June 2021 • Issue #528

AMSTATNEWS

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

ASA Celebrates Pride Month

While Urging Justice, Equity, Diversity, Inclusion

ALSO:

JSM 2021 to Be Held Virtually

Board Approves Revised Public Statement Process

Registration Is Open!

Key Dates for Participants

July 1
Draft Manuscript Deadline

Key Dates for Attendees

July 15
Regular Registration Deadline

August 8–12, 2021
VIRTUAL CONFERENCE

ww2.amstat.org/meetings/jsm/2021

AMSTATNEWS

JUNE 2021 • ISSUE #528

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

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

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

features

columns

A Sense of Humor, Giving Space, Trying to Listen: Advice from 73 Years of Marriage

Herman and Judith Chernoff met at Brown University in 1945 when they were both graduate students in applied mathematics. They married in September 1947. For Judith and Herman, the secret to their 73 years of marriage is simple: "I give him space, and he gives me space," said Judith. "That's how we got along." Herman is a longtime member of the ASA. Read more about this amazing couple in *The Harvard Gazette* at *bit.ly/3brl0Ks.*

Rhyme Time

To celebrate last month's National Limerick Day, Larry Lesser of The University of Texas at El Paso wrote these original statistical limericks:

Lottery Strategy

The lottery numbers you choose
Won't change your chance to lose,
But if all 6 match
You'll get much more cash
If you picked what's picked by few!

Simpson's Paradox

When categories combine,
Sometimes you will find
What had trended
Now upended:
New correlation sign!

Significance

When doing hypothesis tests,
No threshold value is best.
It's very contrived
To use point-oh-five
To say if you should be impressed!

departments

2021 JSM
Statistics, Data, and the Stories They Tell
Virtual Conference
August 8–12, 2021

member news

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Flipping the Research Framework

Photo/Errich Petersen

Rob Santos

Greetings, fellow statisticians. First, I would like to acknowledge that, in April, I was nominated by President Joe Biden to be the next director of the US Census Bureau. I have been deeply moved by and am appreciative for the messages of support I have received. I have not yet been scheduled for a Senate committee hearing. If confirmed, I will serve my country proudly, uphold our nation's Constitution, and do all I can to further the scientific integrity of the Census Bureau and federal statistical system more generally. I am a huge fan of both. In fact, as a young professional statistician, I often dreamed of working at the US Census Bureau—an institution I believe stands at the pinnacle of scientific excellence. I am honored and humbled that I might get a chance to serve in a position of leadership.

If/when I am confirmed, I will have the privilege of serving you, the statistical community, the public, and our nation in a different capacity than I do now. But until then, I will continue to proudly serve as your 2021 ASA president. So, let's turn to the president's corner.

For this issue, I'd like to illustrate how one might flip a research framework to create opportunity through a new perspective. I sometimes do this when working on policy issues as a reality check to the underlying premises of the issue at hand. For context, consider this excerpt from my blog last month:

> We as statisticians are in an awesome position to help researchers think through these issues and understand the limitations and strengths of the statistical inferences that flow from rigorous research studies.

About two decades ago, I was asked to review a National Academies (NAS) report, titled *Eliminating Health Disparities: Measurement and Data Needs*. I eagerly anticipated the recommendations for future directions in research and data collection. And the panel report revealed some excellent recommendations. However, I believe the panel missed an opportunity for which I provided commentary: the need to collect data on health care providers and institutions in addition to clients as part of a comprehensive, systemic health disparity assessment.

My thinking was that health disparities are affected by both access to care and the quality of care delivered. And with regard to the latter, the quality of care is a direct outcome of a *two-way interaction* between health care workers/institutions and their clients. Moreover, health care institutions and their staff are naturally influenced by societal constructs such as how racial and ethnic minorities are served in the health system (e.g., with or without health insurance, steering to specific facilities). This even includes how vulnerable populations are portrayed in everyday life.

The NAS report recommendations focused exclusively on collecting better, more accurate, and standardized data on clients—the recipients of health care. Indeed, there was much that could be improved in this regard. In my review, I "flipped the research framework" to consider how health providers and their institutions (and broader society) have a role in health disparities. I thought to myself, "What data could be collected on the health care providers as well as their institutions that could inform health disparities and guide improvements in health care?"

My thinking was influenced by a health care research study in the 1990s. As I recall, it focused on health care providers and concluded a common sense finding: In situations where the health care providers learned and used some Spanish to interact with their Spanish-speaking patients, both client satisfaction and health care outcomes improved compared to care provided by monolingual English-speaking providers.

While most might think, "of course," and move on, I saw something different. Given the growing demographic diversity of the US population and the blossoming of our multicultural nation, it seemed important to capture data on *how society is acculturating to its wonderfully diverse population*. Acculturation works both ways in an evolving society, yet the research world focuses on one side of the coin all too often, so to speak. Flipping the research framework to incorporate both the provider and patient could shed light on how culturally relevant interactions between patients and providers could improve health and reduce disparities.

Many times, statistical evaluations focus on a vulnerable group undergoing some program to make them behave differently without really understanding the root causes of the underlying behaviors. With critical thinking and discussion between statisticians and substantive researchers at the design stage, perhaps more inclusive research frameworks can be adopted, leading to enhanced insights and better outcomes.

Alas, my alternative perspective did not warrant a revision to the report, probably because it was considered outside the scope of the charge. I understood and was disappointed, but I still consider it an opportunity loss.

Fast forward to 2021, when I recently gave a keynote at Drexel University's inaugural Population Health Symposium. The conference theme was the intersection of racism and health. Here, too, I chose to flip the research framework in my speech. Health programs aimed at Blacks, Indigenous people, and people of color (BIPOC) are typically couched in a framework of altering BIPOC client behaviors (e.g., alter dietary intake, strict adherence to prescription regimens). Yet the role of the providers and society more generally is not considered part of an integrated, interactive, two-player system.

Client health outcomes are influenced by the interaction between two sets of players: (1) the persons seeking health care and (2) health providers and their institutions. And let's not forget greater society, essentially an extension of (2).

Health research to identify and reduce disparities—and structural racism—would be more effective by addressing both players, not just those who are oppressed. You see, everyone is a victim in a structurally racist society. That is why our nation's reckoning with systemic/institutional racism—including the ongoing justice, equity, diversity, and inclusion (JEDI) efforts of the ASA—is so critical. We all have a role to play and work to do to improve things. Yet our policy research all too often bifurcates programs and research studies into some exclusively focused on providers and others focused only on clients. Moreover, we should recognize and address the role of greater society in reinforcing structural/institutional racism; it is typically ignored altogether.

Yes, statisticians are in an awesome position to offer critical thinking to statistical studies in all fields of research. We can flip the research framework by conversing with the research team and asking questions about the nature of the phenomena being studied, the populations involved and their interactions, as well as the appropriate measures and rationale behind expected outcomes. We can start with a systemic, encompassing framework that recognizes and "treats" all the players involved in an interactive system.

Simply having those conversations with researchers could lead to better framing of questions and ultimately more effective research designs, measures, and insightful inferences. Give it a try sometime!

Highlights of the April 14–16, 2021, ASA Board of Directors Meeting

ASA President Rob Santos called to order the first 2021 meeting of the ASA Board on Wednesday, April 14. The board met via videoconference over a three-day period. The highlights of the board meeting follow.

Actions

The board …

- Updated the ASA's Activities Conduct Policy and renamed the policy as the ASA Code of Conduct.
- Updated the ASA's accreditation guidelines to incorporate the Code of Conduct.
- Made editorial appointments for eight ASA journals based on recommendations from search committees and the Committee on Publications. Terms will begin in 2022, but editorial transitions will begin soon.
- Accepted the results of the 2020 audit, another clean audit for ASA. (See Page 8 for details.)
- Changed investment advisers, agreeing to transfer management of the ASA's assets to Vanguard.
- Set journal prices for 2022.
- Decided the format of JSM 2021 needed to be virtual and set registration prices.
- Simplified the membership category structure to improve efficiency and reduce costs.
- Recommended a change to the ASA bylaws to make the treasurer an elected position on the board. (See Page 7 for details.)
- Revised the process for determining when to take an official position on a policy-related issue based on recommendations from the ASA Committee on Scientific and Public Affairs.
- Endorsed the 7th edition of *Principles and Practices for a Federal Statistical Agency*, published by the Committee on National Statistics.

Reports and Discussions

- Associate Executive Director and Director of Operations Steve Porzio summarized the end-of-year financials for 2020. He noted ongoing challenges with variations in revenue sources and indicated that costs will continue to be tightly controlled.
- ASA Treasurer Ruixiao Lu reported on the ASA's investments. She reviewed the allocation of the ASA's nearly $21 million among various types of investments as of March 31. Lu also updated the board on the activities of the Investments Committee and Audit Committee.
- Adrian Coles and David Marker, co-chairs of the ASA's Antiracism Task Force, updated the board on the progress of the task force. They reminded the board of the task force membership, the goals of the task force, the timeline for the task force, and the way the task force has organized itself to accomplish its tasks. They shared reports from each of the three subcommittees of the task force, emphasizing that the process is well underway and recommendations would be emerging later in the process.
- ASA President Rob Santos, President-elect Kathy Ensor, and Past President Wendy Martinez updated the board on the strategic initiatives they are planning or that are in progress. Information about them will appear in *Amstat News*.
- Council of Chapters Representative Anamaria Kazanis reviewed the activities of the council since November. The council discussed challenges faced by the chapters and is considering new approaches to addressing them. They are focusing on improving communication and leadership. Addressing chapter needs as related to current and future JSMs is also important.

2021 Board of Directors

Rob Santos, President

Kathy Ensor, President-Elect

Wendy Martinez, Past President

Richard De Veaux, Third-Year Vice President

Dionne Price, Second-Year Vice President

Matilde Sanchez-Kam, First-Year Vice President

Anamaria Kazanis, Third-Year Council of Chapters Representative

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

Alexandra Hanlon, First-Year Council of Chapters Representative

Mark Glickman, Third-Year Council of Sections Representative

Rebecca Hubbard, Second-Year Council of Sections Representative

Kate Calder, First-Year Council of Sections Representative

Alexandra Schmidt, International Representative

Bin Nan, Publications Representative

Ruixiao Lu, Treasurer

Ron Wasserstein, Executive Director and Board Secretary

- Council of Sections Representative Mark Glickman reviewed the activities of the council since November. The council met once and Glickman and Council of Sections Governing Board (COSGB) Chair Sarah Kalicin met with the members of the Committee on Membership Retention and Recruitment. The COSGB is continuing to improve several ongoing programs and is considering a survey regarding the value of section and chapter membership.
- ASA Vice President Matilde Sanchez-Kam, chair of the Membership Council, and Mark Otto, vice chair, reported on behalf of the council. For each of the committees in this council, they reported their major accomplishments in 2020, compared them to the previously reported planned activities, and looked ahead to activities for 2021. Issues for the board or staff were noted and will be followed up on.
- ASA Executive Director Ron Wasserstein shared a draft paper considering changes to the way the ASA provides value and access to members. The paper defined what a membership model is, described the current ASA membership situation, and proposed new approaches. He asked for board feedback to help determine next steps. Armed with many suggestions, Wasserstein will continue to refine the proposal.
- Wasserstein updated the board on activities related to the decision made at the last meeting to join CSAB, an entity involved in accrediting undergraduate data science programs. Everything is proceeding smoothly to merge the ASA into CSAB and the ASA has already had its first opportunity to provide feedback to the data science accreditation criteria.
- ASA Director of Science Policy Steve Pierson provided his regular report on the ASA's advocacy efforts. He noted that we have been more focused on the federal statistical agencies in the past few years, but we hope to broaden our focus going forward. He mentioned our work with the 2020 Census in developing quality indicators, efforts to interface with the new administration and the legislature regarding statistical agency budgets, and several other ongoing activities of the science policy office.
- ASA Director of Development Amanda Malloy reported on development and fundraising activities and totals for 2020, discussed 2021 plans, and asked the board for feedback and advice, particularly with regards to developing more corporate partnerships. The board provided several suggestions for Malloy to take back to the Development Committee.

The next regular meeting of the board will be August 4–6 via videoconference. The board will hold a budget meeting on June 11. ■

ASA Board Seeks Comments About Making Treasurer an Elected Member

Ron Wasserstein, ASA Executive Director

At its April 2021 meeting, the ASA Board recommended changing the association's bylaws to make the position of ASA Treasurer an elected position, thereby giving board voting rights to the treasurer. Currently, the treasurer is appointed by the board and does not have a vote. Given the duties and responsibilities of the treasurer, the board sees it as advantageous to have this position be a voting position on the board. Under the proposed changes, the elected treasurer would continue to be a non-voting member of the executive committee.

The board will vote in the late summer on accepting these changes. Per the rules set forth by our constitution and bylaws, the board seeks comments from ASA members on the proposed changes. Please send comments to ASA Executive Director Ron Wasserstein at *ron@amstat.org* by August 15, 2021. ■

Constitution, Article VI:

The President, President-Elect, Past President, Vice Presidents, representatives of the Council of Chapters, representatives of the Council of Sections, International Representative, Publication Representative, and the Treasurer are the voting Board members. The Secretary is an ex officio member without vote. All voting members of the Board of Directors must be individual members of the Association for the five years preceding the start of their term of office.

Deleted: and

Deleted: and Treasurer are

Deleted: s

Deleted: and the Treasurer

Constitution, Article IX

Nominees for the positions of President-Elect, Vice President, and Treasurer are selected by the Committee on Nominations as described in Article V, Section 1 of the Bylaws.

Deleted: and

The Secretary is selected according to Article V, Section 2 of the Bylaws.

Deleted: and Treasurer are

Constitution, Article X

The Treasurer is elected for a three-year term and is not eligible for immediate re-election to the same office.

Deleted: appointed to

Deleted: as provided for in Articles V and VII of the ASA Bylaws. The Treasurer may not be immediately reappointed to same office

Bylaws, Article V, Section 1

Nomination. Each year, the Committee on Nominations will submit at least two candidates for President-Elect and at least two candidates for Vice President. The nomination process will include some means by which the Committee on Nominations ensures that the major employment sectors in which Association members work are represented over time. Every third year, the Committee on Nominations will submit at least two candidates for Treasurer.

For the offices of President-Elect, Vice President, and Treasurer, suggestions for nominations will also be solicited through publication of a notice in a news bulletin.

Deleted: and

Bylaws, Article V, Section 5

Delete this section, which currently reads: "The Treasurer is appointed by the Board of Directors. The Treasurer is nominated by the Executive Committee per Article VII."

Bylaws, Article V, Section 6

Renumber to 5.

The Treasurer is responsible for the duties assigned by the Constitution and Bylaws. The Treasurer serves as a voting member of the Board and as an ex officio member of the Executive Committee without vote

Deleted: an ex officio

Deleted: without vote

Bylaws, Article V, Section 7.

Renumber to 6.

Bylaws, Article VII

The Executive Committee is responsible to nominate the Executive Director and to refer this nomination to the Board of Directors for action.

Deleted: and the Treasurer,

Deleted: these nominations

Likewise, the Executive Committee is responsible for nominating the replacement for a vacant position in the office of Vice President or in the office of Treasurer.

Bylaws, Article IX, Section 5b

The Budget Committee consists of the three Vice Presidents and Treasurer.

Deleted: . The Treasurer is an ex officio member without vote.

2020 Audit Report for the American Statistical Association

American Statistical Association

Financial Report
December 31, 2020

Contents

RSM

RSM US LLP

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 statements of financial position as of December 31, 2020 and 2019, the related statements of activities and cash flows for the years then ended, and the related notes to the financial statements.

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

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

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

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

Opinion
In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of American Statistical Association as of December 31, 2020 and 2019, and the changes in its net assets and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

RSM US LLP

Washington, D.C.
April 13, 2021

2020 Audit Report for the American Statistical Association Continued

American Statistical Association

Statements of Financial Position
December 31, 2020 and 2019

	2020	2019
Assets		
Cash and cash equivalents	$ 1,063,886	$ 479,243
Investments	21,537,192	21,967,260
Accounts receivable, net	491,041	647,973
Prepaid expenses	331,409	260,208
Equity in joint venture	75,631	79,085
Property and equipment, net	5,717,741	6,051,675
Total assets	$ 29,216,900	$ 29,485,444
Liabilities and Net Assets		
Liabilities:		
Accounts payable and accrued expenses	$ 978,996	$ 1,072,854
Due to joint venture	89,228	92,922
Deferred revenue	2,237,601	2,553,242
Bonds payable, net	2,925,709	3,271,412
Total liabilities	6,231,534	6,990,430
Commitments and contingencies (Note 11)		
Net assets:		
Without donor restrictions	20,856,287	20,641,647
With donor restrictions	2,129,079	1,853,367
Total net assets	22,985,366	22,495,014
Total liabilities and net assets	$ 29,216,900	$ 29,485,444

See notes to financial statements.

American Statistical Association

Statements of Activities
Years Ended December 31, 2020 and 2019

	2020			2019		
	Without Donor Restrictions	With Donor Restrictions	Total	Without Donor Restrictions	With Donor Restrictions	Total
Revenue and support:						
Membership dues	$ 2,013,101	$ -	$ 2,013,101	$ 2,202,416	$ -	$ 2,202,416
Meeting registration and exhibits	1,921,690	-	1,921,690	4,636,821	-	4,636,821
Royalties	1,486,946	-	1,486,946	1,481,016	-	1,481,016
Advertising	539,900	-	539,900	688,255	-	688,255
Federal grants	498,028	-	498,028	404,904	-	404,904
Contributions and sponsorships	369,994	58,454	428,448	536,612	43,641	580,253
Interest and dividends, net of fees	247,271	25,261	272,532	381,017	33,968	414,985
Sections	200,974	-	200,974	132,270	-	132,270
Maintenance fees	91,187	-	91,187	88,824	-	88,824
Sales	78,442	-	78,442	213,431	-	213,431
Accreditation	30,006	-	30,006	30,751	-	30,751
Miscellaneous	15,072	-	15,072	118,405	-	118,405
Page charges	7,170	-	7,170	12,080	-	12,080
Subscriptions	2,243	-	2,243	2,261	-	2,261
Net assets released from restrictions	29,765	(29,765)	-	43,071	(43,071)	-
Total revenue and support	7,446,769	53,950	7,492,719	10,972,134	34,538	11,006,672
Expenses:						
Program services:						
Programs	2,433,929	-	2,433,929	2,554,980	-	2,554,980
Meetings	1,625,491	-	1,625,491	2,897,394	-	2,897,394
Publications	1,114,593	-	1,114,593	1,169,195	-	1,169,195
Section expenses	760,687	-	760,687	1,006,299	-	1,006,299
Grants and awards	399,497	-	399,497	541,402	-	541,402
Education	279,909	-	279,909	544,084	-	544,084
Total program services	6,613,106	-	6,613,106	8,713,254	-	8,713,254
Supporting services:						
Management and general	1,560,341	-	1,560,341	1,608,490	-	1,608,490
Membership development	916,447	-	916,447	961,868	-	961,868
Fundraising	210,013	-	210,013	230,261	-	230,261
Total supporting services	2,686,801	-	2,686,801	2,800,619	-	2,800,619
Total expenses	9,299,907	-	9,299,907	11,313,873	-	11,313,873
Change in net assets before realized and unrealized gain on investments	(1,851,038)	43,950	(1,807,088)	(341,739)	34,538	(307,201)
Realized and unrealized gain on investments	2,068,678	231,762	2,297,440	2,985,498	264,103	3,250,601
Change in net assets	214,640	275,712	490,352	2,644,759	298,641	2,943,400
Net assets:						
Beginning	20,641,647	1,853,367	22,495,014	17,996,888	1,554,726	19,551,614
Ending	$ 20,856,287	$ 2,129,079	$ 22,985,366	$ 20,641,647	$ 1,853,367	$ 22,495,014

See notes to financial statements.

American Statistical Association

Statements of Cash Flows
Years Ended December 31, 2020 and 2019

	2020	2019
Cash flows from operating activities:		
Change in net assets	$ 490,352	$ 2,943,400
Adjustments to reconcile change in net assets to net cash (used in) provided by operating activities:		
Depreciation and amortization	300,069	371,368
Amortization of bond issuance costs	6,637	6,637
Equity in earnings from joint venture	(40,111)	(35,519)
Contributions restricted for investment in perpetuity	(37,930)	(18,966)
Unrealized and realized gain on investments	(2,297,440)	(3,250,601)
Loss on the disposal of property and equipment	33,865	-
Changes in assets and liabilities:		
(Increase) decrease in:		
Accounts receivable	156,932	(19,471)
Prepaid expenses	(71,201)	(79,448)
Increase (decrease) in:		
Accounts payable and accrued expenses	(93,858)	140,407
Due to joint venture	(3,694)	(19,003)
Deferred revenue	(315,641)	313,251
Net cash (used in) provided by operating activities	(1,872,020)	362,055
Cash flows from investing activities:		
Purchases of investments	(14,080,080)	(2,578,862)
Proceeds from sale of investments	16,807,588	2,764,272
Net cash provided by investing activities	2,727,508	185,410
Cash flows from financing activities:		
Principal payment on bonds payable	(352,340)	(342,794)
Contributions restricted for investment in perpetuity	37,930	18,966
Equity distribution from joint venture	43,565	40,897
Net cash used in financing activities	(270,845)	(282,931)
Net increase in cash and cash equivalents	584,643	254,534
Cash and cash equivalents:		
Beginning	479,243	224,709
Ending	$ 1,063,886	$ 479,243
Supplemental disclosures of cash flow information:		
Income taxes paid	$ 46,900	$ 75,700
Interest paid	$ 107,602	$ 119,069

See notes to financial statements.

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:

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.

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.

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

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.

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.

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.

Membership development: Costs related to member service maintenance.

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.

American Statistical Association

Notes to Financial Statements

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

A summary of the Association's significant accounting policies follows:

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.

Adoption of recent accounting pronouncements: In June 2018, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (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 Association adopted the standard for contributions received effective for the year ended December 31, 2019. The Association adopted the standard for contributions made effective for the year ended December 31, 2020 using the modified prospective method. Based on the Association's review of the contributions it makes, the timing and amount of expense recognized previously is consistent with how expense is recognized under this new standard. The adoption had no impact on the statements of financial position and the statements of activities.

In August 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement*, which modifies the disclosure requirements for fair value measurements by removing, modifying or adding certain disclosures. The Association adopted the provisions of ASU 2018-13 for the year ended December 31, 2020. The adoption of ASU 2018-13 had no impact on the financial statements.

Cash and cash equivalents: For purposes of reporting cash flows, the Association considers all highly liquid investments purchased with a maturity of three months or less to be cash or cash equivalents, excluding cash held by the investment custodian. Cash and cash equivalents also include funds held in a bank account on behalf of a joint venture.

Financial risk: The Association maintains its cash in bank deposit accounts which, at times, may exceed federally-insured limits. The Association has not experienced any losses in such accounts. The Association believes it is not exposed to any significant financial risk on cash.

The Organization invests in a professionally managed portfolio that contains fixed income and equity mutual funds and common stocks. Such investments are exposed to various risks, such as market and credit. Due to the level of risk associated with such investments and the level of uncertainty related to changes in the value of such investments, it is at least reasonably possible that changes in risk in the near-term could materially affect investment balances and the amounts reported in the consolidated financial statements.

American Statistical Association

Notes to Financial Statements

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

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 both December 31, 2020 and 2019, the allowance for doubtful accounts was $8,598. 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 $43,565 and $40,897 were received during the year ended December 31, 2020 and 2019, respectively.

Investments: Investments with readily determinable fair values are reflected at fair value. The change in fair value of these investments is recorded as a component of investment income in the statements of activities.

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 three to five years for furniture and fixtures, equipment, and software. The Association capitalizes all property and equipment purchased with a cost of $5,000 or more.

Valuation of long-lived assets: Long-lived assets and certain identifiable intangible assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of the long-lived asset is measured by a comparison of the carrying amount of the asset to future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the estimated fair value of the assets. Assets to be disposed of are reportable at the lower of the carrying amount or fair value, less costs to sell.

Meeting registration and exhibits: Meeting registration and exhibitor fees are recognized over the 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.

2020 Audit Report for the American Statistical Association Continued

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

Except for 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: 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 and certain private grants are considered conditional contributions due to existence of a right of return and donor-imposed barriers. The recognition of conditional grant revenue is deferred until barriers imposed under the grant documents are met by the Association. As of December 31, 2020, there were conditional promises to give of $351,908 related to private grants and $130,075 related to federal grants. As of December 31, 2019, there were conditional promises to give of $745,131 related to private grants and $98,934 related to federal grants. The conditional grants each have barriers that relate to limited discretion over expenditures. A refundable advance of $351,908 and $295,741 is included within deferred revenue as of December 31, 2020 and 2019, respectively, related to the private grants. The federal grants are paid on a cost-reimbursement basis.

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 2020 and 2019.

Upcoming accounting pronouncements: 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 the Association's year ending December 31, 2022. 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.

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

In September 2020, the FASB issued ASU 2020-07, *Not-for-Profit Entities (Topic 958): Presentation and Disclosures by Not-for-Profit Entities for Contributed Nonfinancial Assets*. This ASU requires a not-for-profit entity to present contributed nonfinancial assets in the statement of activities as a line item that is separate from contributions of cash or other financial assets. A not-for-profit entity also is required to disclose contributed nonfinancial assets received disaggregated by category that depicts the type of contributed nonfinancial assets. The term nonfinancial asset includes fixed assets, use of fixed assets or utilities and materials and supplies, intangible assets, services and unconditional promises of those assets. The ASU will be applied on a retrospective basis. This standard will be effective for the Association for the year ending December 31, 2022.

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 $63,000 in income tax expense on unrelated business income net income earned on advertising sales for the years ended December 31, 2020 and 2019, respectively.

Use of estimates: The preparation of financial statements in conformity generally accepted accounting principles requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

Subsequent events: Subsequent events have been evaluated through April 13, 2021, 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 cash deposits. 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, 2020 and 2019:

	2020	2019
Investments, at fair value:		
Stock – US Equities (Level 1)	$ 2,117	$ -
Mutual funds – US equities (Level 1)	9,075,198	8,870,721
Mutual funds – US fixed income (Level 1)	4,151,329	3,535,233
Mutual funds – International equities (Level 1)	4,895,403	4,464,349
Mutual funds – International fixed income (Level 1)	678,186	222,457
U.S. corporate bonds (Level 2)	1,239,067	2,320,589
U.S. government bonds (Level 2)	1,364,993	2,191,931
Investments, at cost:		
Cash deposits	130,899	361,980
	$ 21,537,192	$ 21,967,260

Investment income consists of the following for the years ended December 31, 2020 and 2019:

	2020	2019
Realized and unrealized gain	$ 2,297,440	$ 3,250,601
Interest and dividends	350,075	493,143
Investment fees	(77,543)	(78,158)
	$ 2,569,972	$ 3,665,586

Note 3. Property and Equipment

Property and equipment consists of the following at December 31, 2020 and 2019:

	2020	2019
Building and improvements	$ 8,541,220	$ 8,541,220
Furniture and fixtures	211,869	211,869
Office equipment	74,861	202,772
Software	512,773	512,773
Computer equipment	70,773	219,637
Land	1,286,000	1,286,000
	10,697,496	10,974,271
Less accumulated depreciation	(4,979,755)	(4,922,596)
	$ 5,717,741	$ 6,051,675

Note 3. Property and Equipment (Continued)

In July 2020, the Association was approached about selling one of its existing parking lots. In October 2020, the Association entered into an agreement of sale and in December 2020 the buyer provided its feasibility notice to the Association indicating that they intend to proceed to closing. The agreement of sale provides the buyer a 14-month initial entitlement contingency period in order to obtain the necessary entitlements for the development of the property with a right to extend the period for up to 24-months. Unless the agreement is terminated during the entitlement contingency period, the sale is expected to close in 2022 and any resulting gain or loss on the sale of the property would be reported in the statement of activities for the year ending December 31, 2022.

Note 4. Joint Venture

The following schedule presents summarized financial information from the joint venture Technometrics, in which the Association has a 80% equity ownership without control as of and for the years ended December, 31, 2020 and 2019:

	2020	2019
Condensed income statement:		
Revenues	$ 130,045	$ 126,674
Expenses	63,193	67,475
Net income	$ 66,852	$ 59,199
Condensed balance sheet:		
Total assets	$ 136,413	$ 145,174
Total liabilities	10,361	13,365
Equity	$ 126,052	$ 131,809

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, 2020 and 2019, which were comprised of the joint venture cash held within the Association's cash account, were $89,228 and $92,922, respectively. Maintenance agreement revenue under this arrangement earned by the Association was $36,795 and $35,341 for the years ended December 31, 2020 and 2019, 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 a financial institution, 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, 2020 and 2019. 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, 2020 and 2019, was $113,225 and $124,719, respectively.

Note 5. Bonds Payable (Continued)

Annual principal payments on the bonds at December 31, 2020, are due in future years as follows:

2021	$ 362,152
2022	372,238
2023	382,604
2024	393,260
2025	404,212
2026-2028	1,060,468
	$ 2,974,934

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, 2020 and 2019:

	2020	2019
Principal amount	$ 2,974,934	$ 3,327,274
Less unamortized debt issuance costs	(49,225)	(55,862)
	$ 2,925,709	$ 3,271,412

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 2020 and 2019, the Association made transfers of $3,000,000 and $600,000, respectively, 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, 2020 and 2019, 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.

	2020	2019
Cash and cash equivalents	$ 1,063,886	$ 479,243
Investments	21,537,192	21,967,260
Accounts receivable, net	491,041	647,973
Financial assets available	23,092,119	23,094,476
Less those unavailable for general expenditures within on year due to:		
Donor-imposed restrictions	(2,129,079)	(1,853,367)
Board designations	(1,613,473)	(1,505,535)
Financial assets available to meet cash needs for general expenditures within one year	$ 19,349,567	$ 19,735,574

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, 2020 and 2019:

	2020	2019
Sections	$ 1,507,615	$ 1,396,560
Education	105,858	108,975
	$ 1,613,473	$ 1,505,535

Note 8. Net Assets With Donor Restriction

Net assets with donor restrictions consisted of the following at December 31, 2020 and 2019:

	Balance December 31, 2019	Restricted Contributions	Investment Income	Released	Balance December 31, 2020
Endowment funds	$ 1,316,500	$ 37,930	$ 183,623	$ 32,553	$ 1,505,500
Other funds:					
Cox Scholarship	175,043	-	24,267	2,000	197,310
Waksberg Award	101,138	-	14,123	2,500	112,761
Bernard Harris Fund	60,562	10,250	9,618	-	80,430
Griffith Award	47,179	1,000	6,717	462	54,434
Wray Smith Scholarship Fund	40,619	-	5,706	-	46,325
Dixon Award	36,726	-	5,078	500	41,304
MG Natrella Scholarship Fund	33,792	-	4,747	-	38,539
Chambers Award	23,245	-	3,144	1,000	25,389
Student and early career travel	6,969	2,274	-	250	8,993
BIPOC in Stats & Data Science	-	5,000	-	-	5,000
Judea Pearl Prize	5,000	-	-	-	5,000
Aliaga Fund	3,992	-	-	-	3,992
Other short-term restricted	2,602	-	-	500	2,102
Pride Scholarship	-	2,000	-	-	2,000
Total other funds	536,867	20,524	73,400	7,212	623,579
Total	$ 1,853,367	$ 58,454	$ 257,023	$ 39,765	$ 2,129,079

2020 Audit Report for the American Statistical Association Continued

American Statistical Association

Notes to Financial Statements

Note 8. Net Assets With Donor Restriction (Continued)

	Balance December 31, 2018	Restricted Contributions	Investment Income	Released	Balance December 31, 2019
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	84,827	-	16,511	-	101,138
Bernard Harris Fund	46,401	5,000	9,161	-	60,562
Griffith Award	36,548	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
Student and early career travel	2,294	4,675	-	-	6,969
Judea Pearl Prize	-	10,000	-	5,000	5,000
Aliaga Fund	4,992	-	-	1,000	3,992
Other short-term restricted	2,102	2,000	-	1,500	2,602
International Prize in statistics	732	-	-	732	-
Total other funds	442,839	24,675	84,300	14,747	536,867
Total	$ 1,554,726	$ 43,641	$ 298,071	$ 43,071	$ 1,853,367

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 U.S. GAAP, 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 U.S. GAAP 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.

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.

American Statistical Association

Notes to Financial Statements

Note 9. Endowment (Continued)

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, 2020 and 2019.

Endowment net assets consisted of the following at December 31, 2020 and 2019:

	2020		
	With Donor Restrictions		
	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Noether Memorial	$ 105,504	$ 206,506	$ 312,010
Sirken Award	48,058	150,000	198,058
Youden Award	111,127	61,082	172,209
Deming Lecture Fund	86,461	67,275	153,736
EC Bryant Award	73,715	60,000	133,715
Wilks Memorial	39,694	47,143	86,837
Links Lecture	21,776	60,876	82,652
Waller Fund	22,643	45,000	67,643
Lingzi Lu Award	24,350	41,270	65,620
Karl E. Peace Award	29,697	34,000	63,697
Marquardt Memorial	30,901	26,250	57,151
Lester R. Curtin Award	16,841	25,000	41,841
Bartko Award	10,574	30,000	40,574
Lamb/Ryne	3,757	26,000	29,757
	$ 625,098	$ 880,402	$ 1,505,500

American Statistical Association

Notes to Financial Statements

Note 9. Endowment (Continued)

	2019		
	With 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
Links Lecture	13,752	47,946	61,698
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
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

For the years ended December 31, 2020 and 2019, the Association had the following endowment-related activities:

	With Donor Restrictions		
	Subject to Expenditure for Specified Purpose	Endowments Given in Perpetuity	Total
Endowment assets, December 31, 2019	$ 474,028	$ 842,472	$ 1,316,500
Contributions	-	37,930	37,930
Net investment income	183,623	-	183,623
Appropriation of endowment assets for expenditure	(32,553)	-	(32,553)
Endowment assets, December 31, 2020	$ 625,098	$ 880,402	$ 1,505,500

Notes to Financial Statements

Note 9. Endowment (Continued)

	With 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	18,996
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

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:

	2020	2019
Money purchase plan	$ 224,605	$ 217,258
401(k) profit sharing plan	105,347	102,849
	$ 329,952	$ 320,107

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 2026. 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.

American Statistical Association

Notes to Financial Statements

Note 11. Commitments and Contingencies (Continued)

COVID-19: It is unknown how long the adverse conditions associated with COVID-19 will last and what the complete financial effect will be to the Association. Quarantines, labor shortages, or other disruptions to the Association's operations, or those of its members, may adversely impact the Association's revenues and ability to provide its services and operating results. The operations of the Association have been negatively impacted by the regional and global outbreak of COVID-19. Membership revenue for the Association has declined approximately 10% during 2020. To date, the Association has also canceled several meetings. The Association's meetings were not covered by insurance, however, efforts were made to mitigate the impact on revenues and expenses. For some, if not most of these meetings, the Association was able to successfully convert the in-person meetings to virtual programs. To further mitigate the potential loss of revenue, the Association has reduced operating costs and drawn down upon available reserves to provide further insulation to the continued cash shortages created by this pandemic.

A full picture of the impact on operations is not yet known. The extent to which the COVID-19 pandemic impacts the Association's results will depend on future developments, which are highly uncertain and cannot be predicted, including new information which may emerge concerning the severity of COVID-19 and actions taken to contain it or its impact, among others.

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.

American Statistical Association

Notes to Financial Statements

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

Expenses by both nature and function are as follows for the years ended December 31, 2020 and 2019:

2020

	Program Services							Supporting Services				
	Programs	Meetings	Publications	Section Expenses	Grants and Awards	Education	Total Program Services	Management and General	Membership Development	Fundraising	Total Supporting Services	Total
Salaries and benefits	$ 1,387,626	$ 771,814	$ 453,133	$ 206,957	$ 5,691	$ 99,951	$ 2,925,172	$ 1,168,485	$ 620,832	$ 160,027	$ 1,949,344	$ 4,874,516
Meeting expenses	63,876	423,360	155,525	405,559	6	2,051	1,050,377	38,806	99,329	10,732	148,867	1,199,244
Non-employee compensation	130,586	48,822	155,716	22,203	378,755	137,100	873,182	38,773	29,111	150	68,034	941,216
Overhead and occupancy	184,527	103,259	52,090	25,818	851	13,197	379,742	196,622	76,335	20,266	293,223	672,965
Professional services	372,735	-	5,106	-	-	-	377,841	44,862	-	-	44,862	422,703
Other expense	107,837	72,999	31,368	17,970	-	1,158	231,332	38,634	50,117	829	89,580	320,912
Postage and shipping	1,867	73,227	78,452	15,126	-	968	169,640	679	18,356	4,177	23,212	192,852
Printing/publishing	1,838	41,120	122,346	1,897	-	1,603	168,804	25	6,762	5,447	12,234	181,038
Contributions	135,379	-	-	15,853	-	3,000	154,232	-	-	-	-	154,232
Taxes and fees	19,997	11,333	60,736	2,903	95	1,481	96,545	22,600	8,563	5,191	36,354	132,899
Travel	26,490	37,837	-	16,155	14,009	7,521	102,012	2,210	3,366	1,049	6,625	108,637
Supplies and equipment	1,171	41,720	111	38,246	-	2,879	84,127	8,645	3,676	2,145	14,466	98,593
	$ 2,433,929	$ 1,625,491	$ 1,114,583	$ 768,687	$ 399,407	$ 270,909	$ 6,613,006	$ 1,560,341	$ 916,447	$ 210,013	$ 2,686,801	$ 9,299,807

2019

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

COMMITTEE SPOTLIGHT

ASA Statistical Partnerships Among Academe, Industry, and Government (SPAIG)


William Scott Clark


Ying Ding


Renee Ellis


Willis Jensen


John Kolassa


Michael Lavine


Julia Lee


Fanni Natanegara


Michelle Shardell

Amstat News is spotlighting ASA committees and their activities. To start the series, we asked the **ASA Statistical Partnerships Among Academe, Industry, and Government (SPAIG) Committee Chair Fanni Natanegara and SPAIG Vice Chair Ying Ding** to answer a few questions about SPAIG's purpose and goals.

In your own words, what is the purpose of your committee?

Ying Ding: To me, the purpose of our SPAIG committee is to identify and promote initiatives and opportunities for establishing, expanding, and strengthening collaborations or partnerships across multiple entities (academic, industry, and government) in our profession and to acknowledge and recognize those outstanding collaborations that really make significant impacts in advancing research and influencing policy.

Fanni Natanegara: Cross-sector and interdisciplinary partnerships are essential in our statistics profession. The SPAIG Committee consists of nine members representing each of the three sectors: John Kolassa (Rutgers), Julia Lee (Northwestern), Ying Ding (University of Pittsburgh), Michelle Shardell (University of Maryland), William Scott Clark (Eli Lilly), Willis Jensen (W.L. Gore & Associates), Fanni Natanegara (Eli Lilly), Renee Ellis (US Census Bureau), and Michael Lavine (US Army). Our mission is to lead and promote initiatives that foster connectivity and collaborations across the sectors providing education, solving real-world problems, and advancing research.

Why did you accept the position to chair and co-chair the committee?

Ying Ding: I was very fortunate to be appointed by the ASA president-elect back in 2017 to serve on the SPAIG Committee, and then was reappointed in 2020 for my second term. Given my working

experience in both industry and academia, I have seen first-hand the many successful and impactful collaborations that greatly improve current practices or help solve real-world problems, which motivated me to contribute to this committee's mission.

During my tenure in SPAIG, I learned a lot from working with all the committee members, as well as from communicating with ASA liaisons and officers. At the end of 2020, I was encouraged by Fanni Natanegara (the new chair-elect), who was my previous colleague at Eli Lilly, to serve as the vice chair of the committee. I am grateful for this opportunity, and I look forward to working with the entire committee toward our mission to further promote and advocate strong partnerships and collaborations in our profession.

Fanni Natanegara: SPAIG Committee members are appointed by the ASA president-elect for a three-year term and can be reappointed for a second three-year term. This year is my sixth and last year on the SPAIG Committee.

I have learned a lot during my tenure in SPAIG. Being part of the committee offered me a glimpse of the ASA's influence on our statistics community and beyond. I have witnessed the tremendous growth and impact the committee has on our community through our sponsorships of the annual SPAIG Award and scientific conference sessions and webinars. I am energized by the cumulative work and ideas of our diverse committee members and for giving back to the community.

In the last couple of years, I had the privilege to serve as the vice chair of the committee. And this year, I am grateful for the opportunity to serve as the chair of the committee. I look forward to continuing the committee's impactful work and identifying new opportunities consistent with our mission to promote and foster statistical partnerships.

How often does the committee meet to plan activities?

Fanni Natanegara: The SPAIG Committee, along with ASA liaisons, meets once a month virtually to discuss and plan for our group activities. Our activities include organizing the annual SPAIG JSM speaker with lunch event and scientific sessions, publishing short articles highlighting a diverse set of collaborative projects and successes, advertising and judging the annual SPAIG Award, cosponsoring webinars with the ASA and other ASA sections, and updating our website to keep ASA members informed about our ongoing activities. The committee also strives to initiate new projects to promote and foster partnerships across the academic, industrial, and government sectors. Our wonderful ASA liaisons—Donna LaLonde (ASA), Mark Otto (US Fish and Wildlife Service), and Matilde Sanchez-Kam (US Food and Drug Administration)—have been critical in providing us insight into the larger ASA initiatives and making connections with other sections relevant to our mission and activities.

At any given time, there could be multiple ongoing projects. Given that there are nine committee members and we all have our day jobs, we often take the approach of divide and conquer based on our interests and availability. Consistent with our mission, we collaborate with each other and ensure diverse representations to tackle each project by forming smaller pods. Depending on the timelines of each project, each pod will meet virtually and communicate as often as they need. We also have an in-person meeting annually at JSM, which we missed last year due to the virtual nature of the conference.

What are some recent or upcoming committee events you would like to highlight?

Fanni Natanegara: The committee sponsors the annual SPAIG Award. The award is distinct from other ASA awards in that it recognizes outstanding collaborations between organizations, while also recognizing key individual contributors such as statisticians and subject matter experts involved in the partnership. The nominated partnership must be between organizations from at least two of the three sectors: academe, industry, and government. In addition, the collaboration must have resulted in significant contributions to the statistical field with applications to real-world problems in areas such as health, education, agriculture, astronomy, geography, epidemiology, pharmacology, forensic science, demography, law, finance, and the environment. Statistical contributions from these collaborations include innovative methodologies or initiatives, new technologies, novel analytic and evaluation approaches, publications, statistical workshops, internship programs, and rigorous analysis of real-world data to answer urgent questions.

Nominations are due by March 1 each year. The winners are recognized before the President's Invited Address at JSM that year. For more information or to ask questions about the nomination process, email ASA Director of Awards, Committees, and Elections Elizabeth Henry at *awards@amstat.org*.

What are some upcoming events you are most excited about?

Fanni Natanegara: Beginning this year, I am excited for the SPAIG Committee to partner with the ASA on the Impact Webinar Series. *Statistics: Making an Impact* was the theme for JSM 2019 and a challenge to the statistics and data science communities proposed by 2019 ASA President Karen Kafadar. The Impact Webinar Series will explore areas that are ripe for contributions from statisticians and data scientists and where statistics and data science already have had positive effects. This webinar series is free.

I am also excited about our recent collaboration with the ASA Section on Statistics and Data Science Education on the Industry Internships Advising Tips Webinar. From the panel discussion, I learned about the unique and common practices across industry internship programs. From the open floor discussion, I heard the need from our students and their university advisers to be able to search internship projects more readily and prepare for successful applications and interviews. There is more work to do here. This is an opportunity for us to show current and future students the advantages of and tips for pursuing internship programs, along with technical and nontechnical skills needed to be successful in post-academic life.

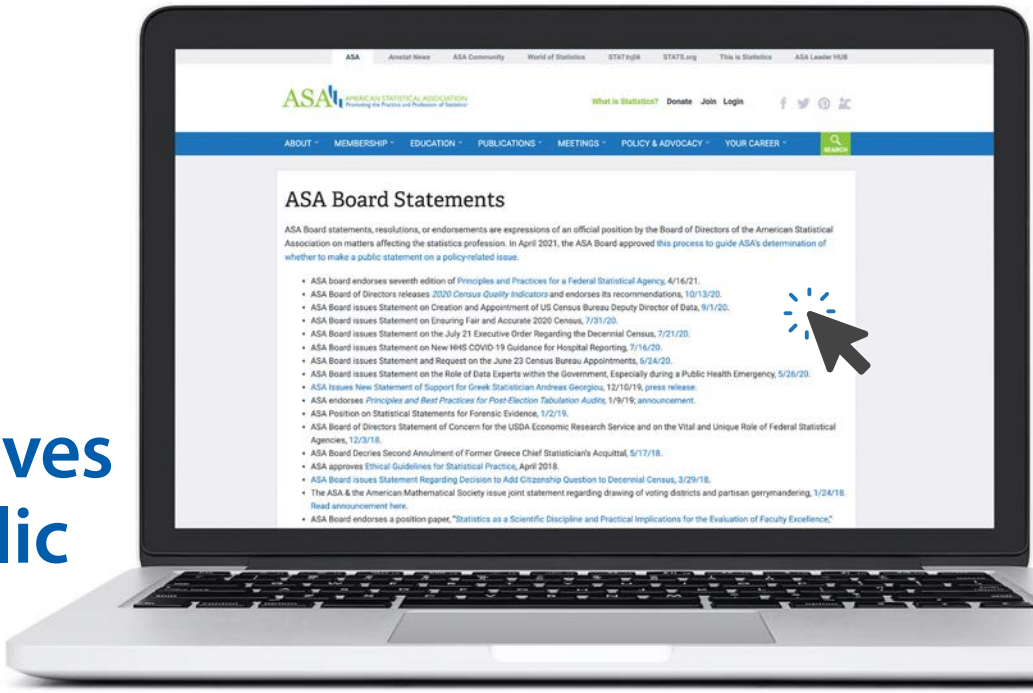
Past and future announcements and recordings of these webinars can be found on the SPAIG website.

Any additional information or news you'd like to share about the committee with ASA members?

Fanni Natanegara: As we plan future Impact webinars, we welcome examples of interdisciplinary teams whose work fits the overarching theme of impact and encourage proposals for work that is in progress or in the exploratory stage. Please share recommendations at *bit.ly/3ogcXXj*.

In addition to hearing about successful examples of collaborations, we would like to hear about hurdles you have or have yet overcome in your current collaborations. We are open to partnering with you and your organizations or sections on initiatives that foster connectivity and collaboration across the sectors and provide education, solve real-world problems, and advance research. ■

Board Approves Revised Public Statement Process



ASA Scientific and Public Affairs Advisory Committee

At its April meeting, the ASA Board approved the process for determining when the ASA should take a position on an issue through a statement, amicus brief, or other means. The process builds on the board's 2017 set of five questions that has been used to guide discussion for when the ASA should make a public statement on an issue (see *bit.ly/3d5dvf9*).

Such a process was proposed by the ASA Scientific and Public Affairs Advisory Committee (SPAAC) because its members thought an open and transparent procedure would help demonstrate the ASA's credibility and help the ASA avoid being overburdened should the rate of requests increase. A draft of the proposed process was published in the March issue (*bit.ly/3htkPmK*) with a request for comments.

Based on the 13 comments received, SPAAC revised the draft and advanced it to the ASA Board. These constructive comments helped strengthen the process from the one published in March.

In the Scope and Guidance section, a paragraph was added near the beginning to clarify that the proposed process does not apply to letters and calls for comments, the process for which is briefly explained. Text was added to note the bylaws empower the ASA Board to act in a way it believes is in the best interests of the association, without requiring it to poll members for their input. Finally for that section, a step was added to direct that "The Professional Issues and Visibility Council (PI&V) should be notified of a statement in development or consideration by the ASA unit leading the effort."

In the Process section, the steps were reordered to be chronological and it was stipulated that requesters should specify any conflicts of interest. A timeline for staff to act was also added to ensure sensitivity to timeliness. In addition, once staff have selected the ASA committee or entity to evaluate an outside request, it is stipulated they will also inform PI&V. This is to provide other PI&V committees an opportunity to comment if they choose.

The board also accepted our proposed two additional questions to the original five: (i) Is the ASA particularly well positioned to respond to the issue? and (ii) Does the issue involve an unambiguous violation of accepted norms of practice in statistical science or the ethical principles of the profession? These are questions #1 and #6 in the list of seven in the process.

This new process is now posted at the top of the ASA Board Statements page (*bit.ly/2QpjbYo*) and ASA letters page (*bit.ly/2S1Dzz1*).

This is a living document and may be amended as circumstances warrant. ■

THE AMERICAN STATISTICIAN

Something for Everyone in May Issue of *TAS*

Joshua M. Tebbs, *The American Statistician* Editor

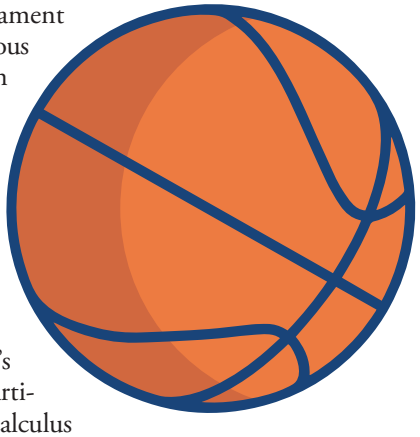
The May 2021 issue of *The American Statistician* (*TAS*) is available online and features 13 articles across different sections of the journal. One of the benefits of ASA membership is free access to the online issues of *TAS*.

Such a process was proposed by the ASA Scientific and The General section has seven articles. The first examines invariance properties and sufficiency for point estimation in general parametric models. The second provides a critical assessment of the use of the slugging percentage metric in baseball. The third article discusses confidence intervals for the exceedance probability as alternatives to confidence intervals for parameters and p-values. The fourth uses the LASSO to solve the problem of "distributive justice" among creditors in the estate division problem. The fifth treats the problem of estimating a large number of parallel effects in genome-wide association studies and related experiments. The sixth article proposes a Bayesian approach to test for ordering constraints among variances with dependent outcomes. Finally, the seventh article describes intuitive graphical methods to visualize influence functions.

The Interdisciplinary section has one article, which examines 30-day readmission rates in American hospitals, demonstrating patients who receive home health care actually have a higher probability of readmission. Using this as motivation, the authors describe a counterfactual probability metric that leads to necessary and sufficient conditions for sign reversals to occur.

The Statistical Computing and Graphics section also has one article. This article combines two existing recursive Bayesian inference methods to offer computational improvements to estimate any statistical model. This can streamline Bayesian data analysis in a variety of applications involving big data, streaming data, and optimal adaptive design.

There are two articles in the Statistical Practice section. The first revisits the long debate in experimental design between classic randomization and deterministic assignments based on notions of optimality. The authors then seek to provide practical advice about modified designs that harmonize both views. The second article considers the popular NCAA basketball tournament and investigates the infamous 5–12 seeded matchup in which "upsets" commonly occur. The authors offer an analysis of this using simple statistical learning models and existing tests for orderings among multinomial probabilities.



Finally, the Teacher's Corner section has two articles. The first shows how calculus and probability techniques can be used to obtain Gini's index and other statistical measures associated with the Lorenz curve, which is commonly used to describe income disparities. The second article examines rank statistics and presents new technical results on the correlations between variables and ranks.

For more information about *The American Statistician*, visit *www.tandfonline.com/toc/utas20/current.* ■

MY ASA STORY

Liz Stuart

Professor and Associate Dean

Elizabeth Stuart is Bloomberg Professor of American Health and associate dean for education at Johns Hopkins Bloomberg School of Public Health.

I first joined the ASA in 1999, when I entered graduate school. One of my first interactions was winning the Gertrude Cox Award in 2000, which gave me a boost of confidence and facilitated attending my first JSM (Indianapolis). I shared a hotel room with three fellow graduate students and had my introduction to the wonderful ASA community; I felt like I was being welcomed into the world of statistics.

I have attended nearly every JSM since to learn about new methods and applications and connect with old friends and colleagues. As someone who now straddles several fields, going to JSM feels like going back to my roots.

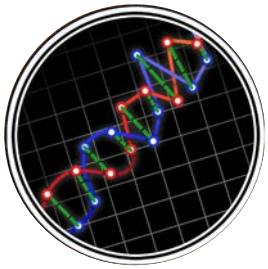
My involvement with the ASA was really solidified in the late 2000s, when I become involved in the effort to start up the Mental Health Statistics Section (MHSS), which is now thriving. At the time, I was an assistant professor of mental health and trying to find my way as someone with one foot in mental health research and one foot in biostatistics. Finding a community of fellow statisticians who were also working in the field of mental health research helped me see that, yes, I could make a career as a statistician, even with a primary appointment in a non-(bio)statistics department.

> Becoming involved in the MHSS has given me a professional identity ...

The collaborative nature of that early group and its commitment to enhancing the visibility of the role of statistics in mental health research was inspiring. I helped write the charter for the section and became one of the first chairs. Becoming involved in the MHSS has given me a professional identity, as well as close friends and colleagues.

I attend at least six conferences per year (ranging from the Society for Research on Educational Effectiveness to Academy Health to the Society for Prevention Research), but ASA conferences such as JSM and the International Conference on Health Policy Statistics always feel like my professional home. ■

Podcast Series Brings Answers to Data Science Career Questions



The ASA is sponsoring a podcast series about careers in data science with Q&As for students and early-career professionals. Subscribe to the podcast at *podofasclepius.podbean.com* or view each episode individually on YouTube.

Data Science Career Q&A | Environmental Science covers broad topics beyond environmental careers, touching on quantitative skills, career growth, specific domains versus broad skills and interests, and the job search process. *bit.ly/3tS7EP0*

Data Science Career Q&A for Undergrads focuses on undergraduate data science job prospects and properly transitioning from a student to a data scientist. Guests answer questions about their typical workday to their most challenging projects. *bit.ly/341lyE5*

Data Science Career Q&A | 10 Beginner Questions covers technical requirements, desirable soft skills and domain knowledge, and how to get an internship when prior experience is required. *bit.ly/3hwteWO*

ASA Celebrates Pride

While Urging Justice, Equity, Diversity, Inclusion

Donna LaLonde, ASA Director of Strategic Initiatives and Outreach; Amanda Malloy, ASA Director of Development; and Wendy Martinez, Former ASA President

"It is absolutely imperative that every human being's freedom and human rights are respected all over the world."

This quote by Jóhanna Sigurðardóttir, former prime minister of Iceland, captures the motivation for the new American Statistical Association Pride Scholarship and Pride Month Celebration. As stated in the ASA Statement on Justice, Equity, Diversity, and Inclusion, we recognize our mission, "can be realized only by fully embracing justice, equity, diversity, and inclusivity in all of our operations. Individuals embody many traits, so the leadership will work with the members of the ASA to create and sustain responsive, flourishing, and safe environments that support individual needs, stimulate intellectual growth, and promote professional advancement for all."

The creation of the ASA Pride Scholarship is one action demonstrating the ASA's commitment to this stated goal.

Looking back to 2020, the President's Corner in the June issue of *Amstat News* presented an interview with Jack Miller, then chair of the ASA LGBTQ+ Advocacy Committee, and Suzanne Thornton, who was chairing a presidential initiative working group. The following excerpts from that interview provide the context for current efforts.

Month

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's name to be reflective of our charges:

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

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 Emma, 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 or Donna LaLonde.) [Note: the work is ongoing, so please reach out to Donna at *donnal@amstat.org* if you are interested in being involved.]

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.

Now, a year later, the ASA has the Pride Scholarship, which celebrates the diverse backgrounds of LGBTQ+ individuals and their allies and showcases the invaluable contributions and perspectives they bring to the ASA, statistics, and data science. However, your help is needed.

In collaboration with members of the working group and \ LGBTQ+ Advocacy Committee, the ASA will celebrate Pride Month while working to endow the scholarship. The celebration will kick off with a book reading by award-winning author Nicole Dennis Benn on June 10 at 6:00 p.m. ET. Benn's book, *Patsy,* has been named Best Book of the Year by Kirkus Reviews, *TIME, NPR, People, The Washington Post,* Apple Books, *O, The Oprah Magazine, The Guardian, Good Housekeeping, BuzzFeed*, and *ELLE.* For details about this and other Pride Month events, visit *bit.ly/ASAPrideEvents.* ■

ASA PRIDE 2021

HELP ENDOW THE ASA PRIDE SCHOLARSHIP

Two anonymous donors are matching all donations up to $10,000 until the end of June. To donate, visit bit.ly/ASAPrideEvents.

Panel Provides Insights on Real-World Evidence in Health Care

Joseph P. Cook, Viatris; Aaron Galaznik, Acorn AI / Medidata Solutions; Joseph S. Imperato; Max Ma, Johnson & Johnson; Jun Su, Astellas; May Yamada-Lifton, SAS; and Kelly H. Zou, Viatris

Real-world data (RWD) can come from a variety of sources, including claims, electronic health records, biobanks, genomics tests, and imaging modalities. Increasingly, it is coming from digital data through electronic health and mobile health modalities. Recent events have pushed innovation in the use of RWD to maximize the value of real-world evidence (RWE) in an era of big data, data science, and artificial intelligence (AI).

Given the COVID-19 pandemic, digital innovation, patient preference assessments, and electronic patient-reported outcomes are likely to see increased use. RWE is also increasingly used to help identify patients for randomized clinical trials (RCTs), optimize RCT design, and help optimize evidence packages to accelerate the approval and reimbursement processes.

A panel was held during the 2020 International Chinese Statistical Association's Applied Statistics Symposium with the goal of providing insights into the current trends and future outlook for RWE. What follows is a summary of the key topics discussed.

Technology: Health Innovations

With respect to RWD, people most commonly recognize insurance claims or electronic medical records. Often used for health services research, they are administrative byproducts of care delivery repurposed for research. In addition to commonly used RWD such as pharmacy claims and EMR, there are other data sources that can be leveraged, including chart reviews, registries, patient-reported outcomes (PROs), biobanks, genomics tests, and imaging modalities. Specific database needs are driven by what study questions investigators aim to address, with each type of data providing unique value.

The study design and statistical methods considered should be those that best address the study objectives. One should consider if the approach should be descriptive, causal-comparative, quasi-experimental, or experimental, as well as the appropriate cohort, whether a prospective or retrospective observational study. Further, one should ask if case-control, cross-sectional, or case report/series should be used. What is the optimal statistical approach? Is there a role for meta-analytic or predictive modeling methods?

Electronic health records (EHR) data-linkage with claim databases, registries, PROs, and surveys are seen more frequently to address specific research questions. Increasingly, it is possible to link these sources of data to increase the richness of what they can provide. We are beginning to figure out how to use genomics, wearables, consumer data, and even social media as new data sources.

RWE is being widely used to gain an understanding of patient populations and subpopulations, as well as the patient journey and when and how treatments are used and any resulting gaps in care. Using this knowledge, RWE can be leveraged across the lifecycle of drug development, including planning and early development, as well as business and commercial activities, including market access, health technology assessments (HTAs), contracting, or tenders.

RWD can serve a crucial role in helping payors understand the financial impact of new treatments for their specific cost structures and in their populations. It can also help bridge the efficacy-effectiveness divide when seeking to understand how new treatments' clinical trial results generalize to their populations. HTAs routinely seek to estimate the incremental economic impacts to a health care system or insurer using models employing RCT data. Direct measurement, however, of the achieved cost burden and experienced cost-effectiveness for a given health care system is assessed using data from a real-world environment.

Anyone who has worked with RWD knows much of the work is in preparing the data and deriving meaningful variables. Companies have found success in employing AI to enhance data anomaly detection, standardization, and quality checking at this pre-processing stage. Rigor and transparency around how data is then transformed and in how machine

Featured panelists, from left: Joseph P. Cook, Viatris; Aaron Galaznik, Acorn AI / Medidata Solutions; Joseph S. Imperato; Max Ma, Johnson & Johnson; Jun Su, Astellas; May Yamada-Lifton, SAS; and Kelly H. Zou, Viatris

learning (ML) is applied will help increase trust and understanding of where and how to employ ML effectively. Improved data linkage and interoperability will be needed to provide the real-time feedback loops in RWD necessary to unleash the potential of AI for clinical decision-making.

The key to data access and linkage is interoperability. No single health system has all the data, and there is an increased tendency to do federated analysis to deal with privacy issues. The difficult part is that not all analytics are adapted or suited to federated analysis. We need a shared system based on trust. For example, what SAS learned during the support for the opioid crisis in Massachusetts was that laws are sometimes required—Chapter 55 was put into place to interconnect multiple databases into law and that helped inform state policy and a program to manage overdose-based mortality.

Technology is already entering the health care industry robustly. Starting to integrate information from wearables and diagnostic devices has the potential to significantly increase the reliability and comprehensiveness of electronic health records. For example, Apple has its health app and the Apple Watch, and Google is adding Fitbit to its holdings. Moreover, we see new ways of doing business with many stakeholders looking for ways to partner that will help encourage greater value for patients. There are many startups and other organizations working on this, but having groups collaborating on data sharing, quality, transparency, and collaboration can help bring structure and order to these innovations.

Applications: RCTs and RWE

RWE and RCT data complement each other. RCT data is generated within a controlled experiment to tease out the incremental benefit of a therapy in a defined setting. RWD is necessary to understand what happens when therapies are deployed in real life. It permits understanding effectiveness in a broader range of patient types, in a larger group than is achievable in an RCT setting. Thus, it complements the internal validity of RCTs with the external validity of RWD. We think by using the two side-by-side, one can better translate the clinical-trial-to-real-world divide, as well as contextualize the representativeness of trial data populations in a broader real-world context.

While RWD can be incredibly rich and varied, it can also be messy and challenging to tease out a signal from background noise. Mining this data, whether with old-fashioned data mining techniques or incorporating AI tools, can be quite challenging. AI is just a tool of data mining. The latest deep reinforcement learning and graph neural network developments show great potential to mine the data with good depth. Cutting-edge changes occur rapidly in technology spaces. However, devices of many types are being developed to help patients better track their health and, if shared, can provide additional richness.

For now, RWE complements RCTs. The holy grail is to not just extend medication indications and labels, but to also get an approval for new medications using RWE sources, as it has the potential to be cheaper and to better account for real-world practice than conducting an RCT. We can have a better understanding of efficacy and effectiveness of medicines in patients with this approach.

It would be ideal to create a feedback loop where "patients like this get treated this way/that way" for clinical decision support that optimizes the outcomes. For this, we would need to define clear goals such as quality of life or cost-effectiveness.

Synthetic control arms and RCTs with real-world data sources are also intriguing. SAS can support

these applications, but to do so requires partnership between many stakeholders. Focusing on fundamentals such as data sharing, quality, transparency, standardized processes, and imputation methods for use of RWE would increase confidence in its usage.

The quality and availability of RWD are improving exponentially, providing more reliable data for analysis and generating RWE. In addition, advances in statistical algorithms continue to improve our ability to leverage RWE for the inferential statistics and hypothesis testing required by regulatory agencies around the world.

Outlook: Aftermath of the Pandemic

The COVID-19 pandemic has accelerated drug development and trial and manufacturing processes at our major customers, and RWD is being captured actively in many countries. Scientific breakthroughs in the future should be faster if we leverage this experience to tackle regulatory processes, incorporate new data sources, and leverage emerging analytics and technology infrastructure. There is a push for greater racial diversity in the patient populations studied and analyzed for COVID-19, but this has not been the case in many historical trials.

We know many people don't live in areas with access to clinical trials, and social determinants of health are key drivers of treatment success. We must pay attention to and eliminate biases from our data sources and models. Secondary data collected for other purposes can introduce collection bias. For example, using claims data already means you are working with a subset of patients who are working. Heightened awareness of this bias in data is a good thing for the future of RWE.

The pandemic has spurred dramatic changes to market access conditions for patients that will have lasting positive effects. For example, to help boost adherence with better access, patients were increasingly allowed to get 90-day prescriptions, use mail-order and home delivery, experience lower out-of-pocket costs at the register for insulin and COVID-19–related health care, and gain improved access to telemedicine and chronic care medications.

In terms of predictions in the aftermath of the pandemic, the health care markets will increasingly find ways to use the available RWE to shape the way markets work, but not without limits. There will be a blurring of the distinction between retrospective and prospective data gathering, both with respect to different RWD types and in linking RWD to RCT data. Innovation in integrated data collection and comprehensive evidence generation will be used to gain insight into the real world, to inform stakeholders' understanding, and to improve patients' lives. The confidence in data quality and increase in data sharing, integration, and transparency will mean greater uptake of RWE. Automating access to RWD to gain RWE will continue to drive our decision-making from intuition to insight.

However, there may be both surprises and disappointments in our future, despite the hope to gain more accurate and reliable results using AI and algorithms. Thus, explainable AI may be important to understand and interpret the results, as well as provide forecasts. We are in early days of using AI for medicine; data standards are still being defined, governance of models could be improved, and users may not understand and trust the results. From this perspective, the failure rate of AI projects can be high. AI requires a combination of disciplines: science, engineering, statistics, math, and biology. Some even say data science is an art due to its exploratory nature and need to convince humans.

Ultimately, AI projects should focus on business value, not AI value. Life is not an AI reality talent show. AI solutions should be no-brainers for end users to incorporate as part of their workflow and not be standalone solutions. Thus, fit-for-purpose data, sound methodologies, and impactful applications go hand-in-hand when dealing with RWD and big data.

Editor's Note: The views expressed are the authors' own and do not necessarily represent those of their employers. ■

PASTIMES OF STATISTICIANS

What Does Arshi Arora Like to Do When She Is Not Being a Statistician?

Arshi Arora's handmade teapot

Who are you, and what is your statistics position?

I am Arshi Arora, and I work as a research biostatistician in the department of epidemiology and biostatistics at Memorial Sloan Kettering Cancer Center. I am interested in integrating genomics and statistics to unravel new clinical and biological findings that impact patient care. I am especially interested in analyzing output of cutting-edge technologies like flow cytometry, copy number data, etc., that determine treatment decisions. At present, I am pursuing statistical analysis of pharmacodynamics in the realm of immunotherapy to understand biomarkers that might be associated with drug response.

My goal as a biostatistician is to make my work more accessible. I love sharing results via plots and other forms of visualizations to explain various trends in the data set.

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

When I am not dabbling in cancer genomics, the right hemisphere of my brain is into ceramics, biking, and DIY crafts. I also co-host a podcast on computational biology called "Computationally Yours"! I consider myself a minimalist and follow an intense reduce, reuse, and recycle waste regimen.

What drew you to these hobbies, and what keeps you interested?

Computationally Yours was started in times of the current pandemic in April 2020 with one of my closest friends, Sabah Kadri, who works as a director of bioinformatics at Lurie Children's Hospital of Chicago and is an assistant professor of pathology at Northwestern University. We both overlapped at Carnegie Mellon University in Pittsburgh and share a love for science, books, and Bollywood dance.

As scientists, it was frustrating to see when scientific misinformation was becoming common in the news and, thus, we decided to do something about it. The idea for the podcast was pre-pandemic, but the pandemic definitely catalyzed the motivation to do something *now.*

Our mission here at *Computationally Yours* is to be a voice of science, especially for topics related to computational biology, biostatistics, and beyond. We talk about what we know and interview experts about topics we are passionate about and think the audience will really enjoy. We have covered myriad topics—clinical trials 101, the Human Genome Project, contact tracing, and climate change. And we look forward to covering many more!

As women in STEM, we are very excited to talk about different topics in science and how interdisciplinary yet unique they are. Stay tuned for one of our episodes in the pipeline with Jaya Satagopan covering five burning questions to ask a statistician. (shameless plug!)

"P is for podcaster and potter! And p-value."

My love for ceramics started when I decided to try a "paint your own pot" activity at one of the local art stores, and the rest is history. I started with a beginner wheel throwing class and went on to more advanced ones at 92Y in New York City.

To me, sitting at the potter's wheel and molding clay into a vessel is extremely meditative and calming. I enjoy all the processes, from shaping up a piece to trimming it (when the clay is dried into a leather consistency, trim the excess clay to get the piece into your desired shape), glazing (adding color to your piece and getting ready to bake it where clay turns into glass), and admiring how it turns out (sheepish smile)!

I still have the first cylindrical-ish piece I made. It was imperfect, yet I cherished it as it was something that could hold liquid and stand on its own. That said, there was definitely a growing and learning curve from that crooked cylinder to a more finished teapot! I had some amazing instructors who taught me so much about different pottery techniques and gave words of encouragement when I wasn't delicate or patient enough. ■

Arshi Arora edits her podcast, *Computationally Yours*, which she started in the early days of the coronavirus pandemic.

STATS4GOOD

ASA GivesBack: Volunteering Opportunities and Networking for Students and Early-Career Statisticians

With a PhD in statistical astrophysics, **David Corliss** is lead, Industrial Business Analytics, and manager, Data Science Center of Excellence, Stellantis. He serves on the steering committee for the Conference on Statistical Practice and is the founder of Peace-Work, a volunteer cooperative of statisticians and data scientists providing analytic support for charitable groups and applying statistical methods in issue-driven advocacy.

The American Statistical Association has a long history of community service. One of the founding principles of this column is to highlight activities of the ASA and its members using statistical science to help people build stronger communities and a better world. This month, I feature ASA GivesBack.

This two-pronged philanthropic initiative includes fundraising and volunteerism, organizing one event per year in each area. Launched by the ASA Development Committee early last year, the program focuses on early-career statisticians and data scientists to foster a lifetime of philanthropy and community involvement. ASA GivesBack brings intentionality, organizational strength, and networking to philanthropic efforts by the ASA and its members.

I spoke with ASA Director of Strategic Initiatives and Outreach Donna LaLonde to get the 411. GivesBack offers many opportunities to get involved. It supports ASA Giving Day activities, including giving through community service. A monthly virtual happy hour helps people connect through social media to develop networks with other statisticians and data scientists. Volunteer projects are in development.

A distinctive feature is the important roles played by people just getting started in their careers.

The American Statistical Association's ongoing commitment to community service is one of the most important commitments we have as a professional society.

GivesBack is both for and led by students and early-career professionals. Many of the events and activities focus on early-career members, including a JSM session on virtual networking—a useful skill during the pandemic that will remain valuable in the post-COVID new normal. More than 90 people attended the 2020 session, with participants across the country and even around the world. Topics at the session included working remotely, virtual interviewing, and effective use of social media.

ASA GivesBack also hosted Visualize Your World (*bit.ly/3bx1M7n*), a seven-week summer program for K–12 students with the goal of developing an interest in statistics through data visualization. Each week, a prompt was given to set a theme such as nature, tracking screen time (maybe something all of us could use), and colors and shapes. Students' work was hand drawn art or created by code. A winner, selected from the submissions each week in each age group, received an ASA goody bag and their visualization was placed on the GivesBack Facebook page. Visualize Your World is returning this summer with more activities to encourage an interest in statistics.

The ASA GivesBack team would like to hear your ideas for events, networking opportunities, and other activities. Visiting the group's Facebook (*www.facebook.com/asagivesback2020*) is a great way to learn about the initiative and offer ideas. The program is also in need of a new leadership team, whose term runs from one JSM to the next. The team organizes fundraising and volunteer events, networking activities, and a JSM session. In addition to the chair—who serves on the ASA Development Committee—and a co-chair, the team includes membership, fundraising, and volunteer event leads; a social media lead; and three members at large. With the entire leadership made of students and early-career professionals, it's a great opportunity to grow your involvement in the ASA and make connections while doing good in the community. Applications for the ASA GivesBack leadership team are being accepted at *bit.ly/2SUpOCV* through July 1.

The American Statistical Association's ongoing commitment to community service is one of the most important commitments we have as a professional society. It's a practice the ASA fosters in so many ways, from ASA GivesBack to chapter activities to publicly available resources and even this column. There are opportunities for every interest and background, all joined by our shared commitment to the greater good through statistical science. Finding your own way to help is an immensely rich and rewarding experience. Join us in helping the ASA *Give Back*! ■

Get Involved

In opportunities this month, check out the Undergraduate Statistics Project Competition (USPROC) at *www.causeweb.org/usproc*. Winners receive cash prizes!

Also, JSM is just around the corner. The conference will be virtual again this year, so the networking sessions will be especially important. You will want to check the website at *ww2.amstat.org/meetings/jsm/2021* regularly to get the latest news.

STAT*tr@k*

Committee on Career Development Announces Initiative Lineup

Claire McKay Bowen is lead data scientist of privacy and data security at the Urban Institute and chair of the ASA Committee on Career Development. Follow her on Twitter: *@ClaireMKBowen.*

Elizabeth Mannshardt is an adjunct associate professor in the department of statistics at North Carolina State University, associate director of the US Environmental Protection Agency's Information Access and Analytic Services Division, chair-elect of the ASA Section on Statistics and the Environment, and vice chair of the ASA Committee on Career Development.

The ASA Committee on Career Development (ASA CCD) provides support for and information about careers in statistics. ASA CCD hosts events at the Joint Statistical Meetings and offers webinars and office hours. Additionally, the committee's website includes resources for professional development and mentoring.

ASA CCD has planned the following virtual initiatives for 2021 with the goal of encouraging interaction and connection among participants and the statistical community. All ASA CCD events are free.

JSM Virtual Guided Networking Session

The ASA CCD will again host the JSM Virtual Guided Networking Session with the goal of helping students and early-career statisticians prepare for virtual JSM 2021. This networking social aims to provide a friendly environment for students and early-career statisticians to practice meeting and greeting volunteer mid- to late-career professionals from academia, industry, and government.

Jeri Mulrow and Patricia Hu will be the featured speakers for this networking event. Mulrow is the vice president and director of statistical and evaluation sciences at Westat. She recently served as the principal deputy director for the Bureau of Justice Statistics and was previously the deputy division director for the National Center for Science and Engineering Statistics at the National Science Foundation.

Hu is the director of the Bureau of Transportation Statistics. Previously, she was the director of the Center for Transportation Analysis at Oak Ridge National Laboratory.

ASA CCD is looking for mid- to late-career professionals from academia, industry, and government to attend the session and provide students and early-career statisticians with the opportunity to practice virtual networking. The more volunteers, the better. Students and early-career professionals will "rotate" through the crowd.

Registration (*bit.ly/33aqBkR*) for both young professionals and volunteer mentors is open for the session, which will take place August 5 from 6:00 p.m. to 7:30 p.m. EDT. JSM registration is not required.

Left: Jeri Mulrow, vice president and director of statistical and evaluation sciences at Westat; Right: Patricia (Pat) Hu, director of the Bureau of Transportation Statistics

The 2020 JSM Virtual Guided Networking Session featured ASA President Rob Santos, Emma Benn of Mount Sinai, and Karen Price of Eli Lilly and focused on networking using social media, interviewing virtually, and working remotely. Santos offered advice about staging your virtual interview space, Benn discussed the benefits of having a professional virtual presence and networking via social media, and Price revealed tricks for maximizing your remote working skills.

Career Path Webinar Series

ASA CCD launched its first webinar series, *Along Your Career Path in Statistics and Data Science,* with "Early Data Science Careers and the Job Search Process" in April. More than 60 people attended. A panel of representatives from industry, academia, and the government spoke about possible career paths in statistics and data science and provided tips for the job search and application process. Panelists included Nancy Murray, a statistician at the US Centers for Disease Control and Prevention and biostatistics PhD candidate at Emory University;



Left: Nancy Murray, US Centers for Disease Control and Prevention; Center: Won Chang, University of Cincinnati; Right: Diane Michelson, JMP

Won Chang, assistant professor at the University of Cincinnati; and Diane (Di) Michelson of JMP. The panel was moderated by Ruth Hummel and hosted by ASA Director of Strategic Initiatives and Outreach Donna LaLonde.

Each panelist expressed what they appreciate about their type of work and why they chose the path they did. Michelson enjoys variety and wanted to be in industry so she could do something different every day. Murray enjoys a mix of coding and communication in her day-to-day work and appreciates the work-life balance working for a government agency gives her. Chang appreciates a flexible schedule and being able to figure out one's own best direction, which she gets working in academia. Each commented that there are many types of careers in data science and statisticians and data scientists learn methods that can be applied to numerous areas. A common theme among all three was the importance of communication in their work.

Details and further takeaways from the first webinar can be found at *bit.ly/3w6vZCb*.

The next webinar in the series, "Career Next-Steps and Promotions" will take place June 11 at 1 p.m. EDT and feature Bo Li, professor and chair of the department of statistics at the University of Illinois at Urbana-Champaign; Adrian Coles, senior research scientist at Eli Lilly; and Elizabeth Mannshardt, associate director of the Information Access and Analytic Services Division at the US Environmental Protection Agency. Topics will include how to best position yourself for advancement, how to broach the subject of promotion, how to brand yourself and network, and how to leverage opportunities outside your organization. LaLonde will moderate.

Register at *bit.ly/3yfc99F*. A recording of the webinar will be available on the ASA CCD website.

Technology Adoptions: Online Portfolio

Another ASA CCD initiative is to provide resources in technology adoptions for expanding your online portfolio via resources such as Netlify for blog hosting, Hugo for blog site generation, R blogdown for blog content, and RStudio and GitHub for pulling it all together. Look for an introduction to Git and ideas for how to use a blog to communicate technical ability.

If you are interested in contributing to the CCD's portfolio initiative, contact CCD Chair Claire McKay Bowen at *CBowen@urban.org*.

If you have ideas for career development opportunities or are interested in serving on the ASA CCD in 2022, contact Bowen or Mannshardt, CCD vice chair, at *mannshardt@stat.ncsu.edu*. ■

Committee on Career Development Resources

Professional Development Resources
community.amstat.org/ccd/asaprofessionaldevelopment

Mentoring Resources
community.amstat.org/ccd/asamentoring

JSM Guided Networking Session
community.amstat.org/ccd/events/jsmnetworking2021

Along Your Career Path in Data Science Webinar Series
community.amstat.org/ccd/events/webinars/upcoming

Portfolio Technology
community.amstat.org/ccd/portfoliotechnology

JSM 2021 to Be Held Virtually

Long List of Featured Speakers, Lectures Just One Highlight

JSM 2021 will be delivered online through a custom platform. The platform will provide easy access to sessions and virtual opportunities to network and engage throughout the meeting. Synchronous participation will help you get the most out of your virtual experience—including sessions with live chat, polling, and other features. However, to accommodate all schedules, most sessions will be recorded and available on demand through the end of August.

Visit the JSM website at *ww2.amstat.org/meetings/jsm/2021* to learn more and view the online program. Register by June 15 for early bird rates.

FEATURED SPEAKERS

ASA President's Invited Address
Vivienne Ming, Socos Labs
Messy Human Problems
Monday, August 9, 3:30 p.m.

Deming Lecture
Ivan S.F Chan, AbbVie
Deming Spirit in Action: Quality, Statistics, and Innovation in Vaccine Development
Tuesday, August 10, 3:30 p.m.

ASA President's Address
Robert Santos, Urban Institute
Thoughts on the Role of 'Self' in a Statistics Career
Tuesday, August 10, 5:15 p.m.

COPSS Distinguished Achievement Award and Lectureship
Wing Hung Wong, Stanford University
Understanding Human Trait Variation from the Gene Regulatory Systems Perspective
Wednesday, August 11, 5:15 p.m.

F. N. David Award
Alicia Carriquiry, Iowa State University
Statistics in the Pursuit of Justice: A More Principled Strategy to Analyze Forensic Evidence
Thursday, August 12, 12:00 p.m.

LECTURES

IMS Presidential Address
Regina Liu, Rutgers University
Proactive and All-Encompassing Statistics
Monday, August 9, 5:15 p.m.

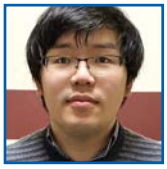
Lawrence D. Brown PhD Student Award Session
Wednesday, August 11, 10:00 a.m.

Xin Bing, Cornell University
Inference in Interpretable Latent Factor Regression Models

Ilmun Kim, University of Cambridge
Minimax Optimality of Permutation Tests

Virtual Conference JSM 2021 | Statistics, Data, and the Stories They Tell

August 8–12, 2021



Yichen Zhang, New York University Stern School of Business
First-Order Newton-Type Estimator for Distributed Estimation and Inference

Le Cam Lecture
Jianqing Fan, Princeton University
Understanding Spectral Embedding
Thursday, August 12, 10:00 a.m.

Medallion Lecture I
Philippe Rigollet, MIT
Statistical Optimal Transport
Monday, August 9, 1:30 p.m.

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Medallion Lecture II
Robert Nowak, University of Wisconsin-Madison
Nonparametric Statistics and the Design of Experiments in Machine Learning
Tuesday, August 10, 1:30 p.m.

Medallion Lecture III
Nancy Zhang, University of Pennsylvania
Transfer Learning in Single-Cell Genomics
Thursday, August 12, 12:00 p.m.

Medallion Lecture IV
Axel Munk, University of Göttingen
Empirical Optimal Transport: Inference, Algorithms, Applications
Wednesday, August 11, 1:30 p.m.

Wald Lecture I and II
Jennifer Chayes, University of California, Berkeley
Modeling and Estimating Large Sparse Networks
Tuesday, August 10, 3:30 p.m.
Thursday, August 12, 4:00 p.m.

INTRODUCTORY OVERVIEW LECTURES

Julia for Statistics and Data Science
Cecile Ane, University of Wisconsin
Claudia Solis-Lemus, University of Wisconsin
Douglas Bates, University of Wisconsin

Advances in the Statistical Understanding of Random Forests and Related Methods and Their Use in Inference
Giles J. Hooker, Cornell
Lucas Mentch, University of Pittsburgh

Fairness in Machine Learning
Sherri Rose, Stanford University

Spatial Models for Massive Data Set
Sudipto Banerjee, University of California at Los Angeles ■

MORE ONLINE
Professional Development short courses and workshops will be offered as distance learning presentations throughout the rest of this year and into 2022. Announcements will be sent when these are scheduled.

Follow **#JSM2021** and tag **@Amstat News** on social media.

The US Army Wilks Award for 2020 was presented to **Paul M. Ellner** recently during a virtual ceremony at Aberdeen Proving Ground in Maryland. Ellner was honored for developing and applying tailored statistical methodologies in reliability growth planning, tracking, and projection used by the US Department of Defense (DoD) and associated contractors for complex weapon system development programs.

Paul M. Ellner holds his US Army Wilks Award.

In a career spanning six decades, Ellner served as analyst, supervisor, and—most recently—senior technologist at the Combat Capabilities Development Command Data and Analysis Center. His work in recent methodological initiatives successfully addressed challenges posed by constraints in testing schedules, test resource limitations, and variabilities introduced across testing environments, helping the Army and DoD improve readiness and decrease costs. Ellner's models and methodology are routinely requested by key analysts, engineering centers, and product offices across the Army and DoD, with hundreds of requests to date.

Ellner earned his PhD in mathematics from Rensselaer Polytechnic Institute. He has been an exceptional work mentor, promoting advances in Army statistical methodology and applications to junior co-workers, and has served on committees for doctoral candidates at the University of Maryland. He is the principal author of the *Army Materiel Systems Analysis Activity Reliability Growth Methodology Guide* and a major contributor to DoD's MIL-HDBK-189C, Reliability Growth Management. He has authored numerous technical reports and open literature articles that serve as a standard for statistical reliability analysis in DoD. Ellner is also the recipient of the 2001 General Powers Test and Evaluation Lifetime Achievement Award and 2008 ASA Section on Statistics in Defense and National Security Distinguished Achievement Award.

This US Army Wilks Award was established in 1981 to commemorate the career of Samuel S. Wilks and his service to the Army. It is given periodically to a deserving individual who has made substantial contributions in research and/or the application of statistical methodology affecting the practice of statistics in the Army. ■

The 2022 Waksberg Award is going to **Roderick Little**, who will give the Waksberg Invited Address at the Statistics Canada 2022 Symposium and write a paper planned for publication in the December 2022 issue of *Survey Methodology*.

The award includes an honorarium made possible by a grant from Westat.

Survey Methodology (*bit.ly/33LnLmD*) established in 2001 an annual invited paper series in honor of Joseph Waksberg to recognize his contributions to survey statistics and methodology. Each year, a prominent survey statistician is chosen to write a paper that reviews the development and current state of an important topic in survey statistics and methodology and reflects the mixture of theory and practice that characterized Waksberg's work.

Waksberg was a giant in survey sampling for nearly seven decades, beginning at the US Census Bureau in 1940 and moving to Westat in 1973, where he served as chair of the board from 1990 until his death in 2006.

The author of the 2022 Waksberg paper was selected by a four-person committee—Jack Gambino, Jean Opsomer (chair), Giovanna Ranalli, and Elizabeth Stuart—appointed by *Survey Methodology* and the American Statistical Association. ■

Joseph Romano, a longtime ASA member, was recently named 2021 LGBTQ+ Scientist of the Year in recognition of outstanding contributions to his field.

Romano, a professor of statistics and economics at Stanford, was presented the award by Out to Innovate, formerly called the National Organization of Gay and Lesbian Scientists and Technical Professionals.

Joseph Romano

The award announcement credits Romano with contributing to fields ranging from econometrics to climate science.

"Romano has developed many new statistical tools, such as subsampling and the stationary bootstrap. The breadth and importance of Romano's work are described in his letters of support, submitted by scholars across the United States and Europe," the announcement said.

His supporters also note that Romano, as an open and out gay man, has been an inspiration to many LGBTQ+ students at Stanford.

Read more about the award and Romano on the Stanford news website, *stanford.io/3flnblc*. ■

Nominations Sought for Links Lecture Award

Data from official statistics is the direct or indirect basis for an enormous number of important decisions. Yet, as many ASA members know, the producers of official statistics must continually fight for resources and other support. With the proliferation in recent years of alternative data sources and techniques (often put under the umbrella of "big data"), some policymakers have even called into question the need for official statistics, not realizing in how many cases official statistics serve as an essential benchmark for other data sources. In addition, the Foundations for Evidence-Based Policymaking Act of 2018 and recommendations of the congressionally chartered Commission on Evidence-Based Policy point to a need for the producers of official statistics to rethink methods and strategies, including the broader use of administrative data.

Recognizing the possibilities and challenges for official statistics, the ASA created the Links Lecture Award in 2017 to focus on this area. The award was created in honor of three statisticians whose careers have been critical links in the forward movement of official statistics: Constance Citro, Robert Groves, and Fritz Scheuren.

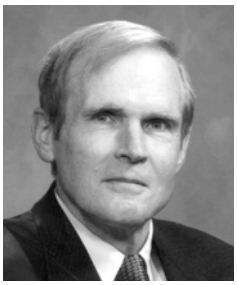
Each year, a distinguished person is selected to give a lecture dealing with forward-looking issues such as use of administrative records and alternative data sources; record linkage; blended estimation techniques; and associated issues such as privacy, confidentiality, researcher access, and reproducibility of results.

A key aspect of this award is the awardee's lecture, which is an opportunity to share his or her vision for innovating official statistics with a broad audience. In normal times, the lecture is presented in Washington, DC, to directly engage with the federal statistical community. The 2021 award lecture will be the fourth in the series. Earlier awardees include Frauke Kreuter (University of Maryland/Michigan Joint Program in Survey Methodology), Bruce Meyer (The University of Chicago), and Daniel Goroff (Alfred P. Sloan Foundation/National Science Foundation).

The ASA committee charged with selecting the 2021 awardee is seeking nominations of candidates who have contributed to the advancement of official statistics and who have a compelling vision for further progress, as well as the ability to share their vision through an inspiring and engaging lecture. The committee asks for a nominating letter, a supporting letter, and a current CV. Self-nomination is allowed. The closing date for nominations is July 1. See *www.amstat.org/ASA/Your-Career/Awards/Links-Lecture-Award.aspx* for details.

The award comes with a modest honorarium and reimbursement for travel expenses. The lecture will take place in the autumn at a time agreeable to the speaker. ■





The Links Lecture Award honors (from left) Constance Citro, Robert Groves, and Fritz Scheuren.

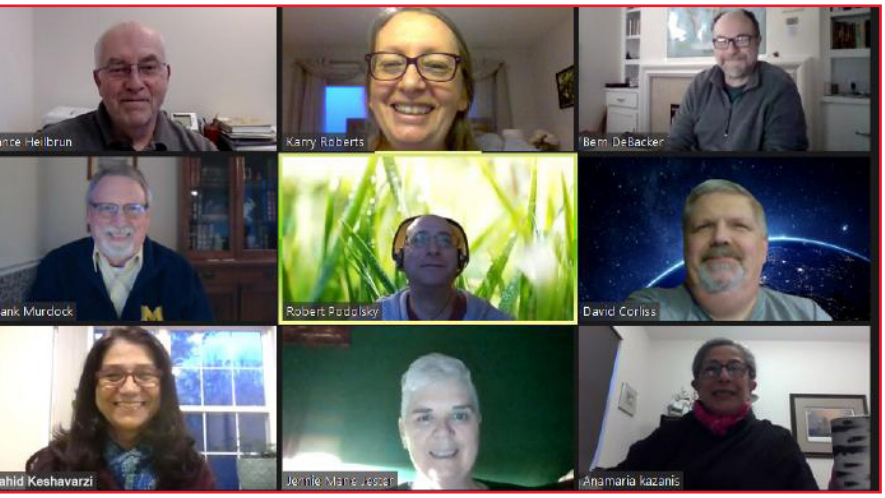
Deadlines and Contact Information for Select ASA National Awards, Special Lectureships, and COPSS Awards

Program	Deadline	Nominations & Questions
Links Lecture Award	July 1, 2021	*awards@amstat.org*
Health Policy Statistics Section Achievement Awards	September 15, 2021	*hpssawards2020@gmail.com*
Lester R. Curtin Award	October 15, 2021	*awards@amstat.org*
Deming Lecturer Award	October 15, 2021	*awards@amstat.org*
Lingzi Lu Memorial Award	October 15, 2021	*awards@amstat.org*

Detroit, Ann Arbor Chapters Give Statistical Awards at Science and Engineering Fair

Karry Roberts, ASA Detroit Chapter Secretary

From March 7–9, members of the Detroit and Ann Arbor chapters reviewed projects at the Michigan Science & Engineering Fair for ASA awards meant to encourage the practice and profession of statistics.



This year's judging team included Lance Heilbrun, Karry Roberts, Bern DeBacker, Frank Murdock, Robert Podolsky, David Corliss, Nahid Keshavarzi, Jennie Jester, and Anamaria Kazanis, who is a Council of Chapters representative to the ASA Board of Directors.

The team developed a scorecard and split the projects up for initial review. Then, they reviewed the highest scoring projects as a team in a Zoom meeting to decide on the award winners. Judging criteria included study design, graphical displays, data visualization, use of basic statistical methods, interpretation, and discussion of limitations.

This year's award winners were selected from 52 projects by Michigan high-school students who qualified for the state level of the competition.

This science fair judging event is a long-standing annual joint chapter activity for the Detroit and Ann Arbor chapters, though all four Michigan chapters are invited to participate. Both chapters contributed funds to support monetary awards for the students whose projects showed the best use of statistics. ■

Student	Project Title	School	City (in Michigan)	Teacher
AWARD OF EXCELLENCE ($200)				
Arnav Nikam	"Development & Statistical Validation of an Integrated Stock Trading Algorithm"	Salem High School	Canton	Marcia Lizzio
AWARD OF MERIT ($50)				
Aaryan Chandna & Mick Gordinier	"Strategic Analysis of Streak Shooting in the NBA"	West Bloomfield High School	West Bloomfield	Nicholas Fraylick
Alexander DeMattei	"Effects of Bacterial Diet on Reproductive Aging in C. elegans"	Mount Pleasant High School	Mount Pleasant	Jordan Krell
Malak Elayyan	"Comparing the Effectiveness of Online and Virtual Learning"	Dearborn Center for Math, Science, & Technology	Dearborn Heights	Jennifer Gorsline
Jibraan Rahman	"Improving Our Drinking H2O-Effectiveness of 6 Key Processes and Applications"	Canton High School	Canton	Heather Duff
Zeinab Zreik	"Effects of Different Intermittent Fasting Regimens of Weight and Tenacity"	Dearborn Center for Math, Science, & Technology	Dearborn Heights	Jennifer Gorsline
CERTIFICATE OF RECOGNITION				
Ali Alomari	"Optimizing Pandemic-Related Shutdowns"	Detroit Country Day Upper School	Beverly Hills	John Dougherty
Tatiana Blurton	"Effects of Ice Crevasse Structure on Melt Rate"	Dearborn Center for Math, Science, & Technology	Dearborn Heights	Jennifer Gorsline
Charlie Chen	"The Effects of High Eccentricity Orbits on Solar Systems"	Detroit Country Day Upper School	Beverly Hills	Patricia Hanlan
Ashwin Mahendran	"Automated Dental X-Ray Analysis"	Dakota High School	Macomb	Jonathan Jones
Jett Miller	"Early Forest Fire Detection"	Saginaw Arts & Sciences Academy	Saginaw	Matthew Miller
Adam Sun	"Efficient Monocular Depth Estimation with Fully Convolutional Neural Networks"	Detroit Country Day Upper School	Beverly Hills	Rami Baroodi
Amanda Xu	"How Do Fruit Flies Sense Cold?"	Huron High School	Ann Arbor	Andrew Collins
Gary Xu	"Properties of Stellar Binaries"	Troy High School	Troy	Rebecca Brewer
Margaret Yang	"Engineering Multi-Enzyme Whole-Cell Biocatalysts for Biofuel Production"	Cranbrook Kingswood Upper School	West Bloomfield	Stephanie Kokoszka

Arizona Chapter Holds Third DataFest Competition

The Arizona Chapter held its third DataFest competition and first with all three public universities in the state participating.

The planning committee included members from all three schools: Yi Zheng (co-chair), Yunpeng Zhao, and Jennifer Broatch of Arizona State University (ASU); Derek Sonderegger of Northern Arizona University; and Hao Helen Zhang of the University of Arizona.

As with many schools, planning began in 2019 for a 2020 DataFest, but plans were postponed due to the pandemic until the weekend of March 19, 2021, for a virtual version. For this, Zheng and Sonderegger became the key tech experts who configured the technology to support the event.

The committee tried to maintain as much similarity with a live event as possible. This included having a Zoom VIP breakout room at the beginning of Friday night for the event hosts to meet in with speakers for the opening ceremonies, an early virtual session for tech help and check-in, a general Zoom meeting for the general addresses and data unveiling, and individual breakout rooms for each team in which mentors could visit. Slack was also highly recommended for teams to use for collaboration.

The competition completion rate for teams was similar to that for live competitions, with 12 teams presenting this year.

The virtual opening night made for challenging coordination and validation of teams. In retrospect, having a better way to get students to form good working teams was needed. On the other hand, we were able to improve the mentoring aspect of the competition.

Sonderegger, along with Rodney Jee (DataFest co-chair) and ASU graduate student Diana Gonzalez, devised a new, more formalized mentoring process. Mentors were assigned to a subset of teams for which they did rounds during their shift. Each day, mentors were provided with a set of prompts they could use to initiate discussion with students.

This seemed to improve upon previous mentoring experiences. In the post-event satisfaction survey, the majority of students scored mentor satisfaction very high. In addition to the scores, the survey question about what students liked most received encouraging comments such as "mentors popping in and out" and "interaction between team members and mentors."

The use of Zoom also scored very high, while the use of Slack was not nearly as high, though not low. Getting the most neutral reaction was the opening ceremony, while the team collaboration and data analysis elements were marked as most enjoyed/loved.

This chapter event served to bring members (such as Bart Hobijn of ASU who served as a judge and Shiwei Lan of ASU who served as a mentor) into activity from an otherwise dormant year. ■

Survey Research Methods

The Survey Research Methods Section (SRMS) announces the following winners of the 2021 Student Paper Award and 2021 Student Travel Award.

2021 JSM GSS/SRMS/SSS Student Paper Award Winners

- Sheridan Grant (University of Washington) *"Measuring Informativeness of Ratings in the Absence of a Gold Standard"*
- Eli Ben-Michael (University of California, Berkeley) *"Varying Impacts of Letters of Recommendation on College Admissions: Approximate Balancing Weights for Subgroup Effects in Observational Studies"*
- Neha Agarwala (University of Maryland Baltimore County) *"Individual and Community-Level Risks for COVID-19 Mortality in the US"*
- Claire Kelling (Virginia Tech) *"A Two-Stage Cox Process Model for Police Use of Force with Spatial and Nonspatial Covariates"*
- Yutao Liu (Columbia University) *"Inference from Non-Random Samples Using Bayesian Machine Learning"*

2021 JSM GSS/SRMS/SSS Student Paper Award Honorable Mentions

- Yuzhou Chen (Southern Methodist University) *"Understanding Power Grid Network Vulnerability Through the Stochastic Lens of Network Motif Evolution"*
- Tuo Lin (University of California, San Diego) *"Extending the MWW Rank Sum Test to Survey Data for Comparing Mean Ranks"*
- Paul Parker (University of Missouri) *"A Bayesian Functional Data Model for Surveys Collected Under Informative Sampling with Application to Mortality Estimation Using NHANES"*
- Zhenbang Wang (George Mason University) *"Estimation in Exponential Family Regression Based on Linked Data Contaminated by Mismatch Error"*

2021 JSM SRMS Student Travel Award Winner

- Paul Parker (University of Missouri) ■

Biopharmaceutical Section Mentoring Program

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

The goal of this program is to help members further enrich their professional experience through achieving personal and professional goals. A constructive mentorship relationship can take many forms and may occur at any stage of one's career, with benefits for both the mentor and the mentee.

The section will provide hands-on resources for mentors and mentees to facilitate their interactions. Information related to the mentoring activities and additional resources for mentors and mentees is available at *http://community.amstat.org/biop/aboutus/sub-committees/mentoring*.

Both potential mentors and mentees should email their contact information to *biopharmmentoring@gmail.com* with the subject "Biopharmaceutical Section Mentoring Program."

TAIG Contest Winners Tell of Experience

Qiuyi Wu, Enshuo Hsu, and the Text Analysis Interest Group

During JSM 2020, ASA Text Analysis Interest Group (TAIG) award committee members systematically evaluated a large body of research in the growing field of text analysis (e.g., text mining, natural language processing, computational linguistics, web scraping, sentiment analysis, topic modeling, GAN text generation, automated translation). Subsequently, awards were presented to Qiuyi Wu and Enshuo Hsu.

Wu and Hsu were invited to elaborate and follow up on their prize-winning research this year at the Data Science DC (DSDC) Meetup, which has more than 13,000 registered members. In their own words, they tell about their research here.

Qiuyi ("Queenie") Wu

University of Rochester

"Naive Dictionary on Musical Corpora: From Knowledge Representation to Pattern Recognition"

This presentation was based on [my] master's degree thesis back in 2018, supervised by my adviser, Dr. Fokoué, who is a passionate, enthusiastic, and brilliant scholar. Inspired by clearly identified strong analogies between the building blocks of music and literature, I sought to utilize statistical machine learning concepts, methods, and tools for the analysis of these two human experiences. The statistical analysis of literary documents had been developed by text mining like topic modeling.

I transformed the music notes into matrices for statistical analysis and data mining. Specifically, each song was regarded and treated as a text document consisting of a bag of "musical words." One way to represent these musical words is to segment the song into several parts based on the duration of each measure. Then, the words in each song turn out to be a series of notes in one measure. I employed the created matrices in topic modeling to detect the potential connections between musicians and latent topics.

Qiuyi ("Queenie") Wu

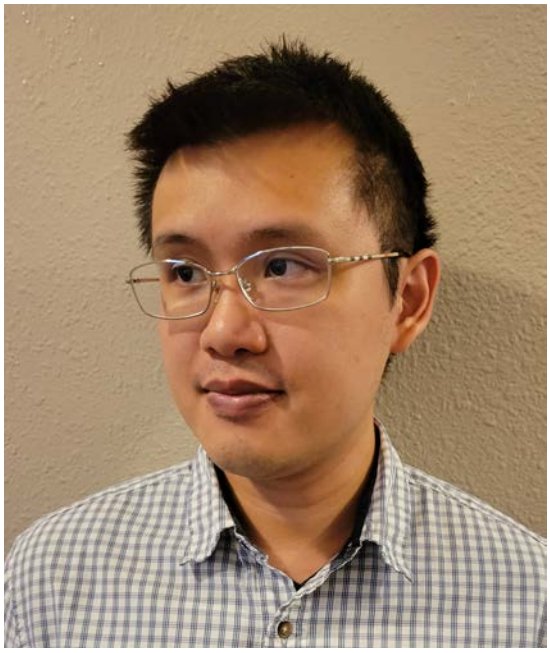
I presented this work in many conferences already, and the most recent ones are JSM 2020 and the follow-up virtual meetup in February 2021 organized by Data Science DC and ASA TAIG. Every time, the audience was intrigued and fascinated by the underlying thought-provoking idea of a homomorphism between music and literature. Along this journey of music, I am fortunate to have made a lot of friends and talents in both statistical and musical fields, who are generous enough to offer me their ideas and [comments] that can possibly push this research forward.

MORE ONLINE
To read abstracts for the winning papers, visit *bit.ly/2QmeJtk* and *bit.ly/3bvnsRb.*

Enshuo ("David") Hsu

The University of Texas Medical Branch

"Combination of Optical Character Recognition and Natural Language Processing to Identify Patients with Sleep Apnea in Electronic Health Record (HER) Data"



Enshuo ("David") Hsu

I initiated this research project, "Deep Learning–Based Natural Language Processing (NLP) Data Pipeline for EHR Scanned Document Information Extraction" (originally "Combination of Optical Character Recognition and Natural Language Processing to Identify Patients with Sleep Apnea in EHR Data"), at The University of Texas Medical Branch in 2019. The motivation was to design an artificial intelligence (AI)–powered data pipeline for extracting laboratory result values from scanned sleep study reports.

Using open-source tools and internet resources, I put together an image preprocessing module, an OCR engine (for processing text in images), and a deep learning–based text classifier to build a functional system. I was fortunate to be able to present the preliminary works [at] JSM 2020. Afterward, I continued to develop the data pipeline by examining different NLP models, including the state-of-the-art BERT model. I improved the image preprocessing and model evaluation processes [and] also collaborated with faculty in The University of Texas Health Science Center at Houston School of Biomedical Informatics for methodological insights. It was a pleasure to participate and share my updates in the April 2021 virtual meetup.

I presented the latest results in publication-ready tables and figures. It was a nice experience having face-to-face discussions within a community that is interested in and has some degree of familiarity with NLP. I collected helpful feedback, including alternative options of optical character recognition (OCR) engines, data pipeline management comments, and language model training suggestions. I look forward to future events from TAIG!

TAIG members are looking forward to the upcoming JSM 2021 contest, as well as new members, volunteers, and initiatives going forward. Contact the TAIG Executive Committee at *asataig@gmail.com* with questions.

Editor's Note: The views expressed are the authors' and do not necessarily represent those of their organizations. ■

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

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

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

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

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

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

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The Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh invites applications for two full-time faculty positions. Review of applications will commence upon receipt of all application materials and will continue until the position is filled. **Please apply by going to *www.join.pitt.edu* and applying for the requisition numbers listed below.** Please attach a cover letter, curriculum vitae, a statement of current and future research directions, and the names of three references to your online application. Salary will be commensurate with experience.

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Assistant Professor or Associate Professor in the Appointment Stream
Requisition #: 21000349
The position is for an Assistant or Associate Professor in the appointment stream and is available immediately. Requires a doctoral degree in biostatistics, statistics, epidemiology, data science, bioinformatics, or a related field with experience in the management and analysis of data from clinical research studies, including randomized clinical trials and observational studies. The successful candidate will be part of a research group involved in designing, coordinating, and analyzing clinical trials and epidemiologic studies. The individual would be expected to participate in study management, supervise students or staff, prepare data reports, and participate in writing manuscripts. This individual will also be expected to assist with teaching, by lecturing in courses, and mentoring students. This position is funded by grants from the National Institutes of Health and other funding organizations. In addition to the qualifications above, appointment at the Associate Professor level requires five years of experience and demonstrated scholarly productivity, including teaching, funded research, and extensive publications in peer-reviewed journals.

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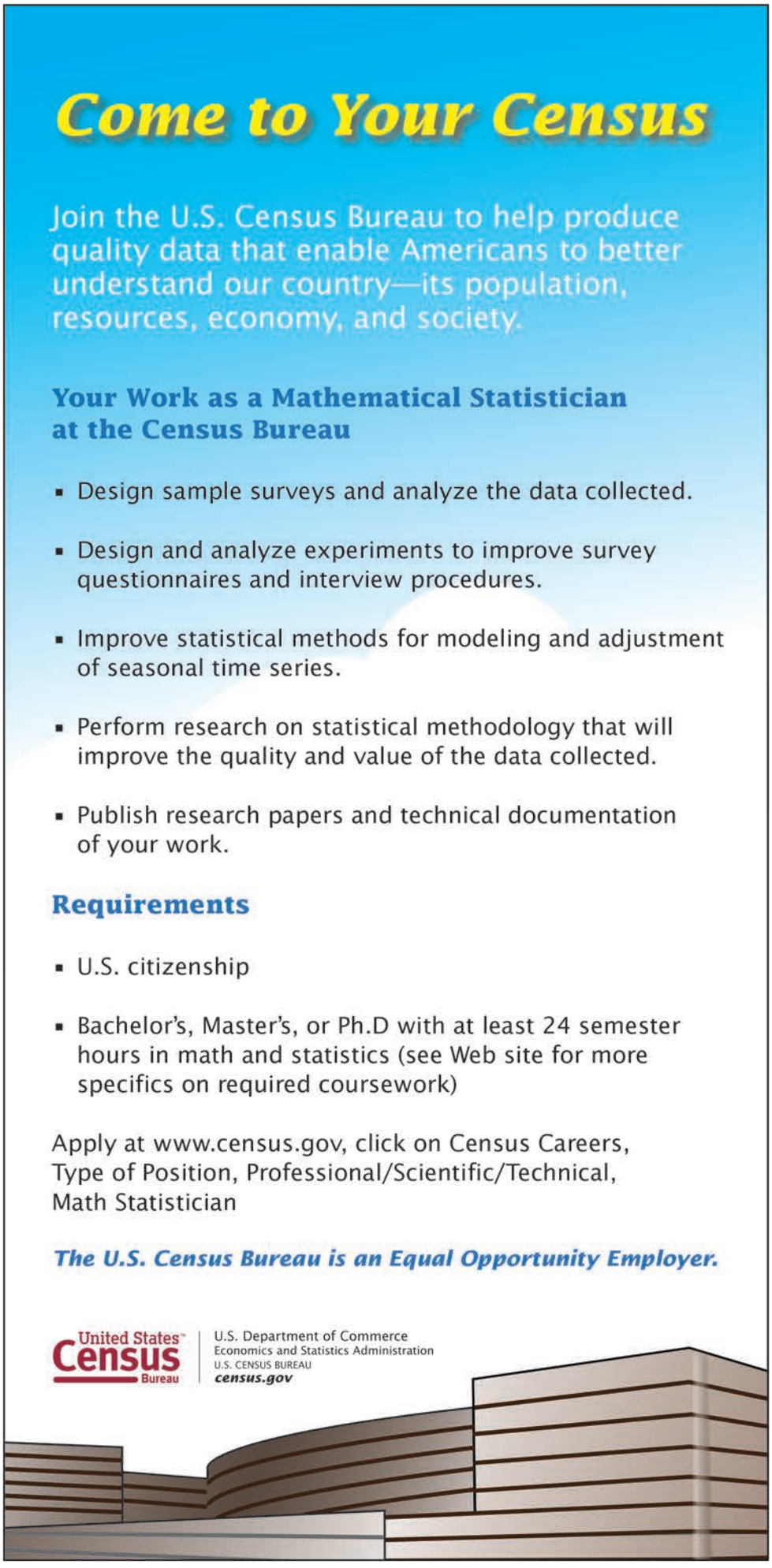

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"Data Scientist (n.): Person who is better at statistics than any software engineer and better at software engineering than any statistician."

– Josh Wills, Director of Data Engineering at Slack

Sent in by Roger Johnson

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