



His Most Excellent and Magnificent Rector of the Miguel Hernández University of Elche, illustrious authorities, members of the university governing body, faculty and research personnel, administrative and service staff, students, ladies, gentlemen, Friends, and my wife Elizabeth.

I would like to express my deepest gratitude towards the Miguel Hernández University for conferring me this Doctor Honoris Causa, and especially its Rector, Professor Jesús Tadeo Pastor Ciurana, presiding today over this ceremony, as the highest university representative.

Special thanks go to the School of Engineering of Elche for nominating me Doctor Honoris Causa on behalf of this university, and I am grateful to Professor Oscar Martínez Bonastre for his laudation.

This appreciation also extends to all colleagues at foreign institutions who supported this nomination and UMH departments as well.

I must start by expressing my gratitude and pride at the Doctor Honoris Causa you have bestowed on me. As a new graduate of the university, I hope we are beginning a long and fruitful relationship.

In the course of my education, I studied at a high school that was founded in 1635, the Boston Latin School; I was an undergraduate at the Massachusetts Institute of Technology, founded in 1861; and lastly acquired a PhD from the University of California, Irvine founded in 1964, only 9 years before I enrolled. Over the same period, I changed focus from Latin, to Physics, to Electrical Engineering, to Computer Science. I think the pattern here indicates a taste for the new on my part. In any case, I was particularly happy to learn that UMH is still in its innovative youth.

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My work has been in an area that was originally seen as a footnote to Electrical Engineering or perhaps, Mathematics; it is now often called Information and Computer Science in academia. Many academics still believe it isn't worthy of being a "science" or even to be a university department, though their number is declining. In the general population, it's called "the Internet", though there's really much more than that.

Today I'm going to speak of Scottish philosophy, and then give you my ideas about how we should think about the Internet and computer science, and how you might think of taking advantage of it.

David Hume, the Scottish philosopher, in *A Treatise of Human Nature*, said "Reason is, and ought only to be the slave of the passions, and can never pretend to any other office than to serve and obey them." I'd express this, less elegantly, as "Passion is how you decide what you want in life; reason and logic are how you best achieve your goals".

I originally studied Latin and Physics; Latin because of the school I attended, Physics for its prestige at the time, and its difficulty. I only got to computers to pay my bills. It took me many years to find that networking technology was my passion. I hear many voices in my home country, the United States, and elsewhere, advocating increased enrollment in math, the sciences and computer science in particular. There's also the fortunes made, and to be made. So while I'm sure that some of you will find your passion in this technology, don't adopt it because it is the current trend – it may be my love, but be sure to find your own, whatever it may be.

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But back to the question of “Is Computer Science is really a science?”. I find this to be a particularly hard question to answer. There are certainly aspects that look like science – the physical science that creates integrated circuits and models their behavior, perhaps queueing theory. But there are also difficulties. Much of the Internet are the abstractions that we call protocols, things like the domain names I invented such as [www.google.com](http://www.google.com), things that the web pioneers invented, like the URL <https://www.us.hsbc.com> which gets me to my bank, and layers of even more obscure software and dozens of protocols which aren’t visible.

We don’t have any experimental way of repeating the creation of the Internet, at best we have, in some case, the results of Darwinian struggles between some competing designs. In the Internet community, we like to congratulate ourselves for inventing the Internet, but perhaps we were just the beneficiaries of photonics and integrated circuit technologies that created a sea of new communications capacity. Perhaps the Internet is simply the channel cut by the bandwidth flood and is in no sense optimal – it was just the first available technology. Also, a lot of the artifacts we have are shaped by competing economic interests rather than any sense of design, science, or aesthetic.

I think there are two principles at work here.

First, the Internet and Computer Science are young, and we haven’t yet learned how to measure ourselves. I’m particularly worried about sentiments like those that I heard at a recent Network Architecture conference at Cambridge University, where the prevailing sentiment was “There’s no point in studying our history.” To be sure, we don’t need to study the obsolete room-sized machines of the past, but we should study our decision making processes, both the ones that succeeded and the ones that failed.

But second, we should just realize that like mathematics and writing, the value of computing and communications lies primarily in its application, even if some find

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their passion in the theory. Like math and writing, it can be applied to nearly every discipline. I remember being surprised at UC Irvine when the first interest in the Internet outside of the Computer Science Department was from scholars assembling a thesaurus of ancient Greek, rather than the scientists. I'm told that devices to monitor a person's exercise, to the step, are one of the fashions of the Consumer Electronics Show.

The difference here is that the "Gutenberg" event in computing is recent, and the literature of algorithms has also just begun. And frankly, I see little reason to worry about the "science" label, but a necessity for more scientific method in the computer world.

So to sum up, I argue that we have only begun to enjoy the changes that will be delivered by Information technology. My advice to those of you who find it fascinating is to look for opportunities to apply it in new ways. Opportunity will be found at the juncture of different fields. The future of the Internet is still ahead of it, and phenomena like big data will change the way we live.

I think that one of the particularly important combinations is looking at government, ethics and computing. Making sure that our digital devices act in our own interest is becoming more and more challenging every day, and may well be the difference between utopia and dystopia. A basic understanding, like literacy, will be both a vehicle and necessity for good citizenship.

Again, thanks for this honor and congratulations to the new graduates and the university.

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