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Empowering computer-assisted biological design by using *in vivo* characterized standard biological parts

With synthetic biology, we can now design and construct new biological parts, devices and systems in a rational and systematic way. The application of forward engineering approach to biology necessarily requires the implementation of two fundamental design principles: 1) the use of standardized biological parts; and 2) the development of multi-scale predictive models to aid system engineering design. The author will report the latest results of our ongoing efforts to develop a comprehensive and highly integrated toolkit to exploit the full potential of synthetic biology based on: Comprehensive *in vivo* characterization of BioBricks and devices within the context of the host organism and under variable experimental settings to achieve a context-related description of part/device dynamics and performance; Development of a computer aided design tools (CAD) for biological engineering capable to support both design and simulation on multiple hierarchical levels. The hallmark is the deployment of a modeling platform that allow the multi-scale description of biological systems combining currently available algorithms and exploiting different modeling paradigms (e.g. continuous-deterministic models, probabilistic graphical models, discrete dynamical networks, P-systems) according to the scale under investigation.

Biography

Davide De Lucrezia is currently the CEO of Explora Biotech Srl, a biotech dynamic company he co-founded in 2006. He graduated in Biology from the University of Rome "Roma Tre" in 2004 and pursued a PhD degree in Biochemistry in the year 2009. Over the years, he has served as Operative Coordinator of the Living Tech Lab at the European Centre for Living Technology (Venice, Italy), Head of the Pharmacokinetics and Metabolomics Unit at San Raffaele Hospital in Rome, Staff Scientist at Polyphor AG (Switzerland), and Research Technician at the Swiss Federal Institute of Technology of Zurich. He wrote several papers published in international peer-reviewed journals and books for both specialized and general audience and is the inventor of 2 patents.

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