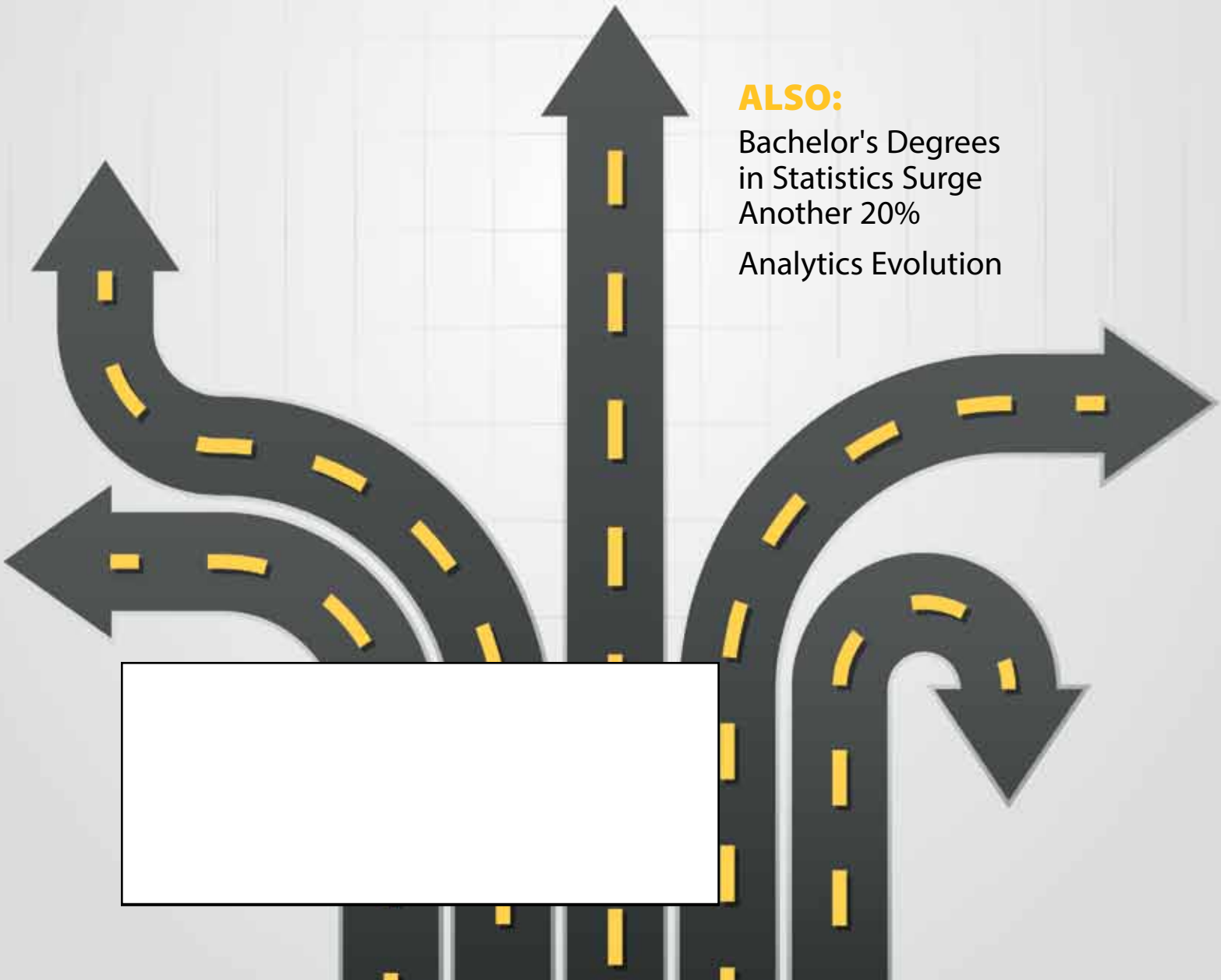
September 2014 • Issue #447

AMSTATNEWS

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

Which **Career Path** Will **You Follow**?



ALSO:

Bachelor's Degrees in Statistics Surge Another 20%

Analytics Evolution

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

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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.

career issue

member news

statisticians in history

departments

TRIVIA *CHALLENGE*

The ASA's Trivia Challenge is a fun way to read *Amstat News* and learn about the ASA. Every month, there will be three questions asked here, with the answers scattered throughout the magazine. Search for those answers while you're reading the issue and input your answers at *www.amstat.org/asa175/triviachallenge.cfm*. Whoever has the most correct answers at the end of each quarter will be entered into a drawing to win a 175th anniversary T-shirt!

1. In what year did the ASA launch STAT*tr@k*:
   - A. 2010
   - B. 2012
   - C. 2009
   - D. 2011

2. Where was the inaugural Five College DataFest held?
   - A. University of California at Los Angeles
   - B. Pennsylvania State University
   - C. University of Masschusetts, Amherst
   - D. Duke University

3. According to statistics and biostatistics degree data from the National Center for Education Statistics, master's degrees saw an 18% increase over 2012.
   - True
   - False

This quarter's winner will be announced in the November issue.

Online Article

The following article in this issue can be found online:

Learn about the committed volunteers who said "yes" to the ASA at *http://magazine.amstat.org/ blog/2014/09/01/ volunteer*.

Make the most of your ASA membership
Visit the ASA Members Only site: *www.amstat.org/ membersonly*.

Visit the **ASA Calendar of Events**, an online database of statistical happenings across the globe. Announcements are accepted from educational and not-for-profit organizations. To view the complete list of statistics meetings and workshops, visit *www.amstat.org/dateline*.

columns

This year marks the ASA's 175th birthday. To celebrate, the column "175"—written by members of the ASA's 175th Anniversary Steering Committee and other ASA members—will chronicle the theme chosen for the celebration, status of preparations, activities to take place, and—best yet—how you can get involved.


Wasserstein

Contributing Editor
Ron Wasserstein is the ASA's executive director and president of Kappa Mu Epsilon National Mathematics Honor Society. Previously, he was vice president for academic affairs at Washburn University.

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*.


Gillikin

Contributing Editor
Jason Gillikin is a senior medical informatics consultant with Priority Health, where he consults on quality improvement strategies related to chronic disease management, avoidable hospital readmissions, and the use of socioeconomic data in health analytics. He earned his BA in moral philosophy from Western Michigan University, where he's also pursuing a graduate certificate in applied statistics. He serves as president-elect of the Michigan Association for Healthcare Quality.

This column is written to inform ASA members about what the ASA is doing to promote the inclusion of statistics in policymaking and the funding of statistics research. To suggest science policy topics for the ASA to address, contact ASA Director of Science Policy Steve Pierson at *pierson@amstat.org*.


Pierson

Contributing Editor
Steve Pierson earned his PhD in physics from the University of Minnesota. He spent eight years in the physics department of Worcester Polytechnic Institute before becoming head of government relations at the American Physical Society.

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A Festival of Data: Student Perspectives

A June Amstat News *article by Robert Gould, Benjamin Baumer, Mine Çetinkaya-Rundel, and Andrew Bray described DataFest, an annual Big Data analysis competition for college students; see also papers by Çetinkaya-Rundel and Dalene Stangl (2013,* CHANCE*) and Gould (2014, ICOTS9 Proceedings). The ASA board, at its April meeting, approved a proposal from the DataFest organizers to make the ASA the national headquarters for DataFest. For this month's President's Corner, I invited Andrew Bray, postdoctoral research associate at the University of Massachusetts, Amherst, to write about student perspectives on DataFest. As a UCLA graduate student, Andrew helped Rob Gould, DataFest's founder, organize the first few UCLA events. This year, he and Ben Baumer organized the inaugural Five College DataFest.*

Nathaniel Scherker

On a Friday night in March, Dana Udwin and four of her friends shifted impatiently as the elevator brought them up to the penthouse of Lederle Tower in the college town of Amherst, Massachusetts. They'd been waiting for this event for weeks and were expecting to stay out late. They knew students from other local colleges would be attending as well, so they came outfitted for success: Each young woman carried a laptop with R installed, ready to tackle any data analysis that came their way.

The event was the inaugural Five College DataFest, a weekend-long data analysis competition held at the University of Massachusetts, Amherst. More than 60 students showed up that Friday night, formed into teams of up to five students. Each team carved out a corner of the penthouse, dragged tables together, reconfigured mobile white boards, and laid claim to power outlets to make a home base for the next 40 hours. Later that evening, the data set would be revealed that would motivate the competition: detailed energy efficiency data from a company called GridPoint.

DataFest challenges students to wrestle with a data set that is far larger and richer than any data set they encounter in the classroom. What students also find challenging is the freedom they're given in their analysis. Dana said, "I was surprised by how open-ended DataFest ended up being. We were given this data set and released to do whatever we wanted to do with it. So there was the immediate challenge of answering questions that we hadn't even yet developed." Guiding the teams to be sensitive to the insights the data can and cannot support is a cadre of onsite faculty and data professionals.

The teams' primary directive was to prepare five slides and a short presentation for a panel of judges on Sunday afternoon, when they would compete for three prizes: "Best Visualization," "Best Use of External Data," and an overall "Best in Show." With this goal in sight, the penthouse buzzed day and night as teams sketched out strategies; delegated tasks; and wrestled with the challenge, excitement, and frustration that comes with getting your hands into a rich data set.

Dana's team, The *p*-Valuables, had a strong background in statistics and computing with data, but the event draws students with a wide range of experience. One team consisted of physics students who had never taken a statistics class. Dana remarked, "They looked at the data from an angle that my group didn't even consider. Part of what made the weekend so exciting was seeing the diversity of approaches taken by all of the different groups."

On Sunday afternoon, after the teams presented their findings and the judges had a chance to deliberate, The *p*-Valuables were awarded "Best in Show" for their clear and compelling presentation of the benefit energy monitoring can have on energy efficiency.

In an 11th-hour twist, the judges decided to replace the prize for "Best Use of External Data" with "Best Garbage Detection." Some of the data fields from GridPoint, it turned out, had been aggregated over time, though there was no indication of this in the code book. One group picked up on this through careful data cleaning and was able to adjust their analysis accordingly. Their recognition by the judges was an important lesson in the challenges of working with real data, a lesson that is too rarely captured with the tidy data sets so often used in the classroom.

Andrew Bray

DataFest as Path Shaper

The DataFest in Amherst was one of five such events held across the country this spring. Emory and Princeton also hosted their first DataFests, while Duke hosted its third and UCLA its fourth.

The students who participated in the first UCLA DataFest in 2011 have all since graduated and moved on to careers in industry and academia. I wondered about what memories they have of the event and how it shaped their paths in statistics, so I got in touch with some of them to find out.

Emory College had 11 teams totaling 28 students participate in its first DataFest.

DataFest has both a collaborative and competitive side. What are your thoughts about how those are balanced?

Jennifer Chuu (UCLA '12): DataFest struck a great balance between collaboration and competition. It gave us a glimpse of what industry stats is like in terms of bouncing ideas off of one another and catching one another's mistakes, pointing out subtleties, etc. Competing with each other also gave us the drive to really be as insightful as we could.

What was the greatest challenge your group faced?

Jennifer Chuu (UCLA '12): The hardest part was stepping back and looking at the big picture, especially when we were caught up in the details of a certain model or method. Sometimes we had to really ask ourselves why we were doing something to find out that we had veered off track a bit and had to center ourselves again.

Max Schneider (UCLA '12): This was now three years ago, but I remember that my group had overly ambitious plans for what we could accomplish in one weekend. We were presented with a data set from the Los Angeles Police Department concerning the spatial distribution of crime and we wanted to incorporate a lot of external data. We ran into the inevitable problem that the outside data existed on levels that did not match the LAPD data and we burned a lot of time trying to merge them.

With the event now several years in the past, what have been your main takeaways from DataFest?

Mallory Wang (UCLA '12): I think the best thing about DataFest is just allowing students to be exposed to data in its natural form. Often, in classrooms, we get toy examples and leave school thinking 1,000 rows of data with cleaned variables is Big Data when in reality we're seeing things closer to a website that scrapes into millions of observations with no labels for variables. The exposure to that kind of data and actually creating something to present at the end of the competition, no matter what level of success, is a great accomplishment and encouragement for a future in statistical study or profession.

Elizabeth Frank (UCLA '12): DataFest really set me up to do well professionally. It was a great chance to network, and I gained skills in analysis. I ended up with an amazing internship at the *LA Times* after presenting with my group. After that, when interviewing for my current position, DataFest was brought up and discussed at length. I also gained immense confidence in my statistical knowledge through talking with the professional consultants and presenting.

Ashley Chiu (UCLA '14): I definitely made a lot of really great friends, and we're still laughing about some of the fun, crazy things that happened at DataFest. Without a doubt, I learned a lot about data visualization and how different applied statistics is from theoretical/classroom statistics. As for interviews, I think I actually got my current job because I impressed my interviewer with the project my team had produced using K-means clustering. Everyone I've talked to in the statistics community has been so excited to hear about my experience and the different projects that are produced in such a short period of time.

Most importantly, I think the event has just truly amplified the rigor, opportunities, and overall awesomeness of statistics. The competition is analogous to the traditional case competitions done in other fields, and in that way, DataFest has really added to statistics' rising presence in academia and the real world.

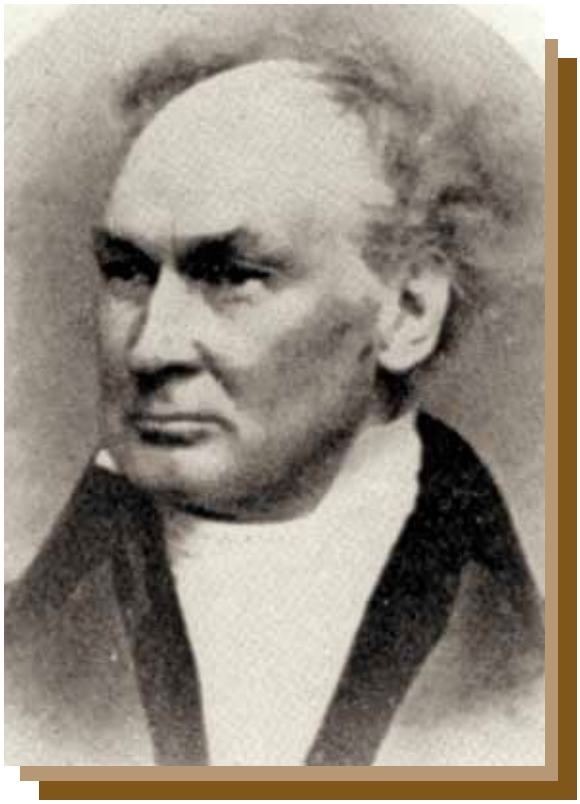
Good for Job Interviews

I checked in with Dana to see how things had been going since her graduation from Smith College this past May. When I asked her what her strongest takeaways were from DataFest, she talked about the value of persisting with the full data analysis process—from asking questions to communicating results—while working in a collaborative environment. As a recent graduate, she also related a more concrete takeaway from DataFest: "It has come up in every job interview I have had since. I've been asked, 'Tell me about a time when you had to work on a project on a tight deadline and you didn't know what the answer would be,' or, 'Tell me about a time when you had to convince an audience of something that you, yourself, were not sure of.' These are questions that just beg to have DataFest as an answer." ■

Richard **FLETCHER**

(1788–1869)

Lawyer, Massachusetts Representative, and Massachusetts Supreme Court Justice



Richard Fletcher was born in Cavendish, Vermont, on January 8, 1788, the fifth of nine children. His father, Dr. Asaph Fletcher, was a physician and prominent politician of Leicester, Massachusetts, and Cavendish. His mother was Sarah "Sally" Green, daughter of Jonathan and Rebecca Green of Chelsea, Massachusetts.

Fletcher grew up in Cavendish, where he attended the local schools and received a classical education, learning the rudiments of English, Latin, French, Greek, and Hebrew; logic; rhetoric; natural history; geography; delineation; arithmetic; algebra; art of surveying; navigation; astronomy; botany; and natural philosophy. He entered Dartmouth College at 14 and graduated in 1806 with the highest honors.

From 1806 to 1808, he taught school at the Salisbury Academy in New Hampshire and then became the principal. In 1809, he began studying law with Daniel Webster, who was in Portsmouth, New Hampshire. After that, Fletcher was admitted to the New Hampshire bar in Rockingham County in 1811. He began his law practice in Salisbury, New Hampshire, but later moved to Portsmouth, where he quickly established a reputation for reliability. He had a natural instinct for circuit work that attracted an ever-increasing professional connection.

In 1819, Fletcher moved to Boston, Massachusetts, to expand his professional connection. He was admitted to the Suffolk County bar in 1820 and, a year later, opened his law office. However, as he was still the senior counsel on several important cases in the New Hampshire courts, he continued to represent those cases until judicature or closure. He was considered one of the last famous New Hampshire lawyers.

Once established in Boston, Fletcher took his place among the leading Massachusetts lawyers with a comprehensive command of law, which he gained through avid reading habits. As he began practicing law, his reputation as a powerful orator with elegant diction, bright thought, and keen repartee emerged.

Though he never studied mercantile (commercial) or maritime law specifically, especially law of marine insurance, his knowledge was considered profound. His greatest success was as a jury lawyer, where he spoke in a conversational style and the facts he presented usually resulted in a conviction.

In 1836, Fletcher was elected to the 25th Congress as a Whig representative for the 1st District of Massachusetts. His congressional biography is listed among many notables representing what is now the 8th District of Massachusetts, including Daniel Webster, John F. Fitzgerald, John F. Kennedy, and Thomas P. O'Neill Jr. While Fletcher took this nomination seriously and represented Massachusetts well, he considered his time in Washington unbearable. His upbringing was religious, so the common use of profanity and immoral living left him shocked and dismayed. He considered the experience as "forced contact" and declined re-nomination.

Fletcher was one of the founding fathers of the American Statistical Association and was elected the association's first president in December of 1839. He held the office until January of 1846. His signature is the first of 25 on the original constitution of the American Statistical Association, which was adopted on December 11, 1839.

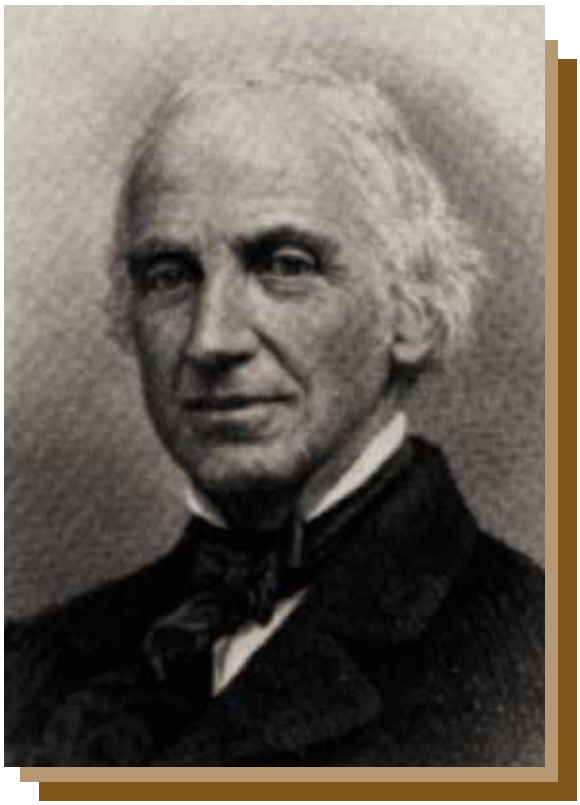
Fletcher earned a doctorate of laws degree from Brown University in 1839, from his alma mater—Dartmouth College—in 1846, and from Harvard University in 1849. His portrait hangs on the walls of Dartmouth College with other eminent alumni, benefactors, and college officers. He was active in many benevolent enterprises and bequeathed more than $100,000 to Dartmouth College. Also, from 1848 to 1857, he served as a trustee to the college.

Fletcher was appointed a judge of the Massachusetts Supreme Court on October 24, 1848, but resigned on January 18, 1853, giving as his reason that he found his judicial duties so unremitting as to leave no time for reading or thinking on any other subject. He returned to the bar for a short time before retiring from practice in 1858.

Fletcher grew up in the Baptist church and had an acute sense of religious responsibility that influenced his social and professional contacts. He joined the Federal Street Baptist Church in 1830 and remained an active, influential, and respected member. For several years, he was the Sunday school superintendent, and then taught a large young men's *Bible* class. According to *The New England Historical and Genealogical Register*, "He was at one time elected a deacon of the church, but after thanking his brethren for the confidence in him, which their votes implied, he declined the honor on the ground that he, unfortunately, had not one of the prominent qualifications for a deacon: He was not the husband of one wife." Although he never married, Fletcher was attached to all his nieces, nephews, and cousins. He aided many with financial expenses for their education. He also left his personal library of 2,600 volumes to the Town of Cavendish. ■

Edward **JARVIS**

(1803–1884)



Edward Jarvis, the third president of the American Statistical Association, was born January 9, 1803, in Concord, Massachusetts, as the fourth of seven children born to Deacon Francis and Millicent (Hosmer) Jarvis.

Jarvis lived at home until he was 16 years old and attended the town school. He was thought of as a good student, learning geometry and trigonometry by the time he was 13.

Throughout boyhood, Jarvis was interested in mechanics. At 16, he took a job in a wool factory in Stow, where he remained for 18 months. The proprietor of the factory told Jarvis' father that his son was a faithful worker, but his heart was in his books. Therefore, Jarvis entered preparatory studies at the Westford Academy and went on to Harvard College in 1822, where his interests were chemistry and botany.

Jarvis maintained good grades and, while at Harvard, taught school during college winters and after graduation. During his senior year, he left college to care for his brother, Charles, who suffered from a lumbar abscess. When Charles died four months later, Jarvis returned to college, only to be called home for his mother's death. He finally graduated with the class of 1826—of which he was secretary for more than half a century.

After graduating, Jarvis taught at a school in Concord while living with his father. In 1827, he began studying physiology and anatomy with Josiah Bartlett and subsequently became a student of the elder Lemuel Shattuck, one of the able vital statisticians of the period. Jarvis practiced among the poor families that were then clustered in the western portion of Boston. He attended the required courses at Massachusetts Medical College (now Harvard Medical School) and also the medical courses for a year at the University of Vermont, where he was a student assistant in anatomy.

Jarvis graduated from Massachusetts Medical College in 1830 and began general practice in Northfield, Massachusetts, where he was moderately successful until 1832. He then moved back to Concord, where his interest in vital statistics began. On January 9, 1834, Jarvis married Almira Hunt, who became his constant assistant in the treatment of insane patients.

In 1837, at the suggestion of New England friends, Jarvis went to Louisville, Kentucky, where he engaged in general practice until his return to Dorchester, Massachusetts, in 1843. While there, he frequently contributed to the *Louisville Medical Journal*, corrected medical abuses in the Marine Hospital, and aroused interest in the establishment of a historical library. Though his financial success in Louisville was greater than it had been in Massachusetts, his antipathy to slavery and fondness for New England people and customs eventually induced him to return.

While in Kentucky, Jarvis became interested in insanity, however, and opened his home for the treatment of the insane. He was so successful that he began to devote all his time to this branch of medicine and was in demand by other physicians for consultation purposes. Jarvis was officially connected with the Institution for the Blind and the School for Idiots in South Boston. For many years, he held the title of superintendent for the School for Idiots.

His interest in anthropology and vital statistics led him to an analysis of census statistics. In studying the returns of the census of 1840, he was

This month in ASA's history...
SEPTEMBER

1956

Roger Baldwin, Wilbert Cantey, Herbert Maisel, and James McDermott—known as "The Four Horsemen of Aberdeen"—discovered and published in the September 1956 issue of the *Journal of the American Statistical Association* the first accurate basic strategy for blackjack, using only desk calculators. They were subsequently entered into the Black Jack Hall of Fame in 2008.

2000

The September 2000 issue of *Amstat News* was the first special issue and focused on careers. The September issue was also an additional issue produced at the ASA, making *Amstat News* a true monthly magazine.

2010

The ASA launched STAT*tr@k*, a website geared toward individuals who are in a statistics program, recently graduated from a statistics program, or recently entered the job world.

Famous September Birthdays

Pao-Lu Hsu, Maurice Kendall, Albert Bowker, C. R. Rao, Warren Mitofsky, and Joseph Waksberg

astonished at the large amount of insanity appearing among free blacks. He attributed this largely to carelessness in the compilation since some towns, which had no black population, were reported as having colored lunatics. He immediately presented the facts as he saw them to the American Statistical Association, which asked Congress to amend the returns. Congress refused to correct the enumeration, but Jarvis' statistical abilities were brought to public notice. In 1849, the superintending clerk of the census of 1850 consulted him frequently and Jarvis wrote hundreds of pages in answer to these inquiries.

Jarvis was elected a member of the American Antiquarian Society in April of 1854. He made a sanitary survey of Massachusetts and published a report in 1855. Subsequently, by appointment of the secretary of the interior, he tabulated the mortality statistics of the United States as reported in the census of 1860, his work constituting half of the fourth volume of the reports of the eighth census. In 1869, he was asked to report a plan for the ninth census to the House Committee on the Census. His suggestions were received well and many were incorporated into the committee's report to Congress.

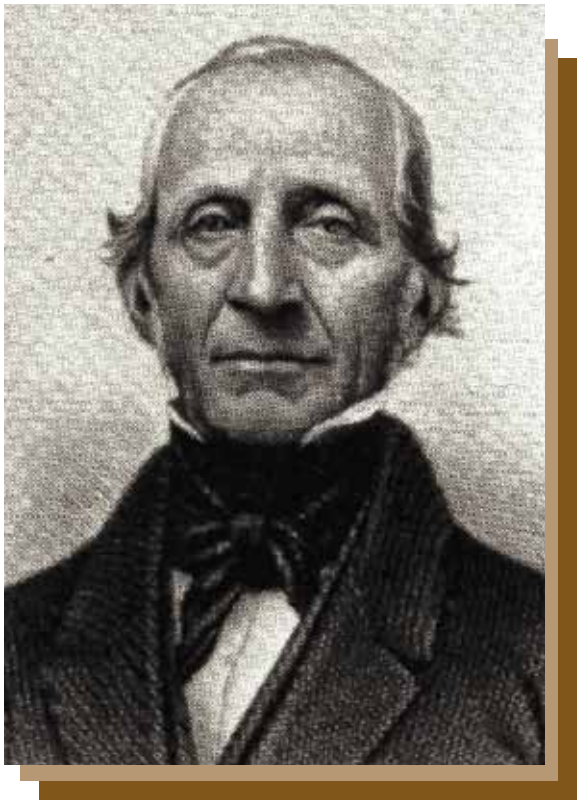
In 1854, Jarvis was appointed a member of a lunacy commission to look into the number and condition of the mentally ill in Massachusetts and the necessity for a new insane asylum. To ensure the best possible study, he traveled to England and France, visiting asylums and attending the International Statistical Congress in London. He made a thorough survey and prepared a 600-page report that resulted in an appropriation for a new hospital. In 1863, he was appointed to inspect U.S. military hospitals.

Jarvis was the author of 175 printed speeches, articles, and pamphlets; two books on physiology, *Practical Physiology* (Philadelphia, 1848) and *Primary Physiology for Schools* (1849); and two manuscript histories of Concord. He wrote a 348-page autobiography that he gave to the Harvard College library. He also wrote extensively for medical magazines and other periodicals on physiology, vital statistics, sanitation, education, and insanity. Through correspondence and exchange with other statisticians in the United States and abroad, he collected one of the best statistical libraries in the country, most of which he gave to the American Statistical Association.

Jarvis had a stroke in 1874 from which he recovered slowly and only partially. After the stroke, he was unable to focus, but gradually began compiling materials on the history of Concord. He died of paralysis in Dorchester on October 31, 1884. His wife died three days later and the two were buried in one grave in their native town of Concord. ■

Joseph Barlow **FELT**

(1789–1869)



Joseph Barlow Felt was born on December 22, 1789, in Salem, Massachusetts, to John and Elizabeth (Curtis) Felt. His parents, especially his mother, served as a great inspiration to him.

When Felt was 14, he worked for a store merchant to qualify himself for mercantile life. What leisure time he had, he spent reading biographical works of men educated through their own endeavors. These examples inspired him to earn an education and, when he was 18, he entered the Atkinson Academy in New Hampshire. In 1809, Felt began attending Dartmouth College and graduated in 1813. Dartmouth bestowed a Doctorate of Laws on Felt in 1857.

Right after graduating from Dartmouth, Felt became a merchant partner in a business in Salem. Then, in January of 1814, he began theological studies and taught at a private school. Felt was licensed as a minister on March 2, 1815, from the Essex Association, after which he ministered to congregations in Salem and Hamilton while continuing to teach.

Felt married Abigail (Adams) Shaw on September 18, 1816. He was ordained as a minister of the Congregational Society at Sharon, Massachusetts, and remained there until April 19, 1824. In June, his family moved to Hamilton, Massachusetts, where he preached until 1833, when ill health ended his pastoralship.

While living in Hamilton, Felt addressed the Masonic Assembly at Ipswich in 1825 and the Ipswich Academy in 1829. Many of his articles were published in *John Farmer's New-England Genealogical Register*. One of his most noteworthy works, *Annals of Salem*, was published in 1827, and his "History of Ipswich, Essex, and Hamilton" was published in 1834, when he and his family moved to Boston. In 1835, his "Ecclesiastical Statistics of Essex County" was published in the *American Quarterly Register*, and then, in 1836, he provided a large portion of the Massachusetts Historical Society's collections.

In April of 1836, the Massachusetts governor commissioned Felt to arrange the state archives, which resulted in 241 bound volumes of papers, classified and chronologically arranged. In May of 1839, he was appointed to visit England to obtain duplicates of provincial records and papers; however, the British authorities were not allowing Americans access to their offices at that time. Finally, in 1845, his commission to visit England materialized and he spent six weeks looking for the original documents. After completing the work in England, he traveled through France, Scotland, and Ireland en route to Boston. Once home, he resumed his work on the state archives, which he completed in the early part of 1846.

On December 29, 1836, Felt was chosen as librarian of the Massachusetts Historical Society, but stepped aside to allow the Rev. T. M. Harris to hold the position. When Harris died in 1842, Felt succeeded him and remained in that office until 1854.

Felt became the recording secretary of the American Statistical Association in 1839 and served in that capacity for more than 19 years. During this period, he wrote *Collections of the American Statistical Association*, consisting of three parts [*Statistics of Towns in Massachusetts* (Vol. 1, part 1, Boston,

Publications

History of Massachusetts Currency

Facts and Thanksgivings of New-England

Collections for the American Statistical Association

Memoir of Roger Conant

Annals of Salem

Genealogical Items for Gloucester

Genealogical Items for Lynn

A Memoir, or Defense of Hugh Peters

The Kidd Papers

Memoirs of Francis Higginson

Sketch of Abigail Brown

Memorials of William S. Shaw

Who Was the First Governor of Massachusetts?

Customs of New-England

1843), *Statistics of Population in Massachusetts* (Vol. 1, part 2, Boston, 1845), and *Statistics of Taxation in Massachusetts Including Valuation and Population* (Vol. 1, part 3, Boston, 1847)], with the three-part collection published in 1847. The second volume was printed, but never published.

Felt was elected a member of the Royal Society of Northern Antiquaries in 1841 and a corresponding member of the New-England Historic Genealogical Society in 1845. Later, he would become a resident member, honorary member, and finally president of the New-England Historic Genealogical Society, as well as edit the January and April *New-England Historical and Genealogical Register* for 1852. In 1846, he was invited to succeed the Rev. William Cogswell as president of the Gilmanton Theological Seminary in New Hampshire, but declined the invitation, as he had already declined two other invitations to take charge of literary seminaries.

In 1852 and 1853, Felt became secretary and librarian of the Congregational Library Association, respectively. Under the association's auspices, he published his first volume of *Ecclesiastical History of New-England* in 1854. The association remarked on the work: "We take pleasure in certifying that, in our judgment, it everywhere discloses a thoroughness of research and an accuracy of statement in regard to matters of fact, which the early history of New-England has never before had, and will never again need. No other writer on the subject, among the living or the dead, has devoted the time, or enjoyed the facilities which have been afforded to the author of this work. Twenty years of investigation among the best libraries of this country, and a visit to those of England, together with the overhauling of an incredible mass of old manuscripts in the archives of Massachusetts and elsewhere—undertaken *con amore*, and pursued with ever-freshening zeal—leaves small hope of original acquisition to those who may glean after him." The second volume was published in 1861.

Felt was a benevolent contributor to many public institutions of science and literature. A notable instance of this may be recalled from *History of the Boston Athenaeum*, when, as the legal representative of his brother-in-law, William S. Shaw, who died leaving claims against the Athenaeum amounting to $10,000, Felt "voluntarily and most liberally executed a release of the whole claim and thereby constituted Mr. Shaw a benefactor to the institution to that amount."

Felt was married to Abigail (Adams) Shaw for 43 years, before she died in Boston on July 5, 1859. In June of 1861, he moved to Salem and, in 1862, he married Catharine Bartlett Meacham of Haverhill, Massachusetts.

On September 3, 1863, Felt returned home after church and sat down to write in his diary. He had written the text of the afternoon sermon: James 4:14—"Whereas ye know not what shall be on the morrow. For what is your life? It is even a vapour, that appeareth for a little time and then vanisheth away." With the last word of the text, his pen wandered over the page and he fell back in his chair paralyzed. He partially recovered and lived for another four long years, passing away on September 8, 1869, at the age of 80. ■

Oliver William Bourn **PEABODY**

(1799–1848)

A twin brother of William Bourn Oliver Peabody—from birth—in appearance, manner, and capabilities—to death a year apart.

Oliver William Bourn Peabody was born a twin on July 7, 1799, in Exeter, New Hampshire, to Oliver Peabody and Frances Bourn. He and his brother, William, were the seventh and eighth of 10 children.

Peabody, along with his father, attended Phillips Exeter Academy, which was meant to educate youth in a traditional manner. He graduated from the academy at 13. While Peabody had a deep desire to study divinity, he wanted to please his father so followed in his footsteps and studied law at Harvard, graduating in 1816 with the degree of LL.B.

Peabody studied with his father and then completed his legal education at Cambridge before settling in Exeter, where he practiced from 1819–1830. He was admitted to the bar in 1822. He was also a representative in the New Hampshire legislature from 1824–1831 and edited the *Rockingham Gazette* and *Exeter News-Letters*. In 1823, he delivered poems to the Harvard chapter of the Phi Beta Kappa Society and on state occasions. His most applauded performance was recited at Portsmouth on May 21, 1823, for the centennial celebration of New Hampshire's first settlement. It is published in *Collections of the New Hampshire Historical Society, Vol. VI*.

Since Peabody's heart was not in law, he decided to move to Boston, Massachusetts, in 1830 to assist his brother-in-law with the *North American Review*—a journal of literature and culture published in Boston in the 19th century. For several years, he was assistant editor of the *Boston Daily Advertiser*. He edited the seven volumes of the *Dramatic Works of William Shakespeare* in 1836 for Hilliard, Gray & Company.

From 1834–1848, Peabody documented the lives of James Oglethorpe, David Brainerd, Alexander Wilson, Gen. John Sullivan, Gen. Israel Putnam, and Cotton Mather for the *Library of American Biography*. He was a member of the Massachusetts legislature from 1834–1836 and was appointed register of probate in Suffolk County in 1836, but resigned in 1842 due to tedious labor requirements and health.

On November 27, 1839, he was one of five men who met at the American Education Society to found the American Statistical Society, which later became the American Statistical Association. Peabody chaired their second meeting on December 11, 1839, during which they reviewed and voted to adopt the society's constitution.

After resigning as register of probate in Suffolk County, Peabody accompanied his brother-in-law to Convent, Louisiana, and became professor of English literature at the College of Jefferson in St. James Parish. He found the southern climate unsuitable and returned to Massachusetts to begin studying divinity around 1843 with his twin brother in Springfield. He was licensed by the Boston Association of Congregational Ministers (Boston Unitarian Association) in 1845 and settled in August 1845 as pastor of the Unitarian Church of Burlington, Vermont. His last work was the preparation of a memoir of his brother. He died on July 5, 1848, in Burlington. ■

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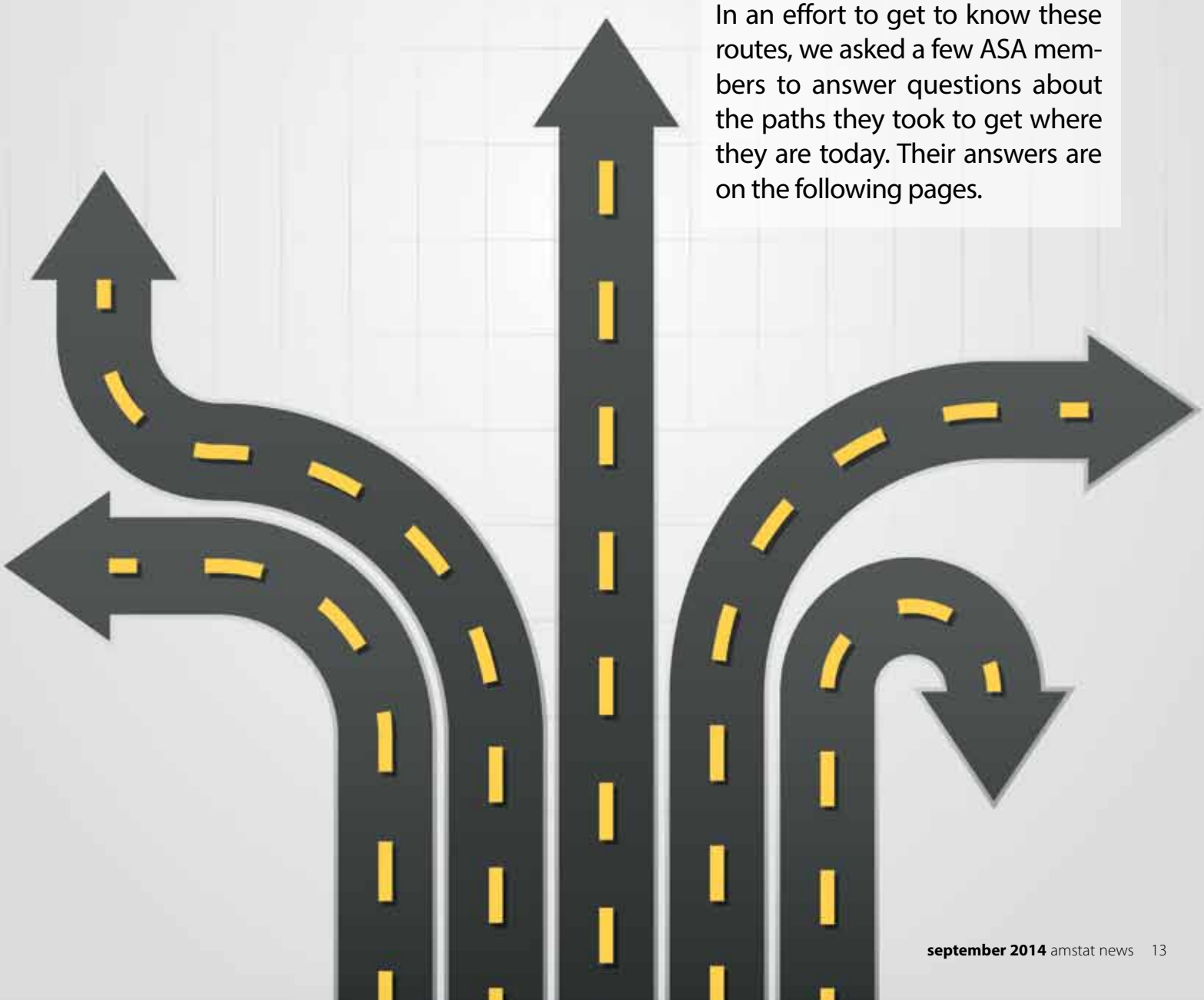
Which **Career Path** Will **You Follow**?

There are many routes a statistician can take to reach an area to study. In an effort to get to know these routes, we asked a few ASA members to answer questions about the paths they took to get where they are today. Their answers are on the following pages.



Janicki

Education: PhD, University of Maryland, College Park

Current position: Mathematical statistician, working with the small area estimation group in the Center for Statistical Research and Methodology at the U. S. Census Bureau

RYAN JANICKI

What do you do on a daily basis?

My typical day is probably very similar to that of most statisticians—a mixture of reading and writing papers, analyzing data, and building models.

Name a few specific skills you need to do your job.

Knowledge of survey sampling, missing data methods, and mixed effects models. Most of the computational work I do is with R.

What is a skill you would like to learn to be better at your job?

Really, I'd love to learn more about everything, but I am spending time right now learning more about missing data methods.

What are the most satisfying and most frustrating parts of your job?

The most satisfying part of my job is having the opportunity to work on important applied problems with very talented colleagues, while also having some freedom to explore independent research ideas, usually motivated by Census Bureau problems.

Research, in general, can at times be frustrating, in that the problems we work on rarely have easy solutions and much time can be spent and many ideas discarded before a working solution can be found.

What or who inspired you to become a statistician?

I was a math major in college because it was my favorite subject, but I didn't know what opportunities there were for mathematicians outside of academia. In graduate school, I wanted to continue to study some theoretical mathematics, but I also wanted to work on applied problems in the future. I felt that studying statistics would be a great way to achieve this balance.

Did you have a mentor?

My advisor in graduate school was Professor Abram Kagan, who suggested many interesting problems to work on and taught me a great deal about mathematics, statistics, and research in general. Also Don Malec, who introduced me to small area estimation and worked with me on my first few projects at the Census Bureau.

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

I have always found that I learn best by working on challenging problems. My advice would be to explore different areas of statistics and collaborate as much as possible with more experienced statisticians. I also think it is useful to learn a statistical programming language such as R or SAS as early as possible, since nearly all the problems we work on require some coding.

What advice would you give to a student who wants to have the same career path as you?

I think, beyond a general interest in statistics, the most important things for a student who wants to be a statistician in the federal government to have are motivation, curiosity, and an openness to new and interesting problems. Having a specific interest in survey sampling would be helpful, as well.

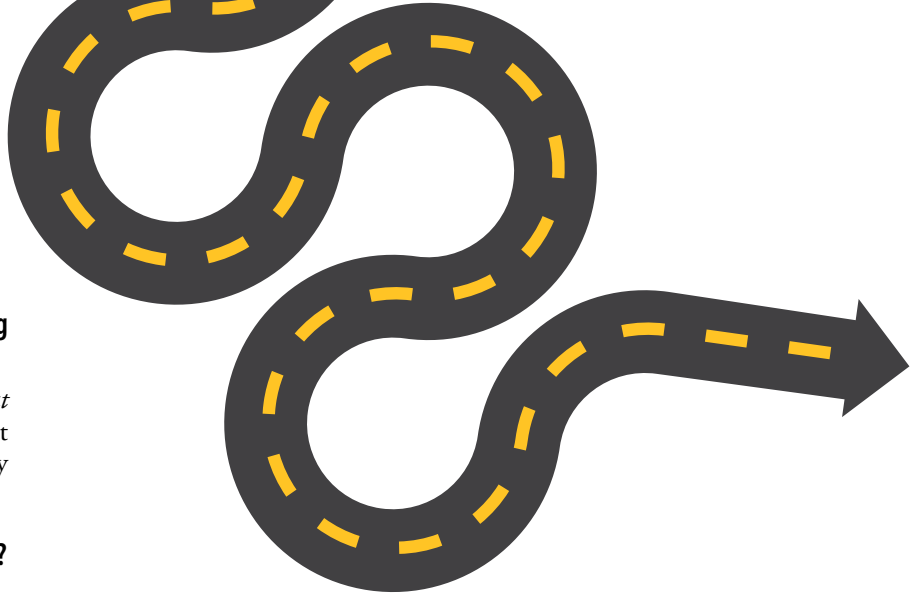
I think internships can be great learning opportunities. If I were a student, I would seek out as many internship opportunities as I could find, rather than focusing on a single type of internship. I think each work experience is an opportunity to get a feel for what work is done in a particular field and to learn what you do and don't like within an industry.

Where do you see the future of statistics going? What trends/challenges do you see in the future?

I often hear that statisticians in the federal agencies will continue to be asked to do more with less—to provide more accurate and timely estimates while working with smaller budgets, smaller sample sizes, and higher nonresponse rates. I think it is possible that there will be more model-based methods, such as small area methods, used by survey statisticians in the future.

How has the field of statistics changed since you first started your career?

We have seen an explosion in the size and nature of the data sets we have to analyze and understand. Advances in high-dimensional data and machine learning are making it possible for us to draw meaningful inferences from very complex data.



› In what ways have you benefitted from having an ASA membership?

I became a member in 2008. I enjoy reading *Amstat News* and *Significance* and attending the Joint Statistical Meetings. The job postings were also very helpful when I was nearing graduation.

› If you were not a statistician, you would be . . .?

A furniture maker.

› What do you enjoy doing in your spare time?

Reading, listening to music, woodworking, playing soccer with my kids.

› Name your favorite blogs or books you have read and would recommend to others.

Andrew Gelman's blog, "Statistical Modeling, Causal Inference, and Social Science," and Nathan Yau's blog, "FlowingData.com."

› What were you doing at age 28?

Struggling through my fourth year in graduate school.

› In 10 years you hope to be doing . . .?

I very much like what I am doing now and would like to continue being a research statistician for the next 10 years.

Emory's Department of Biostatistics and Bioinformatics to Celebrate Its 50th Anniversary October 17–18, 2014

The department of biostatistics and bioinformatics at the Rollins School of Public Health, Emory University, will be celebrating its 50th anniversary with a reunion October 17–18, 2014. All current and former faculty, students, and staff are invited to attend. On Friday, October 17, there will be a luncheon, session on the history of the department, technical session highlighting faculty and former students, and a poster session. A gala banquet will be held that evening with testimonials and awards. The inaugural Mike Kutner Service to the Profession Award for an alumnus of the department will be presented. Ron Wasserstein, executive director of the American Statistical Association, will attend. On Saturday, October 18, there will be a wrap-up brunch with additional testimonials and Emory logo gifts presented to attendees. All former faculty, students, and staff are encouraged to attend this gala. Current faculty, students, and staff are planning to attend and participate in the planned activities. Please see the following website for registration materials and meeting details: *http://sph.emory.edu/departments_centers/bios/anniversary-celebration.html.*

Parker

Education: BA, 2008, mathematics and molecular biology, Pomona College; PhD, 2013, Johns Hopkins Bloomberg School of Public Health

Current position: Data analyst at Etsy

Twitter: @hspter

Blog: *hilaryparker.com*

HILARYPARKER

What do you do on a daily basis?

I provide analyst support for the buyer experience teams at Etsy. What this means is that I consult with various teams that build features on the website, such as the team that builds the search experience on the website. I help with anything from opportunity sizing to behavioral analysis to formal experiment analysis. I also help build the in-house tooling we have for analyzing experiment results and teach my coworkers about statistics.

Name a few specific skills you need to do your job.

Being an analyst is very much like being a statistical consultant—you need to have a diverse set of skills! You, of course, need general statistical knowledge and the ability to perform good statistical analyses. But beyond that, you need to be able to communicate those results to a diverse audience, whether it's team members with different skill sets or board members at a board meeting.

Additionally—and just like a good statistical consultant—the more you are embedded into a team, the more you can help lead decisionmaking, rather than simply doing analyses that others ask of you. This means being able to think critically about where there is opportunity, what projects are worth tackling, and what projects will be derailing for little benefit. One of the biggest skills I feel like I have learned is the ability to say, "I know there is bias in this analysis, but I also know that bias is bounded and my decision wouldn't change if I measured it." Having that ability to know where to invest your energy is huge.

What is a skill you would like to learn to be better at your job?

Software engineering, without a doubt. Etsy is a really special tech company in that, despite its large size, I can still work with teams across the company to build features our buyers and sellers use, or that we use internally. As I become a better software engineer, I can contribute more directly to that and even push code to production! Additionally, seeing software engineers work (and seeing the code they produce) has tremendously improved my R programming.

What are the most satisfying and most frustrating parts of your job?

I love working with teams—it's one of the big reasons why I chose working in tech and at Etsy. I'm the only person at Etsy with formal statistical training (although many people are very good at statistics). As a result, I am often able to provide a perspective that others don't have. The ability to see my training implemented so quickly is hugely rewarding!

Did you have a mentor?

One of my statistics professors at Pomona was Jo Hardin. She and I have stayed in touch ever since. One time when we were at a conference together and I was updating her about my life, she told me, "I can't tell you how many times that I thought I had made a decision for forever."

As my career has twisted and turned in ways I didn't expect, that advice has really stuck with me. I think a lot of folks—and probably especially statisticians—have a desire to map and plan everything out, so it can be hard if those plans don't turn out. Learning to embrace that uncertainty has helped me build a career I really love.

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

Don't be afraid to keep learning! Being a good applied statistician means keeping up with statistical theory, statistical programming languages and software, and whatever field you're analyzing. One of the most energizing things about statistics (that can also be exhausting) is you can't rest on your laurels!

What advice would you give to a student who wants to have the same career path as you?

If you are thinking about a job in tech, I highly recommend seeking out a summer internship while you're in school. It can be hard for a company to hire a statistician with a purely academic track record, since a job in tech requires domain knowledge that's not necessarily taught in graduate school. Since I didn't have internship experience, I know Etsy had to take a leap of faith on me that I would be able to pick up some of the technical skills and business savvy that's required of an analyst. Having internship experience can take away a lot of that uncertainty.

Where do you see the future of statistics going? What trends/challenges do you see in the future?

It's really exciting to see other fields such as computational sociology and digital history pop up as the availability of data explodes. Statisticians did a great job of developing methods relevant to medical

fields, and I think we need to strive to do the same for these new and exciting subfields.

Additionally, it seems like every major news outlet is developing a data visualization team these days, presumably because data stories are hugely successful. I know that *The New York Times* dialect map—built on a project Josh Katz performed during his statistics master's—was their most popular post of 2013 (and it was posted in December). Statistics training has always been about building a narrative and telling a scientific story through data, but the audience is broadening and we need to keep up!

› You recently earned your PhD in biostatistics. Congrats! What advice would you give to students who are currently thinking about earning a PhD?

I'd give the same advice that Jo Hardin gave me: "I can't tell you how often I thought I had made a decision for forever." If you are excited about getting a statistics PhD, you should do it! And then if you decide to take a path that isn't traditional, you should do that too! Statistics is great because it lays a foundation on which you can build so many careers.

› What do you see as the biggest challenges new graduates face today? What can universities do to better prepare new grads to enter the work force?

I think one of the biggest challenges we face as a field is training our students to have the programming skills required for many modern statistical applications. Many training programs don't include computer programming and that is a mistake. While Big Data might be a buzzword, it's also true that the volume of data produced in both science and industry is only going to continue to grow. Being able to deal with this volume of data requires programming savvy that we, as statisticians, aren't yet providing in our training programs.

› In what ways have you benefitted from having an ASA membership?

I became an ASA member during my first year of graduate school and have been to JSM every year since. Especially now that I am outside of academia, I really value being able to gather with other statisticians once a year, compare notes about our work, and bounce ideas off one another. Last year alone, I left the conference with several new ideas for what to implement at Etsy.

> My derby name was "Status: Bitchin'" and my number was 0.05.

› If you were not a statistician, you would be ...?

I have no idea! It was hard enough figuring out I should be a statistician! :)

› What do you enjoy doing in your spare time?

In graduate school, I played Roller Derby, which was a ton of fun! My derby name was "Status: Bitchin'" and my number was 0.05. Now, however, I find my free time mostly filled with exploring New York City and establishing my life here.

› What are one or two favorite blogs or books you have read and would recommend to others?

I have to pitch my advisor's blog, simplystatistics.org. It's one of my favorite resources for statistics news and pontifications.

› What were you doing at age 28?

I was just starting my job at Etsy! I started my job at Etsy about 3 weeks after I turned 28, which was about 4 weeks after I defended.

› In 10 years, you hope to be doing ...?

I'm honestly not sure! I have really enjoyed exploring tech and feel like it's a good fit. But part of the reason I decided not to pursue a career in academia is that I wanted the flexibility to change careers or explore different avenues without restarting the tenure clock. As I've worked more and more, I've found different strengths and interests emerging that I wouldn't have found in a more traditional academic route. I'm not sure which one will win out!

› Tell us a fun fact about yourself.

My cat is named after a character from "The Wire" because I got her in Baltimore. After I named her, I met the actress who played the character and told her about my cat!

Savitsky

Education:
BSME (mechanical engineering) – Rice University; MBA – The University of Texas at Austin; MILR (human resources) – Cornell University; MA (statistics) – Rice University; PhD (statistics) – Rice University

Current position:
Research mathematical statistician in the Office of Survey Methods Research in the Bureau of Labor Statistics

TERRANCESAVITSKY

What do you do on a daily basis?

I perform applied methods–based research loosely organized around resolving estimation and inferential issues associated with dependent sample data collected from surveys. Much of my work is motivated by problems that arise from one of the BLS survey programs (e.g. Local Area Unemployment Survey). My projects generally focus on two types of estimation:

- Develop flexible (nonparametric) models to allow the borrowing of information temporally, spatially, and based on other information to provide more stable estimates for small domains (e.g., counties in a state). These approaches input model-free (direct) estimates that account for informative sampling designs. The direct estimates, however, are often unstable for small domains (where the sample size is small).
- Adapt estimation methods to work with the "micro," respondent-level data in a manner that accounts for the informative sampling design to produce unbiased estimates.

My methods focus is on Bayesian nonparametrics, and I'm working to map this background to the field of survey statistics.

Name a few specific skills you need to do your job.

Statisticians at BLS express a diversity of focus areas. That said, the use of Bayesian methods, which is my focus, is quite new in this environment so there are many challenging opportunities to innovate. Bayesian methods are particularly well suited to estimation of complex dependence relationships that arise from structured data. Data acquired from surveys often express a lot of structure, both induced by the sampling design and also by nature of the survey questions and respondents.

The field of survey sampling, however, is wary of model-based approaches so to not insert unverifiable assumptions (the model) into the production of estimators designed for use by the broader community of researchers and government officials. Yet, flexible nonparametric models often enhance inferential value and provide more usable estimators. Summarizing, from a technical perspective, I need to learn and leverage understanding of Bayesian methods to analyze data collected from informative sampling designs.

I regularly dialogue with nonstatistician researchers and practitioners where it is important to tailor the presentation of one's work to the needs and interests of each of those audiences. For example, I recently worked on a project to estimate sets of time-indexed functions that express dependence across observations for a BLS program that produces unemployment estimates for local areas. They were less interested in the technical aspects of the method I employed and more interested in the estimation properties and inference. So I focused communicating the features of the formulation by using results across data sets that each expressed distinct challenges that would highlight model estimation properties in an intuitive way.

Writing well is, of course, important for both composing research papers and communicating ideas to practitioners who manage BLS programs.

What is a skill you would like to learn to be better at your job?

I'd like to be a better-skilled research statistician. I need more arrows in my quiver. The arrows include leveraging applied probability concepts in my research and developing computationally efficient estimation methods. On the latter point, data acquired from surveys is generally of very high quality because of the active participation of respondents. Yet while these data are generally not classified as "big," they are often still quite large.

My implementations of Bayesian nonparametric models have always sampled the marginal distributions over the set of model parameters, which allows for very straightforward inference. Sampling distributions is, however, computationally expensive and often doesn't scale well in sample size (since it is common for parameters to be indexed by observation unit). I quite like the inferential benefits associated with sampling the posterior distribution (as opposed to extracting point estimates under an approximation to the true posterior), but there is the need to develop new approaches. For example, I recently adapted an approach of Radford Neal that produces samples from the exact posterior distribution in a more computationally tractable way by 'stepping into' a lower-dimensional temporary space in which samples are moved before 'stepping out' to the full-dimensional space.

What are the most satisfying and most frustrating parts of your job?

The most satisfying parts of my work are publishing research papers and producing useful results for BLS program teams. On the latter point, when I deliver a result that a BLS program finds useful, there is much appreciation and that feels great.

Whatever frustrations arise are dominated by the appreciation I have for the opportunity to participate in performing research.

What or who inspired you to become a statistician?

I took a sequence of statistics courses while studying for a graduate degree in human resources at Cornell University. The skillful teaching stoked my interest in statistics as a means to more scientifically contribute to public policy decisions. Statistics is a field that 'parameterizes' models of human behavior in a fashion that allows the linking of art and science. The juxtaposition of qualitative and quantitative, conceptual and cause/effect, allowed by the field of statistics inspires me.

Did you have a mentor?

Besides my thesis advisor, Marina Vannucci, I've received patient and thoughtful advice from Katherine Ensor, Peter Mueller, and Matt Schonlau. The advice I've most taken to heart is to express persistence. Statistics is a difficult field, so it's important to pursue one's work with enthusiasm and focus to occasionally achieve a good result.

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

Given my indirect path to the field of statistics, I would suggest upcoming statisticians to consider that they are navigating a nonlinear journey, rather than moving through a pre-planned set of steps, and to take risks where their interests are piqued.

What advice would you give to a student who wants to have the same career path as you?

Focusing on building research methodology skills—including formulation, analysis, and writing—is probably the best preparation. Taking the opportunity to present one's work also provides excellent preparation for communicating with a diverse audience.

Where do you see the future of statistics going?

Everyone will be Bayesian. Maybe not, but it was fun to write that. Here at BLS, I think there will be a growing interest in approaches that offer useful inference about the nature of dependence. There's been a traditional focus on producing increasingly more efficient estimators and that will continue, though through modeling rather than closed-form approaches. The modeling approaches that will be most readily accepted are those that offer inferential insight to frame the results they produce. I have no idea how the broader field will evolve, but I do know we will never have enough computing power so we will always require clever probabilistic formulations and implementation algorithms.

How has the field of statistics changed since you first started your career?

Machine learning approaches and the convergence in some topics among the fields of computer science, engineering, and statistics are probably the biggest ongoing change.

Probabilistic underpinnings to support the adaptation of nonparametric modeling also continue apace.

In what ways have you benefitted from having an ASA membership?

I became an ASA member during my graduate studies (in 2008) and have benefited from the exposure to the community of researchers that conferences and workshops sponsored by the ASA offer. It is through very proactive organizations like the ASA that we become more than individual researchers and operate as a community.

If you were not a statistician, you would be . . .?

Unemployed. Seriously, I'd probably be a behavioral therapist as there's nothing that interests me more than people's archetypal stories.

What do you enjoy doing in your spare time?

I run. A lot. Every day.

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

I'm afraid to admit that since entering the field of statistics, nearly all of my long-form reading relates to the field. I follow Andrew Gelman's blog (and BDA3), enjoyed reading Dirk Eddelbuettel's Rcpp book, and I like anything written by Hadley Wickham and David Dunson. Research papers are generally more important for me than books. There are just too many beautifully written papers to select from for comment.

What were you doing at age 28?

I was developing the concept for a future sport utility vehicle in the auto industry and playing a lot of ultimate Frisbee in my free time.

In 10 years, you hope to be doing . . .?

I hope to be a skillful and effective statistical researcher in 10–20 years.

Tell us a fun fact about yourself.

I've participated in six marathons and don't use running shoes.

Schmid

Education: BA, mathematics, Haverford College, 1983; PhD, statistics, Harvard University, 1991

Current position: Professor of biostatistics, Brown University

CHRISTOPHERSCHMID

What do you do on a daily basis?

Answer email, teach, advise and mentor students, write and edit manuscripts and protocols, administer a graduate program, serve on university and professional and government committees, provide advice to biomedical colleagues, analyze and supervise analysis of data, research new problems, and program new methods.

Name a few specific skills you need to do your job.

Writing and editing, oral communication and speaking in front of an audience, computer programming, mathematics, and knowledge of the world around me and how it relates to the problems I work on.

What is a skill you would like to learn to be better at your job?

How to use many of the new social networking tools more effectively.

What are the most satisfying and most frustrating parts of your job?

Rewarding: Helping others to solve their problems and learn new things.
Frustrating: Lack of time to learn new statistical techniques. After awhile, much of your term is spent advising and supervising and the time to learn new things shrinks.

What or who inspired you to become a statistician?

I was always interested in sports and statistics as a kid and spent two years as an actuary after college. I liked the statistics, but not the business, so went to get my PhD.

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

Learn how to communicate effectively as a writer, speaker, and conversationalist.

What advice would you give to a student who wants to have the same career path as you?

Do as much applied work as you can and get into an environment where you can participate in planning and discussion. Learn to communicate and how to interact with scientists who are not statisticians. Learn how to consult and find mentors/bosses who will help you learn how to be most effective.

Where do you see the future of statistics going?

As the amount of data available increases and the need for prediction grows, statisticians will need to deal with more and more data in many dimensions. Computer scientists and others are now developing many computational algorithms that handle masses of data. Statisticians have a key role to play in drawing correct inferences and estimating uncertainty in these predictions, but need to be able to make their points effectively, hence communicate.

How has the field of statistics changed since you first started your career?

The speed of communication is so much faster with the invention of the World Wide Web and the spread of email, blogs, and social networking. The number of people worldwide doing statistics has also increased exponentially. It is a much more competitive world. Also, the power of computation is so much greater now so many new methods that were not possible 25 years ago are now routine. It is much more difficult to keep up, and to be an expert in many branches of statistics is impossible. The discipline is much more specialized now.

In what ways have you benefitted from having an ASA membership?

I joined the ASA in 1986, during my first year of graduate school. The ASA has connected me to a lot of other statisticians, has promoted my research career, and has led me to many opportunities to promote statistics and serve professionally in many realms.

If you were not a statistician, you would be …?

A historian.

What do you enjoy doing in your spare time?

I play soccer, garden, read, travel, and do puzzles.

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

The Theory That Would Not Die: How Bayes' Rule Cracked the Enigma Code, Hunted Down Russian Submarines, and Emerged... by Sharon Bertsch McGrayne and *The Emperor of All Maladies: A Biography of Cancer* by Siddhartha Mukherjee

What were you doing at age 28?

I was in graduate school working on my dissertation, working at a software company training users, and raising two kids.

In 10 years, you hope to be doing …?

What I am doing now: teaching and research and traveling.

Tell us a fun fact about yourself.

I coached youth soccer for 11 years.

RICKWICKLIN

Wicklin

Education: BS, mathematics and physics, Guilford College; PhD, applied mathematics, Cornell University

Current position: Distinguished researcher in computational statistics at SAS. I am part of the R&D team that supports and adds new features to SAS software.

Twitter: @RickWicklin

Blog: *blogs.sas.com/content/iml*

What do you do on a daily basis?

I write software that enable SAS customers to analyze data efficiently and effectively. My main focus is extending and promoting the SAS interactive matrix language (SAS/IML).

Name a few specific skills you need to do your job.

Knowledge of matrix computations, numerical analysis, and multivariate statistics. A solid mastery of computer programming. The ability to communicate orally and in writing with other researchers, with executives, and with sales and marketing staff.

What is a skill you would like to learn to be better at your job?

To multitask more efficiently.

What are the most satisfying and most frustrating parts of your job?

I get a lot of satisfaction from blogging about issues in statistical programming. The most frustrating aspect of my job is deciding which features to add for the upcoming release of SAS software and which features to delay until a future release. I wish there were more hours in the day!

What or who inspired you to become a statistician?

My colleagues at SAS. Their passion for statistics is infectious.

Did you have a mentor?

Bob Rodriguez, the president of the ASA in 2012. One of Bob's favorite phrases is "Know your audience." I use that advice when deciding what features to add to SAS software, when giving professional talks, when writing documentation, and when blogging.

How has the field of statistics changed since you first started your career?

The cheap availability of computational power and memory means that algorithms that were once impractical are now feasible, and nonparametric techniques are now commonplace. Unfortunately, powerful computers also mean that careful thought and analysis are sometimes replaced by brute-force computation, much to the detriment of our profession. Back in 1995, Charlie van Loan at Cornell gave a fabulous expository lecture, titled "If Copernicus Had a Computer," in which he described basic theoretical advances that might not have happened if computers had been available to one of history's great scientists. His presentation reminds us that fast computation can be a double-edged sword.

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

Never stop learning.

What advice would you give to a student who wants to have the same career path as you?

Get involved in a large-scale, multi-person software project. Find an internship or postdoctoral position that will enable you to say, "I was part of a team that wrote 10,000 lines of code." To stand out from the crowd, you need more than an R package on your résumé.

In what ways have you benefitted from having an ASA membership?

I became an ASA member in 2003. Being in the ASA helps me keep up with research in computational and graphical statistics.

If you were not a statistician, you would be . . .?

A math teacher.

What do you enjoy doing in your spare time?

Singing and cooking Italian food—sometimes at the same time!

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

The Theory That Would Not Die by Sharon Bertsch McGrayne is a fascinating account of the history of Bayesian analysis. *The Pleasures of Statistics* is the autobiography of Frederick Mosteller, a brilliant teacher and researcher and a former ASA president.

What were you doing at age 28?

I was a postdoctoral researcher at The Geometry Center at the University of Minnesota, where I developed several open-source software projects back before open source became cool! I also wrote several interactive web applications during the early days of the Internet.

In 10 years, you hope to be doing . . .?

The same thing I do today: helping people to analyze and visualize data more efficiently.

Tell us a fun fact about yourself.

I coach high-school wrestling and (of course) keep the team statistics.

Witten

Education: BS, 2005, math and biology, Stanford; MS, 2006, statistics, Stanford; PhD, 2010, statistics, Stanford

Current position: Associate professor of biostatistics at the University of Washington

DANIELA WITTEN

What do you do on a daily basis?

There are four major aspects to my job: (1) developing new statistical machine learning methods for the analysis of large-scale data sets coming out of biology and other fields, (2) mentoring PhD students, (3) formal classroom teaching, and (4) collaborating with domain scientists.

There's no such thing as a typical day! On a given day, I might spend the morning meeting with my PhD students about their statistical methods research projects, the early afternoon working on revisions for a journal submission, and the late afternoon meeting with a genomics researcher about a collaborative project.

Because I mentor a handful of PhD students and have a bunch of ongoing collaborations with other statisticians and with domain scientists, I'm involved in a number of diverse research projects at any given time. This keeps me on my toes and ensures I'm always learning new things. It also guarantees that no two days are alike!

Name a few specific skills you need to do your job.

It goes without saying that, to be a successful statistician, strong technical skills and deep expertise in one's application area are non-negotiable requirements. But in addition to those skills, I find it is critical to have strong oral and written communication skills, as well as good time management skills.

Oral communication skills are needed to collaborate with statisticians and non-statisticians alike, and to communicate my research findings at seminars, conferences, and other forums.

Written communication skills are key to getting my work published in good journals and lowering the "barrier to entry" for my research papers, so that a larger number of people will read and cite my work. In addition, given the current competitive funding climate, strong written communication skills are critical to craft successful grant applications.

And finally, faculty members have a huge number of draws on their time, such as teaching, mentoring students, collaborating with domain scientists, and more. Good *time management skills* are critical to being productive in this setting.

What is a skill you would like to learn to be better at your job?

Patience, patience, patience! Getting deeply involved in a new application area takes time. So does the process of getting papers published in statistical journals (for which the entire process from first submission to acceptance can easily take well over a year).

What are the most satisfying and most frustrating parts of your job?

I have been lucky to work with some incredibly talented and hard-working PhD students during my time as faculty at the University of Washington! It's been both humbling and inspiring to see first-year PhD students develop into mature researchers. And it's been a lot of fun to get up to speed in new areas and techniques alongside my students.

What or who inspired you to become a statistician?

I figured out pretty early on in college that I wanted to become a scientist, but I had a lot of trouble deciding what area of science to pursue. I didn't want to be pigeonholed into a particular research area. Instead, I wanted to be able to work on different types of problems at different points in my career (or even at a single point in my career). This line of thinking led me to become a statistician.

Did you have a mentor?

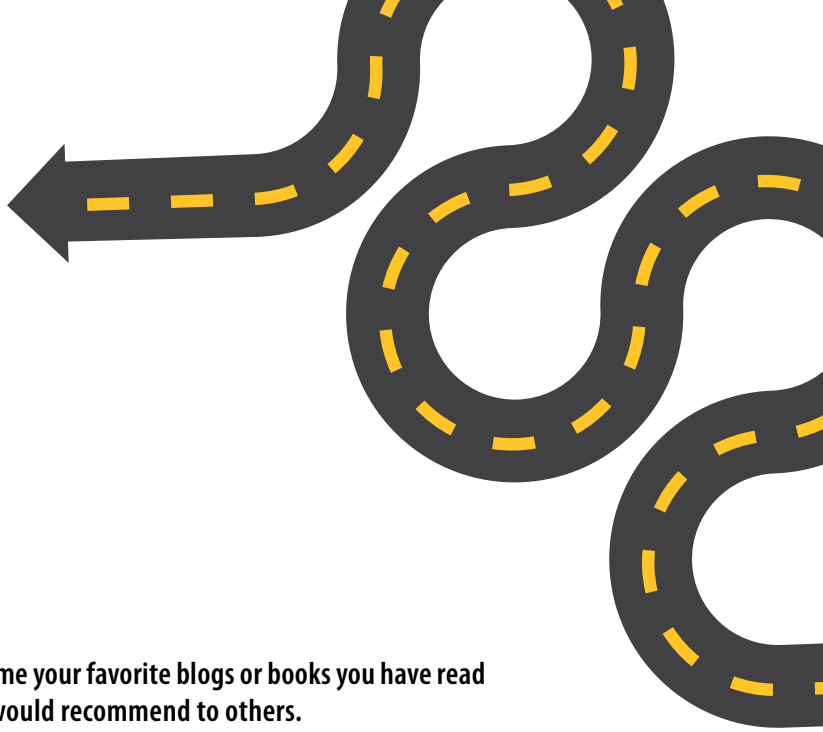
My primary statistical mentor is my PhD advisor, Rob Tibshirani. I learned from Rob to choose research projects that I'm passionate about and to pursue those projects tirelessly.

What advice would you give to a student who wants to have the same career path as you?

I recommend majoring in math in college and becoming deeply immersed in another scientific subject area (e.g., a double major or summer research project). Studying math will ensure that you have the technical skills needed to become a statistician, and exposure to another scientific subject will help you develop the background and communication skills needed to become involved in an application area.

Where do you see the future of statistics going?

Right now, huge amounts of data are being generated across a number of fields, and there is a lot of buzz about Big Data. This is a great opportunity for the statistical community to step in and convince scientists and the broader public that statistics is important and that statisticians (as opposed to, say, computer scientists) are needed to make sense of today's data.



How has the field of statistics changed since you first started your career?

Statistics has become much more mainstream in the past nine years since I started graduate school! Now, thanks to Nate Silver, the Big Data buzz, the rise of AP Statistics in high schools, and more, people are becoming increasingly aware of the importance of statisticians and statistical methods development in science, industry, and policy.

Within my area of statistical methods research, the types of questions people are answering have changed a lot, too. I work in methods development for high-dimensional data. Five years ago, efforts were centered on *estimation* in high dimensions. Now the focus has begun to shift toward *inference* in high dimensions.

In what ways have you benefitted from having an ASA membership?

I joined the ASA early in my graduate school years. I first attended JSM in 2008. The only people there who I knew were the Stanford faculty and graduate students in attendance. I was completely overwhelmed by the huge number of statisticians at the conference. I walked around the Denver Convention Center for hours without seeing a familiar face! Since then, I've been at JSM every year but one. Each JSM has been more fun than the last, as I have gotten to know many more people in the field! Now JSM is a great opportunity to catch up with old friends and collaborators and make new ones.

You were on *Forbes'* 30 Under 30 List not once, but three times. Congrats! How does it feel to be recognized like that?

Thanks! It has been fun to be recognized by *Forbes* three times. It's really exciting to be a statistician at a time when the scientific community and broader public are becoming increasingly aware of the important role statisticians do and should continue to play in scientific research, public policy, and industry.

What do you enjoy doing in your spare time?

Spending time with my husband and our new baby—and hiking, running, biking, wakeboarding, and paddle boarding in the beautiful Pacific Northwest.

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

A great blog for statisticians to follow is Simply Statistics at *http://simplystatistics.org*. Roger Peng, Jeff Leek, and Rafa Irizarry can be trusted to always write timely and entertaining blog posts.

And now for a shameless plug. For anyone (statistician or nonstatistician) looking for a gentle introduction to statistical machine learning, I recommend my recent book with coauthors Gareth James, Rob Tibshirani, and Trevor Hastie: *An Introduction to Statistical Learning*, published by Springer (and available for free download at *www.statlearning.com*).

In 10 years, you hope to be doing . . .?

I'm incredibly fortunate to have a job that I really love! In 10 years, I hope my job will look much as it does now: I will still be working with very smart graduate students and collaborators on exciting and important statistical and scientific problems. But, the scientific problems and solutions I develop to solve them will look quite different from today.

Tell us a fun fact about yourself.

When I started my undergraduate degree at Stanford, I was planning to major in foreign languages! I took my first statistics class at the end of my junior year. ■

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Saying 'Yes' to ASA Enhances Career

Ron Wasserstein, ASA Executive Director

In his president's address at JSM 2014 last month in Boston, Nat Schenker asked and answered the question, "Why should you get involved with the ASA?" His answer addressed three important values that are direct and tangible benefits of ASA membership: community, diversification, and education.

Schenker shared his experiences—and those of other members—about how actively being engaged in various ASA communities had added value to his career, how the diverse opportunities for involvement have enhanced his and others' professional lives, and how the rich educational experiences that come from the diverse ASA community provide the technical and personal skills to remain vital and in demand. He called on all members to get involved in their society, saying in doing so they will discover the real value the ASA brings.

For this month's Column 175, we asked some of the volunteer superstars of the association to tell us how and why they got involved in the ASA. These extraordinary volunteers are past honorees of the ASA's Founders Award (*www.amstat.org/awards/foundersaward.cfm*), which is the association's most prestigious recognition of service. The detailed stories of these dedicated members are found in the online version of this column, but here are several intriguing story lines:

- Opportunities provided by senior members of the profession helped **Lynne Stokes** in important ways.
- Service in their local ASA chapters launched 1997 ASA President **Jon Kettenring**, 2001 ASA President **Dick Scheaffer**, 2003 ASA President **Bob Mason**, 2005 ASA President **Fritz Scheuren**, and **Jessica Utts**—who recently was elected 2016 ASA president—into careers of ASA volunteer service. For **Mary Batcher**, **Mike Kutner**, and **Jeri Mulrow**, extraordinary volunteerism also began with their local chapters.
- For **Bob Starbuck** and **Judy Tanur**, involvement in an ASA section got them started as ASA volunteers.
- Committee service was the initial key to involvement for 1996 ASA President **Lynne Billard**.
- Early involvement in conference programming and editorial service provided great opportunities for **Roger Hoerl**.
- **Susan Ellenberg** saw a need for statisticians to be involved in science fairs. She stepped up to meet that need and the results are still very much in evidence today. **Jerry Moreno** saw tremendous need and opportunity in statistics education. The results of his service also are having an ongoing impact.
- People willing to serve as mentors helped get **David Morganstein**, who will be 2015 ASA president, involved in the association.
- **David Scott** and **John Boyer** encourage young people to attend ASA meetings, noting the network of connections (and friendships) they've made have been enormously beneficial both personally and professionally. JSM attendance and involvement also was an early key to career and personal success for **Wendy Alvey**.

Characteristic of these volunteers is their willingness to say "yes" when there are needs for their active, hands-on involvement and service in the ASA. We hope their stories will motivate your involvement in the ASA in its 175th anniversary year and beyond. You can read these committed volunteers' full stories at *http://magazine.amstat.org/blog/2014/09/01/volunteer*. ■

STAT*tr@k*

Think You're Ready for the Working World? Master These Skills First

Jason Gillikin, PH A&I - Quality Improvement

Last autumn, representatives from one of the region's largest health care employers stood attentively during a career fair while graduate-level biostatistics students engaged in the timeworn ritual of seeking either an internship or full-time employment after graduation. Student after student shuffled to the table. Some hung around nervously, waiting to be invited to speak. Others, bolder, advanced uninvited and demanded to know what jobs we had for them. A few asked us what we do.

The scene replayed itself over and over—not just at this event, but also at similar events scattered among colleges and universities from sea to shining sea. We, the employers, assessed the scene after the event. Some of the students impressed us. Others … not so much. But one thing was clear: As a cohort, new graduates aren't as well prepared for the working world as they think they are. Maybe it's fair to blame the universities *a little*, but the truth is, it's up to you to ensure you're ready to enter the working world.

Because you are your own best advocate, mastering just seven rules can make a big difference when it's your turn to belly up to the table.

Seek school-year employment that translates into effective real-world experience. Why fold clothes at the mall or flip burgers for minimum wage when you could be doing something more useful? It's not hard to decide whom to hire between a freshly minted MS whose only prior job is stocking the shelves at the outlet store and one who's been working in an office environment and has exposure to the rhythms of corporate life. The closer a 'school job' matches the environment or skills of your target industry post-graduation, the better you'll be able to relate to recruiters and hiring managers.

For example, if you have a passion for statistical process capability, it's probably better to take a summer job at a stamping plant instead of the community pool. At least with a manufacturing background, an employer looking for an SPC coordinator can assume you know enough to wear steel-toed boots to work on orientation day.

Push back against substandard internships. If your prestigious internship leaves you faxing papers, fetching coffee, and watching YouTube videos, seek alternative arrangements.

Although for some students—particularly mid-career professionals—internships are a royal pain, they're a valuable introduction to both the application of theory learned in the classroom and the daily life of a statistician for younger students. Never settle for an 'easy' internship that imparts no useful accomplishments you can tout to future employers. Statisticians, in particular, ought to rebel against internships focused on data entry or data abstraction. Demand the chance to apply higher-level statistical skills to self-contained projects that benefit the employer while giving you a real accomplishment to share during hiring interviews.

Pay careful attention to your résumé and your LinkedIn profile. A weak résumé or a nearly empty LinkedIn profile gives prospective employers little to grasp. Get help from your institution's career center to make a résumé that glows. Meanwhile, ensure your LinkedIn profile offers as many endorsements, work products, affinity groups, and other indicators of professionalism as you can manage without it looking like credential stuffing.

Don't underestimate the utility of extracurricular activities as a sign of professionalism, either. If you chaired the undergrad statistics association, mention it. If you coauthored a presentation for a regional SAS or R users conference, mention it. Peripheral accomplishments that are nevertheless germane are preferable to giant blocks of white space.

Answer that phone! A 2010 Nielsen study shows that 42 percent of Millennials use a cell phone primarily for texting, not for calls. In fact, some companies have hired consultants to teach younger workers how to converse using a telephone. When the phone rings, the appropriate response is to *answer it*. Don't let it ring to voice mail, and then reply back later with a text or email. Many recruiters prefer to use phone conversations as a further assessment of a candidate's overall presentation—so ducking the call isn't a winning strategy.

Practice your people skills. The best résumé in the world won't get you a job, so you'll have to shine as a networker; outside of academia, most significant job offers above entry-level positions are made on a "who you know" basis, not on who has the most well-polished CV. As such, you'll need to master people skills so you can approach a recruiter's table with confidence, conduct a brief but friendly discussion, impress the recruiter with your comportment, and convey the impression that you're interested in the company and are committed to its mission. If this kind of task sounds hard, brush up by studying books about basic human psychology or business networking. Statisticians who can grok the psych can apply the paradigms correctly and thus improve their level of "know, like, and trust" pioneered conceptually by networking experts such as Ivan Misner.

Learn the practical side of the industry. Seek a mentor in your chosen field and ask penetrating questions about what most of the work is really like. Some statisticians, for example, may not do much high-level testing; they may actually spend more time data mining, so taking courses in SQL could be a significant differentiator. Look to trade groups that cover industries for guidance, not just profession-specific peer associations. Find opportunities to earn certifications or other credentials, or to claim credit for MOOC short courses on applied topics relevant to the industry. Those credentials and short courses can significantly augment your résumé.

Master the theory behind the procedures explained in the classroom. Savvy employers understand the difference between a person who deliberates over the selection of the right statistical test given a complex data set versus a person who only knows a few tests and tries to force-fit the data to match his statistical palette. Even if your background in statistics is more applied than theoretical, it's imperative you get the 'why' so you can find novel ways to drive value within the workplace.

Moral of the Story

Employers recruit candidates who demonstrate, through a mix of skills and experience, that they are well positioned to succeed from day one. Candidates who cannot differentiate themselves amidst the hordes of résumés and spot interviews are basically saying, "I'm a blank slate that you'll have to spend considerable time and money to train before I'll be useful to you." Tough sell!

Although many schools offer various career-development seminars, many of those offerings are optional. Perhaps they shouldn't be. A student who performs well academically and truly understands the power of statistics, but presents an undistinguished résumé augmented by weak interpersonal skills, is less likely to get a job offer than the mediocre student who parleyed a part-time secretarial gig into a career through social grace alone.

Ask yourself: Would you rather be ready for a career, or would you rather be consigned to folding clothes and living in your parents' basement until you're in your mid 30s? A little prep now, *before* you graduate, can save you years of angst *after* you graduate. ■

SCIENCE POLICY

Bachelor's Degrees in Statistics Surge Another 20%

Number of universities granting statistics degrees also growing

Steve Pierson, ASA Director of Science Policy

The recently released 2013 statistics and biostatistics degree data from the National Center for Education Statistics show continued robust growth for bachelor's degrees, with a 21% jump over the 2012 number and a near doubling since 2009. As shown in Figure 1, master's degrees saw a 15% increase over 2012; PhD's 2%. Figure 2 shows the master's and doctoral data for only biostatistics degrees.

Accompanying the growth in the number of degrees is a growth in the number of universities granting such degrees. As shown in figures 3 and 4, the number of universities granting bachelor's degrees in statistics has increased

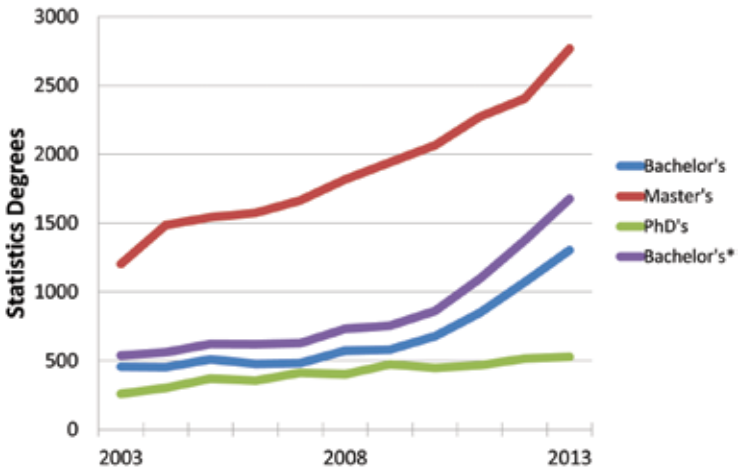

Figure 1. Statistics degrees at the bachelor's, master's, and doctoral levels in the United States. These data include the following categories: statistics, general; mathematical statistics and probability; mathematics and statistics; statistics, other; and biostatistics. The asterisked bachelor's data include statistics degrees categorized as a second major. Both sets of bachelor's data are included here for comparison with analogous charts from previous years. Data source: NCES IPEDS.

Table 1—The 10 Universities Granting the Most Bachelor's Degrees in Statistics for 2011–2013

Statistics Bachelor's	2011	2012	2013	2011–2013	2003–2013
University of California, Berkeley	88	99	143	330	689
Purdue University	77	100	135	312	401
University of Illinois at Urbana-Champaign	30	52	67	149	261
University of California, Davis	32	55	53	140	278
University of Minnesota-Twin Cities	28	52	50	130	260
University of Michigan-Ann Arbor	25	29	55	109	267
Miami University-Oxford	39	36	28	103	321
University of California, Los Angeles	20	30	50	100	149
University of Pennsylvania	36	23	33	92	199
University of Florida	30	29	32	91	207
Subtotal	405	505	646	1,556	3,032
Total	1,078	1,345	1,656	4,079	9,279

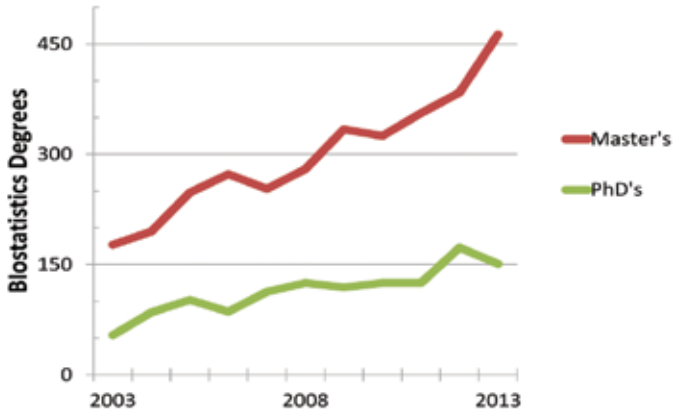

Figure 2. Biostatistics degrees at the master's and doctoral levels in the United States. Data: NCES IPEDS.

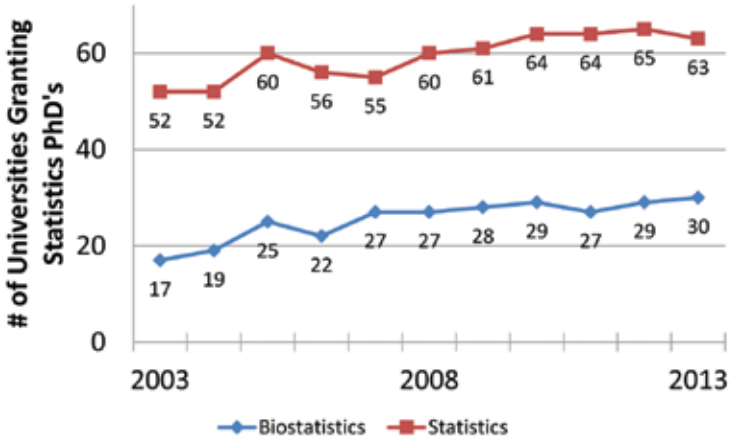

Figure 3. Number of universities granting statistics (statistics, general; mathematical statistics and probability; mathematics and statistics; statistics, other) and biostatistics PhDs. Compiled from NCES IPEDS data.

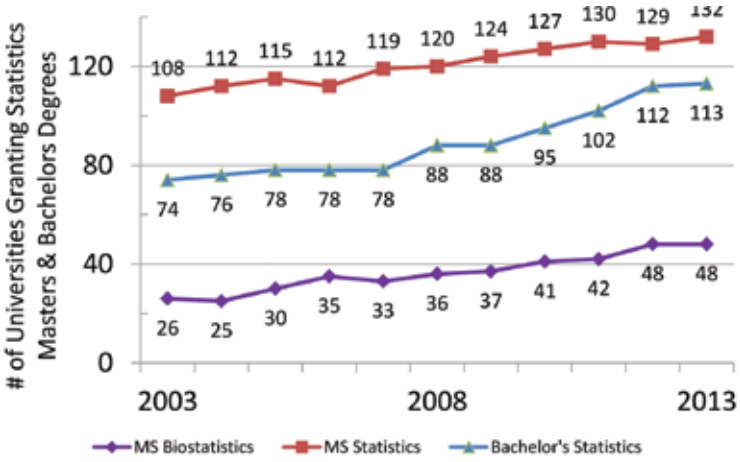

Figure 4. Number of universities granting statistics (statistics, general; mathematical statistics and probability; mathematics and statistics; statistics, other) and biostatistics master's and bachelor's degrees. Compiled from NCES IPEDS data.

> In biostatistics, only five universities actively grant bachelor's degrees.

50% from 2003 to 2013; master's degrees in statistics, 20%; master's degrees in biostatistics, 85%; doctoral degrees in statistics, 20%; and doctoral degrees in biostatistics, 75%.

The 10 universities granting the most bachelor's degrees in statistics over the last three years are listed in Table 1. (For the complete list of 129 universities that have granted bachelor's degrees in statistics, see *www.amstat.org/misc/StatsBachelors2003-2013.pdf*.)

In biostatistics, only five universities actively grant bachelor's degrees. The University of North Carolina at Chapel Hill has granted a total of 87 such degrees from 2003–2013 (26 over the last two years); Brigham Young University, 53 (9); University of Scranton, 31 (7); Emmanuel College, 5 (2); Simmons College, 5 (5).

To see the universities granting master's and doctoral degrees in statistics and biostatistics, follow these links to ASA Community blog entries: master's: *http://bit.ly/1qioeRd*; doctorates: *http://bit.ly/1zrIO7s*. For more information about the categorization of statistics degrees and to see the growth of statistics-related degrees (i.e., bioinformatics, computational math, applied math), see the ASA Community blog entry at *http://bit.ly/1sCSkny*. ■

Student Spotlight: James Joseph

Amstat News *asked James Joseph, student representative of the ASA Philadelphia Chapter, a few questions about why he decided to get involved in the chapter and why other students should do the same.*

Why did you decide to join the Philadelphia Chapter?

After graduating from Penn State, having studied statistics along with some of its applications in health and engineering, I attended the Summer Institute of Training in Biostatistics (SIBS) at the University of Pittsburgh (UPitt) to more fully consider the career paths available to students like me in the "real world." SIBS participants were offered a free ASA student membership.

Sally Morton, past ASA president and then newly appointed chair of UPitt's public health graduate school, gave a welcoming presentation on key habits of successful professionals. After the presentation, I admitted to her that I was unsure of my own prospects, but enthusiastic about the opportunities available to statisticians. Morton recommended I volunteer with my local ASA chapter, ASA-P (P for Philadelphia), to understand the practice of statistics and meet players in the field. I reached out to the chapter officers on her advice and they invited me to attend the local events they hosted throughout the year. Being a student *and* an ASA member allowed me to attend these events virtually free of charge.

How did you become the student representative for the chapter?

I attended short courses and presentations after work and school, especially when they pertained to clinical research. I engaged younger students on their use of statistical methods at science fairs alongside other chapter members. These engagements allowed me to meet new people and understand a variety of career paths, ultimately giving me more confidence to shape my own. I realized I had a lot in common with fellow members despite being a newcomer to both the chapter and profession.

The next summer, the chapter created a new charter that introduced the student representative position on the executive committee. They sought to attract more quantitatively oriented students to chapter activities. Having shown interest in becoming more active in the statistical community (and being the only student at most of the chapter's events, admittedly), I was invited to serve as the chapter's first student representative.

Describe your role as student representative.

Because student representation was a relatively new initiative that summer in 2012, the role was loosely defined and still continues to evolve. Our charter simply states that student representatives are to:

1. Be a representative of student members on the executive committee
2. Liaison to student members

In essence, my duty is to foster new relationships between the chapter and local students. It requires that I understand student needs and align our chapter's resources accordingly.

When I began as a representative, I was continuing my own studies in statistics through an inventive graduate program offered by Texas A&M (TAMU). It is a distance program that pursued "equidistance" with TAMU's in-class version. In both stylings, students had identical passing rules down to the assignments and deadlines—even the graders that evaluated them. Both had access to the same professors, lecture materials, live recordings, and office hours. Struck by the ways technology supported such working relationships, I initially took to the Internet to attract other students to the chapter events that I found so beneficial.

I knew the majority of students could be found on social media, so I established a presence that enlivened the homepage we had established. Beginning with Facebook and Twitter, I learned that these virtual platforms were more effective when they supported real-world chapter activities, and vice versa. For example, we used Twitter in conjunction with our chapter listservs to find candidates for a career panel we hosted last year in conjunction with my high-school AP Statistics teacher. We then broadcast a live video of the event to the Philadelphia Area Statistics Teachers Association (PASTA) and posted the recording on YouTube to extend the event's reach. The options to 'like' our content and subscribe to our channels increased the likelihood that second- or third-degree connections bud from direct impressions made face to face. Last, we offered attendees the chance for a free one-year ASA student membership upon completing an online survey. The results qualified the perceived value of the event and revealed areas needing improvement. The career

Joseph

As a student, you are part of the current pipeline of statisticians and represent the next generation of statisticians.

panel is now a growing, annual event for our chapter at the high-school and university levels.

Chapter officers have been fully supportive of these and other 'social experiments,' always assisting in any way they can. Nonetheless, the task of maintaining, streamlining, and continuously improving our outreach efforts has led me to recruit help from like-minded individuals. Today our student representative group is composed of six highly dedicated members from three universities. My position calls me to facilitate our group's efforts and integrate them with our chapter's current activities. Ultimately, we hope to share what we learn and create with other ASA chapters looking to increase student involvement.

Why do you encourage students to join their local chapter, or get involved with the ASA in general?

Choosing a career path can be daunting, especially when considering the impact of changing direction later, rather than earlier. The ASA offers a variety of ways to test the waters before diving in. And no matter how you like to sharpen your statistical tools and create your future, there is an ASA section comprised of like-minded individuals.

Being in touch with your chapter and the ASA sections will reveal countless opportunities to broaden your knowledge and apply your skills. For example, scholarships are often made available to students and young professionals who show interested in participating in conferences. These opportunities can provide a chance to increase the visibility of your work and finance your education.

Why is it important for students/young professionals to get involved now?

Roslyn Stone, SIBS coordinator and a professor at UPitt, surveyed the academic and professional pursuits of my fellow trainees and me after completing the summer training program. Perfecting the six-week course meant inspiring more and more students to pursue a career in biostatistics. Today, she is on the ASA Strategic Initiatives Committee, where she leads an annual effort to enhance awareness of biostatistics among quantitatively talented U.S. students. These efforts introduced me to the challenge of attracting students to the opportunities that demand them in our increasing data-driven world.

The potential of the Information Age creates a bounty of opportunity for quantitatively oriented students and young professionals in general. Moreover, there is growing demand for statisticians that, if left unfulfilled, threatens our global competitiveness. The gap is a realm of opportunities for those who can understand and serve it best.

In its grandest sense, the role of the student representative is to build the statistics pipeline. With the advent of social media, we become our best advocates. It is an important and relatively unclaimed duty that invites new leaders to emerge from the next generation of statisticians.

What if a local chapter does not have a student representative? What can students/young professionals do? What other opportunities are there?

Students and young professionals typically find industry-wide conferences such as the Joint Statistical Meetings (JSM) and Conference on Statistical Practice (CSP) eye opening and engaging. The executive committee of Pharmaceutical SAS User's Group offers a junior professional scholarship opportunity that afforded me the chance to attend #PharmaSUG in San Diego (hashtag intended – go see what the rave was about). I encourage people to attend conferences for many of the same reasons I recommend chapter involvement.

Nevertheless, if you are interested in establishing student representation in your local ASA chapter, I'm sure your local chapter would appreciate your initiative and ours would be willing to assist you. Student representatives here have been experimenting with a variety of ways to channel more students to our activities. We compile our results and take notes to home in on best practices. Meanwhile, we archive the documents we produce or organize them in an online directory to help other chapters execute successful campaigns. So far, the tools we use are free, collaborative, and easily accessible (our video/voice/text/screen-sharing program does not require anything be downloaded to your computer and begins upon clicking a hyperlink). We've also been committed to executing projects in such a way that they require no more than one hour per week, per volunteer, regardless of how many student volunteers are available.

How can students/young professionals feel like they have a voice or say in their chapter?

Students know students best, and if there is one thing your local chapter needs, it is student involvement. This sentiment is characterized by the widening gap between the supply and demand of statistical talent and echoed in the ASA's new public relations

campaign. Student membership ensures the future success of the association and its activities.

As a student, you are part of the current pipeline of statisticians and represent the next generation of statisticians. If you seek to represent your own views and the views of other's like you, your voice will be valued at all levels of our society.

Do you currently meet/Skype with student representatives from other chapters to discuss ideas or brainstorm?

Our student representative group meets in an online room to review, revise, and reiterate our communication strategy every other week. We brainstorm ways we can support chapter events and devise new initiatives to continue growing our audience. Recently, we've attracted more students to our mission. Their unique perspectives produce an unmistakable synergy that enables us to be more effective and innovative. We expect that collaborating with other chapters will produce a similar effect. We've recently established a blog to share our progress, and we invite others to participate. Cross-collaboration advances the mission of student representation.

How has social media changed the way the chapter interacts with its members?

Social media facilitates interpersonal communication. It is a two-way channel allowing us to share a wealth of information with a variety of audiences *and* learn from their activity: what content they enjoy, what causes they support, what questions and/or opinions they have about our offerings, etc.

We can also find new ways to extend the reach of our traditional offerings. We share live and recorded content with online followers. We've accrued new followers by inviting topical discussions to continue online in an infinitely more public forum. As our online audience grows, we garner feedback from a wider representation of our potential membership. In these ways, social media functions as a valuable decisionmaking and recruiting tool.

Explain how you use social media to reach members or those interested in statistics?

In "Building the Biostatistics Pipeline," Sullivan et al. (*http://chance.amstat.org/2013/02/sibs*) claim that "relevance is critical, introducing students to studies in the current news allows them to make the connection between what they learn in class (often perceived as highly abstract and impractical) and real life."

Our engagement reports validate this claim—statistical musings on timely subject matter induce quantitatively oriented visitors to click, share, and participate. Still, the over-arching goal of using social media for outreach is to convert online visitors to active members. For instance, hosting a statistics trivia contest in the public domain and curiously tagging the open discussion (#ThisIsNotATtest, anyone?) can an attractive and instructive way to encourage visitors to explore our other offerings.

Why is it important for each chapter to have their own social media plan?

Social media, the number-one online activity in the U.S., presents new opportunities to connect with our broader audience, bolster chapter activities, and advance the immediate goals of the ASA (see "Launching a Public Relations Campaign for Statistics: What Better Time Than the ASA's 175th Anniversary," *http://magazine.amstat.org/blog/2014/06/01/presidents-column*).

Once your chapter reasons the use of social tools, it is ideal that objectives be represented as progressive, measurable goals. By pursuing targets, you carve a path that makes the most of failures and successes. Best practices reveal themselves, become incorporated into scheduled activities, and are shared with other chapters that may stand to benefit.

How are you reaching out to other students or those just starting out in their careers?

Every year, members of our chapter volunteer their expertise at the Delaware Valley Science Fair, where they formally serve as judges and informally as advocates for our science. As I mentioned earlier, we recently hosted our second annual high-school and university-level career panels after a very positive reception in 2013. A chief objective of the student representative group is to continue finding ways to extend career resources to students and recent grads. For instance, we're considering the potential of sharing relevant job opportunities under the hashtag #STATJOBS. Every chapter could share the hashtag, thereby collectively branding while still enabling their own audiences to explore nearby openings (tagged posts are prioritized by time, date, and location of origination).

What is one thing you would like to see accomplished during your role as student representative?

I would like to see the role being more and more integrated with our chapter's activities over time. Within our association, I'd like to see student representatives working across chapter lines to advance ASA missions.

If you are interested in being involved with an ASA Chapter, or would like more information about ASA Chapters, email Council of Chapter's liaison, Rick Peterson, at *rick@amstat.org*. ■

Follow the Philadelphia Chapter online at:

AmstatPhilly.wordpress.com

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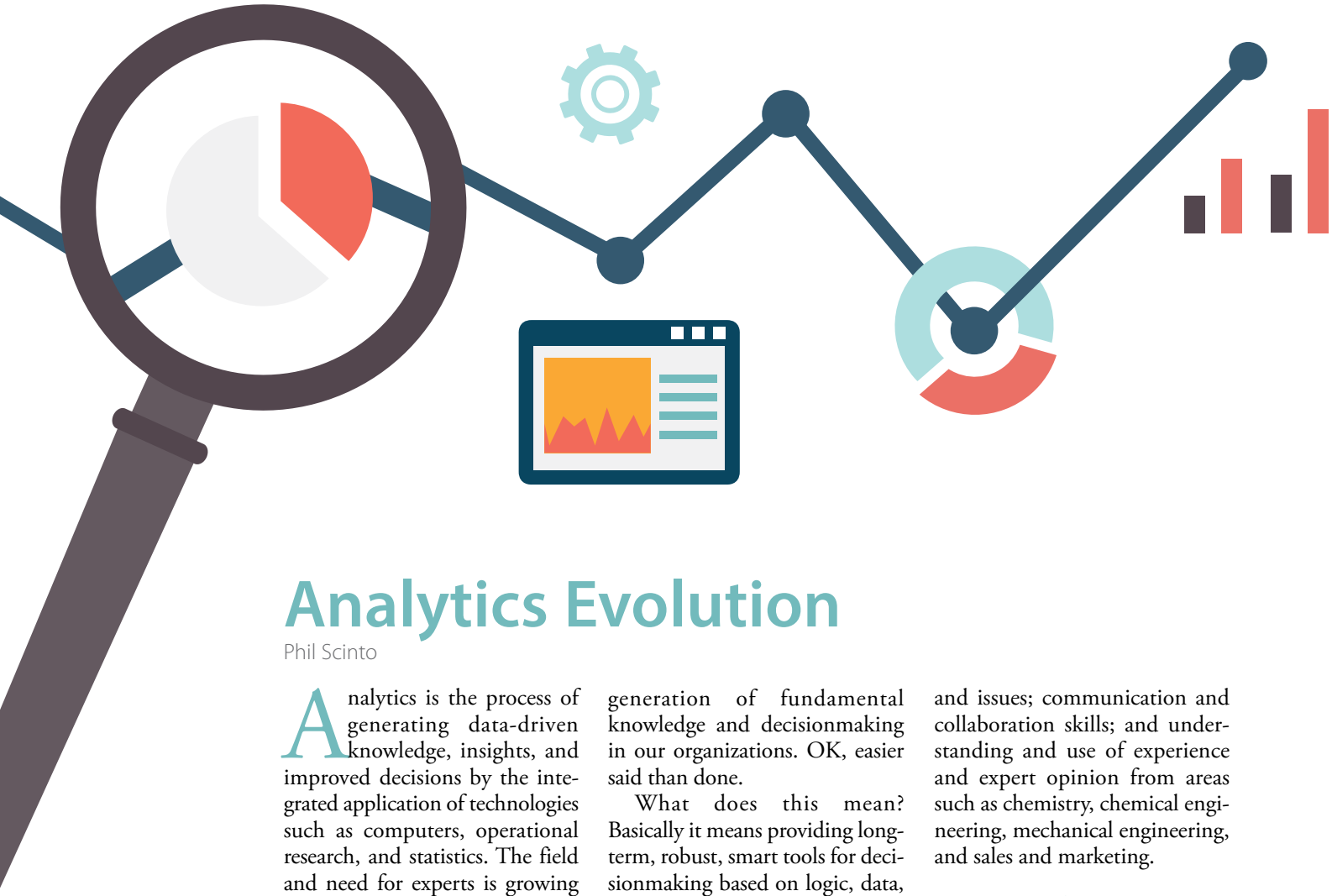


Analytics Evolution

Phil Scinto

Analytics is the process of generating data-driven knowledge, insights, and improved decisions by the integrated application of technologies such as computers, operational research, and statistics. The field and need for experts is growing due to the growth of data breadth and depth, as well as an increased pursuit of tackling complex problems to create a competitive advantage. The power of analytics lies in the concept that the whole integrated combination of technologies is more than the sum of the individual technologies.

During my almost 30 years as an applied statistician (25 of those years with Lubrizol), I have realized that an 'analytics mindset' plays an important role in my effectiveness in the physical and chemical sciences industry. Yes, I have the skills and experiences expected of a statistician in my industry; however, there is more to being a statistical consultant than designing experiments, developing regression models, estimating repeatability and reproducibility, performing analysis of variance, or creating control charts. As applied statisticians, we should strive to improve the capability and cost-effectiveness in the generation of fundamental knowledge and decisionmaking in our organizations. OK, easier said than done.

What does this mean? Basically it means providing long-term, robust, smart tools for decisionmaking based on logic, data, and subject area knowledge. It means, to have a lasting impact, the smart tool solutions must be based on cause and effect variables—rather than association variables—wherever possible.

I call myself a statistician because I have a degree in statistics and biometry from Cornell and a master's degree in statistics from Carnegie Mellon. Also, I have researched and used statistical tools throughout my career. Am I a data scientist, too? Do I practice analytics? Currently, there are many forum arguments on semantics, but I would say essentially yes. However, it has taken many years, realizations, and experiences to get to this point. My evolution into analytics was motivated by my need and desire to generate improved results for Lubrizol. In addition to my statistical toolkit and appreciation of data and algorithms, I needed to enhance my understanding of Lubrizol technology, business, and issues; communication and collaboration skills; and understanding and use of experience and expert opinion from areas such as chemistry, chemical engineering, mechanical engineering, and sales and marketing.

Preparing for a Career in Analytics in Industry

So, how does one prepare for a career as an applied industry statistician in analytics? I believe the first thing that needs to be done is a self-assessment. Can you answer yes to most of the following statements?

- I enjoy working with complex data to enhance understanding of a scientific or business problem
- I enjoy working on problems with no known solutions
- I would rather adequately solve many problems in a short period than spend a lifetime creating the perfect solution for one problem
- I would rather be good at many things, rather than great at one thing
- I have an interest in science and/or engineering

I want to know how things work

I care about the practical problems of other people

I value the experience and expertise of others outside my field

I want to create something useful for customers and consumers

I need to make an impact

If most of these statements resonate with you, then a career as an applied industry statistician using analytics is probably a good fit. However, you may change over time, and what you enjoy at 20 years old may not be the same as what you enjoy at 40. This self-assessment should be made on a periodic basis as you gain experience in school, work, and life.

Now that you know what you want to do, you need to develop and update the tools, skills, and experiences needed to make yourself effective. Note that it is much more difficult and takes more time to gain the necessary experiences than it is to learn about data analysis, data manipulation, and information systems.

Tools and Skills

The technical skills I think are necessary for an effective career in analytics include expertise in the following areas:

Methods for effectively analyzing wide data such as Bayesian model averaging, random forests, and ensemble approaches

Construction of efficient experimental designs in high dimensions (e.g., supersaturated designs)

Operations research areas such as simulation, optimization, and process monitoring

Computer science to enable data manipulation, application and web tool development, and the use of modern computer architectures (e.g., multi-core systems)

Concepts

The concepts include the following:

- Causation versus correlation and the concept of "proxy" versus "lurking" variables
- Common versus special cause variability
- Autocorrelation
- Over-fitting

Experiences

As mentioned earlier, the experience piece is the most difficult to obtain. The best way to gain experience is by practicing (working on as many projects as possible), making mistakes, and learning from those mistakes. Some of what I have learned along the way includes the following:

Understand "Proxy" versus "lurking" variable. When I graduated from school, I thought I was particularly good at modeling. My biggest strength was that I leaned heavily on subject matter, which made my models particularly robust. Throughout the years, I have learned how to make my models far more effective by looking for the "lurking" variable. Yes, the scientist could confirm that, based on theory, ingredient XYZ is better than ABC or Laboratory I yields better results than Laboratory II. And yes, I could build a great model with laboratory, time, and ingredient terms. However, I learned that such a model has a limited life because things change and I did not have terms that captured the essence of the phenomena.

Ingredient, time, laboratory, region, engine, test tube, etc. are all "proxy" variables. They represent what is really happening, but are not the root causes such as molecular structure, physical properties, temperature, speed, load, pressure, etc. I found that the more success I had in turning proxy variables into lurking variables, the more robust my model and the better my predicted results. I also have learned that sometimes it is good enough to use proxy variables for the sake of time, or in cases in which the variable is not essential to the solution.

Optimization is valuable. It is rare that finding the best solution in one dimension is useful. Typically, products need to perform across a variety of areas at the lowest cost. It is therefore important to learn to develop solutions for the entire system, rather than one particular area.

Solutions need to make sense and be easy to use and accessible. If the customer cannot access and use your solution easily, then it is not much of a solution. Your solution needs to make sense to you and your customer. Think about the problem and the solution. It all needs to make logical sense. In addition, the better your customer can understand your solution, the more likely it will be used. Solutions also should include documentation and an audit trail so improvements can be made without much rework.

Keep learning. Keep up to date on the latest philosophies, analysis techniques, and information system/software tools. I have improved my effectiveness throughout the years by learning about supersaturated design, Bayesian model averaging, regression trees, and statistical engineering. I could be doing a better job learning new methods on the data side.

Philip R. Scinto is a senior technical fellow for the Lubrizol Corporation, where he has been employed since 1989. He is also a recently named Fellow of the American Statistical Association. Scinto holds a BS from Cornell University and an MS in statistics from Carnegie Mellon University. He is known for applying innovative statistical solutions in industry, practical applied research in supersaturated designs and statistical engineering, and leadership of the ASA Conference on Statistical Practice.

Keep in mind that a career in this area is a marathon, not a sprint.

Stop being such a statistician. I do not know how else to say this. Basically, stay away from being the stereotypical statistician. Everything does not have to be perfect in a design or analysis to be useful. We can afford correlation in the variables. We can afford to build user experience into our models without hard data. We must not rely on traditional methods that do not work well with large, messy, correlated data such as *p*-values and stepwise regression. We can afford to use proxy variables so we can reduce variability in the data and discover critical root causes. We can analyze data with residuals that are not independent. We can implement a solution that is not perfect for the sake of time. We can realize we should not fall in love with our models/solutions.

What About Big Data?

I often work with extremely wide data (hundreds and even thousands of potential predictor variables). However, I have not yet found the need to work with truly Big Data in my industry. One promising area we are exploring at Lubrizol is text mining of emails and scientific reports. I think this information would be of use in setting priors for analysis of empirical data. For the sciences, in general, I think that if we can get at the root causes, Big Data should be thought of more as empirical data; however, when all we have is correlation, Big Data should be thought of as prior data with a more designed approach to test out the prior belief. Of course, in other areas where lots of data are streaming and answer timing is critical, I can see relying on unproven trends as long as those models are updated on a continuous basis.

I think Big Data has its place and is potentially very useful, but I do not believe in creating and working on Big Data for Big Data's sake. Do not fall into the trap of creating difficult problems, models, and solutions when and where easier ones are available or suffice. Also keep in mind that Big Data and Big Data analysis are not substitutes for sound logic in defining a problem, using prior information, interpreting results, verifying solutions, and developing fundamental knowledge.

Summary

If you like to solve problems, if you enjoy working with data, if you like science, and if you enjoy creating sustainable solutions for difficult problems, then a career in statistics and analytics in industry may be a good fit for you. Keep in mind that a career in this area is a marathon, not a sprint. First, you must learn the necessary technical tools and understand concepts about data. The difficult part is gaining the experiences necessary to be effective. These experiences will come with practice, a willingness to listen to the customer, a willingness to learn additional tools and techniques, and a desire to generate and create improved results for your organization. I think this potential is within all of us. Good luck! ■

The Accidental Consultant

Paul Teetor, Quant Development LLC

Losing your job is the typical reason for becoming a freelance consultant. That's what happened to me, but it wasn't exactly a straight line from ex-employee to freelancer.

Several years ago, I worked at a hedge fund whose niche was something called spread trading, exploiting small discrepancies within the financial markets. The Great Financial Crisis of 2008 brought the demise of the fund and pink slips for the employees, including me. The job market was awful, making reemployment a dim possibility.

With the gracious support of my wife, I decided to write a book on R, the statistical software system. Very fortunately, I landed a writing contract and finished the book while R was becoming a hot topic. Honestly, my motivation for writing was pretty simple. I had accumulated about 200 'recipes' for common tasks. I wanted to share them with others. I thought a cookbook would help people climb R's learning curve.

At the same time, I continued studying ways to quantify spread trading. I wrote some research papers and created a simple website where I could post my writings. The site floated near the top of Google's page rankings because, hey, who the heck writes about spread trading? I also contributed to other writer's blogs.

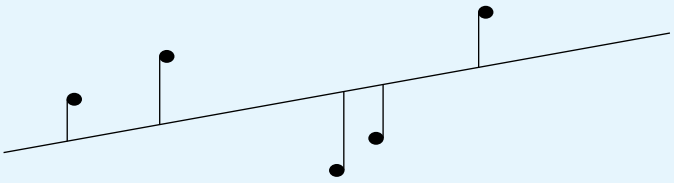
Here, too, my motivation was pretty simple. I was fascinated by the statistics of spread trading. I wanted to explore and learn. I hoped that sharing my ideas would elicit feedback from other analysts, and it did.

I also applied to give talks at conferences, I volunteered to run the local R user's group, and I responded to requests for help with R. I posted on Twitter. I contributed answers to mailing lists.

Over time, the book, the website, and my community activities acted like advertising. People could see what I knew and what I'd accomplished. From that came discussions. From the discussions came business opportunities. I began doing projects and billing for my time.

About that time, one of my job interviews came through with an offer. I had to decide between steady employment and freelance work, which was a difficult decision. I was enjoying myself tremendously, but the 'stochastic income' lifestyle of freelancing created burdens for my family and me. Ultimately, I turned down the job offer. That decision worked out well, and since then, my income has been steady enough and strong enough. (I'll mention that the potential employer was forced to lay off staff within a year. Apparently, the 'steady employment' thing was an illusion.)

Paul Teetor is a quantitative developer, specializing in analytics and software engineering for investment management, securities trading, and risk management. He is the author of the *R Cookbook*, published by O'Reilly. He works in the greater Chicago area, where he lives with his wife and sons. In his mind, he is a fabulous musician.



For students to appreciate why line of best fit is generally implemented by minimizing the sum of the squares *of the errors,* JSE *Editor Michelle Everson suggested that The University of Texas at El Paso's Lawrence Lesser write a parody of "Beat It," Michael Jackson's 1983 number-one hit that went platinum, won a Grammy, and helped make* Thriller *the best-selling album of all time. Here is Lesser's result, which incorporates a couple of suggestions from Ethan Brown.*

Square It!

They told him, don't just add the regression errors here:
The plus and minus cancel and they disappear.
So make each error positive, make it really clear—
Just square it, just square it!
Absolute value doesn't make me a fan:
A line it gives is not unique, ya understand?
And that is real tough for a software command,
So square it, you want to so bad:

Just square it (*square it*), square it (*square it*):
Get a better line of best fit!
It's the least you can do to get the best line,
It really matters how you're inclined:
Just square it (*square it*), just square it (*square it*),
Just square it (*square it*), just square it (*square it*)

Oooh! Markov and Gauss, you know that each was the man,
Showed squaring errors made a better plan.
They talked 'til they were BLUE 'bout their theorem so grand,
So square it, just square it.
Oooh! Well now we know to minimize residuals squared
'Cause other estimators really can't compare:
The coefficients' estimates are most precise there,
So square it, you want to so bad:

Just square it (*square it*), square it (*square it*):
Now derivatives can bear it!
It's the least you can do to get the best line,
It really matters how you're inclined:
Just square it (*square it*), just square it (*square it*),
Just square it (*square it*), just square it (*square it*)

Here are my recommendations for anyone considering freelancing:

Have a specialty. Clients won't hire you just because you "know something about statistics." Clients hire you because you can solve a problem more quickly and efficiently than they can. Besides, without a specialty, your only competitive advantage is to undercut other consultants, and that's the road to poverty.

Be visible. Show the world what you know. Not everyone has the opportunity to write a book, but everyone can create a website where they post their work. Include your contact information.

Get out in the world. Don't sit at home. Volunteer to help with your local ASA chapter or user's group. Apply to speak at conferences. Tell local colleges and universities you are available for adjunct work and statistical consulting. Have lunch with other freelancers in your area.

Be ready for the stochastic income lifestyle. Every freelancer faces periods without billable time. It's inevitable, such as the time between gigs. Are you financially prepared to live for three months with no income? Are you psychologically ready? It can be stressful.

Apprenticeship is necessary. Freelancing right out of school is not a good idea. Find and establish your specialty first. A possible exception is the PhD who has already demonstrated mastery of a topic. Nonetheless, all recent graduates can benefit from joining an established group in which they can learn the practical aspects of business and commercial analytics work.

Add value wherever and whenever you can. Make a difference. This is part of being visible. It's also good experience, good material for your résumé, a good source of referrals and recommendations, and good karma.

Long ago, a wise business consultant taught me the First Rule of Business: Always give more than you get. That applies double in consulting. Clients come back over and over to the consultants who provide genuine value. Clients dump the consultants who don't.

Perhaps you want to be a freelancer and you're asking yourself, "How can I find clients?" Honestly, I don't have a simple answer. But I do know that adding value wherever and whenever you can will make a difference in the world. People will notice. They will wonder how you could add value for them. Be ready to tell them. ■

So, How Was Your Day?

"You're a statistician. What exactly is it that you DO all day?"
Many statisticians are asked that question by those outside the profession. To answer, *Amstat News* asked three ASA members to give us a glimpse into their work day.

Kaiser Fung

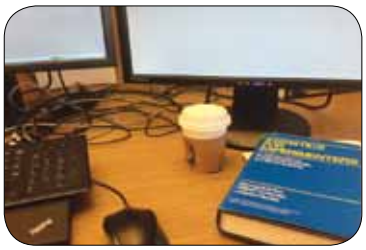
Kaiser Fung provides training and advisory services in business analytics and data visualization. He is senior data advisor at Vimeo. Previously, he held leadership roles in building and managing data teams for businesses in the entertainment, digital advertising, and financial services industries. He is the creator of the popular Junk Charts blog (*http://junkcharts.typepad.com/junk_charts*), which pioneered the genre of critically examining graphics in the media, and author of *Numbers Rule Your World* and *Numbersense*—both published by McGraw-Hill. He has an MBA from Harvard Business School and holds engineering and statistics degrees from Princeton and Cambridge. He is also an adjunct professor at New York University.

8:45 a.m. Jolted awake this morning less by the coffee I get at Chelsea Market than the new price of $2.50 a cup. "I thought you already knew," the server said apologetically. What I know is that I was paying $1.75 only a few months ago. That's a jolt of more than 40%. Incidentally, the coffee stand is situated next to an elevator labeled YOUTUBE, the 1,000-pound gorilla in the online video market that Vimeo, my employer, competes in.

9:05 a.m. Arrive at my office in the glorious IAC Building, surely one of the landmark façades of modern New York City. Chances are you have seen pictures of it.

9:10 a.m. The first order of business is to review the roster of meetings I'm supposed to attend today. For the next hour, I'll be reading and replying to emails. My inbox teems with automated notifications about our overnight data-processing programs. Our team struggles to keep up with these emails; there is never enough time to review them. In the end, most data issues are caught by encountering bad output. And yet the solution to every misstep is to set up another notification!

10:01 a.m. Scrambling to get through all the emails before the majority of the staff arrive, the lights go out and the business of movies begins. Yes, the engineering section of the floor goes dark at a set time each morning, thanks to some high-tech wizardry. I'm told this raises productivity, and I have yet to test the theory with an experiment. I reply to an email from our summer intern, who asks about preparatory reading. As a major task of the internship will be statistical testing, I give my usual recommendations: the front chapters of Box, Hunter, and Hunter and the chapter on randomization in Ian Ayres's *SuperCrunchers*. Most importantly, though, I advise him to enjoy the time off. I hope he isn't confused by the mixed message!



10:15 a.m. The manager of analytics informs the team that overnight data processing has failed due to late-arriving data from Google's display ad reporting system. Everyone reacts calmly, as this happens frequently. We wait and will restart the process when the data show up. I make a mental note: If the delay eats up our buffer, I will proactively notify the executive team that the daily report on key metrics will be tardy.

11:00 a.m. The director of testing convenes a meeting to preview the plan for the next few months. In a couple of weeks, she'll start maternity leave. I will temporarily manage the testing initiatives with the help of the summer intern.

11:15 a.m. The analytics manager confirms that the daily process has succeeded and key metrics will be available on time.

12:45 p.m. Lunch with a co-worker. I mention I am writing an article about recommendation engines. (The article, *http://blogs.hbr.org/2014/05/why-web-sites-still-cant-predict-exactly-what-you-want*, has since been published.)

1:30 p.m. For the next two hours, I am able to concentrate on an analytics project, evaluating a new source of data. I am fiddling with some sample files from a third-party vendor. These files have the tall format of the modern-day convention. There are three (nested) columns of "keys" and a column of "values." This format is simple to ingest, but tough to digest, because individuals generate a varying number of rows of data. I have been working on transposing the data to a wide format so there is one row per individual. I finish that task and move to producing summaries of the data.

2:15 p.m. I hit a snag. All the data should have been text, but a level of 118376 rears up. I size the extent of the issue and then verify that these errant values come directly from the raw files, not from an accident of my processing.

2:35 p.m. I email the account manager at the vendor, describing the problem. At this time, I have a hunch that 118376 maps to one of the missing levels, its numerical equivalent. Even though this vendor responds quickly, it will be a few hours before the problem is resolved. I am at an impasse; after the sample files are corrected, I will have to execute the transpose and other steps anew.

2:40 p.m. I turn to another branch of this project. The new data give us an aggregated view of the psychographics of our customers, but it is impossible to judge the data's value in a vacuum without a reference point. A few days ago, I asked the vendor to provide comparable data for the general Internet population.

3:30 p.m. The account manager acknowledges the 118376 issue and confirms that their engineers are correcting the data.

3:40 p.m. An hour later, I am seeing some rays of light. Yes, what sounds like a simple case of merging two data sets has vaporized 30 minutes of my day. The Internet data are found in an Excel spreadsheet. In the initial merge, I discover that labeling is inconsistent across the two data sources: A few labels contain extra words, which I remove, and an extra whitespace at the end of another label trips up the computer, which I fix. Those prove to be minor obstacles after I realize the taxonomy of the categories does not match perfectly: The Internet data reveal one extra, as well as one fewer, level than the categories extant in the sample files. I fire off another email to the vendor and, at this point, must shelve the project until I get a response.

3:50 p.m. My lunch buddy pings me on Instant Messenger promising something good. I make my way to her desk. Regarding our earlier conversation, she wants to share that Facebook has been sending her suggestions for people to friend, only the first names on the list are her ex-boyfriends! Oops. I guess Facebook has found a good algorithm to predict one's exes.

4:00 p.m. I meet with one of our analytics managers. We have been investigating a long-term trend in the traffic data. Given an observed outcome, we are looking for plausible causes. It's the idiomatic fishing expedition, but a common business problem!

5:05 p.m. The analyst and I present a progress report to the management team on the traffic investigation. We describe which hypotheses have been examined and strike off ones that fail to convince. New ideas emerge and we set up another meeting.

5:46 p.m. The vendor has a diagnosis. The errant rows of data are generated when their computer gets confused by unexpected commas inside the text field. New sample files will be available the next morning.

6:55 p.m. I am home. I make some pasta with a Bolognese ragout that was slow-cooked last week.

8:00 p.m. The second part of my day begins. I am teaching a course in business analytics at New York University the next day. I finalize the slides and upload them to the course website. The class will begin with teams of students presenting results of a cluster analysis from the prior week. I will then lecture on using decision trees for prediction.

9:30 p.m. There's still time to make a blog post. Blogging is the daily grind—it's a delicate plant that requires watering daily, and if you forget for a few days, you may have squeezed a few drops of life out of it. I open the draft of a piece about Josh Katz's marvelous maps of dialects across the United States. When I click on the button to release the completed blog post, *http://junkcharts.typepad.com/junk_charts/2014/05/how-effective-visualization-brings-data-alive.html*, my work day finally comes to an end. I make my evening coffee and relax.

Lee Richardson

Lee Richardson recently graduated from the University of Washington with a BS in mathematics and statistics. He has been working for the Institute of Health Metrics and Evaluation on the Global Burden of Disease study, in which the goal is to synthesize the world's health data into comparable estimates. He will join the department of statistics at Carnegie Mellon as a PhD student this fall.

7:55 a.m. Alarm goes off, leading to my first decision of the day. Snooze button?

8:25 a.m. Three snooze's later and I'm finally up and moving. Thankfully, my job isn't too rigid about when people arrive.

8:30 a.m. My general breakfast strategy is to throw a bunch of presumably healthy ingredients into a blender. Today: One egg, honey yogurt, strawberries, and a banana.

8:45 a.m. Shower, put on some clothes, and head to the bus stop. Luckily, my bus stop is a block away so my commute isn't very stressful.

9:15 a.m. First stop is our kitchen to grab water and coffee. Here's a look at our enormous coffee machine.

9:20 a.m. Coffee and water acquired, it's time to head to my desk to see what's on tap for the day. I keep a handwritten to-do list next to my desk at all times and never move it. This helps me both organize my tasks and keep my work duties separate from the rest of my life. Following is a list of my major responsibilities at work. This contains useful details as to what someone with a bachelor's degree in statistics can expect from a first-year job:

1. Managing our research databases
2. Writing custom programs to assist researchers model their diseases
3. Extracting, transforming, and uploading new sources of data into our research databases
4. Responding to ad-hoc tasks such as pulling specific data, creating tables and figures, etc. …

After checking Grantland for any new Zach Lowe articles, my first task is to re-run our hemoglobin custom models. We're using the Hardy Weinberg equation to estimate years lived with disability (YLDs) due to hemoglobin deficiency. Thankfully, I've done this before and I'm pretty confident my script will work again. Sometimes it's difficult to get onto our computing cluster because lots of other people are using it, but it's early enough to get my jobs through without any worries.

10:30 a.m. Hemoglobin has run without any issues! The results look reasonable, so I email the modeler to further vet the results.

Onto the next task (there's no shortage). Scanning through my email and to-do list leads me to several changes I need to make to our epidemiology database. I'm going to get into "database mode" and try to crank them all out before lunch.

11:00 a.m. More coffee.

12:00 p.m. Database mode was a success. I'm off to lunch with my friends Bryan, Chris, and Logan. We usually go to Whole Foods (along with everyone who works at Amazon) due to the vast array of options. I predictably order a burrito bowl, pay, and head back to our kitchen.

12:15 p.m. The World Cup has just started, so a ton of people are watching the opening games. The lunchroom is no exception.

12:50 p.m. Back to my ball and chain (computer) for the second half of the workday. So far, I haven't done anything too draining, so I have a good amount of mental energy left in the tank to try something a bit more challenging. I'm going to try to crank out a couple new functions that have been lingering on my to-do list. The two tasks are:

1. Write a function that compares GBD 2010-YLD results with our upcoming GBD 2013 estimates
2. Write a function that produces a table/scatterplot of GBD 2013 cause of death results for any cause specified

I'm cautiously optimistic that I can finish both by the end of the day. I usually listen to a meditation playlist on Spotify when I need to focus on completing tasks such as these.

2:00 p.m. Brief interlude to talk to the people who sit near me about the misleading web histories that come from working at the IHME. Maggie (shown at left) is working on literature extraction for STDs, so you can only imagine what her Internet history looks like.

2:15 p.m. I have a working version of the deaths function now and am going to test it on different causes to make sure it's working as advertised. Once it's fully tested, I'm going to document how to use it and pass it off to the requester. On to the Epi results comparison.

3:00 p.m. Institutional knowledge is critical to being successful in the workplace. Having spent a lot of time in our infrastructure this past year, it's much easier to hunt things down. However, since GBD 2010 was released before I arrived, I'm finding it difficult to link the results for corresponding causes in 2010 and 2013.

4:00 p.m. Debating whether I should go get a snack or wait until I get home to have dinner. Pretty classic dilemma I have faced around this time all year.

5:00 p.m. Ended up making some progress, but didn't fully figure it out. I wonder if I would have had I bought a bag of almonds an hour ago? Oh well, I'll probably think about how to finish it off tonight and crank it out first thing in the morning.

5:25 p.m. Heading home. This is probably long enough, so I will end the timeline of my day here. Hope everyone reading this has a better idea of what a first-year statistics job looks like!

Ann L. Oberg

Ann Oberg is a professor of biostatistics at the Mayo Clinic. She earned a BS in mathematics with a minor in statistics from the University of Nebraska-Kearney, an MS in biometry from the University of Nebraska-Lincoln, and a PhD in statistics from North Carolina State University. She has been at Mayo, where she collaborates in both cancer and vaccine research, since 1999. Her expertise is in study design, normalization, and analysis of data from high-dimensional platforms. She and her husband live in Minnesota with their three children.

6:00 a.m. My alarm goes off … hit snooze once … up at 6:09 a.m. Spring has finally arrived in Minnesota! It's a beautiful morning; the rooster is crowing and the meadowlarks and mourning doves are singing. We've even had a bob white around the place lately! I pour a cup of coffee (auto-brew is awesome) and hop in the shower.

6:30 a.m. Nels, my husband, is up and sharing my coffee. ☺ I go downstairs to make sure EmmaAnn, our 7th-grade daughter, is up. She is—this is her favorite day of the week because she has jazz before school. (Though Nels says it's her favorite just because the teacher brings them donuts.)

6:47 a.m. We sit down for strawberries, blueberries, and yogurt with a few Cheerios on top for breakfast.

6:54 a.m. Finish getting ready to leave and quickly wake our two boys, Sven and Sorren, so I can see them before I leave. Nels is a stay-at-home Dad. He and Sorren will take our first-grader, Sven, to school. All three wave out the window at us as we leave.

7:03 a.m. EmmaAnn and I leave for school … we are running a bit late. We chat about her track season being over and her excitement for the 7th/8th-grade dance the next evening.

7:11 a.m. Drop EmmaAnn at school and head to work. I do some memorization while in the car. I am a statistician at the Mayo Clinic in Rochester, Minnesota. One thing I like about working here is that we can live in the country, yet my commute is generally only 30 minutes door-to-door (unless I'm also dropping kids at school), and the rare 'traffic jam' slows me down by ~5 minutes.

7:34 a.m. Park in the parking ramp. Delete junk mail while walking to the office. I take the stairs to my office on the 8th floor. I haven't been good about exercising regularly ever since our 3rd child was born, but I still faithfully do stairs, a habit I started in graduate school.

7:40 a.m. In my office … get a few quick emails taken care of before heading to my first meeting.

7:52 a.m. Head across the street for my 8–10 a.m. meeting with the Vaccine Research Group (VRG). The agenda is pretty full today and includes a discussion of data from an outside vendor (the controls don't seem to have worked, so we decide to ask them to repeat the assays), a review of paper writing progress and priorities (all first authors report status and anticipated submission dates on their respective papers), and R37 grant progress report/plan discussion (the five-year report is due July 1 … we are still tweaking the aims and have to cut from 14 pages of text down to 8 before it goes in). We ran over to 10:20 (unusual), and even so, there were several other agenda items we didn't make it to.

At the computer: Rick
Around the table, from left: Hannah, Sapna, Bob, Inna, Caroline, Jon, Diane, Greg, Iana, Shane

10:26 a.m. Back in office. Answer a few emails. Gather materials for a couple of meetings this afternoon. Set a date to talk next week with Vera, a colleague with expertise in trial design, to discuss adaptive clinical trial designs and whether any of the principles would be applicable to the biomarker screening setting. (That's one of the things I love about working at Mayo. We have one of the largest statistical groups in the nation and people are very collaborative and willing to discuss ideas.) Send agenda for my 1 p.m. conference call.

10:57 a.m. Bill, an MS statistician I work with, arrives for our 11 a.m. conference call. We sign on to talk with Mike, a collaborator in Arizona who works at TGEN and is affiliated with Mayo on our Arizona campus, about a grant for one of the National Cancer Institute's Provocative Question RFAs. We need to finalize details for a couple of the experiments he is proposing. We discuss the hypotheses, sample size/power, and whether existing tissue microarrays (TMAs) will have the proper patient population for his study.

11:59 a.m. Bill and I discuss action items after the call. He will do power calculations and first draft of stat methods, then send to me. He'll also pull the patient summaries for the TMAs. (Our statistical group works in teams here at Mayo. The pancreas group is large enough that we have portions of a PhD statistician [me], two MS statisticians [of whom Bill is one], and a statistical programmer analyst—typically a BS-level statistician.)

12:08 p.m. Oof! Two voice mails and a text from Nels that I hadn't seen between meetings. Surprise! He's in town with our 5-year-old son. Can I have lunch with them at Thursday's on First? (They block off a couple of blocks on First Street every Thursday during the summer for street vendors, farmer's market, and music. It's the first one of the year! Yay!) I don't have much 'work time' today to get things done, but can't turn them down. Good thing I have a lot of meeting-free time tomorrow!

12:58 p.m. Back in the office and get set up for the next call. It's with Brett from the University of Tulsa with whom we collaborate on one of the VRG grants. Diane, master's statistician for the VRG, arrives for the call. We discuss the status of some gene modules Brett has been developing for our mRNA SEQ data, a draft of a manuscript we are working on, and ways to get him involved in some of the other VRG projects.

1:56 p.m. Sign off the conference call and head across campus for the biomarker conference call. Even though it's nice outside, I walk through the subway since it's faster and I'm running a bit late. Someone is playing the piano that sits in the Gonda building atrium. Patients and community members frequently come to play for people walking by, and it always makes me smile.

2:07 p.m. Arrive for the pancreas cancer biomarker collaboration conference call. They've already started the call. (I frequently have back-to-back meetings and seem to be chronically late!) In addition

to the collaborators, we have a PhD epidemiologist (Gloria, who leads our pancreas group), an MD (Rob), and two statisticians (Bill and me) on the call. The discussion is focused on how to design the next set of studies for some promising cancer markers. This includes re-discussion of the target population, types of controls in light of that, balancing sample size, and assay cost. The collaborators are new to pancreatic research, and the insight of Rob, who treats this patient group, is invaluable in thinking about patient characteristics.

From left: Ann, Gloria, Bill, Rob

3:01 p.m. The conference call is ended. Gloria, Bill, and I stay for another 25 minutes or so and finalize sample selection details.

3:27 p.m. Since I have a 4 p.m. meeting on this end of campus, I find a place to sit and read a portion of a manuscript, rather than going back to my office.

4:00 p.m. I arrive for the last meeting of the day (finally on time) with the PI of the Mayo Clinic Ovarian SPORE grant and the core directors. We will be resubmitting our renewal application this fall. We discuss the timelines and potential obstacles, make sure core leaders are hearing from project leaders, etc. Fortunately, this is a great group of people to work with and the investigators are very collaborative (I find this is in general true of people at Mayo). Communication is already going and no major obstacles are foreseen.

4:47 p.m. We finish a bit ahead of schedule, so I head back to my office. I walk outside this time!

4:56 p.m. Back in the office. Go through emails from the day.

5:20 p.m. Head for home. More memorization work in the car.

5:51 p.m. Arrive home. The family is already eating because Sven, our first grader, has soccer practice at 6:30. So I hurry to change and get to the table. Cheeseburgers, salad, and grilled asparagus from the neighbor's garden—yum!

6:10 p.m. Sven is scrambling to find his missing soccer socks … can't find them so he'll wear big sis's socks (good thing they aren't pink). I stay home for the first time all week (end of school always seems so busy with extra evening activities) and clean up after supper. Then EmmaAnn, Sorren, and I get the flowers I bought a week ago potted for the deck. And we finish just before the rain! It's a fun evening with them.

8:13 p.m. Nels and Sven return from soccer about the time it starts raining. The rain is light, so we go look at the garden. Much of it has sprouted, but only ~1/3 of the sweet corn is up … looks like we'll be re-planting this weekend! There is a beautiful sunset in progress, so we walk up by the corncrib for a better view.

8:55 p.m. Nels lets me do a bit more outside while he puts the kids to bed. We try to get them down by 8:30, but it's hard to come in that early this time of year since it stays light so late. Good thing there is only one more day of school left this week! Nels and I chat; it's always good to regroup after a busy day. The soccer socks were discovered at bedtime … in Sorren's drawer! (One con of having a 5 and 8 year old put away laundry!)

9:13 p.m. Nels searches for cabins for our summer vacation. I have some manuscripts I should read for work, but I pick up a book that's been captivating my attention instead.

10:11 p.m. I finish the book. I'm liberated! ☺ Kennel the dog. Get ready for bed. Crash around 10:30. ■

National Academy Baker Award in Statistics/Machine Learning

For this year only, the U.S. National Academy of Science William O. Baker Award for Initiatives in Research will be made in the field of statistics and machine learning.

Formerly the NAS Award for Initiatives in Research, the award will recognize innovative young scientists and encourage research likely to lead toward new capabilities for human benefit. The award is to be given to a resident of the United States, preferably no older than 35. The recipient will be awarded a $15,000 prize.

The deadline for nominations is October 1. Information about how to submit a nomination can be found at *www.nasonline.org/about-nas/awards/how-to-nominate.html*. Questions may be directed to *awards@nas.edu*.

California

■ Will collaborate with internal and external thought leaders in the design, analysis, reporting, and publication of studies associating genomic data with clinical outcomes in patients from controlled clinical trials and observational studies in oncology. Candidate should have experience analyzing high dimensional data, 8 years of relevant work experience in academia/industry, and survival analysis methods. Requires a PhD in biostatistics/statistics with SAS programming skills. *www.Click2Apply.net/nhhf53w*. EOE.

Delaware

■ Senior Research Biostatistician, Nemours Center for Healthcare Delivery Science, Wilmington, Delaware. Join the Nemours Center for Healthcare Delivery Science's CHDS: *www.nemours.org/pediatric-research/area/health-care-delivery-sciencee.html*) team of core investigators and develop a biostatistics section within the CHDS. Doctoral degree in biostatistics or closely related field and five years of related postdoctoral experience required. Send CV to Greg Stets: *gstets@nemours.org* or apply online: *http://careers.nemours.org/jobs/57067*. EOE.

Maryland

■ Seeking PhD/experienced master's statisticians for Center for Devices and Radiological Health, FDA, HHS in Silver Spring, MD. Grapple with rich array of statistical issues in clinical trials for new technologies, from LASIK and artificial hearts to genetic tests and robotic surgery. Review statistical design/analysis issues in medical devices from invention to postmarket. Email CV to Greg Campbell, *greg.campbell@fda.hhs.gov*. Identify residency/visa status in application. *www.fda.gov/cdrh/index.html*. FDA is a smoke-free environment and an Equal Opportunity Employer.

Massachusetts

■ One and a half year visiting assistant professor position in statistics, with possible one year renewal, beginning 1/1/2015. Amherst College is a private liberal arts college with a teaching load of two courses per semester. Applicants must hold a PhD

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Rates: $320 for nonprofit organizations (with proof of nonprofit status), $475 for all others. Member discounts are not given. For display and online advertising rates, go to *www.amstat.org/ads*.

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NC STATE UNIVERSITY **Department of Statistics**
Tenure-Track Assistant and Associate Professor Positions

The Department of Statistics at North Carolina State University seeks to hire two tenure-track professors to begin in August 2015.

The first position is at the assistant professor level. We seek individuals with strong potential to excel in teaching and to develop an independent research program, preferably with an emphasis on big-data applications. This position is partially funded by the College of Agriculture and Life Sciences, and thus the applicant is expected to collaborate with scientists from the ecological and agricultural sciences. To apply, please visit http://jobs.ncsu.edu/postings/39816.

The second position is at the assistant or associate level. Applicants may have interest in theoretical or methodological research in any area of statistics, but high priority will be given to individuals with strong computational skills, interest in high-dimensional data analysis, and ability and desire to supervise graduate student research. Excellence in teaching is also a key expectation. To apply, please visit http://jobs.ncsu.edu/postings/39456.

The Department provides a dynamic environment for teaching, research and collaborations across disciplines. Inclusiveness and diversity are academic imperatives and thus are university goals. We are particularly interested in candidates who have experience working with students from diverse backgrounds and 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 National Institute of Statistical Sciences (NISS) and the NSF-funded Statistical and Applied Mathematical Sciences Institute (SAMSI), both located nearby in Research Triangle Park.

All applicants must have a Ph.D. in Statistics, Biostatistics or relevant field by the time of employment. Processing of applications will begin December 1, 2014, and continue until the position is filled. Questions about the position may be directed to the Search Committee Chair, Brian Reich (stat_search@stat.ncsu.edu).

NCSU is an equal opportunity and affirmative action employer. In addition, NC State University welcomes all persons without regard to sexual orientation or genetic information.

in statistics or a closely related field and a commitment to excellence in research and undergraduate teaching in statistics. Submit application via MathJobs.Org by 9/15/2014. *math.jobs.org*. Amherst College is an equal opportunity employer and encourages women, persons of color, and persons with disabilities to apply. The college is committed to enriching its educational experience and its culture through the diversity of its faculty, administration, and staff.

■ Assistant Professor of Statistical and Data Sciences. The program in statistical and data sciences at Smith College invites applications for a tenure-track assistant professor to begin fall 2015. PhD in statistics, biostatistics, or closely related field, and evidence of teaching and research excellence required. For more information and to apply, visit *http://apply.interfolio.com/25478*. Apply by November 15, 2014, for full consideration. EO/AA/Vet/Disability Employer.

Nevada

■ The School of Community Health Sciences at the University of Nevada, Reno is seeking a candidate for a nine-month, tenured track position in biostatistics at the rank of assistant professor. Engage in research projects; teach successfully in graduate and undergraduate programs; provide statistical consultative support; engage in development. To apply and for more information, please visit: *www.unrsearch.com/postings/15541*. The University of Nevada, Reno is committed to Equal Employment Opportunity/Affirmative Action in recruitment of its students and employees and does not discriminate on the basis of race, color, religion, sex, age, creed, national origin, veteran status, physical or mental disability, and sexual orientation or genetic information, gender identity, or gender expression. The University of Nevada, Reno employs only United States citizens and aliens lawfully authorized to work in the United States. Women, under-represented groups, individuals with disabilities, and veterans are encouraged to apply.

New Jersey

■ The department of information systems and supply chain management at Rider University invites applications for a tenure-track faculty position, with emphasis

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Department of Applied and Computational Mathematics and Statistics

Assistant, Associate or Full Professor of Statistics

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ACMS includes research groups in applied mathematics, statistics and computational science. The current fourteen faculty members have research interests in Bayesian statistics, statistical bioinformatics and high-dimensional data, finance, statistics in networks and Big Data, multiscale modeling of blood clotting and biofilms, mathematical modeling in cell biology and tumor growth, MEMS, and numerical and computational algorithms and computational neuroscience. ACMS offers a Bachelor of Science, a doctoral degree, a research masters degree and a professional masters degree. ACMS is a member of the College of Science.

The successful applicant must have a doctorate in statistics, biostatistics or a closely related field, and a record of success in both research and teaching. The teaching load in ACMS is 3 courses per year, and the position begins in August 2015. Applications received by December 1, 2014 will be given full consideration.

Applications, including a cover letter, curriculum vitae and research and teaching statements, should be filed through MathJobs (www.MathJobs.org). Applicants should also arrange for at least three letters of recommendation to be submitted through the MathJobs system. These letters should address the applicant's research accomplishments and supply evidence that the applicant has the ability to communicate articulately and teach effectively. Senior faculty are invited to contact the Department Chair, Steven Buechler, at buechler.1@nd.edu, at any time.

Notre Dame is an equal opportunity employer, and we particularly welcome applications from women and minority candidates.

acms.nd.edu

DREXEL UNIVERSITY School of Public Health

Drexel University School of Public Health invites applications for the position of Chair and Professor in the Department of Epidemiology and Biostatistics.

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on applied statistics and data analytics. Applicants should possess a PhD in a related discipline by September 2015 and demonstrate potential for excellence in both teaching and research. For more information on this position and application instructions, please visit *www.rider.edu/hr*. Position 311202. AA/EOE.

Pennsylvania

■ Tenure-Track/Visiting. Department of Statistics, Carnegie Mellon University, Pittsburgh, PA. Possible tenure-track and visiting positions. Collegial environment emphasizing disciplinary and cross-disciplinary research and teaching. All statistics areas welcome. Joint appointments possible with other units in Pittsburgh area. See *www.stat.cmu.edu/faculty-search* or email: *hiring@stat.cmu.edu*. Apply online: *https://webapps.cs.cmu.edu/FacultyApplication/Statistics*. Application screening begins immediately, continues until positions close. Women and minorities encouraged to apply. AA/EOE.

■ Assistant/Associate Teaching Professor. Department of Statistics, Carnegie Mellon University, Pittsburgh, PA. Teaching professor, rank (assistant, associate or full) to be determined. This position emphasizes teaching, student advising, curriculum development, and supervising collaborative research projects. PhD in statistics, biostatistics or related area required. See *www.stat.cmu.edu/faculty-search* or email *hiring@stat.cmu.edu* for more details. Apply online at *https://webapps.cs.cmu.edu/FacultyApplication/Statistics*. Application screening begins immediately, continues until positions close. Women and minorities are encouraged to apply. AA/EOE.

■ Temple University, Research Data Manager. Provide professional-level research support for several research studies in the discipline of public health. This is a grant funded position. Qualifications: bachelor's degree in the social sciences, health services research, public health, biostatistics, or related field and at least three years of experience directly related to data cleaning and data management. To apply: visit *www.temple.edu*, job# TU-17927. ■

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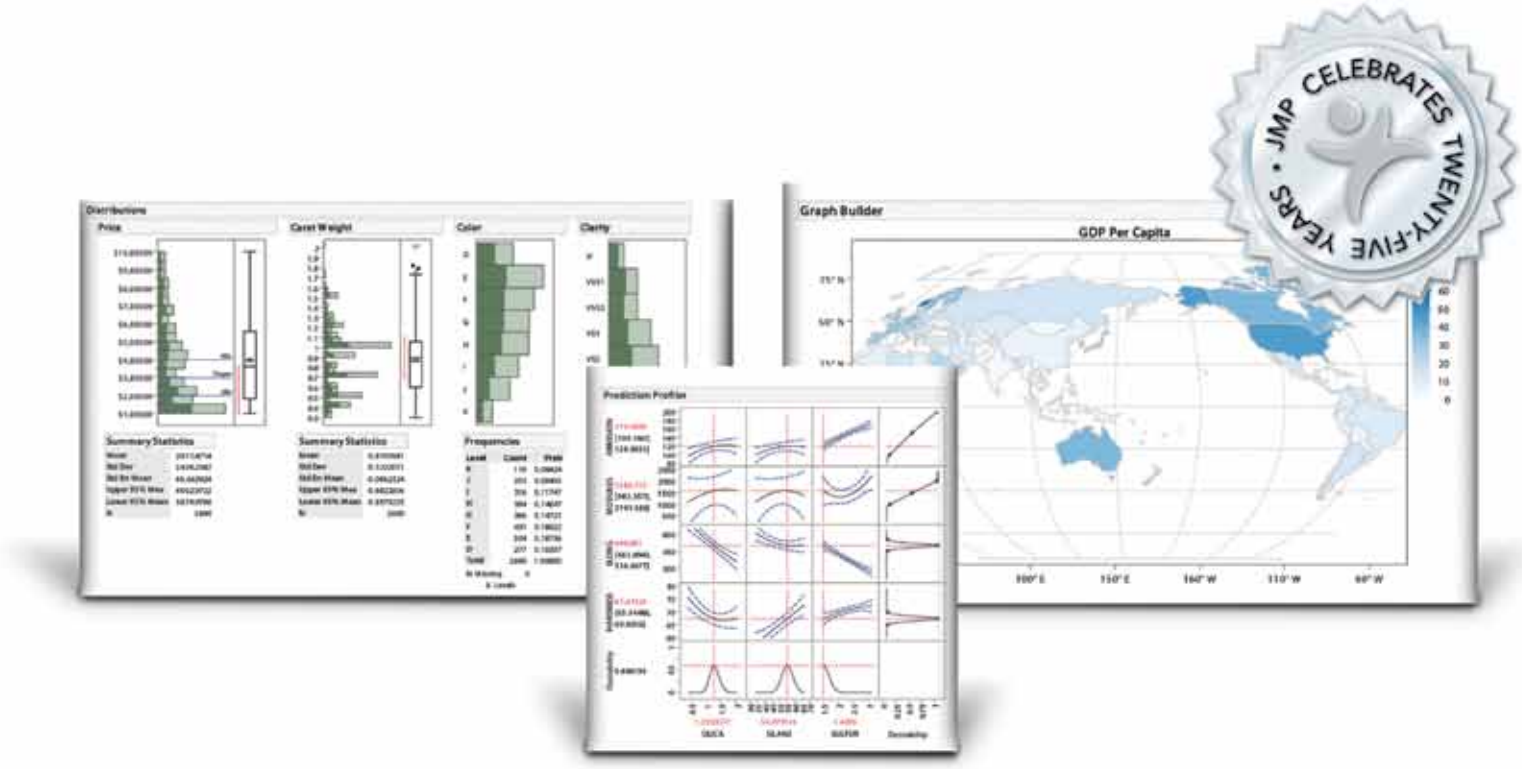

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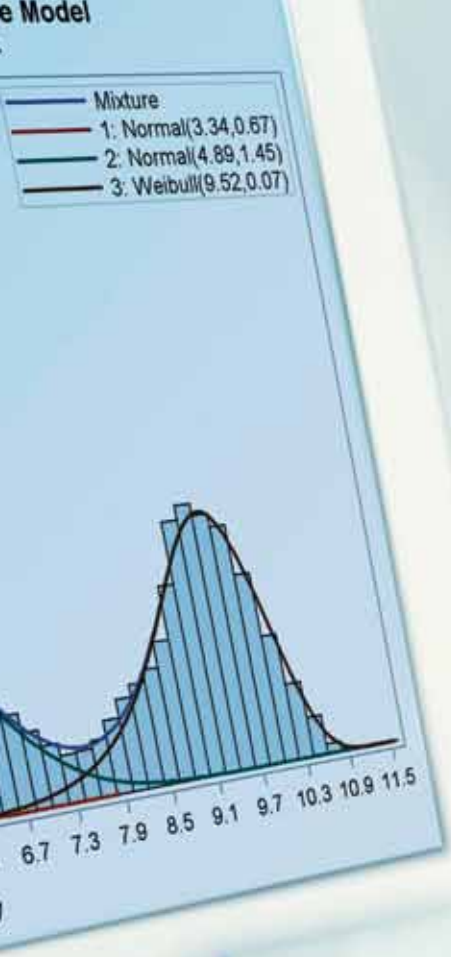

Statistics

Two releases of SAS/STAT® software this year means even more statistical capabilities. Highlights include:

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