

The Statistics Debutante's Dilemma

Radu V. Craiu, University of Toronto, has made a resolution... My New Year Resolution is to make statistics more popular. I know it sounds more ambitious than swimming with the sharks or getting taller but I recognize and embrace a mighty challenge when I see one. Don't get me wrong, I am convinced that stats is *the* buzz word in certain circles, but I just think that those circles are few and far between. One must wonder why.

As a non-North-American citizen, I frequently encounter the probing eyes of vigilant customs officers, and more often than not I am asked about my profession and travel purposes. After I lay out the truth without any embellishment, we go through the mandatory, "Oh. That's really hard, you know", after which an eerie silence descends upon the proceedings and one can clearly see that nothing could make me *less* of a suspect than my profession. In the public eye, a more mysterious—yet boring—craft is hard to come by, so one hooked by it must thoroughly lack the required imagination for misdeeds. If I had, say, mentioned that I am a car repairman, or even a physicist, a more playful ("What's the best mini-van to buy?"), or "How about those black holes?") or suspicious ("Can you build a bomb from a cupcake?") dialogue may have ensued. As we all struggle to recruit good students and pique the interest of the society at large for what we do (see Efron's 2004 article in *Amstat News*, 4, p2, to learn what statisticians do) we also must face the parameters of our struggle.

Oh, I know what you will say—such sweeping summary of our plight cannot come from a relatively green shoot, but must be the coronation of experience and internal growth coupled with a dash of celebrity and a squeeze of genius. I agree, and yet I cannot stop.

Maybe because I feel that, caught in our search for better models and niftier ways to fit and interpret them, we forgot to promote our findings to The Others. When was the last time you read about statistics in the news? Even in those (many) cases when extraordinary scientific finds rely heavily on the anonymous work of statisticians and on the power of our methods, the discipline is merely mentioned as a common noun, bringing to mind pie charts and horse betting, rather than its fundamental contributions. To add insult to injury, in those (few) cases where a statistical model *is* mentioned in the news, you will find it under pseudonyms such as "mathematical model", "computer model" or simply "algorithm" so that the statistics connection is lost to all but the frustrated few.

Why is that?

The battles for the hearts and minds of people are won and lost in high-school

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Are you seeing this expression too often when you talk about your work?



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students in mathematics as well as all those who took my work on stochastic analysis and extended it to areas far beyond my imagination.”

So far, we have reviewed Itô's important contributions particularly in the area of stochastic analysis. We would add his important contributions in somewhat different areas: Itô's theory of excursions and excursion point processes; the Wiener-Itô theory of homogeneous chaos decomposition of square-integrable Wiener functionals (the theory of multiple Wiener integrals); the Itô-Nisio theorem on the almost-sure convergence of orthogonal expansions on an abstract Wiener space; Itô's theory of random current and random distributions; and many others.

For such significant contributions, Itô was awarded many prizes and honors: the Asahi Prize, Japan (1987), The Imperial Prize and Japan Academy Prize, Japan (1987), The Wolf Prize, Israel (1987), Kyoto Prize, Japan (1998), the first Gauss Prize of the International Mathematical Union (2006), and The Culture Prize, Japan (2008). He was elected an associate foreign member of the French Académie des Sciences; a foreign member of the US National Academy of Sciences; member of the Japan Academy. He also was awarded Docteur Honoris Causa, Université Pierre et Marie Curie (Paris 6); Honorary Doctor of Mathematics, ETH, Zürich; and Doctor Honoris Causa, The University of Warwick, UK.

He is survived by his three daughters: Keiko Kojima of Otsu, Japan; Kazuko Sorensen of London, UK; and Junko Itô of Santa Cruz, Calif., USA. His wife, Shizue, died in 2000.

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and University. How well are we faring in either one?

I went to a couple of school and high school science fairs where statistics is used in order to get big prizes. But again, not surprisingly, it is used to support findings in more eye-catching experiments (dog training, levitation, chocolate consumption). In colleges and universities, statistics is merely a means to an end: students take stats courses the way I used to take penicillin, with a grimace.

A few years ago I applied for a considerable grant designed for young science researchers. The grant is awarded across disciplines, the board considering statisticians but also people who create artificial limbs or build robots that walk on Mars. So, inevitably, I did not get it. And frankly, how could I? One important component of the grant proposal was an initiative to promote the researcher's area in high schools across the province. I am still wondering how to beat the guy with the Mars robot using the EM algorithm...

It is true that Statistics is powerful and glamorous when it goes to the Great Ball arm in arm with its cousins, Medicine, Genetics, Astronomy, Economics—in fact, it has so many cousins I cannot enumerate them all. But alone, for many people, it loses much of its shine, like a magic-free Cinderella who is good at scrubbing and tidying up but not so adroit at drawing attention to herself. So is there any hope, besides the magic wand? I believe there is.

We probably could do a better job popularizing the grand successes of statistics. As I keep reading page-turners about prime numbers and the Poincaré conjecture (I am now perfectly aware of the difference between a donut and a tennis ball), I cannot stop thinking that there must be something *cool* about the last hundred years of statistics that can be put out there for all to see. Maybe we cannot win many battles in high school but we surely should be able to win in colleges and universities (and who wants to remember high school anyway?). Whether or not we like to admit it, only the most astute and interested minds will warm up to the intricacies of statistics in their more rarefied form. For others, we need to unwrap the goodies and present them on a silver platter. Courses such as Harvard's, with the catchy title *Real-Life Statistics: Your chance for Happiness (or Misery)*, which “demonstrate the use of statistics without students actually learning lots of formulas” (see Xiao-Li Meng's 2008 *Amstat News* article, 4, pp18–19) are excellent vehicles to capture the interests of our students. While computers cannot be used to prove theorems, they certainly can be used to awe. A bag of tricks like that of Gelman and Nolan (*Teaching Statistics: A Bag of Tricks*, OUP, 2002) can make the teaching experience a more diverse and interesting one. We all have our little secret devices we use in our classrooms—maybe an online repository of such gems would be useful.

My colleague Jeffrey Rosenthal recently published a book, *Struck by Lightning*, in which probability takes center stage. Among other things, we are gently guided through various instances where simple probabilistic calculations make events in our life easier to understand and deal with. Jeff's talent for writing notwithstanding, I am still pleasantly surprised and cheered by the warm reception the book has had from the general public. Maybe similar efforts, with statistics at the center of the plot, will also receive standing ovations.

One can only dream of a day when the red carpet of Science will be rolled out for Statistics and its humble servants. Until then, I will stick to my New Year Resolution, and I invite you to do the same.