June 2020 • Issue #516

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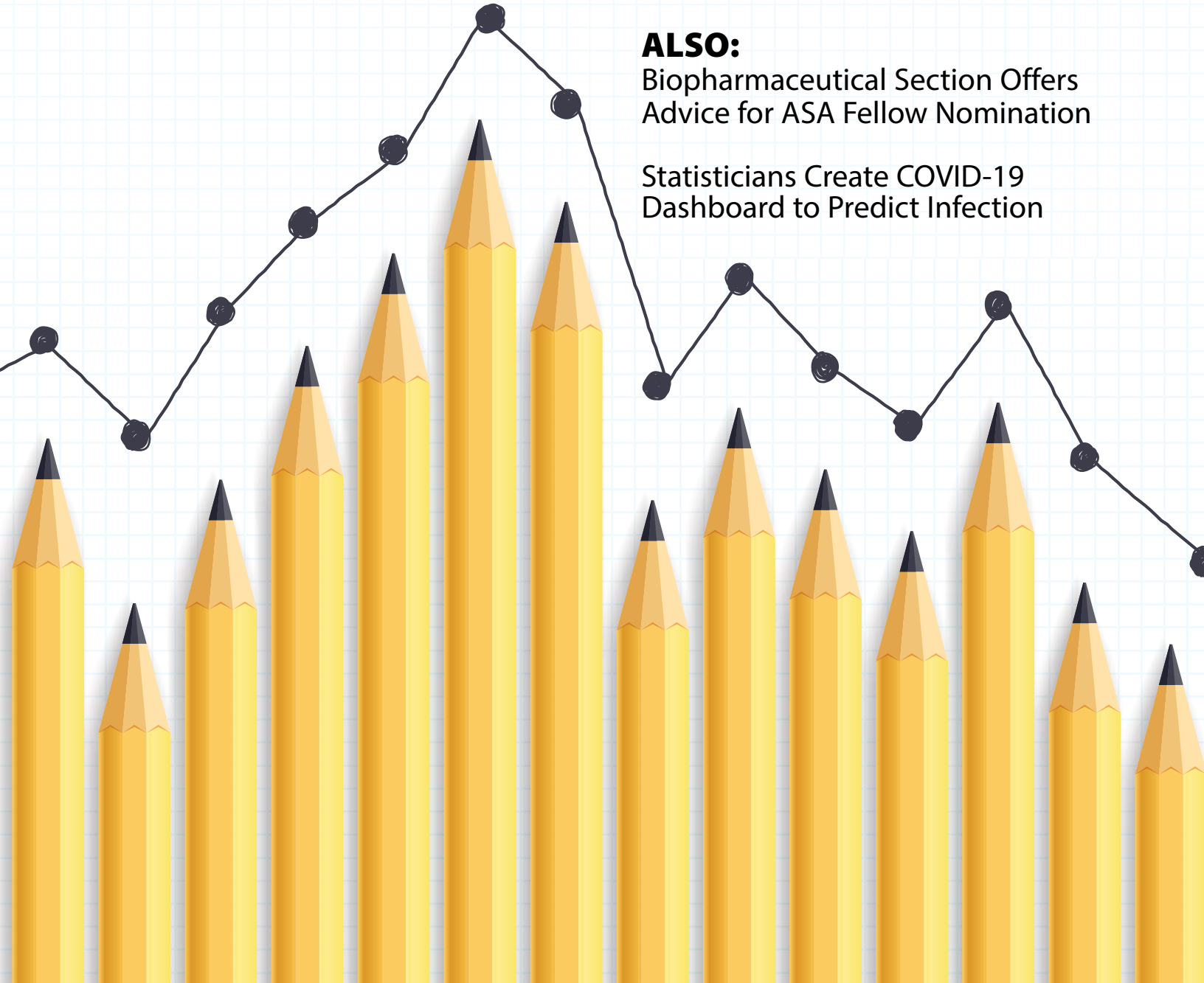

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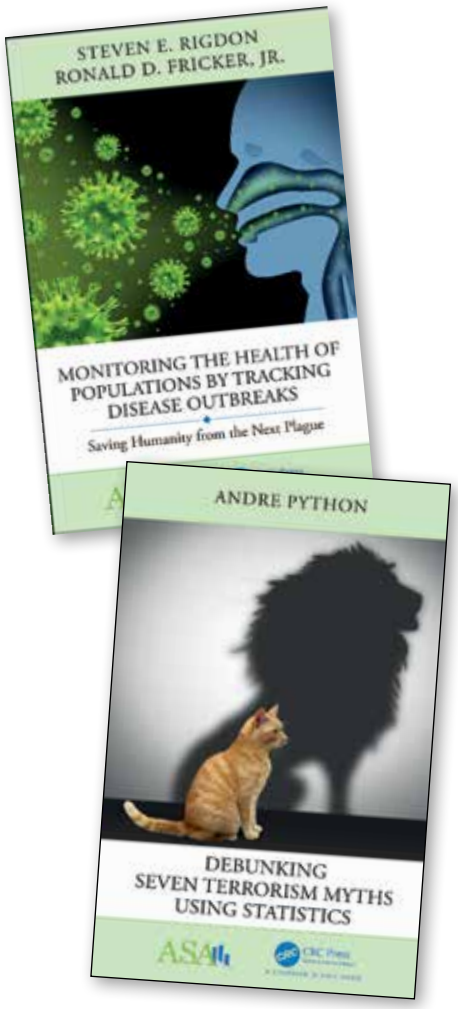

MONITORING THE HEALTH OF POPULATIONS BY TRACKING DISEASE OUTBREAKS

SAVING HUMANITY FROM THE NEXT PLAGUE

Steven E. Rigdon and Ronald D. Fricker, Jr.

Monitoring the Health of Populations by Tracking Disease Outbreaks: Saving Humanity from the Next Plague is the story of the application of statistics for disease detection and tracking. The work of public health officials often crucially depends on statistical methods to help discern whether an outbreak may be occurring and, if there is sufficient evidence of an outbreak, then to locate and track it. Statisticians also help collect critical information, and they analyze the resulting data to help investigators zero in on a cause for a disease. With the recent outbreaks of diseases such as swine and bird flu, Ebola, and now COVID-19, the role that epidemiologists and biostatisticians play is more important than ever.

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American Statistical Association

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

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Big Data Methods for Data for Good

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

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Committee on Career Development Holds Virtual Office Hours with Experts

STAT*tr@k* is a column in *Amstat News* and a website geared toward people who are in a statistics program, recently graduated from a statistics program, or recently entered the job world. To read more articles like this one, visit the website at *http://stattrak.amstat.org*. If you have suggestions for future articles, or would like to submit an article, please email Megan Murphy, *Amstat News* managing editor, at *megan@amstat.org*.

Editor's Note:

Due to COVID-19, two ASA conferences, SDSS and JSM, are going virtual. Please check event websites often for updates.

Online Articles

Spring 2020 Training Resources

Check out this list of student opportunities related to social and behavioral science from the National Science Foundation. These training resources are for graduates, undergraduates, and student postdocs. *http://stattrak.amstat.org*

Datatab Creates Statistics Calculator as a Resource for Students

A free statistics calculator by Datatab allows users to copy and paste data, calculate new values, define scale of measurements, and select statistical methods. Datatab developed the calculator to be easy to use and make statistical data analysis as easy and readily available as possible. Read more at *http://stattrak.amstat.org*.

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A Conversation to Celebrate Pride Month

I dedicated the February President's Corner to the ASA 2020 initiatives, one of which addresses our strategic theme, *Enhancing the Diversity and Breadth of Our Association*. While past ASA initiatives also addressed this theme, I thought it was important to focus on supporting and learning from our LGBTQ+ colleagues in 2020. I am fortunate to be joined in this work by a group of incredibly talented and generous individuals.

In celebration of Pride Month, I spoke with two colleagues, Jack Miller, who is the current chair of the ASA LGBTQ+ Advocacy Committee, and Suzanne Thornton, who is chairing the presidential initiative LGBTQ+ Working Group. What follows is our conversation.

Jack Miller

Suzanne Thornton

Wendy Martinez

Wendy (she/her): I have always embraced diversity and inclusion in my daily life, but I've become even more aware of its importance since being elected as ASA president. Thank you for being a part of this conversation! Would you please introduce yourselves to our readers?

I'm **Jack Miller (they/them)**. I am a statistics educator and hold the position of lecturer IV in the department of statistics at the University of Michigan. I came to Michigan in 2013 after being at The Ohio State University for 10 years. Prior to Ohio State, I was at Drury University for three years.

My PhD is a one-of-a-kind PhD in statistics education (combine two-thirds of a doctorate in statistics with two-thirds of a doctorate in education to get one degree!) from The Ohio State University. I teach both a calculus-based probability and statistics course for engineers and scientists and an algebra-based introductory statistics course aimed at social and behavioral sciences.

My interests are in leveraging technology for teaching and learning, and I have been teaching with a HyFlex (hybrid-flexible, *https://bit.ly/3bJUBpE*) model for 10 years now. Fortunately, the model I was already using made adapting to remote instruction due to COVID-19 easier than it would have been otherwise.

I enjoy being involved with the ASA in several positions and look forward to continuing my leadership growth within the ASA. In addition to being an academic, my wonderful spouse, our perfect(?) dog, and I live on an acre that abuts a forested area. I enjoy mysteries and suspense (both books and TV shows). I am excited to be getting back into working out. And I love building with LEGOs.

I'm **Suzanne Thornton (she/her)**, a 2019 doctoral graduate from the department of statistics at Rutgers University. As a graduate student, I worked with Minge Xie on developing likelihood-free frequentist inferential methods for both large and small data. I started working at Swarthmore College as a visiting assistant professor in the fall of 2019 and will be continuing on as an assistant professor this fall. As faculty at Swarthmore, I will be designing an undergraduate course on various ethical considerations for statistical inference.

My work with LGBTQ+ advocacy in statistics (and STEM in general) is largely motivated by my own experience coming out as a queer woman in graduate school. I quickly realized how important it was for me to have a professional community that understood the nuances of realizing and communicating my identity. I didn't have any communities around me that could offer the support I needed for this. This was true until I heard Emma Benn of the Icahn School at Mount Sinai speak about her experiences as a lesbian of color at a JSM panel session in 2017. I immediately reached out to Emma and she supported me with her guidance and hard work, which has accumulated in the creation of a steadily growing network of LGBTQ+ statisticians and data scientists.

Wendy: Jack, you are the chair of the ASA LGBTQ+ Advocacy Committee. I understand the name of the committee just changed. Why was it important to change the name?

Jack: I am the current chair of the ASA LGBTQ+ Advocacy Committee. Wendy, you're correct about the name change—that was just approved by the ASA Board of Directors in November 2019. When I joined the ASA in 1997, the name was the ASA Gay and Lesbian Concerns Committee. A few years ago, the name was changed to the ASA LGBT Concerns Committee. It was important for us to update the name to be more inclusive (LGBTQ+, but we aim to include all members of sexual and gender minorities). It was also important for the committee name to be reflective of our charges:

- To support research on statistical issues associated with sexual orientation and gender identity

Better Data Collection for LGBTQ+ Community

A group of statisticians led by Stephen Parry and including Suzanne Thornton, Dooti Roy, Donna LaLonde, and Wendy Martinez is working to improve the standards of collecting data on LGBTQ+ individuals. It is important to recognize that collecting data in a noninclusive way can create sources of bias from a statistical perspective. When gender nonconforming participants are forced to identify between a binary gender (M/F), response bias will ensue and cause the signal to be muddied. Similarly, members from the LGBTQ+ community may not answer survey questions if they feel excluded, resulting in nonresponse bias. The work of this group is currently focused on writing guidelines and recommendations for collecting gender and sex data in a more intentional and inclusive manner.

- To work to promote equal opportunity in employment and education for all statisticians, regardless of sexual orientation or gender identity

These charges are framed in a positive light, so "advocacy" fits much better than "concerns." (And thanks to our vice chair Jiashen You, who suggested the word "advocacy"!)

Wendy: Suzanne, you are the chair of the working group related to LGBTQ+ concerns that is now focused on my 2020 presidential initiative. How has this group evolved, and where is the group going? What do you hope to accomplish?

Suzanne: I am leading the LGTBQ Inclusion and Diversity (LID) Working Group at the ASA. This group grew after Benn, Wendy, I, and others presented on LGBTQ inclusivity at consecutive WSDS conferences. With each presentation, we received supportive feedback from attendees who were eager to help us further the outreach of our work. This support has grown into what is now the LID Working Group and a steadily expanding network of LGBTQ+ statisticians and allies. (If you would like to get in touch with us and/or be added to our mailing list (maximum one email per month), please reach out to me (*sthornt1@swarthmore.edu*) or Donna LaLonde (*donnal@amstat.org*).

We are organized into three overlapping subcommittees. The first is focused on fostering supportive and inclusive environments for LGBTQ+ and other minority groups within statistics; the second focuses on creating opportunities for success and leadership for LGBTQ+ statisticians, specifically; and the third increases LGBTQ+ representation within our field. We have a modest but dedicated group of people working on these tasks, but always welcome more, so please contact Donna or me if any of these topics are of interest to you.

Cooperating with Jack and the rest of the LGBTQ+ Advocacy Committee, LID is working toward developing ally training, bridging connections with other minority-focused statistical groups, creating scholarship opportunities, and developing a virtual network with an accessible online presence, among other things.

Wendy: Has working with these groups informed your teaching and/or research? If so, please share with us how.

Suzanne: Most certainly! I tend to observe the world around me with a sceptic's eye (perhaps that's part of what drew me to statistics in the first place). This habit, together with my personal experience exploring my sexual identity, has made me a passionate student and educator—not just of the power of statistical methods, but of the limitations of these methods and awareness of common misconceptions.

In my teaching experience thus far, I've noticed that my students don't need to be convinced of the range of influence the subject has across the board, but they instead seem to perceive statistical analysis as the "holy grail" of objective science. Thus, I strive to illuminate the many stages at which arbitrary or subjective judgment comes into play when analyzing (and collecting) data. Like many of my previous instructors, I hope to establish the ability of my students to contrast the simplicity of mathematics and statistics with the complexity of reality.

While I am still early in my statistical career, my research interests thus far have been motivated by computational inference and the foundations of statistical inference. My LID Working Group and related work has helped me begin to realize a new passion for better understanding and improving upon various ethical considerations in applied statistical methodology. I am particularly interested in bringing these topics together, for example, in the development of small-sample computational inference with applications to studying under-represented groups.

Wendy: Since working with LGBTQ+ colleagues, I've come to appreciate the difference between diversity and inclusion. In your opinion, what is the difference between diversity and inclusion? Is one more important than the other?

Jack: Yes. (And I will expand later.) Diversity is ensuring there are different voices and experiences at the table, regardless of the differences (race, ethnicity, culture, national origin, color, immigration status, social and economic class, educational level, sex, sexual orientation, gender identity and expression, age, size, family status, political belief, religion, and mental and physical ability). Another

aspect of diversity is intersectionality (the combination of minority statuses), and we must be cognizant of how multiple minority statuses impact individuals. It is also important to recognize that there is a "minority tax" (the burden of additional responsibilities that comes with being the only [insert minority status here] in the room). Being in a minority can be exhausting, and we need to find ways to increase diversity and allow others to be involved so we don't overtax a few individuals.

Inclusion means that we are not only increasing our numbers and balancing our membership in terms of the aspects I mentioned above. Inclusion means that those who belong to one or more minority groups are heard and respected and consulted in the larger group. We cannot have inclusion until we have diversity. And the ASA (and other organizations) needs to foster both diversity and inclusion.

Suzanne: I think of diversity and inclusion as two sides of the same coin; one is incomplete without the other, though there are distinctions between the two. The way I understand it, diversity has to do with embracing the scope of the variability in the human experience; inclusion, on the other hand, is the work we must do to ensure that these different human experiences are respected and celebrated.

Wendy: What would you issue as a call to action? For example, I recently added my pronouns to my signature lines as a way to indicate I am gender aware. The ASA is now including pronoun stickers and ribbons at ASA-sponsored conferences. Based on discussions with LGBTQ+ colleagues, the ASA office now has all-gender bathrooms. In what ways can individuals be involved in promoting inclusion, especially with the LGBTQ+ communities?

Jack: All-gender bathrooms are good to have, but they need to be in main traffic areas (like they are at the ASA office) and not far away (like they were at WSDS 2019). Adding pronouns to name badges has been quite nice. I suggest that all people add pronouns to their email signatures. (You can find out about sharing your pronouns at *mypronouns.org/sharing*. In my case, my pronouns link to *mypronouns.org/they-them*.)

Individuals can promote inclusion for the LGBTQ+ community by having a rainbow sticker like the True Colors United sticker available at *https://bit.ly/2Z36qop*.

We need to recognize, too, that each of us needs to be an ally and advocate for others, whether for LGBTQ+ diversity and inclusion or for other aspects of our individuality. I don't know what it is like to be a practicing Muslim in the United States, so I need to allow a Muslim member of my group to speak up about issues that impact them (e.g., afternoon exams during Ramadan). And if there are no Muslim members of my group, I need to speak up for them, to remind others that the dominant paradigm is not the only story (e.g., that an afternoon exam may sound ideal for many, but it will be difficult for a practicing Muslim student to take an exam in the afternoon during Ramadan).

Bottom line: My call to action is that we be aware diversity exists and our lives are made richer by a diverse group of individuals contributing to our shared goals. And once we achieve better diversity, we need to make sure to be inclusive (hear others' voices) and be the ally/advocate when we are the members of the dominant paradigm.

Suzanne: I completely agree with Jack's call to action. It's not possible to advocate for diversity and inclusion of gender and sexual identities without also advocating for people of color, people with disabilities, first-generation students, etc., as there is overlap among all these groups. Any small thing you can do to normalize the radical inclusivity of marginalized peoples (e.g., displaying a pride sticker, introducing yourself with your pronouns, encouraging the use of a microphone at public talks for hearing impaired listeners) is a helpful step toward a more inclusive field.

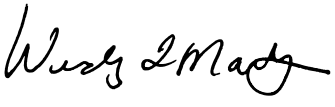
Regarding statisticians and data scientists in particular, it's important for us to acknowledge the limitations of discretizing continuous, socially defined, qualitative variables such as race and gender. For example, we need to be careful we do not simplify the data so much that we end up excluding entire subgroups of the population. Collecting data on human beings is not an easy task, we are complicated and ever-changing creatures. Our treatment of these types of variables will need to evolve with our scientific understanding of these qualities.

Finally, it is crucial for any data analyst to respect the identities of the individuals under study. In doing so, we not only contribute to the practice of ethical statistical analysis, but we also offer implicit support to our peers, colleagues, and/or students.

Jack: Many thanks to Wendy for helping our voices be heard.

Suzanne: Seconded—most emphatically! Wendy has been a key accomplice, and her dedication to working with us underscores the vital role allies play in supporting the voices of under-represented and oft-overlooked groups.

Wendy: We are committed to sustaining a just, equitable, diverse, and inclusive community at the ASA and for our profession, and we hope you will join us.



Highlights of the April 2020

ASA President Wendy Martinez gaveled in the first ASA Board meeting of 2020. Not surprisingly, the board met via videoconference. The highlights of the board meeting follow.

Discussion Items

- As it does annually, the board discussed the status of committees in the Membership Council. The committee councils serve as the connection between their committees and the board. The board expressed gratitude for the great work these committees do on behalf of the profession and association.
- The board continued its ongoing discussion about ways to support the Census Bureau during the 2020 Decennial Census, especially as the pandemic has affected the data collection schedule.

Action Items

- The board approved the appointment of Joshua Tebbs as editor of *The American Statistician* for the period 2021–2023.
- The board unanimously accepted the 2019 audited financials, congratulating Associate Executive Director and Director of Operations Steve Porzio and his team for another successful audit.
- The board, under the leadership of ASA Vice President Katherine Monti, will develop a manual for new committee chairs.
- The board formed a task force consisting of board members and ASA staff to consider possible roles the ASA can play during the COVID-19 pandemic.
- A task force, to be chaired by Executive Director Ron Wasserstein, will review the ASA's governance documents (constitution and bylaws) and make suggestions to the board for changes needed.
- The board formed an ad hoc committee to make suggestions for improving the ability of website users to find materials on the site.

Reported Items

- Porzio summarized the ASA's financial activity for 2019. He noted the ASA ended the year in the black, largely due to income and realized gains from the ASA's long-term investments portfolio. Porzio also updated the board on how the COVID-19 pandemic may affect our overall finances. There are still too many unanswered questions at this time to make a good prediction. However, Porzio said the ASA will take a significant financial hit in 2020. Fortunately, we have financial reserves to help us deal with this downturn.
- ASA Treasurer Ruixiao Lu reported on the ASA's investments. She noted the ASA's portfolio gained about $3.7 million in value in 2019. However, Lu noted 2020 has already proven to be a wild ride for the markets and we are keeping a close watch on developments through our investment manager.
- ASA President Wendy Martinez and Director of Strategic Initiatives and Outreach Donna LaLonde reported on the status of the strategic initiatives for 2020. ASA Past President Karen Kafadar updated the board on the status of two of her strategic initiatives. Also, ASA President-elect Rob Santos introduced his ideas for potential strategic initiatives for next year. He briefly described his original set of ideas, but then noted the COVID-19 pandemic completely changed his approach to planning for 2021. The board will further discuss Santos's ideas at its next meeting.
- Council of Chapters Representative Don Jang updated the board on the meetings of the COCGB since November, plans for JSM 2020, chapter website navigation updates, chapter service awards, and activities of the chapter status committee.
- Council of Sections Representative Katherine Halvorsen updated the board on section health issues, potential topics

Board of Directors Meeting

2020 Board of Directors

Wendy Martinez, President

Rob Santos, President-Elect

Karen Kafadar, Past President

Katherine Monti, Third-Year Vice President

Richard De Veaux, Second-Year Vice President

Dionne Price, First-Year Vice President

Don Jang, Third-Year Council of Chapters Representative

Anamaria Kazanis, Second-Year Council of Chapters Representative

Ji-Hyun Lee, First-Year Council of Chapters Representative

Katherine Halvorsen, Third-Year Council of Sections Representative

Mark Glickman, Second-Year Council of Sections Representative

Rebecca Hubbard, First-Year Council of Sections Representative

Alexandra Schmidt, International Representative

Scott Evans, Publications Representative

Ruixiao Lu, Treasurer

Ron Wasserstein, Executive Director and Board Secretary

for 2020 COSGB discussion, goals of the COSGB chair, and initiatives of the council for the coming year.

- Council of Sections Representative Mark Glickman and former ASA Vice President Kathy Ensor, co-chairs of the ad hoc Data Science Advisory Committee, presented the final report and recommendations of the committee. The board discussed and acted upon each of the five overarching recommendations (more on this in future issues of *Amstat News*). On a related note, Lu made recommendations for outreach to the data science community, which the board will also follow up on.
- ASA Director of Development Amanda Malloy updated the board on the results of fundraising during 2019. She said $233,000 was raised in 2019, a 7% increase over 2018. The number of individual donors, first time donors, corporate donors, and $1,000+ donors also all increased. She noted a 59% retention rate—2018 donors who also gave in 2019—and said the industry benchmark on retention is 45%.

The board will meet next on June 5 via videoconference for its annual budget meeting. ■

Special Issue of *Teaching Statistics:* New Date to Submit

Helen MacGillivray, Teaching Statistics *Editor*

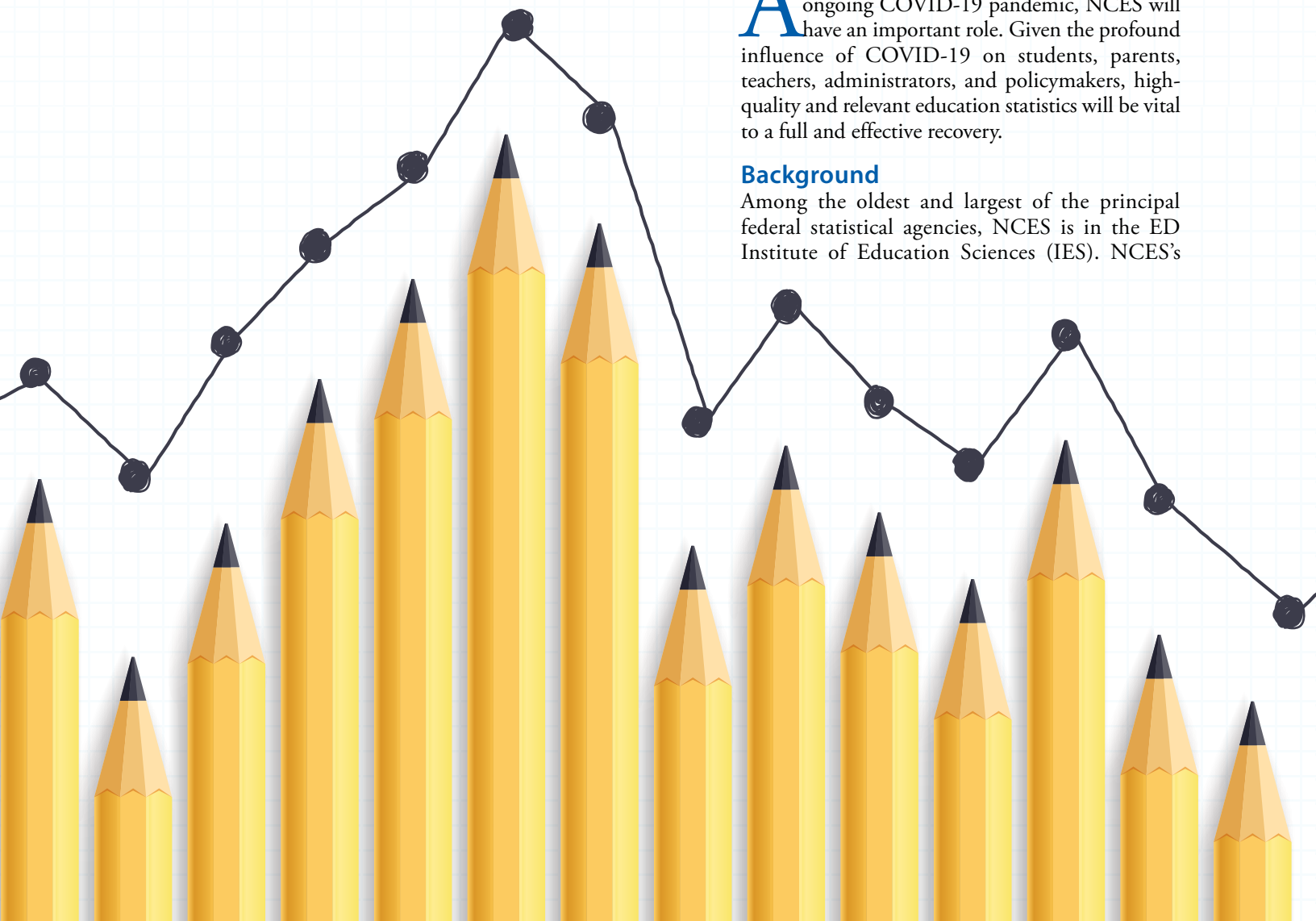
Because of the effects—personally and professionally—of COVID-19, the new deadline for submissions to the *Teaching Statistics* special issue, "Teaching Data Science and Statistics: Senior School or Introductory Tertiary," is July 25, 2020.

Submissions can be made via ScholarOne by visiting the *Teaching Statistics* website at *https://bit.ly/3bzsIjT*.

National Center for Education Statistics
FACES PROGRAM CUTS

Daniel Elchert, ASA Science Policy Fellow, and Steve Pierson, ASA Director of Science Policy

As reported by *The Washington Post* (*https://wapo.st/2T2VzH8*), the National Center for Education Statistics (NCES) may cut or reduce several programs unless the Department of Education (ED) and Congress intervene to provide needed resources. The agency's depreciating budget and low staff number are longstanding challenges that have reached a potential tipping point.



As Congress and the nation respond to the ongoing COVID-19 pandemic, NCES will have an important role. Given the profound influence of COVID-19 on students, parents, teachers, administrators, and policymakers, high-quality and relevant education statistics will be vital to a full and effective recovery.

Background

Among the oldest and largest of the principal federal statistical agencies, NCES is in the ED Institute of Education Sciences (IES). NCES's

historic mission dates to 1867 when the US Department of Education was founded. Using surveys, assessments, and administrative data, the agency compiles, analyzes, and reports education information throughout the United States and across the globe.

Some of this work, such as the annual Condition of Education report and National Assessment of Educational Progress, is mandated by Congress—meaning the agency must report objective education data that can be used by policymakers, administrators, and the public. However, several key programs are in jeopardy due to the agency's staffing and budget constraints, including the School Survey on Crime and Safety (SSOCS), Fast Response Survey System (FRSS), Baccalaureate and Beyond Longitudinal Study (B&B), and High School Longitudinal Study (HSLS).

To briefly explain the importance of these programs, SSOCS provides data on incidents, security staff, and mental health services in America's schools. FRSS is a mechanism for rapid response data on current and critical issues in the education pipeline, which could be a critical source of information about school responses to COVID-19. The B&B tracks college and post-college employment and education experiences in addition to providing data on graduates entering the teaching profession. The HSLS reports statistics about ninth-grade students from the year 2009, describing their trajectories in subsequent stages, including high school, employment, and college.

Problems

Two main problems threaten NCES programs. The first involves the agency's budget, which is provided through annual congressional appropriations and has two parts: the assessment line and the statistics line. As shown in Figure 1, the statistics line has depreciated in value more than 20 percent since fiscal year 2009 (FY09), making it increasingly difficult for the agency's statisticians to monitor, collect, analyze, and report on education topics that affect the lives of students across the country.

As the agency's statistics line has gradually lost purchasing power across time, so too has its number of full-time equivalent (FTE) staff declined, which is the second driving factor behind potential program cuts. In 2000, the agency had 115 FTEs, whereas today there are fewer than 95. This decrease in FTEs has by no means been linear, but has nonetheless deteriorated substantially. With

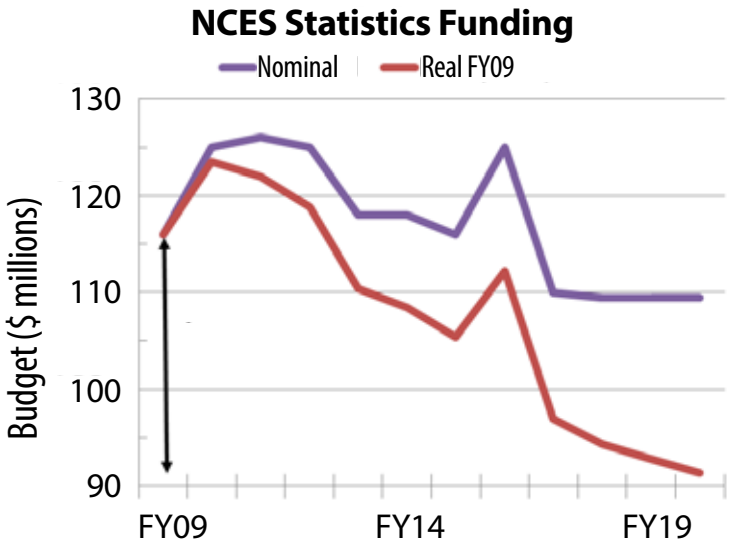


Figure 1: The NCES statistics budget in nominal and inflation-adjusted (i.e., real) dollars, showing the $25 million loss in purchasing power since 2009. Data source: Statistical Programs of the United States Government, OMB, FY11-FY20

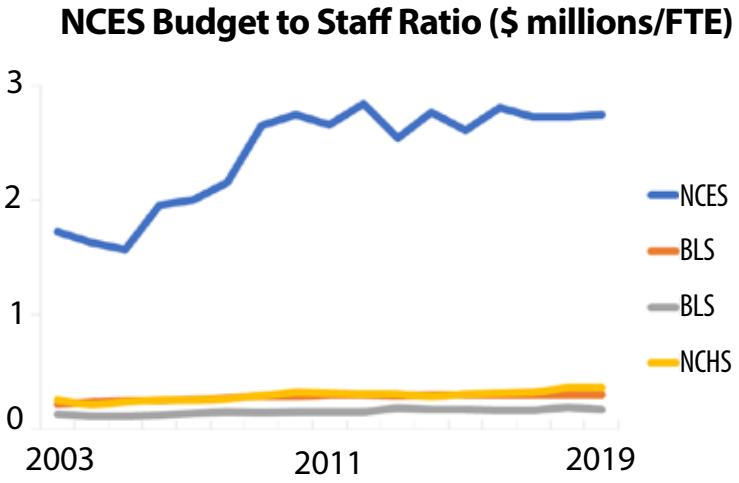


Figure 2: The ratio of the NCES budget to the number of full-time staff since 2003 as compared to three other agencies: Bureau of Labor Statistics (BLS), National Agricultural Statistics Service (NASS), and National Center for Health Statistics (NCHS). This figure does not indicate that any particular agency has sufficient staffing. Data source: Statistical Programs of the United States Government, OMB, FY05-FY20

an FY20 budget of $264 million when including the assessment and statistics accounts, NCES has a budget to FTE ratio of approximately $3 million per employee, which, as shown in Figure 2, is about nine times the median of other large principal federal statistical agencies. While statistical agencies

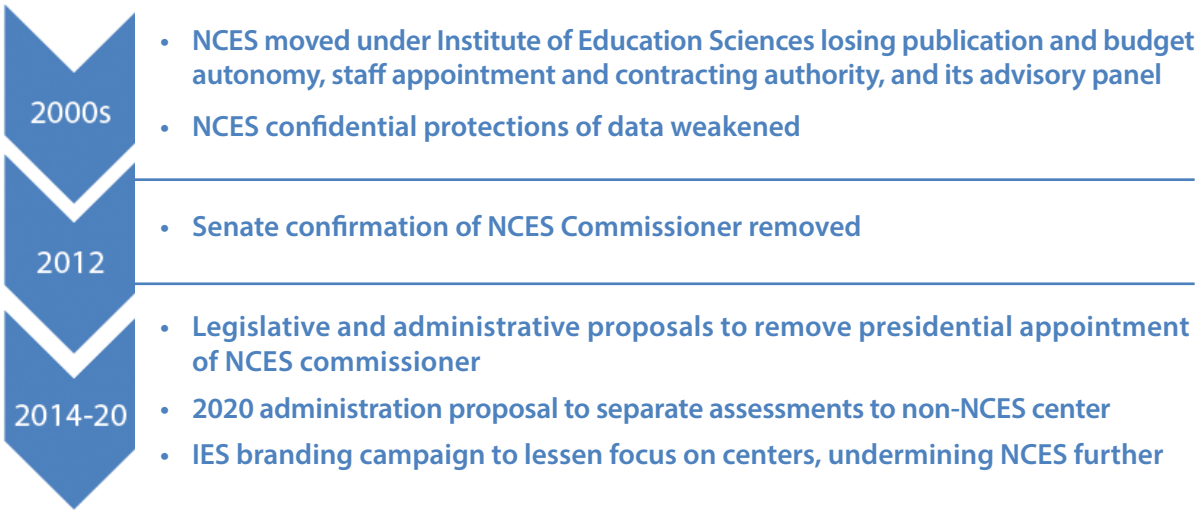


Figure 3: Schematic illustrating series of reductions of NCES autonomy and stature over the past two decades

may use their staff in different ways, the magnitude of this discrepancy suggests NCES is understaffed relative to other agencies that collect, compile, analyze, and report official data.

Consequently, NCES's budget-to-FTE staff ratio may undermine the agency's ability to cost-effectively lead and oversee education statistics programs. Many, if not all, statistical agencies contract out some of their work to non-government organizations, but this pattern may have gone too far in the case of NCES (*https://bit.ly/2T1CKEa*). This problem could worsen if NCES employees who retire or vacate their positions are not replaced in a timely manner, leading to diminished in-house expertise and technical knowledge, less efficient use of taxpayer money, and too few staff to manage contracts effectively.

The NCES staffing shortage is at least partly due to the ED budget structure, along with hiring freezes and other bureaucratic delays. In other words, NCES cannot simply use money appropriated by Congress to hire more statisticians. Instead, NCES and IES staff are part of a large, undifferentiated, salaries and expenses (S&E) budget account for ED administrative costs.

In addition to these budget and personnel challenges, NCES has lost autonomy and stature over the past two decades, which threatens its ability to produce objective education statistics. As outlined in OMB Statistical Policy Directive #1 and the National Academies' *Principles and Practices for a Federal Statistical Agency*, a federal statistical agency should have authority over its budget allocation, information technology, hiring, and publications to ensure independently produced statistics and to avoid even the perception of inappropriate external influences on statistical activities.

In 1988, the Hawkins-Stafford Elementary and Secondary School Improvement Amendments Act provided NCES autonomy to ensure objective and reliable NCES products. For example, it made the NCES commissioner presidentially appointed and Senate confirmed, which helps ensure the administration and members of Congress contribute to the selection of a highly qualified leader. Presidential appointment and Senate confirmation also provide the commissioner with more authority to advocate for the independence, objectivity, and relevance of NCES data.

As illustrated in Figure 3, NCES has been slowly losing such protections since 1988, threatening its ability to produce high-quality, objective data. NCES was moved under IES after the institute's legislative creation in 2002, leading to the disbandment of the agency's advisory panel and partial transfer of its budget, hiring, and contracting control to the IES director. In the same decade, some of NCES's authority to promise data confidentiality—a mandate reinforced today by Title III of the 2019 Foundations for Evidence-Based Policymaking Act—was weakened by the Patriot Act. Despite these challenges, however, NCES has remained consistent in ensuring the confidentiality of data it collects for statistical purposes.

The weakening of NCES's authority continued in 2012 when the commissioner's Senate confirmation status was removed as part of a broad effort to address hearing delays for hundreds of federal positions. There have since been several proposals to remove presidential appointment of the NCES commissioner, including by the current administration in its FY21 budget request. The budget request, which is typically a statement of an administration's funding

priorities, takes the unusual step of including a reauthorization proposal that would separate out NCES assessment activities to a new IES center, a substantial organizational change that could further deplete NCES's annual budget. As the NCES loses authority across time, it is susceptible to further weakening.

Addressing the Problems

Some of these problems could be addressed by ED officials, while others would require congressional action. In principle, the low NCES staff number could be partially ameliorated through carefully implemented ED administrative action to grant the agency more FTEs. Raising this level in one ED agency could mean reductions in another, complicating the nature of any such move because of personnel issues across the department.

Congressional appropriators could also help address NCES's staffing issues by seeking a set-aside for NCES from the ED S&E budget to list the agency as a separate account, as is done for the Office for Civil Rights and Office of Inspector General. Appropriators could provide relief to the NCES through direct budget increases to its assessment and statistics lines, but this is likely to be difficult considering thin margins for nonmilitary discretionary funding and money needed to support the nation's COVID-19 pandemic response. As the education pipeline recovers, NCES is well-suited to contribute positively to this effort. For example, NCES's Fast Response Survey System (FRSS) was designed to collect issue-oriented (education) data quickly and with minimum response burden.

Providing the NCES with flexibility to hire additional statisticians would have several benefits, including equipping the agency with more experts to plan, conduct, and oversee critical statistical quality activities like data collection, design, administration, and analysis. Such flexibility would also facilitate the continuation of valuable education statistics programs and enable NCES leadership to optimize operations.

For problems relating to NCES's level of authority and autonomy, legislation by the congressional authorizers (i.e., the Senate Health, Education, Labor, and Pension Committee and the House Education and Labor Committee) is needed. For instance, ensuring the NCES commissioner is both presidentially appointed and Senate confirmed, which has been recommended by leaders in the federal statistics and education research communities, should be a priority for the reauthorization of IES. The vehicle for this reauthorization is the 2002 legislation establishing IES, the Education Sciences Reform Act (ESRA). Due for reauthorization for many years, lawmakers planned to undertake ESRA in this Congress but the timeline for such work is now understandably uncertain due to the COVID-19 pandemic.

ASA Activities

The ASA has been actively addressing the NCES staffing issues for the past 18 months and the IES reauthorization changes over the past eight years. Paramount to this work is our partnership with the American Educational Research Association (AERA) and statistics leaders such as former Chief Statistician of the United States Katherine Wallman, former NCES Commissioners Emerson Elliott and Jack Buckley, retired NCES official Tom Snyder, and others who provide subject matter expertise and advice. The engagement of organizations such as the Population Association of America and Council of Professional Associations on Federal Statistics has also been constructive in conveying the importance of NCES and the need for its challenges to be addressed.

The ASA's advocacy work includes meetings with congressional staff in both personal and committee offices, letters to leadership of congressional committees, and a request to meet with senior ED officials. Most recently, the ASA joined with AERA, Wallman, Elliott, Buckley, and former Chief Statistician Nancy Potok on a March 23 letter to congressional appropriations leaders (*https://bit.ly/2LrDlL2*) urging that they address

You Can Help

The ASA needs your help to ensure we are aware of and understand the varied challenges facing statistical agencies. To get involved, contact ASA Director of Science Policy Steve Pierson (*spierson@amstat.org*) or ASA Science Policy Fellow Daniel Elchert (*daniel@amstat.org*).

The ASA would especially appreciate your help to support NCES. You can help by making your US representatives and senators aware of the agency's challenges and urging that they address them. You can also help by sharing this article with your network or by letting us know how NCES data inform evidence-based policymaking in your community or state.

Steve Pierson/ASA

Suzanne Vieth (Population Association of America), Tom Snyder (retired from NCES), and Christy Talbot (AERA) stop for a photo between Hill meetings in support of the NCES.

the NCES staffing issue and increase funding to the agency's statistics line. The letter writers also spoke strongly against the proposals to transfer NCES assessment responsibilities to a new center and remove presidential appointment status of the NCES commissioner. Specifically, for the former, they wrote:

> The data program of a modern government education statistics agency must cover a wide array of topics, just as those of health, agriculture, or other topical areas must. For education, examples include traditional areas such as how much money is spent, for what purposes, and how costs are borne by taxpayers. The statistical program also includes data on students enrolled and their characteristics. And it includes descriptions of the teaching resources available and how teachers are prepared. But the capstone measures are ones that inform the public about what students have learned. That information is of greatest help to the public when it can be associated with costs, teachers, and other aspects of education. Planning for the data collections, understanding how the data will be analyzed, and knowing what information the public and policymakers need to make informed decisions works best when the array of statistical studies are housed together and integrated. Among other things, that organizational arrangement will best facilitate making priority decisions across assessment studies and those in finance or demographics or teaching resources when tradeoffs must be made.

For the latter, they stated, "Senate oversight of the NCES commissioner appointment would help ensure a qualified leader and objective education statistics for our nation. Conversely, removing the presidential appointment of the commissioner could further weaken the ability to provide objective and credible statistical data."

Attention to the NCES staffing issue increased after the previously mentioned *Washington Post* article, titled "Understaffing Threatens Work at Key US Education Statistics Agency, Experts Say." The article quotes Larry Hedges, chair of the ASA Scientific and Public Affairs Advisory Committee, and reproduced the ASA's joint letter with AERA and experts in federal statistics.

Through its science policy and advocacy efforts, the ASA developed three one-page documents to succinctly convey the value of NCES's work (*https://bit.ly/2yWquxZ*), outline NCES's staffing crisis (*https://bit.ly/3fJRfpS*), and highlight the ASA's reauthorization priorities (*https://bit.ly/2LrYCnT*).

The ASA has also been working to raise awareness of the challenges facing NCES by communicating with other organizations and education-related coalition groups.

Similar to NCES, statistical agencies across the federal government are facing new and sometimes enduring challenges. Indeed, ASA Director of Science Policy Steve Pierson's annual *Amstat News* article about the agencies' budgets (*https://bit.ly/2YZsdNB*) reported that nine of the 12 principal federal agencies (excluding the Census Bureau) have lost purchasing power since FY09, with several losing at least 10 percent.

To learn more about NCES, numerous resources are available online. Visit NCES's website at *www.nces.ed.gov*, review the *Amstat News* Q&A with Commissioner James Woodworth (*https://bit.ly/2yVCsYx*), or read about NCES's first 150 years (*https://bit.ly/3bsD2dH*). ■

International Epidemiologist Awarded ASA/AAAS Mass Media Fellowship

Regina Nuzzo, Senior Advisor for Statistics Communication and Media Innovation

Jess Craig—a recent graduate of The George Washington University's public health graduate program and an epidemiologist who has worked in Africa, Asia, and the Middle East—has been selected as the ASA's 2020 AAAS Mass Media Science and Engineering Fellow. She will spend 10 weeks this summer training as a science journalist with NPR in its Washington, DC, offices.

Craig comes to the fellowship with a demonstrable passion for statistics and its applications. She chose a concentration of biostatistics and epidemiology for her master's in public health, in which she used her thesis to explore mathematical modeling for antibiotic use and antimicrobial disease burden in lower-income countries. For her work with the CDC's Global Health Security Agenda and its Center for Global Health, Craig used SAS, R, and Python to develop data visualizations. Most recently, she oversaw research and operations across Africa and the Middle East for The Center for Disease Dynamics, Economics, and Policy—an international nonprofit.

With dual bachelor's degrees in microbiology and nonfiction English writing from the University of Pittsburgh, Craig is also unusually well prepared for a stint with NPR's award-winning science journalism team. As an undergraduate, she wrote a weekly column for the university newspaper and worked in numerous roles for *The Pitt Pulse*—the University of Pittsburgh Medical School's creative science magazine—including features writer and editor-in-chief.

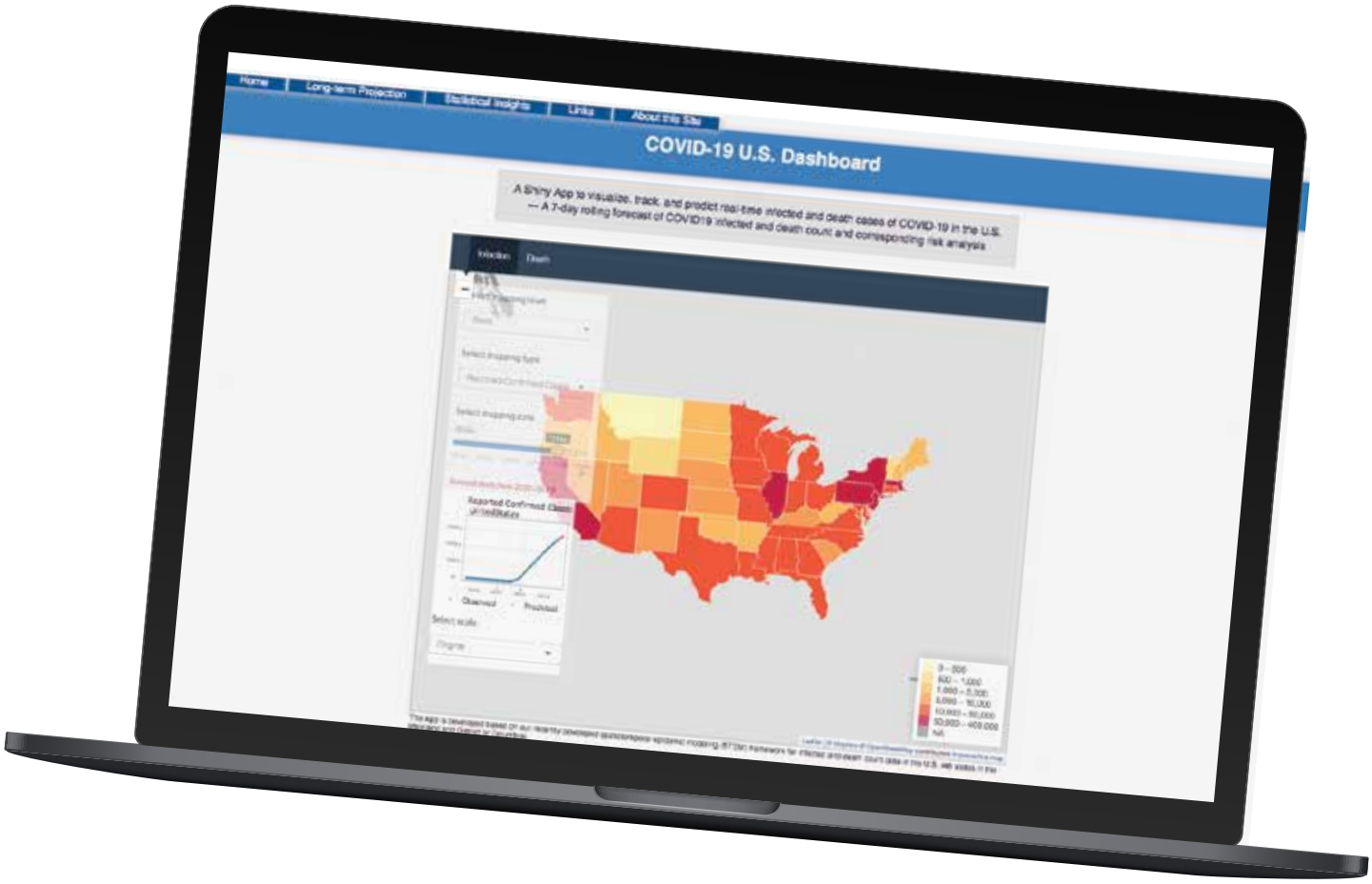
Communicating with various audiences has been a consistent theme in Craig's career. After her undergraduate education, she worked as a journalist covering oncology and infectious disease news for a publication for medical health professionals. Even after she made the transition to working as a microbiologist in genetics and infectious disease laboratories, she continued to work as a freelance journalist on the side, writing for *Newsweek*, *The New Humanitarian*, and *The Daily Beast*, among others. In her international public health work, she has written reports and press releases for technical and nontechnical audiences and helped educate policymakers, government officials, and members of the community around sensitive topics such as vaccination and bioterrorism. Currently, she's part of a multi-national, multi-industry effort to teach scientists and clinicians how to better communicate the threat of drug resistance to nontechnical audiences.

Jess Craig has been selected as the ASA's 2020 AAAS Mass Media Science and Engineering Fellow.

At NPR, Craig hopes to deepen her science journalism skills and put her statistics skills to direct use through data journalism projects. She already sees how her background in biostatistics and epidemiology will help translate to the fellowship. "Field epidemiology and science journalism draw from the same well of fundamental skills, interests, activities, and personal character traits," she wrote in her fellowship application. "Epidemiologists and journalists obsess over documentation and tracing a line of data points to a larger truth. At heart, both are driven by curiosity and truth and are shaped by observation and documentation, the fundamentals of the scientific process."

Craig will join NPR from Nairobi, Kenya, where she has lived following stretches in the Democratic Republic of the Congo, Bangladesh, and India. Proficient in French, Spanish, Swahili, and American Sign Language in addition to English, Craig volunteers as a biology and math teacher in her spare time, empowering young girls and women in urban slums and refugee camps in Kenya and Ethiopia.

The ASA joined the AAAS Mass Media Fellowship sponsorship programs in 2017 to expand its efforts to promote statistical capacity in reporting and provide statisticians with more media experience. A call for 2021 fellows will be issued this fall. Find out more about the ASA/AAAS Mass Media Fellowship by visiting the AAAS website at *https://bit.ly/2ZgzQzw*. ■



Statisticians Create COVID-19 Dashboard to Predict Infection

A group of statistics professors and students from Iowa State University, The University of North Carolina at Chapel Hill, and the College of William & Mary created a dashboard (*https://bit.ly/2WGorap*) with multiple shiny apps embedded to visualize, track, and predict real-time COVID-19 infections and deaths in the US. The dashboard has received attention, so we asked the group to answer several questions about their work.

Your dashboard has already gotten a lot of positive attention. Where did the idea come from?

Thank you for your positive comments about our dashboard. The original idea of developing a dashboard was to illustrate our research findings for COVID-19.

An essential question for developing a defense against COVID-19 is to understand how far the virus will spread and how many lives it will claim. In the early stage of the outbreak, especially when the outbreak is fast-moving like the coronavirus, there are many uncertainties. It is not clear to anyone where this crisis will lead us. One way to answer these questions is through scientific modeling.

We started our work at the time of the outbreak of COVID-19 in late January. We thought that data visualization could be a good starting point for the users to understand how far the virus will spread and to illustrate our findings and statistical insights. Besides, the ability to visualize, track, and predict the spread of the coronavirus can help raise awareness and understanding of the impact of the virus and ultimately assist in prevention efforts.

What is the purpose of the dashboard?

Our research aims to help the local communities as well as guide evidence-based decision-making. The purpose of establishing the dashboard was to provide a user-friendly tool to visualize, track, and predict infected and death cases of COVID-19 in the United States. The dashboard illustrates our research findings on the spread of the virus. It is well known that schools, workplaces, and businesses can contribute to the transmission of COVID-19. The dashboard can also assist in evaluating the consequences of disease spread and helping the policy/decision-makers determine the actions related to a workplace/business/school during the COVID-19 pandemic. Finally, our dashboard can be used to facilitate the research effort to confront COVID-19.

Who are you hoping will use the dashboard?

The potential users are policy/decision-makers, researchers, and the general public. Currently, we offer two main R shiny apps in our dashboard. The first app is targeted to serve the local communities, and we provide a real-time seven-day forecast of the infection/death count up to the county level.

The other app offers a four-month prediction based on the most recent data, and it is updated weekly. This app is useful for policymakers and public health leaders who want to understand how this outbreak may unfold through time and space in the future. For example, it can give hospitals an idea of how quickly they need to expand their capacity and by how much.

We also included multiple small apps to share our findings and insights with users, which is suitable for the general public.

You had a nice big team working together to create this dashboard. Describe your process for working while staying socially distant.

We are a great team, and everybody works around the clock and puts a lot of effort into this project. We have been holding all the group meetings remotely since the outbreak. At the beginning of the outbreak, the group spent a lot of time compiling and collecting the data, studying the epidemic literature, and discussing the methodology remotely. When we found our method was able to obtain accurate predictions, we decided to build the dashboard to help

Collaborators

Lily Wang, Associate Professor in Statistics, Iowa State University

GuanNan Wang, Assistant Professor in Mathematics, College of William & Mary

Lei Gao, Assistant Professor in Finance, Iowa State University

Xinyi Li, Postdoctoral Fellow, Statistical and Applied Mathematical Sciences Institute / The University of North Carolina at Chapel Hill

Shan Yu, PhD Student in Statistics, Iowa State University

Myungjin Kim, PhD Student in Statistics, Iowa State University

Yueying Wang, PhD Student in Statistics, Iowa State University

Zhiling Gu, PhD Student in Statistics, Iowa State University

Yuan Gu, Senior Undergraduate Student in Computer Science and Mathematics, College of William & Mary

This section of the COVID-19 dashboard shows the 10 counties with the highest risk in the United States.

the local communities and decision-makers use our research findings.

To develop the dashboard efficiently, we divided the whole team into several sub-groups. We have sub-groups working on data collection and cleaning, implementing statistical models, developing the software packages and shiny apps, and constructing the website.

Since the dashboard was launched on March 27, we have scheduled a brief group meeting every day to discuss the release of the new forecast. Note that state departments of public health tend to release their data in the evenings. To provide accurate and timely forecasts, we often have to work from midnight until 8:00 a.m. the next morning so we can confidently release our forecasts before people start to check our dashboard in the morning.

When did you start working on the dashboard? How long did the entire project take?

We started working as a team in late January when the COVID-19 cases were reported in the United States. At that time, we mainly focused on reading literature and news and studying the existing epidemic models together.

In February, we established a new spatio-temporal epidemic modeling (STEM) framework for space-time infected/death count data, and we started to collect data and conduct the analysis using our proposed STEM method.

After many rounds of tests, our dashboard was launched on March 27. Since the launch, we received lots of helpful comments and suggestions on how to improve our service. Recently, we have gotten many requests to develop a mobile app based on our dashboard, which will come out very soon. Our research and data will be continuously improved as the pandemic progresses.

The sources you used to collect the data are publicly available (e.g., news articles, press releases, and published reports from public health agencies). What process did you undertake to determine the sources were accurate?

First, thanks to the contributions of institutions and organizations like the Center for Systems Science and Engineering at The John Hopkins University, *The New York Times*, and *The Atlantic*, we are able to access daily confirmed/fatal cases and historical data that dates back to January 20, 2020. Besides these publicly available data repositories, we also collected data from the World Health Organization, US Centers for Disease Control and Prevention (CDC), and the health department website in each state or region, as well as press releases. Data on timings of interventions were compiled by checking national and state governmental websites, executive orders, and newly initiated COVID-19 laws. Sometimes, multiple data sources may not agree with each other, but we are trying our best to identify inconsistencies and correct them based on various sources like official reports and news.

What would you say was the most difficult challenge—technical, logistical, or otherwise—you encountered while building the dashboard? How did you manage to solve it?

One of our biggest challenges is the data-collecting process. We realize there are some quality issues such as under-reporting, delayed reporting, and inconsistencies between state and county sources.

We also noticed there could be sudden decreases in the newly confirmed cases and the newly confirmed death count on weekends, which might be due to the reduced testing on weekends. Reporting criteria was also an issue for us; the confirmed cases and probable cases used to be combined for some states while not for the others. CDC addressed this issue and suggested reporting the total. While there is no ultimate solution to eliminate all the issues, we cross-check sources and make sensible data adjustments and source selections case by case.

Besides that, another big challenge we encountered was a technical issue. Our dashboard was initially held on Amazon AWS, and that crashed several times in the first week of launch due to the traffic volume being much higher than we expected. With IT support from Iowa State University, we eventually were able to move the dashboard to a university server.

Now that the dashboard is up and running, what happens next? Will you maintain it? If so, how?

We are currently developing an R package and a mobile app. We will continue to maintain the dashboard and update our short-term forecast daily and long-term projections every week until we are comfortable with stopping it.

Brag a little. Of what aspect of the dashboard are you most proud?

We are most proud of the versatility of our dashboard. Our dashboard is a useful tool not only to visualize and track infected and death cases of COVID-19 in the US, but also to offer a real-time seven-day forecast of the COVID-19 infected/death count at both the county level and state level. In addition, we provide the corresponding risk analysis and a four-month projection with a prediction band to assess uncertainty. We also launched a series of "statistical insights" that highlight indicators that tend to be less visible but provide interesting evidence for analysis and policy-making related to COVID-19.

What do you think makes your dashboard unique?

As far as we know, our dashboard is the first one to provide both the short-term forecast and long-term projection up to the county level, besides the function of tracking and visualization of the spread of COVID-19. Also, we provide the prediction intervals to quantify the uncertainty in the prediction results. We treat it as a unique statisticians' viewpoint to learn the disease pattern from the data.

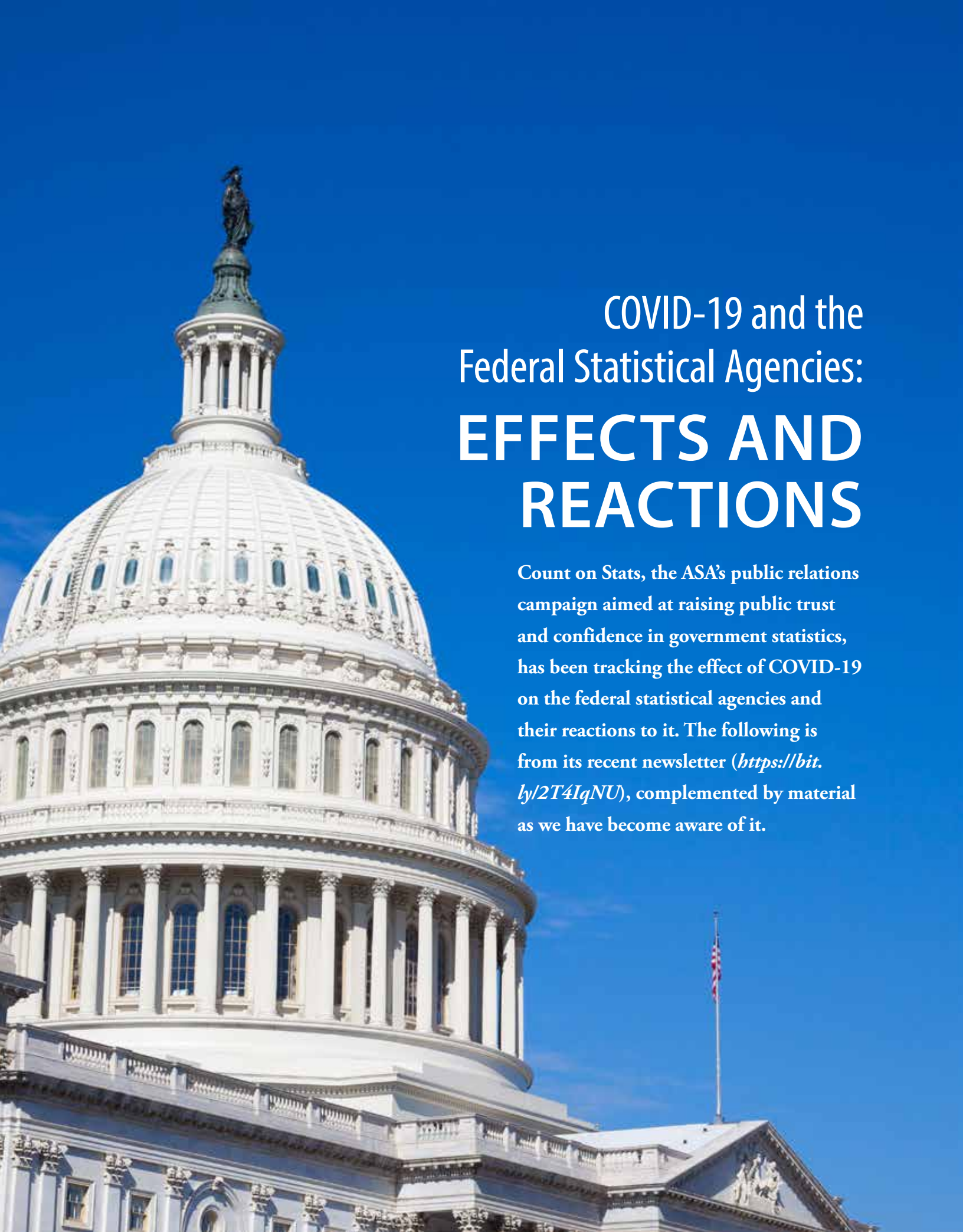
Looking back at your work on the project, how do you think it has changed the way you're dealing with the pandemic?

Along the path of working on this project, we have gained more insights regarding COVID-19. In the beginning, we were worried about the unknown pandemic, like how far the virus will spread and how it can impact economics, public health resources, and our daily life. During the study and research about the pandemic, we got to learn more about the disease. We have been collecting and compiling data from a combination of public sources—like public health agencies and open repositories—updating the status by checking official websites and press releases, and actively studying the literature regarding the models for infectious disease. All these efforts contribute to developing our methodologies in our work. We validate the effectiveness and efficiency of our model through the data, and our analysis reveals that the control measures significantly help to "flatten the curve." We have also discovered the spatiotemporal dynamic pattern of COVID-19 and identified critical health care infrastructure, demographic features, and socioeconomic factors that help explain the variation of transmission rate in space and time. In addition, based on these findings, we are able to provide short-term forecasts and long-term projections, which helps us conclude when the pandemic will end.

Does seeing all the data illustrated give you a different perspective?

Yes, we connected the dots gradually after working on the analysis every day. Seeing and analyzing the data allows us to understand how the spread dynamics of COVID-19 vary over time and space. We also realized the data quality issues, like missing data or under-reporting, could increase the difficulty in an accurate forecast. We learned how the local area characteristics are associated with the spread of the disease, which might provide guidance for local policy-making. Also, by aggregating our results, we could better see the performance of our model at different levels and time periods.

Visit the dashboard and read more about the team's goals and methods at *https://bit.ly/2WGorap*. ■



COVID-19 and the Federal Statistical Agencies: EFFECTS AND REACTIONS

Count on Stats, the ASA's public relations campaign aimed at raising public trust and confidence in government statistics, has been tracking the effect of COVID-19 on the federal statistical agencies and their reactions to it. The following is from its recent newsletter (*https://bit.ly/2T4IqNU*), complemented by material as we have become aware of it.

While all the principal federal statistical agencies have efforts to address the COVID-19 pandemic, we highlight here several related to the economy, health, and transportation.

Some initiatives have been disrupted, and new ones have been launched to address the needs of the pandemic. These efforts demonstrate the responsiveness, creativity, adaptability, and collaborative approach of the federal statistical agencies.

Census Bureau

The decennial census staff has made numerous adjustments (*https://bit.ly/2T6Y4rR*) to manage the challenges of social distancing amid its crucial survey collection period. This includes temporary suspension of field data collection, longer self-response periods, and a request to Congress to extend the legal deadline for delivering decennial census data to the president and states by 120 days. Meanwhile, it has added the Census Bureau Household Pulse Survey in cooperation with several other federal statistical agencies to collect data about the effects of COVID-19, a weekly regional Business Formation Statistics series, and supplemental questions to five additional business surveys.

Bureau of Labor Statistics (BLS)

As business lockdowns and closures make it harder to gather information, COVID-19 poses a challenge to BLS data accuracy (*https://bit.ly/2T4lcai*). Estimating inflation, for example, which can be hard to measure at the start of a recession under normal circumstances, will be challenged because of the normal practice of visiting stores for price checks. In alignment with social distancing, BLS has suspended all in-store visits.

Response rates will also suffer. The response rate to its March business survey was about nine percentage points lower than average. To inform COVID-19 effects on work and employment, the agency has added supplemental questions to the BLS Current Population Survey in cooperation with the Census Bureau and National Center for Health Statistics. It is also proposing the reinstatement of its well-being module as a supplement to the American Time Use Survey to "collect information about how people experience their time, specifically how happy, tired, sad, stressed, and in pain they felt yesterday."

Bureau of Economic Analysis (BEA)

BEA made adjustments to its wages and salaries estimates to reflect activity due to COVID-19 that was not yet captured in the usual source data. For details, see the BEA posting, "How Did BEA Adjust March 2020 Wages and Salaries to Account for the Effects of COVID-19?" at *https://bit.ly/2Z1G0TO*.

National Center for Health Statistics (NCHS)

In-person examinations for the National Health and Nutrition Examination Survey (NHANES) data collection are paused, as well as some exploratory pilot programs. It's anticipated this will reduce overall sample and response rates and delay the release of the data. The National Health Interview Survey, also conducted in person, is paused, with similar anticipated impacts.

In the meantime, NCHS is the primary provider of COVID-19 death data (*https://wapo.st/35Xl1TA*). A team is working on coding COVID-19 deaths for accurate reporting on the mortality impact of the virus, while other employees are updating diagnostic coding in the clinical setting.

The May NCHS newsletter also provided the following updates: "Many of NCHS staff are involved in the COVID response, either through front-line work with the broader CDC response or working from their homes to ensure data collection and standards are met in the COVID response. NCHS plans to add COVID-19 questions to many of our surveys and has contributed health-related questions to the Census Household Pulse Survey. NCHS is also rolling out a COVID-19 Research and Development Survey to test survey questions. And, an NHANES Mobile Examination Center truck is currently in use for mobile testing in Washington, DC."

OTHER FEDERAL AGENCIES

On its COVID-19 media resources page, the Economic Research Service highlights its most recent economic outlook reports for various commodities.

Bureau of Transportation Statistics (BTS)

BTS is posting selected transportation measures (*https://bit.ly/2T4LSIl*) that have raised its profile in the Department of Transportation and more widely, as reported in "The Coronavirus Has Turned This Unlikely Federal Agency into a Predictor of Economic Recovery" (*https://bit.ly/2Z0PpuU*). The agency has also created a Monthly Transportation Statistics page with the latest data from across government and the transportation industry.

The Data Coalition further discusses these developments and the (mostly) private-sector COVID Impact Survey in a blog post titled, "Federal Government Takes Steps to Gather New Official Data on COVID Effects" (*https://bit.ly/2Z1Miml*).

Learn more about the campaign at *www.CountOnStats.org*. ■

THE AMERICAN STATISTICIAN HIGHLIGHTS

May Issue Now Online; Print Copies Delayed

Daniel R. Jeske, *The American Statistician* Executive Editor

The May 2020 issue of *The American Statistician* (*TAS*) is now available online. Print copy subscribers will be receiving their issue when the publisher is able to resume from printing delays caused by the COVID-19 crisis.

The General section has two articles. The first discusses issues related to sports analytics research and offers guidance on selecting the right publication venue. The second article investigates the use of multiple imputation methods when computing a confidence interval for the binomial p with missing data and shows that the Wilson interval has better sampling properties than the Wald interval in this context.

The Statistical Practice section has three articles. The first revisits an old friend, Simpson's Paradox. A new summary statistic is proposed that ameliorates the effects of the paradox. The second article looks into the general question of how many imputed data sets are needed when using imputation techniques to handle missing data. The answer might be more than you think. The final article in this section discusses Bayesian t-tests. The article provides an accessible gateway to Bayesian hypothesis testing and proposes a new Bayesian t-test that offers additional flexibility.

The Statistical Computing and Graphics section has two articles. The first article discusses approaches for testing the equality of covariance matrices and offers graphical methods for revealing how they might differ. The second presents an improved algorithm for plotting a likelihood ratio-based confidence region for general two-parameter families.

The Data Science section includes an article that provides an interesting introduction to archetype analysis, a data mining technique for representing instances of a data set as a mixture of archetypes (i.e., exemplars) constructed from training data. It proposes new methods for handling missing data in this type of analysis.

The Short Technical Note section has an article that discusses different parameterizations of time when designing a cluster randomized trial to be conducted over different time periods. The article shows that the choice of time parameterization does not affect the variance of the treatment effect estimator in many interesting cases.

The History Corner has two articles that discuss the role of statistical thinking in recognizing and fixing problems in the design of war draft lotteries. One of the articles focuses specifically on the draft lottery used by the US 50 years ago for the Vietnam War while the other looks broadly at 13 draft lotteries used by the US between 1917 and 1975.

The May issue concludes with a Letter to the Editor commenting on a previous *TAS* article about Phlegon's use of stem and leaf displays.

The editorial board asks you to consider the journal as a potential outlet for your work. ■

MORE ONLINE
Visit *http://bit.ly/2Wy6bjm* for information about how to submit an article to *TAS*.

Journal of Nonparametric Statistics Plans COVID-19 Issue

Ricardo Cao, Editor, and José Chacón, Guest Editor

The COVID-19 pandemic is affecting the lives of people all around the world. Mathematicians, statisticians, and data scientists can play a prominent role by contributing their analytical and modeling skills to describe possible scenarios; make inferences; and design strategies to control the disease spread, avoid health system breakdowns, and save lives.

With these goals in mind, the *Journal of Nonparametric Statistics* is calling for papers on subjects including prediction of pandemic evolution, case tracking and forecasting techniques, risk analysis, data quality and under-reporting effects, spatiotemporal disease dynamics, peak and length estimation, analysis of transmission reduction covariates, data-supported efficacy of isolation and lockdown strategies, and any other problem related to COVID-19 that has been addressed with a data science approach.

All papers will be refereed and subject to the same high-quality standards as regular submissions to the *Journal of Nonparametric Statistics*. This special issue will be published upon completion of the required number of papers, following a fast-track process and avoiding a publication queue.

Submissions will be accepted until October 31. Those authors interested in submitting an article should visit *https://bit.ly/2LFPRqB*.

Photo courtesy of The University of Texas Health Science Center at Houston
StatFest participants in 2019

StatFest Program Focuses on Engagement, Opportunity

Conference encourages undergrads from historically underrepresented groups to pursue statistical sciences

StatFest 2020 is a free one-day conference that encourages undergraduates from historically under-represented groups (e.g., African American, Latino, Native American, Pacific Islander) with quantitative interests to pursue careers or graduate studies in the statistical sciences. This year's event will take place September 18 at Eli Lilly and Company in Indianapolis, Indiana.

During the conference, a keynote address will highlight the speaker's career trajectory while presentations and discussions will explore opportunities in statistics and data science across government, academia, and industry. Undergraduate students will engage in a candid Q&A with graduate student panelists that explores living as a graduate student, navigating the application process, and thriving as an aspiring researcher. Additionally, students conducting academic research will be able to put their work on display during the poster session. StatFest will also feature ample opportunity for students to network with professionals and other students in attendance, including during an evening reception.

Travel awards will be offered to a select group of registered undergraduate students outside a 120-mile radius of Indianapolis. Preference will be given to students who participate in the poster session.

The conference is an ongoing initiative of the American Statistical Association through its Committee on Minorities in Statistics (CoMiS). The committee seeks to foster participation in statistics and data science by historically underrepresented minorities and focuses much of its effort on two key programs: StatFest, a pipeline program, and the Diversity Mentoring Program, an early-career success program.

Therri Usher, StatFest planning committee chair, says "StatFest provides students from under-represented groups with not only the tools and resources to become successful in statistics and data science but also the opportunity to engage and learn from professionals with similar backgrounds who were once in their shoes."

While the conference is free, registration is required. Visit the StatFest website at *https://bit.ly/363awhr* for more information and to register.

Contact Adrian Coles, CoMiS chair, at *adrian.coles@lilly.com* with questions about StatFest or to support the event. ■

EDITOR'S NOTE
Due to COVID-19, dates and formats for meetings, conferences, and workshops may change. Please check event websites often for updates.

2019 Audit Report for the American Statistical Association

American Statistical Association

Financial Report
December 31, 2019

RSM

RSM US LLP

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Independent Auditor's Report

Board of Directors
American Statistical Association

Report on the Financial Statements
We have audited the accompanying financial statements of American Statistical Association (the Association), which comprise the statement of financial position as of December 31, 2019, the related statements of activities and cash flows for the year then ended, and the related notes to the financial statements.

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

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

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

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

Opinion
In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of American Statistical Association as of December 31, 2019, and the changes in its net assets and its cash flows for the year then ended in accordance with accounting principles generally accepted in the United States of America.

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Other Matter
The financial statements of American Statistical Association, as of and for the year ended December 31, 2018, were audited by other auditors whose report dated March 18, 2019, expressed an unmodified opinion on those statements.

RSM US LLP

Washington, D.C.
March 20, 2020

2019 Audit Report for the American Statistical Association Continued

American Statistical Association

Statements of Financial Position
December 31, 2019 and 2018

	2019	2018
Assets		
Cash and cash equivalents	$ 479,243	$ 224,709
Investments	21,967,260	18,902,069
Accounts receivable, net	647,973	628,502
Prepaid expenses	260,208	180,760
Equity in joint venture	79,885	84,463
Property and equipment, net	6,051,675	6,423,043
Total assets	$ 29,485,444	$ 26,443,546
Liabilities and Net Assets		
Liabilities:		
Accounts payable and accrued expenses	$ 1,072,854	$ 932,447
Due to joint venture	92,922	111,925
Deferred revenue	2,563,242	2,239,991
Bonds payable, net	3,271,412	3,607,569
Total liabilities	6,990,430	6,891,932
Commitments and contingencies (Note 11)		
Net assets:		
Without donor restrictions	20,641,647	17,996,888
With donor restrictions	1,853,367	1,554,726
Total net assets	22,495,014	19,551,614
Total liabilities and net assets	$ 29,485,444	$ 26,443,546

See notes to financial statements.

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American Statistical Association

Statements of Activities
Years Ended December 31, 2019 and 2018

	2019			2018		
	Without Donor Restrictions	With Donor Restrictions	Total	Without Donor Restrictions	With Donor Restrictions	Total
Revenue and support:						
Meeting registration and exhibits	$ 4,636,821	$ -	$ 4,636,821	$ 4,293,105	$ -	$ 4,293,105
Membership dues	2,202,416	-	2,202,416	2,204,611	-	2,204,611
Royalties	1,481,016	-	1,481,016	1,437,537	-	1,437,537
Advertising	688,255	-	688,255	762,853	-	762,853
Contributions and sponsorships	536,612	43,641	580,253	451,292	39,037	490,329
Federal grants	404,904	-	404,904	396,855	-	396,855
Interest and dividends, net	381,017	33,968	414,985	363,827	31,512	395,339
Sales	213,451	-	213,451	221,350	-	221,350
Sections	132,270	-	132,270	157,364	-	157,364
Miscellaneous	116,405	-	116,405	164,635	-	164,635
Maintenance fees	88,824	-	88,824	92,710	-	92,710
Accreditation	30,701	-	30,701	29,598	-	29,598
Page charges	12,080	-	12,080	12,150	-	12,150
Subscriptions	2,261	-	2,261	2,748	-	2,748
Net assets released from restrictions	43,071	(43,071)	-	52,182	(52,182)	-
Total revenue and support	10,973,134	34,538	11,008,672	10,842,817	18,367	10,861,184
Expenses:						
Program services:						
Meetings	2,897,294	-	2,897,294	2,710,431	-	2,710,431
Publications	1,169,195	-	1,169,195	1,226,642	-	1,226,642
Programs	2,554,980	-	2,554,980	2,287,242	-	2,287,242
Section expenses	1,006,299	-	1,006,299	994,117	-	994,117
Education	544,084	-	544,084	575,113	-	575,113
Grants and awards	341,402	-	341,402	283,599	-	283,599
Total program services	8,513,254	-	8,513,254	8,077,144	-	8,077,144
Supporting services:						
Membership development	961,868	-	961,868	958,098	-	958,098
Management and general	1,609,490	-	1,609,490	1,469,673	-	1,469,673
Fundraising	230,261	-	230,261	239,315	-	239,315
Total supporting services	2,800,619	-	2,800,619	2,667,086	-	2,667,086
Total expenses	11,313,873	-	11,313,873	10,764,230	-	10,764,230
Change in net assets before realized and unrealized gain (loss) on investments	(341,739)	34,538	(307,201)	(121,413)	18,367	(103,046)
Realized and unrealized gain (loss) on investments	2,986,498	264,103	3,250,601	(1,567,537)	(136,086)	(1,703,623)
Change in net assets	2,644,759	298,641	2,943,400	(1,688,950)	(117,719)	(1,806,669)
Net assets:						
Beginning	17,996,888	1,554,726	19,551,614	19,685,838	1,672,445	21,358,283
Ending	$ 20,641,647	$ 1,853,367	$ 22,495,014	$ 17,996,888	$ 1,554,726	$ 19,551,614

See notes to financial statements.

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American Statistical Association

Statements of Cash Flows
Years Ended December 31, 2019 and 2018

	2019	2018
Cash flows from operating activities:		
Change in net assets	$ 2,943,400	$ (1,806,66
Adjustments to reconcile change in net assets to net cash provided by operating activities:		
Depreciation and amortization	371,368	385,86
Amortization of bond issuance costs	6,637	6,63
Equity in earnings from joint venture	(35,519)	(43,56
Contributions restricted for investment in perpetuity	(18,966)	(24,98
Unrealized and realized (gain) loss on investments	(3,250,601)	1,703,62
Changes in assets and liabilities:		
Decrease (increase) in:		
Accounts receivable	(19,471)	(56,51
Prepaid expenses	(79,448)	20,95
(Decrease) increase in:		
Accounts payable and accrued expenses	140,407	(4,65
Due to joint venture	(19,003)	67,91
Deferred revenue	313,251	(181,15
Net cash provided by operating activities	352,055	67,46
Cash flows from investing activities:		
Purchases of investments	(2,578,862)	(10,104,50
Proceeds from sale of investments	2,764,272	10,309,17
Purchases of property and equipment	-	(53,31
Net cash provided by investing activities	185,410	151,35
Cash flows from financing activities:		
Principal payment on bonds payable	(342,794)	(333,50
Contributions restricted for investment in perpetuity	18,966	24,98
Equity distribution from joint venture	40,897	-
Net cash used in financing activities	(282,931)	(308,52
Net increase (decrease) in cash and cash equivalents	254,534	(89,70
Cash and cash equivalents:		
Beginning	224,709	314,41
Ending	$ 479,243	$ 224,70
Supplemental disclosures of cash flow information:		
Income taxes paid	$ 75,700	$ 80,00
Interest paid	$ 118,082	$ 129,55

See notes to financial statements.

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American Statistical Association

Notes to Financial Statements

Note 1. Nature of Activities and Significant Accounting Policies

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

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

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

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

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

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

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

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

Membership development: Costs related to member service maintenance.

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

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

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American Statistical Association

Notes to Financial Statements

Note 1. Nature of Activities and Significant Accounting Policies (Continued)

A summary of significant accounting policies follows:

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

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

Without donor restrictions: Net assets without donor restrictions include those net assets whose use is not restricted by donors, even though their use may be limited in other respects, such as by board designation. See Note 7 for details on board-designated net assets.

With donor restrictions: Net assets with donor restrictions include those net assets whose use is subject to donor-imposed restrictions. Donor restrictions may be for a specified time or purpose limitation or the donor may specify that the corpus of their original and certain subsequent gifts are to be maintained in perpetuity. Donor-imposed restrictions are released when a restriction expires, that is, when the stipulated time has elapsed, when the stipulated purpose for which the resource was restricted has been fulfilled, or both. See Notes 8 and 9 for details on net assets with donor restrictions.

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

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

Accounts receivable: Accounts receivable consist of amounts due from the sale of subscriptions, publications, advertising, and conferences. Accounts receivable are presented net of an allowance for doubtful accounts. The allowance for doubtful accounts is provided based upon management's judgment, including such factors as prior collection history and type of receivable. As of December 31, 2019 and 2018, the allowance for doubtful accounts was $8,598 and $10,000, respectively. The Association writes-off receivables when they become uncollectible, and payments subsequently received on such receivables are credited to the allowance for doubtful accounts.

Equity in joint venture: The Association has an investment in a joint venture to produce a journal called Technometrics. The Association accounts for its investment using the equity method due to its lack of control over the joint venture. Under the equity method, the original investment is recorded at cost and adjusted by the Association's share of undistributed earnings or losses of the joint venture. Distributions of $40,897 and $0 were received during the year ended December 31, 2019 and 2018, respectively.

Investments: Investments with readily determinable fair values are reflected at fair market value. To adjust the carrying value of these investments, the change in fair market value is charged or credited to the current operations net of related fees. Money market funds and certificates of deposit are recorded at cost.

American Statistical Association

Notes to Financial Statements

Note 1. Nature of Activities and Significant Accounting Policies (Continued)

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

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

Revenue: In May 2014, the FASB issued Accounting Standards Update (ASU) 2014-09, *Revenue from Contracts with Customers*. This requires an entity to recognize the amount of revenue to which it expects to be entitled for the transfer of promised goods or services to customers. ASU 2014-09 replaces most existing recognition guidance in accounting principles generally accepted in the United States of America (U.S. GAAP). The ASU also requires expanded disclosures relating to the nature, amount, timing and uncertainty of revenue and cash flows from contracts with customers. The Association adopted the new standard effective for the year ended December 31, 2019, using the full retrospective method. The Association's revenue arrangements are recognized over time and consist of performance obligations that are satisfied ratably over a period of no more than one year. Meeting registration and exhibits, membership dues, royalties, and advertising are those significant line items affected by this standard. Based on the Association's review of its contracts with customers, the timing of the amount of revenue recognized previously is consistent with how revenue is recognized under this new standard. The adoption of this standard had no impact on the statements of financial position and the statements of activities and changes in net assets but resulted in additional disclosures.

Meeting registration and exhibits: Meeting registration and exhibitor fees are recognized at the point in time that the related meeting takes place. Registration and exhibitor fees are generally collected in advance of the conference and recorded as deferred revenue until the conference occurs.

Membership dues: Membership dues are recognized in the period to which they apply. The membership period is 12 months beginning the month paid or the member's renewal date, whichever is later. Member benefits include access to *Amstat News and Significance*, career resources including ASA JobWeb, online access to ASA Journals and JSM Proceedings, and ASA eNews. All member benefits are considered one performance obligation and revenue is recognized ratably over the twelve-month membership period as the delivery of the member benefit is provided. The monthly derived value provided to the member is the specific output used by the Association to determine that the performance obligation has been satisfied.

Royalties: The Association has an agreement with a third-party vendor to manage the sales of its publications. The Association recognizes revenue at the point in time the publication is sold and the respective royalty is earned.

Advertising: Revenue is recognized at the point in time that the magazine or other periodical containing the advertisement is published. Amounts received in advance of the advertisement being published are recorded as deferred revenue. The derived value provided by the advertisement being published is the specific output used by the Association to determine that the performance obligation has been satisfied.

2019 Audit Report for the American Statistical Association Continued

Note 1. Nature of Activities and Significant Accounting Policies (Continued)

Except for meeting registration and exhibits, royalties and advertising, all of the Association's revenue from contracts with customers are from performance obligations satisfied over time and is derived from contracts with an initial expected duration of generally one year or less. Prices are specific to a distinct performance obligation and do not consistent of multiple transactions.

Economic factors driven by consumer confidence, employment, inflation, and other world events impact the timing and level of cash received and revenue recognized by the Association. Periods of economic downturn resulting from any of the above factors may result in declines in future cash flows and recognized revenue of the Association.

Deferred revenue: The Association records deferred revenue in situations when amounts are paid in advance of the Association satisfying the applicable revenue recognition criteria. Such revenue is recognized when all criteria are subsequently satisfied. There were no changes in membership dues, meeting registration and exhibits, royalties and advertising that would affect the economic seasonality of the statements of financial position.

Contributions and grants: In June 2018, the FASB issued ASU 2018-08, *Not-for-Profit Entities (Topic 958): Clarifying the Scope and the Accounting Guidance for Contributions Received and Contributions Made*. This ASU clarifies the guidance for evaluating whether a transaction is reciprocal (i.e., an exchange transaction) or nonreciprocal (i.e., a contribution) and for distinguishing between conditional and unconditional contributions. The ASU also clarifies the guidance used by entities other than not-for-profits to identify and account for contributions made. The Association adopted the new standard effective for the year ended December 31, 2019, using the modified prospective method. There were no changes to revenue recordation and presentation as a result.

Contributions and grants include contributions from individuals and various organizations. Revenue is recognized when an unconditional donation is received or when an unconditional promise is made.

Unconditional contributions are recorded as with donor restrictions or without donor restrictions depending upon the existence and/or nature of any donor intent. Support that is not restricted by the donor is reported as an increase in net assets without donor restrictions. Donor-restricted support is reported as an increase in net assets with donor restrictions and then reclassified to net assets without donor restrictions when the restriction expires.

Federal grants are considered non-exchange transactions. In addition, these grants are considered conditional contributions and the recognition grant revenue is deferred until barriers imposed under the grant document are met by the Association.

Functional allocation of expenses: The costs of providing various programs and supporting services have been summarized on a functional basis in the statements of activities. Note 12 to the financial statements summarizes the Association's allocation methods and presents schedules of expenses by both nature and function for 2019 and 2018.

Note 1. Nature of Activities and Significant Accounting Policies (Continued)

Upcoming accounting pronouncement: In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)*. The guidance in this ASU supersedes the leasing guidance in Topic 840, *Leases*. Under the new guidance, lessees are required to recognize lease assets and lease liabilities on the balance sheet for all leases with terms longer than 12 months. Leases will be classified as either finance or operating with classification affecting the pattern of expense recognition in the statement of activities. The new standard is effective for fiscal years beginning after December 15, 2020, including interim periods within those fiscal years. A modified retrospective transition approach is required for lessees for capital and operating leases existing at, or entered into after, the beginning of the earliest comparative period presented in the financial statements, with certain practical expedients available. The Association is currently evaluating the impact of the pending adoption of the new standard on the financial statements.

Income taxes: The Association is generally exempt from Federal income taxes under the provisions of Section 501(c)(3) of the Internal Revenue Code. In addition, the Association has been classified as an organization that is not a private foundation under Section 509(a)(2) of the Internal Revenue Code. However, the Association is required to report unrelated business income to the Internal Revenue Service and the state of Virginia, as well as pay certain other taxes to local jurisdictions. The Association incurred approximately $55,000 and $77,000 in income tax expense on unrelated business income net income earned on advertising sales for the years ended December 31, 2019 and 2018, respectively.

Use of estimates: The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Actual results could differ from estimates.

Subsequent events: Subsequent events have been evaluated through March 20, 2020, which is the date the financial statements were available to be issued.

Note 2. Investments and Fair Value Measurements

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

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

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

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

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

Note 2. Investments and Fair Value Measurements (Continued)

The following is a summary of investments at December 31:

	2019	2018
Investments, at fair value:		
Mutual funds – US equities (Level 1)	$ 8,870,721	$ 7,235,719
Mutual funds – US fixed income (Level 1)	3,535,233	4,380,660
Mutual funds – International equities (Level 1)	4,464,349	3,711,858
Mutual funds – International fixed income (Level 1)	222,457	952,569
U.S. corporate bonds (Level 2)	2,320,589	913,965
U.S. government bonds (Level 2)	2,191,931	1,336,333
Investments, at cost:		
Money market funds	361,980	370,965
	$ 21,967,260	$ 18,902,069

Subsequent to December 31, 2019, financial markets have experienced a high degree of volatility. Therefore, the investment balances presented above as December 31, 2019, and do not reflect subsequent changes that may have occurred during 2020.

Investment income (loss) consists of the following for the years ended December 31:

	2019	2018
Realized and unrealized gain (loss)	$ 3,250,601	$ (1,703,623)
Interest and dividends	493,143	473,300
Investment fees	(78,158)	(77,961)
	$ 3,665,586	$ (1,308,284)

Note 3. Property and Equipment

Property and equipment consists of the following at December 31:

	2019	2018
Building and improvements	$ 8,541,220	$ 8,541,220
Furniture and fixtures	211,869	211,869
Office equipment	202,772	202,772
Software	512,773	512,773
Computer equipment	219,637	219,637
Land	1,286,000	1,286,000
	10,974,271	10,974,271
Less accumulated depreciation	(4,922,596)	(4,551,228)
	$ 6,051,675	$ 6,423,043

Note 4. Joint Venture

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

	2019	2018
Condensed income statement:		
Revenues	$ 126,674	$ 130,754
Expenses	67,475	58,144
Net income	$ 59,199	$ 72,610
Condensed balance sheet:		
Total assets	$ 145,174	$ 165,062
Total liabilities	13,365	24,290
Equity	$ 131,809	$ 140,772

The Association also has a maintenance agreement with the joint venture in which it provides management and collection services, office space, and editorial and administrative support. Amounts due to the joint venture as of December 31, 2019 and 2018, which were comprised of the joint venture cash held within the Association's cash account, were $92,922 and $111,925, respectively. Maintenance agreement revenue under this arrangement earned by the Association was $35,520 and $34,996 for the years ended December 31, 2019 and 2018, respectively.

Note 5. Bonds Payable

During the year ended December 31, 2013, the Association issued Revenue Refunding Bonds (the Bonds) for $5,396,000 with SunTrust Bank, the holder of the Bonds, which have a maturity date of August 1, 2030. The Bonds are callable on May 1, 2028, by the bondholder with 120 days' notice. Interest on the Bonds is calculated at a fixed rate of 3.34% for the years ended December 31, 2019 and 2018. The Bonds are collateralized by the land and building owned by the Association. In connection with the Bonds, the Association must be in compliance with certain specified covenants.

Interest expense incurred for the years ended December 31, 2019 and 2018, was $118,082 and $129,551, respectively. Annual principal payments on the bonds at December 31, 2019, are due in future years as follows:

	Amount
2020	$ 352,340
2021	362,152
2022	372,238
2023	382,605
2024	393,260
2025-2028	1,464,679
	$ 3,327,274

Note 5. Bonds Payable (Continued)

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

	2019	2018
Principal amount	$ 3,327,274	$ 3,670,068
Less unamortized debt issuance costs	(55,862)	(62,499)
	$ 3,271,412	$ 3,607,569

Note 6. Liquidity

The Association strives to maintain sufficient cash to cover all operating expenditures during its annual business cycle. Cash in excess of amounts needed for operating activities is invested in mutual funds and is available to convert back to cash if needed. While the Association's investments may be quickly converted to cash to cover operating expenditures, the Association does so infrequently. In 2019 and 2018 the Association made a one-time transfer of $600,000 from its investments to its commercial checking account to cover an expected temporary cash shortfall. The following table reflects the Association's financial assets as of December 31, 2019 and 2018, reduced by amounts that are not available to meet general expenditures due to donor restrictions or internal board designations (see Notes 7, 8 and 9). In the event the need arises to utilize the board-designated funds for liquidity purposes, the reserves could be drawn upon through board resolution.

	2019	2018
Cash and cash equivalents	$ 479,243	$ 224,709
Investments	21,967,260	18,902,069
Accounts receivable, net	647,973	628,502
Financial assets available	23,094,476	19,755,280
Less those unavailable for general expenditures within on year due to:		
Donor-imposed restrictions	(1,853,367)	(1,554,726)
Board designations	(1,505,535)	(1,461,007)
Financial assets available to meet cash needs for general expenditures within one year	$ 19,735,574	$ 16,739,547

Note 7. Board Designated Net Assets

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

	2019	2018
Sections	$ 1,396,560	$ 1,325,989
Education	108,975	135,018
	$ 1,505,535	$ 1,461,007

Note 8. Net Assets With Donor Restriction

Net assets with donor restrictions consisted of the following at December 31, 2019:

	Balance December 31, 2018	Restricted Contributions	Investment Income	Released	Balance December 31, 2019
Endowment funds:					
Endowment corpus*	$ 823,506	$ 18,966	$ -	$ -	$ 842,472
Endowment earnings*	288,581	-	213,771	(28,324)	474,028
Endowment funds:	1,112,087	18,966	213,771	(28,324)	1,316,500
Other funds:					
Cox Scholarship	148,246	-	28,797	(2,000)	175,043
Waksberg Award	84,627	-	16,511	-	101,138
Bernard Harris Fund	46,401	5,000	9,161	-	60,562
Griffith Award	38,548	3,000	7,625	(1,994)	47,179
Wray Smith Scholarship Fund	33,988	-	6,631	-	40,619
Dixon Award	31,196	-	6,051	(521)	36,726
MG Natrella Scholarship Fund	29,173	-	5,619	(1,000)	33,792
Chambers Award	20,340	-	3,905	(1,000)	23,245
Aliaga Fund	4,992	-	-	(1,000)	3,992
Student and early career travel	2,294	4,675	-	-	6,969
Other short-term restricted	2,102	2,000	-	(1,500)	2,602
International Prize in statistics	732	-	-	(732)	-
Judea Pearl Prize	-	10,000	-	(5,000)	5,000
Other funds:	442,639	24,675	84,300	(14,747)	536,867
	$ 1,554,726	$ 43,641	$ 298,071	$ (43,071)	$ 1,853,367

*See Note 9 for detail of endowment funds.

2019 Audit Report for the American Statistical Association Continued

Note 8. Net Assets With Donor Restriction (Continued)

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

	Balance December 31, 2017	Restricted Contributions	Investment Loss	Released	Balance December 31, 2018
Endowment funds:					
Endowment corpus*	$ 798,526	$ 24,980	$ -	$ -	$ 823,506
Endowment earnings*	394,437	2,500	(75,213)	(33,143)	288,581
Endowment funds:	1,192,963	27,480	(75,213)	(33,143)	1,112,087
Other funds:					
Cox Scholarship	156,040	4,372	(10,166)	(2,000)	148,246
Waksberg Award	94,308	-	(5,681)	(4,000)	84,627
Bernard Harris Fund	44,255	5,200	(3,054)	-	46,401
Griffith Award	43,471	1,250	(2,634)	(3,539)	38,548
Wray Smith Scholarship Fund	37,304	-	(2,316)	(1,000)	33,988
Dixon Award	33,823	-	(2,127)	(500)	31,196
MG Natrella Scholarship Fund	32,168	-	(1,995)	(1,000)	29,173
Chambers Award	22,729	-	(1,389)	(1,000)	20,340
Aliaga Fund	5,992	-	-	(1,000)	4,992
Student and early career travel	1,558	736	-	-	2,294
Other short-term restricted	2,102	-	-	-	2,102
International Prize in statistics	732	-	-	-	732
Judea Pearl Prize	5,000	-	-	(5,000)	
Other funds:	479,482	11,558	(29,362)	(19,039)	442,639
	$ 1,672,445	$ 39,038	$ (104,575)	$ (52,182)	$ 1,554,726

*See Note 9 for detail of endowment funds.

Note 9. Endowment

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

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

Note 9. Endowment (Continued)

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

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

From time to time, the fair value of assets associated with individual donor-restricted endowment funds may fall below the level that the donor or UPMIFA requires the Association to retain as a fund of perpetual duration. In accordance with U.S. GAAP, there were no deficiencies of this nature that are reported in net assets with donor restrictions as of December 31, 2019 and 2018.

Endowment net assets consisted of the following at December 31:

	2019		
	With Donor Restrictions		
	Without Donor Restrictions	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Noether Memorial	$ -	$ 74,716	$ 206,506	$ 281,222
Sirken Award	-	28,969	150,000	178,969
Youden Award	-	94,052	61,082	155,134
Deming Lecture Fund	-	67,542	67,275	134,817
EC Bryant Award	-	62,342	60,000	122,342
Wilks Memorial	-	30,929	47,143	78,072
Waller Fund	-	16,350	45,000	61,350
Lingzi Lu Award	-	17,568	41,270	58,838
Karl E. Peace Award	-	22,870	34,000	56,870
Marquardt Memorial	-	23,861	26,250	50,111
Links Lecture	-	13,752	47,946	61,698
Lester R. Curtin Award	-	14,445	25,000	39,445
Bartko Award	-	6,578	30,000	36,578
Lamb/Ryne	-	54	1,000	1,054
	$ -	$ 474,028	$ 842,472	$ 1,316,500

Note 9. Endowment (Continued)

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

For the years ended December 31, 2019 and 2018, the Association had the following endowment-related activities:

	With Donor Restrictions			
	Without Donor Restrictions	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Endowment assets, December 31, 2018	$ -	$ 288,581	$ 823,506	$ 1,112,087
Contributions	-	-	18,966	18,966
Net investment income	-	213,771	-	213,771
Appropriation of endowment assets for expenditure	-	(28,324)	-	(28,324)
Endowment assets, December 31, 2019	$ -	$ 474,028	$ 842,472	$ 1,316,500

	With Donor Restrictions			
	Without Donor Restrictions	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Endowment assets, December 31, 2017	$ -	$ 394,437	$ 798,526	$ 1,192,963
Contributions	-	2,500	24,980	27,480
Net investment loss	-	(75,213)	-	(75,213)
Appropriation of endowment assets for expenditure	-	(33,143)	-	(33,143)
Endowment assets, December 31, 2018	$ -	$ 288,581	$ 823,506	$ 1,112,087

Note 10. Retirement Plans

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

	2019	2018
Money purchase plan	$ 217,258	$ 202,440
401(k) profit sharing plan	102,849	94,155
	$ 320,107	$ 296,595

Note 11. Commitments and Contingencies

Hotel space: The Association reserves hotel space for its conventions several years in advance. The contracts stipulate the number of rooms to be reserved and the time period for which they are to be reserved. As of the date of this report, contracts for hotel space had been entered into through 2025. However, due to the numerous variables involved, the Association's potential liability under these contracts cannot be determined.

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

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

Federal grants: The Association receives grants from federal agencies. Revenue from such grants is recognized only to the extent of actual grant expenses incurred. Reimbursed costs are subject to audit and final determination of allowability by the federal government. Therefore, there is the possibility that any amount received in excess of allowable costs would be required to be refunded. The Association believes that no material liability would result from such an audit.

Note 12. Expenses by Both Nature and Function

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

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

Note 12. Expenses by Both Nature and Function (Continued)

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

	2019 Program Services							2019 Supporting Services				
	Meetings	Publications	Programs	Section Expenses	Education	Grants and Awards	Total Program Services	Membership Development	Management and General	Fundraising	Total Supporting Services	2019 Total
Salaries and benefits	$ 874,947	$ 392,737	$1,223,851	$ 173,435	$137,101	$ 4,346	$2,806,417	$ 586,536	$ 1,156,637	$ 161,459	$1,904,632	$ 4,711,049
Meeting expenses	680,461	185,576	198,132	584,509	29,270	4	1,677,952	110,010	61,588	15,667	187,265	1,865,217
Non-employee compensation	65,508	155,536	142,481	22,694	207,432	318,443	912,094	61,747	36,378	-	98,125	1,010,219
Supplies and equipment	714,552	2,878	14,745	74,598	41,898	-	848,671	10,741	21,298	2,616	34,655	883,326
Overhead and occupancy	147,128	59,197	184,559	23,464	21,222	402	435,972	91,799	218,061	24,625	334,485	770,457
Travel	121,854	2,024	139,321	54,421	50,554	16,789	384,963	1,635	42,742	7,304	51,681	436,644
Professional services	-	5,047	373,514	-	-	-	378,561	-	34,025	-	34,025	412,586
Other expense	120,866	23,871	65,633	24,759	12,391	1,380	248,900	62,345	13,304	499	76,148	325,048
Printing/publishing	68,406	164,973	2,587	9,918	14,967	-	260,851	9,971	75	6,720	16,766	277,617
Contributions	-	16,000	191,717	36,050	22,000	-	265,767	-	-	-	-	265,767
Postage and hipping	90,514	98,099	1,158	247	5,256	-	195,274	18,473	954	6,422	25,849	221,123
Taxes and fees	13,058	63,257	17,282	2,204	1,993	38	97,832	8,611	23,428	4,949	36,988	134,820
	$ 2,897,294	$ 1,169,195	$2,554,980	$ 1,006,299	$544,084	$ 341,402	$8,513,254	$ 961,868	$ 1,608,490	$ 230,261	$2,800,619	$ 11,313,873

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

STATS4GOOD

BIG DATA METHODS for Data for Good

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

As part of a continuing series on technology to support D4G projects, we're going to look at the big data revolution and how it affects our approaches to problem-solving, as well as examples of how big data is being applied in Data for Good.

First, let me offer a few words on the language used. Three important terms—big data, machine learning (ML), and artificial intelligence (AI)—are often used in an imprecise, overlapping, and even conflicting manner. For the sake of clarity, I will offer definitions for the purposes of this column. As a physicist, I like operational definitions, so here goes.

For machine learning and artificial intelligence, I will offer the convention of using ML for the algorithms and AI for the decisions they make. For example, an ML algorithm estimates the risk associated with a loan application, while AI decides whether the application is approved. Here, ML will be used for a mechanized statistical calculation and AI for a statistical result.

Big data is often nebulously defined. What exactly constitutes big? For this column, I use small data to refer to anything that can be done on a desktop or laptop. Medium data requires a server, while big data is anything a conventional server can't handle. The properties involved are called the "Vs" of big data: volume of the data, velocity—how fast it needs to move and/or be computed, and variety—usually the number and types of fields. Other Vs are sometimes suggested but aren't distinctive qualities of big data because they don't demand a change in the data architecture or computational environment when things get beyond a certain level.

ML algorithms often show their greatest power when applied to big data. This is because many use "boosting," a statistical algorithm combining a large number of weak predictors to make a stronger one.

A single decision tree can be used on small data, like the well-known *Titanic* example, but has limited predictive power in many cases. Leo Breiman and Adele Cutler's Random Forests algorithm and gradient boosting, which has won many competitions but can sometimes over-fit the data, combines thousands of weak decision trees to strengthen prediction. These often are applied to Data for Good situations in which there is a large number of individuals, such as homeless veterans (*https://bit.ly/2LsWUTm*), or repeated observations of a smaller group (e.g.,

using gradient boosting to mine medical records to assess propensity for a severe case of COVID-19). This situation qualifies as big data for the large volume of the data, the huge variety of data in medical records, and the large computing power required.

One of the most common uses of big data methods are classification methods that produce a discrete outcome. These are often binary, such the Kaggle competition identifying households in need of assistance (*https://bit.ly/2LwD8Gx*). The algorithms also work for ordinal (1, 2, 3, …) and categorical (A, B, or C) outcomes. Support vector machines (SVMs) classify by moving the problem to higher dimensions (independent variables), where the distinction between groups becomes clearer. SVM often works well for complex problems when simpler ML classification algorithms don't offer sufficient separation of the final clusters. This makes SVM a popular choice for ensemble modeling, as in predicting the type of crime most likely to occur at a given time and place (*https://stanford.io/3cvMluC*).

Artificial neural networks are a class of ML algorithm that try to mimic how the human brain learns. The algorithms use multiple layers of nodes, with each node making a simple interaction with input data and sending the output to a subsequent layer. Each node is connected to many nodes. Deep learning uses multiple layers in the network to enhance prediction accuracy and detail. Neural nets can be a powerful tool for modeling Data for Good, and researchers studying the COVID-19 pandemic immediately put them to use for image analysis of X-rays to improve detection of the disease (*https://bit.ly/3bzKYd1*).

Applications for social media firehose often require multiple big data capabilities, from large data and computational volumes to complexity and high velocity to deliver real-time results. One application tracks hate speech on social media in real time (*https://bit.ly/3cBb4he*). Another uses text analytics of social media content to fight human trafficking (*https://bit.ly/2Wwvsua*). Social media applications are one of the most promising and rapidly evolving areas in Data for Good.

While big data methods offer great promise, they also have special challenges. Ethical concerns can be magnified since analytic methods can create new ways to identify and track people. Lack of transparency, where it is not possible to know with certainty how an AI decision is made, has caused serious problems in some areas, including criminal justice applications. As models have become more complex, people can be even more likely to rely on model results alone, instead of applying them in context and with a full understanding of their strengths and weaknesses. An increasingly important area of Data for Good is recognizing and intervening when analytics are misused with harmful results. The ethical scientist will always be on guard against bias, violations of data privacy, and the potential for harm and misuse.

The big data revolution isn't just about how the numbers have gotten larger. It's really a paradigm shift, a fundamental change in our thinking and how we approach problems.

The big data revolution isn't just about how the numbers have gotten larger. It's really a paradigm shift, a fundamental change in our thinking and how we approach problems. Whether through distributed data and edge computing, new algorithms to handle more volume and variety, real-time analytics, or other emerging methods, the focus is on how the actions we need to take have changed. The real story of big data is one told by the *verbs*—all the ways we are responding to today's challenges that traditional server environments can't support. It's a story told by many new uses and applications as emerging technology continues to reshape the world of Data for Good.

JSM is going virtual this year, but the theme is still *Everyone Counts: Data for the Public Good,* making it the leading D4G event in 2020. You can get all the details at *ww2.amstat.org/jsm.*

Another great Data for Good opportunity is the annual meeting of the American Association for the Advancement of Science. The 2021 conference will be in Phoenix, Arizona, February 11–14. The call for submissions is open through July 14. Learn more at *https://meetings.aaas.org*. ■

STAT*tr@k*

Committee on Career Development Holds Virtual Office Hours with Experts

First Two Rounds Focus on Postdoctoral Positions

Claire McKay Bowen is lead data scientist, privacy and data security, at the Urban Institute, where she researches methods of data privacy and confidentiality.

Elizabeth Mannshardt is the associate director of the Information Access and Analytic Services Division of the US Environmental Protection Agency (EPA). She is also an adjunct associate professor in the department of statistics at North Carolina State University and past chair of the ASA's Government Statistics Section. Prior to joining the EPA, Mannshardt completed two postdoctoral fellowships in statistics.

The ASA Committee on Career Development (CCD) recently held its first two rounds of virtual office hours (VOH, *https://bit.ly/3cBcLeB*) for 2020, focusing on postdoctoral positions and featuring statisticians who were once postdocs along with professors with advice and/or open positions at their institutions. Questions focused on the interview process, finding a postdoc mentor, pros and cons of choosing the postdoc path, and how and where to find postdoc positions.

Murali Haran of Penn State, Ofer Harel of the University of Connecticut, and Yawen Guan of the University of Nebraska were guests during the first round, with Elizabeth Mannshardt of the US Environmental Protection Agency serving as moderator. The second round showcased Brian Reich of North Carolina State University (NCSU), Veronica Berrocal of the University of California, Irvine, and Howard Chang of Emory University. Claire McKay Bowen of the Urban Institute moderated that round.

More than 30 participants submitted questions in advance and live during the session. Recordings for both sessions and panelist bios are available at *https://bit.ly/2zJCEKM*, along with information about future CCD offerings.

The sessions started with panelist introductions and initial thoughts. The general theme was to have a plan for your research path and corresponding papers, as well as to branch out with your areas of interest and professional connections. Haran said, "Have a plan, one that hopefully includes easy papers to get out." Reich agreed. "Time is short and papers are crucial, so start off with a few concrete projects," he said.

Haran also suggested participants expand beyond their current mentors. Harel echoed this when he said, "Connections are so important." He also emphasized that postdocs should aim to have fun.

Guan agreed and said, "Come up with a detailed research plan and timeline with [your] postdoc mentor. Early postdoc is a good time to broaden research areas, start new projects, and establish your own brand."

Chang emphasized searching for a good research fit, stating this as the reason he chose his postdoc position at the Statistical and Applied Mathematical Sciences Institute (SAMSI).

Postdoc Experts

Haran

Reich

Harel

Berrocal

Guan

Chang

MURALI HARAN, professor of statistics and department head at Penn State University, completed a postdoc at the National Institute of Statistical Science, where he worked on random forests for applications in software engineering research. Haran also spent time as a research fellow at SAMSI in 2009 for the program "Space-Time Analysis for Environmental Mapping, Epidemiology, and Climate Change" and has continued to collaborate with SAMSI fellows. Haran's Penn State research has involved statistical methods for studying climate change, modeling the dynamics of infectious diseases, and studying the spread of invasive plant species.

OFER HAREL, professor of statistics and director of graduate admissions at the University of Connecticut, is a former University of Washington biostatistics postdoc. He earned his doctorate in statistics in 2003 from Penn State, where he developed his methodological expertise in missing data techniques, diagnostic tests, longitudinal studies, Bayesian methods, sampling techniques, mixture models, latent class analysis, and statistical consulting. Harel has served as a biostatistical consultant nationally and internationally since 1997. Through his collaborative consulting, he has been involved with a variety of research fields, including Alzheimer's, diabetes, nutrition, HIV/AIDS, and alcohol and drug abuse prevention.

YAWEN GUAN, assistant professor in the University of Nebraska at Lincoln Department of Statistics, is a former SAMSI postdoc. Prior to joining UNL, she spent two years at SAMSI/NC State University as a postdoctoral fellow developing spatiotemporal methods for air quality and emulation-calibration methods for Artic sea ice.

BRIAN REICH, distinguished professor of statistics at North Carolina State University, is a former NCSU postdoc. Reich completed his PhD in biostatistics in 2005 at the University of Minnesota. After graduation, he joined NCSU first as a postdoc and then as a member of the statistics faculty in 2008. His research interests include spatial statistics, extreme value analysis, variable selection, and dimension reduction. Reich applies these methods to environmental areas such as ecology, air pollution, and climate change, as well as data from the physical and materials sciences.

VERONICA BERROCAL, associate professor of statistics in the University of California, Irvine Department of Statistics, is a former SAMSI postdoc. She joined UC Irvine in the fall of 2019, after spending nine years on the faculty at the University of Michigan in the department of biostatistics. Berrocal earned her PhD in statistics from the University of Washington in 2007 and spent three years in the Research Triangle Park area as a National Research Council postdoc and Duke University/SAMSI postdoc. Her research interests are in spatial and spatio-temporal statistics, with a focus on applications in atmospheric/geophysical sciences, environmental health, social determinants of health, health disparities, and imaging.

HOWARD CHANG, associate professor of biostatistics and bioinformatics at Emory University, is a former SAMSI postdoc. He joined Emory in 2011 after completing a two-year postdoctoral fellowship. Chang works on developing statistical methods for the analysis of complex spatial-temporal environmental exposure and health data.

Reasons for selecting particular postdoc positions were varied. Reich chose his postdoc at NCSU for the chance to work with a great mentor and the opportunity to teach. To work with an exciting data set was a key reason Harel chose his postdoc at the University of Washington. Both Guan and Haran saw their postdocs at SAMSI and the National Institute of Statistical Science, respectively, as a chance to gain experience prior to a faculty position. Berrocal also

pointed out a key reason for choosing her postdoc were the other high-level institutions in the area that would offer additional opportunities for learning and collaboration.

Identifying a Good Fit and Mentor

A postdoc interview and preceding conversations will help determine what a good fit is for you and your career. Harel says it is a chance for you to "gauge the postdoc position's ability to make an impact and give input."

Guan suggested trying to determine what percentage of your time would be allocated to postdoc work versus establishing your own research and finishing your existing projects, encouraging "new but not completely new projects." Reich agreed and added, "Sometimes great ideas come from taking ideas that are well developed in one area and applying them to solve an open problem in another."

Chang says to investigate what the project entails, including deliverables, and to consider how this may fit with your ultimate career goals.

Mentoring is a crucial component of a postdoc position. All the panelists recommended talking to other students and postdocs and asking questions during the interview process. Reich encourages asking about the work environment the adviser envisions.

The guests also offered frank insights into potential drawbacks of a postdoc position. Haran pointed out that academics "might treat you as if you [have] more experience than you do—a postdoc is 'two' years, but given the academic calendar, it may really be 16 months." Chang commented that it can be intimidating to teach 100 students. Berrocal stressed the importance of gaining grant-writing experience. All former postdocs commented that postdocs can be isolating, stressing the importance of networking and creating a social network.

Where, When, and How

There were several questions about finding a postdoc position. Reich pointed people to online resources such as the University of Florida website for jobs in statistics (*https://bit.ly/2TaPIzv*) and encouraged students to talk with their dissertation advisers and ask around their field. Chang encouraged students to email research groups they might be interested in. "You never know who has 'half' a postdoc position," he said. As for when, Reich said it is never too early, and funding is variable each year.

Berrocal encouraged becoming a member of the ASA, along with sections and chapters, and pointed out the NSF often has postdoc funding (*https://bit.ly/2yRHyFv*).

What Is the ASA CCD?

The ASA CCD (*https://bit.ly/2X2jKX9*) provides support and information about career decisions to ASA members. Look for upcoming VOH sessions on topics such as promotions and how to navigate a virtual JSM.

Student participants asked how they can be competitive in their own postdoc search. The question of the 'magic' number of needed papers came up. The answer: There is no magic number. Haran offered guidelines to consider such as "maybe two submitted or somewhere in the pipeline to show that you can produce work."

Chang also encouraged having some form of completed research to show, such as a couple of papers and professional presentations.

Reich agreed it is a competitive market and, when asked what stands out in an applicant, he said he looks for students who are smart and ambitious. Chang echoed this, including "ability to work independently" as a key trait.

Should You Do a Postdoc?

When considering the benefits of a postdoc versus going straight into a faculty position, Haran stressed both paths work. "There are lots of personal considerations and lots of randomness year to year in [the] job market," he said.

A postdoc is a chance to accumulate research ideas and collaborations. Harel pointed out that when you start a faculty position, the tenure clock starts to tick, so you should think about where you want to be in 10 years.

Experts pointed to components of their postdoc that helped them prepare for their faculty positions, such as how to identify important projects, work with PhD students, multitask, write, be a professional researcher, and see the big picture.

Postdoc positions can be valuable for future careers in industry and government. Moderators Mannshardt and Bowen have both completed postdocs and are currently in the government and nonprofit sectors, respectively. Bowen found completing her postdoc was an opportunity to explore research areas beyond her dissertation expertise, which prepared her well for her current position. Mannshardt pointed out that you have a short window of opportunity to do a postdoc. "I personally made the decision as it kept options open and was a great opportunity to learn more about both statistics and my personal path," she said. ■

How (In)Visible Is Science in ASA?

April Amstat News *article needed more information about NCSES budget*

John Gardenier

A feature article on the FY 20/21 budgets in the April 2020 issue of *Amstat News* addressed the impact on selected statistical agencies. On the plus side, it contained a lot of relevant tabular data that is readily readable but, like tabular data generally, is not as readily interpretable. An excellent start to making the implicit messages understandable came in two well-designed graphs with brightly colored, easily distinguishable plot lines, well-formulated and labeled axes, and clear labels.

A very important message was lost in Figure 1, unfortunately, by the lack of an adequate legend and the abject failure to translate the most clear and impactful graphical highlight into text. That is highly unfortunate for the continuing issue of inadequate communication between statisticians and the broader scientific community.

Figure 1 practically shouts the message of a very dramatic increase of interest in data on the scientific enterprise writ large. It would appear that such a message is of virtually no interest to ASA statisticians. Not only is NCSES not defined in the legend to the graph, but unlike the rest of the alphabet soup, it is not even spelled out in the text.

As a relatively new (2012) and mid-sized federal statistical agency, the National Center for Science and Engineering Statistics is not as widely known as most others. Still, its data do impact the most dramatic issues/threats facing the nation and the world. Those prominently include COVID-19 and global climate change, as well as other matters facing humanity throughout this century and beyond. They also may impact less dramatic issues of broad applicability to humanity and life in general, as well as issues that are vital to limited geographies and communities. There is a virtually unlimited range of vastly interesting, highly productive, and well-compensated work for statisticians out there.

The article quite rightly leaves a general, more complete, and more detailed analysis of these data to more intensive and technical research media. That does not justify *Amstat News* ignoring one of the clearest and most relevant messages in the data as an example of why this and similar matters deserve much more analysis and reporting elsewhere. They also can impact members of the profession.

Apart from this one article, there is in ASA current interest and study of the general issue of inter-silo communication among the various sciences generally, importantly including statistics. In general, this problem could be aided by *Amstat News* and similar internally addressed media within many and varied scientific and engineering associations and institutions.

ASA should encourage interested scientists generally and their organizations to contribute to *Amstat News* brief articles describing the critical importance of statistical inclusion in collaborative scientific and engineering research. They should address the benefits achieved in specific instances, the difficulties overcome, and suggestions for ways to further improve such collaborations going forward.

ASA should also encourage statisticians who are engaged in interdisciplinary endeavors—and their colleagues—to seek opportunities to contribute similarly themed communications to the relevant internal media. In doing so, as appropriate, they should emphasize the many areas of agreement on technical and methodical issues they see within our discipline while being willing to admit that there also exist a variety of opinions on many specific statistical matters. In each case, they should distinguish generally held positions from personal or institutional positions that may be important but less generally accepted. This latter note of caution applies to all disciplines and many institutions, of course. ■

Large Budget Increases for Agency Survey Mask Budget and Staff Challenges

Steve Pierson, ASA Director of Science Policy

I thank John Gardenier for his constructive comments on the April article about the budgets for statistical and research agencies. I was remiss to not spell out the abbreviations in this year's article and will return to better practice next year.

Gardenier rightfully points out the lack of discussion for a major feature in Figure 1, where the normalized budgets for the mid-size principal federal statistical agencies for 2009–2020 are shown. I used that graph and Figure 2 to note a major concern: Nine of 12 federal statistical agencies (not including the US Census Bureau) had lost purchasing power since 2009, many exceeding 10 percent.

The aspect of Figure 1 I didn't discuss is that the National Center for Science and Engineering Statistics (NCSES), which is part of the National Science Foundation (NSF), was the exception. It had gained 38 percent in purchasing power. Most, if not all, of that increase is for a single survey and masks budget and staff challenges at NCSES.

To Gardenier's point, NCSES does have an important and unique mission in collecting, analyzing, and disseminating information about the people and establishments that drive innovation and economic growth in our country.

To shed light on NCSES's budget over the past decade, the ASA consulted John Gawalt, NCSES director from 2013–2018, who provided several insights and issued a caution.

The following four factors generally explain the NCSES budget increase:

- NCSES's budget is determined in part by the NSF, a science agency that inherently values data
- NSF's budget in nominal dollars has increased 20 percent this past decade, perhaps providing it the flexibility to increase the NCSES budget
- Broad interest exists for the role STEM plays in growing our economy
- Virtually all the increases in purchasing power occurred in FY14 and FY15, and much—if not all—of it was to enhance the Survey of Doctorate Recipients (SDR)

"NCSES routinely benefits from strong NSF support because of the recognition that investments in science, engineering, and innovation play a strong role in the growth of the economy," Gawalt wrote us. "There is a desire to better understand the drivers behind science, engineering, and innovation and how they contribute to national prosperity, especially in developing a better understanding of the cadre of scientists and engineers, their training, composition, and roles in the workforce. Building a richer, more robust information resource that captures key information about this workforce and the varied ways individuals progress through their careers is important to improving our understanding of the current contributions of these highly trained individuals and where future investments in training and education can be most beneficial."

Gawalt also explained that the enhancement to SDR was an increase in the sample size from 47,000 to 120,000, which was "driven by a need for data to support analysis by field of degree at lower levels of aggregation."

Gawalt further noted that the "absolute dollar increase needed to expand the SDR sample size is in line with what you would expect in terms of survey operations" but that it amounted to a large percentage increase for NCSES because of the relatively small size of its budget.

Despite the large FY14 and FY15 purchasing power increases for the SDR, Gawalt cautioned that one "should not go away with the impression that NCSES doesn't face the budget challenges of other statistical agencies."

"They do," he explained, "especially in recent years because NCSES is not staffed at the level that it should be for the work that it does." They compensate the short staffing by contracting out to external entities.

"Some of that is OK," he commented, "as the quality of NCSES's surveys and its capacity to conduct additional work has benefited from the contributions of its contracting activities, but buying the services of revolving contract staff is not the same as having and growing in-house expertise."

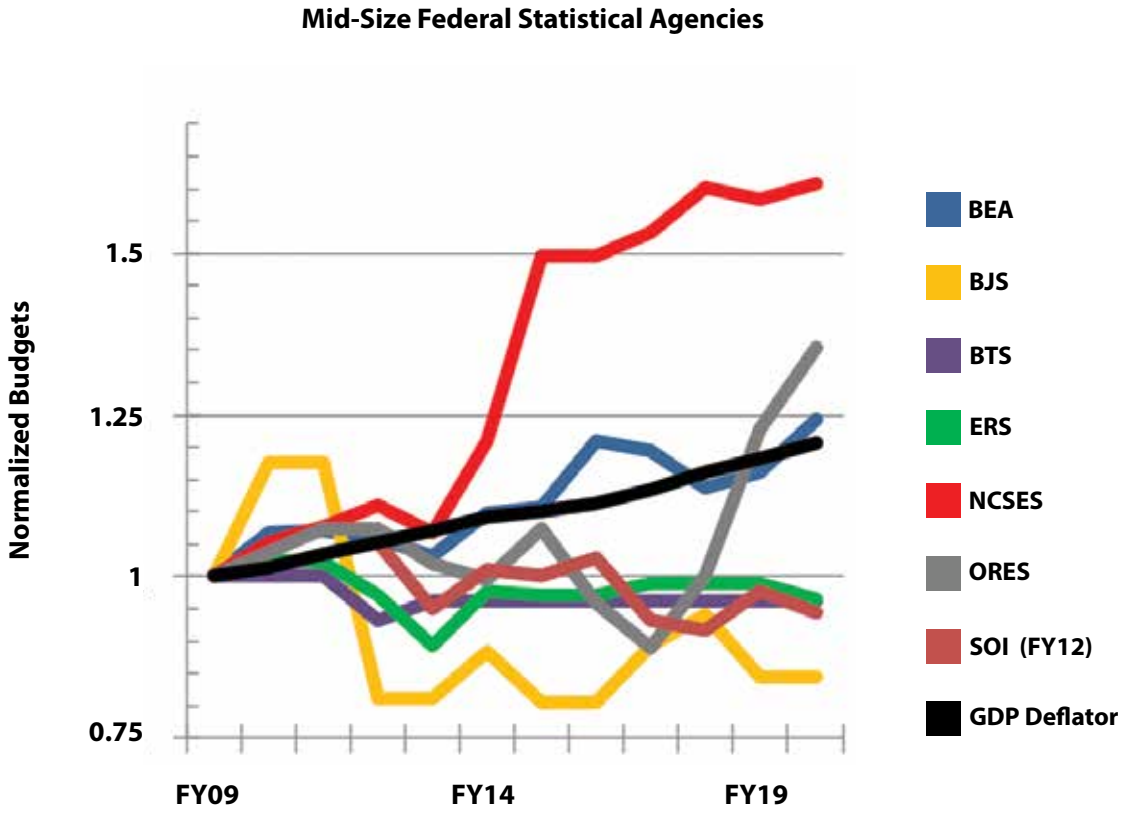


Figure 1: The budgets of the seven mid-sized statistical agencies normalized to their FY09 levels, along with the GDP deflator to account for inflation. Budget restructuring for ERS in FY15 and ORES in FY19 are accounted for in the graph to allow for comparison. [Key: BEA, Bureau of Economic Analysis; BJS, Bureau of Justice Statistics; BTS, Bureau of Transportation Statistics; ERS, USDA Economic Research Service; NCSES, NSF National Center for Science and Engineering Statistics; ORES, Social Security Administration Office of Research, Evaluation, and Statistics; SOI, IRS Statistics of Income Division]

Indeed, to Gawalt's point on contracting, we found in a recent project (*https://bit.ly/3cAf2qt*) that NCSES has a budget to staff ratio of $1.1 million per full-time staff member, which is more than three and a half times the median of the 13 principal federal statistical agencies—second only to the National Center for Education Statistics. Prior to the SDR expansion, this ratio was approximately $900,000 per staff member in FY12 and FY13, which makes the point that full-time federal NCSES staff did not change in line with budgets over this time period.

Like many other federal statistical agencies, NCSES has consistently been doing more over time without commensurate increases in federal staff, leaving them in need of targeted budget and staffing support in the face of increasing operational costs and other pressures.

Former Chief Statistician Katherine Wallman emphasized Gawalt's caution, saying, "Federal statistical agencies must be responsible stewards of their taxpayer-funded budgets and sufficient internal staffing is a necessary first step in this regard."

For more insights about NCSES, please see the recent Q&A with NCSES Director Emilda Rivers at *https://bit.ly/2z1mLiv*.

Returning to Gardenier's final point regarding inter-silo communication among the various sciences, we agree and appreciate his recommendations. If you are interested in contributing brief articles about either of the following two topics, please contact *Amstat News* Managing Editor Megan Murphy: (i) the critical importance of statistical inclusion in collaborative scientific and engineering research and (ii) experiences in interdisciplinary endeavors. ■

Dennis Lin Takes Reins as Purdue Statistics Department Head

Purdue University's College of Science has appointed Dennis K.J. Lin to lead its statistics department.

Lin, who is currently a university distinguished professor of supply chain and statistics at Penn State University, will begin his new role at Purdue in July.

Patrick J. Wolfe, the Frederick L. Hovde Dean of Science, says of his new colleague, "We are delighted to welcome to Purdue such an exemplary scholar and leader, who is also recognized for forging deep collaborations across multiple disciplines. As we strengthen the mathematical and computational sciences across Purdue and launch our new flagship facility for these disciplines, Dennis will help cement our position as a national and global leader in data science education and research."

Lin earned his Bachelor of Science degree in mathematics from National Tsing-Hua University and his doctoral degree in statistics from the University of Wisconsin–Madison with a minor in computer science. His research interests are design of experiments, quality assurance, industrial statistics, statistical inference, and data science. An elected fellow

Dennis K.J. Lin

of the Institute for Mathematical Statistics, the American Society of Quality, Royal Statistical Society, International Statistical Institute, and the American Statistical Association, he will be the Deming Lecturer at the upcoming 2020 Joint Statistical Meetings.

"I am thrilled to have the opportunity to lead a department with such an outstanding reputation in theoretically-based research," Lin said. "I look forward to facilitating current research efforts and the educational mission of the department of statistics while exploring ways to bridge theoretical statistical research with the application and development of modern data science." ■

Northeastern University President Joseph E. Aoun has appointed **David Madigan** the next provost and senior vice president for academic affairs. A distinguished and innovative leader, Madigan comes to Northeastern after a successful career at Columbia University, where he oversaw an academic and research enterprise across several schools and research centers as executive vice president for arts and sciences and dean of the faculty of arts and sciences.

Madigan said he was drawn to Northeastern's leadership in lifelong learning—an anytime, anywhere approach to learning that equips people with the tools and knowledge to succeed as advances in technology transform jobs and economies around the world.

The provost is the university's chief academic officer and leads Northeastern's nine schools and colleges, its expanding research enterprise, information technology services, and university libraries. The provost also collaborates with the senior vice president for finance to set the university's budget and financial priorities.

Madigan is a fellow of the ASA and American Association for the Advancement of Science and has long been a leading researcher in health care and big data.

Read more about Madigan and his appointment at *https://bit.ly/361snWl*. ■

Obituary

Theophilos Cacoullos

Submitted by C. A. Charalambides and N. Balakrishnan

Theophilos N. Cacoullos

Theophilos N. Cacoullos was born April 5, 1932, in the village of Pachna in Limassol district, Cyprus. After his secondary education at Limassol Lanition Gymnasium (valedictorian, 1950), he studied mathematics at the University of Athens and earned his diploma (BSc) in 1954. Then, Cacoullos returned to Cyprus and worked for two years as a mathematics teacher at his alma mater high school. In 1957, he went to the US on a scholarship from the Greek Scholarships Foundation for postgraduate study. He earned his MA in 1960 and then his PhD in 1962 in mathematical statistics from Columbia University.

Cacoullos's master's thesis, with Alan Birnbaum, on median-unbiased estimation prompted his paper, "Combinatorial Derivation of the Distribution of the Truncated Poisson Sufficient Statistic," published in the *Annals of Mathematical Statistics*. In 1989, Cacoullos characterized normality under spherical symmetry by the admissibility of Fisher's linear discriminant function in a paper in *Statistics and Probability Letters*. He established that, within the family of spherical normal scale mixtures, the normal maximizes the minimax probability of correct classification, provided the Mahalanobis distance between the two populations is the same.

In the early 1960s, Cacoullos worked as a research associate at Stanford University. There, he developed ties with Herman Chernoff, Ingram Olkin, and Charles Stein, among others. He worked with Olkin, producing their joint 1965 *Biometrika* paper on the bias of functions of the characteristic roots of a random matrix.

In May 1962, Cacoullos returned to Cyprus, accepting the position of the director of the department of statistics and research of the new independent Republic of Cyprus. To pursue an academic career, however, he returned to the US, accepting an assistant professorship at the University of Minnesota. Yet, during his 15-month administrative work in Cyprus, he prepared his 1966 paper on nonparametric multivariate density estimation. In Minneapolis, he worked on characterizations of normality by constant regression of quadratic and linear forms. During the same period, he discovered the interesting relation between the t and F distributions, published in *JASA* in 1965, and also exploited in relation to homoscedasticity tests for a bivariate normal.

In 1965, Cacoullos returned to New York to take a position in the department of industrial engineering and operations research at New York University. While at New York University as associate professor, he was elected chair of probability and statistics at the University of Athens and, in 1968, returned to Greece to begin his 31-year career as mathematical and physical sciences faculty.

An excellent teacher who never used notes but did use spontaneous humor, Cacoullos no doubt influenced many of his students. In addition to standard courses in statistics, he introduced combinatorics, linear programming, stochastic processes, and actuarial mathematics. In fact, he is an honorary member of the Greek Actuarial Society.

Equally as important for the future of research in mathematical statistics in Greece was Cacoullos's supervision of several young mathematicians. C. A. Charalambides was his first doctoral student. Subsequently, many prominent colleagues earned their PhDs in mathematical statistics under his supervision or joint supervision. Among them are M. Koutras, V. Papathanasiou, and N. Papadatos, now professors of mathematical statistics.

Cacoullos's interest in characterizations was renewed in the 1980s with characterizations of mixtures and priors by posterior expectations. With H. Papageorgiou, a fresh PhD at the time, Cacoullos coauthored several articles characterizing discrete distributions by a conditional and a regression function.

Cacoullos visited McGill University in 1972–1973 and 1975–1976, always enjoying the collaboration and friendship of H. Ruben. Later in the fall of 1983, he gave a series of special lectures at the MIT Statistics Center at Chernoff's invitation. He visited the Center for Multivariate Analysis under the directorship of C. R. Rao, then at the University of Pittsburgh, in the spring of 1989.

Cacoullos published more than 70 papers in international journals. Recently, he became interested in the nature and history of probability and statistics. He published seven textbooks on probability and statistics in Greek and edited *Discriminant Analysis and Applications*, published in 1973 by Academic Press. In 1989, Springer published his book *Exercises in Probability*. His recent contributions on Chernoff-type and Cacoullos-type variance generated much interest and produced a variety of publications.

Biopharmaceutical Section Offers Advice for ASA Fellow Nomination

Alex Dmitrienko of Mediana, Ilya Lipkovich of Eli Lilly, and Paul Gallo of Novartis

Being elected an ASA Fellow is an important milestone in the career of a professional statistician. ASA fellowship has been an honor for numerous members of the Biopharmaceutical Section (BIOP). Figure 1 presents the number of elected ASA Fellows (total and BIOP members) since 1967.

As can be inferred from the graph, about 15% of ASA Fellows elected in recent years were BIOP members. We chose 1967 as the starting point because this is when the first BIOP member was elected: Edmund A. Gehan, professor emeritus of biostatistics at Georgetown University. Note it was not until 1981 that the BIOP subsection was inducted into the ASA as a full section (see *https://bit.ly/369EUXF*).

To become a fellow, an ASA member is nominated by another member and the nomination is supported by three (recently reduced from four) individuals, most commonly ASA members. The nomination package and letters of recommendation are due March 1, when they are reviewed by the ASA Committee on Fellows. Decisions are typically announced in April, and the award ceremony is held at JSM, normally on Tuesday night after the ASA President's Address.

Here, several section members—including two authors of this article—provide a summary of key points from their experiences as nominees, describe what they learned while nominating others, and share advice for those considering nomination. Many have a long history of successful ASA Fellow nominations, and some have served on the ASA Committee on Fellows. This includes Ivan Chan, Christy Chuang-Stein, Paul Gallo, and Stephen Ruberg. (Chan currently serves on this ASA committee.)

If you have questions related to the nomination process, contact Ilya Lipkovich (*ilya.lipkovich@lilly.com*), who currently serves as the chair of the section's fellows nomination committee. Also, the section will be offering an ASA-sponsored webinar, "ASA Fellow Nomination for Biopharmaceutical Statisticians: Strategies and Tactics," on September 17.

MORE ONLINE
You can learn more about the nomination process by visiting the following:

Nomination resources: *https://bit.ly/2WxW8uB*

ASA Committee on Fellows: *https://bit.ly/2WzztxT*

List of ASA Fellows: *https://bit.ly/3bywJFh*

BRUCE BINKOWITZ
Shionogi, ASA Fellow 2015

I was fortunate to have a very experienced sponsor for my nomination and consider being an ASA Fellow one of the greatest honors of my career. My sponsor taught me so much that I also learned how to write impactful supporting letters and how to sponsor a potential new ASA Fellow. I carried my experience successfully forward.

When I was nominated, my sponsor told me how it was going to go from the start, and there were no surprises. Start early by going through the application and thinking about what you want to put into each section of the nomination form. What are your strengths and weaknesses? Which sections in the application are your strengths? Write down everything you can think of and worry about the word limits later.

I learned it is not only important to think about *who* will write my letters of recommendation, but it is just as important *how* to use those letters of recommendation. The letters should be used to go deeper into accomplishments from the various sections of the application. The nomination form has a limit on how much can be written in each section. The recommendation letters can be the "extra space" you need and supplement a specific section, so tying a letter to a section in the application works well.

Also, the diversity of the letters of recommendation matters. Getting all your letters from current coworkers isn't likely to impress the ASA Committee on Fellows. Are you a statistician in the pharmaceutical industry? Letters from FDA statisticians and academic statisticians can be a well-rounded package. Do you have a major accomplishment that needed collaboration with nonstatisticians? If the nonstatistician has a good reputation, perhaps such a letter from them can boost your package.

For most candidates, it is unlikely that everyone on the committee will know who you are, so the recommendation letters say a lot about who knows you. If you have well-respected ASA Fellow statisticians writing you letters, their credibility rubs off on your application. In addition, an extra letter may be helpful, one more than required. You then have the option to leave one out when submitting the package.

You and your sponsor should discuss where each letter fits in, and when asking someone to write a letter, you can suggest areas of focus. When requesting letters of recommendation, give the writers plenty of time (2–3 months) to write and request them to be completed well before the deadline. You can submit the packages well ahead of the deadline, when the reviewers can take the time to review the package on its own, as opposed to the bolus received at the deadline.

If you are sponsoring a nomination package, get more eyes on that package. Use your network to reach out to others who have successfully sponsored someone or used to serve on the ASA Committee on Fellows and have them read the package and give opinions. As a sponsor, you may get too close to the package, and other perspectives will strengthen it.

I have also learned that it is never too early to start planning to be an ASA Fellow. For example, this is an *ASA* fellowship, so what have you done for the ASA? If nothing, planning ahead to get some involvement sets you up well later on. You don't have to be spectacular in every section of the nomination form, but understand what the sections are, identify your strengths, and decide if you need to address any weaker areas. If you are a statistical leader and mentor, discuss with your mentees the idea of becoming a fellow in the future and building a plan toward that goal.

Of course, some people never think about it, don't plan for it, but have built strong enough accomplishments at the time of application. That was me. I was lucky, but learned that applying to be a fellow is something you can actively plan for since there is no downside to thinking about it ahead of time. And for those of us lucky enough to be an ASA Fellow, helping younger statisticians plan for their goal is a rewarding endeavor.

IVAN CHAN

AbbVie, ASA Fellow 2011, ASA Committee on Fellows 2018–2020

The ASA Fellows nomination package lists several categories of contributions that may be considered, including statistical applications, administration of statistical activities, teaching, research, and service to the profession (ASA and other statistical societies). When preparing the nomination package, it is not required to fill in all categories. Instead, it is recommended to focus on the categories in which the nominee's contributions are outstanding. The ASA Fellows website offers lots of useful advice for preparing the package. Here, I offer additional tips to help strengthen the nomination based on my experiences with the ASA Committee on Fellows.

When describing the nominee's contribution, it is important to tell the story of the contribution and its impact, such as the challenge, innovation/novelty of the research, or application of statistical methods. For research contributions, one can include statistical methodology and development of software for implementing new statistical methods. It is good to not only include the number of publications, but also talk about the impact in terms of the number of citations (or how widely the software is used) and applications of the methods or software to solve real-life problems.

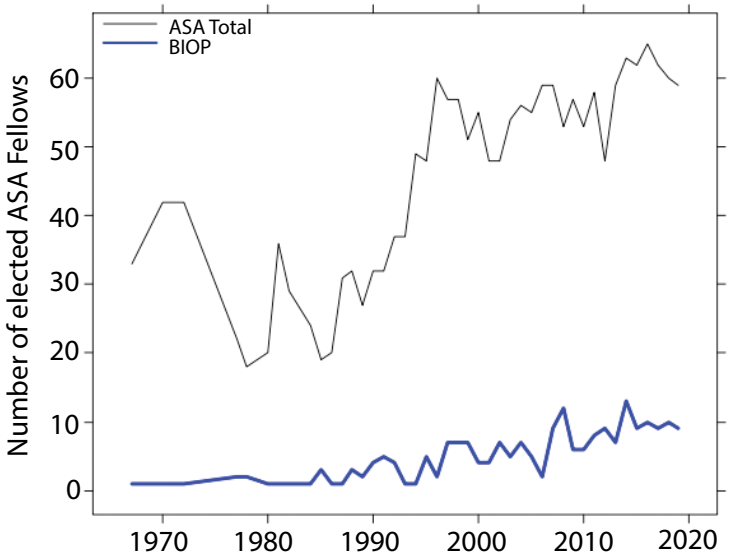


Figure 1. The number of elected ASA Fellows, total and BIOP members, 1967–2019

Many statisticians working in the biopharmaceutical industry are making significant contributions to drug development in a variety of capacities. For example, development or innovative application of statistical methods may have led to better data analysis and interpretation, identification of predictive genomic signatures and biomarkers, better decision-making on drug candidates, acceleration of clinical trials, and/or faster approval of new drugs. In addition, ASA fellowship recognizes organizational leadership for someone who has created a positive environment that fosters scientific excellence, innovation, influence, and the growth of statisticians in the organization. It will be important to tell the story of how the nominee's contributions have significantly impacted the drug development or growth of the statistical organization.

Regarding service to the profession, involvement in ASA leadership activities is considered incredibly important, especially for statisticians residing in the US. Activities in other statistical societies are helpful, as well. There are many ways statisticians can get involved in the ASA (e.g., participating in local ASA chapters, the Biopharmaceutical Section, and multiple ASA committees). For international members, it is useful to describe the leadership activities connecting with the ASA's mission of international outreach in addition to the activities in their country. As a general guideline, for example, chairing a local chapter or special interest section, serving on an editorial board of a journal, or serving on a major meeting's program committee is considered an outstanding contribution to the profession. Be sure to include professional activities in the CV and highlight them in the nomination package.

Recommendation letters should be written by experts who know the nominee's work and can provide accurate assessment of the contributions. It is a good strategy to have the letters covering different aspects of the nominee's contributions, so that they will provide—in aggregate—strong support to the overall nomination. Also, supporting letters from ASA Fellows tend to carry more weight, as the letter writers have already gone through the rigorous nomination process.

CHRISTY CHUANG-STEIN

Chuang-Stein Consulting LLC, ASA Fellow 1998, ASA Committee on Fellows 2008–2010

I have served on the ASA Committee on Fellows and many other award committees sponsored by statistical professional organizations. I have also nominated individuals for ASA Fellow and written supporting letters for many nominees. Based on my cumulative experience, I would like to offer some suggestions for an individual who is considering nominating a colleague now or in the future. Needless to say, all suggestions below require input from the candidate prior to implementation.

- Identify individuals who are truly familiar with the candidate's work and are willing to spend time writing letters that describe the influence and impact of the candidate's contributions. Specific examples of influence and impact are particularly helpful.
- Coordinate with the letter writers to take a divide-and-conquer approach to covering different categories in Section IX (Supporting Statements) of the nomination form. One writer may focus on Subsection D (Teaching and Dissemination of Statistical Knowledge) while another might focus on Subsection E (Statistical Research). This strategy allows in-depth discussions of a candidate's contributions in diverse areas.
- Plan ahead for the candidate's contributions in Subsection F (Activities Related Only to the American Statistical Association). Since the honor is bestowed by the ASA, it is important that a candidate has made substantial contributions to the ASA. Contributions can take many forms, including being an officer of an ASA chapter/section, a member of the organizing committee of a prominent ASA meeting (e.g., the Joint Statistical Meetings), program chair of the ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop, and a member of the editorial board of an ASA journal or the section's *Biopharmaceutical Report*.
- Discuss with the candidate how to address Section VIII (List of Major Publications Containing Statistical Content). Publications with substantial statistical contributions are typically required. Statisticians who aspire to be nominated for ASA fellowship one day should plan early in their career to establish a track record on publications.

PAUL GALLO

Novartis, ASA Fellow 2014, ASA Committee on Fellows 2016–2018

I had the honor of being a member of the ASA Committee on Fellows and served as its chair during the last year of my term. This rewarding experience gave me a valuable perspective on how to make a good case for nominees.

A successful nomination package is often the result of a close collaboration between the nominator and nominee to clearly and most compellingly convey the candidate's achievements. Most potential fellows are nominated at a point in their careers in which their record of accomplishments first reaches a level that makes them viable candidates. Many successful nominees will, at a later point in the career, look like obvious choices, but that's not necessarily the case when their nominations first come before the committee. The committee thus works extremely intensively each spring to understand and distinguish between nominees who overall may seem similarly viable.

This is complicated by the fact that nominees have varied sets of backgrounds and achievements across varied spheres of experience (academic, industry, government, etc.). The committee is also diverse in this sense. In my experience, committee members worked together conscientiously and cooperatively to help each other understand the achievements of candidates whose experiences were in different settings. A clear, complete, well-organized nomination package that appropriately emphasizes the candidate's strongest areas of achievement will play a key role in a successful nomination.

One general piece of advice is that the nomination package should not sound like a "job description." Literally thousands of ASA members hold important positions that their skills and experiences have qualified them for, and they perform their roles well. Describing in a general manner the background that led nominees to their current position or responsibilities they have in that position may not distinguish them from others who hold similar positions in other organizations.

The committee commonly sees nonspecific phrases with flowery adjectives describing their candidates' attributes (e.g., "an outstanding instructor," "an insightful consultant who gets to the heart of

the matter," "communicates extremely clearly," "a great motivator of his/her staff," "a valued mentor"). That may all be quite true but it's good to keep in mind that nearly all nominations contain such phrases. The most effective packages provide specific details or illustrations that make clear to the committee why the claim is particularly and unusually true for their candidate. The supporting letters are often a good place for this.

It should not necessarily be assumed that statisticians automatically receive credit for favorable or meaningful results in important data analysis activities in which they were involved. Using the pharmaceutical industry as an example, several statisticians may have played roles in the development or approval processes of an important therapy. But does that in itself necessarily demonstrate a nominee's contribution was vital? Perhaps the data were sufficiently strong to largely speak for themselves. But if it can be described how a statistician directly influenced the use of a novel or nonstandard study design or cutting-edge analysis method that played a key role in the development of that treatment, the case will be much stronger.

Section IX (Supporting Statements) of the nomination form includes seven subcategories we can summarize as: 1) applications / consultation: results; 2) applications / consultation: methods; 3) administration; 4) teaching; 5) research; 6) ASA service; and 7) other (including non-ASA professional service). Few, if any, candidates can excel in all areas, and most nominees' cases will be carried on the strength of their strongest few areas. Thus, it is not required that all sub-sections of Section IX be filled out.

Among the subsections, the importance of the "service" category cannot be overlooked. While this category rarely carries a successful candidacy entirely, the committee will generally be looking for evidence of meaningful service. This is consistent with the charge the committee receives from the ASA Board of Directors and ASA constitution. Broadly, we might think of "service" as meaningful activity benefiting the statistical community, with strong emphasis on ASA-related activities, that goes beyond one's employment responsibilities. This can take many forms, including: ASA chapter or section office or meaningful chapter/section activity; membership on ASA committees; journal editorial positions (by the way, refereeing several journal articles will generally *not* be viewed as meaningful service); leadership role in the organization of important conferences; impactful contributions to important working groups; and impactful outreach activities of statistics to other fields or communities.

Supporting letters are an important part of the package. Certainly, it's helpful to obtain letters from prominent individuals in our field. But if letters only dryly repeat details provided elsewhere in the package, they will usually add little strength. The most effective letters provide some "backstory," or deeper behind-the-scenes perspective from someone in position to know, about how or why a nominee's achievements were impactful—details that might not fully come across elsewhere in the nomination package where space is limited.

For example, a recognized technical subject matter expert might describe why a nominee's research papers in their area were a particular breakthrough (because the nominee came up with key insights that advanced practice or research); the leader of a working group might write convincingly about how a nominee had a driving role in the group's accomplishments, came up with key ideas the group put forth, or was its designated spokesperson at public forums; a chapter president might describe another officer's specific impactful contributions that enhanced chapter activities; or a journal editor-in-chief might describe an associate editor's unique editorial contributions.

Details are always important. As mentioned previously, most packages contain broad statements with superlative adjectives, but the nominations that support these with concrete examples and illustrations can make the package much more compelling to the committee.

Ilya Lipkovich
Eli Lilly, ASA Fellow 2018

Becoming an ASA Fellow is one of the most significant and rewarding steps in my career as a statistician. Whether successful or not, however, the nomination process is important in itself for setting a stage where one can reflect on his or her contributions to the profession.

The nomination form defines multiple categories, and the nomination process is like putting together a promotional dossier. It motivates the nominee to think about where and how he or she made a difference and how its impact could be measured.

Most importantly, someone—preferably an ASA Fellow—should recognize the impact and be willing to write a supporting letter. This means more than recognition of academic achievements (research being just one of the categories by which a candidate is evaluated). A letter of recommendation from another ASA Fellow means the applicant established credibility that cannot be obtained by anything but years of dedicated work serving the community.

The many ways we influence, help, motivate, educate, and develop other people in the statistical community may often go unnoticed by us, but not by those whom we help and serve. We may give someone only a 10-minute consultation on what methods to use, while we form long-term professional

relationships with others. People whose names I may now even struggle to recall have phoned or emailed me to say "thank you" for giving them advice or help with writing or debugging a piece of code, deriving a formula, or explaining how to deal with a difficult statistical problem.

In the nomination process, of course, you had better remember such people, since they might be the most willing to support your nomination. Frankly, the most delightful part for me was not that I was elected an ASA Fellow, but that I managed to earn credibility with very fine statisticians who supported my nomination.

BILL PIKOUNIS

Johnson & Johnson, ASA Fellow 2014

My path from a nominee to the acceptance into the 2014 class of ASA Fellows covered several years. I was first approached by a longtime colleague and pleasantly surprised and honored to be even considered a potential nominee. But my instinct told me I was not ready yet, particularly with respect to service to *both* the statistics profession *and* the ASA. It has been mentioned how critical it is to hold, act, and accomplish as an officer or representative in an ASA section or chapter, for example. Tangible results matter.

I returned to the thought a couple years later and decided to take full ownership. I approached multiple longtime colleagues to gauge their perspectives. I felt one individual colleague was a clear choice to ask to be my nominator, and that person graciously agreed. I knew they would only do it if they felt my application would be worthy and stand a good chance of being successful. For the remaining colleagues, I asked each of them to consider writing a letter of support. I tried to have the letters sourced from different dimensions of my career, which has only been in positions at pharmaceutical companies: health care industry; academic; service; and regulatory interactions. One interesting footnote was that I did not rely on any current colleagues at my company for a letter of support. I asked a client manufacturing R&D area vice president who I had worked with on successful filings for new medicines. Like my nominator, I knew this person would be rational and represent my value accurately and persuasively.

I felt it was important to clear the path for my nominator and other colleagues in putting together the package. I spent one fully focused day in early January 2014 preparing a draft form I could fill in as much as possible before sending it to my nominator. I also made sure by that time to have connected my nominator to those colleagues who agreed to write letters of support. With the deadline of March 1 that year for application, I was then able to follow the lead of my nominator, who was conscientious to follow up with colleagues who had agreed to write letters, and prepare and submit the application well ahead of the deadline. There were just a couple check-ins between my nominator and me to clarify questions and keep progressing.

More recently, I have experienced the role of being a nominator and a support letter writer. While I am forever grateful that my own nomination was accepted the first time, I have now seen the other side, where nominations were not accepted. I have felt disappointed for my nominees as if it were my own nomination. There is no individual feedback provided by the ASA Committee on Fellows to nominators or nominees on why the application was not accepted.

Time remains on our side, though, as the fellows review cycle is well established and executed on an annual basis. Hope remains if you think the application was worthy and based on reasonable, objective evidence in the first place.

In my own case as a nominator, I will continue to connect with colleagues who can advise based on their experiences, including ones who agreed to provide letters of support on the first try. They are glad to help again. Concurrently, the nominee must continue to take ownership, improve upon their qualifications, and seek advice from their networks to build a sufficiently strong application for next time.

STEPHEN RUBERG

Analytix Thinking, ASA Fellow 1994, ASA Committee on Fellows 2012–2014

ASA fellowship is an honor for our profession and a source of pride for recipients. As one who has successfully nominated multiple candidates, I can also say there is a sense of satisfaction that comes with a successful nomination, as well. As with many activities in life, success can depend on an intentional approach and a strategic plan. As a nominator, I have a playbook, a strategy, a plan, or a template—whichever you may want to call it. It goes like this:

Identify a good and deserving candidate. It helps to identify people you know who have been elected ASA Fellow and understand what they have done to achieve this honor. Then, you and your candidate can assess whether they measure up. I have discussed candidacy with some individuals and pointed out they may not be ready for nomination and also identified those areas where they could bolster their accomplishments to become a worthy candidate.

Discuss with your candidate their key strengths and contributions. I usually like to focus on 3–4 key areas in which they have made strong contributions to the profession and the ASA. These could be research/publications, service on ASA committees, organizing professional meetings, teaching/mentoring statisticians, leadership within their employer organization, etc.

Identify other ASA Fellows who would be willing to write a letter of support for your candidate. I strongly recommend they all be ASA Fellows. At times, I have even solicited a few additional letters and chose the best letters to put into the nomination.

An important aspect of the supporting letters is they be complementary in the material they cover. Each letter writer should be aligned with 1–2 of the key strengths/areas you have selected. Then, as a nominator, I write a letter of "instructions" to the letter writers. The basic instructions I give for structuring their letter are the following:

- First paragraph: Describe how you know the candidate and for how long. This establishes credibility that the writer can speak with authority about the candidate's qualifications.
- Second/Third paragraph: Use a full paragraph to cover each assigned area/strength. Those paragraphs should be explicit with contributions; contain concrete examples; and ultimately end with the value, impact, or influence of the candidate's work.
- Final paragraph: This is where the letter writer is free to add other personal comments. This might include other notable qualities of the candidate (e.g., they are open-minded, curious, easy to work with, a good leader, etc.).
- Closing statement: The writer should make a definitive statement or two affirming the candidate is deserving of ASA Fellow.

The supporting statements in Section IX are the longest and most detailed part of the nomination form and allow considerable room for elaborating on the nominee's contributions. It is not required to fill in each of the subsections, but a deserving candidate should have something notable to discuss in many of the subsections.

The key elements here are to discuss *what* is novel, above-and-beyond the call of their job/role, or demonstrates technical or administrative leadership and *how* those contributions were valuable, impactful, or influential to their employer, the profession, or society. As with the letters, it is more important to describe concrete examples to support your claims of the candidate's contributions. One good example described in more detail that highlights the candidate's contributions to an endeavor is more important than many short, vague sentences.

If a candidate has many examples in one section of the nomination, a second example may be highlighted, but there are some size constraints on the supporting statements. A general statement at the end of the section can state, for example, "There are many other examples similar to the above where the candidate provided excellent leadership for the development and approval of drug x, drug y, and drug z, which span multiple therapeutic areas. This shows the diversity and breadth of knowledge and influence of the candidate."

This is also where statements from the additional letters (if you have any) can be incorporated. I have often used quotes from such letters in the supporting statements while pointing out who made those statements. Furthermore, there are times when I have solicited email notes from others who know the candidate to get some additional positive statements and supporting material. This might be a chapter president, a co-author of a paper, a regulator, or another academic. This helps convey to the ASA Committee on Fellows that there is broad support for the candidate.

Finally, I suggest using meaningful adjectives and adverbs in the write-up without going "over the top." For example, use "*excellent* leadership," or "*considerable* organizational skills" or "*innovative* insights," etc. Again, a few well-placed qualifiers convey the candidate's contributions and personal qualities.

I hope this guideline helps others organize a thoughtful, cohesive nomination package for the candidate. Allowing the ASA Committee on Fellows to see influential and impactful contributions from several directions and in several different dimensions of our profession will give the nominee the best chance of success in the committee deliberations.

LANJU ZHANG
AbbVie, ASA Fellow 2019

ASA fellowship is a significant career milestone and therefore a great honor for any statistician. However, for most nominees, this honor will not come like a Nobel Prize award, delivered by a surprise phone call without one's own involvement. Instead, it is more like a campaign for a public office, and the nominee needs to take the lead in planning, organizing the nomination team, preparing the package, and managing the whole process with the nominator. I just finished this process and luckily was awarded this honor. In the following, I would like to share some of my learnings with future candidates.

Identify key contributions and draft a citation. It is important to remember a candidate may not and does not have to excel in all the features described. As an industry statistician, I didn't include any information about teaching or mentoring in my package. The candidate should select features in which he or she has made significant contributions and, since there is a space limit, this strategy can leave enough space to spotlight the candidate's strengths.

Second, the citation will help determine how the candidate should prepare the package, select the letter writers, and essentially define the nomination. My citation included contributions to three areas

(nonclinical statistics, adaptive designs, and professional service) and the package focused on how to substantiate the citation with examples.

Find highly influential references. Check all your professional connections and acquaintances to identify those who know you best and are willing to write a strong supporting letter. The letters should corroborate what is included in the package from a subject-matter expert's perspective. In addition, it is extremely helpful if the letters can complement the package, instead of repeating the information presented in the package. If possible, choose references from both academia and industry. My nomination package was supported by three industry experts and an academic expert.

Start early and take ownership. It is critical to start the nomination process early. Some potential references could have already committed to other candidates. The best timing may be around late July or early August. It is important to take ownership. It is difficult to overstate the importance of the nominator who provides strategic oversight of the nomination, but the candidate should not expect to just hand over the CV to the nominator and sit back. The candidate needs to work closely with the nominator to prepare the best package.

I want to reiterate that only a few candidates are elected each year. The outcome doesn't only depend on the strength of the candidate's package but also on all the other candidates' packages. So be prepared for both possible outcomes. If you are not elected, this is a good opportunity to find out more about your strengths and weaknesses and then develop a strategy to overcome the weaknesses and win the next time.

KELLY ZOU
Pfizer Inc., ASA Fellow 2012

As a working statistician in the health care industry, the experience of the ASA Fellow nomination has made me realize the importance of several elements, including (1) impact, (2) influence, and (3) leadership.

To elaborate on these points, it is important to demonstrate the *impact* for drug development and quantitative analytics. This challenge or hurdle, however, for those working in industry is that the bulk of the work tends to be confidential and proprietary. One way is to consider becoming a Professional Accredited Statistician or, even earlier, a Graduate Accredited Statistician through the ASA. The accreditation process "testifies that there is a body of knowledge known as statistics acquired through formal education, work experience, and ongoing professional development activities. Accreditation provides a measure of assurance to employers, contractors, and collaborators of statisticians and a mark of accomplishment to society at large." I went through this accreditation process well before I was nominated for ASA Fellow.

The second element is *influence*, more broadly through peer-reviewed publications, conference presentations and posters, and authorship in internal and external newsletters such as *Amstat News*. Fortunately, I had a career transition from academia to industry, which provided me a good foundation in research methodology and informed decision-making. By keeping book-smart and application-savvy, the nominee can possess skillsets for developing manuscripts and getting articles published through the rigor of the peer-review system in both statistical and subject-matter journals. In addition, sharing knowledge through the Biopharmaceutical Section's various venues—such as podcasts, webinars, and newsletters—is both beneficial for improved patient care and satisfying as an applied statistician and data scientist.

Last, it is also important to actively participate through *leadership* in the statistical or data science community. This is particularly important for us women who have faced the glass ceiling. In other words, there are opportunities to raise one's hand and roll up the sleeves to volunteer as an ASA officer through a section, committee, or local chapter; a conference organizing committee member; an invited session organizer; or a session chair. This may take long hours and hard work during the nominee's spare time, but the leadership skills can be extremely valuable and transferrable to future career-related roles. For example, I actively served on ASA committees and participated in section work through several officer roles.

Several tips I gathered are as follows:

- Explore citation counts and impact factors through Google Scholar (e.g., one of my coauthored articles has been cited nearly 1,500 times).
- Work with the nominators to provide information useful for the nomination narratives and keep résumés well-crafted and up to date.
- Be hopeful but do keep a realistic and positive attitude since there can be a large pool of highly qualified nominees.

My advice to those who would like to be nominated is the following:

- Start early in your career to be an excellent statistician and engaging leader.
- Collaborate with stakeholders and ASA community members as a volunteer throughout the years.
- Be a mentee and a mentor for self-awareness and for paying it forward, respectively. ASA fellowship is not only recognition and an honor, but also a badge for one to be a role model for a generation of statisticians. ■

Virtual Workshops on Blended Data a Success

Practicum Including Student Showcase Planned for Fall

Elizabeth Mannshardt and Jenny Thompson

The Government Statistics Section (GSS) and Social Statistics Section (SSS) hosted a series of virtual workshops as part of the ASA's professional development program. This free series targeted audiences who may not be able to travel to conferences but are interested in continuing education opportunities.

Each virtual workshop consisted of a one-hour presentation followed by virtual participation in a group discussion and activities using data and code provided by the presenter. The six sessions had between 75 and 120 attendees each.

Due to the success of the workshops, GSS and SSS will continue the series in the fall of 2020 via a virtual workshop practicum including a student showcase, again hosted as part of the ASA's professional development program. Practicum sessions will focus on user applications—both completed and in progress—from methodologists ranging from current students to seasoned professionals. Students and professionals are invited to submit their projects putting blended data techniques into practice for the opportunity to present in the upcoming virtual workshop practicum**.** Details can be found at *https://bit.ly/3fRCgdH*.

The original virtual workshop series exposed participants to the advantages of using combined data sources for developing inferential models and measures, while remaining cognizant of the challenges associated with combining large data sets and the potential pitfalls of analyses of blended data, including privacy considerations. Topics covered included the following:

- Overview of Blended Data (Frauke Kreuter, University of Maryland)
- Intro to Big Data and ML for Survey Researchers (Trent Buskirk, Bowling Green State University)
- How Rare Is Rare? The Importance of Validation (Aric LaBarr, North Carolina State University)
- Intro to Python for Data Science (Hunter Glanz, California Polytechnic State University)
- Interpretability vs. Explainability in ML for High Stakes Decisions (Cynthia Rudin, Duke University)

Trent Buskirk

Hunter Glanz

Matthew Graham

Frauke Kreuter

Aric LaBarr

Cynthia Rudin

- Differential Privacy (Matthew Graham, US Census Bureau)

All webinar materials and videos are available on the GSS professional development and mentoring website at *https://bit.ly/2Zo8kjF*.

After the final workshop in the series, participants were asked to complete a survey. Although the response pool was small (32 participants), feedback was positive and participants provided useful suggestions for topics and logistics. Overall, the workshop earned a 4.4/5 rating.

The evaluation provided evidence of the relevance of the suite of selected topics, with the majority of respondents agreeing "the concepts presented will inform my practice" (25/32) and "the tools highlighted will be useful in my practice" (25/32).

The benefits of virtual presentations to a broad audience were underscored, with the workshop's most valuable aspects being "community engagement" and "being able to learn without travel." One participant commented, "Not being based in North America, it gave me the opportunity to hear from experts I would not get to hear."

Suggestions for going forward included an open discussion board among attendees to be used during and after the webinar, additional readings and examples for further study and practice, and deeper-dive, multi-part tutorials on certain topics. Several participants also expressed interest in more sessions on various topics. ■

chapternews

Photo courtesy of Anamaria Kazanis

From left: ASA judges Bern DeBacker, Ruth Cassidy (District 3 vice chair), Heidi Reichert, Karry Roberts, Anamaria Kazanis (Council of Chapters representative to the ASA Board of Directors), and Mary Ann Ritter

ASA Members Promote Statistics at Michigan Science and Engineering Fair

Karry Roberts, ASA Detroit Chapter Secretary

This year's Michigan Science and Engineering Fair (MSEF) statistics judging occurred just as the coronavirus began to unfold in Michigan. On March 11, several chapter members judged MSEF science projects under diligent cautions to promote statistics and recognize those students who exhibited effective statistical analyses in their science projects with professional awards.

The event took place at the TCF Center in Detroit immediately following the Science and Engineering Fair of Metro Detroit (SEFMD). In total, 87 projects qualified for the MSEF state-level competition, including projects from other areas of the state.

Due to the coronavirus outbreak, students began the event with a chemistry lab in which they made their own hand sanitizer. The night before the judging, Michigan confirmed its first two cases of coronavirus and the governor issued a state of emergency. During the MSEF, Michigan's public universities announced they were moving to online classes. The next day, the governor announced K–12 schools were closing starting March 16.

The Grand Award winners were congratulated, but then told they would not likely get to attend the International Science & Engineering Fair (ISEF). Especially because of the current constraints, chapter members want to congratulate the students for their hard work and the teachers who continue to educate and motivate them.

There were several exceptional statistical applications and impressive graphical data representations throughout the MSEF. ASA award winners include the following:

$200 Award of Excellence

- Asim Handy, "MLB Ballparks Altitude Effect on Number of Home Runs Hit and Park Factor," Detroit Country Day Upper School, Beverly Hills

$50 Award of Merit

- Olivia Hagan and Catherine August, "Comparing Ferromagnetism and a Hydrophobic Net for Oil Spill Remediation," Macomb Mathematics Science Technology Center, Warren
- Saaim Khan, "Identification of Novel Drug-Like Compounds for Solute Carrier Anion Transport," Cranbrook Kingswood Upper School, Bloomfield Hills

- Trinity Lee, "Light Chromatography Mass Spectrometry to Diagnose Respiratory Viruses," University Liggett School, Grosse Pointe Woods
- Devarshi Mukherji, "Early Prediction of Alzheimer's Progression Using Recurrent Neural Networks," Notre Dame Preparatory School, Pontiac
- Lili Pakko, "Investigation of Soil Liquefaction by Pendulum Impact Testing," Dearborn Center for Math, Science, and Technology, Dearborn Heights
- Andrew Yang, "Combinatorial Analysis of Sequential Win-Probabilities in Tic-Tac-Toe," Washtenaw International High School, Ypsilanti

Certificates of Recognition

- Veer Agarwal, Detroit Country Day Upper School, Beverly Hills
- Jakar Dhillon, Bloomfield Hills High School, Bloomfield Hills
- Annie He and Anna Zhao, Troy High School, Troy
- Corinne Hinson and Natalie Hinz, Macomb Mathematics Science Technology Center, Warren
- Catherine Jiang, Detroit Country Day Upper School, Beverly Hills
- Sujit Lakshmikanth, Novi High School, Novi
- Bhanu Teja Mamillapalli, Saginaw Arts and Sciences Academy, Saginaw
- Senne Michielssen, Washtenaw International High School, Ypsilanti
- Daniel Prakah Asante, Cranbrook Kingswood Upper School, Bloomfield Hills
- Hariti Shah, Detroit Country Day Upper School, Beverly Hills
- Nicole Spizizen, Ella Thompson, and Safia Siddiqui, Detroit Country Day Upper School, Beverly Hills
- Himani Yarlagadda, Detroit Country Day Upper School, Beverly Hills
- Amanda Xu, Huron High School, Ann Arbor
- Jessica Zhang, Kalamazoo Area Mathematics and Science Center, Kalamazoo

Two of the ASA award winners were also among the nine Grand Award winners qualifying for the ISEF, and an additional five were among the first- through fourth-place MSEF category awards.

Statistics judging at a science fair has been a traditional joint effort of ASA Michigan chapters for many years and a great opportunity to promote the practice and profession of statistics. This year, the judging team consisted of Anamaria Kazanis, Council of Chapters representative to the ASA Board of Directors; Ruth Cassidy, ASA District 3 vice chair; Karry Roberts and Bern DeBacker from the Detroit Chapter; and Mary Ann Ritter and Heidi Reichert from the Ann Arbor Chapter. They were able to give several monetary awards sponsored by the Detroit and Ann Arbor chapters. Additionally, they gave many recognition certificates with copies of *Significance* magazine and ASA stickers. ■

sectionnews

Survey Research Methods

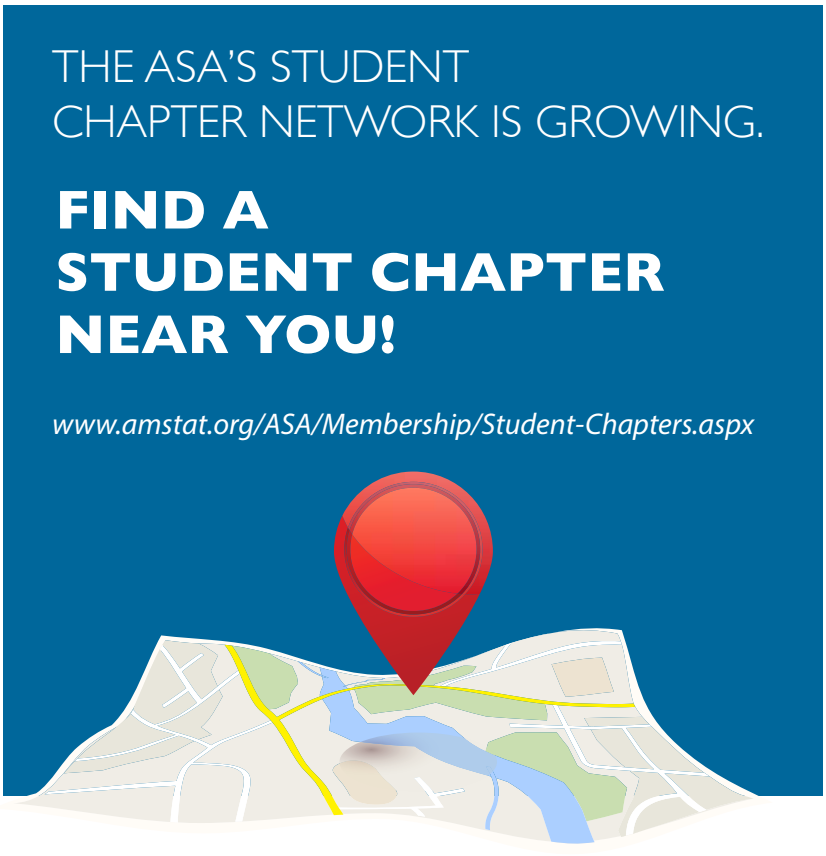
Members of the Survey Research Methods Section congratulate winners of the 2020 Student Paper Awards and 2020 Student Travel Awards.

2020 JSM GSS/SRMS/SSS Student Paper Award Winners

- **Serge Aleshin-Guendel** (University of Washington), "Multifile Record Linkage and Duplicate Detection Via a Structured Prior for Partitions"
- **Sepideh Mosaferi** (Iowa State University), "Transformed Fay-Herriot Model with Measurement Error in Covariates"
- **Ali Rafei** (University of Michigan), "Robust Bayesian Nonparametric Inference for Non-Probability Samples: An Attempt to Combine Sensor-Based Records with Traditional Survey Data"
- **Daniel Schwartz** (The University of Chicago), "An Overlooked Bias-Variance Tradeoff for Average Treatment Effects in Multisite Randomized Trials"
- **Adam Walder** (Penn State University), "Privacy for Spatial Point Process Data"

2020 JSM SRMS Student Travel Award Winners

- **Debangan Dey** (The Johns Hopkins University)
- **Hao Sun** (Iowa State University)
- **Shalima Zalsha** (Southern Methodist University) ■



Social Statistics

Editor's Note: Due to COVID-19, dates and formats for meetings, conferences, and workshops may change. Please check event websites often for updates.

As differential privacy is applied to various 2020 Census data products to help protect the privacy of individuals, where does formal privacy go?

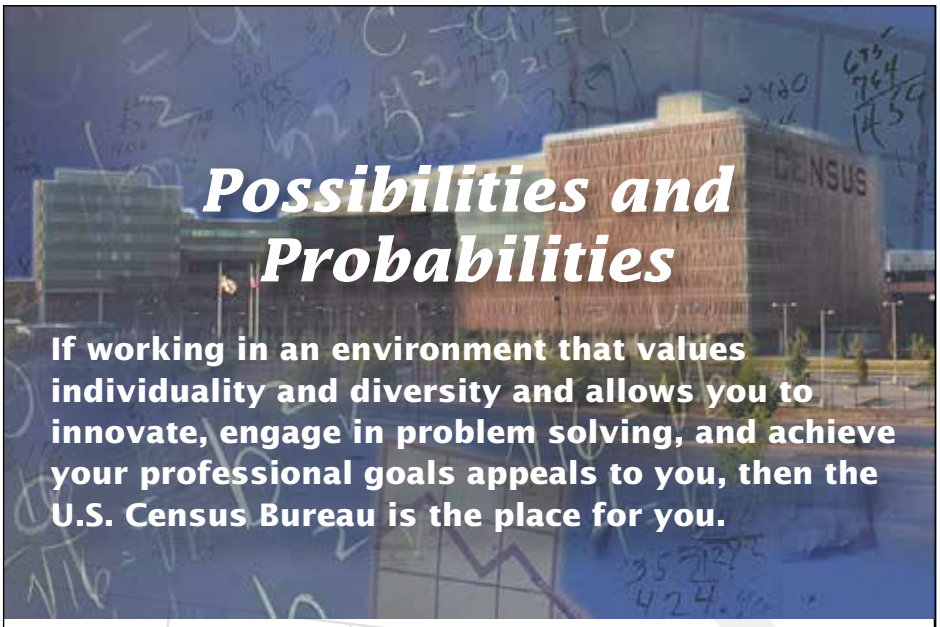
The Joint Statistical Meetings invited session "Private Data for the Public Good: Formal Privacy in Survey Organizations" and associated roundtable discussion are organized to help answer that question.

Included will be discussions about the current state of formal privacy methods in relation to survey organizations and the Census Bureau's formal privacy research agenda for complex survey statistics:

- Frauke Kreuter, Will Differential Privacy Affect Social Science Research Workflow?
- Quentin Brummet and Brandon Sepulvado, The Effect on Data Utility of Using Differential Privacy Techniques to Produce Estimates of the Cost of Child Care
- Aleksandra Slavkovic, How to Achieve Optimal Statistical Inference Under Formal Privacy: A General Framework and Specific Examples
- John Abowd, The Formal Privacy Research Agenda for Complex Survey Statistics

The roundtable discussion, led by Slavkovic, is designed to continue the discussions with the session's speakers.

Other committee activities, including slides from past webinars, can be seen at *https://bit.ly/2ACDqJU*. ■



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Caleb King
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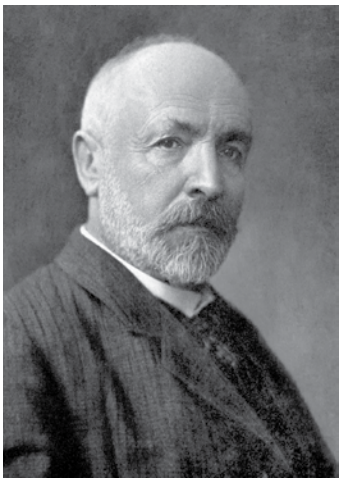
Torn between **William Gosset** and **Leonhard Euler.** Both brilliant yet humble men. At least Gosset's paper count is more attainable...

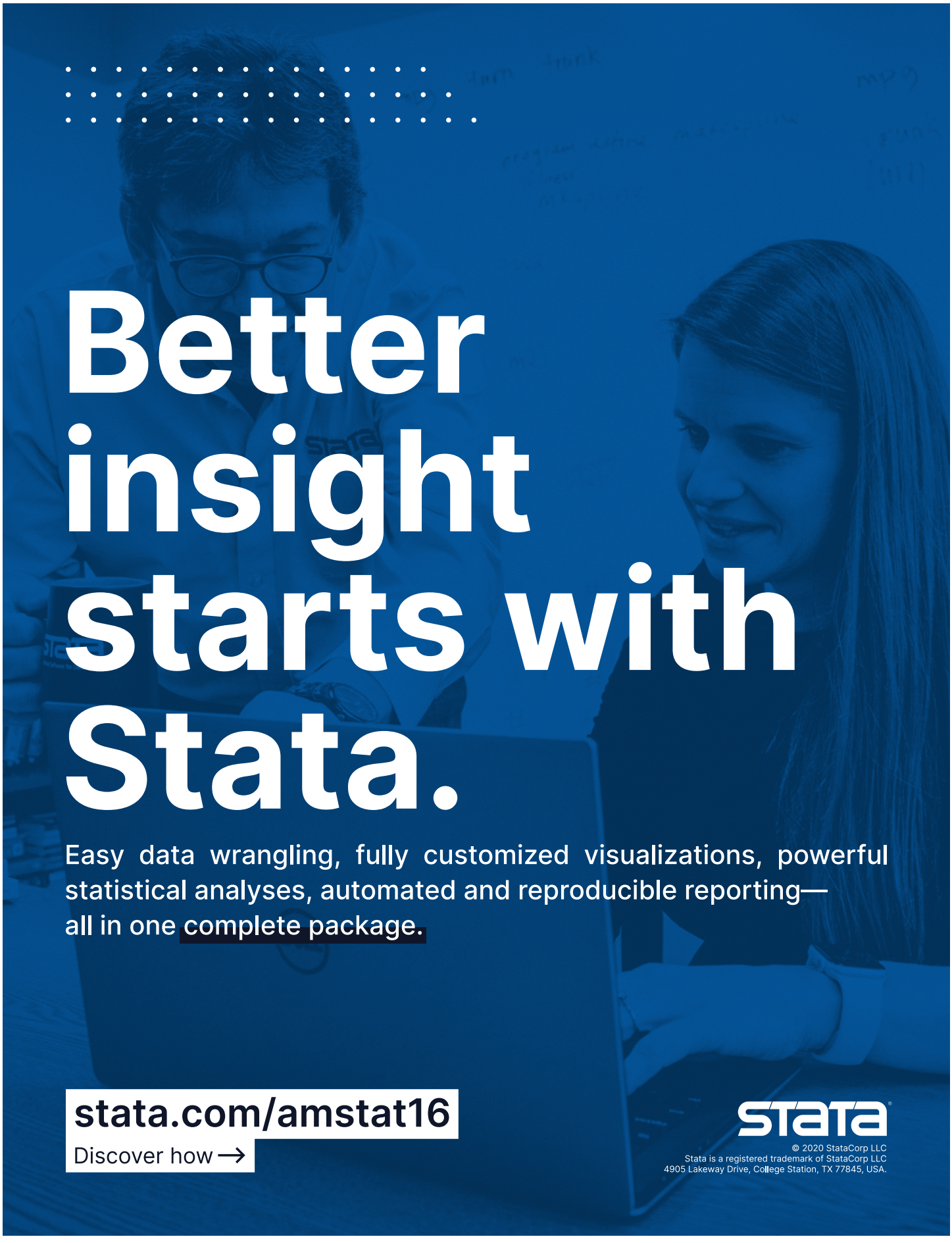
Gosset Euler

Anthony Cutler
@anthonyncutler
Walter Shewhart
Independent thinker but as editor of the Wiley Series was happy to publish alternative views.

Fisher Would Have Discovered It All Anyway • @AnywayFisher
Gosset: statistically ingenious while remaining humble, well versed in both theory and practice, great taste in beer.



Kyle Hinton
Georg Cantor, for his work on transinfinite numbers and his ability to use mathematics to explain the existence of a Creator.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