September 2019 • Issue #507

AMSTATNEWS

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

Consulting BEST PRACTICES:

Practice *and* Mentorship

Also:

Negotiating Fair Compensation

The Dos and Don'ts/Ins and Outs of the Side Hustle

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NEW

MEASURING SOCIETY

Chaitra H. Nagaraja

Collecting and analyzing data on unemployment, inflation, and inequality help describe the complex world around us. When published by the government, they are called official statistics. They are reported by the media, used by politicians to lend weight to their arguments, and by economic commentators to opine about the state of society. Despite such widescale use, explanations about how these measures are constructed are seldom provided for a non-technical reader.

This book is a short, accessible guide to six topics: jobs, house prices, inequality, prices for goods and services, poverty, and deprivation. Each relates to concepts we use on a personal level to form an understanding of the society in which we live: We need a job, a place to live, and food to eat.

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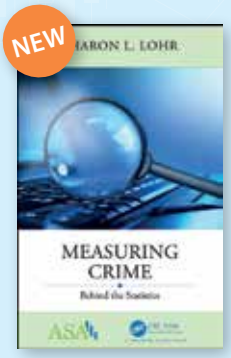

MEASURING CRIME
Behind the Statistics

Sharon L. Lohr

Crime statistics are everywhere, but how do you know when they're valid? If a newspaper report says "the rate of overall violent crime decreased by 0.9 percent," how can you tell where that statistic came from, what it measures, and how accurate it is? Is it worth repeating or sharing? *Measuring Crime: Behind the Statistics* gives you the tools to interpret and evaluate crime statistics' quality and usefulness.

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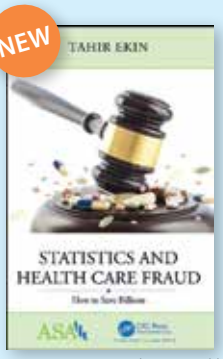

STATISTICS AND HEALTH CARE FRAUD
How to Save Billions

Tahir Ekin

This book helps the public to become more informed citizens through discussions of real world health care examples and fraud assessment applications. The author presents statistical and analytical methods used in health care fraud audits without requiring any mathematical background. The public suffers from health care overpayments either directly as patients or indirectly as taxpayers, and fraud analytics provides ways to handle the large size and complexity of these claims.

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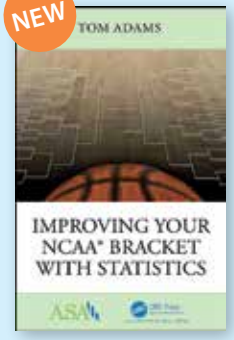

IMPROVING YOUR NCAA® BRACKET WITH STATISTICS

Tom Adams

Twenty-four million people wager nearly $3 billion on college basketball pools each year, but few are aware that winning strategies have been developed by researchers at Harvard, Yale, and other universities over the past two decades. This book is both an easy-to-use tip sheet to improve your winning odds, and an intellectual history of how statistical reasoning has been applied to the bracket pool using standard and innovative methods. It covers bracket improvement methods ranging from those that require only the information in the seeded bracket to sophisticated estimation techniques available via online simulations.

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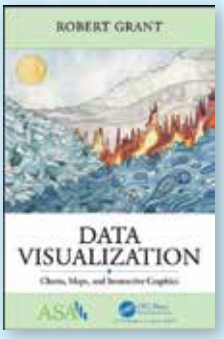

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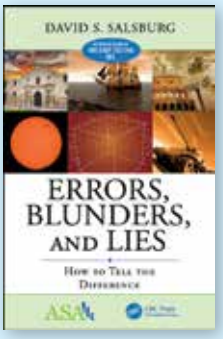

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American Statistical Association

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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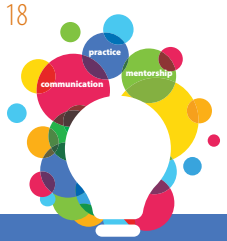

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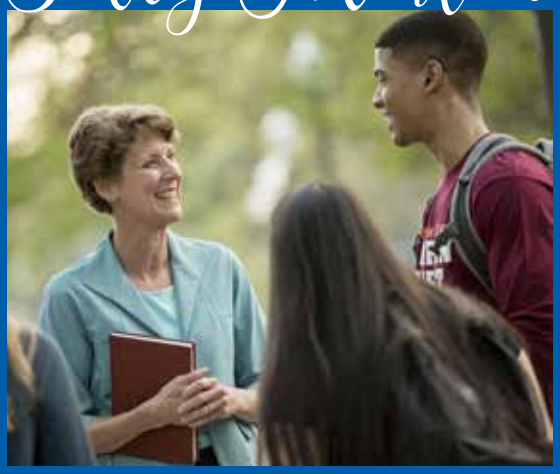
Sally Morton



College of Science Dean Sally C. Morton mingles with students on the Virginia Tech campus. Photo courtesy of Virginia Tech.

Throughout the past 20 years, the **International Conference on Health Policy Statistics (ICHPS)** has played a vital role in the dissemination of statistical methods in health policy and health services research. In preparation for the next conference, which will take place in January 2020, we're running a series of interviews with previous Health Policy Statistics Section award winners. This month, we feature a conversation between **Sally C. Morton** and **Bonnie Ghosh-Dastidar.** Morton was awarded the ASA Health Policy Statistics Section's (HPSS) Long-Term Excellence Award in January 2018 at the 12th International Conference on Health Policy Statistics, held in Charleston, South Carolina. Read the interview at *https://magazine.amstat.org*.

columns

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Why Be a Statistical Consultant?

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

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Back to School With Data for Good

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

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Statistics and Science Policy

Shortly after being appointed the ASA's Executive Director in 2007, Ron Wasserstein said, "Statisticians complain that no one ever listens to us. We need to be saying something!"

As one of his first tasks at the ASA, Ron followed through on the 2006 board motion that arose from 2006 ASA President Sallie Keller's initiative on science policy: to hire a director of science policy. Shortly after, Steve Pierson joined the ASA and found multiple areas in which we all know statistics should be involved. But he discovered our legislators, policy experts, and decision-makers often do not know statistics should be involved. So, he set about identifying those key individuals and has continued to do so, despite changing administrations. At no time since then has his role been more critical than it is today.

At each meeting of the ASA Board of Directors, Steve and his science policy fellow, Daniel Elchert (see *http://bit.ly/2YT5m7K*), provide a report of their activities, and the list of their efforts is extensive. I mention here a few times they have kept statistics in the science limelight.

Census 2020

The Washington Post published an opinion by Ron (March 13, 2019) strongly objecting to the decision by the secretary of commerce to add a question to the decennial census asking whether the respondent is a US citizen.

Although this question is on the American Community Survey (sent to a sample of about 300,000 households each month), its inclusion on the federally mandated decennial census without adequate field testing could grossly affect either the response rate or the accuracy of answers on all questions, or possibly both. In addition, the ASA released an official statement (*http://bit.ly/33xXiI6*) strongly advising against the inclusion of the question on the grounds of inadequate testing, and future ASA President (2021) Rob Santos was quoted in *Science* (July 11, 2019) (*http://bit.ly/2N2A9Yv)* speaking out against adding the question. Several sessions at last month's JSM also focused on the effects of low response rate and/or mistrust in the confidentiality of census responses (see *http://bit.ly/2OTXmyt*).

In the case against the Department of Commerce brought by the State of New York, the words "statistician" and "statistics" appear 11 times in the oral argument to the Supreme Court on April 23, 2019. Although the court seemingly made its decision (to disallow the question) on other grounds (administration's case was not compelling), the ASA's silence on this issue might have been interpreted as supporting inadequate research on a topic as important as the decennial census.

Karen Kafadar

USDA Economic Research Service

The Economic Research Service (ERS) is one of the 13 principal federal statistical agencies and, with the National Agricultural Statistics Service, is a critical research arm of the US Department of Agriculture. Its mission is to provide objective and reliable analyses on issues regarding the farm, rural economy, food safety and nutrition, natural resources, trade and international agriculture, and environment. Its work depends heavily on accessibility to data from the other agencies in Washington, DC. Yet, for somewhat mysterious reasons, the current administration decided to relocate the ERS 1,000 miles away—without congressional approval—and proposed to cut its funding by almost half. Again, the ASA leadership thought its silence would be viewed as support for the decision and joined 170 agricultural, food, and science organizations in opposing the move. Ron also prepared an opinion piece for *The Kansas City Star,* where ERS will be relocated.

National Center for Education Statistics

The ASA also has advocated on behalf of the National Center for Education Statistics (NCES), another of the 13 principal federal statistical agencies whose mission is to collect and analyze data related to education (at all levels) in the US. Its staff size has been so severely limited that it relies increasingly on contractors. The ASA joined the American Educational Research Association and Council of Professional Associations on Federal Statistics in supporting increased resources for NCES, as the data sets it makes public on a timely basis provide valuable information for assessing educational progress and trends in the US.

Editor's Note: Daniel Elchert and Steve Pierson contributed to this column.

To Comment or Not to Comment?

You may be wondering what criteria the ASA uses to determine whether it should publicly comment on an issue. Several years ago, the board identified the following five criteria that would inspire the ASA to comment:

1. Does the issue impact the statistics profession or the ASA itself?
2. Does this issue impact the quality or integrity of science or the ability to inform public policy?
3. Does the issue provide an opportunity to educate the public about statistics or the statistical aspects involved in this issue?
4. In our judgment, would our members expect us to be involved in the issue?
5. Does the issue relate to possible infringement on scientific freedom or human/civil rights?

The ASA Board of Directors considers these questions in deciding whether to speak on any policy matter. Sometimes the answers are clear, but sometimes much less so. Are there issues on which, in your opinion, the ASA should comment?

COUNT ON **STATS**

Count on Stats

Count on Stats (*countonstats.org)* is a public relations campaign to build public confidence and trust in government statistics. In recent months, it has focused on ensuring no attack on federal statistical agencies goes unanswered. With ASA staff, it has advocated for a rigorous 2020 Census and the value and necessity of the ERS, distributed weekly social media features, and provided general agency support though congressional outreach. This advocacy contributed to outcomes such as heightened media attention on statistical agencies, including publications in *The Washington Post, Des Moines Register,* and *The Kansas City Star*.

Forensic Science

The ASA issued two statements on the importance of statistical research in strengthening forensic science: an endorsement of the National Academies' 2009 report, *Strengthening Forensic Science in the United States: A Path Forward* (April 17, 2010), and recommendations for the use of statistical statements used in expressing the strength (or lack thereof) of forensic evidence (January 2, 2019). Thanks to Steve's efforts to keep this item front and center on Congress' radar, federal funds were made available to the National Institute for Standards and Technology to fund the Center of Excellence in Forensic Science, which led to the largest concentration of statisticians conducting research in forensic science (CSAFE: *forensicstats.org*) and the ASA Ad-Hoc Advisory Committee on Statistics in Forensic Science.

Letters of Support

The ASA also supported the Protecting American Votes and Elections Act (PAVE) to enhance federal election security and mandate risk-limiting audits and a bill to restore the Department of Justice Science Advisory Board.

We Still Have Work to Do

Sallie reminded us (*http://bit.ly/2YPccem*) that "statistical sciences through the ASA leadership has become part of the voice of science policy." As a result, statisticians today are now "more visible at the National Institutes of Health, the National Science Foundation, and the White House Office of Science and Technology Policy, making the case that statisticians improve scientific research."

We have seen the respect our work has attracted from people such as DJ Patil, 2015 chief data scientist (*http://bit.ly/2Mi6pam*), and the University of Virginia's Teresa Sullivan. By raising the visibility of statisticians' contributions to questions of scientific research and policy, we create respect for our own profession. Please let us know in what areas you think the ASA's advocacy can help you—either for your own work or for the betterment of society—at *spierson@amstat.org*. Steve, Daniel, and I look forward to hearing from you!

James Rosenberger: A Collaborator Across Disciplines

Coleman Harris

Inspired by a high-school teacher who taught the beauty of mathematics, James L. Rosenberger chose to study mathematics at Eastern Mennonite University. In the final year of his undergraduate degree, he was introduced to statistics. He recalls he particularly enjoyed this course in statistics and FORTRAN programming that, combined with his math degree, landed him his first statistics job as a data assistant for a cardiovascular research group at New York University.

While learning to curate data and perform statistical analysis, Rosenberger earned his master's from the Polytechnic University of New York. Subsequently, his doctoral work at Cornell University cemented his interest in applied statistics, as he had the opportunity to collaborate and consult with researchers in both agriculture and medicine. Rosenberger took a tenure-track position in the statistics department at Penn State, where one of his major responsibilities was to lead the recently formed Statistical Consulting Center, following his PhD. He then took a brief leave of absence to pursue a postdoctoral position at Harvard University working on robust statistics and scientific reporting with esteemed statistician Fred Mosteller—another opportunity to collaborate across disciplines.

JAMES ROSENBERGER ON CONSULTING

Would you consider yourself a statistical consultant? If not, what would you call yourself?

Well, I have used the term statistical consultant most of my career. I would, however, recommend for most academics involved in statistical consulting to actually think of themselves as a collaborator. It's a term that implies a broader role, a more equal status with the project leader. I think over the years, that's become quite clear to me, and it resolves a lot of the stressful issues statistical consultants face getting adequate credit for our contributions.

What have been some of the most rewarding collaborations throughout your career?

It's more of a bundle of applications I found rewarding, and that had to do with my work with agricultural scientists. The reward for me was understanding their reasons, challenging appropriately, and then applying the best methodology or experimental designs that fit their situation [so they could] do their work more efficiently. Another area I worked in for quite a while was transportation research. And again, in that setting, I was often the statistician who understood the research and, by learning enough of a particular discipline, you become a really vital member of the team.

Even before coming to Penn State, I worked in a medical center where my role was to practice the art and science of statistics when things were not as rigorously designed as modern science dictates.

What advice would you give someone who wants to have a career as a statistical consultant?

One bit of advice would be to pick good scientists to work with—those who bring the best of their side of the collaborative role to the process. I would also say pick an area you know enough about that you can communicate with the folks you're collaborating with. And last, pick areas you're genuinely excited about, so it's not a drudgery, but you have a passion for really getting into the heart of the science you're collaborating on. I think that goes a long way toward successful collaboration.

What makes a good statistical consultant?

One important thing is the ability to communicate well and to be interested in what the collaborator is doing. So, in general, the ability to communicate both orally and in writing, so you can express yourself and be understood—those communication skills are very valuable.

What in your training best prepared you to be a good, well-rounded statistical consultant?

I understand a lot about broad scientific questions and how things work. And partly, that's a matter of growing up in the small business environment, where I understood the financial side, the transportation, logistics—a whole broad range of things one learns if they grow up on a farm or [around] a small business. So, I think that was part of why I could communicate with a broad spectrum of

scientists, just my ability to understand what they were trying to do and interact and focus my contribution on the statistical issues that needed to be solved.

What is the most important career advice you have received?
Pursue the things that bring you joy. You can't be successful doing something that is drudgery to you. Ask yourself periodically what part of your life or part of your job is most rewarding, and then pursue that aspect. That's why when I stepped out as department head, I jumped into the political arena. I enjoyed the interaction with a wide range of people, and I think I was fairly good at resolving conflict rather than contributing to it.

How did your work in academia prepare you for your government roles, both with the NSF and NISS?
I think my general understanding of science and how things work provided a great background for being an effective statistical consultant. I was usually a quick study and able to understand the needs of a scientist asking for advice or wanting to collaborate on a research project. I think the ability to listen and understand the perspective of your collaborator is very important. Then, bringing my understanding of statistics and statistical tools—including design of experiments and general linear and nonlinear modeling—allowed me to be successful working with scientists in a variety of fields.

How does a statistical consultant role differ for someone who is in academia compared to someone working in government? Was there anything new you had to learn to succeed in the government roles?
During my time at the NSF, I was exposed to a broad range of research proposals and had to ensure the review process was fair to innovative and even unconventional ideas. What I enjoyed most was working on cross-disciplinary initiatives that linked the mathematical sciences—including statistics—with various disciplines that needed good statistical methodology to make valid and reproducible conclusions.

From a long-term perspective, my most challenging role was as chair of the Mathematical Sciences Working Group, which was directed to develop an initiative to support NSF proposals to increase the budget. We built our case on the important role the mathematical sciences could play in improving the quality of the sciences broadly. The impact of this strategy was seen by a doubling of the division's budget over the next five years.

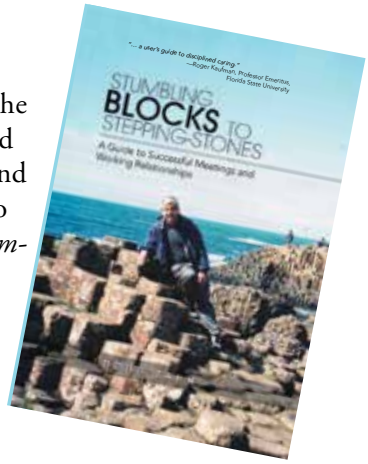
Rosenberger turned the theoretical norms of his statistics department on its head and was awarded tenure with a body of work concentrated on applied statistics upon his return to Penn State. He then focused on shaping the philosophy of the consulting center around three goals: training students to deliver sound statistical advice to researchers; improving the research quality of clients using the center; and finding stimulating research opportunities requiring new statistical methodology.

A researcher with a propensity for side trips, Rosenberger took two years to help develop a college of agriculture in Zimbabwe in the model of an American land-grant university, which focused on useful research for the local economy and agricultural sector, particularly for the benefit of the region. Returning to the United States, he spent 15 years as the department head at Penn State, seeking to build a broad department—from theoretically rigorous statisticians to strong applied statisticians. He then spent two years on sabbatical at the National Science Foundation as a statistics program officer, enjoying the exposure to various disciplines using statistical methodology to improve their respective scientific fields.

When he returned to Penn State, Rosenberger created a bioinformatics consulting center to embrace the rapidly changing field, one that includes constant statistical challenges associated with large data dimensionality and reproducible results. Stepping down as department head, he served as a local councilman for the Borough of State College Pennsylvania Council. He cites the experience as an enjoyable venue to flex his leadership and collaboration skills, teaching him much about the value statisticians can have in consulting relationships.

Since 2017, Rosenberger has served as the director of the National Institute of Statistical Sciences (NISS)—a national non-profit organization that brings together the academic, government, and industry sectors around statistical and data science issues. Among its diverse interests, NISS focuses on delivering sound research related to public policy and statistical issues in the rapidly growing field of data science. Rosenberger sums up this vision best: "As statisticians, we need to recognize that we are not the whole field of data science, but that statistics is a vital component of what needs to be done." ■

A Conversation with Doug Zahn: The Power of Conversation in Consultation



A book for consultants by Doug Zahn

Doug Zahn—recipient of the 2016 ASA Mentoring Award—is professor emeritus of the Florida State University Department of Statistics, where he taught applied statistics and statistical consulting courses for 35 years. He has also coached consulting professionals and taught a course on consultancy skills in the United Kingdom for nine years. So, it was no surprise to us when he shared his knowledge and wrote a book for consultants called *Stumbling Blocks to Stepping Stones: A Guide to Successful Meetings and Working Relationships.*

We chatted with Zahn recently to find out more about the book and how it can help consultants.

What or who inspired you to write this book?

The students from the consulting courses I taught over the years. After almost every course, one or more students made an impassioned plea that I write a book that would pass on the material from the course to a wider audience. At every ASA meeting over the past two decades, a group of them would reiterate this request.

After I retired from FSU, I finally chose to write the book. This was more daunting and time consuming than I had ever envisioned. Finally, in April 2019, I finished the book and published it with iUniverse. A long list of colleagues patiently helped me along the way. Many of them are listed in the acknowledgements section of the book. Without them, I doubt I would have completed the book.

You base your book on three core processes—POWER, RAPID, and LEARN. Can you tell us what they are and describe how they are important to having an effective conversation?

The POWER process is a sequence of five steps—prepare, open, work, end, and reflect. This process is designed to help you consistently produce effective consultations. "Power" in this context does not mean controlling, dominating, or manipulating your client; instead, POWER is an acronym for steps to achieve desired results.

"PREPARE" is an essential first step toward an effective conversation. In this step, one prepares mentally, physically, and emotionally for the upcoming conversation. Completing this step ensures you are ready to engage in conversation.

"OPEN" entails an intentional sequence of thoughtful steps to ensure you have the information required to produce an effective conversation:

- Reach an understanding with your client on how much time each of you has for the conversation. Not having a time conversation is a guarantee for disaster unless one of you is a mind reader.
- Compile a list of your client's conditions for satisfaction. Not having a wanted conversation results in guessing at what your client wants from the consultation.
- Identify what you are willing to do to help achieve your client's goals. Be aware of your boundaries, such as not being willing to work 24/7 for each of the next three weekends.
- Identify what you are able to do to help achieve your client's goals. Be realistic.
- Verify that what your client wants from this conversation matches what you are willing and able to do. This will avoid a breakdown, which is more effective and efficient than recovering from one.

Zahn

"WORK" is the step in which you respond with clear content that answers your client's questions comprehensively, concisely, and accurately. An essential part of all these steps is treating your client with respect, by both your client's standards and yours. In addition, the goal is to produce a relationship that is cooperative, rather than adversarial, and collaborative, rather than hierarchical.

"END" is often overlooked because people think they are done when they complete the "work" step. This is simply not true. Essential work that remains to be done is reviewing and agreeing on any decisions made during the conversation and reviewing and agreeing on who will do what by when to what standards. If another meeting would be helpful, agree on the purpose, time, and place of that meeting.

"REFLECT" is the final step in the POWER process. Now is the time to consider the effectiveness of your words and actions in the session just completed. You can do this by yourself or with a partner. If you have videoed this conversation, you have a treasure trove of data you can use to improve the quality of your conversations. Even if you are ambivalent about videoing yourself, I encourage you to do so (provided your client agrees) because you can always erase the video, whereas you can never video the conversation after it is over.

The RAPID process is also a sequence of five steps—recognize, address, pinpoint, identify, and do it. This process is designed to help you rapidly recover from breakdowns and the resulting emotional clouds that will inevitably occur in your practice.

"RECOGNIZE" your emotional cloud is the first step to recovering from your breakdown, be it large or small. Inevitably, you will encounter surprises in your practice when things do not go as you think they will. These surprises are usually accompanied by emotional clouds. Emotional clouds are similar to thunderstorms in that it is difficult to see your way out once you are in one. In fact, if the emotions are strong enough, it is even difficult to recognize that you are in an emotional cloud.

"ADDRESS" is a natural next step to take once you realize you are in an emotional cloud. A strategy that is often helpful here is to learn what your early warning signs are when heading for an emotional cloud. Once you are aware of these signs, you can deal with the emotional clouds while they are still small, before they become a raging thunderstorm.

"PINPOINT" the breakdown is an essential step toward isolating the components of your emotional cloud.

"IDENTIFY" is an easier task when you are looking at the individual components of your emotional cloud, rather than the whole gnarly mess.

"DO IT" is more manageable when you take on one individual component at a time.

The LEARN process is also a sequence of five steps—listen, evaluate, act, review, and next. It is a structured process designed to help you systematically improve your interactions.

"LISTEN" to your interactions. Identify one to improve.

"EVALUATE" this interaction. Identify a segment you want to improve.

"ACT" out a role-play of this interaction, taking an action to address the segment you want to improve.

"REVIEW" the video of the role-play. What worked? What did not work? What will you do differently in the future?

"NEXT," implement what you learned in an actual consultation. Organize a different role-play relating to another issue. Look at larger questions relating to your career.

Why is conversation so important to consulting, and particularly statistical consulting?

We must become facile in conversations, especially those that have a lot riding on them. This is often the case in statistical consulting. Yet, it continues to surprise me how often we make assumptions about important aspects of our consultations, rather than having a long enough conversation to identify and address the issues at hand. Conversation eliminates the necessity of becoming a mind reader.

What can statistical consultants look forward to taking away from this book?

My hope is that statistical consultants learn and apply these strategies for producing effective consultations, recovering from breakdowns, and learning from their breakdowns by using video.

Any tips for how the reader can use your book successfully?

Find a partner to journey through the book with as is described in the introduction. Yes, you can read the book by yourself. However, to get maximum value from the book, a partner is essential so you can role-play the situations that cause you trouble in your professional practice. You would not think of going into an interview without checking how you look in the mirror. Yet, many of us consistently make the same mistakes in a consultation because we are not using the mirror that is available, namely video, to assess what we do and what we do not do in consultations. I encourage you to address your barriers by using video starting today.

I wish you much success in systematically improving the quality of your consultations. ■

For Linda Young, It's About Learning the Right Questions to Ask

Coleman Harris

Linda J. Young, who grew up in the small town of White Deer, Texas, enjoyed math from an early age. Before her senior year in high school, she applied for a National Science Foundation program on probability and FORTRAN programming at the University of Tennessee-Knoxville. After thoroughly enjoying her experience with statistics and computer science, she ended up at West Texas State University (now West Texas A&M University) to pursue her bachelor's and master's degrees in mathematics.

Hailing from an academic family, Young planned to earn a PhD in mathematics at Oklahoma State University but found herself inclined toward the statistics department. This introduced her to a formative project in her career: Why were all the golden marmosets at the Oklahoma City Zoo getting sick? After going behind the scenes and learning the right questions to ask, she was hooked. She then traversed Oklahoma's scorching hot cotton fields to develop sequential sampling plans for cotton pests, culminating in her doctoral thesis work.

LINDA YOUNG ON CONSULTING

Would you consider yourself a statistical consultant? If not, what would you call yourself?

I think of myself more as an applied researcher. I have done consulting projects throughout my career, but, in the end, some solutions require innovation. And so, there's usually a gap between the material that's first published in journals and what can be done in practice—that interface between the science and the statistics is where I basically live. So, I've done consulting where I didn't need to do anything new, but often it's an applied problem that requires research and innovation to actually address the issues at hand.

How does a statistical consultant role change between academia and government?

The emphasis is different in the two places. At a university, the emphasis is on publication, and in the government, it's on the product you put out. You can't always implement the optimal solution in the government, because there's a strict timeline you have to adhere to; if you have a Bayesian model that takes a week to run, it's not suitable. At the university, the secondary goal is the project answer, getting something that addresses the real-world problem; if they don't quite solve the problem, they can still publish. So, you have those kinds of trade-offs. And it requires a real understanding of the gives and takes and what's important—what you really mean with your set of assumptions. Then, you have to consider what method would be robust enough to implement, even if it's not the optimal solution.

What advice would you give someone who wants to have a career as a statistical consultant?

Think about what you'd like other than statistics, because you cannot be an effective statistical consultant without learning about the subject matter. I could not do what I'm doing at NASS if I had not been involved with farming. So, I won't be making a mistake simply because I don't know winter wheat is planted in the fall and harvested the next year. You have to like not just the statistics, but you have to like what you're applying it to and enjoy learning about that subject matter.

Are there any experiences you'd recommend to students interested in statistical consulting, like particular jobs, internships, courses, etc.?

The big thing is to figure out what it is you really like. I learned a lot working in the entomology department for two or three summers, going out to the cotton fields and breeding the plants, and also the experience I had with the Oklahoma City Zoo. And you can do internships, because not everyone wants to do consulting in agriculture, and you could work under a consultant. But the big question is, do you really have fun looking at those kinds of problems?

What makes a good statistical consultant?

The more you can solve problems, the better you get, which is where I was really fortunate. I worked for a professor in the entomology department, and he would ask me tough questions I had to think about. Then, after I came back with the answer, he would have another tough question, and so on. And after a while, I could think about it while I sat there, but that didn't come automatically for me. It's important to understand that when you start out, you may not be able to answer the question immediately. There's nothing wrong with saying you need time to think about it; it takes a lot of practice.

What is the most important career advice you have received?

Find what you love, your passion, and pursue it.

Was there anything you had to change in the transition from academia to government?

I've had to continue to update and learn more, and to continue to grow as a statistician. But that's what the PhD prepares you for, right? This continual evolution, so I have continued to evolve. And sometimes, I do miss teaching. If I wanted to, there are opportunities for me to teach in the area. But, in the government, vacations are not restricted to the summer or between semester breaks, so it kind of spoils you after a while. But teaching and interacting with students is something I miss.

If you could change one thing in your career thus far, what would it be?

I really can't think of anything, because it took all of my right and wrong choices together to get me to the point I am now, and I'm happy with where I am. Some of my biggest failures taught me lessons that were extremely painful, and I would have given anything not to learn them at the moment. But it is through that growth, through those experiences, that I really grew professionally.

Do you have any parting words for our readers?

I really encourage people to consider statistical consulting—research at the interface of science and statistics—because there's a great need. People are becoming more statistically literate, but there is still quite a gap. And we can really help make data-based decisions far more solid if we do a good job.

Young spent a few more years working with the faculty at Oklahoma State after finishing her PhD, collaborating with entomologists and weed scientists. Sensing it was time to leave the university, she took a position working at the University of Nebraska, collaborating again with those in the agricultural sciences. She says a key to her consulting success was personally observing occasional experiments—there was always a gap between what she thought researchers meant and what they were actually saying. From zoo cages in Oklahoma City to sloped fields in Nebraska, this helped her fully understand the challenges of applied agricultural research.

Realizing again that she needed a change, Young recalls a memorable email from renowned statistician George Casella, then a faculty member at the University of Florida. He wrote, "Linda, I heard you might be interested in changing your snow shoes for sunglasses." She left for Florida, also excited to trade agricultural problems for new problems related to the effects of red tide and issues for wildlife like manatees and sea turtles. Subsequently, she formed new collaborations with the Florida Department of Health, looking at the impact of climate change and heat on the health of Floridians.

Young began spending summers in Washington, DC, after being recruited by the National Institute of Statistical Science (NISS) to work on a problem for the USDA's National Agricultural Statistics Service (NASS). Her team comprised methodology to improve annual estimates of farm counts as a supplement to the Census of Agriculture, measured every five years. Pulling on her experiences in ecology, she hoped to implement designs similar to capture-recapture methodology to improve the severe underestimates NASS measured.

Young eventually moved to NASS full time, taking on the chief mathematical statistician and director of research and development positions. There, she has focused on making a national impact using statistics, namely implementing the capture-recapture methods into the Census of Agriculture in 2012 and an enhanced methodology in 2017.

The future, she says, is all about incorporating other kinds of data to make the census estimates more accurate. At present, she is working on a method using web scraping to supplement traditional estimates and aims to incorporate more administrative data into the next decade. And even though she moved to NASS to implement capture-recapture, she is excited about the future including learning and implementing new types of data. It requires the learning and growing process she says is necessary to succeed as a statistician—the continual evolution her PhD prepared her for nearly three decades ago. ■

Communicating Statistics to Nonstatisticians

One of the biggest challenges faced by any collaborative statistician is communicating statistical information to those with less knowledge of statistics. Many of us with a formal education in statistics receive extensive training in theory, methods, and application; however, even with a PhD in statistics, it is not uncommon to have taken one or no courses that focus on communicating this knowledge to those who can benefit from it. In other words, many of us leave school with little understanding of how to put our skills into effective practice.

What do our nonstatistician colleagues need from us to get the most out of our interactions? As posited by Janice Derr in her 1999 textbook *Statistical Consulting: A Guide to Effective Communication*, there are five dimensions of quality that nonstatisticians evaluate when collaborating with statisticians:

Availability of support
Responsiveness of support
Timeliness of support
Completeness of support
Pleasantness of support

Note that none of these dimensions directly incorporates correctness, technical savvy, or methodological awareness. It's not that those are unimportant; they are extremely important, and a collaborative statistician will not last long without solid abilities in those areas. It's simply that most nonstatisticians are unable to evaluate those aspects of a collaboration and have to make the assumption that their statistical collaborator possesses those skills.

The question then becomes, how can we improve our communication skills when working with nonstatisticians so they will understand and appreciate our expertise? The following recommendations are based on my personal experience and the advice of other statisticians in the consulting and collaboration community. I refer to nonstatisticians as "clients" in these recommendations, but that term is not limited to what one might view as a traditional consulting client; it could be a boss, a coworker, or even a friend who asks for help with a quantitative problem.

Focus on the client and project at hand, rather than general statistical concepts.

During my time at the University of Georgia Statistical Consulting Center, I supervised many students who were just learning to become collaborative statisticians. Across the board, when these students were initially challenged to explain a statistical method to a client, they provided equations full of Greek letters and other mathematical notation. While each client's needs should be evaluated individually, for many clients, this tends to add to their confusion about a method rather than mitigate it.

Here is my personal hierarchy, from greatest to least chance of success, of techniques to explain statistical methods to most clients:

Plain English

Example: "Across your group of students, for every additional point a student scores on the entrance exam, the final achievement score increases by an average of about half a point."

Equations with your client's variables written out in words

Example: "Estimated Average Achievement Score = 0.32 + (0.54 x Entrance Score)"

Equations with mathematical notation

Examples: "$\hat{y} = 0.32 + 0.54\, x_1$"; "$\hat{y} = \beta_0 + \beta_1 X_1 + \varepsilon$"

Well-labeled figures are always helpful when it comes to understanding and should be used in tandem with these techniques when possible. Don't label figures using the cryptic, abbreviated variable names we often use as programming shortcuts; this is a barrier to a client who does not think like a programmer and who would need to continuously remind him or herself of the meaning of those labels.

Some addenda: Some clients require mathematical notation for their eventual research output, including those who are publishing in quantitative academic journals in their fields. Many of my clients require a combination of these methods to both understand the concepts and be able to provide a final product that meets the requirements of their stakeholders.

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Some clients do have an interest in learning more general information about statistics. When a client asks a general question (e.g., What is power?), it is still helpful to explain it in a way that is specific to that client and his or her research. For example, for a client in agriculture, "Power is the probability that you will choose a sample of lettuce plants for your study that will result in a statistically significant difference between your two lettuce strains, assuming a difference exists." The wrong explanation would be "Power is the probability of rejecting the null hypothesis when the alternative hypothesis is true."

Actively improve your communication; communication skills can be learned.

Why do so many new statisticians respond to clients' difficulties in understanding with Greek letters and nonproject-specific explanations? The short answer is this is how most of us learned statistics. This notation and general conceptual discussion is useful in a classroom—it's a shorthand language we have in common so we can learn advanced concepts quickly. However, its usefulness diminishes greatly when working with someone who does not share our background in quantitative sciences. The good news is, contrary to what many of us believe (at least in practice), communication abilities can be practiced and learned.

One of the best ways to improve communication in client interactions is through the use of video review. Think of it as collecting data on client interactions (with the client's approval, of course). Set the recording device in a location where both the client and statistical collaborator are visible on the video, record the interaction, and then choose some or all of the video to watch—preferably with a trusted colleague. A video by Eric Vance from the Laboratory for Interdisciplinary Statistical Analysis at *www.youtube.com/watch?v=uZq8GWp3Ims* is a helpful resource for implementing video coaching and feedback sessions.

Focus on the following during video review:

- Was your communication effective? Did you provide explanations that were appropriate for your client, and did he/she seem to respond to them? Did you ask the necessary questions when you didn't understand something? Listen to the verbal exchange, but also examine body language.

- What was the relationship between you and the client like? Was it collaborative or hierarchical? Was it constructive or combative?

- Did you follow a proper structure for the interaction (see the next recommendation)? Make a checklist.

- Most importantly, leave your review session with one or two goals for future client interactions.

Statisticians also can improve communication outside of live client sessions. New collaborators can practice communication skills using role play scenarios, in which one person acts as a client and the other acts as a statistical collaborator (and these can be video reviewed as well). Workshops and continuing education opportunities to help improve communication throughout a statistician's career also are available at ASA conferences (such as the Conference on Statistical Practice or the Joint Statistical Meetings) and through other professional organizations.

Structure your interactions and their outcomes.

One of the keys to practicing communication effectively is to have a well-thought-out plan for your interactions. Several prominent collaborative statisticians have presented structures for interactions, including Derr (again in her textbook, *Statistical Consulting: A Guide to Effective Communication*) and Doug Zahn, who developed the POWER process for client interactions (see *http://magazine.amstat.org/blog/2009/09/01/hearto-fastatcareersept09)*. While it is probably more important to have a structure in the first place than to adopt a specific meeting structure, these structures do have a number of elements in common. There is an initial period to prepare for the meeting; terms for the interaction and a mutual agenda are agreed upon between the statistical collaborator and the client; there is a work session in which information is exchanged productively, with opportunities to question and enhance understanding on both sides of the table; and time is allowed at the end to review the interaction and agree on steps going forward.

While it will take some time and experience to implement a meeting structure smoothly and with appropriate flexibility, the benefits to the participants are well worth it. When there is a structure in place and the statistician no longer needs to concentrate on the meeting logistics, it becomes much easier to focus on communication and gauge effectiveness. Note that this idea can be extended to written reports and other outcomes outside of immediate interactions—having a general, flexible structure in place to organize statistical information is immensely helpful to making that information understandable.

Gauge your clients' knowledge and communication needs on an individual basis.

Not all nonstatisticians who need statistical expertise are the same. That may sound like common sense, it is easy to begin treating all clients as if they are the same over time. While I have seen many attempts to categorize clients—some serious and some humorous—they fall short of describing the variety and nuances of nonstatisticians who seek statistical collaboration.

With respect to background knowledge, the simplest approach is to ask clients what kind of experience they have had with statistics. It's important to do this in a respectful manner (see my next recommendation), as immediately firing off a barrage of questions related to specific statistical techniques and courses can be intimidating. Instead, clarify that you are asking because you want to make sure you use appropriate vocabulary and provide proper explanations. Also, invite them to ask questions any time you are not being clear.

Communication needs are a bit subtler, and I've emphasized just a few points in the following bullets:

- **Atmosphere:** Some clients prefer an atmosphere that includes friendly conversation, while others prefer a more polished, down-to-business environment. I usually try to gauge this based on my client's demeanor after the introduction—is the discussion moving to the parking situation outside? Or is the client already placing material on the table and starting to tell me about some of the issues involved in his or her project?
- **Attitudes:** Unfortunately, some clients have preconceived negative perceptions about statistics; they have had little exposure and believe they have poor abilities. They may be nervous or even fearful about meeting with a statistician. Make an effort to be particularly patient when you recognize a client has an emotional reaction to working with statistics, and that client will be more receptive to what is being communicated.

Never be afraid to ask a client if he or she understands something.

- **Directness:** Some clients are very good about asking questions and guiding the direction of the meeting. Others are quieter and prefer to be invited to contribute. Never be afraid to ask a client if he or she understands something or is happy with the pacing and direction of the meeting.

Practice respect.

Respect takes many forms during client interactions. General politeness (such as showing up on time, remaining focused on your interaction, and not interrupting your client) is one way to demonstrate respect. Some of what I have already discussed in my other recommendations also go toward demonstrating respect and are more specific to collaboration: acknowledge your client as an individual; structure your interactions so they are efficient; and be patient with your clients' hang-ups when needed.

There is also an issue of professional respect, which cannot be understated—clients collaborate with us because they acknowledge we have statistical expertise they do not. It is important to recognize in return that our clients have expertise in their areas that we do not have. Just like clients do not become experts in statistics after an hour-long meeting, we do not become experts in their fields or areas of expertise during that meeting. Allow and encourage clients to contribute to the interaction. This not only results in open lines of communication and positive relationships, but even improves the technical aspects of statistical work, as it provides a more complete view of clients' research problems and objectives.

Mentor others.

One of the greatest contributions experienced statisticians can make to the field is to share their experiences. How do you explain complicated statistical procedures to nonstatisticians (think random effects, ordinal responses, and computationally intensive techniques)? How did you learn to expand your communication abilities? ■

COMMENT ONLINE
Please visit the web version of this article at *http://magazine.amstat.org* to add your own comments and thoughts about communication.

Negotiating Fair Compensation

Stephen Simon is a part-time independent statistical consultant and part-time faculty member in the department of biomedical and health informatics at the University of Missouri-Kansas City. He writes about statistics, evidence-based medicine, and research ethics. Read more of his work at *http://blog.pmean.com*.

If I had to find fault with my colleagues in the statistics profession and myself, it would be because we sell ourselves short. I can't blame the researchers we work with. If they offer us support at 5% effort on a research grant where everyone else is getting 20% effort or more and we accept, they are the smart ones and we are the dumb ones.

It is not just in the research arena that we sell ourselves short. In our outside consulting work, we don't charge nearly enough. Much too low is the $130 average hourly rate listed in a 2006 newsletter of the Statistical Consulting Section (*http://community.amstat.org/cnsl/documents/newsletters/archive/2000-2009*).

You already know how much a typical lawyer or accountant makes because you needed their help getting your business started. Your training and experience are at least as good as theirs, so consider what you pay them a minimum for what you should charge.

I won't go into the advantages and disadvantages of charging a flat fee versus charging by the hour. A discussion of both approaches appears in an earlier *Amstat News* article (*http://bit.ly/31EFLMo*). But here are some tips for how to get the compensation you deserve.

First, if you are charging by the hour, post your hourly rate on your website. It will save you time by scaring off anyone who is trying to get statistics help on the cheap and give you something to point to if someone tries to negotiate a lower rate. Sorry, you can say, but my rate is what I have listed on my website. Non-negotiable rates are the norm in the legal and accounting fields, so you are not being unreasonable.

Charge a premium when the client asks for something unusual. Your client needs you to run SAS programs and you are much more comfortable with R? Fine, but that will be $75 more per hour. Your client wants to own your code and not let you re-use it for any future client? Same thing. Will you have to work odd hours to meet a ridiculous deadline? Let them know your evenings and weekends are valuable to you. You'll sacrifice them for an important deadline, but it will cost 25% extra.

Every time you ask for more money, you do need to "up your game" to the same extent. Your SAS code will have to be every bit as good as the R code you normally write. The programs your client owns will be meticulously documented. And you won't even think about being one minute late if you are charging a special evening and weekend rate for their tight deadline.

And please don't raise your consulting fee because the client is asking for something you know is unethical. You don't take a $10,000 bonus when you find a way to push that *p*-value below 0.05. There are some things that are not worth any amount of extra money.

Get some of your money up front. In legal circles, this is known as a retainer fee. Tell someone what your minimum cost is going to be and ask for half of this amount before you start your work. I had a client who cut me off after seeing some of the preliminary results. I didn't ask for a minimum, so I couldn't complain. But it hurt me much more than the loss of expected income. I take pride in my work and knew I had not provided a quality data analysis for this client.

Raise your consulting rates over time. If you were working for a big company, you'd see extra pay because you're more experienced and produce better quality work using less time. The same must be true for your independent consulting work. So, think about asking for an extra $25 dollars per hour at the beginning of a new year. If it helps, you can offer the earlier rate for longtime customers. Hey, anyone who sticks with you year after year probably deserves a better consulting rate than a new client.

On the flip side, you are not anyone's slave, and if a project isn't worth it to you anymore (usually because the aggravations are not worth the money), just call it quits. Find a good stopping place that does not leave your client hanging. That's the big advantage of being an independent consultant. In a big company, you might be able to get out of an aggravating project that isn't worth your time, but more often than not, your boss will tell you to suck it up and be a team player.

Put everything in writing. I have never been burned by a bad client, but enough consultants have that they insist on a contract. Put a payment schedule in the contract and include a penalty if the company does not pay within an agreed-upon time frame (usually 30 or 60 days from receipt of the invoice). If you don't like the idea of a penalty, offer a discount for timely payments and raise your base consulting rate to compensate.

If you have exceptions to your stated consulting rate, that is okay, but you should know what your exceptions are before you enter into negotiations. I offer a substantial discount to graduate students needing help on their dissertations. I was a poor graduate student once, so I can sympathize. I also offer volume discounts. For one client, I cut my normal consulting fee by 25% in exchange for a guarantee of 10 hours of consulting a week for a full year. But limit your exceptions to cases where *you* see the need.

You must have a stiff spine when you are negotiating pay with a new client. Any reasonable person will understand if your fee is non-negotiable. They may not like you for it, but they will respect you.

Roger Fisher and William Ury have a great book about negotiation, *Getting to Yes*. One of their top recommendations is to know your BATNA (best alternative to a negotiated agreement). Never say yes to conditions in a contract that are worse than what you would have if you didn't reach an agreement.

Also consider what your client's BATNA would be. If they got your name from a consulting list, they'd lose a bit of time by having to go back to that list and look for a different consultant. But if you are the only consultant they know who has the right skills and experience, then their BATNA puts them in a poor negotiating position. This is the case, more often than not. The cost to a client of leaving a problem unsolved is usually much greater than the cost to you of the lost business opportunity.

Don't use this edge to win concessions that are excessive to the point of being coercive. You do want repeat business, so treat everyone fairly. When you have the negotiating edge, just use it to give yourself the courage and determination to keep your important conditions non-negotiable.

When you accept less than you truly are worth, you aren't just hurting yourself. You are hurting every other statistician who is trying to get decent compensation for their work. So, go out there and get every last penny you deserve. ■

When you accept less than you truly are worth, you aren't just hurting yourself. You are hurting every other statistician who is trying to get decent compensation for their work.

The Dos and Don'ts/Ins and Outs of the Side Hustle

Michael J. Anderson

After a career in structural engineering, **Michael Anderson** earned a business degree and followed that with a master's in finance. He advanced to the executive level, first as a vice president and then as a CEO. His love for statistics was born in business school, and he is now finishing a master's program in applied statistics. His focus and passion are in statistical analysis for improved business decisions. His email is *MJAServiceData@gmail.com*

Haven't we all desired to better ourselves, especially once we became adults and joined the work force? We strive to better our position where we work, and many of us studied to earn our advanced degree(s) while working full time. Since "work hard to get ahead" is an American battle cry, it's no wonder the side hustle has become so popular.

The side hustle (i.e., moonlighting) is nothing new, with probably the most famous and successful moonlighters being Steve Jobs and Steve Wozniak, who founded Apple Computers. They did so while working at Atari and Hewlett Packard, respectively. Similarly, Instagram's founders created their company by working evenings and weekends.

As a corporate executive, I exhort all of us to do our side consulting ethically and legally. Our firm has experienced many damaging actions by unethical staff members, but those actions always come back to bite the culprits—the world is much smaller than it once was. Consequently, always discuss it with your firm if you feel there could be a conflict of interest. Our consulting work should never adversely affect our performance for our current employer, and a good starting point is to use common sense and the golden rule.

For example:

Don't run your side business during your day job. It is tempting to shoot a quick email to a client while at work, but don't do it! It's not only unethical, but with all the tracking software on the market, companies know what is being done on their computers. Further, they have a legal right to observe any email you send. If you must, take your lunch break outside the office and send your emails from your laptop or smart phone, but never on the company's time.

Don't take on too much and show up at your day job late, distracted, stressed out, or over-tired. Be open and up front with your side hustle clients. Tell them this is a side business (for now) that you will be conducting after regular business hours. Tell them to expect your emails when they have likely gone home.

Don't run a side business that competes with your day job and/or do anything that goes against your contract with your employer. Conflicts of interest are not only unethical, but can result in a lawsuit. Therefore, be cognizant of what projects you engage in.

Do continue to work hard and be focused at your day job. The goal should always be to do what you can at your job to grow the company, not just go through the motions to collect a paycheck. Jobs and Wozniak accomplished much at their day jobs, even collaborating to create one of the most successful computer games, called *Breakout.*

Do be open and honest if asked about your side business. … Honesty is always the best policy, even if the short-term results are painful.

Do operate your business in a manner that you'll be able to explain to your boss with your head held high. Treat your employer the way you want your future employees to treat you.

Having owned two successful corporations, I am one who always looks for business opportunities in whatever I pursue. Our side hustle should be approached as if starting a company, both structurally and operationally, so it will flow smoothly as it grows.

Here are a few steps worth taking, whether you are just starting out or considering taking it to the next level.

1

Create a business plan—this should always be job one!

A business plan is an invaluable tool; it helps guide you and can answer difficult questions about the venture. Tons of information exists on creating one in book stores and on the internet.

2

Get organized.

This is critical as your business grows, and if you don't start early, it becomes overwhelming as the number of documents grows. Consider a structured and logical numbering system for all your files (e.g., invoices, analytical files, computer programs, etc.). This allows for quick and easy access at all times. I often create database software to assist with this, but use a spreadsheet program at a minimum to help you stay organized.

3

Protect yourself with insurance.

An errors and omissions liability policy is appropriate for consulting work. Hopefully you will never need it, but one claim can make it well worth the cost, not to mention the peace of mind it brings.

4

Draft a contract/work agreement.

Sadly, the days of the handshake are long gone. Consequently, a solid agreement between you and the client is a must. It doesn't have to be 20 pages long; binding contracts can be as short as one page. However, you want to be sure you are protected, and thus a lawyer should review the contract. In the past, I have drafted the contract in grave detail and then had a lawyer review it. If you've done good research, the lawyer should only need to make minor changes, and thus the legal costs can be substantially reduced. Be sure to discuss this with the attorney in advance, because some don't allow this type of arrangement.

5

Consider a business structure.

There are many business structures you should consider (e.g., sole proprietorship, partnership (if you have a partner), LLC, S-Corp, C-Corp, etc.). There are different tax advantages and operational requirements with each that must be considered to determine which is right for you. Be sure to consult with a CPA to help you weigh all your options.

Moonlighting for statisticians isn't like delivering pizzas after our day jobs.

Moonlighting for statisticians isn't like delivering pizzas after our day jobs. Our analysis and subsequent recommendations have the potential to make or break a company. Not to mention, some firms can be quite litigious.

There is such a diverse group of analysts here that it would be difficult to give ideas for obtaining clients; however, staying within your passion is always a good idea. Perhaps you desire to help the legal, health care, or transportation fields. We become much more valuable as an expert in one or two areas. My advice would be to think creatively and outside the box. Sometimes, that's what it takes to get to the next level.

The side hustle can be rewarding and exhausting—physically, mentally, and even emotionally—at the same time. Taking care of ourselves can keep us performing at our best (at both of our jobs). Make sure to take time out for physical and spiritual exercise, and regularly do absolutely nothing but relax and recharge emotionally. ■

Build Your Successful Consulting Practice: Advice from a Blog Series

Anthony Carra, Business Improvement Group

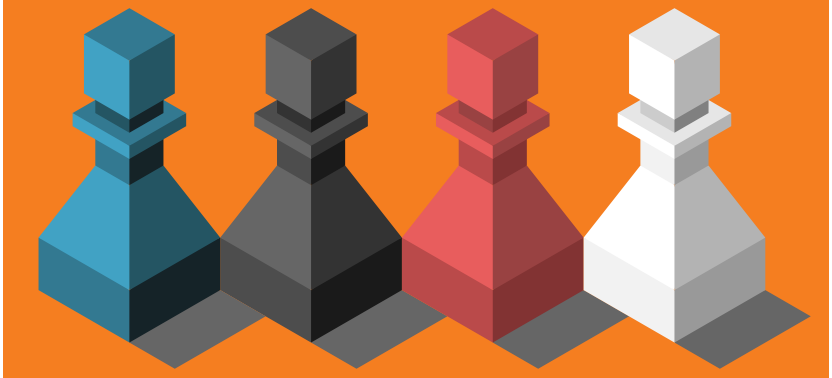
The Business Improvement Group has been busy the past few years! What started off as dabbling in the consulting space has developed into a thriving practice with several team members and contributors. One of our recent activities was to create a blog series to share some of the lessons we have learned over time. Here are some of the highlights, with links to the full articles.

As principal consultant and a co-founder of the Business Improvement Group, **Anthony Carra** brings more than 20 years of experience in technical services, process engineering, equipment engineering, applications engineering, sales, and quality engineering. Carra is an ASQ Certified Six Sigma Master Black Belt and holds a degree in electrical engineering from the New Jersey Institute of Technology and a master's in applied statistics from Penn State University.

They say a journey of a thousand miles begins with the first step. How often do individuals come up with an idea for a product or service to offer, only to be disheartened by the supposed hardships of starting a business? How many dreams have been dropped, only to be picked up by others willing to make a go of it? We often find ourselves encouraging others to at least start off with what they have and slowly build toward their BIG dreams. In "Dream BIG, Start Small," we share how we walked a group of aspiring entrepreneurs through their limiting beliefs and demonstrated how they could start their businesses that very day with the resources they already had. *http://bigbpi.com/dream-big-start-small*

Most of us who offer consulting, collaboration, and other professional services do so as a skilled practitioner in a particular field. This is the most common way to get started, leveraging the network you have and meeting an immediate need. However, there are other roles one must consider to ensure a sustainable business for years to come. While the practitioner is focused on completing the tactical work *in* the business, there are two other roles that transition from tactical to strategically working *on* the business for future growth and profitability. You will want to exercise all three as you build your practice. *http://bigbpi.com/the-3-key-roles-for-a-successful-business*

The Team Inside the Machine



Just as there are three roles the professional service provider must take on to ensure business for tomorrow, there are four primary functions required. Most start off filling these functions themselves, but only on an as-needed basis (and most commonly in response to some sort of crisis). By proactively identifying these four functions and developing strategies, you can avoid crises and systematically build your practice. Unlike the three key roles that are more of a mindset (albeit, there are some skills involved), these functions can either be learned through training, given to employees, or contracted out to others providing these services. You'll find the most successful consulting practices align the strengths of each team member with the functions they are most proficient with. *http://bigbpi.com/the-team-inside-the-machine*

Grow Your Professional Services Business

I often tell people there is a big difference between consulting and owning a consulting business (as I have personally found). When you are skilled in what you do, delivering your services by collaborating with your client is probably the most fun and rewarding part of the job. However, what happens when that project is over and you have to find another? Most professional service providers find themselves on a sort of roller coaster, reaping the benefits of project work and then roaming social media channels to announce their availability when that project is over. This approach is similar to holding the proverbial "will consult for food" cardboard placard and often results in periods of downtime and no cash flow. A better way is to treat your practice like a garden—plant seeds, nurture them, and then harvest a plentiful bounty according to your season. *http://bigbpi.com/grow-your-professional-services-business*

If you are thinking about starting your own practice or would like to learn more growth strategies, request a copy of The Small Business Owner's Handbook at *http://bigbpi.com/download.* Also, follow our company page on LinkedIn for upcoming webinars and articles with tips to help you grow your successful consulting practice. ■

David Morganstein and Philip Rocco Scinto

Consulting BEST PRACTICES: Practice *and* Mentorship

Many of us have been touting *what* you should do to be an effective consultant over the past several years, but we have been neglecting the *how.*

So, how do we successfully implement and execute the necessary "nontechnical" habits, characteristics, qualities, and practices? The answer is to use the same approach as in mastering any subject.

First, we assess our enthusiasm. We often start down the path to statistics (biology, chemistry, engineering, etc.) because we have an interest, desire, and/or passion for the subject. There is no way to sugar coat this: If you do not have a passion, desire, or inclination to dedicate yourself to helping and enabling people and organizations to collect, analyze, and learn from data, then statistical consulting is probably not for you. This is not a bad thing; statistical consulting just isn't *your* thing.

Next, we identify the gaps in education. If you wish to be a biologist, you study biology. If you wish to be an engineer, you study engineering. If you wish to be a consultant … Well, what do you do? Since there is no formal degree in consulting, look for bachelor's, master's, and doctoral programs that incorporate consulting and consulting practice in the curriculum. Make sure you include a good dose of electives involving communication, writing, speaking, humanities, philosophy, and human behavior. Anthropology and sociology (focusing on culture) are valuable, as well. If you already have your degree and do not wish to revisit a college campus, then you will need to find the needed training elsewhere.

When we are talking about consulting, we are talking about interacting with humans. While some online training may be fine (humanities, philosophy, and human behavior), steer away from communication courses in which there is no active, live human participation. Active participation and role-playing are necessary components of most learning and training for communication and consulting.

We must admit that the ASA could do more to offer quality courses, seminars, and tutorials in communication and consulting. The current offerings are good, but they could be better. While several attempts have been made, we need to recruit more experts in the actual communication and consulting fields to teach these subjects. Could these instructors also be statisticians? Yes, but not at the expense of bringing in the most capable instructors.

Practice, Practice, Practice

You have the passion for consulting. Check. You are actively learning the skills involved in communication and consulting. Check. What's next? Practice.

If you do not practice what you have learned, you will not improve. Consulting is no different than golf, tennis, speaking a new language, or playing an instrument. New skills cannot be mastered by reading a book or attending lectures. They must be practiced.

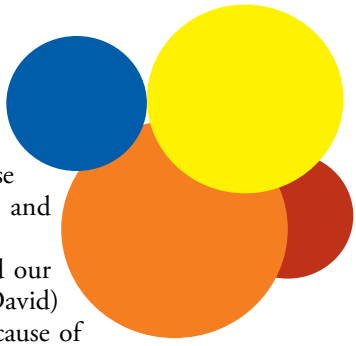
The opportunities to practice are much more available than you might think. Toastmasters is an effective and convenient way to practice public speaking. Writing in a journal and/or on a blog to communicate your thoughts and/or convey information is a great way to practice writing. If you do not wish to share your writing with the public, write for family and friends. Develop your ability to convey simple ideas and concepts to more complicated ones. These can be topics related to statistics or not, but if you can write about collinearity to your grandparents and have them understand it, then you will probably do well with your clients. Speaking of family and friends, there is no reason you cannot practice empathy, patience, and listening with them.

Reading your presentation for a meeting aloud and practicing it in front of a mirror is effective. You get direct feedback on your timing, expressions, approach, and style in addition to mastering what you want to say and how to say it. Other opportunities to practice communication skills include volunteering for local clubs or professional organizations. Take a leadership position such as chair, group leader, secretary, and/or treasurer for your local running club, an ASA section, or ASA chapter. Volunteer as a spokesperson for a local charity and/or coach a team.

> Develop your ability to convey simple ideas and concepts to more complicated ones.

Reach Out to a Mentor

What to learn, where to learn it, and how to practice and improve are just as important for consulting as they are for any effort, whether it's statistics or tennis. Awareness is a great first step, but action is required. But what action, how often, and how much? How do you know if the action is effective and leading to improvement? In addition to action, we all need guidance, direction, and feedback. The best way to plan your path may be through a mentor. You may not realize it, but you've been mentored before. Ever play baseball? You probably had a coach. Play the piano? You probably had a teacher. And most of us have had the fortune of a parent or guardian to help guide us through childhood. Why not a mentor for consulting? A good mentor should have the experience, wisdom, and patience to work with you to explore your passion; identify the skills needed; develop a plan to learn, practice, and strengthen those skills; and provide feedback.



We make these suggestions for many reasons, but the primary one is we have followed these suggestions in our own careers and found them helpful.

We both chose statistics and our sub-areas of survey statistics (David) and industrial design (Phil) because of our keen interest in what we could accomplish and because the field offered a discipline we valued: Enthusiasm!

We've filled in the gaps in our educations by taking or offering to teach short courses in relevant and related topics. There is nothing like having to teach a topic to deepen your own understanding! We often look to short courses at professional meetings such as JSM or the Conference on Statistical Practice for opportunities to learn new methods and improve our understanding.

Improving our writing and speaking skills have been fundamental to both of us for professional growth. Here we are, preparing an article for *Amstat News*. We seek out opportunities to present ideas in various forums, via both papers and presentations. When we have talks to give, our motto is "practice, practice, practice." At work, conducting a dry run of any talk is a helpful way to improve and sharpen it (not to mention testing to make sure it fits into the allotted time).

Mentors? Here we have some disagreement. Phil believes he had the best mentors in the world, and David argues he did. What mattered to both of us? We were willing to accept the help offered. It is a natural evolution for many to reach a point in their careers when they realize how important it is to help bring along the next generation. We were both fortunate to have superb senior statisticians who taught us so much. We realize the value of what we received and felt the calling to do the same. Throughout our careers, we have both worked to create and grow mentoring opportunities at our workplaces, at conferences, in ASA sections, and in ASA chapters. What is more, we helped acknowledge the outstanding mentors in our profession by initiating an annual recognition bestowed to those who have contributed so much to our profession.

In Summary

We would like to congratulate you on taking this step to improve as a consultant. Step? Absolutely. You have made clear your interest, desire, and enthusiasm by reading this article. Next, determine and reduce the gaps in education and training you may have in communication and consulting. Practice what you learn, and practice the identified effective techniques. Finally, a mentor is of tremendous benefit in providing guidance, direction, and feedback in your quest for excellence. ■

MORE ONLINE
Nearly seven years ago, David Morganstein wrote a summary of the characteristics of a good statistical consultant. To view that article, visit *https://magazine.amstat.org/blog/2012/09/01/consulting-best-practices.*

STATISTICAL CONSULTING CLIENTS: How to Get Them *and* How to Keep Them

Acquiring and nurturing your statistical consulting client base

Melissa Kovacs, PStat®, is the founder of data analytics, program evaluation, and litigation support firm FirstEval, LLC. She is also a part-time associate director at Arizona State University's Morrison Institute for Public Policy.

If you're a statistical consultant or you want to be a statistical consultant, how will you build and maintain a client base?

The Answer

Word-of-mouth. While some consultants advertise, specifically in niche areas to niche audiences, most of us get clients because someone recommended us.

How to Make It Happen

I have six thoughts about your obvious next question: How can I be personally recommended for statistical consulting work? My thoughts here span from the origination of your business cycle to your work with clients. Here we go:

1

Network. Don't let this word lead to a pit in the stomach of your introverted statistical self. This isn't as bad as it sounds. Networking is as simple as telling everyone you know that you are a statistical consultant. Speak it into existence. Announce it on LinkedIn; tell your friends; tell your family; and tell your professional colleagues you are looking for projects. You'd be surprised whose colleague's roommate's girlfriend's colleague is looking for a statistician for a project. If you're bold, join a networking group in a particular area—maybe one for women, tech in your city, or data visualization lovers.

2 Market yourself.

Think of marketing as being relentlessly helpful and working to actively solve people's problems. You don't have to think of it as placing ads on Google, but do educate yourself about what it is. As a statistical consultant, marketing will encompass talking to others about what you do (see #1) and providing helpful ideas to solve business problems using statistics.

3 Treat your consulting like a business, because that's what it is.

All those biostatistics, applied econometrics, and statistical theory courses will only help you with your actual client work, not with building and maintaining a client base. You are officially in the business world now, so immerse yourself in it and embrace it. I recommend not assuming you can just "figure it out" without some help and education. Attend a business boot camp. Take classes for entrepreneurs at your local library. Read some Seth Godin books. Steer your podcasts toward advice for business owners and entrepreneurs. Join a business founders' meetup group. You don't need to get an MBA; the information and help is out there for free, in your community and online.

4 Consider your brand.

As a statistical consultant, you do have a brand. What is your brand? Give this some serious thought. What do you do that signals your brand to your client? Is it high-quality statistical consulting? (Well, that should be a given). Is it the professional data visualizations and graphics you deliver with your end product? Is it your witty repartee on Twitter? Is it your go-to blog posts? Is it your friendliness and ease when doing business? Is it your helpful monthly newsletters? Is it your nerdiness with a touch of humor? Is it your blunt honesty when delivering results? Is it your community ties? Is it your trustworthiness or remarkable attention to detail? All these elements are a brand. Are they your brand? Consider what you want to be known for and how you'll impart your brand to your potential clients.

5 Listen.

This is the most important item on this list. Once a client engagement originates, a statistical consultant should be in listening mode until the finish. From that first phone call and initial client meeting, the consultant should be listening carefully to understand and recognize the unique situation and story of each client. Remember that this is part of marketing—listening to actively find and solve people's problems and the problems in their organizations (using statistics, of course). Recognizing people's problems and their organization's needs requires empathy, which requires listening. Your clients may not know what they need, but if you listen long enough, you'll know. Or, they may think they know what they need, but after careful listening, you may be able to offer a better solution to their problem.

6 Maintain your integrity.

After careful listening, you may realize you are not the right consultant for a client. Their project may be too much of a stretch for you, you may not have time to deliver a high-quality product, or the topic isn't in a space for which you feel comfortable providing advice. It is alright to decline a project for these reasons, or in any situation you don't feel you can deliver high-quality work. Be honest and be yourself. Even if you lose income in the short term, you'll maintain your integrity and gain respect in the long term.

All these factors, combined with your rock-solid knowledge of applied statistics, sum to an incredible statistical consultant—one who will be asked to return for more work and be recommended by past clients to new clients. ■

STAT*tr@k*

WHY BE A STATISTICAL CONSULTANT?

Mary J. Kwasny

As relatively new members of the statistics profession, you might be considering a career as a statistical consultant. You may also be wondering what it is exactly that statistical consultants do. (As a more established statistician, I hear that question a lot. I also want to reply that we don't do anything "exactly"; we allow for error, unlike mathematicians.)

Well, as statisticians, we know how to deal with data—collect it, clean it, analyze it, and interpret the findings. We are not, however, experts in the subject matter in which the data was collected. But, the subject matter experts, or clients, who collect data are—guess what!—not experts in statistics. Working in a particular industry or research field, or on a specific project, the statistical consultant needs to not only understand, but be able to translate, the subject matter into a statistical problem and then translate findings back to the client.

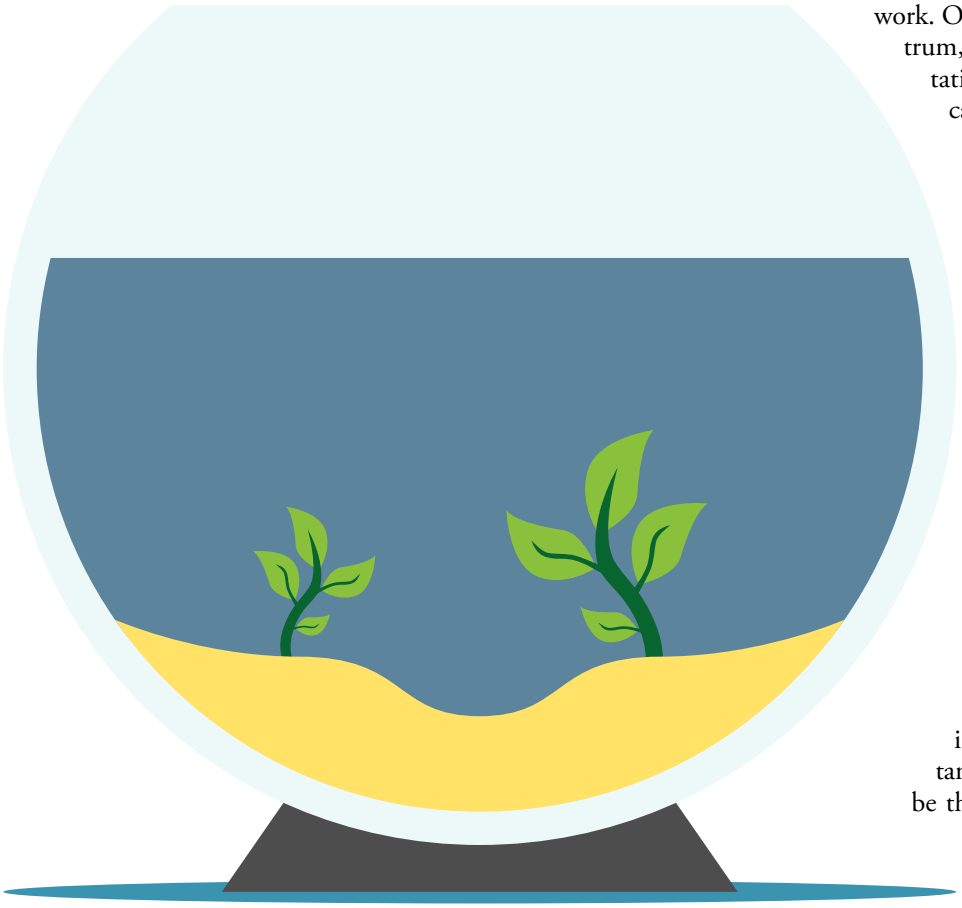
Anyone who has read a translation of a translation, or played Telestrations or Telephone, knows this is not always easy. As statistical consultants, we have to be able to understand how the data are generated and what measures are being used. We have to translate research questions into problems that can be analyzed with data, determine the appropriate type of statistical analysis, and sometimes be the "honest broker" when interpreting the results to avoid bias.

Apart from knowing statistics and learning about the research field you work in, you will also need communication skills to be able to talk to clients, understand their language, and communicate statistics effectively. You will need business skills, business acumen, time-management skills, networking talents, and a host of other skills. Putting yourself out there as a new professional is hard, isn't it?

Consulting Comes in Many Colors

There are different types of consulting and different types of consulting jobs available. On one end of the spectrum, there are short-term consultations, which may just be one or two meetings. These typically are for quantitatively skilled individuals who are comfortable running their own analyses, but appreciate an expert looking over their work. On the other end of the spectrum, there are long-term consultations; these are occasionally called collaborations in an academic setting. These are projects in which you are an integral part of the research team from start to finish, and they may span many years. And there are projects that could be anywhere in between. Consulting may include being an expert witness in a trial or helping someone with a master's thesis in physical therapy.

As for settings, you could work on your own as an independent contractor or in a small group. You could also work in a large group of consultants, in a consulting firm, or be the "in-house" statistician in



Mary Kwasny is an associate professor in the department of preventive medicine and an active member of the Biostatistics Collaboration Center at Northwestern University Feinberg School of Medicine. She has been enjoying the art of statistical consulting and collaboration for more than 20 years in academic medical centers and external nonprofits.

a large company. I personally enjoy working in an academic environment; I am a member of a collaboration center in which part of my job is consulting. Consulting may not be part of your job description at all, but you may want to do some consulting "on the side" if your current employer allows it.

Consulting Takes You to the Unknown

Almost every consulting project is a giant step into the unknown. You meet with a client, discuss their research questions who knows how many times, learn more about their problem, and then you do the statistics part—possibly including, but not limited to, providing assistance for study design, data collection, proposing an analysis plan, conducting an analysis, and writing up the results. But it doesn't stop here. You need to estimate the time and cost for your work and later invoice for your work—and all this is for the straightforward projects.

It's definitely not like coursework, in which you can expect to fit longitudinal models for your Longitudinal Analysis class or survival models for your Survival Analysis class. Any consulting project has the potential to be … anything!

My colleague and friend Masha Kocherginsky said that in more than 15 years of consulting, she has never encountered a real-world consulting project that's straight out of a textbook, and it's never the same analysis twice. As a result, it's never boring!

So Why Would You Want to Do This?

For me, it was precisely because of all the above. John Tukey once said, "The best thing about being a statistician is that you get to play in everyone's backyard." I love learning and problem solving. I love seeing what other people are excited about. I love helping them learn more about their data, which, in turn, helps them learn more about their subject matter. Topics change, people are different, and the one thing you know will happen is you will learn something and help someone. This alone can be addictive.

There are times I call consulting a mix between statistical triage and statistical improvisation. In triage, the key is to quickly assess, diagnose, and assist a patient. Any actor will tell you their craft is honed when they are forced to improvise. Not that you are "making things up" as you go, but rather you are attempting to give unscripted advice to an unknown question.

Short consults can be difficult this way, but not everyone needs a full-time statistician. Other projects provide great opportunities to learn new topic domains, as well as to delve into potentially different statistical methods or skills. For these projects, I use the analogy that statistics are the scaffolding that helps construct or renovate the building. Statistical consulting provides a means to keep statistical and communication skills sharp. Additionally, like teaching an introductory statistics course, it provides the opportunity to discover different and potentially better ways to explain things. All told, statistical consulting is educational, exciting, and challenging.

When I was a graduate student, I did a summer internship and had my first "outside the classroom" statistical consult. A pediatric surgical fellow wanted to look at the importance of staging laparotomy in pediatric Hodgkin's disease. As an intern, I had the good fortune to work on this consult under the supervision of a faculty member, who was there to facilitate the consult. It was the first time I used categorization and regression trees (in my defense, I don't think random forests had been developed at that time). I learned something about medical procedures and treatments. The investigator was really nice and brought doughnuts to our meetings. And I got my first collaborative publication out of it. It was amazing. I was hooked. I never worked with that investigator again, but recently looked him up only to discover it was his first publication as well. He is now an endowed chair in surgical research at a prominent children's hospital. Apparently, he was hooked, too.

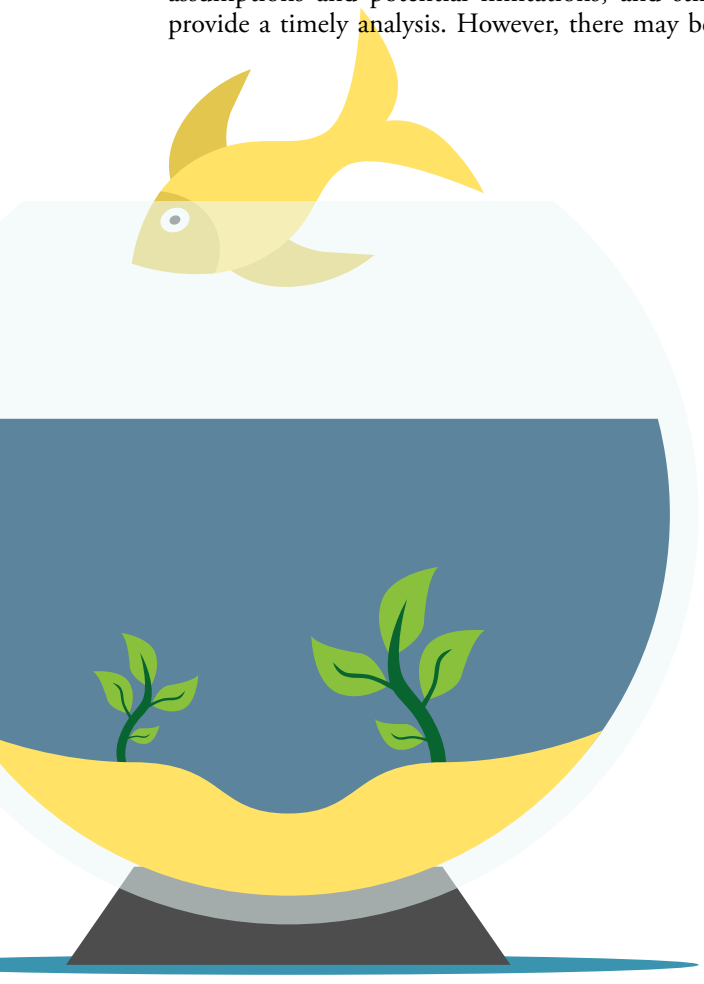
Consulting Perks and Struggles

Not all projects have gone as smoothly or been as productive—and I quickly realized doughnuts were not the norm. There have been problems with investigators wanting to run inappropriate methods, times when I thought I understood a data set and was—in fact—wrong, and times when I sent an invoice only to have the recipient email back, "FOR WHAT!!!" I would hazard a guess that these problems are common and that every statistical consultant, anywhere in the world, has dealt with one or more of the same struggles. But, over the years, I have learned to be a better collaborator and to make it a priority to align expectations so those problems don't occur quite as much. Granted, bad consulting experiences will happen, but, fortunately, there are

many more positive experiences and enough enjoyment in the "random consult" to continue including collaboration in my job description.

Another perk of consulting is that, if you are interested in methodologic research, it is a hotbed for motivating examples and finding omissions and gaps in knowledge. Clients may seek statistical help after data collection, and it may be clear that traditional statistical methods are not appropriate. Other times, when investigators are collecting data, they change protocol out of necessity. These changes may not have gotten a statistical stamp of approval beforehand. For example, I once worked with an investigator who failed to tell me they changed urine collection from a 24-hour collection to a 12-hour collection until the end of the trial. While pragmatic and understandable, had they consulted me on the change, I would have requested they had a period of time where both were collected so we could properly adjust numbers taken under the different conditions.

In many of these situations, we can make assumptions, appropriately and clearly state those assumptions and potential limitations, and still provide a timely analysis. However, there may be more statistically efficient or better methods that could be developed over time to address these adaptations. The bonus with these motivational examples is that, provided you have the investigator's consent, you automatically have data to use as an example!



Apart from the statistical, educational, and communication opportunities consulting provides, it is also a convenient way to expand your professional network. Being newer to the workforce, this may not seem like an important reason to become a consultant, but thanks to different collaborators over the years, I have developed a network of experts in various fields. These individuals have referred other investigators in need of statistical assistance to me and provide me with feedback if I'm looking for second opinions or clarifications when working on another project—or since I work in a medical school, when looking for a trusted medical specialist. Additionally, you will learn that not every statistician gets along with every potential collaborator. When that does happen, it is nice to know there are investigators out there who appreciate your unique talents and style.

Consulting for New Statisticians

As new statisticians, I would strongly recommend some consulting, be it on the job or as pro bono work. It is a great way to keep learning and honing your statistical craft. I would also suggest you don't go it alone; find a mentor, colleague, or boss who is available for advice. This is especially helpful when you have one of those difficult clients.

Independent consulting can be a fabulous career choice, but first it is important to have a network of potential clients and a portfolio of work. As you develop as a consultant, you will be able to better estimate how long a project might take, more easily figure out the real question the investigator is asking, and develop an expanding toolbox of statistical methods to be used for other projects and new problems. While you learn and hone these skills, it is vital to have backup and advice.

The Statistical Consulting Section is active in the online ASA Community and caters to all types of consulting—within universities, pro-bono, on the side, sole proprietorships, or wherever and however consulting is done. This is a tremendous resource for those who are thinking of, or actively consulting in, any of those environments. So, go! Consult! Have fun! ■

STATS4GOOD

With Data for Good

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

With the start of the academic year, students, professors, and staff are looking forward to the opportunities the new year brings. One order of business many students face—and sometimes delay as long as possible—is choosing a subject for term papers, class projects, and other research. To turn this potentially worrisome task into a unique opportunity, students might consider how Data for Good subjects can meet the educational specifications given by their professors. This can create an opportunity for an interesting paper or project that addresses a question of need in the community and develops D4G experience while completing class requirements.

While the goal of the class is learning new analytic methods, there can often be a fair amount of latitude in how these methods are applied: The techniques are determined by the class, but the specific cases may vary widely. Programming courses can find practical applications in any subject to make a difference in an area students care deeply about. A project for a big data or machine learning class can mine social media and extract features. Professors can inspire students with projects that make the grade and make a difference. D4G projects can facilitate team projects by choosing a subject that motivates the group to work together and go above any course requirements.

Of course, student papers in Data for Good aren't just for STEM courses. Classes outside the sciences can benefit from scientific research. Here, the context is often the reverse of science classes: The subject is narrowly defined by the class but the research methods vary widely. For example, document vectorization and feature extraction of Abraham Lincoln's speeches could be plotted on a time series—like a search on Google Trends—to trace the development of his thought and language from opposing the expansion of slavery, to "send them back" to Africa or Central America, to emancipation, to reconciliation in the second inaugural address … a gradual development reflected in our wider society today.

Good statistical science and a little creativity can go a long way toward developing both your analytic skills and D4G practice while delivering a powerful, creative, and unique essay to professors tired of reading term papers that merely regurgitate lecture points. Of course, it's always important to read the syllabus carefully and discuss ideas for papers and class projects with your professors to be sure they meet the requirements for the course. I think most professors would be only too happy to see modern methods of text analytics, econometrics, and other statistical research techniques applied to literature, history, philosophy, and the arts.

Outside the Classroom

Beyond classes, there is an abundance of educational opportunities in Data for Good. Hackathons are a great way to expand your skills and horizons at the same time. The ASA's DataFest (*ww2.amstat.org/education/datafest/index.cfm*) is one part hackathon and one part Kaggle competition, with events at a number of universities over a weekend. Multiple small teams at each site explore the same data set over several weekends late in the school year, with applications to host an event likely due in January.

Another ASA activity is the annual Data Challenge. The 2019 Data Challenge looked at data from the New York City Housing and Vacancy Survey. Next year's JSM has a D4G theme, so the Data Challenge should be a good opportunity to get involved. More information about the 2020 event will be available around the end of the year. Keep watching this column to find out more.

Many organizations have resources to support projects and events in which students can participate. The AAAS Science

and Human Rights Commission offers a Campus Event Toolkit (*www.aaas.org/resources/campus-event-toolkit)* that includes guidance and materials for events and ways to apply science to human rights research. Next year is a census year, and the US Census Bureau's Statistics in Schools (*www.census.gov/schools/?eml=20190725mssiss1ccpuprs&utm_medium=email&utm_source=govdelivery*) program provides resources for K–12 activities that could be implemented by college students in statistics education. Teach Data Science maintains a list of Data for Good groups (*https://teachdatascience.com/data4good*), each full of opportunities for student and faculty research. (If you are part of a D4G organization, look into getting connected here!)

Internships and research partnerships with industry are another way students can become involved in Data for Good projects while at school. Whether scouting places to work after graduation or just trying new experiences, Data for Good can be on your list of considerations.

Students, professors, and research partners can all find ways the important work of Data for Good intersects with course requirements and other educational activities. Finding your project for next year will bring new opportunities for learning and service. It also might be the beginning of a lifetime of activity in Data for Good.

The theme for next year's JSM is "Everyone Counts: Data for the Public Good"! Watch this space for more information as statistics' biggest event in North America focuses on Data for Good. Now is the time to organize topic-contributed session proposals. I'm putting together one on human rights analytics (i.e., genocide forecasting) and doing what I can to help develop other D4G proposals. Let me know if I can help refine an idea, suggest possible speakers to complete a proposal, or facilitate in other ways.

Get Involved

Throughout the school year, many organizations host events to encourage girls and young women to develop their careers, often in STEM fields. One such program is Dream It, Be It (*www.soroptimist.org/our-work/dream-it-be-it/index.html*) from Soroptimist International. This particular program focuses on girls with multiple barriers to career development. I can write about this vitally important work by Soroptimists and others but can never do what is needed most, which is to be the role model these young women need. Through programs such as this, professional women in statistics and data science make a huge impact on the future of Data for Good by making a difference in the lives of girls at a critical point in their development. ■

Survey of Publications Generated by ClinicalStudyDataRequest Consortium

The worldwide research community has embraced the efforts of the *ClinicalStudyDataRequest.com* consortium (CSDR) to share patient-level data from clinical studies.

Here are some numbers to back up that claim:

- More than 500 research proposals have been submitted to CSDR since its inception in 2014.
- 40+ papers have been published using clinical research data that has been shared by CSDR member companies.
- These papers feature data collected in more than 193 studies.
- A closer look at the resulting publications reveals a diverse profile:
- Two-thirds of the researchers were based at universities, and the others were from medical institutions.
- Half of the researchers were based in the EU, a third in the US, and the rest from other parts of the globe.

The list of journals associated with these papers is also diverse. Examples include the following:

- The *BMJ*
- *Cancer Prevention Research*
- *Journal of Urology*

The success of CSDR demonstrates the model can and does work. Sponsors post a list of available studies, researchers prepare a formal proposal, an independent review panel reviews the proposal with respect to scientific merit, and the clinical data associated with the proposal is shared (fully de-identified, of course).

This work has enabled sponsors to meet the growing transparency demands of world-wide regulatory agencies (such as the European Medicines Agency) and world-wide scientific associations (such as the International Committee of Medical Journal Editors).

In addition to handling day-to-day research proposals, CSDR is also working to let the global research community know of its existence and the plethora of opportunities available.

Note that full data on the published work is shared! It can be found at *https://clinicalstudydatarequest.com/Metrics/Published-Proposals.aspx.*

What Does the ASA Section on Statistical Consulting Mean to You?

LeAnna Stork, chair of the ASA Section on Statistical Consulting, asked members on the ASA Community to unlock the "secret sauce" and answer the following questions about what the section means to them. Following are some of the responses she received.

Allison Grove

Owner/Statistician and Scientific Writer, AG Research LLC

Why did you join this section?

I'm a new member of ASA and the Statistical Consulting Section. It was recommended to me by a member of ASA. I have an MS in animal science and worked in this research area for 20+ years. Ten years ago, I started a business that provides research support on a freelance basis, primarily statistical analysis and scientific writing (*agresearchllc.com*). I often help a researcher take a thesis or summary report and turn it into a manuscript for submission to a peer-reviewed scientific journal. This has involved redoing the statistics and learning new techniques. I discovered the part I enjoyed most in this process was analyzing and interpreting the data. I'd like to shift my business more toward statistical analysis and thought this section would be a good way to network and learn.

What value do you get from being a member?

I just joined in the last month, but have already found the discussion threads and blog posts very helpful. My next task is to create a listing in the ASA Directory of Statistical Consultants.

What else would you like to see the section provide as a member service?

Networking and/or mentoring opportunities and marketing assistance. Anthony Carra's blog posts on building a successful consulting business have been great, but would I find a marketing resource that understands this kind of consulting work? My desire to focus my business more toward statistics is somewhat of a career shift, and I could use some guidance along the way. I've recently begun taking online stats courses toward obtaining a graduate certificate and/or MS in statistics.

Michael Schell

Senior Member, Biostatistics and Bioinformatics, Moffitt Cancer Center

Why did you join this section?

Keith Muller advised me to join. When we were both biostatistics faculty at UNC, he said this was a great section for people who cared about statistical practice, which I do. I had thought that this section was really for statisticians in consulting or business only. Thank you, Keith!

What value do you get from being a member?

While I don't post very often to this online message group, I enjoy seeing the various issues, both statistical problems and consulting business issues. The JSM Statistical Consulting Section meetings are also good for meeting others who care about similar issues.

What else would you like to see the section provide as a member service?

Translation of good ideas from theory to practice remains a major problem for our profession. Whatever this section can do to help facilitate that translation will be beneficial.

Deborah Dawson

Professor of Biostatistics, Iowa Institute for Oral Health Research, University of Iowa

Why did you join this section?

I joined quite a while ago, basically out of an interest in the consultatory aspect of being a statistician. This was despite the initial impression that I also shared that this section was primarily intended for those in consulting or business only. I am an academic and collaborate with many groups and individuals, but do little other consulting. But it has turned out to be one of the sections most helpful to me and one that always keeps my interest.

What value do you get from being a member?

I have enjoyed and benefited from the discussions—whether they were about business aspects of consulting, consulting relationships, or specific issues related to statistical practice. I have learned a great deal from other members of this section. I particularly appreciate the helpful and respectful tone of the discourse.

What else would you like to see the section provide as a member service?

Besides more of the same great discussions, I would agree with Michael Schell's wonderful comments about the translation from theory to practice.

Ronald Mowers

Senior Statistician

Why did you join this section?

I wish to do some consultancy work. I did stat consulting work for a private ag startup the past two years (my only client), after a 30+-year career with a major seed company (and six years of teaching math and statistics at major universities). Would like to do more part-time statistical consultant work for seed or ag product companies, or for cognitive decline research (AD, Bredesen-type intervention research). The ag economy has been down this year, and I have not had additional customers; this is an example of the ups and downs of a private consulting business.

OIN?

COMM

What value do you get from being a member?

I get some good pointers from the blog, especially interactions of experienced consultants with "newbies" who are asking questions. I am still wanting to be active in statistics, even after a long and (dare I say) productive career.

What else would you like to see the section provide as a member service?

Networking in specific topic areas. For example, would like to connect with some individuals or a group who are currently working in either the world food production area or in the area of Alzheimer's disease/cognitive-decline research. Thanks for the opportunity for giving feedback.

Isabella R. Ghement

Ghement Statistical Consulting Company Ltd.

Why did you join this section?

When I took a consulting course in grad school, I was the least likely candidate to become a statistical consultant. I had a passion for teaching, but consulting seemed terrifying and I remember crying for a whole weekend because I just didn't know how to write a consulting report. But then I graduated and needed to find a job option that allowed me to stay in Vancouver, which is how I ended up considering starting my own training and consulting business. At the time, I tried to get some support and guidance on how to do so via the Statistical Society of Canada, but didn't get very far, so I somehow stumbled upon the ASA Section on Statistical Consulting and was impressed with the level of engagement and support I found within this section. ASA has provided a welcoming professional home for me and given me a sense of belonging. I am grateful in particular to two local consultants, Dr. Carl Schwarz and Dr. Jonathan Berkowitz, for offering guidance and support when I first started. And to my former professor, Dr. John Petkau, who is an outstanding teacher and mentor of aspiring consultants.

What value do you get from being a member?

I've met many wonderful colleagues by being a member of this section. I also tried to give back to the section by working with some of these colleagues to organize JSM sessions such as Communicating Statistical Findings to Consulting Clients Operating in a Decision-Making Climate: Best and Worst Practices (whose materials are available at *www.ghement.ca/jsm2014.html*) and Secrets to Effective Communication for Statistical Consultants (*www.ghement.ca/resources.html*).

UNITY

What else would you like to see the section provide as a member service?

I would like to see that the section does more to support consultants such as myself who are professionally isolated. There have been some attempts to do this in the past, but they didn't pan out long-term.

Jackie Szymonifka

PhD Candidate, NYU School of Medicine, Department of Public Health, Division of Biostatistics (*with 11 years of experience in academia/consulting)*

Why did you join this section?

I've been consulting for about a decade now, but only recently rejoined the ASA, so when I was looking at the various section options, this one seemed very appropriate.

What value do you get from being a member?

As others have said, it's been very educational to read responses to technical questions. It's also helpful, and at times cathartic, to read about others' experiences, both positive and negative.

What else would you like to see the section provide as a member service?

I think we have a fairly diverse set of interests and a range of experience. It might be neat to set up mentoring relationships so that more junior consultants have some guidance as we venture out into the consulting world. Someone else also mentioned special interest groups, which likely could accomplish the same goal in a group setting.

It also might be nice to set up an online "library" of sorts that has consulting-related documents for others to refer to. Again, given our range of experience, items like consulting agreements, invoices, proposed budgets, etc. all could be really useful to have sample documents to refer to, as well as general tips and guidelines for consulting relationships. A previous thread was posted by someone looking for advice on how to approach initial consultations, questions to ask, etc., and I think having a summary of that type of information in one place would be extremely valuable.

There also have been a few threads about administrative/logistical details (obtaining insurance, what type of company to form, etc.) that I think would be useful to have in a single document to refer back to. ■

MORE ONLINE
Log in to view the entire thread at *http://bit.ly/30ppWIY.*

FREE

Electronic Undergraduate Statistics Research Conference

The Electronic Undergraduate Statistics Research Conference (eUSR) will take place November 1.

The conference will feature talks from the Undergraduate Statistics Research Project Competition winners and sessions on graduate school and careers in statistics and data science.

KEYNOTE ADDRESS
Jennifer Thompson
Biostatistician at Devoted Health

Undergraduate students who want to share their work and register for the conference should submit an abstract by **October 23, 2019.** Prizes will be given for the Best Video Presentations!

For details visit
https://www.causeweb.org/usproc/eusrc/2019

Co-sponsored by the American Statistical Association and Consortium for the Advancement of Undergraduate Statistics Education

Science and Technology Policy Fellows Ready to Effect Change

William Adler, Kyle Novak, and Jiayang Sun were selected as fellows for the inaugural ASA/ACM/AMS/IMS/MAA/SIAM 2020–2021 Science and Technology Policy Fellowship and will begin their appointments this month.

Adler earned his PhD in computational neuroscience from New York University in 2018. He has been working with the Princeton University Gerrymandering Project in the role of computational research specialist to develop tools to help citizens understand district maps and fairness in redistricting. His community service includes working as a data scientist with DataKind on a project with an education startup to track college persistence. Adler will serve as a congressional fellow.

Novak earned his PhD in applied mathematics from the University of Wisconsin - Madison in 2006. Since 2017, he has worked with the US Agency for International Development as a AAAS Science and Technology Policy Fellow researching the use and impact of emerging and digital technologies like machine learning, blockchain, big data, open data, and real-time data in low-income countries. He also has worked with DataKind, collaborating with other data scientists to analyze air quality data and assess impacts of humanitarian aid. Additionally, Novak contributed to the OpenStreetMap's Missing Maps project to help digitally map countries such as Côte d'Ivoire. He will serve as a congressional fellow.

Sun earned her PhD in statistics from Stanford University in 1989 and is a fellow of the ASA. Until recently, she was a professor at Case Western Reserve University in the department of population and quantitative health sciences. She will begin a new position as professor and chair of the department of statistics at George Mason University at the conclusion of her fellowship. Her interdisciplinary work includes cancer epidemiology, environmental science, imaging, neuroscience, surgery, wound care, astronomy, computer science, energy, and law. Her service includes work with the Caucus for Women in Statistics (CWS), for which she was the 2016 president. As president, she led an effort to modernize the CWS web presence. Her fellowship placement is with the US Department of Agriculture.

When asked what he hopes to achieve, Adler responded, "I hope that I will be able to use my technical skills to help whichever office I join make meaningful changes to policy. I also hope to gain a stronger understanding of how statistical findings and ways of thinking can have an impact in Congress."

As the fellowship name indicates, the ASA collaborated with the Association for Computing Machinery (ACM), American Mathematical Society (AMS), Institute for Mathematical Statistics (IMS), Mathematical Association of America (MAA), and Society for Industrial and Applied Mathematics (SIAM) to recruit applicants with expertise in statistics and data science. These partners used their networks to promote the program through organizations devoted to increasing diversity in the mathematical sciences.

The fellows will help realize a future envisioned by the Commission on Evidence-Based Policy Making: A future in which rigorous evidence is created efficiently as a routine part of government operations and used to construct effective public policy.

The fellows are supported by a grant from the Alfred P. Sloan Foundation and will help establish the "learning agenda" for the federal government envisioned by the commission's 2017 report by bringing expertise to such areas as data science, machine learning, data visualization, and causal inference.

The selection committee was chaired by ASA Past President Lisa LaVange, ASA President Karen Kafadar, and ASA President-elect Wendy Martinez. Also serving on the committee were representatives from the ASA Committee on Minorities in Statistics, Government Statistics Section, and Section on Statistical Learning and Data Science, along with representatives from the AAAS, AMS, ACM, IMS, MAA, and SIAM. ■

We interviewed a handful of statistical consultants to find out who inspired them, why they became consultants, and what skills they think consultants need to succeed.

Andrew D. Althouse

Assistant Professor of Medicine, University of Pittsburgh

What or who inspired you to be a statistician/data scientist?

I liked the class! Seriously, it was my favorite class as a freshman in college, and I just went with it. Over time, I began to develop more specific interests (statistical applications in medicine), but it all started with college freshman-year statistics.

Why did you become a consultant?

Because I like to collaborate! For me, the most fun part of this job is working with a physician or medical professional who has a question. We can help them define and refine it, figure out the right data source and study design to answer their question, create an analytic plan, and execute that plan!

Name a few specific skills you need to be a consultant.

Communication is critical. You can have all the technical and programming knowledge in the world, but if you cannot communicate (both listening and speaking), it is very difficult to be an effective consultant.

What is the most exciting part of consulting?

Seeing the results come to fruition! You put so much work into these projects. The rewarding part is seeing the finished product in a journal and, hopefully, seeing that it has a meaningful impact on clinical practice.

What is the best piece of advice you received from a mentor regarding statistics or consulting?

As much as possible, try to work with good collaborators. The work experience of many statisticians is dictated by the environment and people you work with, so you'll be best suited to find a place where you have some say in the people you work with.

What advice would you give to statisticians just beginning their careers?

Learning the field and practice of statistics is an ongoing process. Don't expect to know it all on your first day as a staff member or faculty. There are always more models, tests, programming tricks to learn. Keep an open mind, and don't be afraid to engage or ask questions when you aren't sure of something.

What do you enjoy doing in your spare time?

Lifting weights! See *https://magazine.amstat.org/blog/2018/08/01/pastimesalthouse.*

Name one or two favorite blogs or books you have read and would recommend to others.

Four Days to Glory, about two high-school wrestlers in pursuit of their fourth state championship. An inspiring story about the importance of hard work and determination. ■

Q&A

Robyn L. Ball

Statistical Consultant, Stanford University Center for Artificial Intelligence in Medicine & Imaging (AIMI)

What or who inspired you to be a statistician/data scientist?

When working on my BS and MS in mathematics, I thought I wanted to be a theoretical mathematician and philosopher. While a master's student, I took a statistics class from Blair Sterba-Boatwright, who elegantly explained the fundamentals of statistical concepts. Then, for my master's thesis, I developed a machine learning algorithm with Philippe Tissot and Beate Zimmer used for many years by the Texas Parks & Wildlife Department to preserve wildlife. I was so excited that what I built could actually be used—and used for good—that I decided to pursue statistics.

Plus, options. When I was in high school, someone gave me the best advice: "Make the choice that gives you the most options—you can always turn something down if you decide you don't want to do it." Statistics gives me options; I can work in just about any field.

Why did you become a consultant?

Mainly, it's fun! I love getting to learn all the time, and I enjoy the creative process of understanding what the investigator/collaborator wants to know, why they want to know it, how they plan to use it, and then translating that into a statistical framework that provides a pathway to a trustworthy result.

Name a few specific skills you need to be a consultant.

I think it's more qualities, rather than skills, though skills will grow over time. In my opinion, the personal qualities needed for success are the following:

- A natural curiosity to learn and a willingness to ask questions
- Perseverance and integrity (relationships—and trust—take time and persistence). Be true to your word.
- Enjoyment of the creative process of finding the right statistical framework for the problem at hand

What is the most exciting part of consulting?

For me, I get excited when the investigator/collaborator lights up and says, "Yes, that's it!" Sometimes, they don't know the question they truly want to ask, and getting there is half the fun. Also, finding a way to get the data back into the hands of the expert is powerful. They know what to look for, and so providing a means for them to interrogate their data—perhaps in an interactive way—has led to insightful discoveries. As Mary Ann Handel put it, "I don't have to send you an email at 2 a.m. when I have an idea and a question about a gene's expression; I can just log in and look for myself!"

What is the best piece of advice you received from a mentor regarding statistics or consulting?

I'm not sure who told me this, but it has stood the test of time: "You may have the most brilliant idea, but if you can't express it or if it's so complicated that no one understands it, no one will want to use it. Learn to communicate and choose the simplest, most straightforward approach first."

What advice would you give to statisticians just beginning their careers?

It's the same advice I give everyone. Spend some time with yourself. Write down what is most important to you in every area of your life: where you live; relationships; community; your work; etc. Don't consider any barriers. Just take the time to write down what you want because you are either moving toward your goal or you are moving away from it; there is no standing still. Then, every decision becomes clearer.

Above all, trust yourself and be trustworthy. Trusting relationships with friends and colleagues will always see you through. Don't be afraid of a challenge or a change; walk through the open doors. Importantly though, listen to yourself when it's time to walk away.

What do you enjoy doing in your spare time?

I love hiking, camping, snowshoeing, staring at mountains, and watching waves crash. Also, I enjoy spending time with family and friends, whether just talking or going on adventures together.

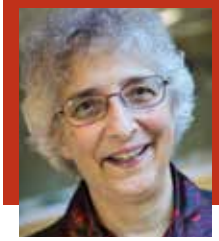
Name one or two favorite blogs or books you have read and would recommend to others.

These aren't statistics books, I know, but ...

On the Road - Jack Kerouac

Together Is Better: A Little Book of Inspiration - Simon Sinek ■

Marlene J. Egger



Professor (*tenured*), Division of Public Health, Department of Family and Preventive Medicine, University of Utah School of Medicine

What or who inspired you to be a statistician/data scientist?

In 1970, I went to Knox College in Illinois. My favorite professors were Rothwell Stephens and Bob Oberg (another ASA member). Rothwell Stephens suggested biostatistics, as I was a double major in math and biology and had done well in his intermediate theory of statistics course. He also wrote a letter of recommendation for me to Stanford. I was further inspired by Ingram Olkin, Brad Efron, Persi Diaconis, Ted Anderson, Alice Whittemore, and others. When it was time to do my dissertation, I did it with Bill (Byron William) Brown in biostatistics, and he assisted me in getting a position at the University of Utah, where I still work today.

Why did you become a consultant?

It just happened. At the University of Utah, there was/is no statistics department nor a department of biostatistics. So, departments knew they needed statistical scientists, though they didn't call it statistical science back then. In my position in 1979, there were teaching, research, and administrative responsibilities, but "research" really meant statistical collaboration or consultation on biomedical research, as it paid our salaries even in the tenure track. I had the good fortune to work with the Cooperative Systematic Studies of Rheumatic Diseases with John R. Ward, and Bill Brown was on our advisory committee. John Ward turned out to be one of my best mentors. Thus began a collaborative research effort that lasted through the mid-1990s, with side trips in cancer biostatistics, then into health services research, maternal and child public health, and now urogynecology statistics. So, I am an internal consultant, with all the benefits and constraints of internal consulting.

Name a few specific skills you need to be a consultant.

Keeping up with developments in statistics, statistical software, and advances in computing is essential, as that is the capital a statistical consultant brings to the table. The ASA has fine continuing education programs in this regard, though their value was not always as well understood as it is now. Proactiveness and time management are essential. Diplomatic skills with grant writers are essential. Contract writing is not as formal for an internal consultant as an external consultant, but mutual, experience-based trust is essential. For example, it is generally a norm that the statistician who wrote the grant proposal will be the statistician doing the work of the grant. But occasionally, I have been shocked by researchers one might characterize as nouveau-riche, who were more absorbed in their own power than in any sense of collegial norms.

What is the most exciting part of consulting?

My favorite part of statistical consulting is the ability to go into a new substantive area equipped with the skills to make strong analytical contributions. In about 2006, I met another of my favorite colleagues, Ingrid E. Nygaard, who was very interested in a previously untouchable subject: women's pelvic floor disorders. Earlier in my lifetime, this was far too private to be discussed, and yet 50% of women will have a pelvic floor disorder by age 75. We are still collaborating.

What is the best piece of advice you received from a mentor regarding statistics or consulting?

Well, this is about neither, but rather advice for life. I received it from Gladys Reynolds, the statistician who did pioneering research on STDs and was the first woman to run a Centers for Disease Control and Prevention statistics branch. Gladys helped found the ASA Section on Statistics in Epidemiology. I have known her to stop for a panhandler and ask, "What do you really want?" In one case, she gave a young woman a bus ticket to get off the street and go home. Gladys told me, "It is always time to right a wrong." When I see the Me Too and Black Lives Matter movements, I think of what my generation encountered, and the generations before me, and what we accomplished or failed to solve. And I am heartened by the courage of a new generation. It is always time to right a wrong.

What advice would you give to statisticians just beginning their careers?

It is such a different world now than in 1979, when there were no cell phones and it took five minutes to run a logistic regression on a good computer! I think the best advice I can give is to continue to learn. Trans-oceanic collaborations have become routine. Bayesian statistics and modern causal methods will be very important in the lifetimes of new statisticians. Big Data and supercomputing will continue to draw on our expertise. Look broadly at what influences statistics and stay current with internet and computer advances, programming languages, databases, and related software.

What do you enjoy doing in your spare time?

I have had many recreational activities over the years: kayaking; cooking Indian food; poetry; oil painting; and gardening, to name a few. In this modern world, it is important to have your own life, and the analytic mind requires counterbalances. Whitewater kayaking was a blessing to me, as it was physical, nonmathematical, and focused me in the moment. As I begin to look toward retirement, I have a new hobby—amateur astronomy—and I am looking forward to the time when I will be able to allocate my statistical expertise to questions that attract me in this area.

Name one or two favorite blogs or books you have read and would recommend to others.

Statistical or nonstatistical? I think Peter Block's *Flawless Consulting* is a classic, as is James Boen and Douglas Zahn's *The Human Side of Statistical Consulting*, though I very much like the content of Javier Cabrera and Andrew McDougall's *Statistical Consulting*. I read the *Women's Review of Books* attentively, as it tells me what young women are thinking. ■

Gregory Csikos

Sole Practitioner (Gregory Csikos, CPA, CFE, GStat)

What or who inspired you to be a statistician/data scientist?

I can't identify anything or anyone specific who inspired me to become a statistician. I was working as an accountant at a CPA firm and realized the growing importance of data analysis, including descriptive and inferential statistics, to answering business questions. At that point, I decided to enter the Master of Applied Statistics program at Penn State.

Why did you become a consultant?

I started my solo practice in 2016, after eight years of working at public accounting firms. I provide tax, financial accounting, and forensic accounting services. My statistical experience is most relevant to the forensic accounting aspect of my practice.

I decided to start my own practice because self-employment gives me autonomy and long-term security.

Name a few specific skills you need to be a consultant.

Being able to translate what a client wants into services you can provide that will result in the appropriate answers, knowing how to find and retain clients, ensuring you get paid, and dealing with the administrative aspects of being self-employed.

What is the most exciting part of consulting?

I don't think my work is "exciting," but it is enjoyable. I get a lot of satisfaction from making order out of chaos and providing an answer to a puzzle faced by a client.

What is the best piece of advice you received from a mentor regarding statistics or consulting?

Not everyone should be your client. It is normal and healthy to not always match with every potential client, whether that's regarding the client's professional needs, financial resources, or working style.

What advice would you give to statisticians just beginning their careers?

Know what you're worth. I've noticed statisticians undervalue their skills and seem ignorant of what other highly trained professionals are paid.

What do you enjoy doing in your spare time?

Exploring my adopted city, Philadelphia, and listening to Mary Beard lectures on YouTube.

Name one or two favorite blogs or books you have read and would recommend to others.

Of what I've read most recently, I'd recommend *12 Rules for Life: An Antidote to Chaos* by Jordan Peterson. ■

Q&A

Charles Kincaid

Product Owner / Principal Data Scientist, Experis Solutions

What or who inspired you to be a statistician/data scientist?

The undergraduate statistics courses taught at Kansas State University were standard courses, but they excited me with what could be done. When I started taking graduate classes, the instructors made it so alive with possibilities that I never looked back.

Why did you become a consultant?

I've always been a consultant. Kansas State had a consulting center in which students helped faculty and grad students from other departments. It fits well into my desire to help others.

Name a few specific skills you need to be a consultant.

The ability to listen to others and dig into the questions behind their questions is very important, as well as the ability to build up trust with your client so they become more of a collaborator. The ability to learn other disciplines and grasp the technical aspects quickly is an immense help for doing more than just order taking. And, of course, the many other skills necessary. :-)

What is the most exciting part of consulting?

The feeling of accomplishment and excitement from helping people solve problems is definitely exciting. We make people's jobs easier, help them create better products, and even make the world a better place.

What is the best piece of advice you received from a mentor regarding statistics or consulting?

"Clients always lie to you." This advice from a professor of computer science at Kansas State has been helpful my entire career. They don't do it intentionally. It's just that people come to us with problems and questions they've filtered through their understanding and experience, which often gives an inadequate representation of what they need.

What advice would you give to statisticians just beginning their careers?

If you want to be a statistician, do statistics. Find opportunities to do, or help with, a wide variety of consulting projects. Learn the skills that cut across disciplines. If you want to specialize, the broad skills and experience will help you more than specializing from the beginning.

What do you enjoy doing in your spare time?

Over the years, I've had a lot of hobbies and interests. In this season of my life, I enjoy playing board games, reading theology books, doing tough mudders, playing softball, dancing, watching movies, and playing with my grand kids. ■

LeAnna Stork

Soy Crop Modeling Lead, The Climate Corporation - Bayer Crop Science

What or who inspired you to be a statistician/data scientist?

My dad. I was good at math in high school but was unsure at the time of what types of careers might be possible. He had a friend who was an actuary (I had never heard of an actuary at the time!) and suggested I take some statistics classes in college. I loved the stats classes so much that I ended up majoring in statistics and pursuing this as my career path.

Why did you become a consultant?

Because I like learning from people about diverse business problems. For me, the most rewarding part of being a consultant is listening to customers' problems and asking them thought-provoking questions about those problems they may not have even considered.

Name a few specific skills you need to be a consultant.

The ability to ask your client really good questions—not just about their data, but also about the "why." What is the purpose and objective of their study? What questions will the results of the study answer? How will the results of the analysis be used? Who/what will be affected by the results? What are important assumptions in the collected data?

What is the most exciting part of consulting?

Meeting new people and learning new spaces. Thinking outside the box has really accelerated my career development.

What is the best piece of advice you received from a mentor regarding statistics or consulting?

Put yourself in the researcher's shoes; they may have spent years planning and conducting the study you are consulting on. Think creatively of the "best" statistical solution that is practical and achievable for the researcher. Sometimes the best solution is the simple one.

What advice would you give to statisticians just beginning their careers?

Walk the hallways and meet with your collaborators; don't hide out in your cubicle! Visit their laboratories, fields, factories, etc. to see their processes and the data they are collecting. Ask questions about the process so you can truly understand the variability associated with the data you are analyzing.

What do you enjoy doing in your spare time?

Chasing after my kids, traveling to new places, and tasting wine!

Name one or two favorite blogs or books you have read and would recommend to others.

The Oz Principle: Getting Results Through Individual and Organizational Accountability by Roger Connors, Tom Smith, and Craig Hickman. The concept in this book is simple: Individuals are accountable for results. The authors highlight the "See It. Own It. Solve It. Do It." concept. I believe most people are good at the first three steps: See It. Own It. Solve It. But to cross the finish line and truly deliver impactful results, those who master "Do It" will achieve greater success. Simply seeing the problem, identifying flaws, and blaming others for failures will not deliver results. People who take accountability for actions, identify solutions, and implement them will achieve great results. I hold myself and my team accountable to this standard. ■

Todd Coffey

Chair and Associate Professor, Department of Research and Biostatistics, Idaho College of Osteopathic Medicine

What or who inspired you to be a statistician/data scientist?

I took a course in statistics as a sophomore in college. In one of the first lectures, the professor described how statistical methods could be used to design and analyze a clinical trial to determine if a novel therapy was better than placebo. The recognition that statistics held the key to understanding how to determine which experimental treatments were better, worse, or no different fascinated me. I quickly became hooked on becoming a statistician and never looked back.

Why did you become a consultant?

Two reasons: I was fascinated with the research being done in other fields and I loved the intellectual challenges consulting requires. These challenges include understanding the research question in the collaborator's language, translating it to a statistical framework, developing a broad methodological background, improving programming skills to implement solutions, retranslating the results into the language of the applicable field, and communicating how the research question has been appropriately answered. The challenges vary across disciplines, so a consultant can move from one to another and continue to find opportunities.

Name a few specific skills you need to be an effective consultant.

Effective consultants I have worked with have a strong and broad methodological background and a solid understanding of statistical theory. The best consultants add to that background with active listening, good questions, excellent written and verbal communication, creative thinking, appropriate lack of fear toward trying something new, analytical thinking to understand advantages and disadvantages of various approaches, and social engagement with the collaborator.

What is the most exciting part of consulting?

When a reluctant collaborator recognizes the power of statistical thinking and transforms into a champion for implementing the methods proposed. This process is the most satisfying when you can convince the collaborator to invest resources into an experimental design or study plan he or she has never considered and then demonstrate results through the analysis that could not have been achieved without statistical methodology. When this happens, the surprise and excitement on the face of the astonished collaborator is priceless.

What is the best piece of advice you received from a mentor regarding statistics or consulting?

On a recruiting trip to a graduate school I ultimately attended, I was taken to see a graduate of the program who was working locally as a statistical consultant. After some small talk, he asked me what I thought was the most important question a statistical consultant needed to ask. Before I could answer, he responded that consultants must understand completely the question the collaborator is asking. It was an impressionable moment, and I learned clearly that all the fancy statistics I would learn in graduate school wouldn't help the collaborator if I answered the wrong question.

What advice would you give to statisticians just beginning their careers?

Recognize your influence as a statistician will likely be proportional to the professional closeness of the relationships you develop with your collaborators. Becoming a full partner with those you work with is critical. You may have an optimal technical solution to a research question, but if the collaborator does not trust you, you'll never get the chance to show the power of statistics. ■

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

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

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

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

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

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

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Louisiana

■ Louisiana State University located in Baton Rouge, Louisiana, seeks candidates for Department Head of the Department of Experimental Statistics (EXST). The successful candidate will be a leader with a shared vision to guide, support, and inspire a multidisciplinary faculty and staff in their tripartite mission of scholarly teaching, research, and outreach. For more information visit the LSU Career site: *https://lsu.wd1.myworkdayjobs.com/LSU/job/LSU---Baton-Rouge/Department-Head-Chair---Tenured_R00036318*. EOE.

New York

■ Applications are invited for a tenure-track position in statistics at Vassar College to begin fall 2020: see the full ad at MathJobs.org. The ideal candidate is committed to excellence in scholarship and undergraduate teaching, and working with the Department's two statisticians to further expand statistics and data science at Vassar. Application review will begin October 7, 2019, and continue until the position is filled. Vassar College is an affirmative action and equal opportunity employer with a strong commitment to increasing the diversity of the campus community and the curriculum, and promoting an environment of equality, inclusion, and respect for difference. Candidates who can contribute to this goal through their teaching, research, advising, and other activities are encouraged to identify their strengths and experiences in this area. Individuals from groups whose underrepresentation in the American professoriate has been severe and longstanding are particularly encouraged to apply.

Pennsylvania

■ The Biostatistics Core is seeking a full-time master's-level biostatistician. The Biostatistics Core collaborates with researchers across Geisinger. The Core assists investigators throughout

Head, Department of Statistics

Texas A&M University, College Station, Texas

TEXAS A&M UNIVERSITY Statistics

A national search is underway to identify outstanding candidates for Head of the Department and holder of an endowed chair of Statistics at Texas A&M University, the fourth largest university in the nation with an enrollment of over 50,000 students. The position will be hired at the rank of Full Professor. The Department has a strong tradition of theoretical and interdisciplinary research. Faculty members have extensive research collaborations with faculty in all ten colleges on campus.

The Department has 70 graduate students on campus with an additional 300 distance-learning M.S. graduate students, 150 undergraduate students, 26 research faculty members, and 13 academic professional track faculty. Further information about the Department, its faculty, and its facilities can be found at our website: www.stat.tamu.edu.

The Department seeks an individual with a dynamic and internationally recognized research program, a sincere commitment to undergraduate and graduate teaching, and proven leadership skills to be the Head. The Head reports to the Dean of the College of Science and is responsible for the Department's administrative, budgetary, and personnel matters. Candidates for Head must demonstrate a vision for supporting, directing, and enhancing the goals of the Department. The position requires a Ph.D. in Statistics or a related field and a record of scholarship and teaching consistent with the level of professor at a major research university.

Any questions regarding this position may be directed to the Chair of the Search Committee, Dr. Bani Mallick at headsearch@stat.tamu.edu. Interested applicants should apply at academicjobsonline.org/ajo/jobs/13998. Applications will continue to be accepted until the positions are filled. The Search Advisory Committee will review applications as they are received, and the review will continue until the position is filled.

Texas A&M University is committed to enriching the learning and working environment for all visitors, students, faculty, and staff by promoting a culture that embraces inclusion, diversity, equity, and accountability. Diverse perspectives, talents, and identities are vital to accomplishing our mission and living our core values.

The Texas A&M System is an Equal Opportunity/Affirmative Action/Veterans/Disability Employer committed to diversity. The College of Science and the Department of Statistics are dedicated to the goal of building an inclusive and culturally diverse faculty and staff who are committed to teaching and working in an environment of academic freedom and equality of opportunity.

NC STATE UNIVERSITY

Department of Statistics
Tenure-Track Faculty Positions

The Department of Statistics at North Carolina State University seeks to hire multiple tenure-track faculty. All ranks will be considered. The start date is August 2020.

Applicants with interests and expertise in theoretical or methodological research in any area of statistics or biostatistics will be considered. Candidates with interests in data science, machine learning, and modern methods of data analysis more generally are encouraged to apply. The ability and desire to supervise graduate student research and to pursue excellence in teaching are essential.

To apply, please visit: https://jobs.ncsu.edu/postings/120549

The Department provides a dynamic environment for teaching, research and collaborations across disciplines. Inclusiveness and diversity are academic imperatives and are university goals: You will be expected to foster an environment that is supportive and welcoming of all groups. We are interested in candidates who have experience working with students from diverse backgrounds and have a demonstrated commitment to improving access to higher education for students from underrepresented groups.

The Department's location in the Research Triangle provides rich opportunities for interactions with industry; other universities, including Duke University and the University of North Carolina at Chapel Hill; and government agencies. Faculty enjoy collaborations with medical researchers at Duke, environmental scientists at the EPA research facility, pharmaceutical researchers at Glaxo-SmithKline, and software developers at SAS Institute, among many others. The Department is also a founding cooperator of the NSF-funded Statistical and Applied Mathematical Sciences Institute (SAMSI), located nearby in Research Triangle Park.

All applicants must have a Ph.D. in Statistics or Biostatistics or a related field by the time of employment. Review of applications will begin soon, and continue until the positions are filled. Questions about the search may be directed to the Search Committee Chair (stat_search@stat.ncsu.edu).

NC State University is an equal opportunity and affirmative action employer. Women and members of other underrepresented groups are encouraged to apply. In addition, NC State University welcomes all persons without regard to sexual orientation or genetic information.

all stages of research from proposal drafting to analysis and interpretation. Core members assist with research question and hypothesis specification, study design and variable selection, sample size and power estimation, analysis plan, data collection design, randomization, data management, and biostatistical analysis. Apply: *bjhicks@geisinger.edu.* EOE.

■ The Department of Epidemiology and Health Services Research and Geisinger's Biostatistics Core is recruiting a full-time PhD biostatistician. This position is eligible for a faculty appointment depending on qualifications and career interests. The department currently consists of six faculty members and the core has nine staff. The department and the Biostatistics Core has strong interest to expand capabilities in multi-level modeling and spatial statistics. Contact us: *lakilgus@geisinger.edu*. EOE. ■

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EOE

UCI Department of Statistics

Tenure-Track/Tenured Faculty Position

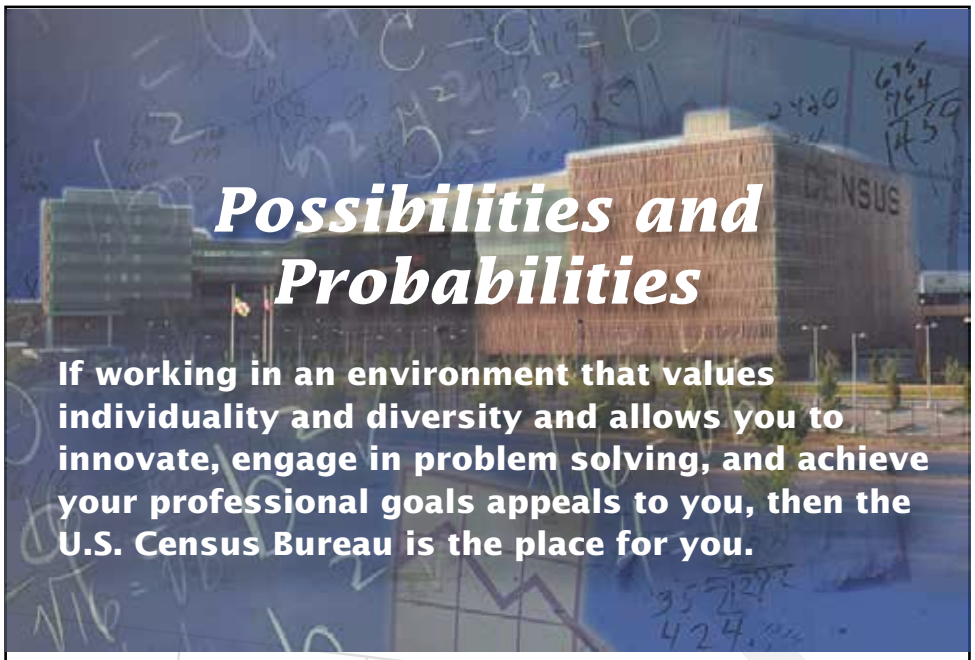
The Department of Statistics (*www.stat.uci.edu*) in the Donald Bren School of Information and Computer Sciences (ICS) at the University of California, Irvine (UCI) invites applications for a tenure-track or tenured faculty position at the assistant or open-rank level beginning July 1, 2020.

The Department of Statistics has a strong interdisciplinary flavor, focused on developing state-of-the-art methods for solving topical data-driven problems in science and engineering, and advancing the statistical theory that underlies those methods. We are searching for faculty with strong research potential, a commitment to excellence in teaching, and enthusiasm for helping our collegial department continue to grow. Applicants should hold a Ph.D. degree (or expected by fall 2020) in statistics, biostatistics or a related field. Candidates with research interests in all areas of statistics will be considered.

The University of California, Irvine is part of the premier public university system in the world. UCI is a member of the Association of American Universities (AAU), is ranked as a top ten public university by U.S. News and World Report, and was identified by the New York Times as No. 1 among U.S. universities that do the most for low-income students. UCI is located in Orange County, 4 miles from the Pacific Ocean, 45 miles south of Los Angeles, and 80 miles north of San Diego. Irvine is one of the safest communities in the U.S. and offers a very pleasant year-round climate, numerous recreational and cultural opportunities, and one of the highest-ranked public school systems in the nation. All positions would be eligible to participate in UCI's faculty housing program.

Completed applications containing a cover letter, curriculum vita, graduate transcripts (for assistant professor candidates), statements on diversity, teaching, and research, three letters of recommendation, and sample research publications should be uploaded electronically. Please refer to the following web site for instructions *https://recruit.ap.uci.edu/JPF05335*. Applications received by **November 1, 2019** will receive the fullest consideration.

The University of California, Irvine is an Equal Opportunity/Affirmative Action Employer advancing inclusive excellence. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, age, protected veteran status, or other protected categories covered by the UC nondiscrimination policy. A recipient of an NSF ADVANCE award for gender equity, UCI is responsive to the needs of dual career couples, supports work-life balance through an array of family-friendly policies, and is dedicated to broadening participation in higher education.



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Jessica Lavery • @jessicalavs
What's the sentence you want to be able to say when the study is over?

JonJohnson • @randomjohn
What decision do you plan to make, or how will you make it?
or
Why didn't you involve me earlier? We could have avoided this!"

Elmen Damián D'Achiardi Barreto • @elmendachiardi
"If you had all the money in the world, what would you want to know? Now, how much money do you have?

This phrase was said by my sampling professor, Leonardo Bautista.

Emily Griffith • @EmilyHGriffith1
I always start with, "Could you tell me a little about your project? How'd you get interested in this?" Let clients start by sharing their own expertise.

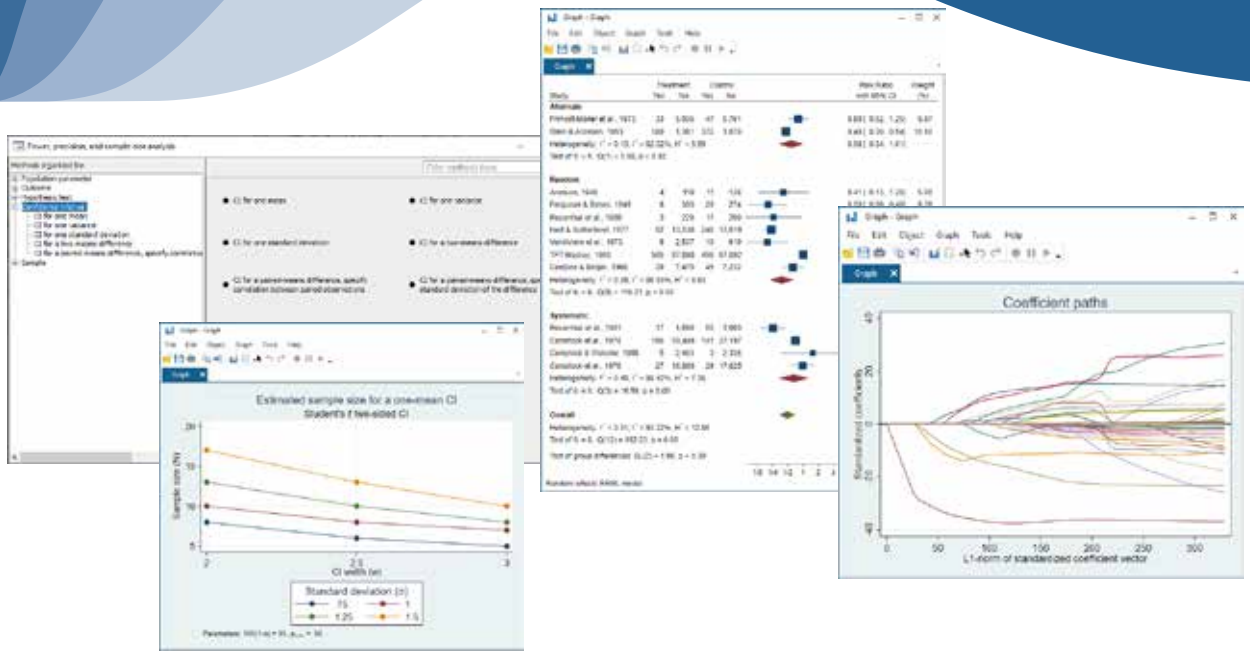
Leslie McClure • @StatGirlLAM
Yes! It's so important to establish rapport and to establish trust!

Zach Weller • @wellerstats
One I almost always start with: "What is the question you are trying to answer?"

Jane Coe Johnson • @jcjohnsonmo
And I end up asking it over and over and …

For next month, we ask our followers—"What is your favorite pastime as a statistician?" Make sure to tag @AmstatNews in your response.

Announcing Stata® 16



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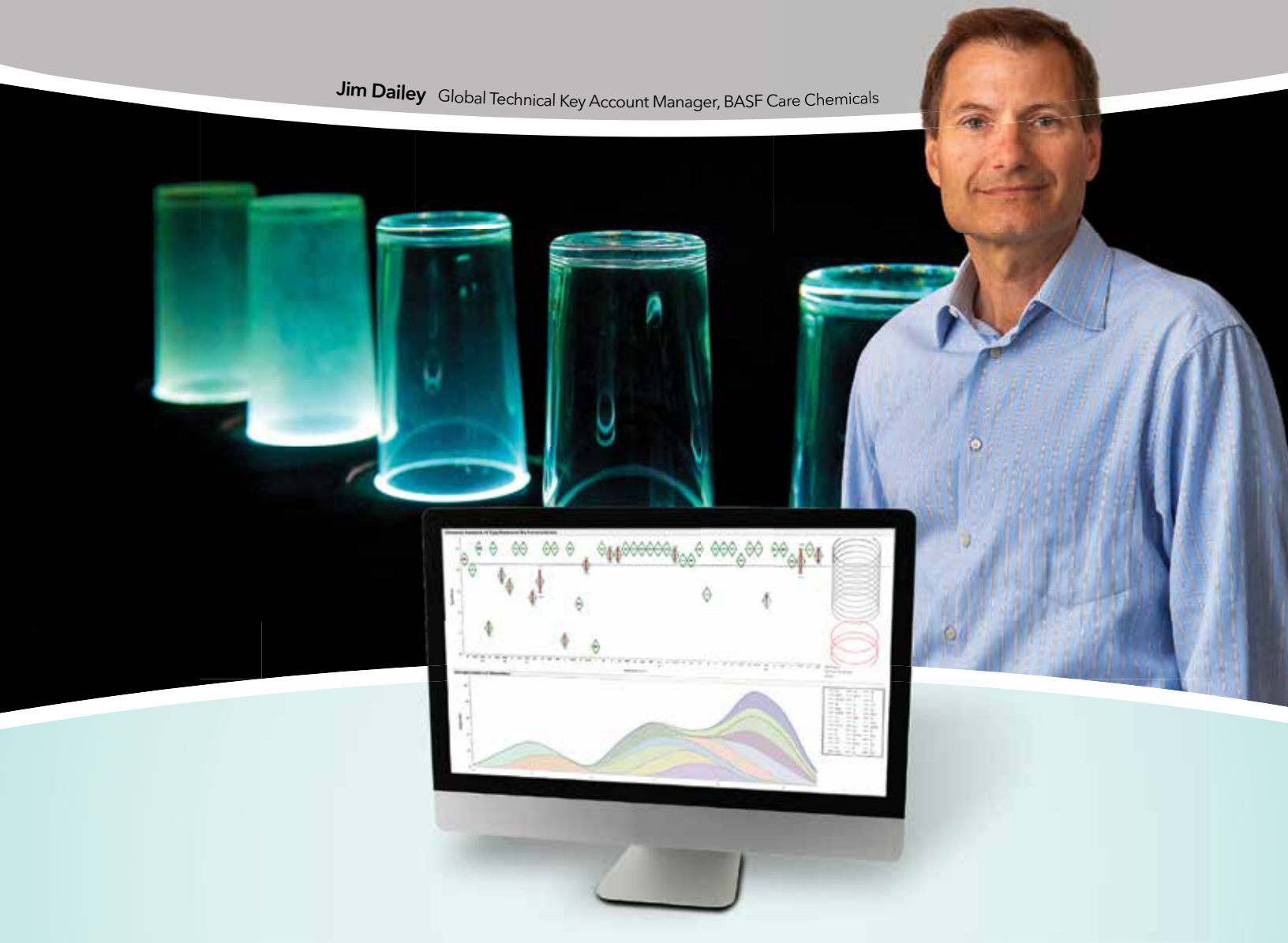

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