Consiglio Nazionale delle Ricerche

ISTITUTO PER L'ENDOCRINOLOGIA E L'ONCOLOGIA SPERIMENTALE "G. SALVATORE" 2nd UNIT

Friday Seminar

24th March 2023, 14:30h CEST

Velia Siciliano

Istituto Italiano di Tecnologia-IIT, Napoli

Synthetic Biology: what, why and how

Host: Raman Parashuraman

Conference Room, CNR, P. Castellino Campus

Abstract

Synthetic Biology is a Bioengineering discipline that aims at reprogramming cell fate by designing genetic circuits that perform sophisticated information processing. Synthetic biology has the potential to revolutionise the treatment of hard-to-tackle diseases by reprogramming cells with synthetic device. To obtain robust and specific activity, synthetic circuits must sense and respond to the intracellular or extracellular environment recognizing the unhealthy condition. Over the talk I will focus on the design of a platform that can be easily readapted to sense intracellular protein of interest, and their application for engineering potential cell-based therapies. I will also show our work on RNA-encoded circuits that use RNA-binding proteins, siRNAs and proteases to engineer sensors, cascade and switches. Finally, I will present our recent research to address one of the standing bottlenecks of mammalian synthetic biology, namely the burden given by competition for intracellular resources that synthetic circuits impose to the cells.

Biography

Velia graduated in Medical Biotechnology and obtained a PhD in Human Genetics and Bioengineering at the Telethon Institute for Genetics and Medicine (Naples, ITA). She then moved to MIT as postdoc and then to Imperial College London as Junior PI. She is now Principal Investigator Tenured at the Istituto Italiano di Tecnologia-IIT where she leads the Synthetic and Systems biology lab for Biomedicine. Over the past few years, she received awards including the MIT Young Innovator award and the ERC Starting Grant. She is involved in collaborative European projects at the forefront of designing novel technological platforms for healthcare and cell-based therapies. Her research is at the interface of building foundational technologies for rational design and robust performances of synthetic circuits and translational applications of synthetic biology in biomedicine.