

April 2020 • Issue #514

AMSTATNEWS

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

ZOMBIES ON TREADMILLS



GAME ON!

Help celebrate Mathematics
and Statistics Awareness Month

MSAM
POSTER
INSIDE!

ALSO:

COPSS to Host First
Scott Lecture, Fisher
Lecture at JSM 2020

FY20 Budget Brings
Increases for NIH, Select
Statistical Agencies

BAPS

BEYOND AP STATISTICS

WEDNESDAY, AUGUST 5, 2020 • 8:00 A.M. - 4:30 P.M. • PHILADELPHIA, PENNSYLVANIA

A WORKSHOP FOR EXPERIENCED TEACHERS

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

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

COST

The course fee for the full day is \$50.

PROVIDED

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

PROGRAM

The 2020 program will be posted when available.

SCHOLARSHIPS

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

LOCATION

Joint Statistical Meetings (JSM),*
Philadelphia, Pennsylvania

REGISTRATION

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

QUESTIONS

Contact Rebecca Nichols at rebecca@amstat.org.

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



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American Statistical Association



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

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- 28 **STATS4GOOD**
Data for Earth Day 2020

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

- 30 **STATtr@k**
Do Pharmaceutical Statisticians Need a Master's Degree?

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



Online Articles

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

Committee Member? Chapter or Section Officer?

The ASA Leader HUB is here for you. ASA leaders are ASA members who volunteer in some way, primarily as chapter or section officers or committee chairs or members. We appreciate your service and aim to make your volunteer experience easy by providing materials you need in one convenient location. If you cannot find what you are looking for on the Leader HUB or would like additional resources added to it, email Jack

Joyce at jack@amstat.org. The HUB is on the ASA Community at <https://bit.ly/39K0lu2>.



What is your pastime?

Do you have a hobby outside of work you would like to share? If so, let us know and we'll feature it in an upcoming Pastimes of Statisticians column. Email Megan Murphy, *Amstat News* managing editor, at megan@amstat.org to receive a short questionnaire to complete. Return your answers along with photos of you participating in your leisure activity and we'll publish your story in an upcoming issue. View previous columns at <https://bit.ly/2Q8PNIF>.

Teaching Elementary Statistics

Few undergraduate schools in Pune, India, include a statistical programming language in their curriculum, and many schools have no computers, so students learn basic concepts about sampling, distributions, and variability and work through formulas by hand. Meena Doshi taught in both Pune and the US and shares her experience in "East or West: My View on Teaching Elementary Statistics." Read it at <https://magazine.amstat.org>.



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A Different Type of Impact

"I'm going to donate a kidney to Abe."

With that simple statement, my husband told me he was going to donate a kidney to one of our colleagues who I will call Abe for the purposes of this story. Since April is National Donate Life Month (www.donatelife.net/ndlm), I thought it appropriate to share my journey in the hope it might inspire others.

So, how did this journey start? In 2004, my husband and I were both working for the US Navy and as adjuncts at a local university teaching night classes in statistics and mathematics. Abe was the head of the computer science department at the time, and we came to know him well. From conversations with Abe, my husband learned Abe wanted to work on his PhD but was dealing with many challenges. His family included older children and a newborn. He had a long commute to the university, where he was teaching a full load of four classes per quarter and had extra duties as department head. The most critical issue was his health. Abe had end-stage renal disease (ESRD).

Abe immigrated to the United States with the hope of being a donor for his older brother, who had ESRD. Abe was not able to be a donor because of the risk he would also experience ESRD. It appears many from Abe's country of origin suffer from ESRD, according to "Causes of End-Stage Renal Disease in Sudan: A Single-Center Experience," an article by Mohamed Elhafiz Elsharif and Elham Gariballa Elsharif published in the *Saudi Journal of Kidney Diseases and Transplantation*.

What made my husband even think of being a donor? After all, Abe is not a blood relative. In retrospect, it is amazing, but this important decision was inspired by a story on National Public Radio about someone donating a kidney to a non-relative. My husband decided to leave a note for Abe asking if he would be willing to accept a kidney from him, since my husband is a Christian and Abe is Muslim. Abe said yes, and the donation process was started.

Doctors are careful to ensure the donor is healthy to mitigate the potential for harm to the donor. Extensive tests were performed on my husband, including counseling. They also need

National Donate Life Month

Celebrated in April each year, National Donate Life Month features an entire month of local, regional, and national activities to encourage Americans to register as organ, eye, and tissue donors and celebrate those who have saved lives through the gift of donation.

For more information and to champion the cause, visit www.donatelife.net.

To read more about organ donation, visit www.donatelife.net/types-of-donation/living-donation.

To register to become an organ, eye, and tissue donor, visit www.donatelife.net/register.



Wendy Martinez

to ensure there are no dangers to the recipient, such as diseases carried by the donor that could be passed on. As our donation story illustrates, the donor and recipient do not have to be related. It is the match between the donor and the recipient antigens that improves the success of the transplant. Blood tests are used to determine blood type and human leukocyte antigens (HLA), which drive the body's immune response. They also mix a small amount of blood between the two parties to see if the recipient will form antibodies.

Once the two parties have been cleared medically and the tests have confirmed a match, the surgery can proceed. In most cases, the surgeons are able to use laparoscopic surgery to extract the kidney. This is a minimally invasive approach in which several small incisions are made. Devices are inserted into the incisions that have video cameras and surgical tools. This type of surgery reduces the recovery time for the kidney donor.

All went well with the surgery, and the transplant was successful. Abe had several years during which he did not have to undergo dialysis, and he had a much improved quality of life. We also

The process of living organ donation was so satisfying that I would consider other living-donor procedures. However, I'll have to skip donating my other kidney because I'm going to need it for a while longer!



became close to Abe and his family, and we enjoyed getting to know them and their extended family. Sadly, the success was short lived and, after about four years, we got some distressing news: The kidney transplant was failing. They eventually had to remove my husband's kidney from Abe, and Abe was back on dialysis.

I soon found myself going through a strange grieving process over the 'death' of the kidney. I suppose it was because a piece of my husband had passed away.

There came a point where I had committed to a healthy lifestyle and felt I was in the right place to donate a kidney to Abe. He was a bit reluctant, but I told him I was ready to be a donor and would like him to be the recipient. My surgery was not done laparoscopically because the surgeon thought that technique put too much stress on the kidneys. Six years later, I am happy to write that Abe continues to do well.

What I find interesting about my journey is the many aspects I encountered along the way—a loved one donating, transplant failure, and donation

itself. There are also the differences between Abe and me—gender, religion, race, and culture. Organ donation can cross all these boundaries and more.

There are other ways to be a living donor. The other common organ for a living-donor procedure is the liver. In this type of donation, part of the donor's liver is transplanted to the recipient. Eventually, the size of both sections grow to normal size. There are also bone marrow (or stem cell) transplants, which are sometimes used to treat leukemia, multiple myeloma, and some lymphomas.

I encourage you to think about organ donation—whether it is through the living donation process or by registering as an organ donor. The process of living organ donation was so satisfying that I would consider other living-donor procedures. However, I'll have to skip donating my other kidney right now because I'm going to need it for a while longer!

Wendy L. Madry



Recognizing the ASA's Longtime Members

Each year, the ASA recognizes all members reaching a milestone of 35, 40, 45, or 50+ years of membership. All members who joined 35 or more years ago are also extended an

invitation to a reception at the annual JSM. If you believe you should appear in the list below but do not see your name, please contact asainfo@amstat.org or call (703) 684-1221 to correct your record.

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Mary-Jane Mietlowski	David Oakes	William J. Raynor	Neil C. Schwertman	Ajit C. Tamhane	Stanley Wasserman
John A. Miller	Morris Olitsky	Kenneth J. Resser	William L. Seaver	Ronald A. Thisted	William L. Weber
John Francis Monahan	Leonard Oppenheimer	Paula K. Roberson	Joseph Sedransk	Hoben Thomas	William E. Wecker
Roderick Montgomery	Joyce Orsini	Rosemary A. Roberts	Subrata K. Sen	John M. Thomas	Thomas E. Wehrly
Katherine L. Monti	Willis L. Owen	Jeffrey A. Robinson	Glenn R. Shafer	John H. Thompson	William W. S. Wei
John K. Moore	Maurice E. B. Owens	Frank W. Rockhold	Arvind K. Shah	Steven F. Thomson	Lynn Weidman
David R. Morganstein	William S. Pan	Robert N. Rodriguez	Andrew F. Siegel	Jerome D. Toporek	Daniel L. Weiner
Max D. Morris	Won J. Park	Russell H. Roegner	Richard S. Sigman	Robert D. Tortora	Jon August Wellner
Barbara G. Mroczkowski	Van L. Parsons	John E. Rolph	Walter Sloboda	Kam-Wah Tsui	Roy E. Welsch
Robb J. Muirhead	Karl E. Peace	Paul R. Rosenbaum	Robert D. Small	Alan R. Tupek	Fredrick S. Whaley
Wayne L. Myers	N. Shirlene Pearson	James L. Rosenberger	Martyn R. Smith	David L. Turner	James P. Whipple
Elliott Nebenzahl	Raymond C. Peck	N. Phillip Ross	William A. Sollecito	Gregory W. Ulferts	Andrew A. White
Reinhard Neck	Peter H. Peskun	Carl T. Russell	Dan J. Sommers	Neil R. Ullman	David G. Whitmore
James W. Neill	Arthur V. Peterson	John P. Sall	Bruce D. Spencer	Jessica M. Utts	Howard L. Wiener
Margaret A. Nemeth	A. John Petkau	William M. Sallas	Nancy L. Spruill	Richard L. Valliant	Rand R. Wilcox
H. Joseph Newton	Charles G. Pfeifer	Allan R. Sampson	Richard M. Stanley	Kerstin Vannman	Leland Wilkinson
Earl Nordbrock	John G. Phillips	Gilles F. M. Santini	Robert R. Starbuck	Niels H. Veldhuijzen	Jean F. Williams
Marija J. Norusis	Philip J. Pichotta	Thomas J. Santner	David W. Stewart	Paul F. Velleman	Michael A. Wincek
El-Sayed E. Nour	Linda Williams Pickle	Patricia A. Scanlan	John A. Stewart	Joseph S. Verducci	Lawrence C. Wolfe
Ralph G. O'Brien	Dale J. Poirier	Nancy K. Schatz	Sandra S. Stinnett	Hrishikesh D. Vinod	Kirk M. Wolter
Michael W. O'Donnell	William E. Pollard	Josef Schmee	Robert L. Stout	Howard Wainer	Tommy Wright
Judith Rich O'Fallon	Darwin H. Poritz	David A. Schoenfeld	Miron L. Straf	Joseph J. Walker	Marvin Yablon
Patrick D. O'Meara	Dale L. Preston	Timothy L. Schofield	Donna F. Stroup	Katherine K. Wallman	Michael G. Yochmowitz
	Kevin Price	Friedrich W. Scholz	Perla Subbaiah	Stephen D. Walter	Daniel Zelterman
	John N. Quiring	John H. Schuenemeyer	Richard A. Sundheim	Chao Wang	Eric R. Ziegel
				James F. Ward	

40-44 Years

John M. Abowd	Arlene S. Ash	Nancy Berman	James E. Breneman	Deborah A. Cernauskas	Peter D. Christenson
Michael A. Adena	Steven P. Bailey	Charles C. Berry	Ron Brookmeyer	Raymond L. Chambers	B. Christine Clark
Mohammad Ahsanullah	Stephen P. Baker	James Calvin Berry	Roger L. Brown	Amrut M. Champaneri	Cynthia Z.F. Clark
Adelin I. Albert	Jim Baldwin	Robert H. Bigelow	Edward C. Bryant	Promod K. Chandhok	Daren B. H. Cline
James H. Albert	David L. Banks	Thomas R. Birkett	Judith A. Buchino	Richard A. Chechile	Avital Cnaan
Jeanne M. Aldred	Chris M. Barker	Jan F. Bjornstad	Shelley B. Bull	Gina G. Chen	Paul E. Coffman
Robert W. Aldred	Andrew Lewis Baughman	David K. Blough	Christine M. Bunck	William W. S. Chen	Mark E. Cohen
Melvin T. Alexander	Eileen J. Beachell	David E. Booth	Lawrence F. Burant	Ching-Shui Cheng	Michael L. Cohen
Rich Allen	Moray B. Bear	Richard C. Borden	Thomas E. Burk	Michael R. Chernick	Michael P. Cohen
Paul D. Allison	Mark P. Becker	Victor Marek Borun	Thomas J. Bzik	Richard P. Chiacchierini	Stephen H. Cohen
Wendy L. Alvey	Jay H. Beder	Robert D. Bowser	Richard J. Caplan	Yu-Kun Chiang	Salvatore V. Colucci
Yasuo Amemiya	Alexander E. Belinfante	Michael N. Boyd	Lynda T. Carlson	Vernon M. Chinchilli	Charles F. Contant
Clifford W. Angstman	Michael E. Bellow	John E. Boyer	Arthur Carpenter	Ronald Christensen	Richard S. Conway
Thomas Arbutiski	Peter M. Bentler	Nancy J. Boynton	B. Thomas Carr		Bruce K. Cooil
Stephan Arndt	James O. Berger	Norman M. Bradburn	Daniel B. Carr		Peyton J. Cook
	Catherine S. Berkeley	Mary-Lynn Brecht	Aki N. Caszatt		Kennon R. Copeland

Longtime members

Charles D. Cowan	Stephen A. Freitas	Carol C. House	Thomas P. Lane	Samuel Merrill	Elgin S. Perry
John R. Crammer	Arthur Fries	Wei-Min Huang	Jerry Langley	Eva R. Miller	David W. Peterson
Keith N. Crank	Paul Gallo	Arthur L. Hughes	Stephen S. Langley	Michael F. Miller	John J. Peterson
James A. Creiman	Michael A. Gates	Allen C. Humbolt	Linda B. Lannom	Renee H. Miller	Daniel Pfeffermann
Noel A. Cressie	Constantine Gatsonis	Luis H. Hurtado	Lisa M. LaVange	David H. Moen	Gerald L. Phillips
Douglas E. Critchlow	Jeffrey J. Gaynor	Henry F. Inman	Brian T. Leahy	Leyla K. Mohadjer	Gregory F. Piepel
Leonard A. Cupingood	Joseph C. Groferer	John M. Irvine	Barbara A. Leczynski	George E. Morgan	Joseph G. Pigeon
Estella Bee Dagum	Malay Ghosh	Denis George Janky	Hyunshik J. Lee	Walter T. Morgan	Chester H. Ponikowski
Robin A. Darton	John A. Gillespie	Guillermina Jasso	Kwan R. Lee	June Morita	Dudley L. Poston
Marie Davidian	Michael E. Ginevan	Jean G. Jenkins	John J. Lefante	Michael Joe Morton	Paul N. Powell
Bruce M. Davis	William J. Glynn	Gary R. Johnson	Greg M. Lepak	Ronald P. Mowers	Manfred Precht
Charles S. Davis	A. Blanton Godfrey	Robert E. Johnson	Donald K. Lewis	Daniel H. Mowrey	Louis H. Primavera
Thomas M. Davis	Alfred D. Godfrey	Albyn C. Jones	Richard A. Lewis	Lawrence H. Muhlbaier	Howard M. Proskin
Thomas C. Dawe	Avni Goeksel	Michael P. Jones	Steven A. Lewis	Nitis Mukhopadhyay	Lloyd P. Provost
Virginia A. de Wolf	Barry I. Graubard	Harmon S. Jordan	Wai K. Li	Jay Munson	Jamie K. Pugh
Angela M. Dean	J. Brian Gray	David R. Judkins	Lillian S. Lin	Bengt Muthen	William M. Pugh
Michael R. Delozier	Janis G. Grechko	Karen Kafadar	Barbara A. Lingg	Haikady N. Nagaraja	Clifford R. Qualls
Wayne S. Desarbo	John W. Green	Lee D. Kaiser	Charles L. Liss	Larry Alan Nelson	Volker W. Rahlfs
Marie Diener-West	Stephanie J. Green	Tzu-Cheg Kao	George A. Livingston	Dean V. Neubauer	James O. Ramsay
Ralph Digaetano	Joel B. Greenhouse	Bruce A. Kaplan	Wei-Yin Loh	David Butcher Nolle	Richard F. Raubertas
Joseph R. Donovan	Berton H. Gunter	John M. Karon	Roger Longbotham	Michael A. Nolte	Gopa Ray
Gaylen W. Drape	Yesvy Gustasp	Charles R. Katholi	Stephen W. Looney	Phillip N. Norton	Domenic J. Reda
Kevin Ward Drummey	Josue Guzman	Barry P. Katz	Helmut Luetkepohl	Robert M. Norton	Nancy Reid
Bonnie P. Dumas	Perry D. Haaland	Darryl Katz	Michael J. LuValle	Tom S. Nunnikhoven	Mark R. Reiser
Harold E. Dyck	Michael Haber	Jerome P. Keating	Michael F. Macaluso	Barry D. Nussbaum	William K. Rice
Jean L. Dyer	Michael D. Hale	Elizabeth J. Kelly	John MacIntyre	Douglas W. Nychka	Wasima N. Rida
Robert G. Edson	William A. Halteman	Arthur J. Kendall	Donald Macnaughton	Kevin F. O'Brien	Mark William Riggs
Don Edwards	Katherine T. Halvorsen	Harry J. Khamis	Jay Magidson	Thomas W. O'Gorman	William J. Riley
Marlene J. Egger	Michael S. Hamada	Meena Khare	David A. Marker	Walter W. Offen	Edwin L. Robison
Curtis S. Engelhard	David C. Hamilton	John E. Kimmel	Paul J. Marovich	Akinori Ohashi	David M. Rocke
Patricia A. English	John B. Hannon	Robin Laurence Kirby	Ray L. Marr	Thomas H. Oliphant	Ward Rodriguez
Eugene A. Enneking	J. Michael Hardin	Syed N.U.A. Kirmani	Adam T. Martinsek	John A. Ondrasik	Javier Rojo
A. Richard Entsuah	William V. Harper	John C. Klensin	Joe Matsuoka	George Ostrouchov	Anthony M. Roman
Neil R. Ericsson	Stephen P. Harris	George J. Knafl	Carl A. Mauro	Soo Peter Ouyang	Elvezio Ronchetti
Kent M. Eskridge	Rachel M. Harter	Edward L. Korn	Fred M. Mayes	William J. Owen	Robin L. Rose
Mark A. Espeland	Nancy C. Hassett	Kallappa M. Koti	Charles Maynard	Albert Palachek	Gary L. Rosner
Sylvia R. Esterby	Gary D. Hatfield	Kenneth J. Koury	Michael J. Mazu	Alberto Palloni	Peter J. Rousseeuw
Michael J. Evans	Maurine A. Haver	Lawrence Krasnoff	Donna K. McClish	J. Lynn Palmer	Lawrence V. Rubinstein
David Fairley	William D. Heavlin	Jeffrey P. Krischer	Joseph P. McCloskey	Mari Palta	Andrew L. Rukhin
Frederick W. Faltn	Charles E. Heckler	Alok Krishen	Kenneth F. McCue	Deborah L. Panebianco	David Ruppert
Dean H. Fearn	David H. Henry	Pieter M. Kroonenberg	Peter McCullagh	Sastry G. Pantula	Roland T. Rust
Michael B. Feil	Ellen Hertzmark	Katherine B. Krystinik	Janet Elizabeth McDougall	Robert A. Parker	Jim Rutherford
Luisa T. Fernholz	Richard P. Heydorn	Naoto Kunitomo	Daniel L. McGee	Robert E. Parson	Pedro J. Saavedra
Christopher A. Field	Chihiro Hirotsu	Lynn Kuo	Philip G. McGuire	Sharon M. Passe	Michael S. Saccucci
Dianne M. Finkelstein	Joseph G. Hirschberg	James R. Lackritz	Christine E. McLaren	Jeffrey S. Passel	William H. Sachs
Hans-Theo Forst	Edward C. Hirschland	Edward Lakatos	Kenneth B. McRae	Kevin Pate	Jerome Sacks
T. A. Foster	Doug A. Hlavacek	Mansum A. Lam	Kathleen A. Mellars	Charles L. Paule	Ulderico Santarelli
Leroy A. Franklin	Lorrie L. Hoffman	Kuang-Kuo Gordon Lan	Shailendra S. Menjoge	Roxy L. Peck	Robert L. Santos
Larry D. Freese	Larry R. Holden	Jurate M. Landwehr	Michael Meredith	Jane F. Pendergast	Michael J. Santulli
	Paul S. Horn				Rama Sastry

Longtime members

Miles M. Sato	Teddy I. Seidenfeld	Elizabeth C. Smith	Mark Lionel Suda	Thomas P. Turiel	Clarice R. Weinberg
Nathan E. Savin	Thomas R. Sexton	Eric P. Smith	James J. Swain	Leo T. Upchurch	James G. Wendelberger
John W. Sawyer	Ramalingam Shanmugam	Richard J. Smith	Yoshio Takane	Thomas J. Uryniak	Robert M. Wharton
William G. Saylor	Steven J. Shapiro	Richard L. Smith	Roy Noriki Tamura	Esa Ilkka Uusipaikka	Glenn Dean White, Jr.
Stephen M. Scariano	Mohammed A. Shayib	Robert A. Smith	Deborah L. Tasky	Pamela M. Vacek	David C. Whitford
Stephen Schacht	Mack C. Shelley	Tom A.B. Snijders	Robert L. Taylor	Richard Craig Van Nostrand	Dexter C. Whittinghill
David J. Schaeffer	Mark R. Shenkman	Karen L. Snowdon-Way	Marcia A. Testa	Stephen B. Vardeman	Priya J. Wickramaratne
Kenneth Schechtman	Weichung J. Shih	Francisco P. Soler	Brian J. Thelen	Denton R. Vaughan	Christopher John Wild
Mark J. Schervish	Lucy Shneyer	Eric R. Sowe	Hanspeter Thoeni	Steve P. Verrill	William E. Wilkinson
Mark F. Schilling	Gary L. Shoop	Terence P. Speed	Mary E. Thompson	Joseph G. Voelkel	Thomas R. Willemain
Brian R. Schlain	Patrick E. Shrout	Clifford H. Spiegelman	Theodore J. Thompson	Joachim Vollmar	Jeffrey R. Wilson
Mark D. Schluchter	Stanley A. Shulman	Gene D. Sprechini	Anthony D. Thrall	Edward F. Vonesh	William E. Winkler
Paul R. Schneeman	Arthur R. Silverberg	Donald M. Stablein	Luke-Jon Tierney	Grace Wahba	F. Lennie Wong
Donald E. Schreiner	Jeffrey S. Simonoff	Joel H. Steckel	Richard B. Tiller	Paul G. Wakim	Farroll T. Wright
Charles B. Schriver	Judith D. Singer	Barbara Stevens	Naitee Ting	Joel A. Waksman	Linda J. Young
Steven J. Schwager	Joan H. Skurnick	Robert A. Stine	David C. Trindade	Lars Walloe	Elizabeth R. Zell
Sidney H. Schwartz	Charles Eugene Smith	Michael A. Stoto	Claire Tsao	Carol Weideman	
David W. Scott		Walter W. Stroup	Ruey-Shiong Tsay	David L. Weimer	
Marilyn M. Seastrom			Clyde Tucker		

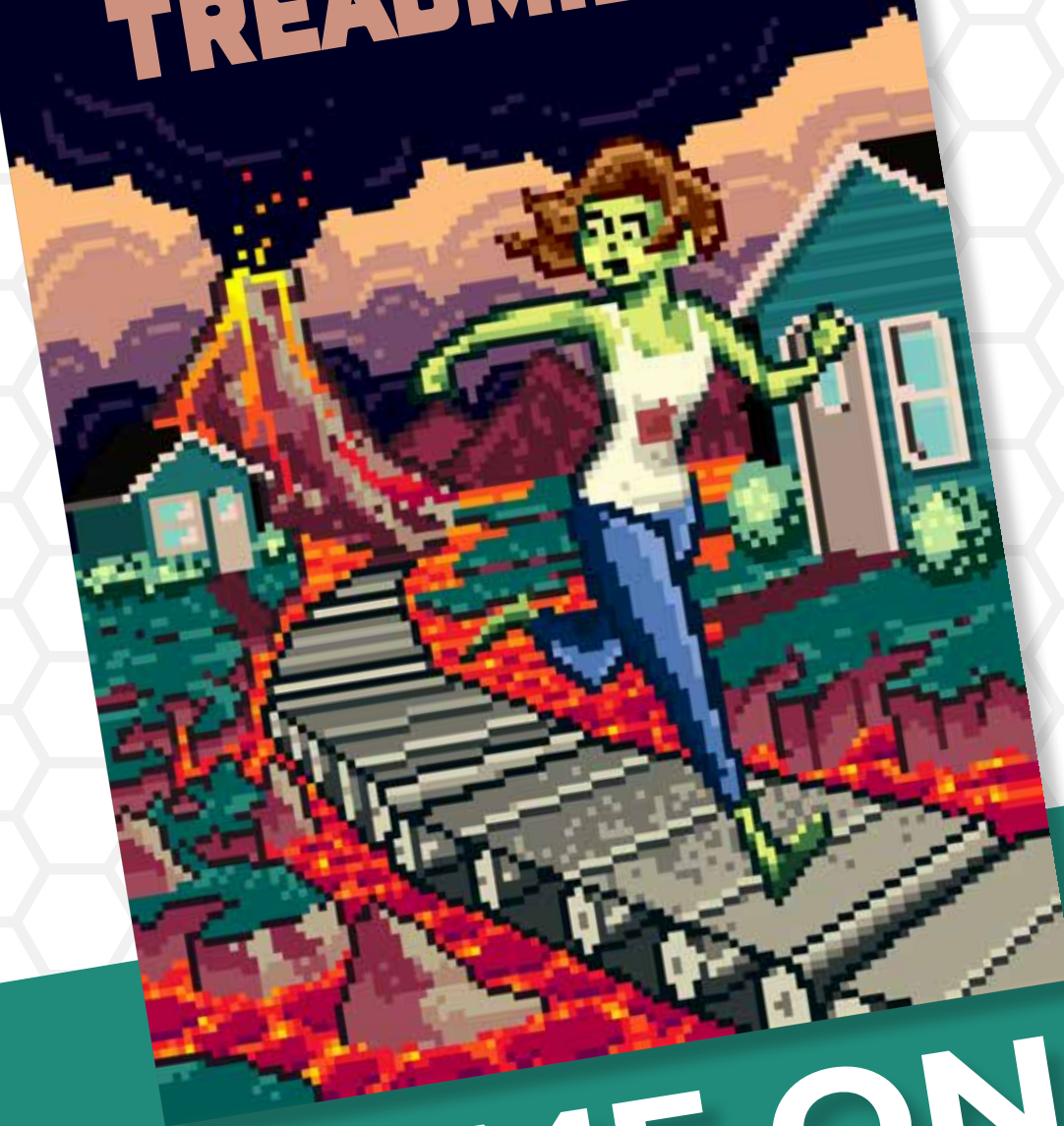
35–39 Years

Joseph Adwera-Boamah	Bruce Steven Binkowitz	Subhabrata Chakraborti	John L. Czajka	Gwyn R. Ferguson	Michael M. Granaas
Chul W. Ahn	Paul K. Black	Charles W. Champ	Mark Y. Czarnolewski	Eric Jeffrey Feuer	Michael A. Greene
Sung K. Ahn	Carol Joyce Blumberg	Theodore C. Chang	Veronica A. Czitrom	Denzil G. Fiebig	Daniel A. Greer
Christian M. Alaouze	Mary Ellen Bock	Douglass S. Chapman	Richard A. Davis	Patrick E. Flanagan	Timothy G. Gregoire
Demissie Alemayehu	Barry A. Bodt	Robert L. Chastain	Anthony C. Davison	Stergios B. Fotopoulos	Yves Grize
Dhammika Amaratunga	Steven B. Boswell	Jean Chesson	Pieter J. de Jongh	Floyd J. Fowler	Miriam S. Grosof
Kathryn H. Anderson	Leonard E. Braitman	Christy Chuang-Stein	Richard D. De Veaux	David J. Francis	Antonio F. Gualtierotti
John Angle	Craig C. Brandt	Constance F. Citro	Roger L. Deaton	Christine A. Franklin	Pushpa L. Gupta
John E. Angus	Pamela W. Broene	Murray K. Clayton	Thomas A. Delehanty	Jerome Frieman	Ramesh C. Gupta
Gerhard Armingier	Thomas W. Broene	Mario A. Cleves	Dipak K. Dey	Peter P. Gaccione	Sam Gutterman
Sarah J. Arterburn	William J. Browning	James J. Cochran	James DiCanzio	Shayne C. Gad	Wilbur C. Hadden
Babatunde J. Ayeni	Nancy E. Brucken	Richard D. Cohn	David M. Dillard	Lionel A. Galway	Alula Hadgu
Jenny A. Baglivo	Janet P. Buckingham	Michael Christopher Conlon	John S. Dixon	Joseph C. Gardiner	Marc Hallin
John Bailer	Carolee Bush	Margaret Conomos	Thomas W. Dobbins	Mary E. Garvin	Trevor J. Hastie
Steven A. Bailey	Kevin C. Cain	Nancy R. Cook	Ken Grant Dodds	James Connell Gear	John D. Healy
Donald E. Bamber	Carol Veum Caldwell	Germaine Cornelissen-Guillaume	Jeff F. Doerzbacher	Subir Ghosh	Nathaniel Alan Heckert
Anna E. Baron	Charles A. Calhoun	Stephen R. Cosslett	Susan L. Durham	Eric Ghysels	Donald R. Hedeker
Edward J. Bedrick	Richard Raymond Carlson	David A. Crabtree	Kirk A. Easley	Zvi Gilula	Daniel F. Heitjan
Stephen S. Bell	Michael L. Carniello	William S. Croson	Bruce P. Ekholm	Carl V. Gogolak	Wolf-Dieter Heller
Jonathan Berkowitz	John V. Castellana	David C. Cue	Ronald K. Elswick	Miguel A. Gomez-Villegas	Victoria Black Hench
Jonas V. Bilenas	N. Rao Chaganty		Brian John English	Nancy M. Gordon	Tim Hesterberg
Warren B. Bilker			James T. Fagan	William Warren Gould	Keith Heyen
			Charles M. Farmer		

Longtime members

Susan G. Hilsenbeck	Ingo Klein	Morteza Marzjarani	Sudhir Ranjan Paul	John Weldon Seaman	Ram C. Tiwari
Hideo Hirose	Mark D. Knowles	Cathy Mayhew	Robert J. Pavur	Gilg U.H. Seeber	Walter S. Tletski
Myron Hlynka	John Miller Koester	Allen A. McIntosh	Dennis K. Pearl	Bahman Shafii	Mark A. Traccarella
Brian Hochrein	Sarah Hurwicz Kogut	Raymond E. McIntyre	Darryl Neil Penenberg	Simon J. Sheather	Michael W. Trosset
James S. Hodges	Henryka K. Komanska	Gerald W. McLaughlin	Kimberly T. Perry	Lianne Sheppard	Kao-Tai Tsai
Robert Michael Hoekstra	Ken G. Kowalski	Gregory C. McLaughlin	Barbara H. Perry Cooper	Holly B. Shulman	Siu-Keung Tse
David B. Holiday	Rita M. Kristy	Paul B. McMahon	John D. Pesek	Stephen D. Simon	David M. Umbach
Frederick W. Hollmann	Gregory A. Kruger	Robert W. Mee	Walter W. Piegorsch	Douglas G. Simpson	Leslie A. Van Alstine
Welling C. Howell	Bertram Krumm	David W. Meek	Rebecca L. Pierce	Karan P. Singh	Robert L. Vogel
Pao-sheng Hsu	Richard A. Kulka	William S. Messina	Mark M. Pierzchala	Krishan Pal Singh	Stanley Von Hagen
Norma Faris Hubele	Joachim Kunert	R. Daniel Meyer	Michael J. Pomerantz	Barbara W. Sirotnik	Mark Von Tress
Esther Sid Hudes	Edmund C. Lau	Rosemarie Mick	Stanley Presser	Eric V. Slud	William Dennis Wacker
Beverley Adams Huet	Purushottam W. Laud	Ruth M. Mickey	J. Michael Price	Richard A. Smiley	Chih-Ming Wang
Clive A. Hunt	Michael Lavine	Steven P. Millard	Victor R. Prybutok	Marjolein V. Smith	Ronald L. Wasserstein
Gerardo Ignacio Hurtado	David J. LeBlond	Margaret A. Minkwitz	Charles P. Quesenberry	Steven M. Snapinn	Ann E. Watkins
Clifford M. Hurvich	William M. Lebow	Brian C. Monsell	Trivellore E. Raghunathan	Victor Solo	Michael T. Weaver
Shelley Hurwitz	Lawrence M. Leemis	Clinton T. Moore	David C. Randall	Andrew R. Solow	Sheila O'Leary Weaver
Linda S. Hyman	Peter J. Lenk	Dirk F. Moore	Dabeeru C. Rao	Refik Soyer	David W. Webb
James N. Issos	Peter E. Leone	Leslie M. Moore	Howard L. Rauch	James C. Spall	William J. Welch
Harald K. Iverson	Virginia M. Lesser	John P. Morgan	David M. Reboussin	John J. Spinelli	Stefan Wellek
Satish Iyengar	Hans Levenbach	Stephan Morgenthaler	Ray Redd	Andrew W. Spisak	Alan H. Welsh
Patricia A. Jacobs	Burton B. Lieberman	Christopher H. Morrell	James S. Roberts	Kadaba P. Srinath	Joanne R. Wendelberger
Debra J. Jacobson	Stephen B. Linda	Linda L. C. Moss	Richard A. Rode	Cidambi Srinivasan	Peter H. Westfall
J. Rodney Jee	Anne S. Lindblad	Lawrence H. Moulton	John W. Rogers	Paul G. Staneski	Donald B. White
Christopher Jennison	Ernst Linder	Hans-Georg Mueller	Jorge Luis Romeu	Leonard A. Stefanski	David A. Whitney
Daniel R. Jeske	Bo Henry Lindqvist	Robert A. Muenchen	Robert J. Rosati	Michael L. Stein	Alice S. Whittemore
B. Alan Johnson	Amanda F. Linnell Nemece	Jurgen Muller	Mitchell J. Rosen	Seth M. Steinberg	John L. Wieting
Roger W. Johnson	Regina Y. Liu	Jeri Metzger Mulrow	Francis J. Rossi	Lorraine C. Steiner	Christopher J. Williams
Wesley Orin Johnson	Lily Llorens	Daniel Najjar	Peter E. Rossi	Hal S. Stern	Jeffrey A. Witmer
Bradley A. Jones	Lily Llorens	Jayalakshmi Natarajan	Keith F. Rust	Susan LeRoy Stewart	Marty J. Witt
Wendell D. Jones	Andrew W. Lo	William Navidi	Jon Todd Sahlroot	Mark C. Strong	Luke G. Wolfe
John J. Judge	A. Russell Localio	Tapan K. Nayak	Michael E. Salzillo	Therese A. Stukel	Peter C. Wollan
Robert I. Kabacoff	Joseph J. Locascio	Fassil Nebebe	V. A. Samaranyake	Agus Sukmana	John R. Woods
Alan F. Karr	Robin H. Lock	Barry L. Nelson	Thomas D. Sandry	Shumei Sun	Werner Wothke
Sri Haryatmi Kartiko	Sharon L. Lohr	Steven Nettler	Sanat K. Sarkar	Shumei Sun	Patricia Wozniak
Laurent M. Kassalow	Anthony J. Lonardo	John M. Neuhaus	Albert Satorra	Tim B. Swartz	Lap-Ming Wun
Richard L. Kasul	James T. Love	William I. Notz	Daniel J. Schaid	Winson Taam	John Charles Wurst
Terry L. Katz	Joseph F. Lucke	William P. O'Hare	Michael J. Schell	Jeremy M. G. Taylor	Sergio Yanez-Canal
Sallie Keller	Esfandiar Maasoumi	Yoshimichi Ochi	Nathaniel Schenker	Veronica Taylor	Emmanuel Yashchin
John T. Kent	Greg Maislin	Ann W. Olmsted	David C. Schlotzhauer	Timo L. Terasvirta	K. F. Yee
Kurt T. Kessler	Dibyen Majumdar	Robert A. Oster	Stephen P. Schmaltz	Fisseha Tesfaye	James H. Yen
Ravindra Khattree	Lukas Makris	Mark C. Otto	Helmut Schneider	Jeffrey D. Tew	Cun-Hui Zhang
Choongrak Kim	Michael K. Mara	Franz Christian Palm	John R. Schoenfelder	Terry M. Therneau	Georgia Ziembra Morgan
KyungMann Kim	Laurentius Marais	Jeffrey R. Parno	Loren T. Schoof	Neal Thomas	Dale L. Zimmerman
Seock-Ho Kim	James C. March	Antonio Pascual-Acosta	John D. Schoolfield	Lori A. Thombs	David M. Zucker
Genshiro Kitagawa	James Stephen Marron		Lonni R. Schultz	David J. Thomson	Rebecca Zwick ■
John M. Kittelson				Michael H. Thomson	
				Yeow M. Thum	
				Robert W. Tipping	

ZOMBIES ON TREADMILLS



GAME ON!

Help celebrate Mathematics and Statistics Awareness Month
Donna LaLonde, ASA Director of Strategic Initiatives and Outreach

April is Mathematics and Statistics Awareness Month. The goal of this month-long celebration is to increase public understanding of and appreciation for statistics and mathematics. Past activities have included workshops, competitions, festivals, lectures, symposia, department open houses, math art exhibits, and math poetry readings. This year, we are celebrating by launching a game development challenge!

Virtual Science Fair

In addition to the game development challenge, we are celebrating MSAM with a virtual science fair. Working independently or as a member of a team, spend the month investigating an interesting topic and submit a short video highlighting your process and results.

What Students Do

- Formulate a question about a topic that fascinates you
- Design a plan to collect appropriate data to help you answer the question
- Use your plan to collect the data
- Use appropriate graphical and numerical methods to analyze your data
- Interpret your analysis and answer your original question
- Create a 3–5-minute video showcasing your process and results
- Write a short essay outlining your process and analysis to accompany your video

What Teachers, Parents, or Sponsors Do

- Submit a form online to register your student or team for the virtual science fair
- Assist your student or team in the final submission of the video and essay

Good to Know

The science fair is open to any student in grades K–12. Homeschoolers may participate. There are three grade categories: K–4, 5–8, 9–12. In each category, projects may be submitted by individuals or teams composed of 2–3 students. All the students on a team must be in the same grade category. Registration and video and essay submission are due by 11:59 p.m. ET June 1. Winners will be notified by July 1. Visit <https://bit.ly/2TRQ6Un> for more information.



Photo courtesy of Laber Labs

North Carolina State University graduate students Jesse Clifton, Alex Cloud, and Kyle Duke play “Space Mice” in Laber Labs. Find it and more at www.laber-labs.com.

“Alex, I will take Statistical Questions for \$100.” From that quote, you may have guessed being a contestant on “Jeopardy” is on my bucket list. Before joining the American Statistical Association staff, one of my favorite teaching activities was to collaborate with colleagues to plan and host summer computer camps for middle-schoolers. As you may know, middle-schoolers have a lot of energy, so we had to plan a variety of activities.

Playing STEM “Jeopardy” was one successful activity. We would create a “Jeopardy” game complete with the appropriate theme music. The campers would compete as teams to state questions for the “answers” in STEM categories. It was active learning and fun.

Fun and educational games are effective resources for teaching and learning at all levels. To help celebrate Mathematics and Statistics Awareness Month (MSAM) and as part of ASA President Wendy Martinez’s K–6 presidential initiative, we are launching a game development challenge. We want you to be creative, so your game can be a board game, card game, video game, or Shiny app like the Correlation Game (<https://bit.ly/2Qg4nrP>). Although the initiative is focused on K–6, your game may be for any age level.

The Correlation Game, STEM “Jeopardy,” and the Laber Lab video games highlighted in the MSAM poster (see centerfold) are great examples, but we want more! Working with colleagues or independently, generate ideas—apps, video games, board games, and card games. A panel will judge all the submissions and prizes will be awarded. Submissions will be accepted until July 1, 2020.

To enter the contest, you will need to provide a brief description of your game and specify the grade level for which the game is designed. Use the form at <https://bit.ly/2TREGK1> and enter as many ideas as you have. Game on! ■

CHECK
OUT THE
CENTERFOLD FOR
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Reaching Your Networking Peak: A Guided Networking Session at JSM



Claire McKay Bowen is the lead data scientist for privacy and data security at the Urban Institute. She is a member of the ASA Committee on Career Development, secretary/treasurer for the Statistical Computing Section, and program chair for the Physical and Engineering Sciences Section.



Elizabeth Mannhardt is a statistician at the US Environmental Protection Agency. She is active in the ASA, currently serving as past chair of the Government Statistics Section and recently as 2018 president of the North Carolina Chapter. She is also an adjunct associate professor in the department of statistics at North Carolina State University.

The Joint Statistical Meetings (JSM) and other conferences are great venues to network with people from around the world. However, for many students and early-career professionals, networking can be extremely intimidating. Additionally, although networking is an essential skill at all stages of a professional's career, courses and/or training on how to network may be hard to find. With the goal of helping students and early-career statisticians, the ASA Committee on Career Development (ASA CCD) hosted the guided networking session, "Reaching Your Networking Peak," at JSM 2019 in Denver and will host the same event at JSM 2020 in Philadelphia.

In Denver, pro-networker Sally Morton, dean of the college of science at Virginia Tech and an ASA former president, discussed topics such as introducing yourself confidently. Each topic discussion was followed by three five-minute practice sessions during which participants had the opportunity to interact with more experienced members of the ASA community. Color-coded tags indicated whether the seasoned networkers were from industry, government, or academia, so participants could connect with professionals in the career area they plan to pursue.

These volunteers were invaluable, as they provided both constructive feedback and a friendly networking environment in which participants could practice their own networking skills. The engagement, encouragement, and active learning between the attendees and volunteers was energizing," said Morton. "We all left the session with practical tips and increased confidence—thanks to the Committee on Career Development and Claire for the impactful session!"

Morton also solicited networking tips from the seasoned networking volunteers. Tips included how to exit a conversation gracefully and the importance of eye contact.

Feedback was overwhelmingly positive from both participants and volunteers:

"As a shy person with little networking experience, meeting people at a large conference like JSM was really daunting. The session gave me the



Sally Morton is dean of the college of science at Virginia Tech and a former ASA president.

confidence boost that I needed to network with potential employers and interview well at the Career Service." – Kara Martinez, North Carolina State University graduate student

"Sally helped me beef up my one-liner game for the next time I'm stuck alone at a JSM mixer." – Eva Tourangeau, University of Washington graduate student

"It was great to have such a well-organized and focused event to start JSM. As a mentor, I enjoyed listening to Sally Morton and thinking about ways to help our students learn how to network at conferences." – Emily Griffith, SAMSI deputy director and North Carolina State University associate professor

"The students from NCSU who attended gained a lot of confidence. We were so inspired by this that we are organizing a smaller version of this at NCSU before ENAR using ASA CCD materials." – Kara Martinez, 2019 ASA CCD guided networking participant



Sally Morton shares networking tips with a packed room of volunteers and participants at JSM 2019 in Denver.



Participants practice Sally Morton's suggestions with seasoned networking volunteers.

"It was great to interact with young professionals and students. They were excited to ask about insights on how to navigate JSM and benefit from networking at conferences and other professional events." – Elizabeth Mannshardt, US EPA

Looking Forward to JSM 2020

ASA President-elect and Vice President and Chief Methodologist Director at the Urban Institute Rob Santos will lead the 2020 JSM guided networking session in Philadelphia as the pro-networker. ASA CCD will also welcome seasoned networkers as volunteers. Based on feedback from 2019, the ASA CCD plans to have an area for networking and an area for sitting, as well as water drinking stations.

Organizer Takeaways

The ASA CCD received overwhelmingly positive feedback from participants, volunteers, and Morton. Given the success of the session, the organizers encourage academic institutions to consider hosting similar events locally to help their students become networking pros. Full session details and tips for organizers can be found on the ASA CCD blog at <https://bit.ly/2Qvn36X>. Visit the ASA CCD Upcoming Events page at <https://bit.ly/2xbm4lo> for details about the 2020 schedule and additional CCD offerings such as office hours and professional development webinars, including "A Beginner's Guide to Navigating JSM." ■

EDITOR'S NOTE
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NYU Abu Dhabi and Pfizer Inc. Collaboration Drives Progress

Raghib Ali, New York University Abu Dhabi; Omar El Shahawy, New York University; Kelly H. Zou, Upjohn Division, Pfizer Inc.; Scott Sherman, New York University; Michael Weitzman, New York University; and Amrit Ray, Upjohn Division, Pfizer Inc.



Photo courtesy of Amina Cherchali

Delegates, instructors, and organizers of the joint Clinical Research Training Program held at New York University Abu Dhabi November 24, 2019

EDITOR'S NOTE

The authors are respective employees of New York University Abu Dhabi, New York University School of Medicine, and Upjohn. Views expressed are their own and do not necessarily represent those of their employers. Editorial support was not provided.

New York University Abu Dhabi (NYUAD) and the Upjohn Division of Pfizer Inc. (Upjohn) launched a collaboration—the Clinical Research Training Program—to bring academia and the private sector together to build scientific research capacity in the United Arab Emirates (UAE).

This collaboration is based in Abu Dhabi and has the mandate of both building research capacity in the UAE and contributing scientific insights that can affect the population locally, regionally, and globally. The long-term vision of the partnership is to harness observational data, randomized clinical trials, and analytical skills to generate real-world evidence (RWE) to advance the prevention

and management of noncommunicable diseases (NCD).

RWE is the clinical evidence regarding the usage and potential benefits or risks of a medical product derived from analysis of real-world data (RWD), according to the US Food and Drug Administration. RWE can be generated by different study designs or analyses, including randomized trials, large simple trials, pragmatic trials, and observational studies (prospective and/or retrospective). RWE offers possibilities for translating data into meaningful health outcomes, particularly through observational studies, patient-reported outcomes, clinical trial optimization, synthetic control arm construction, and pragmatic trials.

As analytic capabilities and digital innovation mature, there are new opportunities to analyze high volumes of data in an efficient way, harnessing computational power and artificial intelligence.

The Clinical Research Training Program is designed to provide the basic research skills and advanced analytic skills needed to enable researchers in the UAE to drive scientific initiatives that include RWD and RWE.

The Inaugural Research Training Module

The first module of the Clinical Research Training Program attracted more than 40 delegates, who were exposed to presentations concerning qualitative and quantitative methodology from NYU

faculty members and Upjohn experts to serve as a foundation for the ensuing series of modules.

An array of topics was introduced and innovative and highly interactive teaching methods were used to engage delegates. For example, VoxVote, a mobile app to facilitate teaching, enabled live voting during presentations. Core topics included the following:

- Assumptions in research, qualitative and quantitative approaches, assessing validity of your research question, and steps in conducting research
- Discrete and continuous data probability distributions, estimation, and central limit theorem, confidence intervals
- Introduction to systematic reviews as a research methodology
- Protection of human subjects, informed consent, and patient and data confidentiality
- Sampling in quantitative and qualitative research
- Study design and causal inference

Vision for a Successful Private-Public Partnership

By working closely across sectors through scientific partnerships (e.g., the pharmaceutical industry, academia, and government), previously disparate data and discrete tools can converge to generate new scientific insights, identify risk factors, and define interventions that can make a difference in relieving the burden of NCDs.

For more information about the Upjohn and NYUAD partnership, visit <https://bit.ly/2wEb3cm>. ■



Diversity Mentoring Program participants took part in JSM 2018 in Vancouver, British Columbia, Canada. The 2020 program will be held during JSM 2020 in Philadelphia, Pennsylvania.

Applications Encouraged for Diversity Mentoring Program

The 2020 JSM Diversity Mentoring Program will be held during the Joint Statistical Meetings, taking place August 1–6 in Philadelphia, Pennsylvania. This program, provided by the ASA's Committee on Minorities in Statistics, brings together historically underrepresented minority (e.g., African/African American, Hispanic/Latino, and Native American) statisticians and data scientists at early- to mid-career levels with senior-level statisticians and data scientists from academia, government, and the private sector. The program features one-on-one mentoring and professional development such as engaging small-group discussions and networking.

Interested students and professionals are encouraged to apply on or before May 31. Limited student travel funding

About the program

The 2020 Diversity Mentoring Program is celebrating 10 years of mentoring, networking, leadership and skills development, community growth, and ensuring a diverse profession. Join the program this year as it brings underrepresented students and early-career professionals together with senior statisticians.

support is available. Full consideration for travel funding will be given to applications received by May 31. Applications received after May 31 will be considered as space allows.

For more information and a link to the application, visit <https://bit.ly/333Hugl> or contact Emily Butler at emily.lynn.butler@gmail.com. ■

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Meet Sylva Collins, Director of the Office of Biostatistics, US Food and Drug Administration



Sylva Collins joined the US Food and Drug Administration's Office of Biostatistics in the Office of Translational Sciences of the Center for Drug Evaluation and Research on August 19, 2019. She brings more than 30 years of drug development experience and biostatistics leadership to her position.

Prior to joining the FDA, Collins was vice president of biometrics at ACADIA Pharmaceuticals, based in San Diego, where she led all aspects of statistical design and analysis of clinical trials, as well as statistical programming and clinical data management. She has emphasized standardization and automation to accelerate clinical development. She pioneered the large-scale deployment of electronic data capture at multiple companies, including Bayer and Novartis. She implemented standardization of biometrics systems and processes for large pharma organizations to allow near simultaneous regulatory submissions globally. She has experience leading large global biometrics organizations and has contributed to dozens of successful regulatory submissions in multiple jurisdictions.

Collins earned her bachelor's degree in mathematics from the American University of Beirut,

master's and doctoral degrees in statistics from Boston University, and later a master's degree in computer science from New York University.

Please tell us about your work as director of the Office of Biostatistics at the US Food and Drug Administration?

The Office of Biostatistics (OB) at FDA enjoys a reputation for excellence. Seeing it up close is even more impressive.

OB's core mission is to ensure the safety and efficacy of drugs and biologics. Our staff reviews regulatory submissions for new drugs, therapeutic biologics, and generic products (NDAs, BLAs, and ANDAs). We check for data quality and completeness; perform thoughtful, state-of-the-art statistical analyses to determine the validity of the sponsor's analyses; assess risk vs. benefit in support of product approval; and present findings to advisory committees. Once drugs are approved, our mission continues. We develop methods for post-marketing surveillance and review surveillance studies.

OB's role in reviewing hundreds of applications is well known. However, our role extends beyond application review. Our statisticians advise sponsors on statistical approaches in study protocols. In 2019, OB reviewed more than 350 NDAs, BLAs, and ANDAs and provided advice on more than 2,500 study protocols.

There are nearly 250 analysts, statisticians, and support staff in OB. Almost all the staff hold advanced degrees in statistics or biostatistics. The majority have PhDs.

Our staff stays current on all relevant statistical developments. They conduct independent research on statistical methodologies relevant to Center for Drug Evaluation and Research's (CDER's) scientific mission and regulatory review process. Research includes such topics as Bayesian methods, meta-analysis, risk-benefit analysis, signal detection, and bioequivalence. In 2019, OB staff published more than 70 papers in peer-reviewed journals about these topics.

The Office of Biostatistics recently completed a reorganization (Figure 1) to align with a larger reorganization of the Office of New Drugs.

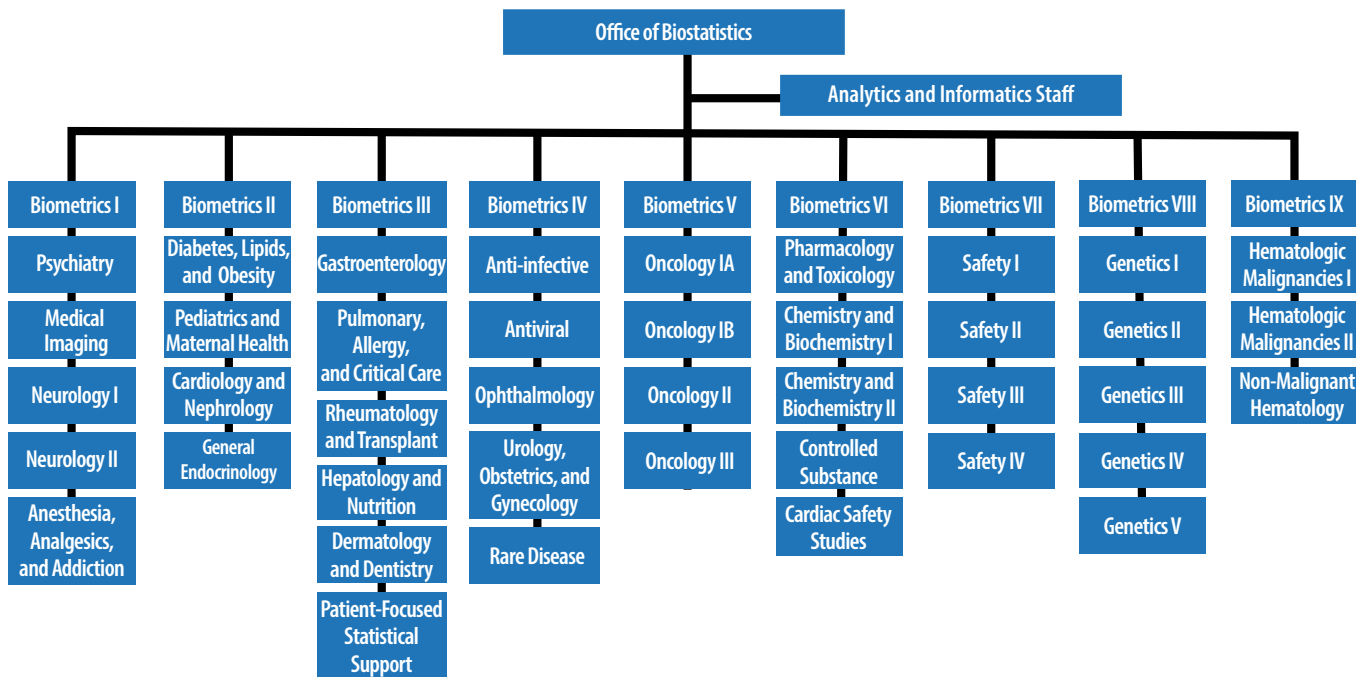


Figure 1: The Office of Biostatistics organizational structure

What about this position appealed to you, and what are your priorities for the next few years?

OB’s overarching objective is to maintain global scientific leadership and rigorous standards for statistical reviews of drug applications while striving constantly to be faster and more efficient.

Biostatistics is an open field. Our staff carries out independent research on statistical methods relevant to CDER’s mission. There are many ongoing and emerging topics in statistical design and analysis. There is strong motivation to reach more definitive conclusions in less time.

We are at the forefront of promoting complex innovative clinical trial designs and patient-focused drug development. An emerging topic is the use of real-world evidence (RWE) for regulatory decisions. Our statisticians organize public workshops, develop guidance documents for industry, and present about these topics at professional conferences.

We are speaking with industry, academia, and the patient community about innovative approaches to drug development and approval, including nontraditional data sources such as RWE, external controls, and Bayesian methods. These present interesting statistical challenges to exploit available data while avoiding bias and other statistical pitfalls.

It has been an exciting first few months. Coming up to speed on all the initiatives in OB has been a large but enjoyable experience. Just getting to know the staff members and their capabilities has been rewarding.

What do you like most about working as a statistician for the FDA? What’s most challenging?

There are two basic parts to the statistician’s job. One is to identify the relevant statistical methods needed to reach a useful conclusion. The other is getting it done.

OB is a focal point for statistical development. It is where statistical theory meets statistical practice. The development of new pharmaceuticals adds some dimensions to the question of statistical inference. In the practical world, we must always be cognizant of time and efficiency. Our overriding objective is to serve patients. We cannot ignore the cost in time and resources when working to improve strategies for drug development.

In these regards, this is an exciting time to be a statistician. In my position, I can contribute to the process of accelerating these new strategies.

The esteem with which OB is held in the industry is well known. Nonetheless, FDA does not have all the answers, nor does it have all the questions. At FDA, I can fully collaborate with industry and academia. OB not only reviews protocols and submissions, but also makes original contributions. It is stimulating to be at the intersection of statistical theory, clinical trial practice, and regulatory oversight.

What was your training and career path to your current position?

Prior to FDA, all my positions were in the pharmaceutical industry. These positions ranged across sponsors, contract research organizations, and software developers. My very first position at Lederle Laboratories came

immediately after completing my PhD in mathematical statistics at Boston University. My title was research statistician. Soon after, I enrolled in a graduate program in computer science at New York University, where I completed a master's degree. My roles in the industry have included leadership positions in statistics, data management, statistical programming, and health economics. In all my positions, I have achieved efficiencies by means of standardization and application of relevant computer technologies.

What advice would you offer younger statisticians and students who might be interested in working for the government?

OB is a very rewarding place to deploy skills in biostatistics, statistical programming, and project management. By many measures, OB offers a great opportunity to apply the most sophisticated techniques in biostatistical analysis. Our statisticians serve to protect the American public by ensuring that safe and effective drugs are available.

We review thousands of new protocols every year submitted by sponsors from all over the world.

In addition, we develop new methods of analysis and write guidance documents for industry. Our staff is expected to stay current on all relevant developments, to participate in the activities of professional societies, and to give presentations at technical conferences. Newly hired staff are mentored by senior staff and collaborate broadly with other regulatory scientists.

Part of FDA's mission is to ensure the safety and efficacy of new drugs and monitor existing products. Regulatory statisticians play a vital role in analyzing a constant stream of new data to carry out its objectives.

Working at OB has many characteristics of academic research. Statisticians are not only reviewing state-of-the-art regulatory submissions, but also developing fundamentally new statistical approaches. The breadth of analysis is that of the entire pharmaceutical industry.

The newly hired statisticians are assigned a senior mentor to introduce them to the regulatory environments, the review process, and their role in developing new methods of analysis. Many of our new statisticians participated in the ORISE (Oak Ridge Institute for Science and Education) summer internship program, where their mentoring began.

2020 Spring Research Conference Slated for May in Michigan

The 2020 Spring Research Conference (SRC) of the Institute of Mathematical Statistics (IMS) and American Statistical Association Section on Physical and Engineering Sciences (SPES) will be hosted by the Oakland University Department of Mathematics and Statistics May 20–22. (**Editor's note:** Due to Covid-19, dates and formats for meetings, conferences, and workshops may change. Please check event websites often for updates.)

Alfred O. Hero of the University of Michigan and Roshan Joseph of Georgia Institute of Technology are the keynote speakers. A list of invited speakers and topics can be found at <https://bit.ly/2UeZEaP>.

SRC has been a popular venue for interaction between industry and academia with an emphasis on applied topics, novel applications, and new methodological developments in statistics. As a conference smaller in size than JSM, it provides an ideal environment for closer and more informal interactions and exchange of research ideas.

Oakland University is located half way between Detroit and Flint, Michigan. Southeast Michigan has pleasant weather during late May, and the area is known for its beautiful lakes, beaches, water sports, and historic museums. Meadow Brook Theater and the historic Meadow Brook Hall are on the Oakland campus, and Henry Ford Car Museum is a 45-minute drive away. Windsor in Ontario, Canada, is also about 45 minutes from the campus.

More information about the conference can be found at <https://bit.ly/2WvIF6O>.

How does one find out about opportunities for internships and employment at FDA?

There are many avenues to find a job at FDA. Graduate students would be particularly interested in the ORISE summer internship program.

ORISE Research Participation Training Program

The goal of the ORISE Research Participation Training Program is to provide practical scientific training for scientists and physicians through the performance of scientific projects onsite at the FDA. All the projects are relevant to the FDA's mission.

Office of Biostatistics Recruitment Program

The Office of Biostatistics recruits statisticians through a continual search for qualified master's- and doctoral-degree candidates who are interested in statistical methods in clinical trial conduct and evaluation, risk assessment, pharmacovigilance (statistical reviewers), and statistical programming (statistical analysts).

Information about employment with the FDA is available at www.fda.gov/about-fda/jobs-and-training-fda and <https://bit.ly/2Izj3gG>.

Additional information may be obtained by emailing CDER-OTS-OB-Recruitment@fda.hhs.gov.

Please tell us about your personal interests or hobbies.

I enjoy spending time with family, boating in New England, and traveling widely. Recently, we explored a number of the western national parks. ■

COPSS to Host First Scott Lecture, Fisher Lecture at JSM 2020



Kathryn Roeder will be the R.A. Fisher Lecturer at JSM 2020 in Philadelphia, Pennsylvania.



Amita Manatunga will be the Elizabeth L. Scott Lecturer at JSM 2020 in Philadelphia, Pennsylvania.

The Committee of Presidents of Statistical Societies (COPSS) will host the 2020 Elizabeth L. Scott and R.A. Fisher lectures at the Joint Statistical Meetings in Philadelphia, Pennsylvania.

The Elizabeth L. Scott Award committee awarded the 2020 Scott Lecture to Amita Manatunga of Emory University. She was selected as this year's recipient for her dedicated mentoring of the next generation of statisticians; committed leadership in expanding statistical opportunities for women and minorities at the individual, institutional, and professional society levels; and excellence in biostatistical research.

Manatunga is Donna Jean Brogan Professor of Biostatistics and Bioinformatics in the Rollins School of Public Health at Emory University. She was born and raised in Sri Lanka and earned her BS in physics and mathematics with first-class honors from the University of Colombo, Sri Lanka. She earned her master's in statistics from

Purdue University and her PhD in statistics from the University of Rochester in 1990. Manatunga was an assistant professor of biostatistics at Indiana University before joining Emory in 1994.

Manatunga's research is inspired by the need for innovative statistical methods in important and complex public health problems. Three primary areas of application she has worked on are mental health, epidemiology, and nuclear medicine. She has made substantial methodological contributions in multiple areas, including survival analysis, interpretation of diagnostic markers, agreement studies, and functional data. She has also published more than 125 peer-reviewed papers and been funded by numerous methodological and collaborative grants from the National Institutes of Health (NIH). Manatunga is a recipient of many awards, including a FIRST award from NIH in 1996 and fellow award from the ASA in 2004.

Throughout her career, Manatunga has served as a mentor to many graduate students, junior faculty,

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Manatunga Also Named Donna J. Brogan Professor in Biostatistics

Kelly Jordan

Amita Manatunga has been named as the inaugural Donna J. Brogan Professor in Biostatistics. This endowed professorship recognizes Manatunga's excellence in teaching and research—particularly as it relates to the field of biostatistics—and honors the legacy of Donna Jean Brogan.

“Being named as the Donna J. Brogan Professor is personally gratifying and deeply meaningful to me,” says Manatunga. “Donna is a mentor and a colleague who I have long admired and respected. She is a wonderful role model in light of her extensive contributions to the advancement of the careers of women, her scholarship, and her honesty and integrity. It is incredible to be a part of her legacy in this way.”

This is the first named professorship in the department of biostatistics and bioinformatics other than the Rollins Professorship, which is designated for the chair of the department.

Aside from recognizing Brogan's illustrious career, this named professorship also serves to commemorate the contributions women have made to biostatistics, a field in which women have historically been underrepresented. Brogan is also hopeful it will help attract more exceptional people to the field (particularly women), like Manatunga.

“Amita is a good fit for the named professorship because of her excellence in all aspects of a model biostatistics career,” says Brogan, referencing Manatunga's methodological research, collaborative research, teaching, service, and mentoring. “Her selection is a well-deserved acknowledgement of her past and ongoing contributions to the field.”

Manatunga has dedicated her more than 26-year career to advancing methods and applications of complex data structures to address critical public health problems, including mental health, epidemiology, and nuclear medicine. She has published more than 125 peer-reviewed manuscripts and is the senior biostatistician for Georgia Clinical and Translational Science Institute at Emory University and lead biostatistician for a phase-two clinical trial and another group randomized clinical trial.

Additionally, Manatunga has led seven major R01 grants on statistical methodology as principal investigator or multiple principal investigator and has served as a co-investigator to many collaborative, federally sponsored research grants. She has partnered with researchers across the university and helped establish a strong mental health methodology research group within the Department of Biostatistics that currently includes three full professors (all female).

and other researchers in biostatistics and the health sciences, with a focus on helping early-career women. She has chaired the ASA Committee on Women in Statistics and Gertrude Cox Scholarship for Women Award Committee and is deeply involved in multiple diversity initiatives. She is a co-founder (in 2010) and consistent supporter of ENAR's Diversity Caucus and a frequent invited speaker at workshops aimed at increasing diversity. Her contributions to ENAR's annual Fostering Diversity in Biostatistics Workshop—continuously since its inception—have had a lasting impact on the participants and many others who see her as a role model. Many of her former students are now in leadership positions in academia, government, and professional societies.

Manatunga's Scott lecture is titled “Statistical Methods for Diagnosis of Complex Diseases with Complex Data.” She will speak about innovative statistical methods addressing challenging problems in the diagnosis of complex diseases and characterization of their underlying mechanisms in two specific contexts. One is mental disorders, complex and multifactorial conditions often lacking reliable tools for diagnosis. Multiple instruments are often used to quantify the same mental health trait, and combining them is a challenge. A statistical framework will be proposed for creating new scales and interpreting new instruments on different types of measurements.

In a different setting, nuclear medicine practitioners collect and analyze diverse and complex

clinical data to characterize kidney obstruction, including renal images, renogram curves, and pharmacokinetic parameters. Due to the lack of well-established and objective guidelines for analyzing these data, clinical judgement of kidney obstruction heavily depends on the experience of the radiologist and typically has poor interrater agreement. A statistical model will be presented to effectively integrate information from different modalities and produce accurate interpretations and stable predictions of kidney obstruction.

Kathryn Roeder, UPMC professor of statistics and life sciences in the department of statistics and data science at Carnegie Mellon University, was chosen to give the R.A. Fisher Lecture.

Roeder, a former vice provost for faculty at Carnegie Mellon, is a professor in the department of statistics and data science and department of computational biology. Her research contributions are wide and deep in both statistical theory and applications. Her influences on the design and analysis of genetic studies are substantial.

Roeder earned a BS in biology from the University of Idaho and a PhD in statistics from Penn State. Prior to joining Carnegie Mellon, she held appointments of assistant and associate professor of statistics at Yale University. She has served in editorial roles for *JASA*, *Biometrics*, and *Genetics*. Roeder has supervised 19 PhD students and has been an outstanding mentor for numerous faculty members, particularly through her work on the Institute of Mathematical Statistics (IMS) New Researchers Committee.

Roeder has developed statistical approaches to exploiting and adjusting for heterogeneity in samples from populations using ideas of mixture modeling. Her solution to adjusting for confounding in genome-wide association studies, denoted *genomic control*, is now the standard. Roeder has also developed a framework to integrate information gathered from multiple types of study designs using Bayesian principles for gene discovery, a particularly valuable approach for high-dimensional data. Her development of an approach to identify discrete clusters whose membership may belong to two clusters, denoted *semi-soft clustering*, continues to make a profound impact on single-cell RNA sequencing analyses.

Roeder's collaborative work focuses on identification of the genetic basis of complex disease. She is one of the leaders of the Autism

Sequencing Consortium, an international organization dedicated to discovering the genetic etiology of autism. Her collaborative work has been published in *Scientific American*, *Cell*, *Plos Genetics*, and *Nature*.

Roeder is an elected member of the National Academy of Sciences; a fellow of the ASA, IMS, and AAAS; and an elected member of the International Statistical Institute. Her awards include the National Science Foundation Young Investigator Award, COPSS Snedecor Award, COPSS Presidents' Award, IMS Medallion Lecture Award, Janet L. Norwood Award, and Myrto Lefkapoulou Lecture Award. ■

Call for Virtual Workshop Practicum, Student Showcase Submissions

Due to the success of the six-part virtual workshop about various aspects and challenges of working with blended data (see <https://bit.ly/39K0cMC>), the Government and Social Statistics sections are continuing in fall 2020 with sessions focusing on user applications.

Hosted again as part of the ASA's professional development series, this virtual workshop practicum will share experiences putting the techniques and lessons learned into practice with a large statistical community without the inconvenience and cost of conference travel.

In addition to highlighting work from career professionals and seasoned practitioners in blended data, the sections are offering a student showcase within the practicum offerings so students can share their work with the statistics community.

Students and professionals can submit their projects putting blended data techniques into practice by sending a title and brief description (200-word abstract) to Government Statistics Section 2020 Chair Jenny Thompson at katherine.j.thompson@census.gov.

FY20 Budget Brings Increases for NIH, Select Statistical Agencies

The FY20 federal budgets were finalized in December, yielding the fifth consecutive year of multi-billion-dollar increases for the National Institutes of Health (NIH). The US Census Bureau budget was also increased to \$7.6 billion to complete the decennial census. Among the other highlights, as seen in Table 1, the National Science Foundation (NSF) received a \$200 million (2.5 percent) increase, the Bureau of Labor Statistics (BLS) received a \$13 million (2.1 percent) increase, and two federal statistical agencies received increases of many percent.

The FY21 budget request has the administration's usual cuts for the NIH, NSF, and Agency

for Healthcare Research and Quality (AHRQ), but also increases for the Bureau of Economic Analysis (BEA), BLS, and National Center for Education Statistics (NCES). The budget for the Census Bureau, one of the three economic statistical agencies along with BEA and BLS, is ramped back down, but its economic statistics accounts receive a modest increase as part of the administration's emphasis on economic statistics. President Donald Trump's FY21 budget also proposes to double the funding for research and development for artificial intelligence and quantum information science over two years.

The FY21 request has two impactful requests for the federal statistical agencies. In the Department

Table 1: FY16–FY20 Budgets and FY21 Requests

	FY16	FY17	FY18	FY19	FY20		FY21	
					Final (estimate)	Change from FY19	Request	Change from FY20
Research Agency (amounts in millions of dollars)								
NIH	32311	34229	37084	39084	41684	6.7%	38694	-7.2%
NSF	7463	7472	7767	8075	8278	2.5%	7741	-6.5%
AHRQ	334	324	334	338	338	0.0%	257	-24.1%
Statistical Agency (amounts in millions of dollars)								
BEA	105.1	103.8	99.0	101.0	108.0	6.9%	111.9	3.6%
BJS	41.0	45.5	48.0	43.0	43.0	0.0%	43.0	0.0%
BLS	609.0	609.0	612.0	615.0	628.0	2.1%	645.3	2.8%
BTS	26.0	26.0	26.0	26.0	26.0	0.0%	26.0	0.0%
Census	1370.0	1457.0	2814.0	3821.4	7558.0	97.8%	1599.8	-78.8%
EIA	122.0	122.0	125.0	125.0	126.8	1.4%	128.7	1.5%
ERS	85.4	86.8	86.8	86.8	84.8	-2.3%	62.1	-26.8%
NASS	168.4	171.2	191.7	174.5	180.3	3.3%	174.5	-3.2%
NCES	261.0	258.5	258.5	260.5	263.5	1.2%	294.5	11.8%
NCHS	160.4	160.4	160.4	160.4	160.4	0.0%	155.0	-3.4%
NCSES	58.3	59.7	62.4	64.0	65.0	1.6%	62.3	-4.2%
ORES	25.9	24.0	27.0	35.4*	38.8	9.6%	39.9	2.8%
SOI	37.8	34.3	33.7	35.9	34.7	-3.3%	37.4	7.8%

*The ORES budget increase from FY18 to FY19 is partially explained by the merging of the Office of Retirement Policy (ORP) into ORES. The FY18 ORP budget was \$2.3M.

of Education (ED), the administration proposes the transfer of the NCES's assessment responsibilities—which has a \$151 million budget in FY20—to a new center and the transfer of the appointment of the commissioner from the president to the director of the ED Institute of Education Sciences. The new center creates additional bureaucracy that could undermine the current efficiencies and benefits of having the array of statistical studies housed together and integrated. The removal of presidential appointment of the NCES commissioner runs counter to the ASA's efforts to have Senate confirmation of the commissioner, removed in 2012, restored to strengthen NCES's ability to provide objective and credible statistical data.

For the fourth straight year, the USDA proposes to cut the Economic Research Service (ERS) budget, this time by 27 percent. As justification, The White House states they seek “to eliminate low priority research that is duplicative of research at land-grant universities ... while still supporting ERS's core mission to develop the statistics needed to measure economic concepts in a dynamic farm and agricultural sector.” They specify the Census of Agriculture and Agricultural Resource Management Survey as high-priority statistical reports. The specific proposed cuts for ERS are \$11 million to research on agricultural markets and trade, farms, conservation, and agricultural research and development; \$8 million to research and analysis on food assistance, nutrition, and diet quality; \$2 million to rural prosperity and well-being research and analysis; and \$2 million to food safety research and analysis. Congress has rejected these cuts in past years and is likely to do so again.

The administration's congressional justification does affirm the ERS headquarters remains in Washington, DC, with 78 positions. The remaining 251 ERS positions are in Kansas City, Missouri, following last year's move, though an estimated 200 are in the early stages of being filled.

Excluding the Census Bureau, which has large swings for the decennial census, the median percentage requested for the federal statistical agencies trends up from -2.7 percent in FY18 to 0.8 percent for FY21, as seen in Table 3.

The requested increases for BEA and BLS are shown in Table 1. For the Census Bureau, the general economic statistics accounts see a requested increase of \$4.3 million to \$79.0 million that will be used for work with the BEA. In addition to the

Table 2: Requested Changes in Budget (Percent)

	FY18	FY19	FY20	FY21
BEA	-6.1	-1.0	6.9	3.6
BJS	-10.0	-14.6	11.6	0.0
BLS	-0.2	-0.5	0.0	2.8
BTS	0.0	0.0	0.0	0.0
Census	1.6	34.9	88.0	-78.8
EIA	-3.3	-8.0	-5.6	1.5
ERS	-11.6	-48.1	-48.7	-26.8
NASS	8.5	-13.9	-6.6	-3.2
NCES	-0.6	1.2	-0.6	11.8
NCHS	-3.4	-3.4	-3.4	-3.4
NCSES	-5.3	-4.2	-4.1	-4.2
ORES	24.0	14.8	6.7	2.8
SOI	-2.0	-0.6	-1.5	7.8

requested \$645 million for BLS shown in Table 1, there is an additional \$13 million requested to support the move of the BLS from Washington, DC, to the Census Bureau facilities in Suitland, Maryland. While the requested BLS increase is positive, if it were to be fully funded by Congress, BLS would still be down \$50 million in purchasing power since FY09, as seen in Table 3.

The requested increase of 12% for NCES is mostly a \$28 million increase for NCES's assessment line to address, in large part, the rising cost of developing and implementing digital-based assessments.

Turning to the finalized FY20 budgets, NIH again saw a sizable increase. For the more modest budgets of the federal statistical agencies, the Office of Research, Evaluation, and Statistics (ORES) in the Social Security Administration saw a 10 percent increase in FY20 over its FY19 level and the BEA saw a 7 percent increase. As seen in Figure 1, the increases mean each agency has the same or more purchasing power than they had in FY09. The BEA increase is to be used to harmonize the national, state, and industry release of gross domestic product data, develop and begin reporting on income growth indicators by 2020, and continue its work on the Outdoor Recreation Satellite Account.

The \$13 million increase for the BLS—accompanied by \$27 million in multi-year funding for

Mid-Size Federal Statistical Agencies

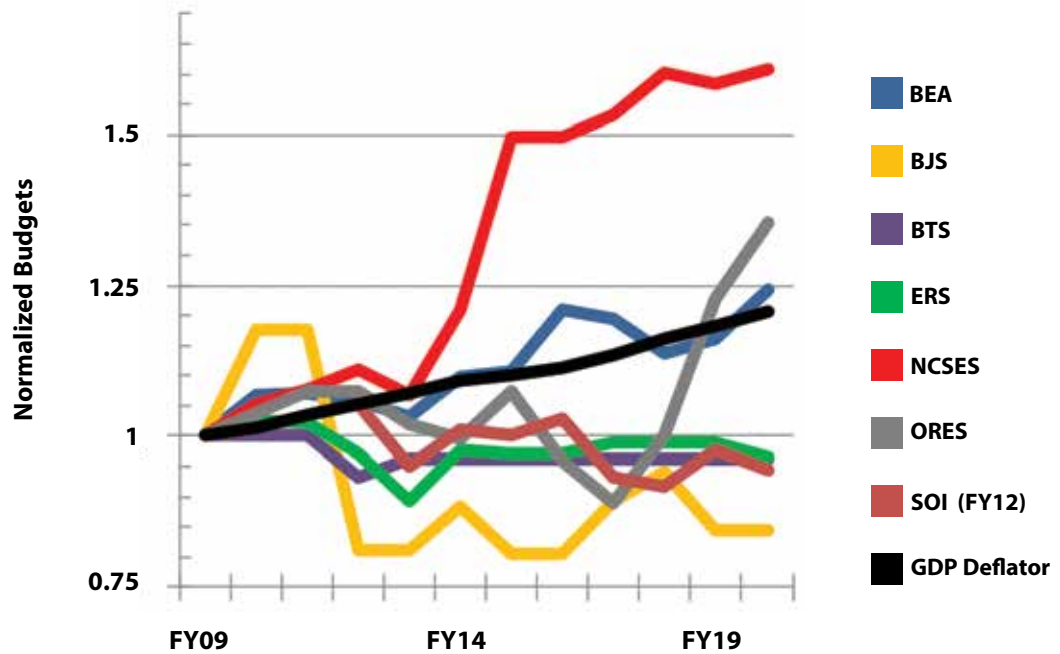


Figure 1: The budgets of the seven mid-sized statistical agencies normalized to their FY09 levels, along with the GDP deflator to account for inflation. Budget restructuring for ERS in FY15 and ORES in FY19 are accounted for in the graph to allow for comparison over this time period. One-time moving costs in FY16 for BEA are omitted.

Table 3: Agency Budgets in 2009 Dollars, Calculated Using the GDP Deflator

	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	% Change since FY09
BEA	87	91.9	90.2	87.6	83.8	87.5	87.4	94.4	91.5	85.2	85.4	89.5	2.90%
BJS	51	59.3	58.1	39.2	38.6	41.3	37.2	36.8	40.1	41.3	36.4	35.6	-30.10%
BLS	597	604	590.6	579	539	543	537	546.9	536.7	526.6	520	520.6	-12.80%
BTS	27	26.7	26.1	23.9	24.3	23.8	23.6	23.3	22.9	22.4	22	21.6	-20.20%
Census	4169	7142	1115	895	786	866	987	1230	1284	2421	3231	6266	50.30%
EIA	111	109.7	93	99.8	92.9	107	106	109.5	107.5	107.5	105.7	105.1	-5.30%
ERS	80	81.1	79.2	73.8	66.7	71.6	70.5	69.8	69.7	68.1	66.9	63.9	-20.10%
NASS	152	160.1	151.4	151	155	148	148	143	142.8	157	139.8	141.8	-6.70%
NCES	246	244.2	239.2	235	211	215	211	234.4	227.8	222.4	220.3	218.4	-11.20%
NCHS	125	137.4	134.3	132	130	128	127	130.2	127.8	124.8	122.6	120.2	-3.80%
NCSES	39	40.5	40.7	41.1	38.8	43.2	52.9	52.4	52.6	53.7	54.1	53.9	38.20%
ORES	27	27.7	28.1	27.6	25.7	24.7	26.3	23.3	21.2	23.2	28	30.3	12.20%
SOI	42	42.6	37.9	36.8	32.6	34	33.4	33.9	30.2	29	30.4	28.8	-21.80%

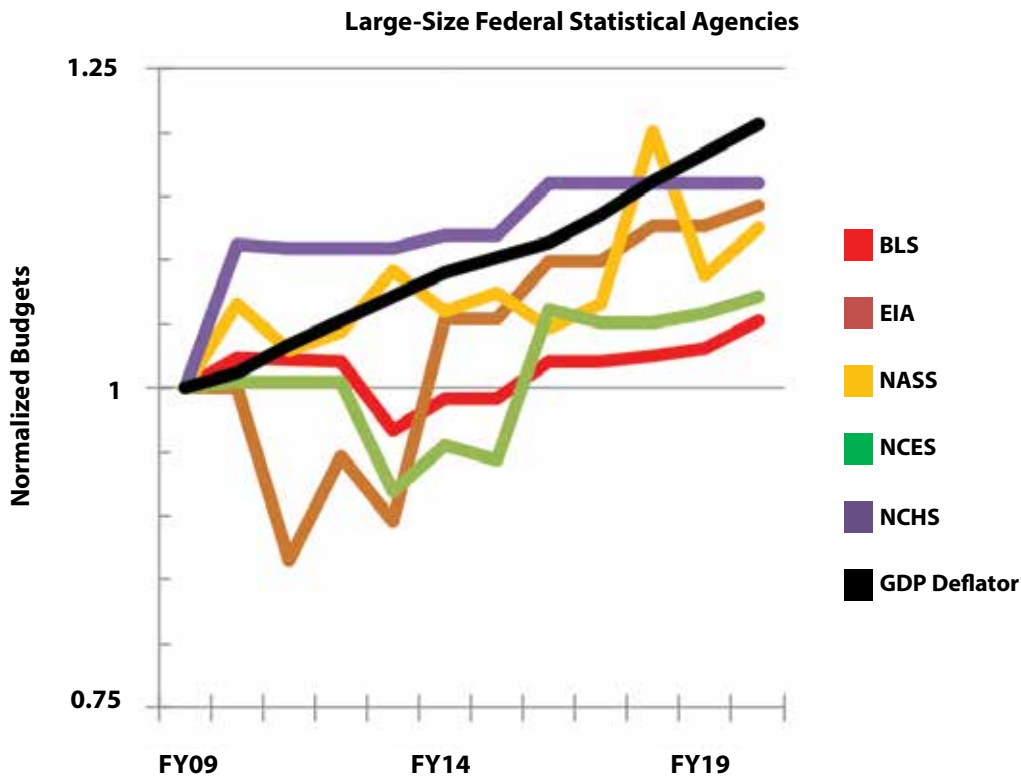


Figure 2: The budgets of five larger statistical agencies normalized to their FY09 levels, along with the GDP deflator to account for inflation. Census is omitted because of the large changes in the decennial census cycle. Budget restructuring for NASS and NCHS in FY15 is accounted for in the graph to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

the physical move of BLS to Suitland, Maryland—is to be used for an annual supplement to the Current Population Survey for the digital economy and work on a new National Longitudinal Survey of Youth cohort.

As noted in previous years, funding for the federal statistical agencies has been anemic, as seen in figures 1 and 2, where nine of the 12 (non-Census) statistical agencies have lost purchasing power due to inflation since FY09. This trend is also seen in Table 3, where the budgets are shown in FY09 dollars. For six of the agencies, the loss of purchasing power is greater than 10 percent. As a result, many of these agencies are struggling to track emerging trends and take advantage of methodological and technological advances that would help them improve data and reduce respondent burden.

The FY21 budget request also takes several steps to implement the Foundations for

Evidence-Based Policymaking Act and Federal Data Strategy, as Data Coalition Executive Director Nick Hart writes in “President’s 2021 Budget Includes Positive Signals for Data and Evidence Priorities” (<https://bit.ly/2Q35X04>).

*The ERS, NASS, NCHS, and ORES budgets were adjusted for their budget restructurings to make their budget levels comparable for the time period covered.

To follow the FY21 budget developments, see “FY21 NIH, NSF, and AHRQ Budget Developments” at <https://bit.ly/2TKG:65> and “FY21 Statistical Agency Budget Developments” at <https://bit.ly/3cP9OYj> and follow @ASA_SciPol on Twitter. Also, join the Count on Stats LinkedIn group at <https://bit.ly/3cV2quH>, where you can network with fellow supporters of the federal statistical agencies, share your observations and perspective, and receive relevant updates. ■

STATS4GOOD



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



With Earth Day on April 22, this month's Stats4Good column features the work of Data for Good scientist-activists to support and strengthen environmental action. The opportunities are endless, and D4G can have a huge impact for the benefit of the world around us.

For people just starting out in Data for the Environment, one way to get involved is by working with organizations you are supporting now. Maybe it's a nature center looking for teachers and other volunteers with an analytic background. Maybe it's a birding group needing analysis of bird counts to study trends and identify local risk factors. Maybe it's a community group needing practical, effective ways in which people can reduce their carbon footprint. Working where we are already connected and

participating in activities is a great way to introduce the power of statistics for environmental action.

While we cherish and are inspired by global leaders, the truth remains that most actions for preserving, protecting, and sustaining the environment take place in a local setting. The aphorism "Think Globally, Act Locally" is nowhere truer than in Data for Good. Whether supporting sustainable use of energy and other resources; wildlife conservation; human and habitat health; or air, water, and land pollution, the application of statistics and data science to support local projects often makes the biggest difference in turning broad goals into tangible results. One of the most basic questions we can ask is how local organizations participating in good environmental projects

can become even better through the application of statistical science. Partnering with local groups—often the same organizations where we are working now—is one of the best ways to get plugged in to a D4G project or start a new one.

Other promising opportunities can be found on the job. Corporations in a variety of industries are increasingly aware of the central role advanced analytics plays in addressing environmental issues. For example, a survey of business leaders undertaken by Intel found 74 percent saw a role for artificial intelligence in addressing these challenges. This trend is especially strong in tech industries: Corporations already using statistical science to guide their business and develop new products—or as their products—will see the value these same capabilities bring to acting as good corporate citizens for the benefit of the community.

The number of hackathons in Data for Good has exploded, and they have become one of the most important avenues for environmental Data for Good. Hackathons offer many advantages. They focus on a single important question; are prepared in advance so participants can focus on developing analytic solutions, networking, and collaborating; and are high in intensity with a specific, short-term time commitment. Local environmental groups and ASA chapters can make perfect partners for hosting a hackathon, so talk with members of your chapter to brainstorm ideas and find the right organization for a partner.

Another great way to use our analytic skills to make a big impact is through educational programs offered by nature centers affiliated with parks, colleges, and other institutions. Many volunteer teachers like to use statistics with M&M'S to show students how math can be used for good. For example, statistics can be used to describe benthic testing of macro-invertebrates—basically bugs that live in stream beds. Different genera have varying affinity for water purity, with some very sensitive to pollution. A few families actually prefer dirty water, and some are found in all water conditions. The equivalent mammal types are chipmunks for very clean environments, rats in adverse locations, and squirrels in almost all conditions.

Benthic testing is a popular and effective means for environmental resource centers to partner with the general public to monitor water quality. For a Statistics for the Environment session, each piece of candy represents one genus found in a water sample—the corresponding bugs only appear in

Get Involved

JSM is now less than four months away! This year, with the theme Everyone Counts: Data for the Public Good, JSM is the biggest D4G event anywhere. You can get all the details at ww2.amstat.org/jsm. I am looking forward to meeting many of you there, getting your feedback about this column, and talking about your plans for making a difference with Data for Good.

pictures. Blue pieces represent genera requiring very clean water, brown for dirty, green for those associated with algal blooms, and the other colors for genera without a water quality preference. Students can assess the quality of the water in their “sample” and match it to a map of the local watershed marked with colors at places in which the water was tested. Analysis of the patterns shows how pollution travels downstream and identifies locations in which the water quality deteriorates quickly. Classes like this are a fun way to introduce statistical science as a powerful tool for protecting the environment.

These are just a few of the many ways people are getting involved. The list of Data for Good projects to preserve and protect our planet is as colorful and diverse as the Earth itself. Each of us can have a role to play.

Each year in April, Earth Day brings to mind pressing environmental concerns and the different ways people can make a difference. Now is the time to start conversations—with our colleagues, in our communities, in the organizations we support, and in the workplace—about the roles Data for Good can play. From collecting, curating, and publishing environmental data to innovative research, greener manufacturing, and supporting data-driven decision-making and legislation, thousands of statisticians, data scientists, and other researchers are working to make the world a better, cleaner, healthier place. The dedication of countless people in this labor of love is reaching beyond the horizon to create a brighter future for all. In this, as in all our work, the Data for Good movement is changing the way people change with world. ■

MORE ONLINE

Intel Study: Applying Emerging Technology to Solve Environmental Challenges, <https://intel.ly/2IEYaS0>

STATtr@k

Do Pharmaceutical Statisticians Need a Master's Degree?

The vast majority of pharmaceutical companies and clinical research organizations (CROs) ask for a master's degree (MSc) in statistics (or medical statistics) when hiring statisticians, claiming these degrees in particular provide adequate preparation and the necessary hands-on experience needed to work in the industry.

However, how strict is this rule across different companies, and should it be a requirement? Can similar qualifications, such as an MMath or PGDip (which can have a lot of crossover with traditional statistics MScs), be equivalent and provide the required statistical training for a successful career in industry? Or, can a BSc be sufficient?

I aimed to answer these questions by asking senior statistical leaders and recruiters the following four questions:

- Would you employ a graduate statistician without an MSc in statistics, but with an alternative master's-level qualification?
- If yes, which alternative master's-level qualifications would you consider?
- Do you feel that not having an MSc would put someone at a disadvantage?
- Do you think the typical requirement for an MSc in statistics is justified or an unnecessary formality?

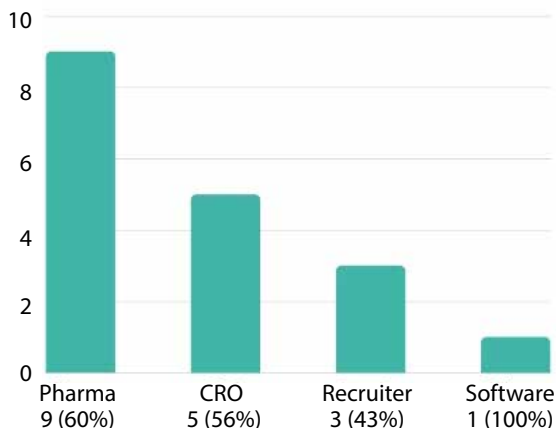
Of the 34 people emailed, 18 (53 percent) responded. The percentages below are out of the total for that type of company.



Sofia Baber

has five years of experience working as a statistician in the pharmaceutical industry. She earned her BSc in mathematics with honors and MSc in statistics from Imperial College London before joining Quanticate in their UK head office. She worked there for a year before moving to Canada.

Responders by company type

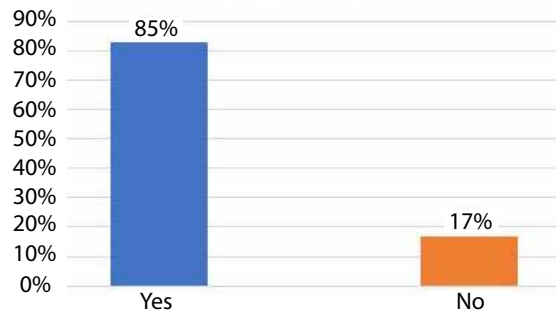


Results

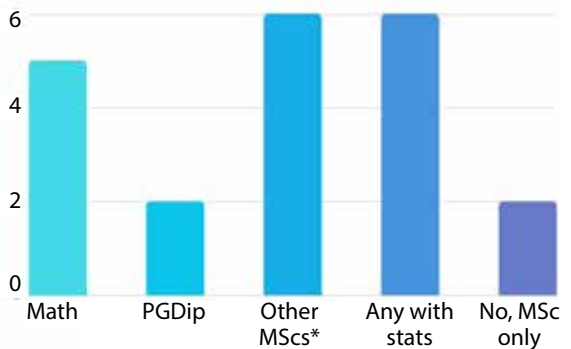
Would you employ a graduate statistician without an MSc in statistics, but with an alternative master's-level qualification?

Some "yes" answers came with a condition—if it was an exceptional candidate, if they had right skills, if there was a good foundation in statistics, etc. The yes/no split was even between pharma companies and CROs.

Would you employ a graduate statistician without an MSc in statistics, but with an alternative master's-level qualification?



If yes, which alternative master's-level qualifications would you consider?

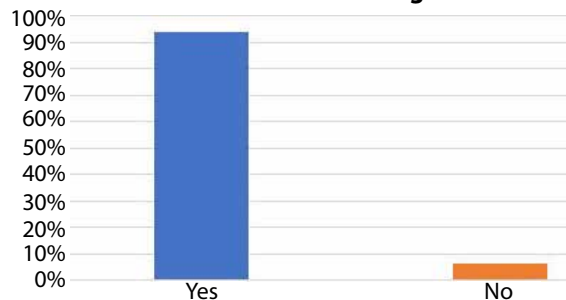


*Includes mathematics, epidemiology, bioinformatics, medical areas, psychology, genetics, data science, and machine learning

Do you feel that not having an MSc would put someone at a disadvantage?

Almost everyone thought one would be at a disadvantage without any master's degree, especially if starting out in their career. Six said a PhD is becoming a growing preference, with two of those saying not having a PhD would be a disadvantage, especially for American companies.

Do you feel that not having an MSc would put someone at a disadvantage?



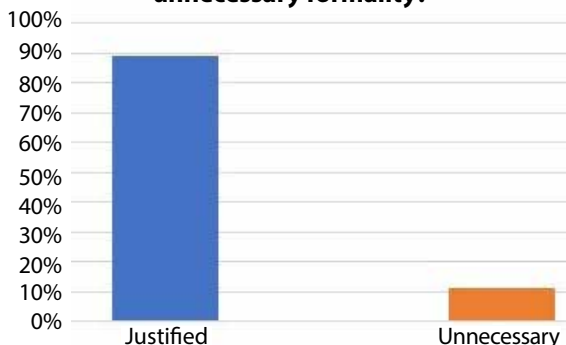
Do you think the typical requirement for an MSc in statistics is justified or an unnecessary formality?

The various reasons given were the following:

- Master's degrees demonstrate hard work and knowledge
- CROs need to showcase their talent and an MSc does this
- The complexity and more practical components of an MSc
- Companies are pushing statisticians to be more technical, hence the high requirements
- MSc degrees provide better training and require more perseverance

One commented that BSc + Placement students could give MSc graduates a run for their money, and three said they would consider someone with a BSc if they fulfilled the requirements and had considerable relevant experience (10+ years) and depth of knowledge. Six said BSc + PhD would also be accepted.

Do you think the typical requirement for an MSc in statistics is justified or an unnecessary formality?



Methodology

- Find suitable contacts in pharmaceutical/biotech companies, CROs, universities, recruitment agencies, and others
- Create draft "test" questions and send to small number of contacts, receive feedback to determine whether questions are clear and understood
- Create final four questions and send to all contacts, collate results, conduct follow-up discussion

There was confusion between different types of master's degree. Respondents said the MSc requirement is justified but other master's degrees are also fine. Clearly, the requirement is *justified*, but, in reality, not always *necessary*.

Final Word

From the results, we can conclude that some form of master's degree is a definite requirement, and even a PhD is favorable. However, several of those surveyed said they know successful statisticians without a master's degree.

Employers typically appear to be open to many types of master's degrees. Some have not heard of more obscure ones such as MMath, but would happily accept it as a form of qualification if it demonstrates enough statistical content.

As one advances in their career and applies/progresses to more senior positions, the less relevant academic background is. Even graduates with an MSc and PhD can struggle to step on the career ladder, as companies are increasingly wanting industry experience.

Clearly, each company has their own policy. One general recommendation for the industry would be to promote this career choice in a wider variety of courses. Currently, the pharmaceutical industry gets no mention as a potential workplace in any traditional math courses.

Companies should also be more explicit about their entry requirements. Asking specifically for an MSc in statistics when they would be open to other qualifications eliminates many graduates who don't apply because they are put off by the strict requirement and don't realize they could be eligible. Also, companies should look into the course content, rather than just the name, to not miss out on quality candidates who may not match their ideal profile.

In short, while an MSc is not the be-all, end-all for a pharmaceutical statistician (though it helps), some sort of master's in a quantitative discipline is recommended. ■

EDITOR'S NOTE

This article originally appeared on the Quanticate blog (<https://bit.ly/2U0Wrvq>) and is reprinted with permission.

CSP 2020: Contemporary Statistical Practice Moving Us into Future

Kim Love, Owner and Lead Collaborator, K. R. Love QCC; Chair, 2020 CSP Steering Committee



Photos by Olivia Brown/ASA

Leena Choi of Vanderbilt University Medical Center presents her e-poster, "An Algorithm for Post-Processing Medication Information Extracted by Natural Language Processing Systems from Electronic Health Records," at CSP 2020.



Rittal Mehta of The Ohio State University presents an e-poster.



Eric Vance (left) of LISA-University of Colorado Boulder speaks on a panel about CSP themes with Mary Kwasny of Northwestern University and Michael Regier of Verisk Analytics.

The 9th annual Conference on Statistical Practice (CSP) took place February 20–22 in Sacramento, California. The size of CSP is consistently small when compared to conferences like JSM (approximately 350 attended this year), but the heart of this conference is large enough to rival any ASA event.

Attendees come to this conference each year for multiple reasons. An obvious draw, given the title of the conference, is adding to their knowledge of statistics and data science in ways that move them forward in their careers. The conference features 24 concurrent sessions, three poster sessions, and short courses and tutorials drawn from four major themes. This year, those were the following:

- Communication, Collaboration, and Career Development
- Data Modeling and Analysis
- Data Science and Big Data
- Software, Programming, and Data Visualization

Topics covered included everything from statistical image processing to mediation analysis, from



Nick Lytal of the University of Arizona participates in an interactive activity during the “Communication with ADEPT and Methods for Sparse Data” session.



Mohammed Chowdhury, Kennesaw State University, presents a short course titled “Side-by-Side Learning of R and Python by Analyzing Big Longitudinal Data.”



Poster session attendees discuss their ideas.



ASA President Wendy Martinez delivers the conference’s keynote address.

project management to R packages—topics relevant to many areas of application, appropriate for varying levels of pre-existing expertise.

Another reason this conference holds continuing appeal for attendees is the prospect of networking. The smaller size means attendees have opportunities to come together, converse with each other, and truly digest what they are taking in at the conference. For several years, we have facilitated group gatherings, and this year’s gatherings included meals organized for isolated statisticians and those practicing in health care, among others. Although only one poster session was an official “mixer,” all three of these sessions served double duty: small crowds gathered around poster presentations, leading to in-depth conversations and forging further connections between the attendees.

A final layer to the conference, though, is the opportunity to learn about and discuss major current issues that affect everyone in our data-oriented communities. Wendy Martinez, president of the ASA, gave a keynote titled “The Ethical Statistician and Data Scientist,” raising many important issues

that will drive changes in data practices in the near (and potentially far) future. Attendees had a chance to join in on the discussion of ethics with a panel during a later session.

Another panel, “Adventuring Beyond $P < 0.05$,” picked up on the recent ASA focus on p -values and provided perspectives from different parts of industry, government, academia, and private practice for audience discussion.

Next year, CSP will return to the East Coast, as it takes place in Nashville, Tennessee, February 18–20. Although I will no longer be heading up the dedicated committee’s effort to make this conference a reality, I am already looking forward to my next CSP experience with my colleagues in the data community. Look for changes to the theme descriptions and objectives in 2021 as the conference continues to flow into the future of statistical practice. I especially encourage you to consider submitting your own proposal for a presentation—what knowledge can you share with this community, and what can you bring to the discussion? See you there! ■

MORE ONLINE
Check out ww2.amstat.org/csp for more information about CSP 2021, which will take place in Nashville, Tennessee.

13th ICHPS Sold Out in San Diego

Kate Crespi



Photos by Olivia Brown/ASA

Students and special guests enjoy lunch during the 13th International Conference on Health Policy Statistics.

The 13th International Conference on Health Policy Statistics was host to a sold-out crowd—with more than 350 statisticians, methodologists, and health policy experts—January 6–8 at the Wyndham San Diego Bayside in San Diego, California.

ICHPS is held every two years and is the flagship conference of the Health Policy Statistics Section (HPSS) of the ASA. Conference co-chairs Catherine (Kate) Crespi from the University of California at Los Angeles and Ofer Harel from the University of Connecticut were supported by organizing committees with more than 30 members hailing from academic centers, government organizations, and pharmaceutical and medical devices companies.

The theme, “Leveraging Data to Shape the Future,” emphasized the key role of statistics and data science in developing evidence that shapes the future of health care, health outcomes, and health policy. Eleven workshops and 26 themed sessions over three days addressed such topics as causal inference for observational data, measurement of the quality of health care, evaluating disparities, conducting research using electronic medical records, and using machine learning and artificial intelligence in health research. Several invited sessions addressed the pressing societal issues of gun violence and the opioid addiction crisis.

Daniel Polsky of The Johns Hopkins University gave the opening keynote address, titled “Closing



HPSS award winners (from left): Health Policy Statistics Section award honorees Thomas Belin, Sherri Rose, and Rebecca Hubbard with HPSS President Laura Hatfield (second from left) during the 13th International Conference on Health Policy Statistics



Susan Murphy of Harvard University delivers the closing plenary address, titled “Online Experimentation and Learning Algorithms in a Clinical Trial.”



Daniel Polsky of The Johns Hopkins University delivers the opening plenary address, titled “Closing the Gap Between Research and Policy,” at ICHPS.

the Gap Between Research and Policy,” while Susan Murphy of Harvard University gave the closing keynote address, “Online Experimentation and Learning Algorithms in a Clinical Trial.”

Workshop topics included deep learning, stepped wedge trials, utilizing nonprobability samples in survey analysis, causal inference methods,

and social network analysis. A communication skills workshop was conducted by COMPASS, a nonprofit, nonadvocacy organization with a vision to see more scientists engage effectively in public discourse. Networking dinners and meet-ups afforded opportunities to mingle in a relaxed environment while enjoying San Diego’s delicious food in its highly walkable and entertaining Little Italy section of town. Student attendees were hosted at a special networking lunch.

ICHPS is committed to disseminating the conference proceedings. Many conference presenters have shared their presentations online under the online program at <https://bit.ly/2Q7w5qB>. A peer-reviewed special issue of conference papers will be published in *Health Services and Outcomes Research Methodology*.

At the close of the conference, the Health Policy Statistics Section conferred its most important awards. HPSS presented the Long-Term Excellence Award to Tom Belin (UCLA) and mid-career awards to Rebecca Hubbard (University of Pennsylvania) and Sherri Rose (Harvard Medical School). ICHPS also provided 17 student travel awards.

Planning is underway for the 14th ICHPS. For more information, contact conference chairs Ruth Etzioni at retzioni@fredhutch.org and Mike Baiocchi at mike.baiocchi@gmail.com. ■

StatPREP

Living in Interesting Times for Introductory Statistics Education

Daniel Kaplan, Macalester College

These are interesting times in statistics education. As with the proverb, living in interesting times can be both blessing and curse.

The last decade has seen the emergence of data science as an organizing theme for extracting information from data. Some claim data science is merely a rebranding of statistics, a position that doesn't withstand scrutiny. We face a genuine need to collaborate, an unnatural position for many academics. Our colleagues in computer science education need to acknowledge that they are often naïve with respect to statistics and the statistics education community accept that decision-making—the root of the demand for data science—is closely aligned with Bayesian thinking.

The last decade has also brought the emergence of randomization-based inference as a mainstream approach to teaching. This is a wonderful opportunity to enhance student understanding of inference, but requires careful rethinking of the traditional algebra-based curriculum.

Two other developments can be bewildering to educators. Prompted by the “crisis” in reproducibility, and in the face of a century of conflict about an appropriate basis for statistical inference, the American Statistical Association issued a statement in 2016 about p -values, calling for a course correction toward a “post $p < 0.05$ world.” Ideas are starting to emerge about how to respond. For instance, Jeff Witmer proposed replacing the technical word “significant” with “discernible,” avoiding the misleading confusion of “significant” with its everyday meaning.

Still another important development, modern causal inference, is unknown to the vast majority of statistical educators. It conflicts with the central mantra of introduction to statistics—“correlation is not causation”—and calls for tools for dealing with confounding that are alien to the traditional t -test course.

A challenge that must be met before we can respond completely to the previous developments is the crawling pace of the integration of modern computing into the statistics education curriculum. The computer is the essential tool in all areas of the economy, science, and government and the foundation of data science. Yet it's commonplace for introduction to statistics students to see only graphing calculators, a limited and obsolete appliance widely found in algebra courses but in no other place in professional work or education.

The StatPREP initiative (*StatPREP.org*), funded by the National Science Foundation, is a collaboration of the Mathematical Association of America (MAA), American Mathematical Association of Two-Year Colleges (AMATYC), and the ASA. StatPREP works to help introductory statistics instructors overcome the challenges of change. Only about 1–2 percent of statistics instructors can participate in StatPREP summer faculty-development workshops, although the StatPREP materials are available to anyone.

Through the StatPREP project, we have learned a lot about the obstacles to change. Not least among these are the many statistics instructors who have no training and no professional contact with statistics beyond the introductory course. Another is the sprawling historical development of the introductory course balkanizing the central inferential concepts into a series of historically contingent settings. A randomization curriculum can provide unity. But facing the simultaneous challenges of requiring a transition to computing and introducing a new paradigm, the authors of leading textbooks have sensibly decided to stick to the balkanized settings.

StatPREP.org is highly computationally oriented, so it may seem a surprise that we are also exploring an alternative strategy: minimizing computation, retaining formulas, but unifying inference. Our new short book, *A Compact Guide to Classical Inference* (<https://dtkaplan.github.io/CompactInference>), brings all the traditional inference settings of introductory statistics into a common framework: simple modeling and a single test statistic introduced in a novel, streamlined manner. We are literally “F-ing up statistics.” Some may see “F-ing” as referring to something other than Fisher's eponymous statistic, particularly since we dispense with the extensive probability tables still found in most textbooks. But we propose the substantial gains are worth the tiny loss.

Compact Guide is not a textbook. First, it is solely about inference. Second, it is a guide for instructors, not students. We hope the book can help instructors see a path forward from the traditional course and toward one that can properly embrace covariation, computing, and data.

Take a look at *StatPREP.org* and share your thoughts with us. You may find *Compact Guide* illuminating or utterly confounding. Whichever, it is an honest attempt to respond to the interesting times in which we live. ■

Links Lecture Award

The Links Lecture Award honors the contributions of Constance Citro, Robert Groves, and Fritz Scheuren. It recognizes excellence in the advancement of official statistics through the statistical use of administrative records and alternative data sources, record linkage, statistical methods for creating blended estimates, and issues associated with these activities such as privacy, confidentiality, researcher access, and reproducibility of results.

The deadline to send nominations to awards@amstat.org is May 1. Contact Barry W. Johnson at barry.w.johnson@irs.gov with questions. ■

Health Policy Statistics Section Achievement Awards

The Health Policy Statistics Section (HPSS) achievement awards honor individuals who have made significant contributions to the development of statistical methods or have developed innovative statistical applications for health care policy or health services research. The awards are given to encourage research in this area and increase awareness of HPSS in the statistical community.

The deadline to send nominations and questions to hpssawards2020@gmail.com is September 15. ■

Lu, Bartko, and Curtin Awards

The Lingzi Lu, John Bartko, and Lester R. Curtin awards offer registration and travel support to students attending the ASA Conference on Statistical Practice, which takes place in Nashville, Tennessee, in 2021. The Curtin and Bartko awards provide \$1,000 in travel support, while the Lu award provides up to \$1,300 in travel support. Early registration for the conference opens September 30.

Applications for the Lu and Curtin awards should be sent by October 15 to awards@amstat.org or mailed to American Statistical Association, Attn: Awards Nominations, 732 N. Washington St., Alexandria, VA 22314-1943.

Applications for the Bartko award are due by December 2. ■

Monroe G. Sirken Award in Interdisciplinary Survey Methods Research

Monroe G. Sirken created an endowment to recognize a distinguished researcher for contributions to interdisciplinary survey research that improve the theory and methods of collecting, verifying, processing, presenting, or analyzing survey data.

Send nominations to awards@amstat.org by December 20. Send questions to Aaron Maitland at amaitland@cdc.gov. ■

Jerome Sacks Award

Nominations are being sought for the 2020 National Institute of Statistical Sciences' (NISS's) Jerome Sacks Award for Outstanding Cross-Disciplinary Research. The prize recognizes sustained, high-quality, cross-disciplinary research involving the statistical sciences. An award of \$1,000 will be presented during the National Institute of Statistical Sciences' reception at the Joint Statistical Meetings (JSM) in Philadelphia, Pennsylvania, August 1–6. The deadline for submissions is April 30. For more information, including a list of previous award winners, see <http://bit.ly/38doHQN>.

To nominate an individual, the nominator is asked to collect two letters of recommendation with the names and contact information of the letter writers and submit them with their nomination letter and the most current version of the nominee's CV as one PDF to sacksaward@niss.org by April 30.

Questions can be sent to sacksaward@niss.org. ■



Sallie Ann Keller, 2006 ASA president, has been elected a National Academy for Engineering (NAE) member.

Keller—Division Director, Social and Decision Analytics, Distinguished Professor in Biocomplexity Professor of Public Health Sciences at the University of Virginia—was elected for development and application of engineering and statistical techniques in support of national security and industry.

Election to the NAE is among the highest professional distinctions accorded to an engineer. Membership honors those who have done one or more of the following:

- Made outstanding contributions to engineering research, practice, or education, including significant contributions to the engineering literature
- Pioneered new and developing fields of technology, making major advancements in traditional fields of engineering
- Developed/implemented innovative approaches to engineering education

This year, the NAE elected 87 new members and 18 international members through a year-long process. Individuals in the newly elected class will

be formally inducted during a ceremony at the NAE's annual meeting in Washington, DC, on October 4.

For more about Keller, read an interview with her at <https://at.virginia.edu/2U0efXA>. ■



John Peterson, senior director in chemistry and manufacturing control statistics at GlaxoSmithKline Pharmaceuticals, was recently presented with the 2019 AIChE Pharmaceutical Discovery, Development, and Manufacturing Award for “outstanding contributions to quality-by-design for drug product.” This is a national annual award presented by the American Institute of Chemical Engineering (AIChE).

Peterson received this award for contributions across the pharmaceutical product lifecycle through discovery, development, and manufacturing spanning drug substance, drug product, and in-vivo studies. In particular, he was recognized for his work on ICH Q8 design space development, where he created an innovative and highly cited Bayesian approach: <https://bit.ly/2TWNweB>.

Peterson is the first statistician to receive this award from AIChE. He is a longtime member of the American Statistical Association and an ASA Fellow. For more information about this award, visit <https://bit.ly/2TIsaCL>. ■

Obituary

Roger C. Pfaffenberger

Roger C. Pfaffenberger, 76, died at his home in Kailua Kona, Hawaii, July 12, 2019, after a brief illness.

Roger was born in Los Angeles, California, February 14, 1943. He earned his PhD in statistics from Texas A&M University in 1971 and spent the next 30 years as a beloved and gifted teacher, researcher, and textbook author.

His career led him to Penn State, the University of Maryland, and Texas Christian University, where he was professor of decision sciences at the Neeley School of Business from 1978–2001. In July 2001, Roger began a new career with the tax services and consulting firm of Ryan, LLC, based in Dallas, Texas, directing its audit sampling and statistical analysis practice for 18 years.

Roger was passionate about baseball from an early age. He liked to say his aptitude for calculating baseball statistics as a child led to his eventual career. He loved to travel and his favorite destination was Hawaii, where he was determined to one day live. That dream was fulfilled in 2012 when he and his wife moved to Kona.

Roger is survived by his wife, Barbara; his daughter, Janelle Bretten, and her partner, Chris Knox, of Oklahoma City, Oklahoma; and brother, Bryan Pfaffenberger of Virginia.

Those who wish to remember his legacy may donate by mail to The Ryan Foundation, Attn: Amy Lee, 13155 Noel Road, Suite 100, Dallas, TX 75240 and designate their gift for “The Roger Pfaffenberger Endowed Scholarship at TCU” or online at <https://bit.ly/2TVHr25>.

EDITOR'S NOTE
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Obituary

Peter F. Merenda

Contributed by Lisa L. Harlow and Grayson L. Baird

Peter Francis Merenda—statistician, psychometrician, quantitative psychologist, professor, dean, Navy captain, father, and husband—passed away October 19, 2019, at the age of 97. Peter is survived by his three daughters, three granddaughters, and three great-grandchildren.

Born in Everett, Massachusetts, in 1922, Peter was the first son of Sicilian immigrant parents and raised by an extended family of his mother, grandmother, and aunts. He earned his BS (1947) and MA (1948) degrees in mathematics and education, respectively, from Tufts University. While at Tufts, Peter participated in the Navy ROTC program, eventually becoming an ensign and serving the US Navy during World War II. After the war, he married Rosie Cafasso. He enrolled in a psychometrics graduate program at Harvard under Philip J. Rulon, taking courses from Kenneth Vaughn, David V. Tiedeman, and Julian Stanley. In 1951, he left this program due to an invitation to work as the director of research and sole psychometrician for the newly established US Naval Examining Center. During this time, he worked on his doctorate in statistics at the University of Wisconsin-Madison, completing his PhD in 1957 under Chester Harris and Julian Stanley.

Soon after, Peter accepted a position as director of research for Walter V. Clarke Associates in Rhode Island, a national and international consulting firm for psychometrics and statistics. In 1960, he was approached by Kenneth Carpenter of the University of Rhode Island (URI) to co-found the department of psychology, thus splitting his time between URI and Clarke Associates. In 1968, while serving as the dean of the graduate school at URI, Peter co-founded the URI Department of Computer Science and Statistics with William Hemmerle, who was the recently hired director of the computer

laboratory and who also became the first chair of the new department.

The creation of the computer science and statistics department was a reaction, in part, to URI accidentally renting an IBM 1410 commercial computer, which was underpowered to do research, instead of a 1620 scientific computer. Ultimately, through the advocacy of Peter and others at URI, the computer mix-up helped serve as the impetus for the formation of what is now the Academic Computer Center and a vibrant and successful department of computer science and statistics that currently has more than 20 faculty working on research in computational statistics, big data, machine learning, and high-performance computing, among other areas.

In all, Peter was with Clarke Associates for 40 years (1957–1997) and was a professor at URI for 25 years (1960–1985), although he became professor emeritus and remained involved at URI well past 1985. During much of this time, Peter was active in the US Navy Reserves, rising from ensign (1944) to captain before retiring in 1980 (between 1950–1980 as a line psychologist in the Navy Reserve).

Not surprisingly, Peter received many honors during his long career. He was a senior Fulbright-Hay Research Scholar (Italy, 1967–1968, 1974–1975) and a Pacific Cultural Foundation Grantee (Taiwan, Republic of China, 1981–1982). In addition, he received the Karl F. Heiser Presidential Award for Advocacy in Professional Psychology, the New England Psychological Association Distinguished Contributions Award, the James McKeen Cattell Fellow Award for Outstanding Contributions, an Honorary Doctorate of Humane Letters from the University of Rhode Island, and the prestigious American Psychological Association Messick Award for Distinguished Scientific Contributions in methodology and

statistics. Peter was also an engaged member of the American Statistical Association for 68 years (1951–2019).

His prodigious scholarly research included three books and more than 250 articles, book chapters, book reviews, technical research reports, and test critiques. His expertise was substantial, providing greater understanding to a multitude of areas. In his later years, Peter's work continued to contribute much to the field, particularly as he shared his experience and vision with an overarching and historical focus, such as in his 2003 article, "Measurements in the Future: Beyond the 20th Century."

Among his notable achievements, Peter made it a priority to recognize and reward those young emerging statistical scholars who had just received their PhDs. To this end, he established the Peter Merenda Prize in Statistics and Research Methodology at URI that generously awarded more than 30 students an annual prize and check for \$1,500. The prize winners have gone on to highly successful careers, with more than half of them each publishing from 50 to 100 or more major articles in their fields. In an ongoing commitment to mentoring, Peter also made opportunities to invite colleagues and students over to his home for a sumptuous meal and wine, where vibrant statistical discussions punctuated the air.

In closing, Peter Merenda will always be remembered for his many remarkable accomplishments, including his encouragement and nurturance of the interests and achievements of students, faculty, and other professionals in the wonders of statistics and research methodology. He left a legacy built on enormous expertise and myriad meaningful contributions that spanned more than six decades, long into his retirement. A more complete account of Peter's life can be found at <https://bit.ly/38DX2IQ>.



Members of the Detroit chapter, from left: Barry DeCicco, Julie Keros, Angela Lin, Heather Johnson, Margaret Mikula, Bob Graban, Andrew Ekstrom, David Corliss, Rob Podolsky, Karry Roberts, Nathan Soderborg, Rob Kushler, Ellen Barnes, Mary Coffey, and Nai-Wei Chen

Detroit

Karry Roberts, Detroit Chapter Secretary

Members of the Detroit Chapter had a successful second Numbers & Networking social event January 17 as they gathered on a snowy night at an event hosted by chapter president, Rob Podolsky.

Attendance increased by 50 percent over the first Numbers & Networking social event in October 2019. Intentionally choosing a different location, this time in the western Detroit suburbs, a different group of chapter members attended, as well as two interested non-members.

Planning for Numbers & Network events includes a deliberate choice of locations for wider coverage of the chapter's region. Plans are in the works to continue hosting these events quarterly as an alternative to the

traditional chapter meetings with a presentation. The next social will be held in May.

Numbers & Network events allow members to share opportunities such as upcoming seminars and science fair judging. Plus, the casual atmosphere offered members a chance to get to know each other. The chapter provided appetizers, and members purchased their own beverages and menu items.

Podolsky was motivated to initiate the Numbers & Network events when he attended the March 18, 2019, Chapter Mentoring Virtual Workshop sponsored by the ASA Council of Chapters Governing Board. During the workshop, members of the governing board suggested chapters start small with a community outreach event and continue to offer it to let the concept develop. ■

Quality and Productivity

The 37th annual Quality and Productivity Research Conference (QPRC, <https://bit.ly/396MD8W>) will be hosted by Florida State University June 8–11. It is the main annual meeting for the ASA Quality and Productivity Section. The conference theme reflects the changing nature of the statistics discipline, “Data Science and Statistics for Quality.”

The aim of the conference is promotion of data science in diverse applied areas, especially those associated with the fields of quality and process control. Massive amounts of data are being collected on a daily basis, processed and analyzed in virtually every branch of society and every aspect of everyday life, and so the science, quality, and statistical communities are obligated to keep up with the rapid growth and variety of collected data and provide up-to-date methodologies and guidance to those using this data. This conference will explore and promote ideas that will further this goal.

Statisticians, data scientists, and practitioners will propose and discuss the latest ideas and cutting-edge modern methodologies in all aspects of data analysis and their applications. Sessions will focus on the progress made in computationally intensive fields such as data mining, machine learning, functional data analysis, image reconstruction, statistical process control, and uncertainty quantification.

The first day of the conference is a short course emphasizing computational methods for analyzing big data, “Introduction to Data Science the Tidy Way.” The remaining three days consist of plenary, invited, and contributed presentations and poster sessions.

To submit a contributed paper or a proposal for a contributed session, contact Eric Chicken at chicken@fsu.edu. ■

EDITOR'S NOTE
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Photo Courtesy of Hai Yang

From left: Cristina Tortora, Chito Hernandez, Bhramar Mukherjee, Bin Yu, and Rajesh Parekh at the SFASA chapter's gathering in January

SFASA Members Celebrate New Year with Keynotes, Panel Discussion

Ling Shen, Chad Pickering, and Jing Huang

Nearly 100 ASA San Francisco Bay Area Chapter (SFASA) members gathered at San José State University January 26 to celebrate the arrival of 2020 with an event that included keynote presentations, a panel discussion, sponsor presentations, dinner, and social networking opportunities.

Keynote Presentations

Four invited keynote speakers shared their views during 30-minute presentations. **Bhramar Mukherjee**, John D Kalbfleisch Collegiate Professor and chair of biostatistics in the school of public health at the University of Michigan focused on the nature of data science and its three key elements: statistics; computer science; and domain knowledge. She touched on the meaning of data science beyond algorithmic prediction and cited Miguel-Herman, saying “A hallmark of intelligence is the ability to predict counterfactually how the world would change under different actions by integrating expert knowledge and mapping algorithm.”

Chito Hernandez, group vice president at BioMarin Pharmaceutical Inc., shared his perspective

on the career of data scientists in the era of big data. He emphasized that passion with purpose is the key to a successful career and a meaningful life. He shared his personal journey, as well as his daughters’ stories, to highlight the importance of passion. He also recommended everyone think deeply about their passion and purpose. He said passion alone is guaranteed to fall short.

Bin Yu, chancellor’s distinguished professor and class of 1936 second chair in the departments of statistics and EECS at the University of California, Berkeley, proposed the predictability, computability, and stability (PCS) framework for veridical data science, including PCS documentation that records human judgment calls in the data science life cycle. She also proposed the PDR desiderata for interpretable machine learning as part of veridical data science (with PDR standing for predictive accuracy and relevancy to a human audience and a particular domain problem).

Rajesh Parekh, engineering director at Google LLC, explained that Google has deployed cameras all over the world to gather street views. These imaging

MORE ONLINE
Read the ASA’s Ethical Guidelines for Statistical Practice at <https://bit.ly/2IDIGhb>.



Photo Courtesy of Hai Yang

SFAS panelists and SFAS officers, from left: Ron Yu, Charles Qi, Ray Lin, Li Zhang, Jing Du, Rajesh Parekh, Cristina Tortora, Bin Yu, Alexandra Piryatinska, Bhramar Mukherjee, Tao He, Chito Hernandez, Jing Huang, Ling Shen, Ruixiao Lu, and Kathy Zhang

data and crowdsourcing were fed into artificial intelligence to enable business recognition and capture changes in our environment.

Panel Discussion

Cristina Tortora, assistant professor in the department of mathematics and statistics at San José State University, moderated as Mukherjee, Yu, Hernandez, and Parekh provided responses to the following questions:

What are the codes of ethics? How does one deal with pressures in publication?

Yu cautioned about being compelled to publish because of a significant p -value. While the p -value remains a useful statistic in hypothesis testing, we as statisticians must acknowledge limitations of the study and work closely with domain-specific scientists to understand scientific implications.

Mukherjee elaborated that statistics is not just about crunching numbers such as p -values; the focus, rather, is far more fundamental—serving the scientific community and general public.

Hernandez responded with a thought-provoking analogy: You should only feel comfortable publishing if it could withstand the scrutiny that would follow if it were reported on the front page of *The New York Times*.

What are statistics job prospects in terms of compensations in different industries?

According to Yu, the top job markets for UC Berkeley statistics students are high-tech companies, fintech companies, academia, biotech companies, and entrepreneurship.

Hernandez noted that today's students are drawn to high-tech companies. They offer incredibly high

salaries. A data scientist can have an annual salary as high as \$200,000 with just two years of experience.

Parekh said the high salaries at Google can be justified by the impact of the work itself.

Yu said today's students are more socially conscious compared to previous generations and, as a result, inspired to contribute to society. The social impact of high-tech companies such as Google, Facebook, and Uber are massive and therefore attractive to students. Yu urged Hernandez and similar biotech executives to sponsor research programs and student projects so students would have an easier time developing their passion toward biotechnology and transitioning into the industry.

What are the important qualities or skills to be successful?

Mukherjee advised, when working with people in other fields, be open to criticism, give respect, and try to learn from them. She shared her personal experience working with oncologists as an example. She emphasized the role of the three C's of being a modern data scientist: computation; communication; and collaboration.

All panelist emphasized the importance of being a life-long learner to keep up with tech innovations and develop interdisciplinary knowledge.

Lightning Talks

The celebration concluded with a networking dinner and lightning talks by sponsors. Industry and academic sponsorship are an important way to support such events and connect statistics and data science professionals within the SFASA community. During the dinner, gold- and silver-level sponsors provided an overview of their business and the role of statistics/data science in the company. ■



2020

April

»23–24—13th Annual FDA/
AdvaMed Medical Devices and
Diagnostics Statistical Issues
Conference, Washington, DC

For more information, visit <https://bit.ly/3b2T8LI> or contact Will Browning, 701 Pennsylvania Ave. NW, #800, Washington, DC 20004;

(202) 469-7374; wrowning@advamed.org.

»*24–25—Conference of Texas
Statisticians 2020, Corpus
Christi, Texas

For details, visit <https://bit.ly/2Ud4Agj> or contact Sunil Mathur, Department of Mathematics and Statistics, Texas A&M University, Corpus Christi, Texas 78412; (361) 825-3932; Sunil.Mathur@Tamucc.edu.

The following events are the latest additions to the ASA's online calendar of events. Announcements are accepted from education and not-for-profit organizations only. To view the complete list of statistics meetings and workshops, visit www.amstat.org/dateline.

* Indicates events sponsored by the ASA or one of its sections, chapters, or committees

» Indicates events posted since the previous issue

*29—13th Annual UPenn
Conference on Statistical
Issues in Clinical Trials: Cluster
Randomized Clinical Trials:
Opportunities and Challenges,
Philadelphia, Pennsylvania

For more information, contact Jonas Ellenberg, 423 Guardian Drive, Suite 617, Philadelphia, PA 19104; (215) 573-3904; jellenbe@penntel.net.
upenn.edu.

»30–5/1—Biostatistics:
Foundations and the Era
of Data Science, Waterloo,
Ontario, Canada

For more information, visit uwaterloo.ca/sas/conference or contact Greg Preston, 200 University Ave. W., Waterloo, Ontario N2L 3G1, Canada; (519) 888-4567, Ext. 33277; gpreston@uwaterloo.ca.

EDITOR'S NOTE

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May

5–7—SIAM Conference on
Mathematics of Data Science
(MDS20), Cincinnati, Ohio

For more information, contact Adrienne Ali, 3600 Market St., Philadelphia, PA 19104; (215) 382-9800; ali@siam.org.

8–10—The 8th Workshop on
Biostatistics and Bioinformatics,
Atlanta, Georgia

For details, visit <https://bit.ly/38UigSI> or contact Yichuan Zhao, 1342, 25 Park Place, Atlanta, GA 30303; (404) 413-6446; yichuan@gsu.edu.



***18—Pfizer/ASA/Columbia University Symposium on Risks and Opportunities of AI in Clinical Drug Development, New York, NY**

For more information, contact Stephen Porzio, 732 N. Washington St., Alexandria, VA 22314; (703) 684-1221; meetings@amstat.org.

»*20–22—2020 IMS/ASA Spring Research Conference, Rochester, Michigan

For more information, visit <https://bit.ly/2QmUcSm> or contact Harvey Qu, Department of Mathematics and Statistics, Oakland University, Rochester, MI 48309; (248) 370-4029, qu@oakland.edu.

***27–29—SLDS 2020, Newport Beach, California**

For details, visit <https://bit.ly/2QkMsA3> or contact Po-Ling Loh, 1300 University Ave., Madison, CA 53706; polingloh@gmail.com.

June

1–5—NSF-CBMS Regional Research Conference: Parallel Time Integration, Michigan Technological University, Houghton, Michigan

For details, visit <https://bit.ly/39VvQ9Y> or contact Benjamin Ong, Michigan Tech University, Houghton, MI 49931; ongbw@mtu.edu.

***3–6—2020 Symposium on Data Science & Statistics, Pittsburgh, Pennsylvania**

For more information, visit ww2.amstat.org/meetings/sdss/2020 or contact ASA Meetings, 732 N. Washington St., Alexandria, VA 22314; (703) 684-1221; meetings@amstat.org.

»7–8—3rd LARS-IASC School on Computational Statistics and Data Science, Mexico City, Mexico

For more information, visit <https://bit.ly/33nsrye> or contact David Muñoz, Av. Camino a Santa Teresa, #930, Col. Héroes de Padierna, Mexico City, International 10700, Mexico, 5628 4000; davidm@itam.mx.

»*8–11—Quality and Productivity Research Conference (QPRC2020), Tallahassee, Florida

For details, visit qprc2020.com or contact Eric Chicken, Department of Statistics, Florida State University, Tallahassee, FL 32306; (850) 644-3218; chicken@stat.fsu.edu.

»9–11—LACSC 2020 5th Latin American Conference on Statistical Computing, Mexico City, Mexico

For more information, visit lacsc2020.itam.mx or contact David Muñoz, Av. Camino a Santa Teresa, #930, Col. Héroes de Padierna, Mexico City, International 10700, Mexico, 5628 4000; davidm@itam.mx.

15–18/2020—10th International Workshop on Applied Probability (IWAP2020), Thessaloniki, Greece

For more information, visit iwap2020.web.auth.gr or contact George Tsaklidis, Aristotle University of Thessaloniki, University Campus, 54124, Thessaloniki, Greece; +302310997964; tsaklidis@math.auth.gr.



»17–18—45th Annual Summer Institute of Applied Statistics, Provo, Utah

For details, visit statistics.byu.edu/sias or contact Diana Larsen, 223 TMCB, Provo, UT 84602; (801) 422-4506; sias@stat.byu.edu.

21–23—The Fifth Workshop on Higher-Order Asymptotics and Post-Selection Inference (WHOA-PSI), St. Louis, Missouri

For details, visit <https://bit.ly/2TV9VKg> or contact Todd Kuffner, 1 Brookings Drive, Campus Box 1146, Saint Louis, MO 63130; kuffner@wustl.edu.

22–26—International Statistical Ecology Conference (ISEC2020), Sydney, Australia

For more information, visit isec2020.org or contact David Warton, School of Mathematics and Statistics, UNSW Sydney, International 2052, Australia; +61405781724; isec2020@unsw.edu.au.

24–27—5th International Workshop on Functional and Operatorial Statistics (IWFOs 2020), Brno, Czech Republic

For details, visit <https://bit.ly/3b0FY0Y> or contact David Kraus, Kotlářská 2, Brno, International 611 37, Czech Republic; david.kraus@mail.muni.cz.

25–27—Open Problems in Parametric Likelihood-Based Inference, St. Louis, Missouri

For details, visit <https://bit.ly/39Xqefw> or contact Todd Kuffner, 1 Brookings Drive, Campus Box 1146, Saint Louis, MO 63130; kuffner@wustl.edu.

29–7/3—2020 World Meeting of the International Society of Bayesian Analysis (ISBA2020), Kunming, China

For more information, visit <https://bit.ly/2U61TgG> or contact Li Ma, Statistical Science Box 90251, 214 Old Chemistry, Durham, NC 27708; (919) 684-2871; li.ma@duke.edu.

July

5–10—International Biometric Conference (IBC), Seoul, South Korea

For more information, visit <https://bit.ly/33o2WwU> or contact Kristina Wolford, 1120 20th St. NW, Suite 750, Washington, DC 20036; (202) 712-9049; conference@biometricsociety.org.

6–10—International Conference on Robust Statistics (ICORS 2020), Vienna, Austria

For details, contact Peter Filzmoser, Wiedner Hauptstr. 8-10, Vienna, International 1040, Austria; 43-1-58801-10560; P.Filzmoser@tuwien.ac.at.

»6–10—ANZSC2020, Gold Coast, Australia

For more information, visit anzsc2020.com.au or contact Marie-Louise Rankin, PO Box 213, Belconnen, International 2616, Australia, 0262513647; eo@statsoc.org.au.

*16–17—2020 Data Science & Intelligent Systems Conference, London, United Kingdom

For more information, visit www.dsis2020.com or contact Nathan Walsh, 5201 Great America Pkwy., #320, Santa Clara, CA 95054; (408) 352-1010; nathanwalsh2020@gmail.com.

»28–30—ISBIS2020, St. Catherines, Ontario, Canada

For details, visit <https://bit.ly/2xl896S> or contact Martina Vandebroek, Naamsestraat 69, Leuven, International 3000, Belgium, +32476676323; martina.vandebroek@kuleuven.be. ■

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>.

Massachusetts

■ The Statistical and Data Sciences Program at Smith College invites applications for two-year, benefits eligible position at the rank of lecturer, to begin July 1, 2020. Candidates should have teaching experience in statistics and/or data science. Info: Statistical and Data Sciences Program at Smith College at www.smith.edu/sds. For more information and to apply, visit <http://apply.interfolio.com/73980>. Review of applications will begin on March 15. EO/AA/Vet/Disability Employer. EO/AA/Vet/Disability Employer.

New Jersey

■ Full-time Biostatistician openings at Hackensack Meridian Health in New Jersey. Apply here: <https://bit.ly/39oTtaI>. EOE.

Texas

■ Department of Biostatistics and Epidemiology at UNT Health Science Center is seeking an outstanding faculty at the rank of Assistant/Associate Professor on the tenure-track in the field of Biostatistics. The successful candidate will develop an independent program of methodological research and actively collaborate with other researchers at UNTHSC. A cover letter, CV, and name of three references should be submitted online at www.unthsc.edu/about-us/careers. University of North Texas Health Science Center is an EOE. ■



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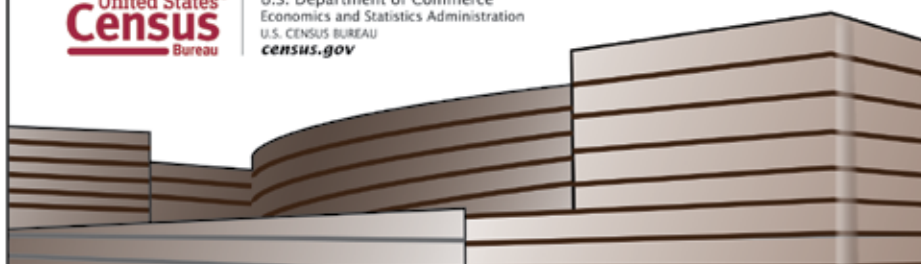
Listed below are our display advertisements only. If you are looking for job-placement ads, please see the professional opportunities section. For more job listings or more information about advertising, please visit www.amstat.org.

professional opportunities

US Census Bureau p. 47
Westat p. 46

software

JMP software from SAS..... cover 4



SOCIAL CHATTER

In three or fewer words, describe the feeling of solving a data science problem.

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Caleb King

@ckingsstats

Hope it works

Vahid Tilaki

@VahidTilaki

Next one please.

Geoff Shaw

@StatGeoff

Completely indescribable
feeling

Nicholas Horton

@askdrstats

Insights from data



Kristin Rahn

Cleverly improving life

Erfan Pirbhai

Pop the Champagne!

Nooshin Ha

dataset preparation

Ben Power

Just more questions.

Alison Wagoner

Okay, next steps.

Marta Kolczynska

Makes sense! Now.

Alice Allen

Addictive

Frank Yoon

Against all odds

Chary Akmyradov

Sssave, save it!

Brian Fullilove

Jumping Fist Pump

Alex Fedotov

Uncertainty.

Larry Lesser

V for Victory

NEXT MONTH :

In honor of Mathematics and Statistics Awareness Month, we'll ask our followers to name a favorite math/statistics game. Make sure to tag @AmstatNews in your response.



Kyle Hinton

Sheer
mathematical
wizardry



a statistics workshop for math and science teachers

www.amstat.org/education/mwm

Based on the *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report: A Pre-K–12 Curriculum Framework II* and college and career readiness standards

Dates: Tuesday, August 4, and Wednesday, August 5, 2020 8:00 a.m. to 4:00 p.m.

Place: Joint Statistical Meetings, Philadelphia, Pennsylvania (meeting room TBD)

Audience: Middle- and high-school mathematics and science teachers. Multiple mathematics/science teachers from the same school are especially encouraged to attend.

Objectives: Enhance understanding and teaching of statistics within the mathematics/science curriculum through conceptual understanding, active learning, real-world data applications, and appropriate technology

Content: Teachers will explore problems that require them to formulate questions and collect, organize, analyze, and draw conclusions from data and apply basic concepts of probability. The MWM program will include examining what students can be expected to do at the most basic level of understanding and what can be expected of them as their skills develop and their experience broadens. Content is consistent with college and career standards, *GAISE* recommendations, and *NCTM* standards.

Presenters: *GAISE Report* authors and prominent statistics educators

Format: Middle-school and high-school statistics sessions
Activity-based sessions, including lesson plan development

Provided: Refreshments
Handouts
Certificate of participation from the ASA certifying professional development hours
Optional graduate credit available

Cost: The course fee for the two days is \$50. **Please note:** Course attendees do not need to register for the Joint Statistical Meetings* to participate in this workshop.

Follow up: Follow-up activities and webinars (www.amstat.org/asa/education/K-12-Statistics-Education-Webinars.aspx)
Network with statisticians and teachers to organize learning communities

Registration: More information and online registration is available at www.amstat.org/education/mwm. Space is limited. If interested in attending, please register as soon as possible.

Contact: Rebecca Nichols, rebecca@amstat.org; (703) 684-1221, Ext. 1877

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

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