causal assumption via informative prior distributions. You'll learn even more from a wealth of examples, supported by detailed instructions on software implementation using R.

### Data Science for Statisticians

*Instructor: Rafael Irizarry*

Do you possess the three key skills needed to succeed in today's data science revolution? Come to this course to find out! This short course focuses on statistical thinking in today's data science environment. Real-world data analysis examples will introduce data science concepts and skills

not typically taught in traditional statistics courses. Exploratory data analysis, data visualization, machine learning, and tidyverse tools are just a few of the 'essentials' we will cover. And throughout the course, there will be an emphasis on three key skills needed for you to succeed: creating, connecting, and computing. This half-day course is an ideal quick guide for statisticians wanting to gain practical knowledge about data science. ■

## Biopharmaceutical

*Janelle Charles, Juliet Ndikum, and Wen-Chi Wu*

The Biopharmaceutical Section invites all section members to participate in the 2018 mentoring program.

Networking can be challenging but beneficial. Meeting others in our profession can help us quickly learn the ropes, improve our careers, and contribute to the statistics profession. Finding a mentor has its challenges and, keeping that in mind, the Biopharmaceutical Section has created a mentoring program based on the mentoring blueprint created by the Committee on Applied Statisticians. More than 100 people have participated in our mentoring program since 2014.

Mentee Wenlin Yuan has this to say about the program:

The mentoring program has been extremely stimulating and satisfying to me. My mentor, Greg, has been providing me lots of helpful advices and has been answering all kinds of my questions regarding statistics study, research projects, career development, graduate school application, and a lot more. I really appreciate the time and effort that my mentor has been devoted in helping me, and also the opportunity that the mentoring

program provided to learn from great statistician! I believe the mentoring program is a very beneficial and successful program, especially to people who are new to the statistics field, like myself. Thank you very much!

And mentor Greg Ball says this about his experience:

Really like the mentoring program. For me, in addition to being able to help young statisticians get off to a good start, I like keeping a connection to my roots. Wenlin and I have had some interesting and productive discussions this year. Would like to see this program continue to expand.

The goal of this program is to help members further enrich their professional experience through achieving personal and professional goals. This may occur through sharing knowledge and experience between a professional practitioner and someone entering the profession. A constructive mentoring relationship can take many forms and occur at any stage of one's career with benefits for both the mentor and mentee.

We will provide hands-on resources (<https://bit.ly/2JEWozx>) for mentors and mentees to facilitate their interactions. Information related to the mentoring activities and additional resources for mentors and mentees is available via the Biopharmaceutical Section website (<http://community.amstat.org/biopl/aboutus/sub-committees/mentoring>).

Are you interested in becoming a mentor and helping fellow biopharmaceutical statisticians? Are you a potential mentee, or can you nominate a statistician who may be looking for a mentorship program? If so, email your contact information to [biopharmmentoring@gmail.com](mailto:biopharmmentoring@gmail.com) with "Biopharmaceutical Section Mentoring Program" in the subject line. ■

## Quality and Productivity

The Quality and Productivity (Q&P) section will offer one invited session at JSM 2018. **Leading with Statistics: Process Monitoring and Improvement** will cover a range of important and contemporary topics such as using baseline data in process improvement, control charts and multivariate process monitoring, and the real-time monitoring of events. *Subhabrata Chakraborti* of the *University of Alabama* is organizing the session.

Q&P is also sponsoring the following two roundtable discussions:

**Dynamic Data Visualization**, led by *Blanton Godfrey* and *Lori Rothenberg* of *North Carolina State University*.

**Preparing Statisticians to Be Successful Data Scientists in Big Data Era**, led by *Ming Li* of *Amazon*. ■

## Statistics in National Defense and Security

The ASA's Section on Statistics in National Defense and Security (SDNS) sponsored the student poster session prize at the Conference on Data Analysis (CoDA), which took place in Santa Fe, New Mexico, March 7–9.

The prize has become a major feature of CoDA and is a great way to introduce students to the section. The conference highlights data-driven problems of interest to the Department of Energy. Talks and posters feature research from the Department of Energy national laboratories, academia, and industry.

There were 28 students presenting posters, and three prizes were awarded to the following students:

**First Prize, \$400: Lauren M. Foster**, *Colorado School of Mines*

**When Does Uncertainty Matter While Modeling Climate Change in Mountain Headwaters? Contrasting Model Resolution and Complexity Under a Changing Climate in an Alpine Catchment**

Alpine, snowmelt-dominated catchments are the source of water for more than one-sixth of the world's population. These catchments are topographically complex, leading to steep temperature gradients and nonlinear relationships between water and energy fluxes. Recent evidence suggests alpine systems are more sensitive to climate warming, but these regions are vastly simplified in climate models and operational water management tools due to computational limitations. Simultaneously, point-scale observations are often extrapolated to larger regions where feedbacks can both exacerbate or mitigate locally observed changes. It is critical to determine whether projected climate impacts are robust to different methodologies, including model resolution and complexity.

Using high-performance computing and a representative headwater catchment modeled in Parflow-CLM, we determined the spread of uncertainty in hydrologic fluxes across 30 projected changes for the Rocky Mountains. These projections were run on multiple model configurations of varying complexity, including 100m and 1km resolution, a traditional land surface modeling single column vertical flow, and subsurface 3D lateral flow.

We find that model complexity alters nonlinear relationships between water and energy fluxes; for example, higher-resolution models predicted larger reductions to snowpack, surface water, and groundwater stores per degree of temperature increase, suggesting that warming signals may be underestimated in simple models. Hydrologic impacts from increases in temperature are robust to variation in model complexity, but impacts from changes in precipitation are within uncertainty bounds of model configurations. This result corroborates previous research showing that mountain systems are significantly more sensitive to temperature changes than to precipitation changes and that increases in winter precipitation are unlikely to compensate for increased evapotranspiration in a higher energy environment.

These experiments help to bracket the range of uncertainty in published literature of climate change impacts on headwater hydrology, characterize the role of precipitation and temperature changes on water supply for snowmelt-dominated downstream basins, and identify changes to climate impacts at different scales of simulation.

**Second Prize, \$100: Divya Banesh**, *UC Davis/Los Alamos National Laboratory*,

**Finding Change Points in Time-Dependent Image Sequences Based on Feature Analysis**

Time-dependent sequences of images derived from simulated scientific models or imaged from the experimental sciences can range over long periods of time with many time steps. Often, this data can be cumbersome for the scientist to parse, or extract pertinent information specific to their

research. We present an analysis technique to extract change points from a time-dependent image sequence using image processing and computer vision tools. We use these tools to extract types of features that would be of interest to a scientist and analyze changes to these features over time. We then apply change detection to these features to extract time steps that may be most interesting to a scientist. To showcase these tools, we use a cinema database of MPAS-Ocean image files.

**Honorable Mention: Michael Darling, Sandia National Laboratories, University of New Mexico**

#### Uncertainty Propagation in Multimodal Image Analysis

The continued proliferation of remote sensing systems, particularly with respect to their use in decision-making applications ranging from national security to climate science, has resulted in increasing demand for data-

driven analysis methods that quantify the uncertainty in their results. In this work, we explore the propagation of uncertainty through multiple levels of data analysis. In many cases, the ultimate result of a real-world data analysis is the output of the final stage of a pipeline of processing and inference steps. While statistical uncertainty quantification methods exist for individual pipeline stages, methods that systematically incorporate and propagate uncertainty end-to-end remain largely unexplored.

We demonstrate one possible approach to uncertainty propagation on a multi-sensor supervised pixel classification task based on co-registered optical and LiDAR images. The baseline classification scheme uses the raw data as its features and estimates the uncertainty in the assigned classes. We compare the baseline approach to one in the data that is clustered, and the cluster probabilities are used as features for supervised

classifiers. We show how uncertainty propagates through the two approaches and compare the resulting classifications and associated uncertainties. ■

## Physical and Engineering Sciences

*Brad Evans, SPES Program Chair-Elect*

The Physical and Engineering Sciences Section (SPES) will support four roundtables as part of JSM 2018. Roundtable discussions are a great way to network, share ideas, discuss topics of interest, and participate within the SPES and statistical communities. For 2018, the topics are the following:

- DOE: It's not a one and done! Discussion will focus on design as part of sequential learning where the accumulated knowledge is based on scientific method and leads to greater collaboration and success.
- Go green, do good. Learn how you can support green engineering projects as a consultant or volunteer. Green science needs input from statisticians who understand algorithms and uncertainty.
- Have you always wanted to be a Bayesian? This roundtable focuses on practicalities for successful Bayesian implementation based on examples from the medical device industry.
- Sources of variation. Sure, "we" know what that means, but how do you extract this information from collaborators? This roundtable will focus on how to communicate this concept to project teams based on a broad understanding of the research problem. When successful, this leads to greater collaboration and places statisticians as critical team members. ■

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[ww2.amstat.org/meetings/jsm/2018/registration](http://ww2.amstat.org/meetings/jsm/2018/registration)



## Minnesota

■ The School of Public Health, University of Minnesota, seeks a division head to be appointed at the rank of full professor for its division of biostatistics. The position requires a well-established researcher, collaborator, and mentor to be a visionary leader with skills to strengthen and further develop our successful teaching and research programs. This national search will continue until filled. Submit application at <https://z.umn.edu/jobopening322561>. EOE

## Virginia

■ Daniel H. Wagner Associates, Inc.—a leader in mathematics, operations research, and software development—is currently seeking bright, highly motivated, self-directed individuals who are interested in solving real-world problems. Applicant is expected to work closely with software engineers in developing / designing algorithms / solutions for various DoD agencies. PhD in mathematics, statistics, physics, computer science, or related field. [www.wagner.com/contact-wagner-operations-research](http://www.wagner.com/contact-wagner-operations-research). EOE. ■

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

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

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

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

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

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

Also, look for job ads on the ASA website at [www.amstat.org/jobweb](http://www.amstat.org/jobweb).



RTI International invites applications for its Senior Survey Statistician position. In this role, you will work in a variety of fields, in the domains of public and global health, education and workforce, social science research, sample surveys, and the environment. You will have the opportunity to utilize your skills in survey sampling, experimental design, and complex data analysis. We take our mission “to improve the human condition” seriously and seek staff who resonate with it.

Qualifications: PhD in Statistics, Biostatistics, or Mathematics with at least 10 years of nonacademic related experience and 5 years of experience with survey statistics. See [www.rti.org/careers](http://www.rti.org/careers) (search “survey statistician”) for the complete position description and application information.

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We are currently recruiting for the following position:

### Survey Sampling Statistician

This position requires a master's degree or Ph.D. in statistics with coursework in survey sampling or a master's or Ph.D. in survey sampling. Candidates with a master's must have at least 8 years of experience in sample survey design, selection, or weighting and a Ph.D. with 6 years' experience. Although not required to do programming, candidates would benefit from knowing SAS and other statistical software packages. Qualified candidates must have excellent written and oral communication skills, strong organizational skills, and the ability to handle multiple tasks simultaneously.

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## DIVISION HEAD, BIOSTATISTICS

The University of Minnesota School of Public Health (SPH) seeks a Division Head, to be appointed at the rank of full Professor, for its Division of Biostatistics.

The Division, one of four in SPH, focuses on the critical statistical methods employed in scientific, health-related research, from designing studies to analyzing and comprehending data

### RESPONSIBILITIES:

- Chief administrator of the Division and member of SPH Executive Team;
- Strengthen a collegial and collaborative culture that is inclusive, diverse, and supportive for faculty, staff, and students;
- Recruit excellent faculty, particularly those from under-represented backgrounds;
- Organize and provide exceptional mentoring to junior and newly promoted faculty;
- Work collaboratively with SPH leadership to supervise, prepare, implement and monitor the Division budget, which encompasses all funding sources and ensures compliance with grant, legislative, and institutional guidelines and effective management of Division resources;
- Advance and contribute to the Division's diverse portfolio of interdisciplinary research, teaching, and service;
- Support and expand activities with community, industry, and government partners;
- Actively seek philanthropic opportunities and partnerships.

**REQUIRED QUALIFICATIONS:** PhD or ScD in Biostatistics, Statistics, or closely related field and credentials commensurate with appointment as tenured full professor in the Division and School. Nationally recognized record of scholarship, including: securing funding; demonstrated excellence in mentorship, leadership, and management; and experience in teaching and/or mentoring in a diverse academic environment.

**PREFERRED QUALIFICATIONS:** A global thinker who is intellectually curious about advancing the science of biostatistics and its applications in public health and medicine. A candidate who can articulate a vision for enhancing the research and educational missions of the Division nationally and internationally, and who has knowledge, skills, and managerial experience needed for guiding our organization.

The School of Public Health seeks to increase the diversity of its faculty, and we particularly welcome applicants from groups that have been historically underrepresented in our discipline, including racial/ethnic groups and/or LGBTQIA.

**Initial review of applicants will begin the week of April 16, 2018.** For full description and to apply at [z.umn.edu/jobopening322561](http://z.umn.edu/jobopening322561)). Salary will be competitive and commensurate with qualifications and background. Questions about the position can be directed to Search Committee Co-Chairs, Lynn Eberly ([leberly@umn.edu](mailto:leberly@umn.edu)) and Tim Beebe ([beebe026@umn.edu](mailto:beebe026@umn.edu)), or to Interim Division Head Wei Pan ([panxx014@umn.edu](mailto:panxx014@umn.edu)). Questions about the employment website or the application process can be directed to Tracey Kane ([kane@umn.edu](mailto:kane@umn.edu))

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DIVISION OF BIOSTATISTICS



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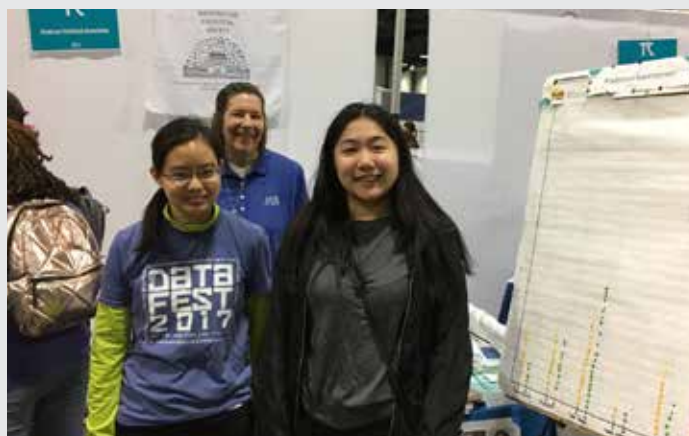
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**American Mathematical Society** • @amermathsoc

Our fellow JPBM society partner @AmstatNews is offering some activities involving #statistics at #scifest and helping to celebrate #Mathstatmonth







# HELP US RECRUIT THE **NEXT GENERATION** OF STATISTICIANS

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Many just don't know about statistics. But the ASA is working to change that, and here's how you can help:

- Send your students to [www.ThisIsStatistics.org](http://www.ThisIsStatistics.org) and use its resources in your classroom. It's all about the profession of statistics.
- Download a handout for your students about careers in statistics at [www.ThisIsStatistics.org/educators](http://www.ThisIsStatistics.org/educators).



If you're on social media, connect with us at [www.Facebook.com/ThisIsStats](http://www.Facebook.com/ThisIsStats) and



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Tatsuo Yamamoto Statistician and Statistical Consultant, W.L. Gore & Associates



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