

## **The center for nanoscience and technology of IIT@POLIMI: mission, vision and early challenge**

The mission of research is the betterment of the human kind condition through knowledge (Science) and its application (Technology). This is indeed the ultimate and most common outcome of research. Yet, it is not the real driving force behind that. Indeed scientific research answers to a basic need of mankind: exploration. While today research and researcher are far away the early time spirit of the heroic pioneers animated by pure passion, the deep quest for knowledge and discovery is still there, under a more plane, professional life style and work method.

If curiosity might still be at the bottom of research heart, for sure today plans are fixed by economical and political reasons. Research objectives are linked to society needs through the mechanism of funding, which is ruled by national or super-national (e.g. EU) bodies. Energy, Health, Defense (which is a mild way to say weapon research), Wealth, Education and ICT are among the main areas of interest. Depending on economic and political situation, some may become more prominent than others. Now-a-days the research forefront demands multi-disciplinary efforts. Material science is a typical example, because it contains many traditional disciplines, like physics, chemistry, biology, mathematics and engineering.

Scientific research also plays a fundamental role in *education*, mainly through PhD programs. The PhD school and the related research activity provide a full professional training, far beyond the specific research area. Skills such as team working, problem solving and independent thinking are developed in the young graduate students. Those skills are indeed peculiar of PhDs and rarely founded in undergraduates of the recent years. A needed action for supporting research is the promotion of PhD in the job market. This would allow a dynamical equilibrium in which graduate students while contributing to research also build their own future career, improving their placement. Young minds are essential in research, and turn-over, given the transitory character of youth, the only means to achieve that.

The center for Nanoscience and Technology (CNST) of IIT@POLIMI aims to become a national stronghold in material science. The center research plan rests on the IIT national strategic plan and on the traditional fields of research of Politecnico di Milano. Merging of these two brings a synergic enhancement of the center potential, beneficial to both partners. In setting up the center firstly a research project was established, to fix the major areas of activity. The project was intentionally broad in order to allow a substantial shaping by the most important resource of the whole initiative: the human factor.

It is the selection of people that provides the final setting of the center. Competitive hiring and career plans are the most revolutionary aspects of IIT initiative. IIT hires selected people on non-permanent positions, essentially promoting accountability, i.e. the responsibility to report and bear the consequences of what has been done.

This is an absolute novelty in the national system, which certainly provides a clear means for meritocracy, indeed as applied in most industrialized countries. Not only hiring and advance in careers, but also the yearly income of the researchers is connected to the value of the undergone activity. Not a surprise that evaluation of researchers and programs is a crucial topic in IIT.

The most important challenge I'm facing in the realization of the center is team building. The distinct target of CNST is to reach a critical mass, which allowed a high impact research, by focusing the available resources in few key areas. This demands realizing a team of people with common goals and strong inter-relationship, and yet it has to be done preserving the independent spirit that is essentially to any researcher to be creative. CNST is however mission driven more than

target driven, the later being characteristic of industrial labs. Cohabitation of these diverging concepts is a major challenge. While strategic lines can be provided and are accepted by researcher or effectively embodied by them, short term achievement can not be imposed, for sake of originality, independence and finally fun for the people. The later, far from being a luxury, is a need for good quality research. The famous coffee machine effect, not to be confused with the coffee stain effect we recently published about, represents in a nut-shell what CNST should be: a place where people and ideas meet, exchange, grow and evolve. Free and open discussion is supported by a proper stimulating environment, by the absence of heavy hierarchy, by the full open access to knowledge and resources and by the constant push to self improvement. As in brain storming, where any ideas have the right to exist and be seriously posted, anyone should have the chance to participate with his own ideas to the scientific discussion. A dense program of talks (CNST-colloquia) is already running and participation is high. This permanent and continuous confrontation aims at enhancing the sense of togetherness and belonging and to foster new ideas through collaborations.

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