

## The value of a PhD in nano-engineering for the student, university, industry and society

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The question often arises : why embark on a doctorate study, knowing that the PhD degree will in most cases not lead to an academic career or does not even guarantee extra employment opportunities? Some keep also claiming that a doctorate study leads to overspecialized experts who are working for a (too) long period of 4-6 years on a very narrow topic, producing a thick manuscript but at the same time getting estranged from reality and environment. Industry also often prefers to recruit young engineers, young Masters, fresh from school, and claims to see more benefit in providing a dedicated and targeted training to this young talent within and by the company.

In this presentation I would like to share my ideas and conviction about the value of a PhD and on why and how the student himself of course, but all stakeholders can fully benefit from this research effort.

In my more than 40 years career in the micro-electronics domain – in which I was involved as a Professor and PhD Supervisor at a university, as Research Director in an important R&D center in nano-electronics and last but not least, in charge for interaction with and transfer to local and international industry – I have not only experienced the fascinating evolution of technology, but I have also seen an important evolution in the role and level of contributions to this domain of the different actors. The PhD student has undeniably a very special and important share in all of this. But the content and scenario of this PhD research had to go necessarily through an important evolution as well, the Bologna process and reforms being but a part of this. It is therefore imperative to continuously and critically review and refine the PhD research process in order to reach the optimal and most satisfactory outcome for the student during these most productive years of his/her life but for all the stakeholders as well, who have the right to benefit from these important efforts and contributions by society.