Università degli Studi di Roma "Tor Vergata"
Dipartimento di Scienze e Tecnologie Chimiche
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AVVISO DI SEMINARIO

Il **Prof. Sebastian Maerkl**
Ecole Polytechnique Federale de Lausanne
Institute of Bioengineering - School of Engineering

il giorno 29/03/2018 alle ore 12: 00
Nell' Aula seminari del Dipartimento di Scienze e Tecnologie Chimiche

Terrà un seminario dal titolo:

"**Engineering Gene Regulatory Networks *In Vitro***"

Proponente; Prof. Francesco Ricci

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Engineering Gene Regulatory Networks *In Vitro*

Cell-free synthetic biology emerged recently as a viable *in vitro* alternative for biological network engineering. Cell-free synthetic biology implements biological systems in a coupled transcription – translation reaction and therefore is a well-defined environment that is easier to control and interrogate than complex cellular systems. Since genetic networks can be implemented *in vitro* as linear dsDNA templates, as opposed to plasmids, it also circumvents time consuming cloning and transformation steps, enabling rapid prototyping of genetic systems. We discuss several technological and methodological advances including the development of a microfluidic chemostat device, a high-throughput microfluidic device, and a method to easily produce a recombinant cell-free system. With these various tools in hand we were able to rapidly prototype genetic networks and transplant them into living hosts. More recently we engineered gene regulatory networks from the bottom-up with synthetic Zinc-finger transcriptional regulators. We comprehensively characterized our novel parts by deriving binding energy landscapes for our transcription regulators, which in turn allowed us to precisely tune repression and optimize more complex gene regulatory network topologies. We expect that this work will form part of the technological and biological foundation required for the creation of artificial cells or cell-like entities as well as provide a simpler system than cells to study complex regulatory mechanisms in what one could think of as "systems biochemistry".