

Marie-Skłodowska-Curie Actions – Postdoctoral Fellowships 2024

INL Expression of Interest

Research Group Leader /Research Group name:	
Begoña Espiña/ Water Quality	
Scientist in charge:	
Name & surname	Begoña Espiña
Contact email	begona.espina@inl.int
Short description of the research group, including URL if applicable (Strengths and scientific achievements (publications, patents, etc.), important infrastructure (up to 2000 characters with spaces)):	
<p>Dr. Begoña Espiña founded the Water Quality Group at INL in 2016 (https://inl.int/research-groups/water-quality/). Dr. Espiña received 3 awards, had 2 patents granted, established collaborations with >40 research groups from 10 countries, and co-authored 5 book chapters, 80 articles in peer-reviewed international journals, and ca 150 communications in conferences. Dr. Espiña's track record also includes the supervision of 4 PhD students and 14 postdoctoral researchers and participation in 25 national/international projects. Since 2015, she has attracted >5 M€ of competitive funding for more than 20 projects on the development of sensors for environmental monitoring and econanosafety. Dr. Espiña is also a member of several Water Europe working groups and of the Society of Environmental Toxicology And Chemistry (SETAC). At our group, we run two research lines with the same moto: <i>Nanotechnology for a Safe and Sustainable use of Water Resources</i>; Water monitoring and Econanosafety. Within the ECONANOSAFETY research line, we evaluate nanomaterials' fate, transformation, toxicity and bioaccumulation in aquatic environments. A particular focus is paid to safe and sustainable-by-design approaches in nanomaterials and nano-enabled products. We have a complete set of characterisation equipment for nanomaterials and bio-interactions available. We develop lab-on-a-chip devices that can automate and build more reliable and suitable nanomaterial testing models, including nanoparticle sensors. We have two devoted laboratories; Zebrafish lab and Econanolab, for zebrafish embryos and microalgae and other aquatic invertebrates, respectively, and extensive knowledge in biological sample preparation and imaging by optical and electron microscopies. Additionally, we have extensive experience in microfluidics' design and fabrication by photolithography + soft lithography, 3D printing, laser cutting and CNC micromilling. At INL, we have excellent micro- and nanofabrication as well as Nanophotonics and electron microscopy and advanced spectroscopies core facilities.</p>	
Project title:	

Microfluidic flow-through systems for more representative aquatic environmental risk assessment tests

Project description (up to 2000 characters with spaces):

One of the main limitations of the ecotoxicity experiments with nanoparticles and low water-soluble molecules is the impossibility of maintaining a constant concentration throughout the experiment. The nanoparticles and molecules tend to lose stability in the environmental matrix and deposit at the bottom of the container, modifying their bioavailability to the exposed organisms.

We welcome applications focused in generating, based on our expertise in microfabrication, microfluidics, ecotoxicology, and sensors, prototypes for ecotoxicology-on-a-chip that would allow multispecies evaluation of chemicals and nanoparticle toxicity. Some recent examples of fish embryos on a chip can be found here for inspiration:

Petr, Panuška., Zuzana, Nejedlá., Jiří, Smejkal., Petr, Aubrecht., Michaela, Liegertová., Marcel, Štofík., Jaromir, Havlica., Jaromir, Havlica., Jan, Malý. (2021). A millifluidic chip for cultivation of fish embryos and toxicity testing fabricated by 3D printing technology. RSC Advances, 11(33):20507-20518. doi: 10.1039/D1RA00846C

Fan, Yang., Chuan, Gao., Ping, Wang., Guo-Jun, Zhang., Zuanguang, Chen. (2016). Fish-on-a-chip: microfluidics for zebrafish research. Lab on a Chip, 16(7):1106-1125. doi: 10.1039/C6LC00044D

Research fields (You may choose more than one)

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

Expiration date for Expressions of Interest from postdoctoral fellows: 12th July 2024

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

Not applicable