Hello and warm best wishes to the World Statistics Congress. I seem to have missed the party by eight thousand miles. The five constituent societies — the ISI, ASA, IBS, RSS, and IMS — have honored me with the International Prize in Statistics, for which I am truly grateful. Their Presidents are all here — hello Helen, Karen, Louise, Deborah, and Susan (a clean sweep for Women in Statistics) — and also hello to Susan Ellenberg, head of the prize committee. The IPS is an almost new prize, given for the first time just two years ago to our esteemed colleague David Cox. One of my friends, trying to explain the new award, said it is given for "the best work done before one is 80".

But that isn't really right of course. The prize is intended to highlight individual contributions of substantial general influence - proportional hazards for Prof Cox, the bootstrap for me. The hope is to impress on the wider world how influential the statistics discipline really is. This is definitely a good idea. I wish we'd started it a long time ago. By now the winners might have included:

- Abraham Wald and George Barnard for sequential analysis
- Harald Cramér, C. R. Rao, and David Blackwell for optimal estimation bounds
- Edward Kaplan and Paul Meier for survival curves
- Maurice Quenouille and John Tukey for the jackknife
- Hirotugu Akaike for the Akaike information criterion
- Emanuel Parzen and Grace Wabha for reproducing kernal Hilbert spaces
- Robert Wedderburn and John Nelder for generalized linear models
- Herbert Robbins and Charles Stein for empirical Bayes and shrinkage estimation

The list goes on, but the point here is that Statistics, a comparatively small field, punches way above its weight in terms of influence on the big world of science. A few years ago I had to give a general interest talk at the national meetings of the American Mathematics Society. I started out with a joke map of the math science world, with statistics as a small country surrounded by powerful neighbors like Mathematics and Artificial Intelligence. Susan Holmes, who helped make the map, used the outline of Poland for Statistics, which seemed historically about right. We keep being invaded but manage to more than hold our own.

Tomorrow I'm going to talk about the latest invaders, those big prediction algorithms like Deep Learning, that seem to dominate the scientific news, at least around the US. "Is this the end of statistics as we know it?" my more nervous friends fret. Not at all. Deep Learning and its ilk are recognizable regression methods, something we have 200 years' experience thinking about. The prediction algorithms have been a shot of energy for statistics, and something we are already starting to improve and understand. Many fields work on data analysis algorithms. Only one field thinks much about inference, and that's us.

In fact there has been a new proto-field forming, called "data science". It concerns the algorithmic side of statistical thinking, and its computational execution. Departments around the world are starting to be renamed "Statistics and Data Science", or maybe the other way around.

My university, Stanford, is starting a major new Data Science Institute, with the Statistics Department playing a central role. All of this is to the good of our profession. I tell my fretful friends that we have a strong positive regression coefficient with data science, as long as we remember not to let the inferential side of statistical thinking get lost in the excitement over new technology.

Getting back to the International Prize in Statistics, it is clear from the phrasing of the award that the real winner this time is the bootstrap, not me. I started working on the bootstrap a while after my advisor Rupert Miller published an influential article called "A trustworthy jackknife". The success of the jackknife and the bootstrap show that there is a strong preference in applied statistics for methods that are automatic, that is, ones that can be applied in a wide variety of situations without requiring special theoretical calculations from the statistician. Recently I've been working with my colleague Balasubramanian Narasimhan on a computer package that automates bootstrap confidence intervals. The package, called bcaboot, is available on CRAN and it really does take the pain out of using bootstrap confidence intervals: at the cost of a lot of computation, of course, but that's a price that's easy to pay these days.

Not long ago I was at a museum with a friend and colleague. We were looking at the famous painting of "Girl with a Pearl Earring", the so-called Dutch Mona Lisa. She's a beautiful young women wearing a head bandanna, shown in three-quarters profile, with the pearl earring conspicuously displayed. After a couple of minutes my friend said, "What do you think the chances are that she has TWO pearl earrings?" That's not likely to get you a good grade in art appreciation class, but it's what I love about statistics: it's a way of thinking about the world, not just a bunch of formulas.

Since I was first a student there has been a steadily increased appreciation of the statistical way of thinking, in public discourse but especially among our science colleagues. One way to say that, is that science has nearly run out of interesting things that can be analyzed deterministically. Biologists, medical scientists, economists, social scientists, astronomers, even physicists, now regularly phrase their research in terms of statistical models. Our discipline has responded with a succession of ingenious methods that help scientists make accurate inferential decisions, even in situations that would have seemed hopeless 50 years ago. The bootstrap is one such method but there are lots more waiting to be celebrated at future World Congresses.

My best wishes for successful meetings this week, and once again my deep thanks for this signal honor.