

## Emerging opportunities at the boundaries of ICT and life sciences

Thierry Van der Pyl  
European Commission, DG INFSO  
B-1049 Brussels, Belgium

The convergence between ICT and life sciences is grounded on the commonalities of *information, matter* and a *systems view* of living systems and artificial systems. This convergence further encompasses materials at the nano-scale, natural cognition, social sciences and the applications enabled by the new opportunities.

The elucidation of the human genome and the large amounts of information collected on proteins, physiology, pathologies, environment, motivates research on the way information is processed in the living world and furthers our understanding of human physiology in relation to health and well-being. The understanding of the biological world from a systems point of view improves our ability to understand, design and manage complex systems and to develop more appropriate computational paradigms for ICT.

ICT devices miniaturised to sizes compatible with those of living organisms and bio-compatible materials enable us to build bridges between living organisms and artificial systems. Inspiration from the living world motivates new approaches in ICT to mediate the limits of traditional engineering for the design and development of large systems, including a more fluent interaction among humans and ICT systems.

The convergence of ICT and life sciences is fruitful for the development of new knowledge-based industry sectors, strongly contributing to the objectives of the Lisbon strategy. European sectors of nanoelectronics, Microsystems, embedded ICT, health, pharmaceuticals will be strategically important in the context of creating new knowledge-based employment and coping with an ageing European population.

This new renaissance in the converging sciences and technologies raises important questions on how to motivate, organise and nurture research spanning a continuum from basic curiosity-driven research, to industrial R&D, including upstream proof-of-concept and collaborative objective-driven R&D. The convergence requires the mutual recognition and understanding among researchers from different disciplines.

Advances in the above domains require tight multidisciplinary work among experts in chemistry, biology, physics, ICT. Multidisciplinary research strains the usual functioning of research teams and centres, and needs to be encouraged as a process to reach well-defined R&D objectives such as finding new therapies for a disease or developing new evolutionary ICT systems. Multidisciplinary research raises challenges such as, how efficiently can we create transdisciplinary teams when research teams, publications and conference are organised in faculties and disciplines? How can we reconcile the differences in handling intellectual property, e.g. in pharmaceuticals, chemistry and IT? How do we motivate exploitation when industries from different branches are concerned but not yet committed to invest?