

Who cares about what I do?¹

N I Fisher

ValueMetrics Australia & University of Sydney

nif@valuemetrics.com.au

I'd like to congratulate all of you on what you've achieved, to be here tonight, and to thank Professor Weber for the opportunity to say a few words to you.

Many years ago, my mentor and friend Professor Myron Tribus, who was Dean of Engineering² at Dartmouth College at the time, was welcoming the new intake of undergraduate *Engineering* students. His address went along the following lines:

"We're here to celebrate the fact that you are all embarking on the noblest of professions!

After all, where would the world be without engineers? What you eat, how you dress, what you listen to, how you got here, and where you're sitting now: it's all down to decades – indeed centuries – of fine engineering.

So, I think it's appropriate that we have a toast to the fact that you've chosen Engineering, and to your mutual success in making the world a better place.

In front of each of you is a glass of water. For a toast, it should be a glass of champagne. Unfortunately, some of you aren't yet 21, and it's also illegal to consume alcoholic beverages in this lecture theatre, so I'm afraid it's only water ... but it's the thought that counts. So, let's raise our glasses in a mutual toast!"

Everyone duly raised their glasses, then took a large mouthful of the water ... and promptly spat it back into the glass. It was absolutely foul.

"Exactly", said Myron. It's awful. That is, in fact, the current drinking supply for such-and-such a town nearby. Your class project, as part of your 4-year Engineering course here, is to turn that into potable water."

Myron told me many years later that this project had spawned 3 or 4 spin-off companies that were still operating.

Nearly fifty years on, why am I telling you about this? Well, now I'm afraid I have to get a bit partial. If you're bent on pursuing Pure Maths and you resonate with G H Hardy when he claimed

"I have never done anything 'useful'. No discovery of mine has made, or is likely to make, directly or indirectly, for good or ill, the least difference to the amenity of the world³."

¹ Address to attendees at the Prizes and Scholarship evening for the School of Mathematics and Statistics for 2011

² <http://engineering.dartmouth.edu/about/history.html>

³ Hardy, G. H. (1940). [*A Mathematician's Apology*](#). Cambridge: Cambridge University Press

best of luck and more power to your elbow! It worked for him. Some of us lesser mortals have to be a little more applied ... but there are great rewards here too. Whilst my remarks will relate to Statistics, about which I know a little, I'm confident that they are relevant to Applied Maths, about which I know nothing (as my lecturers would attest were they still with us).

The fact is, a career in Statistics, or Data Science, if you like, presents comparable opportunities ... the chance to make a big difference to other people's lives. To quote Hal Varian, chief economist at Google⁴: "I've been telling people that the really sexy job in the two thousand and tens is to be a statistician".

Last August, I was at a meeting where the new draft K–10 Mathematics Curriculum was being discussed. During a break, I fell into discussion with the head of a School of Mathematics from a local university about whether or not Statistics is fundamentally different from Mathematics (my argument being: one is a Science, and inductive; the other a branch of Logic, and deductive). My colleague pondered the issue for a few minutes, then rejoined:

“Ah, I get it. Statistics starts with a question!”

Well, I'd never thought about it in quite such explicit language, but yes, Statistics does start with a question, and it's someone else's question. (Here, I'm not talking about Mathematical Statistics, which is what pure mathematicians do when they're not sure about anything, but about Statistics as the Science of Data, or the Science of Managing Uncertainty.)

Do you like working collaboratively? Do you like computing? Are you interested in learning about other disciplines – engineering, financial services, law, geology, management, biology, medicine, ...whatever ? You need an open mind and good dose of common sense, a willingness to listen, and to communicate in plain language. If you're prepared to tackle problems on their merits, in other words, to find – or develop – the appropriate method for each problem rather than relying on a fixed approach, there will be unlimited opportunities to do interesting research, if that is your bent, and improve the lives of others.

I can already hear some of you muttering:

“Pretty big claims. What are you doing that's going to change my life?”

Well, I can tell you what I'm tackling easily enough, although whether I can do it remains to be seen.

One of the critical aspects of practising Statistics is to measure the right thing. These days, my particular interest is an area called Performance Measurement. You're not unfamiliar with this, of course, having just produced some excellent performance measures. Let's look at how people try to measure performance in other areas.

⁴ <http://www.youtube.com/watch?v=D4FQsYtBLol&feature=related>

1. Some years ago, CityRail conducted a survey of the travelling public, from which they concluded that the most important thing for rail passengers was that trains were on time. So, train drivers were instructed that they had to be on time 95% of the time. What do you think happened? Well, suppose a train was travelling south on the North Shore line. As the train reached Killara, the driver might have looked at his watch, and realised that if he stopped, he'd be late getting to Lindfield, so He wasn't being measured on whether or not he stopped for passengers to get on or off the train.
2. Then there were the two departments of a toy-making factory, one of which was rewarded for how many toys they assembled in a day, and the other on how many defects they found in each toy. How long do you think it was until collusion set in? The problem is, of course, that Measurement drives behaviour; or, to quote Eliyahu Goldratt⁵,

"You tell me how you measure me, and I will tell you how I will behave".

It's critical to put good performance metrics in place at the outset. Remember the Home Insulation and Safety Plan? It was announced as part of the \$42 billion Nation-Building Economic Stimulus Plan on 3 February 2009. There was massive waste. So here's the performance measurement question: What performance measures should have been put in place to provide the Government with assurance that the work would be conducted efficiently and effectively?

3. Still not relevant to you? OK. Let's bring it closer to home. Some of you may go on to research careers in universities, so you'll probably apply for research funding. What sorts of performance measures do you think are currently being used to assess the quality of research of individuals and groups? Here are a few (and I'm simplifying a bit):
 - a. Number of papers published. What sort of behaviour will that drive?
 - b. Number of times your papers are cited. How can you make yourself look good on that one? Answer: citations rings, where you cite various of your colleagues and *vice versa*.
 - c. Quality of journal you publish in. That depends on the so-called 'impact factor' of the journal – the average number of citations of a paper. How does a journal editor make that look good?
Answer: once your paper has been accepted, the editor asks you to look through back issues and cite anything that could be even vaguely relevant.

And so on.

"OK" (I hear you say), "How *should* you measure Research Quality?" Well, I don't know yet, but maybe in a few years' time my friends and I might have made enough progress that you

⁵ Goldratt, E.M. (1990), *The Haystack Syndrome. Sifting Information Out of the Data Ocean*. Croton-on-Hudson Inc, NY: North River Press, Inc.

benefit from we've done. Meanwhile, I leave you with a summary thought: try to work on problems where someone else cares about the answer. Just as much fun, just as challenging, and you'll have done something worthwhile.

Or, as Woodrow Wilson said rather more eloquently, in an address at Swarthmore College in Philadelphia 98 years ago⁶:

"You are not here merely to make a living. You are here to enable the world to live more amply, with greater vision, and with a finer spirit of hope and achievement. You are here to enrich the world. You impoverish yourself if you forget this errand."

⁶ "Address at Swarthmore College, October 25, 1913," in [*The Politics of Woodrow Wilson: Selections from His Speeches and Writings*](#), edited by August Heckscher (1970). See <http://boatagainstthecurrent.blogspot.com/2010/07/quote-of-day-woodrow-wilson-on-making.htm>.