

## Marie-Sklodowska-Curie Actions – Postdoctoral Fellowships 2024

### *INL Expression of Interest*

<b>Research Group Leader /Research Group name:</b>	
<b>Prof Dr Clivia M Sotomayor Torres / Sotomayor Group (Nanophononics)</b>	
<b>Scientist in charge:</b>	
<b>Name &amp; surname</b>	<b>Prof Dr Clivia M Sotomayor Torres</b>
<b>Contact email</b>	clivia.sotomayor@inl.int
<b>Short description of the research group, including URL if applicable (<i>Strengths and scientific achievements (publications, patents, etc.), important infrastructure (up to 2000 characters with spaces)</i>):</b>	
<p>The group current strategy is to advance the science and engineering of phonon-based interactions in condensed matter, as in opto-mechanics, topological matter and nanoscale thermal transport. It is an experimental group with strong collaborations with theory groups and physical electronics groups. The Group has recently moved to brand new laboratories and is restarting its state-of-the-art equipment such a optomechanical set up, Brillouin scattering, Raman scattering, Laser Doppler vibrometry, pump-and probe spectroscopy and contactless thermal transport techniques. The materials we use are Si, SOI, nanocrystalline Si and various 2D materials, as well as polymers. The publications of the group leader can be found at: <a href="http://scholar.google.com/citations?user=Xq_JZHkAAAAJ&amp;hl=en&amp;oi=ao">http://scholar.google.com/citations?user=Xq_JZHkAAAAJ&amp;hl=en&amp;oi=ao</a> and at <a href="http://orcid.org/0000-0001-9986-2716">http://orcid.org/0000-0001-9986-2716</a></p> <p>The web page of the group at INL is under construction: <a href="https://www.inl.int/research-groups/nanophononics/">https://www.inl.int/research-groups/nanophononics/</a></p> <p>Our previous web page is still accessible at: <a href="http://www.icn2-p2n.eu/">www.icn2-p2n.eu/</a></p> <p>Prof Sotomayor has supervised over 60 postdoctoral researchers, among them four M S Curie fellows, three of whom went on to pursue independent research careers in academia and one in an international high-tech industry. The research of the group is currently funded by three European projects, included an ERC Advanced Grant and one internally funded project.</p>	
<b>Project title:</b>	
An experiment to test the Fermi-Pasta-Ulam-Tsingou (FPUT) recurrence	
<b>Project description (<i>up to 2000 characters with spaces</i>):</b>	
<p>The FPUT recurrence dates back to 1954 and it is particularly attractive due to its challenge to deliver a low-power computational scheme. In a weakly coupled non-linear system the energy, or information, avoids equipartition and, instead, the energy travels between the available modes of the system. Early attempts succeeded in the demonstration of the recurrence using km of optical fibre. In this project we propose to demonstrate it in a scale that allows integration on silicon using MEMS/NEMS technology. A potential advantage could be offered by incorporating topological protection building the design of a topological interface in the lattice under study. The host institution is well equipped for the characterisation of the FPUT structures, which will be realised at the National Technology Research Centre of Finland, where the fellow would have a research stay to learn advance MEMS/NEMS fabrication methods and electrical characterisation techniques as well as digital holography imaging. At the Host institution the fellow would become</p>	

familiar with Laser Doppler vibrometry in the MHz range and Brillouin light scattering to study the modes in the GHz range. The prospective fellow would bring expertise in experimental aspects of statistical physics and or device modelling. The proposal focuses on fundamental physics of the behaviour of non-linear systems. However, in the long run we can expect the realisation of low-power memory and switching elements from MHz to the GHz ranges.

**Research fields** *(You may choose more than one)*

Chemistry (CHE)	<input type="checkbox"/>	Life Sciences (LIF)	<input type="checkbox"/>
Economic Sciences (ECO)	<input type="checkbox"/>	Mathematics (MAT)	<input type="checkbox"/>
Environment and Geosciences (ENV)	<input type="checkbox"/>	Physics (PHY)	X
Information Science and Engineering (ENG)	X	Social Sciences and Humanities (SOC)	<input type="checkbox"/>

**Expiration date for Expressions of Interest from postdoctoral fellows:** **15<sup>th</sup> June 2024**

**Necessary documents to be submitted** (in addition to the required CV and motivation letter):

[Title and abstract of PhD thesis](#)