2022 Hans & Marlies Zimmer International Scholar

Francesco Ricci

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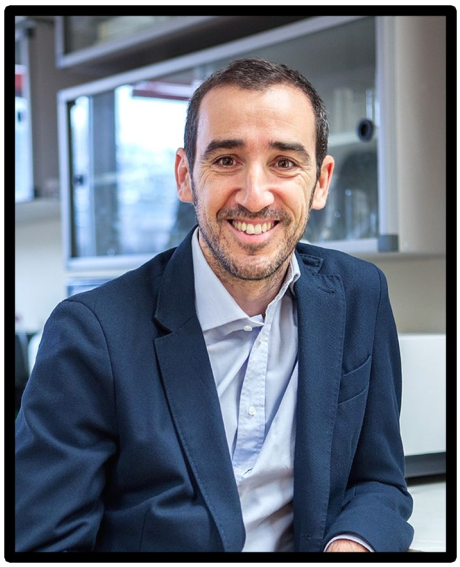

Francesco Ricci is a full professor at the Chemistry Department of the University of Rome, Tor Vergata. His research interests lie in the fields of electrochemical sensors, DNA functional nanotechnology, DNA-based sensors, aptamers, conformational switching probes and smart drug-release. After the PhD in Chemistry earned in 2005 at the University of Rome, Tor Vergata, Francesco Ricci spent 2 years as a visiting post-doc researcher at the University of California, Santa Barbara. Francesco Ricci has been awarded an International Marie Curie Outgoing Fellowship (2010), an ERC Starting Grant (2013) and an ERC Consolidator Grant (2019). He is also the recipient of the inaugural 2017 ACS "Advances in Measurement Science Lectureship" Award, the 2017 "Heinrich Emanuel Merck Award on Analytical Science" and the 2021 Luigi Galvani Prize of the Bioelectrochemical Society. Francesco Ricci is author of more than 120 papers in ISI peer-reviewed journals that received more than 6000 citations so far (H-index=48).

Synthetic DNA-based devices, switches and genes for clinical applications

DNA nanotechnology uses synthetic DNA (or nucleic acids) as a versatile material to rationally engineer tools and molecular devices that can find a multitude of different applications (e.g., in-vivo and in-vitro diagnostics, drug delivery, genetic circuits etc.).

During this presentation I will introduce the field of DNA nanotechnology and I will show how to exploit the "designability" of DNA to fabricate DNA-based nanoswitches, nanodevices and synthetic genes that are specifically designed to respond to different targets and generate a measurable output or release a molecular cargo.

I will demonstrate how to characterize and recreate in-vitro several mechanisms to control the response of such DNA-based systems and how to regulate their activity with different chemical and environmental stimuli including pH, antibodies, enzymes, small molecules and redox inputs.