

Discurso de Joseph J. Monaghan

Doctor honoris causa por la UPM

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I am greatly honoured by being awarded an Honorary Doctorate by the Universidad Politecnica de Madrid, and I have many to thank. These include the Rector of this University Prof. Cisneros, Professors Gomez-Goni, Perez-Rojas, Fernandez-Jambrina and the director of this school Prof. Nunez-Rivas.

I am also honoured by the numerous scientists and engineers who have given their support to this award. I regard myself as fortunate to have been associated with people of such high ability.

I began my life in Western Australia. When I was born, Western Australia had a population of almost 0.5 million people in an area of 2.6 million square kms that is 5 times the area of Spain.

It was possible to travel a long way without seeing anyone. I lived for my first 12 years in a small town called Narrogin, that served a community of wheat and sheep farmers. This was a dry area, like parts of Spain. It was in this country that we learnt to amuse ourselves without outside help.

We had no TV, or mobile phones, and we rarely heard a radio but we had plenty of books to read.

We trapped rabbits and learnt the skills of where to put the traps, how to kill the rabbits, how to skin them and clean them and, being budding entrepreneurs, we sold the rabbits around our town; 5 cents for a small ones, 9 cents for a large one.

We also learnt to make catapults to shoot birds. To make a catapult we had to select the best tree, then the branch of the tree, then attach the leather and rubber following, what I see, in retrospect, were good Engineering principles.

We didn't realise this but we were inventing algorithms. Address at Universidad Politecnica de Madrid. We moved from Narrogin to a coastal town where I went to High School. It was then that I realised I could solve mathematics problems better than the teacher.

I can still remember how I was astonished that you could work out the trajectory of a stone knowing the equations that described the motion. I decided there and then that I would focus my life on trying to understand the physical world using mathematics.

There are two things that played a large part in my education. One was sport the other was study. Curiously, success in either demanded much the same strategy. If you wanted to do well in sport, and you had some skill, then you quickly learnt that you had to work hard, you had to practice, and you had to work out a winning strategy. In academic study the same rules applied. Even if you have talent you must still work hard work and use good strategy if you want to be successful.

I went to the University of Western Australia. At that time there were no computers at all. No laptops no electronic calculators, no main frame computers in Western Australia.

If you wanted to calculate you used a slide rule or, for a big calculation, a mechanical calculator. However one lecturer, a theoretical physicist, R. B. Dingle gave wonderful lectures and inspired me. Dingle was English and had a very successful career in Cambridge before coming to Australia. I was also inspired by working with the CSIRO for a year.

This gave me access to Australia's first electronic computer, and it was love at first sight. After that I became a PhD at the University of Cambridge. Address at Universidad Politecnica de Madrid I have made many working visits to Cambridge and, during one of those working visits Bob Gingold and I invented the SPH algorithm for computational fluid dynamics.

The SPH algorithm has since expanded into a vast number of areas in the academic world, and in business and industry, as wide ranging as cosmology, star formation, marine research and special effects in movies.

This has been due to the work of many researchers around the world.

Some of the best, for example Professor Souto-Inglesias and his group who has applied SPH to problems in marine engineering, are in this University, and others are in this audience.

Professor Dalrymple from the USA who has made fundamental contributions to coastal engineering, Professor Ben Rogers from Manchester who has made fundamental contributions to marine engineering, and Dr. Victor Gonzalez from the company Next Limit whose company won an Academy award for their contribution to special effects in movies.

EXCELLENCE

And now, because it is a fundamental question, I want to talk a little about how a University becomes highly ranked and famous. The key thing, is the pursuit of excellence.

Excellence in research, excellence in teaching and excellence in administration. Address at Universidad Politecnica de Madrid You might think that other Universities like Cambridge and Harvard have special advantages, but those advantages didn't appear by magic.

They evolved from the pursuit of excellence. In this respect, in my view, a University that wishes to be successful is like any other group that aims to be highly ranked.

Take as an example football. A surprising example perhaps, but I think it is realistic.

In Madrid you have an outstanding football team, Real Madrid that began in 1902.

It wasn't always outstanding but it improved and maintained its excellence largely by following the ideas of Miguel Marmo in the 1950s. Miguel set up a youth training facility (the Cantera) and introduced the idea of signing outstanding players from abroad.

Let us think about that. The aim was to build the best team, and if that meant players from outside Spain, then it was not a problem.

A University that wishes to be successful should also pursue excellence. It should aim to attract and support very good researchers wherever they are.

The best universities I have worked in have attracted staff from around the world. Their numbers do not need to be great, but their influence can be huge.

I can't emphasise the employment of excellent staff enough. It is the key asset.

Once that is achieved, good students will be attracted to the University by the work and reputation of the staff. New staff will flow from the best of those students.

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GOOD RESEARCHERS

Of course a fundamental question is how do you attract Good researchers? We might debate the details for a very long time but here are some key points.

Good researchers are attracted by creating an environment that the researcher is proud to be part of. It is a place where the life of the researcher is not dominated by teaching, or by administration, but by solving research problems.

It is a place where administration and researchers are a team, helping each other.

In my view you could begin by selectively employing outstanding researchers from outside Spain with the aim of a steady improvement in your research ranking in Spain, and a steady improvement in your research ranking compared to the UK, France, Germany, and other European countries.

If you can do this then, in my view, this University could eventually become the Spanish equivalent of the Massachusetts Institute of Technology.

THANK YOU