

INVITED PAPER/TRABAJOS INVITADOS

THE INTERNATIONAL YEAR OF STATISTICS, THE AMERICAN STATISTICAL ASSOCIATION, AND A NEW COLLABORATION

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ABSTRACT

The year 2013 was designated as the International Year of Statistics, a world-wide recognition of the discipline of statistics and its contributions to science and society. The American Statistical Association is one of five statistical societies involved in the conception, planning, and coordination of the International Year celebration. In the spirit of the International Year, which recognizes the global importance of statistics, a delegation of American Statistical Association members visited Havana in May 2013 with the goal of forging ties between statisticians in the United States and Cuba. We provide an overview of the American Statistical Association, the International Year of Statistics, the experience of the delegation, and goals for future interactions.

KEYWORDS: American Statistical Association delegation to Cuba; Research collaborations; Statistics2013; University of Havana.

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RESUMEN

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1. INTRODUCTION

Statistics is the science of learning from data, and of measuring, controlling, and communicating uncertainty in findings from data (Davidian and Louis, 2012). Statistical science is critical to scientific advances, providing the framework for designing experiments and for conducting other studies in fields from astronomy to agriculture to biology to engineering to medicine and interpreting the data the result. Statistical science is equally important to advances in society. Statistical methods are the basis for population censuses, economic analyses and forecasts, and environmental studies that provide information to government decision makers. Developers of pharmaceutical products use statistics to design studies to determine whether or not an experimental new product is as good as what is currently available, and government agencies that regulate such products rely on statistics to assess the quality of the evidence from such studies in determining whether or not the product should be made widely available. Statistical science has even been used in sports such as baseball to predict player performance. Undeniably, then, statistics is fundamental to science and to society. However, historically, much of the public across the globe has been unfamiliar with the important contributions of statistics. To many people,

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statistics is a course they were forced to sit through in college, and a course most found boring at best and mystifying at worst. The public, and in fact many scientists, are too often unaware of the relevance of statistics to their daily lives and work.

During the last decade, with the development of new technologies and computational power, there has been a veritable explosion in the amount of data that can be collected, manipulated, stored, and analyzed. For example, in the biomedical sciences, rapidly evolving technologies have led to the ability to sequence the entire human genome and the prospect of using these vast data to guide understanding and treatment of disease. The internet has been key; search engines such as Google and social media sites like Facebook lead to massive amounts of continually streaming data. Across the globe, there has been increasing excitement over the possibility of tapping these so-called “Big Data” to inform decision making and understanding.

These developments emphasize more than ever the importance of statistical science. And, indeed, there has been increasing recognition of this importance. For example, in 2009, Hal Varian, the chief economist at Google, made the now-immortal observation to the New York Times that “I keep saying that the sexy job in the next 10 years will be statisticians. And I'm not kidding.” (Lohr, 2009). Since then, numerous accounts highlighting the need for more statisticians presented by the “data deluge” have appeared in popular and scientific media across the globe (e.g., Bialik, 2012, 2013; Hardy, 2012; Teitell, 2012; Walker, 2013). The 2012 presidential election in the U.S. placed the spotlight on the power of statistics when Nate Silver, founder of the popular FiveThirtyEight blog, predicted the outcome perfectly in each of the 50 U.S. states using statistical modeling of polling data and wrote a best selling book on the importance of statistical thinking (Silver, 2012), becoming an international sensation as a result. Despite these reports in the media, the broader contributions of statisticians to all facets of science and society are still relatively unknown to much of the general global public.

Simultaneously, the challenges posed by this new data-driven age will demand a much larger statistical workforce, and students must be made aware of the opportunities and excitement presented by the study of statistics and be encouraged to pursue training and careers in the field.

Fortunately, statistical professional societies have long embraced this challenge. The American Statistical Association (ASA), the largest professional society for statisticians in the world, has for decades been a leader in advocating for the importance of statistics in science and society. In Section 2, we present a brief overview of the ASA and its strategic activities to promote statistical science.

Several years ago, some leaders of the ASA and several other statistical societies had the vision to join forces to bring global recognition to statistical science. This led to the timely event of the year 2013 being designated as the International Year of Statistics. In Section 3, we provide an overview of the International Year and the story behind it and describe the extensive outreach efforts conducted under its auspices toward the objective of enhancing public understanding of the contributions of statistical science.

The International Year of Statistics recognizes that statistics is truly a global discipline. Statistical scientists across the globe must join together to advance the discipline so that it keeps pace with the new challenges posed by this unprecedented era of data and scientific discovery, to raise awareness of statistics as a profession to students, and to broaden understanding among the public and decision makers of its contributions. In this spirit, a delegation of ASA members visited Havana for one week in May 2013 to initiate connections between statisticians in Cuba and the extensive community of statisticians in the U.S. We present the background for this landmark interaction and describe the visit from the point of view of the U.S. delegation members in Section 4 and discuss possibilities for the future in Section 5.

2. THE AMERICAN STATISTICAL ASSOCIATION

The ASA is the second oldest continuously-operating professional society in the U.S., founded in Boston, Massachusetts, in 1839. (Only the American Philosophical Society, founded by Benjamin Franklin in 1743, is older.) The ASA is the world’s largest community of statisticians, with close to 19,000 members who work in academia, government, and industry, including 4,000 members who are students. In fact, ASA members reside in over 90 countries, so that the organization is invested in the interests of not only statisticians in the U.S. but globally. The ASA website, www.amstat.org, presents extensive information on the association and its activities.

The ASA is committed to supporting excellence in the development, application, and dissemination of statistical science. The association does this through meetings, publications, membership services, education, accreditation, and advocacy for the profession of statistics. The ASA is the managing partner society of the Joint Statistical Meetings (JSM), sponsored by five founding societies and additional partner organizations. Held annually, the JSM is the largest gathering of statisticians in the world, routinely

attracting close to 6,000 participants. The ASA also sponsors the Conference on Statistical Practice directed toward the needs of practitioners. Groups within the ASA sponsor additional meetings focused on various specialties, alone or in partnership with other organizations.

The ASA publishes some of the world's top scholarly journals focused on statistics, including the Journal of the American Statistical Association, Journal of Business and Economic Statistics, Statistics in Biopharmaceutical Research, Statistical Analysis and Data Mining, The American Statistician, and Journal of Computational and Graphical Statistics. It also publishes a monthly membership magazine, the Amstat News, and, jointly with the Royal Statistical Society (RSS) in the United Kingdom, Significance, an international outreach magazine that promotes the statistics profession.

The ASA is a major advocate in the U.S. for the inclusion of statistics and data analysis in decision making by government and industry. The U.S. has numerous statistical agencies across the government (as opposed to having a single, centralized statistical agency), and the ASA supports and advocates for the activities of these organizations. The ASA promotes proper application of statistics and works for improvement and innovation in statistical education at all levels. The association is also offers accreditation for professionals who are skilled practitioners of statistics. Finally, the ASA serves the needs of its members through continuing professional development opportunities; and recognitions of achievement, such as awards and the designation of ASA Fellow.

Ultimately, the ASA's mission is to advance the statistics profession and promote the use of the discipline to enhance human welfare.

The ASA is governed by a 16-member Board of Directors, of whom 14 are elected by the general membership, including the president, past president, president-elect, several vice presidents, and representatives of various bodies within the association. Two members, the treasurer and the executive director, are appointed; the executive director is an employee of the association and is responsible for overseeing implementation of the Board's directives and managing the association's staff. The current executive director, Ron Wasserstein, a former academician, has served in this role since 2007.

The association is organized into sections, chapters, and committees. Sections are subject-area interest groups covering 27 specialties, including Bayesian statistical science, biometrics, biopharmaceutical statistics, government statistics, health policy, nonparametric statistics, risk analysis, physical and engineering sciences, social sciences, statistical computing, statistical education, imaging, statistical learning and data mining, survey methods, and many more. Chapters are arranged geographically, representing 78 areas across the U.S. and Canada. The ASA also has more than 60 committees that coordinate and advise on meetings, publications, education, career development, and special-interest topics involving statisticians.

The ASA has a strategic plan that addresses areas of importance to the vitality of the association and its members. It was most recently revised in December 2012 and focuses around two main themes: The ASA as "The Big Tent for Statistics" and Increasing the Visibility of the Profession. The first theme is devoted to positioning the ASA as an organization that serves the needs of all who practice and study statistical science, and has sub-themes for membership growth, meetings, publications and information needs, and maintaining the financial status and organizational efficiency of the association. The second is centered on enhancing public awareness, visibility and impact in policy making, and education, and hence speaks directly to the issues raised in Section 1.

3. THE INTERNATIONAL YEAR OF STATISTICS

It is difficult to point to one milestone event that led to the International Year of Statistics. The idea of staging a recognition of the contributions statistical science was in the minds of many in the profession for some time. However, there was no coordinated, global attempt to act on this idea until recently. In 2010, the United Nations Statistical Commission declared the FirstWorld Statistics Day on 20 October. Since then, numerous countries have celebrated a national Statistics Day. The goal of World Statistics Day was to recognize the importance of statistics in shaping societies.

However, the focus was mainly on the role of official statistics and national statistical agencies and systems as opposed to the profession and discipline more broadly. Moreover, a single day recognition, while notable, can only go so far to promote the contributions of a field, the professional opportunities it affords, and its impact on all of science and society.

Many other sciences have attempted to achieve this broader exposure through an entire year of recognition. For example, the world chemistry community designated 2011 to be the International Year of Chemistry and mounted a worldwide outreach campaign to promote that discipline.

The catalyst for concrete action toward an International Year of Statistics is in fact purported to be this effort by the chemistry community. Sastry Pantula, 2010 ASA president, was also the head of the department of Statistics at North Carolina State University. At a department head's meeting in 2009, he

heard about the chemistry effort, and the idea to push for a similar initiative by the statistical community was born. He immediately contacted ASA Executive Director Wasserstein, and they in turn reached out to leaders of several other statistical societies, from whom they received an enthusiastic reception. Six societies (the ASA, the Institute of Mathematical Statistics (IMS), International Biometric Society (IBS), International Statistical Institute (ISI) and the Bernoulli Society, and the RSS) agreed to



Figure 1. International Year of Statistics logo.

collaborate on the idea, and settled on 2013 as the target year. This choice gave enough of a time horizon to undertake what would undoubtedly be a major effort.

Moreover, 2013 is the 250th anniversary of the posthumous reading of an essay by Thomas Bayes to the Royal Society in the United Kingdom in which the first formal statement of Bayes' Theorem was presented, providing some statistical context for the choice.

A steering committee of nine representatives from these societies was convened and immediately began planning. A website was established at which materials could be posted and ideas could be shared with members of the statistics community. During the planning and development phase, this website was not publicly accessible, but the plan was that it would be developed into a public portal for the International Year that would go live at the start of 2013.

The steering committee worked tirelessly to conceive the website design, content, and scope; design a logo (see Figure 1); recruit members of the profession to identify and develop resources about the discipline, statistical education, and so on that could be posted or linked on the site; and encourage organization across the globe to endorse the effort.

The International Year of Statistics, also referred to as Statistics2013, was introduced to the public on 1 January 2013 with the unveiling of the official website, www.statistics2013.org.

The site features extensive informational and educational materials and links for the public, the media, and teachers worldwide, and is updated almost daily (the ASA has major responsibility for maintaining the site). Resources for teachers, career information, videos, blogs, and more are available. Organizations across the globe were invited to sign on as participating organizations, of which there are now over 2,000, including professional societies, universities, research institutes, government agencies, and businesses. All are dedicated to promoting the importance of statistical science to fellow scientists, governments, the media, industry, students, and the public. The website includes a list of events affiliated with the International Year, including conferences, workshops, and courses.

In November 2013, a capstone event, the Future of the Statistical Sciences Workshop, was held in London. The goal was to bring together leading statistical scientists from across the globe to chart a vision for the future of the discipline in this age of unprecedented data.



Figure 2. International Year of Statistics banners at SAS Institute.

A report summarizing the conclusions is forthcoming. By all accounts, the International Year is a resounding success. The Year has been highlighted in numerous media reports (e.g., Bialik, 2012; Walker, 2013) and has inspired broad recognition of the field. SAS Institute in Cary, North Carolina, in the U.S., the company that created SAS statistical software, posted banners along the main road on its extensive campus celebrating Statistics2013 (Figure 2). The Huffington Post, a widely-read online news source, features a blog on statistics sponsored by the ASA at <http://www.huffingtonpost.com/news/american-statistical-association>; the first entry (Davidian, 2013) publicized the International Year and encouraged readers to learn more about statistics.

Discussions are ongoing on strategies for maintaining the

website in perpetuity ASA Delegation to Cuba

In 2010, the ASA was approached by an organization that has facilitated people-to-people trips for several decades about the possibility of taking a delegation of members abroad. The ASA leadership discussed this possibility and decided that it would provide the association a unique opportunity for outreach. As a result, since 2010, each ASA president has led a delegation to a different country with the goal of forging ties with the statistical community and achieving greater understanding of the role of statistics and statisticians in nations outside the U.S. In 2010, Sastry Pantula led a delegation to China; trips to Israel and Russia followed in 2011 and 2012.

As 2013 president, I had the privilege of selecting a country to visit. For some time, I had heard from colleagues in Europe and South America about the long tradition of scholarship in mathematics and statistics in Cuba. From 2006 to 2011, Geert Molenberghs coordinated a Cuban-Flemish outreach program through the Center for Statistics (CenStat) at Hasselt University in Belgium focused on introducing biostatistics training and research at the University of Havana, in collaboration with biotechnology institutes in the Havana region. This project resulted in the creation of the Masters program in biostatistics administered by the University's Faculty of Mathematics and Computer Science, which has already graduated a number of students. Clarice Demetrio, 2012-2013 president of the International Biometric Society, who has given short courses in Havana, also spoke highly of the statistical activity in Cuba.

Because of the political situation between Cuba and U.S., an ASA delegation to Cuba was considered controversial by some ASA members. However, given the easing of restrictions governing U.S. citizens' travel to Cuba by the U.S. government in 2011, such a trip would be possible. Moreover, outreach to a statistical community keen to initiate more global collaborations seemed consistent with the global spirit of the International Year of Statistics.

Academic Travel Abroad (ATA), a U.S. organization with over 50 years of experience arranging educational travel, was chosen to coordinate the trip. The trip was announced to ASA members, and there was considerable interest in the U.S. statistical community, and the ASA received many inquiries. In the end, 17 ASA members signed up to participate. It is worth noting that each participant was responsible for his or her own funding; as with all such delegations, no ASA funds were used to support the trip. Because the trip included all travel to Cuba, accommodations, most meals, guide/translator and bus, and all necessary visas and licenses, the costs were unfortunately too high for some additional ASA member who wished to participate.

ATA began working with Amistur, the Cuban people-to-people agency responsible for coordinating the program. The ASA delegation members communicated their interests and goals, which would help shape the program, requesting exposure to how statisticians are trained; their research; how they are involved in government, public health, and health care; and opportunities for collaboration. ATA worked with members of the Cuban statistics and mathematics community, including Luis Ramiro Piñero, Carlos Bouza-Herrera, and Pedro Valdés-Sosa, among many others, to develop a four-day agenda of systematic presentations, tours, and meetings covering all of these areas.

On Sunday, May 19, the 18-member delegation departed Miami for Havana. Members included a number of academicians, statisticians from the U.S. Food and Drug Administration, the U.S. National Institutes of Health, Google, and the U.S. Census Bureau (retired), and a statistics PhD student. Many of the members work in health sciences research and had particular interest in learning about activities of statisticians in Cuba in this area.



Figure 3. The ASA delegation at the University of Havana.

The first full day of the visit was spent at Casa de la Amistad. The morning featured presentations by faculty at the University of Havana on statistical education and methodological research programs, including the Masters programs in biostatistics and statistics and the PhD program, and on biostatistics training for health professionals. These were followed by presentations by delegation members on the ASA and the International Year and the background and interests of each delegation member. That afternoon, the delegation visited the University and the mathematics and statistics facilities (Figure 3).

The second day, also at Casa de la Amistad, featured presentations on the activities in the area of public health. These included overviews of the roles of statisticians in the Institute for Tropical Medicine; the Animal

Sciences Institute and other agricultural centers; the Institute for Cybernetics, Mathematics, and Physics; the Center for Medical Genetics; and the clinical research programs at Havanas Hermanos Ameijeiras General Hospital.

On the third day, the delegation traveled to the so-called Scientific Pole in the western part of Havana, home to a cluster of biomedical and biotechnological research institutes.

At the Center for Molecular Immunology (CIM), presentations were given on clinical and bioinformatics research by statisticians at the CIM, the Genetic and Biologic Engineering Center, the Neuroscience Center, and the National Coordinating Center of Clinical Trials.

That afternoon, the delegation visited the the University's Center of the Study of Demography (CEDEM) and the National Statistical Information Office for presentations on Cuba's demographic, economic, and public health characteristics and were provided with provided statistical reports on Cuba's population and resources.

The final day took place at Casa de la Amistad. A full morning of unstructured interchange took place between delegation members and virtually all Cuban statisticians who participated in the previous three days. Groups of Cubans and Americans with common interests formed spontaneously and discussed possibilities for future collaboration.

One group discussed possible collaborations based on specific CIM research projects. Others discussed possible joint educational initiatives. Several delegation members agreed to return to Cuba within the next two years to teach short courses on topics such as survival analysis and causal inference.

5 THE FUTURE

The delegation left Havana with tremendous respect for the Cuban statistical community and the vitality and breadth of statistical activity in Havana. The visit revealed enormous possibilities for collaboration between the U.S. and Cuban statistical communities. The delegation set up a Google Site through which both groups can share materials and resources.

Delegation members and statisticians in Cuba continue to communicate and are working on joint grant applications, sharing instructional techniques and strategies, and plans for short courses. Since the visit, additional ASA members who were not able to participate have expressed interest in the possibility of a future visit, and several have offered to teach short courses.

Both sides of this new collaboration are determined to see it continue and grow. With the need for statisticians and for new advances in statistical science to meet the challenges of the data revolution, global partnerships that exploit the complementary resources and skills in different parts of the world will be essential. Such partnerships will also be key to continuing the goal of the International Year of Statistics to draw worldwide recognition to the importance of statistical science to science and society and to encourage students in every country to embrace study of statistics. The ASA delegation to Cuba, taking place during the International Year, is an inspiring model for future such interactions.

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