

Opening Lecture | 2023-2024

# Prof. César Rodríguez-Emmenegger

ICREA Research Professor | IBEC, Spain

## Bio-inspired soft matter at the service of interactive biointerfaces and synthetic cells



A CENTRE OF:



Barcelona Institute of Science and Technology



September 15, 2023  
12.15 h

CiQUS · Seminar Room (Ground Floor)

*This event is part of the "Tutored Training Activities" at the Master in Chemistry at the Interfaces with Biology and Materials Science and it is open to the whole CiQUS community and the rest of the USC members*

# Bio-inspired soft matter at the service of interactive biointerfaces and synthetic cells

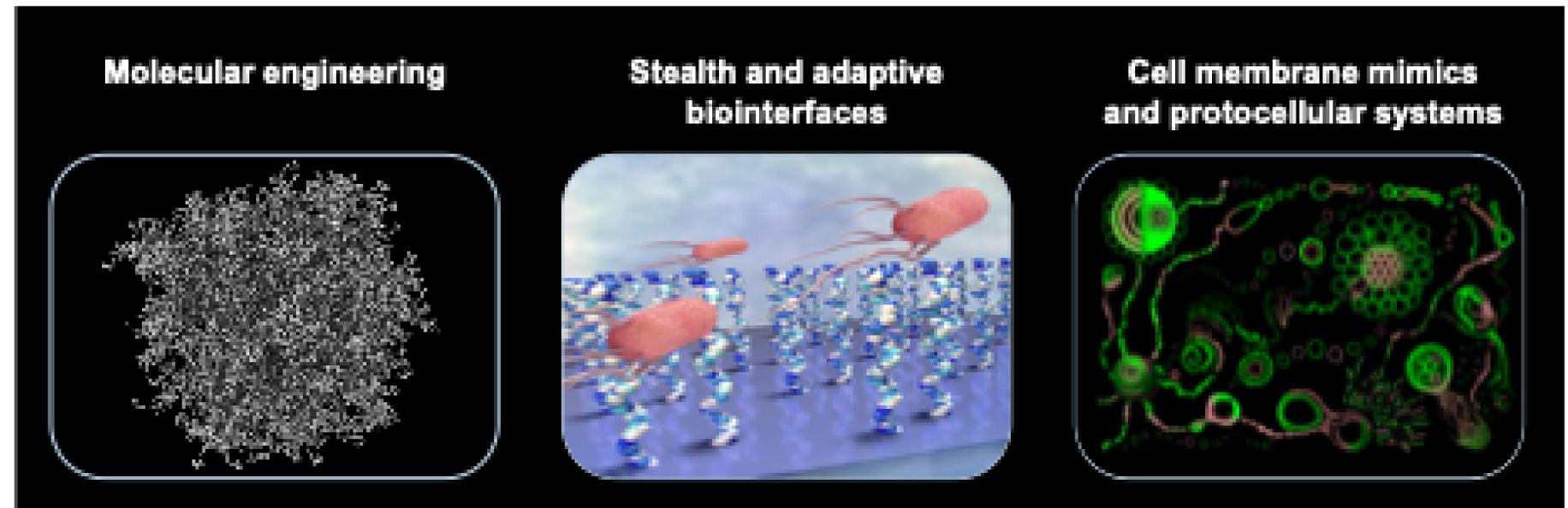
**César Roriguez-Emmenegger**

Nature achieves unparalleled functionality through the hierarchical self-assembly of macromolecular building blocks. Deciphering these blueprints provides a robust framework for the bio-inspired synthesis of materials that can seamlessly interface with living organisms or execute not natural functions. In this presentation, I will highlight several research endeavors conducted in my laboratory, all dedicated to the overarching goal of developing bio-inspired interactive materials for biomedical applications. Firstly, I will present hydrophilic arborescent polymers, a new class of quasi-dendritic macromolecules in which the topology codes for extreme flexibility that enables multivalent interactions. Secondly, I will introduce our innovations in the realms of 'Kill&Repel', antimicrobial nanoscale coatings for medical devices inspired by the dynamic interface of mammalian airways. Lastly, I will delve into the creation of synthetic cells, specifically tailored vesicles engineered to emulate essential biological properties and perform specific tasks. These tasks range from hosting bacterial divisomes to designing synthetic macrophage-mimetic microrobots capable of phagocytizing bacteria and viruses, including SARS-CoV-2.



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**Research lines of Bioinspired Interactive Materials and Protocellular Systems group**

# César Rodríguez-Emmenegger



ICREA Research Professor | Institute for Bioengineering of Catalonia (IBEC), Spain

*Bioinspired Interactive Materials and Protocellular Systems*

César Rodríguez-Emmenegger is a Research Professor at the Institute for Bioengineering of Catalonia (IBEC) and the Catalan Institute for Research and Advanced Studies (ICREA) in Barcelona, Spain. The overarching goal of his research is to uncover design rules to develop materials capable of communicating with living matter —pathogens, cells, tissues— and directing its behavior in a self-regulated manner to enable new biomaterials, therapeutics, and medical devices. He studied Chemical Engineer at Universidad de la República, Uruguay; and a PhD in Biophysics and Macromolecular Chemistry and Physics at the Institute of Macromolecular Chemistry in Prague under the mentorship of Eduard Brynda and Aldo Bologna Alles. Following a postdoctoral research at the group of Prof. C. Barner-Kowollik (Alexander von Humboldt postdoctoral fellowship, 2012–2013), and research stays in Melville Laboratory in Cambridge (Prof. W.T.S. Huck, 2009), University of Pennsylvania (Prof. V. Percec, 2013, 2015) and Pasteur Institute in Lille (Prof. Lafont, 2015), César returned to Prague to start his independent group supported by a Junior Grant from GACR. He was then a Junior Group Leader at DWI-Leibniz Institute for Interactive Materials in Aachen (2016 – 2022) before joining IBEC.



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## More info:

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