

## Code B\_2409

<b>Departments</b>	Physics and Chemical and Geological Sciences
<b>UniCa reference person</b>	Matteo Ceccarelli
<b>Project title in English</b>	Hybrid nanopores for sensing molecules
<b>Project title in Italian</b>	Nanopori ibridi per misurare molecole
<b>Subject area of reference (World University Ranking)</b>	PHYSICAL SCIENCES (inc. Mathematics, Chemistry, Geology, Earth & Marine Sciences)
<b>Project summary and VPS' profile</b>	<p>Sensing single molecules by measuring their electric fingerprints as they pass through nanopores has revolutionized the field of DNA and RNA sequencing, delivering the first and only technology capable of characterizing native, unamplified genetic samples using a highly portable, pocket-size device. The next decade of nanopore science promises to bring game-changing advances to the emerging field of single molecule proteomics and eventually detection of small analytes, a revolution for applications in biomedical laboratories. Their advent, however, requires a method to create large arrays of identical, stable, and individually addressable nanopores, robust just like an array of transistors on an integrated circuit. A radical solution to the above problem is to combine the atomically precise structure of biological nanopores with the mechanical stability and electronic addressability of solid-state nanopores in a hybrid nanopore system. Harnessing the advantages of such hybrid systems requires thorough characterization of the interface between the biological and man-made materials, which is presently possible only through high-end all-atom molecular dynamics simulations.</p> <p>We seek a person with a background in theoretical biophysics and/or biochemistry and an extensive experience in numerical simulations, in particular, classical molecular dynamics simulations of biological and solid-state nanopores. We will leverage that experience with our own in modelling transport of metabolites and its control by through environmental variables.</p> <p>The candidate will have a profile that complements the expertise of the Department and be interested in developing long-term collaboration with members of the Department. Willingness and experience to teach at the Master/Ph.D. level any of the above topics are required.</p>
<b>Proposed length of stay</b>	Long visit of 1 month
<b>Expected period of activity</b>	May-June 2024
<b>Academic position of the VPS'</b>	Professor
<b>Course of Study</b>	Laurea magistrale (2nd cycle University Degree), Laurea magistrale a ciclo unico (5-6-year Master Degree), Dottorato di ricerca (PhD Course), Scuola di specializzazione (Specialization Course)
<b>Language of instruction</b>	English