March 2019 • Issue #501

AMSTATNEWS

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

WOMEN'S HISTORY MONTH

ALSO:

2020 ASA Board of Directors Candidates

Inaugural Florence Nightingale Day Inspires Students to Pursue Statistics, Data Science

DENVER, COLORADO

JSM2019 KEY DATES

ATTEND

May 1, 2019
Registration and Housing Open

May 31, 2019
Early Registration Deadline

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June 30 – August 1
Late Registration

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Housing Deadline

July 27–August 1
2019 JOINT STATISTICAL MEETINGS
Denver, Colorado

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January 23 – April 3, 2019
Meeting and Event Request Submissions Accepted

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April 15, 2019
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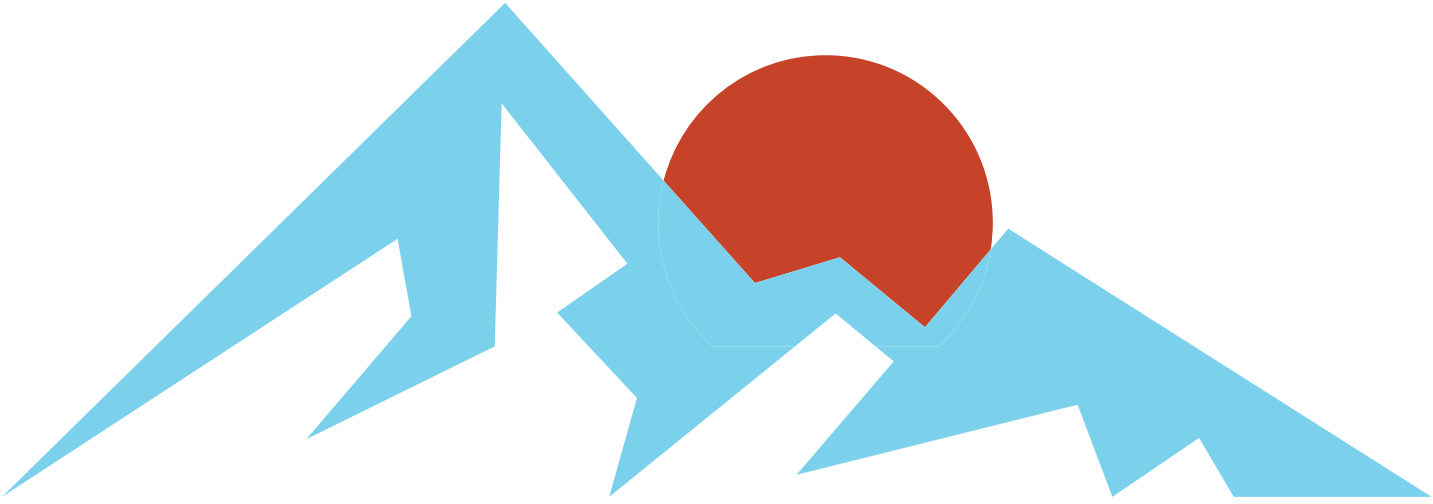
May 17, 2019
Draft Manuscript Deadline



ww2.amstat.org/meetings/jsm/2019

AMSTATNEWS

MARCH 2019 • ISSUE #501

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

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American Statistical Association
732 North Washington Street
Alexandria, VA 22314–1943 USA
(703) 684–1221
ASA GENERAL: *asainfo@amstat.org*
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features

columns

COFFEE BREAK

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

STATS + STORIES PODCAST

Recent Stats + Stories episodes include:

Getting Health and Science Reporting Right | Episode 81

Stats + Stories talks to Christie Aschwanden, the author of *GOOD TO GO: What the Athlete in All of Us Can Learn from the Strange Science of Recovery*

How to Become a Data Scientist | Episode 82

Stats + Stories interviews Julia Silge, a data scientist at Stack Overflow who has a PhD in astrophysics and an abiding love for Jane Austen.

Mapping Out Disease | Episode 83

Hear Lance A. Waller, from Emory University, talk about his work with spatial modeling. In addition, you can hear about his favorite map and what map gaffes really bug him.

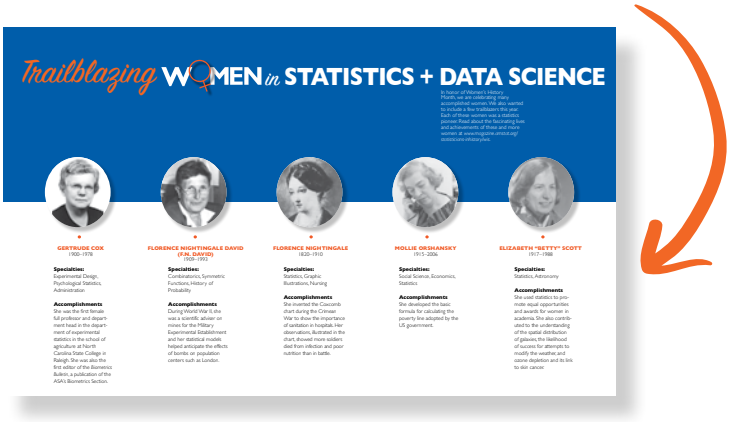
Listen to any of these episodes at *https://statsandstories.net/episodes.*

CORRECTION

In the February issue of *Amstat News*, we inaccurately wrote that nominations for both president and vice president should come from industry in the 2020 election year. Actually, nominations for president should come from academia and nominations for vice-president should come from industry.

departments

See **INSIDE** for Women in Statistics and Data Science Poster



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Statistics, Fake News, and AI: **Who's on First?**

The title of the book in the hands of the fellow seated next to me on the plane was "*Everybody Lies: Big Data, New Data, and What the Internet Can Tell Us About Who We Are,*" by Seth Stephens-Davidowitz. The book is actually a good illustration of why we need sound statistical design, surveys, and analysis to avoid the pitfalls that arise when we rely on our own intuition about "data" we find on the internet—self-selected and highly biased pieces of "information." Indeed, the famous headline, "Dewey Defeats Truman" (1948)—familiar to students in our sample survey classes—reminds us sample survey design is important and erroneous information is not new to journalism (or, for that matter, any discipline).

What seems to be new is the introduction of *intent.* While errors in reporting were previously unintentional (e.g., the result of bias in surveys, errors in typesetting, misunderstanding the information, or recording incorrect information from the source), the "disinformation" that is particularly insidious seems to be generated with the intent to persuade to a particular viewpoint that cannot be justified by, or (more maliciously) is contradicted by, the facts.

Much of statistical learning (cf. *The Elements of Statistical Learning* by T. Hastie, R. Tibshirani, and J. Friedman) focuses on classifiers, starting with Fisher's discriminant analysis and moving on to logistic regression, neural networks, and more advanced multi-layer neural networks (i.e., "deep learning"). So, the mathematical properties of classification techniques have been well studied over the years. In this time of "fake news," many important questions emerge: How can statisticians contribute to the reduction of disinformation caused by malintents? What are the research challenges in applying these techniques to massively streaming online news stories, tweets, postings, and social media outlets? Can those methods meet the demands of streaming data? Do the mathematical properties still hold under those circumstances? Do we need to develop more sophisticated approaches to meet these challenges?

At least as important as the research challenges associated with identifying "fake news" are the challenges in convincing readers the news is disingenuous. That turns out to be an even harder problem, one that requires not only statistical methods but also understanding of human psychology and media communications. What aspects of a so-called "news story" lead a person to be convinced by it? What traits lead some people to receive "fake news," propagate it (e.g., via the internet or Twitter), and believe versus disbelieve it? How do we design studies to identify these aspects and traits, and what studies can we conduct to see how effectively we can change the "believers" of fake news stories into "skeptics" or "disbelievers"? What research has been done in this area, what further research should be conducted, and how shall we establish the collaborations to conduct it?


Karen Kafadar

Both sets of challenges are being tackled by the second of this year's presidential initiatives. I am delighted that co-chairs Jessica Utts of the University of California, Irvine and Jun Yang of Duke University have agreed to lead the "Disinformation Initiative." Jessica is well known to our community as the ASA's 2016 president. During her presidency, her initiatives focused on communicating statistical concepts to broad audiences. Jun Yang, associate chair of the department of computer science at Duke, is well known in the computer science community for

June Yang

Jessica Utts

research in computational fact-checking. Their team consists of statisticians (Tim Hesterberg at Google, Trevor Hastie at Stanford, John Bailer at Miami University, and Regina Nuzzo at Gallaudet), computer scientists (Huan Liu at Arizona State), and a media specialist (Trevor Butterworth). Together, we hope they will develop the following:

- A research agenda and plan for encouraging statisticians and data scientists to engage in research and collaborate in this area (both in the technical algorithms in misinformation and disinformation and in the design of studies to identify traits that lead people to be influenced by fake news)
- A plan for creating mechanisms (public information campaign or venues for dissemination) that will help the public understand, and be less influenced by, fake news.

As with so many of the successes in our field, this one requires close collaboration with domain experts. I feel confident this task force will demonstrate much is to be gained in advancing this multidisciplinary research by collaboration.

The field of artificial intelligence (AI) seems to exemplify the need for collaboration. While many have seen the proclaimed successes of AI as largely oversold (see last month's President's Corner), AI has more recently been identified—by both government agencies and industry—as a core component in which billions of dollars are being invested.

Statistics has a major role to play in AI research, which heretofore has been dominated largely by computer scientists and engineers. Indeed, the National Science Foundation (NSF) has recognized AI as a "highly interdisciplinary endeavor, which has included many fields such as computer science and engineering, cognitive science, philosophy, mathematics, economics, psychology, linguistics, and ethics." Where is "statistics" in this list? How can the ASA persuade the NSF "statistics" should be in this list?

There is some hope in this regard, if we choose to take advantage of it. My colleagues report several presenters at the most recent meeting of the American Association of Artificial Intelligence (*www.aaai.org*) called for collaboration with statisticians. We need to step up to the plate before we find ourselves behind the curve, as has happened already with data science and machine learning.

We recognize our training in the mathematical sciences, the importance of experimental design, and the development of inferential procedures and expression of our confidence (and uncertainty) in those inferences is essential for AI. This training positions us well to respond to the challenge. Now we need to take the lead in collaborating on the research that will lead to advances in both AI and statistics.

The "morals" identified in last month's President's Corner apply here to the challenges in identifying fake news (and converting "believers" into "skeptics") and in artificial intelligence. These two fields allow statisticians the opportunity to do the following:

- Showcase all our talents—logical thinking, identification of process steps, design of relevant data collection, analysis and inference, characterization of uncertainty, clear results
- Seize opportunities to create the demand for our talents and meet that demand
- Be prepared to use our skills to present reasonable approaches to solving problems, even before the theory has been developed, before others offer less sensible approaches

If you have ideas for the Disinformation Task Force, please send them to Jessica Utts (*jutts@uci.edu*) and Jun Yang (*junyang@duke.edu*). Thank you for helping to bring statistical thinking into this critical area!

Thank You!

Amanda Malloy, ASA Director of Development

Just under $233,000 was raised in 2018 for ASA programs and initiatives from more than 930 donors. Every single dollar matters and helps provide programs that promote the practice and profession of statistics.

A special thank you to the more than 280 donors who contributed in excess of $50,000 on the ASA's inaugural Giving Day. The 2017/2018 ASA Board of Directors matched the first $30,000 in contributions, which made the grand total raised on one day in support of ASA programs $80,000. Thank you also to those who participated in the Giving Day contests: Early Bird Donor, Donate and Share, Afternoon Energizer, and JSM Selfie Challenge. Winners received either a collection of ASA goodies such as a timeline of statistics poster and "Statistics Is My Superpower" water bottle or an invitation to the President's Invited Speaker Reception at JSM 2019.

I am asked frequently why it is important to donate in addition to paying membership dues. Your membership in the ASA is incredibly important. You help make the ASA the largest community of statisticians and data scientists in the world! Your membership dues help with the administrative costs of running the association and providing you the many benefits that help you in your student and professional careers.

So Why Donate, Too?

Everyone is touched by statistics in some way, whether they know it or not. The ASA is the only major organization in the country focused on improving the quality of statistics education at all levels, helping people have a better understanding of data that affect every-day decisions, advocating for better use of statistics in government, and cultivating the next generation of statisticians and data scientists. That is a lot of work, and it is only made possible through generous donations and countless hours of volunteer time.

You are an integral part of the ASA. Your membership, your time, and your donations are helping us build a world that relies on data and statistical thinking to drive discovery and inform decisions.

Thank you again for your support!

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Harvey A. Singer
Janet S. Sinsheimer
Richard A. Smiley
Jeffrey A. Smith
David McCulloch Smith
Stephanie A. Smullen
Rhona Souers
Susan E. Spruill
William J. Stager
Nancy Stambler
Donald Edward Stanley

Memorial Gifts

Gifts were made in fondest memory of the following individuals:

Ignatius M. (Jim) Bienias
Patrick Carmack
Mr. and Mrs. Ray C. Clark
W. Edwards Deming
Jim Dickey
Joyce Feinberg
Steve Feinberg
Bernard Harris
Peter W.M. John
Eun Sul Lee
Michael McKay
Herman Rubin
Swayam P. Srivastava
Baolai Sun
John W. Tukey
N.S. Venkatesa

Tribute Gifts

Gifts were made in honor of the following:

Kirk Anderson, Grand Valley State University
David Blackwell
Kasturi Chanda
Sushmita Chanda
Phyllis Curtiss, Grand Valley State University
Arthur Kennickell
David Salsburg, ASA Fellow
Fritz Scheuren
ASA Staff
FDA Statisticians
Students
Columbia University
Ron Wasserstein

Lenard S. Starks Jr.
Chad Daniel Stecher
Marco Steenbergen
Susan LeRoy Stewart
John M. Stickler
Marilyn J. Stolar
Charles Leslie Strecker
John P. Strohm
Mark C. Strong
Guoqin Su
Yanqing Sun
Xuming Sun
James J. Swain
Peter Swanson
Ruth Ellen Swanton
Dionne Swift
Lu Tang
Daniel Ray Thompson
Mary E. Thompson
Sally W. Thurston
Lu Tian
Emiliano Tollemeto
Tammy Tom
Hsiao-Hui Sophie Tsou
Hiroe Tsubaki
Ralph M. Turner
Charles R. Twardy
Esa Ilkka Uusipaikka
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Timothy W. Victor
Carl Norwood von Ende
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Roger Walker
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Mei Wang
Tao Wang
Michael T. Weaver
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Peter H. Westfall
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Linda C. Whitehand
Jean F. Williams
Colin Williams
Joel Wolfrath
Rebecca Wong
Bradford Stuart Woodard
Colin O. Wu
Bin Xing
Robert Peter Yerex
Lisa H. Ying
Marian Y. Y. Yong
Yuxin Zhang
Bing Zhang
Zuoshun Zhang
Yun Zhang
Qian Zhang
Nicole Zubizarreta

*Additionally, 210 donors made anonymous gifts

2020 ASA BOARD OF DIRECTORS CANDIDATES

RUNNING FOR **PRESIDENT-ELECT 2020**

David A. Marker

Senior Statistician and Associate Director, Westat

Marker

What a wonderful time it is to be a statistician. Every day, I feel inspired hearing about decisions being made based on data; I'm sure you feel similarly. Unfortunately, we know that often these decisions do not properly account for the presence of uncertainty in the data or they completely exclude data that do not conform to the user's expectations. We know that *all* decisions have uncertainty, but we can't let that lead to inaction. Statistician's capabilities and data-based decision-making can have powerful and influential results.

My work as an expert witness before federal and state courts on voter ID laws—and in Canadian provincial court on language-minority rights—provided an opportunity to demonstrate the important role statistics can play in advancing human rights. Testifying before Congress, I conveyed the accuracy of data we collected on homelessness to encourage its use in policy-making.

The ASA's Strategic Plan vision statement is "A world that relies on data and statistical thinking to drive discovery and inform decisions." This only happens if decision-makers and regular citizens understand how to *act in the presence of uncertainty.* Our goal should be to move forward with efforts to increase willingness to make such decisions. All segments of the ASA can be involved in such efforts.

The ASA **Board of Directors** has issued a number of important statements consistent with this goal, from proper use of *p*-values to the role of statistics in climate change; we need to continue these efforts. We should encourage our journals to allow for pre-registration of analyses to strengthen the reliability of our findings.

Chapters have a large role to play. As chapter's representative to the ASA Board, I learned about many vibrant chapter programs. We must continue to support the development of programming that is relevant to acting in the presence of uncertainty and ensure these programs are replicated.

As chair of the ASA's Scientific and Public Affairs Advisory Committee, I organized the ASA Workshop on a Statistical Consensus on Climate Change. We brought together **academics, industry, and government statisticians** to identify how our profession could increase its role in advancing science through better use of statistics. The ASA Advisory Committee on Climate Change Policy continues this important work. Partnerships with the AAAS and other scientific communities are essential to expanding the breadth of topics where statistical knowledge is brought to bear.

The ASA can help educators, whether K–12 or at colleges and universities, communicate "that statistics is the science of learning from data and of measuring, controlling, and communicating uncertainty." Current events provide many examples that can be used to make statistics relevant to students, who will become our future ASA members. Continued outreach to educators (e.g., providing a database of examples through our K–12 Statistical Ambassador) is an essential building block to expand the impact of statistics.

To be most successful, **we need to grow our organization.** Statistical and data science jobs are growing rapidly; statistical degrees, especially at the bachelor's level, are also growing. By encouraging many of these people to join the ASA, the power of our voice will be expanded.

The current push to expand voting rights in this country includes automatic voter registration, whereby citizens are added to voter rolls unless they decline the opportunity. The ASA should establish a similar program, where every student who graduates with a degree in statistics/biostatistics/data science automatically becomes an ASA member for free. By the time they switch from free to dues-paying, we can demonstrate the advantages of membership.

We should reach out to large employers—including Google, Facebook, and the pharma industry—to encourage their participation.

The ASA, while international in both membership and ethnic backgrounds, has more to do to be welcoming to all. Recent presidential initiatives have encouraged people of all backgrounds to become leaders within the ASA; we can expand on this. We should continue to recruit students of minority backgrounds to ensure representation of our country's diversity. Local chapters could reach out to historically black colleges and other institutions to share opportunities to positively impact society by being a statistician.

I am deeply honored to be a candidate for president of the ASA. Having represented chapters, sections, and committees of the ASA in the past, I look forward to the opportunity to work with all ASA members to promote the practice and profession of statistics. ■

The ASA announces the selection of candidates for the 2019 election. The winning candidates' terms will begin in 2020. Make sure to look for your ballots in your email inbox and vote early. Voting begins at 12:01 a.m. ET March 15 and ends at 11:59 p.m. PT on May 1.

RUNNING FOR **PRESIDENT-ELECT 2020**

Robert L. Santos

Vice President and Chief Methodologist, Urban Institute

Santos

I'm just a kid (albeit much older) from a San Antonio barrio with two career passions: statistics and helping people. I like adventure, too, so, over the years, I took some chances and here I am, ready to help you.

I think big and creatively, offering half-crazy ideas to provoke thoughtful deliberation. I value teamwork above individualism because I find it typically yields richer results. Parts of my career were as an isolated statistician; it allowed me to focus on and value ASA membership. I've worked hard at increasing ASA member diversity and helping us understand its immense value to our profession. I've found a home in public policy research, consulting, mentoring, and working on teams to improve our society.

As potential ASA president, I offer the following for your consideration:

Strategic reflection. The ASA offers a big tent, but we yearn to attract and retain young professionals, as well as students not just from statistics departments. In a global and digital world, let's reconsider what an association should be in contemporary society. In turn, this will motivate who our member base is and what ASA membership means, thus reinforcing our cultural relevance. I will work with you to develop this vision.

Building community from sections. The ASA has sections, many devoted to a specific statistical application. I would promote synergies by fostering cross-section activities so that members learn from each other. This could be through special invited sessions, workshops, hackathons, or other more engaging activities at JSM, CSP, or chapter events. We have an opportunity to cross-fertilize, and this will build a stronger sense of community.

Increasing support of member-based work. The ASA enjoys a broad membership across many disciplines. Membership strengths lie in increasing diversity, global reach, and expanding areas of application. As a board member, I witnessed firsthand the leadership of our sections, chapters, committees, and caucuses. As president, I'd advocate for additional support to committees, sections, and chapters, including a broad-ranging assessment to identify scalable initiatives and programs (best practices) that might otherwise slide off our radar.

Adding critical thinking. Statisticians often work in teams and can be the wise adviser via critical thinking. It's irresponsible to just crank out a sample size, model, or *p*-value on demand. The ASA offers related programs in leadership, communications, etc., plus CSP short courses. I'd canvass these to create a pilot training focusing specifically on the role of critical thinking for statisticians in project teams.

As a leader, I've devoted much of my career to serving the statistical community, serving on both the ASA and WSS [Washington Statistical Society] Board of Directors. I held numerous committee and section officer positions since joining in 1977, receiving ASA Fellow and Founder's awards. I've served as president of a sister organization, AAPOR. I've worked in academic and commercial research organizations and heavily participated in government service (e.g., study sections, federal committees, NAS panels); I serve on the NCHS Board of Scientific Counselors. I understand the myriad perspectives and diverse backgrounds of our members.

As an executive officer, I embrace stewardship and decision-making motivated by values, mission, and fidelity to strategic plan. I make tough decisions as needed, but with compassion. It would be the honor of a lifetime to serve you. It would be a labor of love and service with humility.

Want to know more? Check out my candidacy website at *robthinkbig.org*. ■

RUNNING FOR **VICE PRESIDENT 2020–2022**

Dionne L. Price

Director, Division of Biometrics IV, Office of Biostatistics, Office of Translational Sciences, Center for Drug Evaluation and Research, Food and Drug Administration

Photo by Perry Price

Price

As a statistician at the Center for Drug Evaluation and Research of the Food and Drug Administration (FDA), I have witnessed the changing landscape of drug development over the years. With this evolution has come a vast number of opportunities and challenges for statisticians. I propose that this phenomenon is not unique to FDA and that the statistics profession is also experiencing an evolution. While the foundation of statistics remains unchanged, the practice and application of statistics has grown with the emergence of scientific advancements impacting all areas of life. As we build on the past and prepare for the future, I would be honored to serve the profession as the vice president. My vision entails the intersection of awareness, sound statistical science, and adaptability.

Awareness

I gained exposure to the field of statistics and the diverse career opportunities during a summer internship while an undergraduate student. The internship set me on a path to becoming a statistician. I firmly believe that there are untapped quantitative thinkers from diverse backgrounds that could become the next Gertrude Cox, David Blackwell, or John Tukey. There is a need to continue to explore alternative avenues to reach and expose younger generations to statistics and its global impact.

As a professional statistician, I value the opportunities to network, to continue learning, and to stay abreast of current events impacting statisticians afforded me through my membership in the ASA. Although membership is of immense value, a greater awareness of the benefits of membership is needed. As the old saying goes, there is strength in numbers, and there are endless challenges that could be addressed using the full power of our collective think tank.

Sound Statistical Science

With the proliferation of quantitative scientists, the era of big data, and the rapid rise of artificial intelligence, we must ensure that statistics is properly used to answer questions of interest. This will require communication and education. Within the statistical community, we must stay current and critically evaluate how best to engage and collaborate with quantitative scientists to guarantee that sound statistical theory and principles are applied. External to the statistical community, we must become leaders equipped with the knowledge and skills to drive discovery and inform decisions. Many sectors have begun to incorporate leadership into training modules, but expansion of leadership training is essential.

Adaptability

A quote from Shakespeare's *Hamlet* is "To be, or not to be, that is the question." Our context is different, but I suggest that the question for statisticians is "To adapt or not to adapt?" And the answer is we must adapt. Although the hallmark of statistical theory remains, curricula for our statistics degree programs may need modifications to keep pace with contemporary, real-world questions spawned by scientific advancements. Modifications may also include attention to soft skills, which become invaluable in professional settings where we are posed to lead. We must also play an active role in society to ensure the value of statisticians is not diminished. This entails continuing to stay abreast of current events that impact our statistical community and supporting the community through policy statements or other strategies to raise our collective voice. We, as a community, must also be willing to assess our approaches and welcome novel ideas for further advancement of the profession.

If elected, I look forward to working with you to navigate the intersection of awareness, sound statistical science, and adaptability. ■

RUNNING FOR **VICE PRESIDENT 2020–2022**

Stephanie S. Shipp

Deputy Director and Professor, Social and Decision Analytics Division, Biocomplexity Institute, University of Virginia

Photo by Delana M. Nalesnik

Shipp

The American Statistical Association (ASA) has been my professional home and an integral part of my career for over 40 years. The ASA's tenets to welcome all disciplines, support excellence in all phases of statistical science, provide opportunities and training at all levels, and promote the quintessential translational science—statistics—have shaped my career. I am honored to be your candidate for vice president and, if elected, I will use my experience, enthusiasm, and ideas to advance the ASA's mission.

My professional goals are deeply aligned with the ASA's vision to promote "a world that relies on data and statistical thinking to drive discovery and decisions." As your vice president, I will apply my passion to bring[ing] data and statistical literacy to all levels of society and work collaboratively with ASA members and committees to ensure our collective vision is realized.

Current society provides both a great opportunity and challenge for the ASA to build on its legacy of supporting and encouraging quantitative literacy to enhance the value of statistics. Data literacy is not only the basis of statistical and quantitative analysis, it is a critical mechanism to improve society. As former president of the ASA and champion of statistical literacy, David Moore wrote, "The study of statistics provides tools that informed citizens need in order to react intelligently to quantitative information in the world around them. Yet many research studies indicate that adults in mainstream society cannot think statistically about important issues that affect their lives."

Data literacy—as the ability to read, recognize, generate, and communicate data—is a necessary first step to statistical understanding. One does not need to be a statistician to understand basic statistical concepts, their importance, and their application. And data does not have to be perfect to be useful. But a data-literate population is necessary if we are to create a future where decisions and actions are made using evidence-based policy development and practice. The ASA must vigorously lead that effort.

One example of where the ASA can have a crucial impact is at the local community level. A large, imperfect, and mostly untapped source of rich data exists at this local level—with local governments, towns, and municipalities. Every day, local governments collect massive amounts of data but do not use (or know how to use) these data for statistical insights and analyses. Enhancing data and statistical understanding for local policymakers and organizers will help them improve data collection and make better decisions about policies that directly impact economic conditions, human welfare, and technological growth. As an added benefit, the improved quality and quantity of local data will enhance its use in official statistics at all levels.

Throughout my career, I have had the opportunity to serve the ASA in many capacities on committees, programs, and sections. I am honored to now be running for vice president. I believe that, in this capacity, I can help the ASA make significant contributions to our society, our science, and our planet. ■

RUNNING FOR **COUNCIL OF CHAPTERS REPRESENTATIVE**
TO THE BOARD OF DIRECTORS 2020-2022


Stevens

John R. Stevens

Professor of Statistics, Department of Mathematics and Statistics, Utah State University

I am honored to be nominated to represent the Council of Chapters on the ASA Board of Directors. Having previously served in my local chapter and on the Council of Chapters Governing Board, I have seen first-hand the great opportunities that exist because of our local chapters—professional development and networking for members and outreach to students, policymakers, the general public, and professionals in quantitative fields.

I fully support the ASA's mission to promote the practice and profession of statistics and I believe the Board of Directors helps to fulfill that mission by supporting and encouraging chapter activity.

If elected to the board, I will proactively reaffirm and strengthen the ASA's commitment to the support and vitality of its local chapters. In addition, I will carefully consider any proposed ASA board statements to ensure they further the critical mission of the ASA and will look for ways to broaden the ASA's membership base in interdisciplinary areas, including data science and other quantitative fields. ■


Lee

Ji-Hyun Lee

Professor, Department of Biostatistics, University of Florida; Director, Division of Quantitative Sciences, University of Florida Health Cancer Center

I am honored to be a candidate to represent the Council of Chapters Governing Board (COCGB) to the ASA Board of Directors. If elected, I will work closely with other board members to support the strategic plans of the ASA: enhancing the diversity and breadth of our association, increasing the visibility, and ensuring the future of our profession.

I believe participation in the ASA is a critical way to enhance our profession. Obvious benefits include expanding opportunities for networking, continuing post education, accessing some excellent peer-reviewed journals, and staying current in statistical practices and issues.

I have held various roles within the Council of Chapters. While working for District 6 as the vice chair, I was surprised to learn that a considerable number of statisticians are unaware of or underutilize the benefits and resources from the ASA. This is especially true of statisticians who are in nonacademic sectors, master's-level statisticians, and those who are more geographically isolated from the major statistics community. While I was seeking some ideas to address this problem, I had to leave District 6 for a new position in Florida.

Aligning with the vision of the ASA, I also believe that diversity, embracing all aspects of our differences, matters to our professional organization. In a big data era, expanding inclusion beyond the classic statistics discipline is also crucial to our future. My endeavor to support the good work of the ASA and our profession would start by listening to the voice of the COCGB leadership, Council of Chapters, and local chapters that are at the core elemental level of our organization. ■

RUNNING FOR **COUNCIL OF SECTIONS REPRESENTATIVE** TO THE BOARD OF DIRECTORS 2020-2022

Tony An

Principal Research Statistician Developer in Research and Development, SAS Institute Inc.

An

Advances in technology and the big data explosion bring both unprecedented challenges and unparalleled opportunities to the ASA. The ASA has a rich, 180-year-old history of promoting the practice and profession of statistics. But taking pride in our past is not enough. We must continue to evolve to keep the organization vital to the statistics science community, and we must implement changes to remain a strong leader into the future.

I have had the pleasure and privilege to serve this esteemed organization in various positions over the past two decades. I would be honored to serve as one of the Board of Directors Representatives from the Council of Sections, and I pledge to work closely and proactively with our extraordinary colleagues to implement the ASA's strategic plan.

For the ASA to continue to thrive, our membership must achieve greater diversity and attract more young statisticians by providing a more welcoming environment, where all our members can flourish. Exploring new ways to expand our membership and offer more member benefits will be one of my top priorities.

With my firsthand experience of creating the online proceedings for the Survey Research Methods Section, I plan to propose several initiatives to modernize the ASA's *JSM Proceedings,* as well as other publications and communications, to serve our members even better.

Sections play a tremendously important role in the ASA. Better governance and coordination among sections are crucial to the health of the organization. Sections should be a magnet to members that encourage them to share common statistical research and practice interests, rather than merely a mechanism for getting allocations for invited sessions at JSM. I look forward to finding innovative ways to get members more involved in section activities.

I am grateful for the prospect of having an opportunity to build a stronger ASA community with all of you, together, and I humbly ask for your support. ■

Rebecca Hubbard

Associate Professor, Department of Biostatistics, Epidemiology, & Informatics, University of Pennsylvania

Hubbard

Photo courtesy of Penn Medicine communications staff

I'm excited by the opportunity to serve on the ASA Board of Directors as one of the Council of Sections Governing Board representatives. Looking outward to the expanding community of data consumers and inward to better understand the evolving needs of our members are key to the long-term success of the association. I believe my experience as a scientist and mentor, as well as [participation] within several ASA sections, has prepared me to contribute to this important work.

The landscape of statistics is changing rapidly. I'm enthusiastic about the ASA's "big tent" notion of statistics as encompassing everyone working to transform data into knowledge. Recently, data scientists have become an important component of this community, and the ASA has worked to include data science within the scope of our activities, including sponsorship of a number of data science conferences, workshops, and symposia. We also need to reach out to other core data science disciplines, including computer science and informatics. Co-sponsorship of the Data Science and Advanced Analytics Conference with IEEE is a great step in this direction. Moving forward, we need to continue to collaborate with other professional societies to establish guidelines for the content of data science training programs to ensure that a focus on rigorous statistical principles remains a priority.

Despite broadly growing interest in data science and data-related fields, membership in the ASA has not kept pace with this trend. Parallel to the declining trend in membership for the ASA as a whole, membership in the ASA's sections has also been declining. As chair of the Biometrics Section, I convened a working group to identify new ways to engage with and bring value to our members. To remain relevant, we need to support activities that meet the needs of an evolving field. For instance, as interest in practical and applied content has grown, conference programming needs to continue to adapt to this need. As data-related disciplines are rapidly changing, it is important that our activities reflect the needs and interests of our membership. I will work to communicate the perspectives, ideas, and lessons learned within the sections with the Board of Directors and vice versa.

Enhancing the diversity of the association is a theme of the ASA's Strategic Plan and applies not only to the disciplines the ASA represents but also the demographics of our membership. Eliminating explicit and implicit barriers to participation for women and historically under-represented groups is key to the continued growth and vibrancy of the profession. The ASA has taken an important step to address issues of sexual harassment and misconduct by establishing a conduct policy and ombuds services for ASA activities.

Providing mentoring opportunities is also key to recruiting and retaining a diverse membership. I have had the privilege of participating as a mentor for a number of the ASA's mentorship programs, including the Committee on Minorities in Statistics' JSM Diversity Mentoring Program. However, the need for good mentorship does not end at graduation. Expanding mentoring programs to support statisticians throughout the career trajectory is another way we can help to support individuals from historically under-represented communities and also decrease attrition in membership.

This is a critical time for ensuring that statistical rigor is a key component of the new ways that data is being used throughout society, and the ASA is an important voice in this conversation. It would be my honor to contribute my effort and insight as a member of the ASA Board of Directors. ■

Running For **International Representative**
To The Board Of Directors 2020–2022


Perez-Abreu

Victor Perez-Abreu

Senior Researcher, Probability and Statistics Department, Mathematics Research Centre (CIMAT);
Part-Time Teacher, University of Guanajuato, Mexico

I am honored to be considered as a candidate to become international representative to the ASA Board of Directors. I hold a BSc in mathematics and physics and an MSc in applied math from the National Polytechnic Institute in Mexico and a master's and a PhD in statistics from The University of North Carolina at Chapel Hill. Since 1987, I have been a researcher of probability and statistics at the Mathematics Research Centre (CIMAT) in Guanajuato, Mexico, with several sabbatical periods in Denmark, Germany, Japan, Mexico, and the United States.

I have more than 30 years of extensive academic experience in research, teaching, mentoring, and dissemination of statistical and mathematical sciences, including organization of international academic events. I also have broad involvement as a leader and have founded statistical programs in addition to having led a mathematics center in Mexico and international statistical societies and initiatives. This experience has given me opportunities for strategic thinking and planning toward the goal of organizations. This was particularly useful as general director of CIMAT, when an applied program with industry and society was established, after studying and understanding the challenging relation of academy with industry.

The ASA is the largest statistical organization in the world, with the goal to support the development, application, and dissemination of statistical science. A key success has been its strategic plan, which is succinct and has been guiding the selection of its activities toward enhancing the diversity and breath of our association, increasing the visibility of our profession, and ensuring the future of our profession.

In this direction, the International Year of Statistics (IYS) in 2013 was an important initiative where several societies and organizations around the world showed the importance of collaborating toward common goals for the promotion and visibility of statistics. This was a major effort for the ASA and its executive director, who led the IYS Steering Committee. I had the honor to promote and lead several IYS initiatives.

As president of the Bernoulli Society for Probability and Mathematical Statistics, I promoted several IYS activities of this society, like special issues of journals and public and historical lectures. Likewise, as vice president of the International Statistical Institute, I was [a] member of the IYS Steering Committee, attracting a very large number of supporting organizations from Mexico, Latin America, and Spain.

I also led the IYS Guanajuato Committee, one of [the] organizations around the world with more and diverse IYS initiatives, like general conferences around Mexico, public lectures and activities, concerts with stochastic music, special activities for kids, among others. My favorite enrollment was the co-production and co-direction of the video series, "A Look at Statistics from the Viewpoint of other Fields," consisting of 27 video-recorded interviews with English subtitles. This set of presentations documents views on the role and impact of statistics from the unique standpoints of those users who have experienced the benefits of statistics firsthand.

One of the important specific outcomes of the IYS was the establishment of an International Prize in Statistics by several major societies, which is also now a major activity for the ASA and for executive director. It has been my privilege to be the ASA representative in the organizing committee of this prize for its first two editions.

If elected international representative to the ASA Board of Directors, I would work to bring my international experience at this time by the decisions of the board and by supporting and conferring with the presidential initiatives of the president in turn and the executive director. Always in keeping with the ASA strategic plan and all its successful activities and challenges for the development, application, and dissemination of statistical science in the age of modern data. ■

Alexandra M. Schmidt

Associate Professor of Biostatistics, Department of Epidemiology, Biostatistics, and Occupational Health, McGill University

Schmidt

I am honored to be nominated to stand for election for international representative to the ASA Board of Directors. I hold a BSc and an MSc in statistics from the Federal University of Rio de Janeiro, Brazil. I received a PhD in statistics in 2001 from the University of Sheffield, UK, where I was supervised by Anthony O'Hagan. In 2001–2002, I did a post-doc with Alan E. Gelfand at the University of Connecticut, USA. In 2002, I took a position as assistant professor in statistics at the Federal University of Rio de Janeiro and became full professor in 2012. In 2016, I moved to Montréal, Canada, to become associate professor of the department of epidemiology, biostatistics, and public health at McGill University.

My main area of research is the development of flexible spatial and spatio-temporal models. In 2017, I was awarded the Distinguished Achievement Medal of the ASA's Section on Statistics and the Environment. In 2010, I became an elected member of the International Statistical Institute, and, in 2008, I was awarded the Abdel El-Shaarawi Young Investigator Award of the International Environmetrics Society. I have published papers in the *Journal of the Royal Statistical Society* Series B and C, *Annals of Applied Statistics, Technometrics,* and *Environmetrics*, among others.

Over the past decade, I have been very active in the international statistical scenario. I have experience serving several scientific societies in different capacities. I became a regular ASA member in 2009. Currently, I am program chair of the Statistics and the Environment Section of the ASA. I was president-elect (2014), president (2015), and past-president (2016) of the International Society for Bayesian Analysis (ISBA). During my term as president of ISBA, I encouraged the creation of the Section on Bayesian Education Research and Practice, the creation of the ISBA's Eastern Asian Chapter, and the realization of the first ISBA world meeting in China, which will be held in 2020. I also served ISBA as program chair in 2010 and member of the board from 2007 to 2009. I was [a] member of the board of the Brazilian Statistical Society from 2006 to 2010.

I believe I can actively contribute to the ASA Board of Directors as its international representative because of the experience I have acquired along the years. As international representative, I would aim at building connections not only between the USA and Canada, but also with other regions of the world.

The ASA plays an important role in disseminating the good practice of statistics. If elected, I will encourage the continuation of the ASA's education programs worldwide and support the ASA's role in stimulating discussion on the role of statistics in data science. I find it important that we, as statisticians, lead this discussion and disseminate broadly the use of sound statistical techniques. ■

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Melinda Kay Higgins, *Emory University*

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Bayesian Statistical Science

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Kate Calder, *The Ohio State University*

Program Chair-Elect 2020
Matt Heaton, *Brigham Young University*

Veronika Rockova, *The University of Chicago Booth School of Business*

Publications Officer 2020–2021
Candace Berrett, *Brigham Young University*

Leanna House, *Virginia Tech*

Council of Sections Representative 2020–2022
Juhee Lee, *University of California, Santa Cruz*

Donatello Telesca, *University of California, Los Angeles*

Biometrics

Chair-Elect 2020
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Pamela Shaw, *University of Pennsylvania Perelman School of Medicine*

Council of Sections Representative 2020–2022
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Yong Chen, *University of Pennsylvania Perelman School of Medicine*

Biopharmaceutical

Chair-Elect 2020
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Meg Gamalo, *Eli Lilly & Company*

Program Chair-Elect 2020
Jonathan Moscovici, *IQVIA*

(unopposed)

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James Flegal, *University of California, Riverside*

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Colin Rundel, *Duke University*

Nick Horton, *Amherst College*

Statistical Consulting

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In honor Women's History Month, we are once again celebrating more than 20 ASA women who work in statistics and data science. These accomplished women were chosen because they inspired and influenced other women in their field. Visit *http://magazine.amstat.org/statisticians-in-history/wis* to find out why they chose statistics, who influenced them, and what they have accomplished.

SUSMITA DATTA was born in Kolkata, India, where she attended an eclectic school for women that taught her science, literature, drama, and music. She contemplated whether to pursue a career in music or science, with her passion for science winning out and bringing her into the world of physics, followed by statistics. Susmita is widely published in peer-reviewed journals and currently serves on the editorial boards of *Briefings in Bioinformatics* and the IISA Springer book series.

RHONDA BACHER found patterns and solving problems interesting when she was younger, so she fell in love with statistics when she realized it was its own powerful language, capable of explaining patterns and problems. Currently, she teaches and mentors biostatistics students and—like her mentors—she's able to help students discover their careers, passions, and paths.

NANCY GELLER'S interest in biostatistics developed at Memorial Sloan-Kettering Cancer Center and, more recently, at the National Heart, Lung, and Blood Institute. Currently, she leads a group writing many papers in biomedicine and biostatistics.

Her family called **BONNIE GHOSH-DASTIDAR** a human calculator when she was growing up, and it was her father who encouraged her to study computer science because it was the "future!" Eventually, Ghosh-Dastidar realized she wanted to do applied work and collaborate more so she turned to statistics. Currently, she works in health policy statistics and her first-authored article in the *American Journal of Preventive Medicine* is listed on the journal's website as one of the most downloaded papers.

AMANDA GOLBECK is a first-generation college student who attended Grinnell College on scholarships. It was at Grinnell that she taught herself how to conduct a cluster analysis using SPSS, analyzed the results, and became hooked on quantitative research. She earned her graduate degree and studied a broad array of subjects—finally settling on biostatistics. In 2017, she authored a book on the life and work of Elizabeth Scott: *Equivalence: Elizabeth L. Scott at Berkeley.* It includes a microhistory of Scott's use of statistics to promote the status of women in science.

SIMONE GRAY grew up on the island of Trinidad and enjoyed being challenged by mathematical problems. After graduating from the University of Miami, she became aware of the critical shortage of math and science teachers in high schools across the US and became a tutor and mentor. Recently, Simone was the co-chair of the Fostering Diversity in Biostatistics Workshop hosted by the Eastern North American Region of the International Biometric Society at JSM.

EMILY GRIFFITH took statistics in high school to avoid taking a "real" math class. Unfortunately for her plan to avoid math, she fell in love with statistics and ended up finishing college with a degree in statistics and a minor in math. She eventually earned her PhD, completed a postdoc at the Patuxent Wildlife Research Center, and then worked as a survey statistician for the FBI. She was recently named director of the North Carolina State University's Statistical Consulting Core.

JO HARDIN'S father was an actuary so she thought about having a career in a mathematical field. But once she got to college, she fell in love with academia and found herself working toward a career as a statistics professor. She is now professor of mathematics at Pomona College. She is also a mentor for a group of students from the Chicago Public School District. Additionally, she started a program at Pomona College, Pomona Scholars of Mathematics (PSM), designed to build community and support students who are navigating college mathematics. Happily, quite a few of the inaugural PSM students are now in graduate programs in the mathematical sciences.

LAURA HATFIELD grew up in Kansas City, Missouri, as a classic nerdy kid interested in math and science. She began college on a pre-med route, but while doing medical research at Johns Hopkins, she learned she wanted to design studies and analyze data. After several years immersed in health policy research, she co-founded the Heath Policy Data Science Lab with Sherri Rose at Harvard.

STEPHANIE HICKS began her college career majoring in chemical engineering but learned that what she loved about chemistry was mathematics. Currently, she is an assistant professor in the department of biostatistics at Johns Hopkins Bloomberg School of Public Health and co-founder of R-Ladies Baltimore, a local chapter of a global organization to promote gender diversity in the R programming community. She is also working on creating a children's book trailblazing women in statistics and data science.

KAREN KAFADAR had the great fortune to heed the council of her master's adviser, Bradley Efron, and earn her PhD in statistics. It was during her studies she learned from some of the best, including John Tukey. Her career is living proof of the influence others can have on a career. Besides her service to the ASA, she has worked in applications such as forensic science and randomized cancer screening trials.

HELEN MACGILLIVRAY set out to be a physicist but became captivated by the concepts, real-world problem-solving, and universality of statistics. She earned a PhD in statistics and eventually chose professional and teaching leadership over university leadership. In 2017, she became the second female, and second Australian, to be president of the International Statistical Institute.

AMELIA MCNAMARA went to design school during her first year in college but learned working with data allowed her to cultivate her broad interests. When she saw people struggling to understand histograms, she collaborated with Aran Lunzer to write an essay titled "What's So Hard About Histograms?" This essay has become a popular, interactive, and educational tool.

AMANDA F. MEJIA started with limited financial resources at her disposal, but pursued scholarship and fellowship opportunities and earned her master's as an industrial engineer. She soon discovered she wanted to learn more advanced analytical techniques and work toward a positive societal impact, so she returned to graduate school. As a professor today, she strives to emphasize the "why" of statistics before the "how" and to bring research problems into the classroom.

JERI MULROW turned in her first statistics book after the semester thinking it was boring. Her college adviser insisted she take more statistics classes, however, including regression, analysis of variance, and design of experiments. She was hooked after that. Today, Mulrow has more than 30 years of experience in applied statistics, working in various occupations and for several federal agencies. She and her husband recently set up a scholarship fund in statistics and data science at Colorado State University, their alma mater.

A New Year's resolution brought **DEBBIE NOLAN** to statistics; her love for teaching moved her to want to communicate the story behind statistical analysis. She has written numerous books and, in 2018, was recognized for her excellence in teaching with the ASA's Waller Distinguished Teaching Career Award.

POLLY PHIPPS fell in love with statistics when, as a student, she designed and carried out a probability survey from beginning to end. She trained as a survey methodologist and joined the federal government in the late 1980s. Ultimately, she developed tools to evaluate quality at early and late stages of questionnaire development and put into place a model for instrument design that incorporated qualitative and quantitative methods.

NANCY POTOK couldn't decide whether she wanted to be a forest ranger or a librarian when she grew up. Eventually, it was her love for reading that led to an interest in research, analysis, and data. She has since worked as a statistician for the public, private, and non-profit sectors and has experience in all three branches of the federal government—including being the first female deputy director at the US Census Bureau.

After being awarded a scholarship to Norfolk State University, **DIONNE PRICE** earned a summer internship at the National Institute for Neurological Disorders and Stroke. It was there she fell in love with biostatistics. Currently employed at the US Food and Drug Administration, her statistical expertise contributes to ensuring the efficacy and safety of drugs and therapeutic biologics for the public.

Price's photo by Perry Price

Read their full bios online at *www.amsta.org/wis.*

KAREN BANDEEN-ROCHE was inspired by her dad's life as a NASA scientist and studied mathematics in college and graduate school. She wasn't exposed to statistics until she attended Cornell and it was there, while mentored by David Ruppert, that she found joy in analyzing data. She now fosters trainees and co-founded a National Institutes of Health–funded training program in the epidemiology and biostatistics of aging.

CYNTHIA RUDIN became interested in machine learning because she wanted to predict the future. She is now associate professor of computer science, electrical and computer engineering, and statistics at Duke University and directs the Prediction Analysis Lab. In 2015, she was named one of the "Top 40 Under 40" by *Poets and Quants* and one of the 12 most impressive professors at MIT by Businessinsider.com.

AARTI SHAH began her tenure at Eli Lilly in 1994 as a senior statistician and rose among the ranks to become senior vice president and chief information officer. She is accountable for setting the company's strategic direction so it can deliver on its mission to make medicines that help people live longer, healthier, and more active lives. In 2016, she was named one of the "Fierce Women in Biopharma" by *Fierce Pharma*.

STEPHANIE SHIPP started out wanting to be a lawyer, but quickly found that economics and statistics were what she preferred. Upon graduation, she applied for and accepted a full-time job at the Bureau of Labor Statistics and built on a federal career from there. Currently, she is developing an interdisciplinary team of statisticians and social and behavioral scientists to create and advance data science for the public good.

Shipp's photo by Jack Looney Photography

Inaugural **Florence Nightingale Day** Inspires Students to Pursue Statistics, Data Science

Shili Lin

Students discover the opportunities for careers in statistics and data science during Florence Nightingale Day.

The American Statistical Association and Caucus for Women in Statistics (CWS) jointly hosted the first Florence Nightingale Day (FN Day) October 27, 2018, in Athens, Georgia; Chapel Hill, North Carolina; and Columbus, Ohio. Middle- and high-school students gathered to discover the opportunities for careers in statistics and data science, do fun activities with data, and develop connections—the primary goals of the event.

ASA Past-President Lisa LaVange and President-elect Wendy Martinez kicked off the event at all locations via live streaming, each talking about why they chose a career in statistics and telling personal stories that inspired the young audience.

The event in Columbus took place on The Ohio State University (OSU). Ninety-five female students from grades 8–12 packed the auditorium of the Mathematical Biosciences Institute to start the day full of fun activities showcasing statistics and data science. After the introduction by the ASA presidents, the students were treated to a lively round of Kahoot! Created and facilitated by a high-school senior, students answered questions related to Florence Nightingale, women in STEM history, popular culture, career opportunities in statistics and data science, and fun facts about OSU—all involving numbers.

Next, the students were divided into 10 groups and rotated through 10 stations focusing on an aspect of statistics, including "Statapult," "Monty Hall: Let's Make a Deal," and "SKUNK." Through these engaging educational activities, students got a taste of what statistics and data science are all about. Study design, data collection, organization, visualization, and running simulations on a calculator were just a few of the concepts illustrated by the activities. Students were also given the opportunity to sign up for the CWS "Member in Training (MiT)" membership, which exposes them to a wealth of resources and connects them to the CWS network of peers and mentors throughout the year.

The ASA and CWA hope to expand FN Day to more sites next year. ■

Fun Facts from OSU FN Day

Ninety-five students came from 23 schools representing eight counties throughout Ohio.

Students from Columbus City schools and suburban areas came with their parents.

There were many enthusiastic students coming from farther afield, traveling as far as 150 miles on school buses.

The day ran smoothly thanks to 43 volunteers, including a high-school senior, undergraduate and graduate students, a postdoc, a high-school math teacher, local community members, and OSU faculty and staff.

Differential Privacy: What Is It?

Joshua Snoke and Claire McKay Bowen on Behalf of the ASA Privacy and Confidentiality Committee

As statisticians, many of us use public-use data files and internal institutional or product data under nondisclosure agreements. We also analyze restricted data obtained via data use agreements, remote access, or research data centers such as those supported by the US Census Bureau. Statisticians in industry, though likely not using data use agreements or restricted data centers, still face questions about data sharing, either internally or for products developed using sensitive data. A much smaller fraction of our community is involved in the development and implementation of statistical disclosure control and data privacy techniques permitting access to confidential data and publication of the results based on such data.

Statistical disclosure control (SDC), or limitation, has existed as a subfield of statistics since the mid-20th century. Using these techniques, data maintainers have for years provided both the public and research communities high-quality data products that preserve the confidentiality of sensitive data.

The data landscape has changed dramatically over the past two decades. Advances in modern information infrastructure and computation have made it easier to collect, store, and analyze vast amounts and varieties of data. These advances have also enabled us to reconstruct databases and identify individuals from supposedly anonymized data.

Even for those who advocate only giving data to trusted researchers, recent misuses of data access such as those by Cambridge Analytica further call into question who can truly act as a trusted third party. The difficult question of how to achieve the proper trade-off of data quality and disclosure risk, while enabling data sharing and supporting scientific endeavors and sound policy decisions, has become even more difficult.

There exists a need for increased efforts to tackle statistical data privacy and disclosure control that match the shifting data culture. We, the statisticians, can play a more significant role. Addressing this problem starts with a healthy interest and discussion among statisticians about privacy demands in our current data culture and how we should best address those concerns. A comparable situation is emerging in economics with several debates about the meaning of privacy. Demography and health policy, among others, are also having similar discussions, with each field contributing research based on their unique contexts and problems.

A proper approach to data confidentiality and privacy has been and continues to be an area of hot debate that differs widely across contexts. While traditional methods of SDC and secure data centers are still used extensively, varying opinions about procedures have been developed across academia, government, and industry and in different countries. A definition known as Differential Privacy (DP) proposed by Cynthia Dwork, Frank McSherry, Kobbi Nissim, and Adam Smith has garnered much attention, and many researchers and data maintainers are moving to develop and implement differentially private methods.

Notably, research using this definition has been dominated by researchers in computer science, with few statisticians pursuing the topic. This situation has led to an imbalance in the goals and scenarios for which differentially private applications have been produced. Traditional inferential analysis, for example, has been under-researched compared to machine learning topics and prediction tasks. As statisticians become more involved, they should seek further collaborations with computer scientists, increasing the statistical perspective in the field and building on the work already performed.

So, why all the "hype" for DP? DP's primary selling point, in contrast to its SDC methodological ancestors, is the offer of privacy according to a provable and quantifiable amount, sometimes referred to as the privacy-loss budget. A lack of formal quantification has often been a critique of older methods, which instead implement ad-hoc procedures with subject-matter experts determining how to quantify the privacy protection under assumed hypothetical scenarios. The formal quantification offered by DP has inspired new research efforts, generally falling under the term "formal privacy," that seek to develop approaches with quantifiable privacy loss. These methods do not have to adhere to DP structures, but draw on many of its philosophical underpinnings.

How does DP exactly add quantifiable noise to the true data? It uses the concept of a privacy-loss budget, often denoted mathematically as e. This concept is useful to explain the definition in nontechnical terms and it allows the data curator, or steward, to know how much information is being leaked to researchers accessing the data. Specifically, if the data curator "spends" more of the privacy-loss budget (a larger value of e), researchers should gain more accurate information about the data. However, providing more information and greater accuracy typically means less privacy is guaranteed because information is being "leaked." Inversely, a data curator spending a smaller privacy-loss budget will result in less accurate information from the data but ensure a higher privacy protection. Additionally, with a set privacy-loss budget,

DP adjusts the amount of noise being added to the data based on how sensitive the information is the researchers want. This sensitivity is not in terms of personal or private information, but how robust the information is to outliers.

Specifically, DP works by tying privacy to how much the answer to a question or statistic is changed given the absence or presence of the most extreme possible person in the population. For example, suppose the data we want to protect is income data and the statistic we want answered is, "What is the median income?" The most extreme person who could possibly be in any given income data could be Jeff Bezos. If he is absent or present in the data set, the median income shouldn't change drastically. This means we can provide a more accurate answer for us and the researchers about the median income that satisfies DP without using much privacy-loss budget.

What if the question is, "What is the maximum income?" Unlike the previous statistic, the answer would significantly change if Bezos is absent or present in the data set. A DP algorithm would provide a less accurate answer, or require more privacy-loss budget, to answer this query and protect the extreme case, Bezos.

Another strength of DP is it proposes a fully transparent approach, contrasting many older techniques that use the lack of transparency as additional protection. Although security through obscurity might seem to provide protection, it detracts from the credibility and robustness of the procedures for many researchers.

Additionally, from a statistical perspective, transparency is as important for preserving analyses on the perturbed data as it is for guaranteeing privacy. The typical argument in favor of older approaches is they recommend less perturbation than needed to satisfy DP, but they do not typically provide users a way to account for the impact of the additional noise, which leads to the analyses being either biased or an under-estimation of the standard errors. Knowing the distribution and magnitude of the noise added should allow researchers to account for this bias in the modeling procedure (see *https://rss.onlinelibrary.wiley.com/doi/pdf/10.1111/rssc.12185*).

In some cases, protecting the most extreme outlier can be difficult, if not impossible. To remedy this, researchers have developed alternative definitions, or "relaxed" versions, of DP. One common relaxation is approximate DP, which has an additional probability (albeit a tiny one) that someone within the data will be fully exposed while everyone else is protected under the full privacy-loss budget. This small probability tends to be on the order of 10-3 to 10-5.

Another popular alternative definition is local DP, which has the same spirit as regular DP but is conceptually different. Local DP focuses on how individual data are collected and aggregated for analysis. Each individual protects his or her data before sending it to the data curator to be used, and the total privacy-loss budget is divided evenly among all individuals. This means local DP methods trust no one, including the data curator, so the information the data curator receives is already noisy. These approaches are commonly combined with multi-party computation techniques.

Overall, DP has inspired a new era of data privacy research and been incorporated into applications such as shrinkage regression, principal component analysis, genetic association tests, Bayesian learning, location privacy, recommender systems, and deep learning. Despite the rapid growth in papers published on the topic, issues remain. As the field has grown, there have been cases in which published attempts at formal privacy methods do not actually satisfy DP. The challenge of guaranteeing research quality (echoing the reproducibility issues in other fields) comes as no surprise, considering how young the field is.

In addition to the demand for transparency in data privacy research, most of the work is theoretical and there are few implemented applications on real research data. Because many proofs require theoretical conditions not typically met, problems exist for implementation on real-life data. Many approaches only apply to particular data, such as univariate data, or a particular type of data, such as categorical and not continuous. Another common problem is some DP methods make unrealistic assumptions about publicly available knowledge of the data to improve the proposed method's results. Furthermore, several theoretical approaches are computationally demanding or unfeasible, hindering the applicability for an average data curator with limited computational resources. Computational complexity is a particular issue for techniques that seek to release entire data sets.

Many of these practical issues represent an area in which increased input from statisticians and other collaborations should lead to improved solutions. In fact, the underlying concept is not new for statistics. Randomized response, originally proposed by Stanley Warner, is equivalent to a form of local DP. Approaches that enable feasible data analysis under DP will require statistical expertise and techniques that understand the effect of perturbations on the data and analyses. For instance, noise added to a statistic from different distributions may offer equal protection but significantly different amounts of bias or variance to an estimate of interest. Alternatively, adding noise in one fashion may preserve predictive power of a model, but it may remove any meaningful inference from the estimated parameters.

FURTHER READING

Anonymized Data

"Robust De-Anonymization of Large Datasets (How to Break Anonymity of the Netflix Prize Dataset)," *https://arxiv.org/pdf/cs/0610105.pdf?utm_source=datafloq&utm_medium=ref&utm_campaign=datafloq*

"Publishing Search Logs—A Comparative Study of Privacy Guarantees," *https://ieeexplore.ieee.org/abstract/document/5708146*

"Revealing Information While Preserving Privacy," *https://dl.acm.org/citation.cfm?id=773173*

Meaning of Privacy

"An Economic Analysis of Privacy Protection and Statistical Accuracy as Social Choices," *https://arxiv.org/pdf/1808.06303.pdf*

"Implications of Differential Privacy for Census Bureau Data and Scientific Research," *https://assets.ipums.org/_files/mpc/MPC-Working-Paper-2018-6.pdf*

Differential Privacy

"Calibrating Noise to Sensitivity in Private Data Analysis," *https://link.springer.com/content/pdf/10.1007/11681878_14.pdf*

Approximate Differential Privacy

"Our Data, Ourselves: Privacy Via Distributed Noise Generation," *https://link.springer.com/content/pdf/10.1007/11761679_29.pdf*

Local Differential Privacy

"Local Privacy and Statistical Minimax Rates," *https://ieeexplore.ieee.org/document/6686179*

Multi-Party Computation Techniques

"Secure Multi-Party Differential Privacy," *http://papers.nips.cc/paper/6004-secure-multi-party-differential-privacy*

Randomized Response

"Randomized Response: A Survey Technique for Eliminating Evasive Answer Bias," *www.tandfonline.com/doi/pdf/10.1080/01621459.1965.10480775*

RAPPOR

"RAPPOR: Randomized Aggregatable Privacy-Preserving Ordinal Response," *https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/42852.pdf*

DP for SQL Queries

"Towards Practical Differential Privacy for SQL Queries," *www.vldb.org/pvldb/vol11/p526-johnson.pdf*

"Uber's Differential Privacy … Probably Isn't," *https://github.com/frankmcsherry/blog/blob/master/posts/2018-02-25.md*

OnTheMap

"Privacy: Theory Meets Practice on the Map," *https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/4/7616/files/2017/10/ICDE08_conference_0768-1v11wm0.pdf*

Opportunity Atlas

"The Opportunity Atlas: Mapping the Childhood Roots of Social Mobility," *www.nber.org/papers/w25147*

National Institute of Standards and Technology's Differentially Private Synthetic Data Challenge, *https://challenge.gov/a/buzz/nist-pscr/differential-privacy-synthetic-data-challenge*

Most papers on privacy by computer scientists focus on prediction tasks or models, which dictate the design of privacy algorithm. Few of these methods are suitable for statistical inference. The problem becomes even more complicated when considering complex survey designs, weighting schemes, missing data, or many of the common issues faced with real data. With the under-representation of statisticians in data privacy, these research questions have been barely touched.

A few applications exist that try to move DP from the theoretical to the practical and begin to address the problems that inevitably arise. These can be used as examples for efforts moving forward, both for statisticians and computer scientists. Within industry, Google, Apple, and Uber have explored versions of DP.

Google created a local DP method called RAPPOR (Randomized Aggregatable Privacy-Preserving Ordinal Response), an end-user client software on Chrome browser data for crowd-sourcing statistics. Upon initial release, RAPPOR only worked on a few cases and the examples in the original paper were idealized.

Apple successfully implemented a local DP approach on their iPhone to gain information about suggested emojis based on keyboard strokes (in iOS 10 and 11). However, multiple sources (see *https://arxiv.org/pdf/1709.02753.pdf*) suggest the privacy-loss budget employed by Apple to collect users' data on mobile devices is too high to be acceptable for privacy protection.

Uber took a different route and developed an approximate DP method instead of using local DP, a substantial and unique attempt on practical DP SQL queries. Like Google and Apple, Uber's approach also suffered conceptual and technical flaws.

All three companies are continually updating their implementations and working toward improving on their current shortcomings.

Consequently, much work remains in the early stages of progress with respect to DP and other formal privacy techniques. The US Census Bureau is undertaking a major overhaul (see *www.nytimes.com/2018/12/05/upshot/to-reduce-privacy-risks-the-census-plans-to-report-less-accurate-data.html*) of the data privacy approaches for the 2020 Decennial Census and considering carrying out similar changes to other data products.

The bureau has already spearheaded applications of DP and other formal privacy methods. One of the more popular examples is the US commuter data called OnTheMap, which is protected by approximate DP.

Less well-known examples are the Post-Secondary Employment Outcomes longitudinal data and Opportunity Atlas on childhood social mobility. While these examples are introducing

formal privacy approaches, many standard disclosure limitation approaches are still used by the US Census Bureau and remote access data-sharing centers remain essential for providing original data to responsible researchers.

A new opportunity geared toward practical DP is the National Institute of Standards and Technology's (NIST) Differentially Private Synthetic Data Challenge. Synthetic data sets are a leading method for releasing publicly available data that can be used for numerous analyses. Combining this with DP can maximize both rigor and flexibility. The challenge seeks submissions of practically viable DP data sets that will be tested for accuracy on summary statistics, classification tasks, and regression models. Detailed proofs and code must be made available for the submissions, and the highest-scoring submissions will receive cash prizes. This competition encourages in-demand work, moving DP from the theoretical to the practical as NIST seeks to establish a measurement-based approach to fostering data-driven research and development in this area.

In addition to these practical implementation hurdles, there is no consensus on the appropriate amount of privacy-loss budget for practical use. As mentioned earlier, some may argue Apple's local DP approach use of the privacy-loss budget is too high for practical use, but what is the threshold of "too high"? Any attempt to answer this question should recognize it will always be contextual. It is both a policy and social question, which will likely be answered by stakeholders who are able to bear responsibility for the decision. Furthermore, data privacy researchers, including statisticians, should be involved, since we will be responsible for communicating the best trade-off curve and informing decision-makers about appropriate interpretations of the privacy-loss budget. Finally, the participants in the data may have their own views on this value. Incorporating all this to determine the right budget is an open question.

The decision about how to implement DP at the US Census Bureau and elsewhere is far from made; a robust conversation with the research community is just beginning. Although statisticians have representation in the field, the statistics community should seek a more active role. Without the involvement from the statistics community, we risk more biased research data. Advancing privacy methodology is necessary to maintain peoples' trust in institutions such as tech companies and the US Census Bureau. Public opinion of many institutions, particularly those responsible for collecting and maintaining data, has degraded over the past few years and will continue to do so without significant work overhauling our privacy methods. ■

STAFF SPOTLIGHT

Olivia Brown

Hello, *Amstat News* readers. I'm Olivia Brown, and I would say I am the ASA's new graphic designer and production coordinator, but I've actually been here for almost nine months (and designed three of these magazines)! Time flies.

I was born in Frederick, Maryland, but I grew up somewhere in the swamps of Jersey. To be specific, my hometown of Smithville, New Jersey, is about 20 minutes outside Atlantic City and less than a mile off Highway 9, a road you may recognize from a little song called "Born to Run." I could make about fifty more "Bruuuuuce" references, but I'll spare you. Just give me a Philly cheesesteak and a little Darkness on the Edge of Town and I'm a happy camper (though you won't catch me actually camping in the Pine Barrens … or anywhere else for that matter.)

I moved to Washington, DC, to attend American University in 2010 and haven't left the DMV (DC, MD, Virginia) since. After graduating with dual degrees in graphic design and public communication, I jumped into the trade association world for a couple years (shout out to the National Confectioners Association and their legendary candy room, which is just as fabulous as it sounds). More recently, I did a stint in the music industry, designing graphics for an organization that deals with digital performance royalties. I needed a change of scene, and the ASA was just that!

I now live in Old Town Alexandria and have a 10-minute walking commute, which is great most of the time. (I am at home writing this autobiography today amidst the icy, slushy remnants of this winter's first major snowstorm. Some of my neighbors apparently don't know how to salt their sidewalks.)

Brown

I do freelance design work in my spare time and enjoy photography, both as a part of my job with the ASA and as a hobby. I particularly like music photography—trying to capture the energy of a live performance under changing, challenging lighting conditions is like a game to me. I like going to shows even when I'm not behind the camera, and I just love music in general—here's a statistic for you: I somehow managed to listen to more than 106,000 minutes of music in 2018. That's about 73 days. Whoops? Jason Isbell, Bruce Springsteen (there he is again!), and David Cook lead my play-counts. I also occasionally design animated music lyric videos.

I love traveling (usually for concerts), trying new restaurants, and finding places to wander around the DMV—walking or running, though admittedly it's more of the former these days!

Working at the ASA has been a great change of pace so far, and I'm looking forward to visiting New Orleans for the first time to shoot photos and video at CSP 2019. Say "manchego" if you see me! ■

STAT*tr@k*

Thriving as a **Master's-Level** Statistician

Jennifer Thompson earned her MPH in biostatistics from The University of North Carolina at Chapel Hill in 2005. After spending more than 13 years in academic clinical research focused on critical illness at Vanderbilt University Medical Center, she is now a data scientist at Devoted Health in Waltham, Massachusetts.

Heather Kopetskie holds an MS in biostatistics from The University of North Carolina at Chapel Hill. She is a senior biostatistician at Rho and also serves as the biostatistics operational service leader, an internal expert sharing biostatistical industry trends, best practices, processes, and training.

A master's degree is a rewarding educational choice for those who are excited by the application of statistical methods to practical problems. Compared to those with a PhD, however, there can be some specific challenges: Career development options are not always clear, and it can be more difficult to gain respect. We have found the following strategies to be helpful in navigating these potential challenges.

Understand the values of your employer and yourself. Determine what is important to you in a career. Is it financial stability, skill growth, or the ability to lead? (Keep in mind these may, and likely will, change over the course of your career, and make sure to re-evaluate every few years.) Once you have a strong idea of what is important in each season of your career, you can focus on finding an employer who will provide an environment in line with your goals. Do you want to be challenged daily and work on lots of projects or dive deeply into a specific domain? Do you love applied statistics and want to expand your technical knowledge, or do you like leading and want to grow into a manager? Use your job interviews as an opportunity for you to get to know the company better, in addition to them meeting you. Questions like the following will help you form a well-rounded view of the employer's perspective:

- What do promotion path(s) look like for those with a master's? Are there multiple paths, or is everyone expected to have similar roles? Is there room for growth in directions that interest you?
- What projects are you likely to work on, both short- and long-term? If you are interested in developing skills in Bayesian statistics but master's employees at the company generate standardized statistical reports, this won't be a good match.
- Are there any jobs at this organization you won't be able to do without a PhD? Are those jobs that would be attractive to you?

> Your previous career/experiences are a valuable asset when you figure out how to leverage them in your new career.

CONTINUE DEVELOPING SKILLS IN BOTH STATISTICS AND RELATED AREAS. Master's statisticians are often more generalists than PhD statisticians and need to continue learning about a wide variety of methods and applications. Read journal articles to give yourself an arsenal of ideas you can apply to research or business problems. If you're on Twitter, follow hashtags such as #StatsTwitter or #EpiTwitter to see what others think. Be aware of both your knowledge gaps and new statistical and technical approaches and find ways to learn about them. In addition to traditional methods like conference short courses and textbooks, a wealth of learning material is available online through massive open online courses and blogs about statistics and statistical programming. No one needs to (or can) know everything, of course. But keeping an eye on developments in areas most relevant to your career path will help you grow personally and add value to your team.

Developing expertise in stats-adjacent areas is another way to add specific value to your organization and differentiate yourself. Depending on your career path, you may have experience in project management, reproducible research, data privacy, a particular business or research domain … possibilities abound! Find an area of interest to you and learn more.

Continue working on your communication skills. Learn how to play the role of translator going from research or business questions to statistics and vice-versa. While PhD programs have built-in writing preparation thanks to dissertations and research papers, many master's programs put less emphasis on writing. Focus on developing all forms of communication, from writing emails, reports, and manuscripts to formal presentations and articulating a statistical point of view in meetings. Better business and scientific writing, and being able to verbally communicate statistical concepts and interpretations, will help you communicate and demonstrate your value.

Our jobs involve communication, collaboration, project management, independence, and problem-solving; without these, our statistical work will have little impact. Developing these professional skills is as important as developing your statistical toolbox.

THINK ABOUT YOUR CAREER STRATEGY. You may not always know what the next best move is, but a mentor can help steer *you* in the right direction. Find mentors who can help you get the best out of your career, focusing on what you value and not what they think you should concentrate on. Sponsors can also help you see opportunities for recognition and growth. Remember we mentioned blogs? Here's a great one on sponsorship: *bit.ly/StatTrak2*.

Small conferences and interest groups are a great place to connect. A local ASA chapter may also be able to help. For example, the ASA North Carolina Chapter holds mentoring meetings periodically.

Over time, it will be helpful to identify more than one mentor in multiple areas of expertise and levels of experience. This ensures you have someone to look to for multiple perspectives and types of questions, whether related to statistics, leadership, or work-life integration. These mentoring relationships don't have to be formal; the most important idea is to connect with people who can help shape your career goals and directions. Also, don't forget to be a good mentee (*bit.ly/StatTrak1*).

If statistics is your second career, remember to leverage the skills you developed in your previous career. If you came to statistics with a teaching background, you'll excel at communicating new ideas to others. If you have a law degree, you may have an advantage working with regulatory authorities. Your previous career/experiences are a valuable asset when you figure out how to leverage them in your new career.

Being a master's statistician can be incredibly rewarding when there's a good fit between your goals and your roles. Knowing what you value and continuing to develop your skills and expertise are key to thriving in your career. ■

STATISTICAL EXCELLENCE AWARD for Early-Career Writing OPEN FOR ENTRIES

Are you an early-career statistician with a statistical story to tell? If so, consider entering the 2019 Statistical Excellence Award for Early-Career Writing. The competition is open to the following:

1. Students currently studying for a first degree, master's, or PhD in statistics or a related subject

2. Graduates whose last qualification in statistics or related subject (whether first degree, master's, or PhD) was not more than five years ago

The rules of entry are simple. Send us your best statistical writing in the form of a magazine article (1,500 to 2,500 words) on any subject you like.

Successful submissions from past years were based on original analyses, produced specifically for the competition. This does take work, but it often results in a unique and compelling article.

For example, last year's winner, Letisha Smith, scraped online recipes and used clustering algorithms to group foods with similar ingredients to help streamline meal plans and reduce food waste.

You might also write about work you have done as part of your studies or during your career. However, if these articles draw on previously published work, you must ensure the competition submission is sufficiently different in terms of style and structure. Remember, *Significance* is a magazine, not an academic journal.

You can also write about the work of others, but this must be in the form of a critique or wider overview of a subject area.

How to Enter

Email your submissions as a text/Word file or PDF to *significance@rss.org.uk*. Make sure to include the competition entry form, which you can download from *http://bit.ly/2E7leqT*.

Whatever you choose to write about, articles must be engaging and easy to read. *Significance* is published for a broad audience, so accessibility is key. This means technical terms and mathematics must be kept to a minimum and explained clearly when used.

We recommend you read articles from past winners and finalists at *www.significancemagazine.com/613* to get a sense of the style of writing and storytelling judges are looking for.

The competition is open until May 27. Three finalists will be selected in June, with the winner announced in July at the Royal Statistical Society (RSS) Statistical Excellence Awards ceremony. The winning article will be published in the October issue of *Significance* and online at *significancemagazine.com*. Runners-up also may be published online or in print at the editor's discretion.

Finalists will be invited to give presentations based on their articles at a special session of the RSS International Conference, which takes place September 2–5 in Belfast, Northern Ireland. Visit *http://bit.ly/2BA28bv* for more information about the conference.

The competition is jointly organized by *Significance* and the RSS Young Statisticians Section. It forms part of the RSS Statistical Excellence Awards program. ■

MORE ONLINE

Help promote the competition in your statistics department or workplace. Download the official poster from *www.significancemagazine.com/files/2019-writingcomp-poster.pdf*.

For detailed competition information, visit *www.significancemagazine.com/612*.

STATS4GOOD

Being an Advocate for Data for Good: Solving the Identity Crisis

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

Data for Good today addresses a vast number of concerns using all types of statistical methods, yet the work needed to support its goals includes more than mathematics. In February, we talked about the importance of organizing and managing projects and my view that huge growth recently has given the D4G community "growing pains." This month underscores another critical but nonmathematical dimension of Data for Good: advocacy. All of us have opportunities to tell others about D4G, promote the work, speak well of those engaged in it, and promote participation to our network of colleagues.

It's unusual for an organization doing good to have a bad reputation; often, groups don't get much of a reputation at all. Maybe people have heard about them and maybe not, but most don't know much about their mission and how they work. Data for Good often faces this kind of identity crisis, lacking a strong public image. Too often, only a few people directly involved ever hear the details, and it's too easy for people to overlook what they don't know about.

We can help solve this identity problem by speaking up, writing, encouraging people and organizations doing good work, and helping people make connections so they can get involved. Think about your own work. You are sure to remember the times someone praised your work and told others about it. That's the essence of advocacy—to speak out in favor of the important work people are doing.

Becoming an advocate usually doesn't happen by chance. Developing a plan with specific actions and objectives is the best way to become a strong voice capable of speaking for others. There are three aspects in particular all of us can become involved in to promote using statistics to make a positive difference: organizational advocacy; public channels; and social media.

One of the best ways to get started as an advocate for D4G is to choose one organization that interests you, follow their work, and tell others about it. There are so many great groups such as Statistics Without Borders and DataKind. Many people will want to choose a local group, like those that sponsor community hackathons. Learn about what they do and tell your friends and colleagues about it. Organizational advocacy is a great way to get the message out about people making a real impact with Data for Good.

Another way people can be an advocate is through speaking and writing: hosting a blog; giving a presentation for a community organization; or writing a letter to the editor of a news outlet or magazine in your area.

Even a single letter to a local newspaper can have a lasting effect. This Stats4Good column traces its journalistic DNA to a letter to the editor. The first D4G piece I wrote for publication appeared in the *Toledo Blade* in 2010 in support of a school district my analysis had shown performed what could be expected from its modest means. There are many aspects of Data for Good well suited for a newspaper, magazine, or blog, including letting people

Get Involved

MassMutual and the Boston Museum of Science will host their second annual conference, Data Science for Social Good, April 5. The event will showcase organizations making an impact and driving social change with data, leading speakers from around the country, poster sessions, and networking opportunities. You can find more information about this event, including registration, at *https://datascience.massmutual.com/conference.*

"I'm participating in a hackathon on homelessness." This kind of brief mention in casual conversation is called "raising the flag"—a quick mention to let people know you support Data for Good activities.

know about an organization and their work; helping recruit volunteers; and developing community, financial, and logistical support outside the statistics space.

Data for Good activities can even be introduced at work. This can come up naturally when talking with people: "What are you doing this weekend?" "I'm participating in a hackathon on homelessness." This kind of brief mention in casual conversation is called "raising the flag"—a quick mention to let people know you support Data for Good activities. Also, many of us participate in knowledge-sharing meetings, in which someone will share an interesting presentation or white paper to teach a new statistical method, in the 9-to-5 space. These can be great opportunities to introduce new science and get people talking about D4G.

For example, RTI's work on arrest-related deaths (*www.bjs.gov/content/pub/pdf/ardpatr.pdf)* describes the useful capture-recapture methodology for estimating hard-to-count populations from multiple independent samples. Some of the most important advances in statistical methods come from projects serving the greater good. So many statisticians and data scientists are eager to use their professional skills in community service that raising the flag at work can lead to conversations as much about Data for Good as the specific statistical method described.

Social media is another important channel for advocacy. Sharing posts, writing messages to encourage others, and reposting opportunities to get involved are important ways to promote D4G. LinkedIn recommendations for our D4G coworkers are another important way to get the word out, helping people and organizations gain a higher profile and present a clearer image of their mission and work.

Becoming an advocate for D4G activities fits everyone's budget and calendar and goes a long way toward creating and shaping the public identity of Data for Good and the many participants in it. By supporting and encouraging the work of others, we put both science and service into action. This is the best we can accomplish, whatever the particular activities we choose to pursue. For we are all advocates—for each other and for the vision we share of a world in which our highest scientific abilities are put into service for the greater good. ■

PASTIMES OF STATISTICIANS

What Does **Tamraparni Dasu** Like to Do When She Is Not Being a Statistician?

Tamraparni Dasu

Who are you, and what is your statistics position?

I am Tamraparni Dasu, a lead inventive scientist at AT&T Labs - Research. I work across multiple disciplines to develop algorithms for large-scale, automatic monitoring of data movement, data quality, and data content using adaptive statistical approaches. The best part of my job is the people I work with. They are smart, funny, and generous with their time and knowledge. I have enjoyed my job of 28 years and learned so much professionally and personally from my colleagues.

My formal writing adventure began with the publication of the first technical book on data quality, *Exploratory Data Mining and Data Cleaning,* in 2003. It turned out to be a segue to my real hobby, much like Lewis Carroll, who dabbled in writing about mathematics while his more famous creations claimed the bulk of his mind space.

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

I write fiction under the name T. Dasu. My trilogy, *Spy, Interrupted,* focuses on an unlikely couple, an Indian-American woman and the undercover CIA officer tasked with recruiting her. The first part (*Spy, Interrupted: The Waiting Wife*, 2014) is a love story and thriller in which the two lovers are pursued by terrorists across multiple continents. After vanquishing the villains, they decide to settle down to a quiet life, but the hero decides to run for political office

when boredom sets in. The second book (*Spy, Interrupted: The Perfect Candidate*, 2015) follows the hero's political campaign and features a vengeful tabloid journalist who is determined to humiliate the candidate and his family. The final part of the trilogy (coming soon) is set in an ashram, where the main characters settle scores in a dramatic showdown with unexpected consequences. Stay tuned!

The proceeds from the sale of my fiction support charitable organizations, including International Rescue Committee, Kiva, and Malala's Fund. You can read all about it on my website (*www.tamraparnidasu.com*).

In addition, I founded IndiaWrites Publishers, a 501(c)3 organization, to support and give exposure to regional Indian writers by commissioning and publishing English translations of their work. Our first anthology, *1947 Santoshabad Passenger and Other Stories,* was published in 2010 to critical acclaim by Rupa & Co., India's top publisher. I have spoken at a number of literary events and festivals, including the Indo-American Arts Council Literary Festival in NYC and Fall for the Book Festival in Virginia, and been interviewed by India Abroad, an eminent publication serving the Indian diaspora, and ITV Gold, the longest-running Indian TV channel in the US.

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

Both my parents come from distinguished literary families in India. I was considered the black sheep of the family for choosing statistics over music, literature, or law. I guess the writing gene lurked in my blood all along and finally demanded its due.

I have always admired good writing—Gabriel Garcia Marquez, Jose Saramago, Doris Lessing, Salman Rushdie, Jane Austen—and it seemed natural to start writing. It has turned out to be a terrible yet wonderful hobby—time consuming, tiring, frustrating, and never as good as what's in my head, but always stimulating and exhilarating.

According to my father, an authority on desserts and literature, writing is like cheesecake for your brain. No wonder it is so addictive! I find it helps me understand my behavior and that of the world around me and to capture fleeting joys and let go of sadness.

I write longhand before committing my novel to a digital format, and just the feel of a high-quality pen against a smooth sheet of white paper is a sensual pleasure. And the characters! Once you are in the middle of a novel, they won't let you sleep with their constant jostling for attention.

It's quite amazing! I highly recommend it. ■

A **Wake-Up Call** to Statistical Consultants

Jonathan J. Shuster, University of Florida, and Chris Delcher, University of Kentucky

Based on a random survey of American Statistical Association members by Min Qi Wang, Alice F. Yan, and Ralph V. Katz discussed in the *Annals of Internal Medicine* paper, "Researcher Requests for Inappropriate Analysis and Reporting: A US Survey of Consulting Biostatisticians," one can infer that surprisingly many collaborator (client or colleague) requests for analysis should have aroused suspicions of possible misconduct. The goals of this follow-up analysis, using the actual survey data supplied by Katz, are to answer the following questions:

1. How many ASA members have received at least one of three specific inappropriate requests (cited below) in the past five years?

2. How many episodes of these requests collectively occurred in the past five years?

Neither the Wang et al. article nor the accompanying editorial by A. Russell Localio, Catharine B. Stack, Anne R. Meibohm, Eric A. Ross, Eliseo Guallar, John B. Wong, John E. Cornell, Michael E. Griswold, Steven N. Goodman, titled "Inappropriate Statistical Analysis and Reporting in Medical Research: Perverse Incentives and Institutional Solutions," addressed these critical questions.

Briefly, the results of our analysis conservatively suggest more than 1,800 ASA members, covering more than 3,000 episodes in the past five years (or 600 episodes per year), have received what some may call "nefarious-looking" requests because they seem to be intended to deceive.

To illustrate the potential severity of these numbers, consider that, in 2017, the Office of Research Integrity (ORI) received 215 new cases (phone, email, or institutional) that may have qualified as nefarious-looking. Even if half the consulting cases merit reporting to ORI, funder of the Wang at al. study, this would more than double their caseload.

Given the magnitude and implications of our estimates, we recommend new procedures for consultants, their institutions, and the ASA to follow to help maintain a high level of integrity for statistical science. The full report also contains a Google survey we conducted of the 1,558 ASA members about their opinions of the consultant's responsibility when faced with such requests.

The Office of the ASA Executive Director provided the Wang team with a random sample of 4,000 ASA members. The team screened 126 of these members as ineligible because they were not primarily involved in biostatistical consulting or data analysis, leaving a frame of 3,874 members. By random sampling in 16 50-person batches of emails, the team requested a final sample of 800 members to complete the survey. Four hundred attempted to complete the survey, but 10 of these were excluded, leaving a final sample of 390.

The survey asked the respondent two questions about each of 18 scenarios of analytic requests they received for "inappropriate" action:

(a) Frequency in the last five years: 0, 1, 2–4, 5–9, or 10+ episodes

(b) The consultant's perceived seriousness of the apparent "bioethical violation" on a scale of 0–5, with 5 being the most serious

In our judgment, only three of the questions would require immediate action to resolve possible misconduct.

The nefarious-looking questions: How many times in the last five years were you asked to (1) "falsify the statistical significance (such as *p*-value) to support a desired result"? (2) "change data to achieve the desired outcome (such as prevalence rate of cancer or other disease)"? and (3) "remove or alter some data records (Observations) to better support the research hypothesis"?

For the 390 who completed the survey, we impute an outcome for each question as 0, 1, 2 (if 2–4 episodes), 5 (if 5–9 episodes) and 10 (if 10+ episodes). Since, for each respondent, the same episode may be reported under multiple questions, we imputed the overall episode count conservatively as the maximum imputed response for the three questions. For the 410 members sampled

MORE ONLINE
This is a summary. For the full report, see *http://magazine.amstat.org/wp-content/uploads/2019/01/Wakeup_call_stat_consult_FULL-REPORT.pdf.*

Jonathan Shuster, Department of Health Outcomes and Biomedical Informatics, College of Medicine, University of Florida

Chris Delcher, Department of Pharmacy Practice and Science, College of Pharmacy, University of Kentucky

Table 1: Conservative Episode Count of the 800 Sampled Individuals

Episodes	0	1	2-4	5-9	10+
Count (N=800)	699	73	15	7	6

who either refused to participate (400) or had a non-evaluable response (10), we conservatively imputed the response as zero. Table 1 gives the distribution of the 800 episode-count outcomes.

Projecting these data to the 17,400 ASA members, we conservatively estimate with 95% confidence that more than 1,800 members experienced more than 3,000 episodes in the past five years.

Implications for the Consulting Community

We view these estimates as unacceptably high and a wake-up call for action by all of us engaged in statistical team science. We must be more proactive to greatly reduce or eliminate this behavior—not only for our clients, but for the integrity of our profession. It is not appropriate for us to resolve suspicious requests in a vacuum without a thorough and discrete assessment by university or organizational ethics officers.

We are obligated professionally to reach out when faced with a request for aiding and abetting potentially unethical conduct. However, we must not make any direct accusations of intellectual misconduct on the part of our colleagues. View the full report to see how similar events are handled by the American Contract Bridge League, which governs Duplicate Bridge in North America. Similar systems could readily be adopted by the ASA.

Limitations

Our analysis has two limitations that are beyond anything mentioned in either of the parent articles. First, because the survey retrospectively requested respondents to estimate their five-year experience, respondents could well have had recall bias, especially with respect to number of episodes and whether they occurred within the five-year window. However, it seems likely that the estimate of whether the member had at least one of these potentially nefarious requests should be viewed as a still more conservative estimate of their career-long experience.

The second limitation is of greater concern. The questions seem to require an inference on the part of the consultant about the purpose of the nefarious-looking request. For example, if you were asked to remove or alter some records (an affirmative answer to the first part of Question 3), how does the consultant infer the purpose was "to better support the research hypothesis"? The ability of the respondent to understand intent seems uncertain at best. ■

The Evolution of Variables and the Existence of Trans People

Jo Hardin and Jack Miller

In June 2016, Jo Hardin, a cisgender (an individual whose gender matches the sex that they were assigned at birth) woman, found herself talking about randomization of study participants with the goal of balancing the proportions of men and women across treatment groups. In particular, it was important that the two study groups had, on average, the same center of gravity. (The example comes from Chance and Rossman, *Investigating Statistical Concepts, Applications, and Methods*, Investigation 3.4 – Have a nice trip.)

Jo had used the example many times and it had never crossed her mind that randomizing gender may be a sensitive topic for some students (indeed, the example and corresponding applet are fantastic ways to teach about randomizing to avoid issues of confounding!). But in that class of students, there were two transgender men (individuals who identify as male but were assigned female at birth) who caused her to stop and think. Jo could tell by the look on their faces that the discussion of the binary didn't quite sit right. And why should it? Those students had both spent many years struggling with the world at large trying to fit them into a box in which they do not belong and they had both (presumably) come to a place where they feel more comfortable—which, in their cases, happened to be in another box. Theirs is just one situation. For some transfolks, there is no box that is correct—gender is *not* binary!

Meanwhile, on October 21, 2018, *The New York Times* reported that the Department of Health and Human Services is "spearheading an effort to establish a legal definition of sex under Title IX." The proposed change would require that "key government agencies needed to adopt an explicit and uniform definition of gender as determined 'on a biological basis that is clear, grounded in science, objective and administrable.' The agency's proposed definition would define sex as either male or female, unchangeable, and determined by the genitals that a person is born with, according to a draft reviewed by *The Times*. Any dispute about one's sex would have to be clarified using genetic testing."

The same week that this memo was uncovered by *The Times*, the Department of Justice filed a brief with the Supreme Court to support a narrow definition of "sex" that does not include transgender people. Many individuals and organizations from the Bureau of Labor Statistics to companies like Amazon, Apple, and Google are gravely concerned about this move by the administration, and many transgender persons now live in fear of being "erased" and discriminated against because they "no longer exist" with this definition.

Why should statisticians care about this issue?

We as statisticians know that (a) randomization doesn't care about the gender binary and (b) statistics is a field of "on average." The randomization process used to balance confounding variables is agnostic to the type of variable. One need not even adjudicate whether gender is binary before using randomization to balance treatment groups. The statistical nuances, however, are lost on students who hear Jo's lecture and immediately feel they are made invisible by the conversation. Invisibility is less divisive than being erased, but none of us want our students to feel invisible in our classroom. So, as teachers, what do we do?

The in-class experience led to a thought-provoking discussion between Jo and Jack, a nonbinary transmasculine statistics educator who has thought long and hard about gender identity issues in the classroom on both a personal and professional level. Jack's words of wisdom are woven in to the remainder of this article as advice for all of us in both teaching important aspects of randomized studies and relating to our students as people.

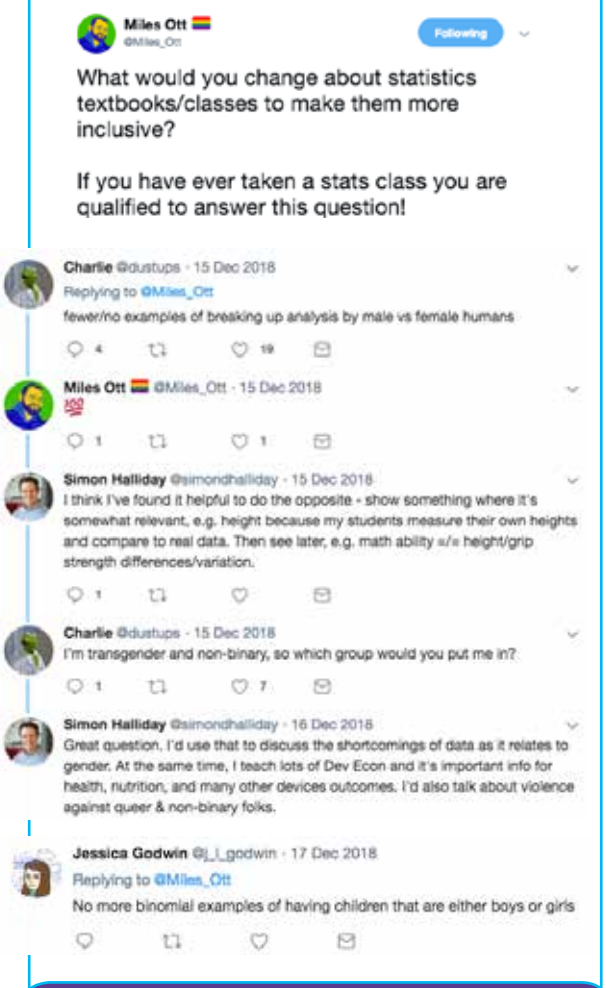
When first using the "binary" variable of gender in the classroom, what can teachers do to make the conversation more inclusive? First, mention that (in virtually all disciplines) most study participants are cisgender men and women (because there is not much research done on trans people). Also, open the discussion to ask about how the variability in the groups (e.g., with respect to center of gravity) might change if there were noncisgender people in the study.

As it becomes safer for trans individuals to be open with their identity, the students in your

Jo Hardin (pronouns: she/her/hers) is a professor of mathematics and statistics at Pomona College. She completed her PhD at the University of California, Davis and started research in statistical analysis of high-throughput data through her postdoc at the Fred Hutchinson Cancer Research Center.

Jack Miller (pronouns: they/them/their or he/him/his) is a statistics education specialist who joined the faculty at the University of Michigan in the fall of 2013. Prior to the University of Michigan, Miller was at The Ohio State University and on the faculty of the Department of Mathematics and Computer Science at Drury University. Miller is interested in both the teaching of statistics and training future statistics teachers.

Twitter Question



To read the full conversation online, visit https://twitter.com/Miles_Ott/status/1073987077728034818.

class are more and more likely to have trans friends or family members. Perhaps the students (cis- and trans-) would be willing to contribute to the rich discussion on gender identity as it relates to scientific research. If not, you could mention that some transgender people choose to medically transition and that might impact center of gravity. Note: You (the instructor) may not be able to tell (visually) if you have any trans students in your class. You may have (or have had) at least one trans student who did not disclose their gender to you.

Right now, as educators, we are in an odd place with examples and actual experiments/studies. There are not enough studies that include trans, nonbinary, genderqueer, or folks of other identities for us to include in our classes, but we don't want to be exclusive of our students who are not cisgender. Fortunately, the examples we choose to use in the classroom can be inclusive.

The conversation around gender identity reminds us of statistics textbooks from the mid-1990s that used only Black and White for race. At that time, it was difficult to navigate the examples in a room full of students of all races. Fortunately, our textbooks have changed over time with respect to race, which gives us hope that the classroom conversation around gender will expand to include transfolks or at least specify that (presumably) studies include cismen and ciswomen.

To date, (almost) all textbooks refer to gender as a binary when teaching proportions. This is incorrect and can negatively impact students who are not part of the gender binary. At the same time, we often feel restricted to actual research that has been done only when talking about the studies we use while teaching. We can include other examples we bring in ourselves (e.g., left-handed or not? Proportion of golden retrievers or not?)

We are not advocating that statistics instructors overhaul their entire courses. We only suggest that, as teachers, we should be aware of the perspectives our students bring to the table with respect to their identities. Bringing up issues such as the gender binary within research studies will go a long way toward making the statistics material accessible to all students. As we were writing this article, we came across the Twitter conversation (see sidebar) that we present here as an indication that others are concerned with the same issues we are.

Perhaps the little things we do with our students will help us teach better and think more carefully about research—when is it okay to block by gender? Does blocking by gender still have meaning as the world changes to include gender on a spectrum? We believe it does because most of the world can be reduced to a binary in terms of gender. Thus, centers of gravity will, for the most part, still behave like we would expect in a binary world. We do not think the binary should be thrown out; we just want to point out the sensitivity we need in terms of working with our students, not all of whom will identify with the binary.

Originally, we hoped to share our experience with you to open the discussion of inclusivity in the classroom. Now that the federal government is taking steps to "erase" transgender persons, it is even more urgent for academics and practitioners alike to think about gender issues and how we, as statisticians, define and categorize variables. We welcome you to share your ideas with us, so we can help all students and coworkers. If you have any ideas and/or want to discuss this further, feel free to contact either or both of us: *jo.hardin@pomona.edu* or *jabmille@umich.edu.* ■

US Conference on Teaching Statistics: Evaluating Evidence at Penn State in May

The 2019 United States Conference on Teaching Statistics (USCOTS), hosted by the Consortium for the Advancement of Undergraduate Statistics Education (CAUSE), will be held at the Penn Stater Hotel and Conference Center May 16–18. This conference brings together teachers of statistics at all levels to exchange ideas and discover how to improve their teaching.

This year's conference theme of "Evaluating Evidence" is inspired by recent ASA efforts to educate researchers, decision-makers, and the public about sound statistical practice for drawing inferences from data in the 21st century. This conference theme will embrace all aspects of evaluating evidence, including helping students to do the following:

- Understand the reasoning process of statistical inference
- Recognize appropriate interpretations and limitations of statistical inference
- Design studies to facilitate evaluating evidence
- Conduct research in a reproducible manner
- Consider alternatives to traditional methods for conducting inference
- Reflect on the role of inference in the context of big data and data science

The theme also refers to evaluating evidence about teaching effectiveness and student learning.

Confirmed plenary speakers for the conference are Ron Wasserstein of the American Statistical Association, Jane Watson of the University of Tasmania, John Kruschke of Indiana University, and Kari Lock Morgan of Penn State University.

Participants in interactive breakout sessions will discuss topics such as simulation-based inference, assessment strategies, teacher preparation, data science, and technology tools. Technology demonstrations by conference sponsors, engaging poster sessions, a conference banquet and awards ceremony, and 11 pre-conference workshops are also included with conference registration.

To ensure the workshops on teaching a modern inference curriculum reach the widest possible audience, the ASA will provide funding for instructors with financial need.

Statistics teachers at university, two-year college, and secondary levels will find USCOTS provides a welcoming, active, and fun environment. Participants will meet new colleagues and renew friendships with peers who are united by a common desire to teach students effectively to become the next generation of citizens and scholars.

More information about the conference program and a conference registration form can be found at *www.CAUSEweb.org/uscots*.

Contact Allan Rossman, USCOTS program chair, at *arossman@calpoly.edu* or Dennis Pearl, CAUSE director, at *dkp13@psu.edu* with questions. ■

2019 Data Visualization Poster Competition and Project Competition

Introduce your K–12 students to statistics through the annual poster and project competitions directed by the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability. There is no cost to enter either competition.

Posters (grades K–12) are due every year on April 1. See details at *http://bit.ly/2GrVSqk*.

Projects (grades 7–12) are due June 1. More information can be found at *http://bit.ly/2SznHmR*.

Look closely at the new rules for the project competition and new rubric for the poster competition.

Student Awarded; Graduates Introduced

Winston Richards and Patrick Herbert

While at the University of the West Indies in Trinidad, Winston A. Richards—professor emeritus at The Pennsylvania State University—presented the Winston A. Richards Prize in Statistics to Patrick Herbert.

This award, which comes with a cash prize, was presented in October 2018. It is given to a student who has the best II and III performance in statistics.

Masters students (from left) with Winston Richards, professor emeritus at The Pennsylvania State University: Danielle Samuell-Seeraj, Anthony Ramdeen, Ravi Ramcharitar, Winston A. Richards, Isaac Dialsingh, Rafael Guerrero, Brendon Bhagwandeen, and Anna-Keren McMayo

Richards' graduate student, Isaac Dialsingh, returned as a faculty member to the University of the West Indies. He has now produced several master's in science statistics graduates, who he introduces here. Dialsingh has indicated he plans to organize a statistics club with the students. ■

Obituaries

Joan Raup Rosenblatt

Joan Raup Rosenblatt, a longtime ASA member and president of the Caucus for Women in Statistics in 1976, died December 5, 2018, at the age of 92. She devoted her career to public service, retiring in 1995 as director of the Computing and Applied Mathematics Laboratory at the National Institute of Standards and Technology (formerly the National Bureau of Standards).

Rosenblatt's contributions to her field earned her numerous awards and commendations, including the Award for Achievement in Mathematics from the Washington Academy of Sciences (1966), the Federal Woman's Award (1971), the US Department of Commerce Gold Medal (1976), and the ASA Founders Award (1991).

Rosenblatt was born Joan Eliot Raup on April 15, 1926, the daughter of two professors: Robert Bruce Raup, an educational psychologist at Teachers College, Columbia University, and Clara Eliot, an economist at Barnard College. At her birth, her mother became the first woman at Barnard to obtain a maternity leave.

In 1950, Rosenblatt married another ASA Fellow, David Rosenblatt. They were married 51 years, until his death in 2001.

A longtime resident of Washington, DC, Rosenblatt moved to Ingleside at King Farm in Rockville, Maryland, in 2009. Her family plans to hold a memorial gathering in early 2019.

David Hinkley

David Hinkley, passed away January 11, 2019.

Students of the theory of statistics will know David through the book *Theoretical Statistics,* co-authored with David Cox and published by Chapman and Hall in 1974. In laying out the key concepts of the theory of inference with a focus on statistical—rather than mathematical—thinking, the authors marked a new approach to the discipline focused on the needs of science—rather than the formal mathematical structures—and were influential in advancing the field of statistics through the 1970s, 1980s, and beyond.

David also co-authored the book *Bootstrap Methods and their Application* with Anthony Davison, published at a time when new papers on the bootstrap were appearing at a rapid pace giving a balanced account of the theory, its successes and failures, its range of applications, and the importance of reliable software.

In 1978, David co-authored with Bradley Efron an influential paper for the development of statistical theory: "Assessing the Accuracy of the Maximum Likelihood Estimator: Observed Versus Expected Fisher Information." The paper preceded a rapid and exciting development of asymptotic theory of statistical inference, its relationship to conditioning, and the development of improved approximations to likelihood inference. Some of this early work was summarized in a paper in the *Canadian Journal of Statistics* in 1980 simply called "Likelihood." This paper was based on an invited talk given to the Statistical Society of Canada and had a large impact on research in likelihood theory and methods.

David leaves his children, Sara and Steve; four grandchildren; and many friends and colleagues who appreciated his clarity of thought, his brilliant lectures, his lively and broad-ranging intellect, his wry humor, and his passions for soccer and photography.

San Francisco Bay Area Chapter **Celebrates 90th Birthday, Hosts Career Development Panel**

The San Francisco Bay Area Chapter (SFASA) celebrated its 90th anniversary and presented a career development discussion panel December 8, 2018, at the Seven Hills Conference Center of San Francisco State University (SFSU). More than 200 chapter members attended.

Kathy Zhang of BeiGene, who is the past president of SFASA, made opening remarks.

Two eminent keynote speakers, Bradley Efron of Stanford University and Michael Jordan of the University of California, Berkeley, gave talks in the afternoon. The title of Efron's keynote was "Easy-to-Use Programs for Bootstrap Confidence Intervals." Jordan's keynote presentation was titled "Machine Learning: Dynamics, Economics, and Stochastics."

Between the keynote speeches, several past and current chapter officers shared their experiences volunteering for the local chapter with the audience. Li Zhang of the University of California, San Francisco, who is the current chapter president, reviewed the history and recent activities of SFASA.

Ruixiao Lu of Genomic Health, who was the chapter president in 2014–2015 and currently serves as vice chair of District 6 on the ASA Council of Chapters Governing Board, gave an informative talk on the many ways in which the ASA is able to help its local chapters.

Chris Barker of Statistical Planning and Analysis Services presented the AP Statistics program, a volunteer initiative he initiated and has been organizing since he was chapter president in 2011–2012. Through this program, statisticians from the chapter volunteer their time and give one-hour lectures about careers in statistics to AP Statistics students at local high schools.

Jing Huang of Veracyte, who was the chapter president in 2015–2016, is the founding president of DahShu and Council of Chapters representative for SFASA. She reviewed the close collaboration between the two organizations.

Before the coffee break, a large custom cake with the written message "SFASA 90th Anniversary Celebration" was cut by Efron and Hosten, marking a celebratory moment.

After the dinner, we continued with our new annual tradition of hosting a career development panel discussion for statisticians and data scientists. The eight distinguished panelists from both academia and industry were the following:

Chetan Gadgil, Global Director: Intel IoT RfP Ready Kits, Intel

Alan Hopkins, Global Vice President of Biometrics, BeiGene

From left: Alex Tsui, Shengle Lin, Alan Paciorek, Xiaoli Qi, Michael Wulfsohn, Doris Shu, Tao He, Chris Barker, Li Zhang, Kathy Zhang, Dean Fearn, Donna Spiker, Ron Yu, Bradley Efron, Alan Hopkins, Jing Du, Ling Shen, Jing Huang, and Ruixiao Lu

Alan Hubbard, Professor and Division Head of Biostatistics, University of California, Berkeley

Qi Jiang, Vice President and Head of Biometrics, Seattle Genetics

Mohammad R. Kafai, Professor and Director of Statistics, San Francisco State University

Mi-Ok Kim, Professor of Biostatistics and Director of Biostatistics at UCSF Helen Diller Family Comprehensive Cancer Center, University of California, San Francisco

Fei Long, Director of Data Science, Dropbox

Michael Wulfsohn, Senior Vice President of Biometrics, Gilead Sciences

The panel discussion, which was facilitated by Tao He of SFSU and Ron Yu of Gilead Sciences—who are the SFASA vice president and president-elect, respectively—began with a self-introduction from each panelist. The panelists recounted how they entered the field of statistics and described their career paths. After that, the floor opened for questions.

For more than one and a half hours, the audience sought advice and insight from the panelists on topics such as applying for graduate studies; learning statistics on one's own; a statistician/data scientist's job in academia, pharma/biotech, and high-tech industries; success stories of real-world data; communication and decision-making in the workplace; social responsibilities of statisticians and data scientists; and the time ahead for automated machine learning. Panelists addressed those concerns and questions with patience and warmth, and the audience responded enthusiastically.

Based on a follow-up survey, more than 90% of the respondents rated this event above average and would recommend it to their colleagues and friends. ■

Biometrics

The David P. Byar Young Investigator Award is given annually to a new researcher in the Biometrics Section who presents an original manuscript at the Joint Statistical Meetings. The award commemorates David Byar, a renowned biostatistician who made significant contributions to the development and application of statistical methods during his career at the National Cancer Institute. In addition, the section gives travel awards. This year's recipients are the following:

David P. Byar Award Winner

- **Tiffany Tang,** University of California, Berkeley | Integrated Principal Components Analysis

JSM Travel Award Winners

METHODS SECTION

- **Yuan Chen,** Columbia University Mailman School of Public Health | Stage-Wise Synthesis of Randomized Trials for Optimizing Dynamic Treatment Regimes
- **Lucy L. Gao**, University of Washington | Are Clusterings of Multiple Data Views Independent?
- **Pixu Shi,** University of Wisconsin - Madison | High-Dimensional Log-Error-in-Variable Regression with Applications to Microbial Compositional Data Analysis
- **Ted Westling,** University of Pennsylvania | Causal Isotonic Regression
- **Rui Chen,** University of Wisconsin - Madison | Tailored Optimal Post-Treatment Surveillance for Cancer Recurrence

PRACTICE SECTION

- **Amanda Mejia,** Indiana University | A Spatial Bayesian Modeling Approach for Cortical Surface fMRI Data Analysis
- **Fan (Frank) Li,** Duke University | Propensity Score Weighting for Causal Inference with Multi-Valued Treatments
- **Giovanni Nattino,** The Ohio State University | Triplet Matching for Estimating Causal Effects with Three Treatment Arms: A Comparative Study of Mortality by Trauma Center Level ■

Survey Research Methods

While the section's main website is on the ASA Community (*https://community.amstat.org/surveyresearchmethodssection/home*), we needed to set up a separate site for proceedings papers (*www.asasrms.org/Proceedings/index.html*) due to changes in ASA policies, so you may need to update your bookmark.

Our section provides free access to the proceedings for the entire history of the Survey Research Methods Section (1978–2017; 2018 will be added later this year), as well as the proceedings from the Social Statistics Section (from which our section separated in 1978) from 1958–1977 and all five International Conference on Establishment Statistics (ICES) meetings (1993–2016). Some of these years are prior to the electronic proceedings available through the ASA (2009–today); section members scanned all earlier papers as a service to survey researchers.

In addition to the information provided in *Amstat News,* our section publishes a newsletter every six months. The January 2019 *SRMS Newsletter* (as well as previous newsletters) can be found on our ASA Community

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

Program	Deadline	Nominations	Questions
Links Lecture Award	May 1, 2019	*awards@amstat.org*	Arthur B. Kennickell *arthur.kennickell@gmail.com*
Lester R. Curtin Award	Oct. 15, 2019	*awards@amstat.org*	Ronald L. Wasserstein *ron@amstat.org*
Lingzi Lu Memorial Award	Oct. 15, 2019	*awards@amstat.org*	Victoria Sides *victoriasides16@gmail.com*
Monroe. G. Sirken Award in Interdisciplinary Survey Methods Research	Oct. 15, 2019	*awards@amstat.org*	John L. Czajka *jczajka@mathematica-mpr.com*
Deming Lecturer Award	Nov. 15, 2019	*awards@amstat.org*	Roger W. Hoerl *roger.hoerl@gmail.com*
Elizabeth L. Scott Award	Dec. 15, 2019	*community.amstat.org/copss/home*	

DEPARTMENT of BIOSTATISTICS EPIDEMIOLOGY & INFORMATICS

Perelman School of Medicine University of Pennsylvania

Center For Clinical Epidemiology And Biostatistics 12th Annual UPENN Conference on Statistical Issues in Clinical Trials

April 17, 2019

Electronic Health Records (Ehr) In Randomized Clinical Trials: Challenges And Opportunities

Website and Registration opens January 3, 2019
https://bit.ly/2QLGLIP

CASE STUDIES

Denise Esserman, Phd, *Yale University:* From Screening to Ascertainment of the Primary Outcome Using Ehr, Challenges in The Stride Trial

Steven Zeliadt, Phd, *University Of Washington:* The Approach Trial: Assessing Pain, Patient Reported Outcomes and Complementary and Integrative Health

Richard Platt, Md, *Harvard University*: The Impact-AFib Trial: **IM**plementation Of An RCT to Im**P**rove Treatment with Oral **A**nti**C**oagulan**T**s in Patients with **A**trial **F**ibrillation

Matthew T. Roe, Md, *Duke University*: Leveraging Electronic Health Record Data forPragmatic Randomized Trials in Learning Health Care Systems in the United States – Lessons Learned From The Adaptable Trial

OVERVIEWS

Benjamin A. Goldstein, PhD, *Duke University:* Design Considerations for Running Health System Based Trials Through the Electronic Health Record

Mark LevensOn, PhD, *Food and Drug Administration:* Regulatory Perspective On Performing Rcts in an Ehr Environment

STATISTICAL METHODS

Patrick J. Heagerty, PhD, *University of Washington:* Addressing Heterogeneity inthe Data, Design, and Analysis of Pragmatic Trials Embedded in Delivery Systems

Sebastien Haneuse, PhD, *Harvard University:* On Selection Bias Due to Missing Data in EHR-Based RCTs

Susan M. Shortreed, PhD, *Kaiser Permanente Washington Health Research Institute:* Using Real-World Data to Improve Trial Design

JINBO CHEN, PhD, *University of Pennsylvania:* Study Design Issues for Exploiting EHRs to Design Clinical Trials

PANEL DISCUSSION

Rebecca Hubbard, PhD University of Pennsylvania

Ralph D'Agostino, PhD Boston University

BILL CAPRA, PhD Genentech

website page. The section also is on Twitter at @srmsasa (*https://twitter.com/srmsasa*). Follow us for announcements, news, and updates of interest to survey researchers. ■

Teaching of Statistics in the Health Sciences

Do you know an exceptional statistical educator in the health sciences? Would you like to see their efforts recognized?

The ASA Teaching of Statistics in the Health Sciences Section (TSHS) is accepting 2019 nominations for the following three major awards:

- **Distinguished Achievement Award**
  This award recognizes a section member who has provided outstanding long-term service to the TSHS and ASA. *http://bit.ly/2V0OghD*
- **Outstanding Teaching Award**
  This award recognizes an outstanding statistics educator and mentor in the health sciences. *http://bit.ly/2X6prCE*
- **Young Investigator Award**
  This award recognizes a promising "young investigator" for her/his promise as a statistics educator or in conducting statistics education research in the health sciences. A young investigator is defined as (i) a current graduate student OR (ii) a recent graduate who has received her/his terminal degree no more than seven years ago and who is in a position with rank below associate professor and does not hold tenure (or equivalent classification). *http://bit.ly/2GJAps5.*

The first two awards carry a $250 prize, while the third carries a $500 prize. Details regarding qualification and nomination requirements can be found at each link provided above. The deadline for nominations is May 15. Any inquiries and all award nominations should be submitted to *tshs.asa@gmail.com.*

Information will also be posted on the section blog at *https://tshsblog.wixsite.com/main.* ■

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

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

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

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

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

Also, look for job ads on the ASA website at *https://jobs.amstat.org/jobseekers.*

California

■ Johnson & Johnson Surgical Vision (JJSV) is recruiting for a QA Statistician to be located in Santa Anna, CA. JJSV designs, manufactures, and distributes products for the surgical treatment of anterior segment ophthalmic disorders, most notably cataract removal. *Ray Barberrbarber@its.jnj.com.* EOE.

■ Senior statistician: Position available at pharma-focused health economics consulting firm in Beverly Hills. Responsible for conducting modeling in SAS on study types including epidemiology, burden of illness, adherence, resource utilization. Master's in health or statistics related field required, PhD a plus. 3+ years' experience with SAS and health insurance claims data. Send CV, cover letter, and writing sample: Marianne Burrows, *marianne.burrows@pharllc.com.* PHAR, LLC is an Affirmative Action/Equal Opportunity/ADA Employer.

Illinois

■ Join our growing company! Xeris Pharmaceuticals is looking for a master's-level biostatistician to join our team in Chicago, IL. This position will support the head of biostatistics in leading all company efforts globally. Great opportunity to get in on the ground level and help build the biostatistics department at Xeris! To learn more about our company and to apply directly, please visit *www.xerispharma.com.* EOE.

Maryland

■ The Emmes Corporation in Rockville, MD, a full-service contract research organization, has openings for PhD-level statisticians to serve on and lead multidisciplinary project teams supporting clinical research with great public health impact across a range

UCLA ASSISTANT OR ASSOCIATE PROFESSOR OF BIOSTATISTICS

The Department of Biostatistics in the UCLA Jonathan and Karin Fielding School of Public Health (http://www.biostat.ucla.edu) is searching for an Assistant or Associate Professor in Residence of Biostatistics. Titles in the In-Residence series, which confer membership in the UCLA Academic Senate, are assigned to individuals who engage in research and teaching to the same extent as those holding corresponding titles in the regular Professor series at UCLA. We seek a candidate with a strong track record and/or evidence of outstanding potential for methodological research, teaching at the graduate level, and obtaining external funding. Given accompanying professional opportunities through the Nathanson Family Resilience Center in the UCLA Semel Institute for Neuroscience and Human Behavior, background and experience in interdisciplinary research involving military veterans and members of their families, including community-partnered research and analysis of health-services databases, would be highly desirable. The Fielding School of Public Health is located on the main UCLA campus in direct proximity to the other health sciences schools (Medicine, Dentistry, and Nursing), several professional schools, and the College of Letters and Science. The UCLA Dept. of Biostatistics has a strong history of and commitment to interdisciplinary research and collaboration.

Candidates should: hold a Ph.D. or equivalent in statistics or biostatistics, show evidence of excellence or outstanding potential in teaching and training of doctoral students, have a strong record of peer-reviewed publications, and have a demonstrated commitment to applications in the health sciences. Faculty appointment level and salary will be commensurate with the candidate's experience and qualifications. All qualified applicants are encouraged to apply online. Applicants should submit a cover letter, curriculum vitae, the names of three individuals willing to provide a letter of reference, a statement of research interests including a summary of previous research and its significance, teaching statement, and a diversity statement addressing past and or potential contributions to diversity through research, teaching and/or service. All applications should be submitted electronically using the UCLA Academic Recruit portal at https://recruit.apo.ucla.edu/apply/JPF04205 . Review of applications will begin in January 2019. The deadline for receiving applications and required documents is April 30, 2019. Informal inquiries may be submitted to Chair, UCLA Biostatistics Faculty Search at biostatsearch@ph.ucla.edu.

The UCLA Department of Biostatistics values equity, diversity, and inclusion and the ways that each contributes to scholarship, teaching, service and the overall intellectual life in the Department and the University. Women and underrepresented minorities are encouraged to apply. UCLA is an Affirmative Action/ Equal Opportunity Employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, age, or protected veteran status. The complete University of California policy covering nondiscrimination and affirmative action in employment is at https://policy.ucop.edu/doc/4000376/DiscHarassAffirmAction.

of disease areas. Requirements: Solid background in statistical methods with a PhD in biostatistics/statistics/epidemiology, strong oral and written communication skills, and leadership potential. Apply directly online at *www.emmes.com.* EOE.

Massachusetts

■Mclean Hospital/Harvard Medical School Biostatistics Faculty Position. Position available at instructor or assistant professor level in psychiatric biostatistics program. Responsible for developing collaborations with McLean investigators and participating in statistical consultation service. Doctoral degree in biostatistics or a statistics-related field required; publication record in methods or applications; 3+ years of experience in collaborative research. Send CV, research interests statement: Garrett Fitzmaurice, Search Chair, *gfitzmaurice@mclean.harvard.edu*.EOE.

Pennsylvania

■ The Department of Statistics at The Pennsylvania State University is seeking applicants for the Lindsay Visiting Assistant Professorship. The applicant will teach between one and two courses per year under the close mentorship of prominent faculty in various areas of statistical methodology and applications. Apply through *mathjobs.org* (*www.mathjobs.org/jobs/jobs/13506*) and ALL must apply to *https://psu.jobs/job/85108*. Penn State is an equal opportunity, affirmative action employer.

Virginia

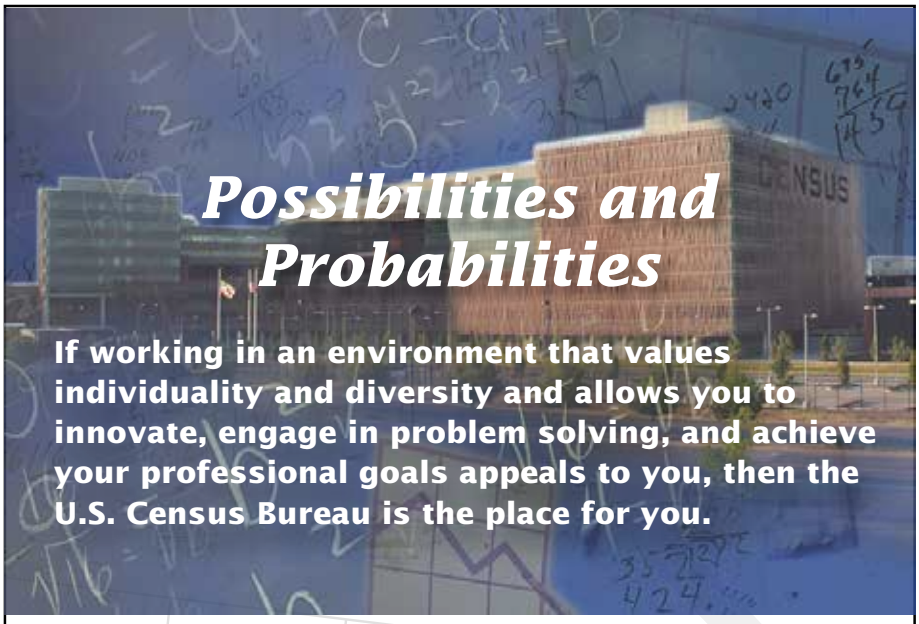
■ The University of Virginia's Social & Decision Analytics Division (SDAD) is a leading laboratory in the Biocomplexity Institute & Initiative (BII). SDAD is seeking applications for multiple postdoctoral associates in statistics and social and behavioral sciences. For questions about the application process, please contact Savanna Galambos, Faculty Search Advisor, at *skh7b@virginia.edu*. For a description and to apply for this position, please go to *jobs.virginia.edu/applicants/Central?quickFind=86114*. EOE.

MULTIPLE OPENINGS

Multiple openings, Machine Learning English mathematical + statistical modeling; study user behavior; feature extraction + analysis; use supervised-learning techniques.

Need Mast's + 1 yr exper w/discriminative methods; Python or R; analyz'g terabyte + petabyte data; perform'g data mining + data visualizatn; & w/info retrieval. Travel not req'd.

Must live in/near Bellevue, WA (job location). Cannot telecommute. Resumes: Businessolver.com Inc, c/o Engagement Team, YJ Jobs, 1025 Ashworth Rd Ste 101, W Des Moines, IA 50265.



Your Work as a Mathematical Statistician at the Census Bureau

- Design sample surveys and analyze the data collected.
- Design and analyze experiments to improve survey questionnaires and interview procedures.
- Improve statistical methods for modeling and adjustment of seasonal time series.
- Perform research on statistical methodology that will improve the quality and value of the data collected.
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Apply at www.census.gov, click on Census Careers, Type of Position, Professional/Scientific/Technical, Math Statistician

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Williams College

The Williams College Department of Mathematics and Statistics invites applications for a one-year visiting position in statistics, to begin fall 2019. Candidates should have earned a Ph.D. in statistics, or a related field by summer, 2019. We will consider candidates with any area of statistical expertise.

Visiting Assistant Professors are asked to teach four courses per year on our 12-week semester schedule, advise several undergraduate student colloquia (our capstone experience for seniors), and make small contributions to service activities in the department. This set of professional duties provides a window into the experience of being a statistician in a liberal arts setting.

Our department offers a vibrant undergraduate program with majors in mathematics (including an applied mathematics emphasis) and in statistics. For more information, see our website. The multidisciplinary environment is a rich and collegial setting for student education and faculty research. Williams College provides: the opportunity to apply for student research assistant support; a standard, annual allocation of funds to support travel and research; and a shared computer cluster for parallel computation. Visiting Assistant Professors are also eligible to participate in the college's comprehensive First3 professional development program.

Approximately one hour from the Albany, NY airport, Williams College is located in Williamstown, a thriving destination proximate to: three major art museums; theater, music, and dance festivals; community supported agriculture farms; a highly-rated public school system; and many other resources. The Williams undergraduate student body has 40% U.S. minority enrollment and nearly 10% international enrollment. Reflecting the institution's values, our department is diverse and inclusive, with 50% of our faculty being women, people of color, and/or members of the LGBTQ+ community. We encourage applications from members of underrepresented groups with respect to gender, race and ethnicity, religion, sexual orientation, disability status, socioeconomic background, and other axes of diversity.

Applications should be submitted via *https://www.apply.interfolio.com/54115*. Your application should include the following components.

1. Please provide a cover letter. This letter might describe your interest in Williams and in the liberal arts, and provide a brief summary of your professional experience and future goals. We ask you to address how your teaching, scholarship, mentorship and/or community service might support Williams' commitment to diversity and inclusion.
2. Please provide a current curriculum vitae.
3. Please provide a teaching statement. Ideally, this statement should be 2 - 3 pages long, and it might address your teaching philosophy, teaching experience, and any other reflections or relevant information you would like to share.
4. Please have at least three recommenders submit letters of recommendation. If possible, at least one of these letters should comment on your teaching or on any other instructional capacities in which you have served.

If you have questions about this position, contact search committee chair Richard De Veaux (*rdeveaux@williams.edu*). Review of applications will begin on or after November 1 and will continue until the position is filled. All offers of employment are contingent upon completion of a background check. Further information is available at *https://faculty.williams.edu/prospective-faculty/background-check-policy*.

Williams College is a coeducational liberal arts institution located in the Berkshire Hills of western Massachusetts. The college has built its reputation on outstanding teaching and scholarship and on the academic excellence of its approximately 2,000 students. Please visit the Williams College website. Beyond meeting fully its legal obligations for non-discrimination, Williams College is committed to building a diverse and inclusive community where members from all backgrounds can live, learn, and thrive.

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SOCIAL CHATTER

We asked our followers to name three women who are pioneers in the statistics profession.

PIONEERS

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NEXT MONTH:

In celebration of Mathematics and Statistics Awareness Month, we ask you to provide three words that describe your work in statistics. Use #Mathstatmonth and follow @Amstat News.

Thomas Lumley • @tslumley
Kate Claghorn
Gertrude Cox
Janet Norwood

Joe Hogan • @jwhogan42
Nan laird
Grace Wahba
Marie Davidian
Xihong Lin
Susan Murphy
..... for starters.

Mark A. • @360unfiltered
Gertrude Mary Cox, Stella Conliffe, Grace Wahba

PieterHog • @PieterHog
Deborah Mayo @learnfromerror

Yossi Levy • @yoslevy
I will add some names on top of those who were already mentioned: Kirsten Smith, Yivone Bishop, Alice Lee

Dianne Cook • @visnut
Debby Swayne for really broad multivariate interactive data vis software, she needs an honorary doctorate from somewhere

Eve Bofinger Basic probability and confidence intervals

Francois Dion • @f_dion
My #infoviz bias: Florence Nightingale
My North Carolina bias: Gertrude Cox
My Canadian bias: Isobel Loutit

Also, it depends how you view the statistics profession (ie. Ada Byron Countess of Lovelace, statistician to statisticians, mathematician to mathematicians etc)

Ada Byron Countess of Lovelace

Isobel Loutit

Florence Nightingale

Radu Craiu
Nancy Reid, Mary Sara McPeek, Louise Ryan, Bin Yu

Carolina Liskey
Francesca Dominici (Harvard-Air Quality's impact on human health)

Esther Duflo (randomized trial applied to study of education's impact on poverty)

Rachel Thomas (Duke- ethics of AI)

Kristin Rahn
Gertrude Cox
Marie Davidian
Radika Khulkarni

Ryan Kappedal
Marina Meila
Maryam Fazel
Elizabeth Thompson

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

www.amstat.org/education/mwm

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

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

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

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