



UNIVERSITÀ
DI TRENTO

Dipartimento di
Biologia Cellulare, Computazionale e Integrata - CIBIO

08 JUNE

11.30 A.M.

ROOM A203 - POVO1

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● ● SINGLE-MOLECULE ● ● INFORMATION PROCESSING ● ● WITH PROTEIN NANOPORES

Can molecules show intelligent behavior? In my talk, I will show how protein nanopores, the same molecular machines used in DNA sequencing, can be repurposed as tiny chemical computers. By introducing reactive chemistry inside the pore, we create systems in which a single molecule can store information, perform logical operations, and retain a memory of its chemical past. I will show how this molecular information processing can be read out electrically, and discuss the selenium and sulfur chemistry that enables molecular memory and computation. I will also present chemically modified nanopores that detect peptides in real time without labels or tags. By exploring such minimal information-processing systems, we aim to shed light on the emergence of biochemical memory and adaptation both in extant cellular networks and in the earliest chemical systems that preceded life.