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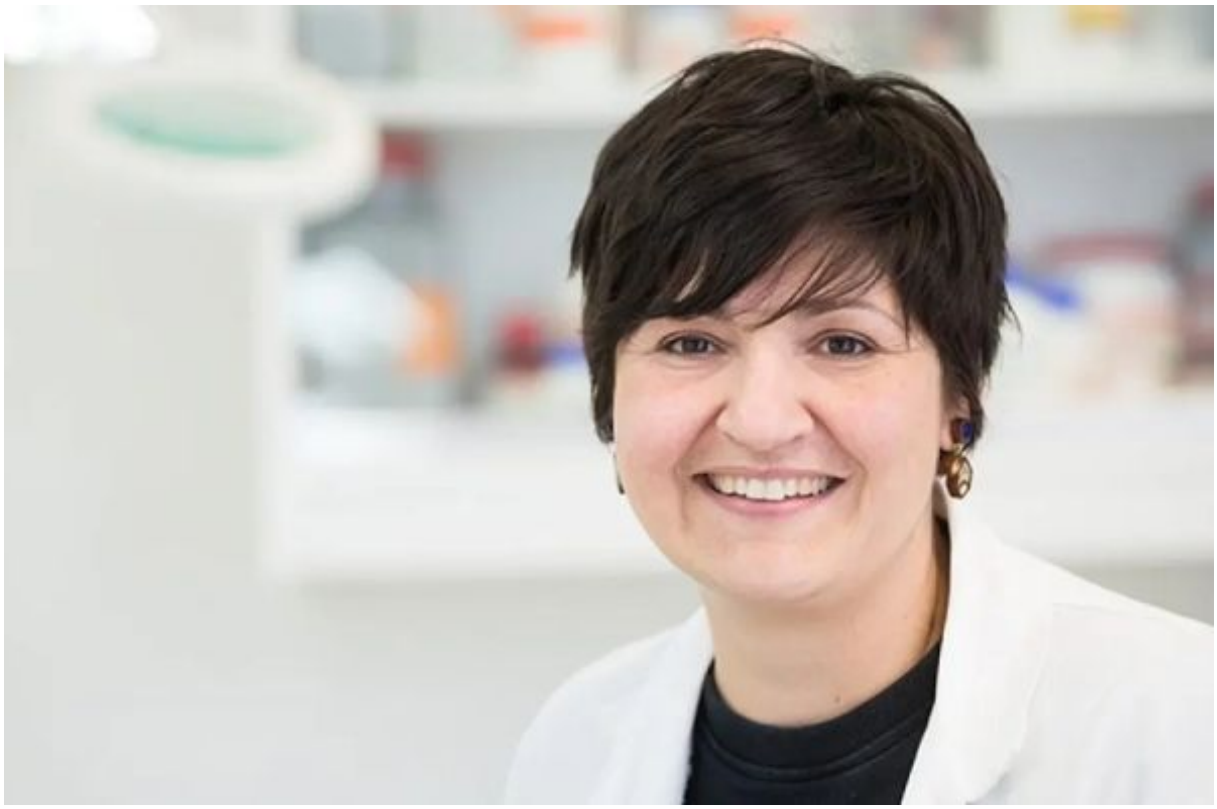

ICFO Colloquium | Nano Comes to Life: How nanotechnology ushers physics into biology , transforming medicine and the future of technology

SONIA CONTERA

March 07, 2025
12:00 to 13:00
ICFO auditorium

BIO:

Prof. Sonia Contera works on physics at the interface of biology, nanotechnology, and information processing. She is an expert in atomic force microscopy of biological systems and has a special interest in the role of mechanics in biology. ?

Her interest in matter at the nanometer scale led her from a PhD at Osaka University (Japan on the physics of nanostructures, to biology. Her multidisciplinary journey is a quest t interrogate how matter entangles itself with its environment, storing information in time an

space, to create (and sometimes to compute) complex structures (from the nanometer scal up) that are able to adapt, learn, reproduce and evolve to become i¿½alivei¿½. Her main interest is understanding the profound physical meaning of i¿½biological shapei¿? , so she studies the physics of i¿½biological growth and shapei¿½ in diverse systems su h as plants, neural network
and tumors. She is a believer in i¿½learning by makingi¿½, collaborating, creating tec nology, engaging with the public. By doing so she finds interesting problems, but more undamentally she strives to weave responsibility into her science, so her work can contribute to progress in a meaningful, ethical,

ABSTRACT:
How and why do we design and build artificial structures and even machines at the nanoscale using DNA, proteins, and other biological molecules or construct hybrid bio-inorganic robots using the building principles of biology? I will explore how nanotechnology (the capacity to visualize and manipulate matter at the nanoscale) is revolutionizing medicine in ways that will have profound effects on our health. From nanomachines inspired by biology that can train the immune system to fight cancer, to nano-antibiotics that can eliminate resistant bacteria and vaccines to end the COVID pandemic, to the engineering of tissues and organs for research, drug discovery, and transplantation. More profoundly nanotech facilitates the study of biology within the framework of physics, thereby creating interfaces with other fields (e.g. bioinspired quantum devices and computer science). This will potentially change not only the future of materials, engineering and AI, but also the way we think about life itself, and dare to think how we pose questions such as i¿½what is intuition?i¿½ from a physics lab.
Hosted by: Maria Garcia-Parajo