

Call reference number	(2025-06)
Call name	Predocctoral position: Optical Nanoprinting
Application Deadline	2025/04/30

Introduction and main description

BCMaterials, Basque Center on Materials, Applications and Nanostructures, Leioa, Spain (www.bcmaterials.net), is an autonomous research center, belonging to Ikerbasque, the Basque Foundation for Science and the University of the Basque Country (UPV/EHU).

We are seeking a predoctoral researcher in Chemical Physics/Materials Chemistry, specializing in emerging optical techniques for nanomaterial printing. We offer a full-time, one-year predoctoral position. The position focuses on developing opto-thermophoretic printing of nanoparticles on solid surfaces.

Thermophoresis, the movement of molecules and colloids under a thermal gradient, has been recently shown to be effective for localized trapping, manipulation, and even printing of colloidal particles at interfaces. However, fundamental challenges persist, including limited understanding of interparticle or particle-substrate interactions, scalability or precision in deposition. The lack of broader understanding of the behavior of various molecules and colloidal species poses a great challenge to the ongoing development of thermophoresis as a tool for patterning and assembly. Measuring and predicting thermophoretic behaviour and interactions between solvent/substrate/ligand/particle will allow us to advance the field of optically-driven colloidal assembly, which is critical for rapid, on-demand fabrication of sensors and devices.

The work will involve heavy use of a customized optical setup and microscope, where lasers are used to generate local thermal gradients which can drive assembly, followed by characterization of printed patterns by techniques such as electron microscopy and Raman spectroscopy. Detailed studies of the colloidal interactions between nanoparticles, polymers, and solvent will provide the opportunity for combining both experimental and computational studies.

Skills and Requirements

A Master's Degree in Supramolecular Chemistry or a related field.
 Experience in research involving thermophoresis, optothermophoresis, or laser assembly of nanoparticles at interfaces will be an advantage.
 Proficiency in speaking and writing in English.
 Demonstrable experience in writing scientific articles.
 Self-motivation and ability to work in a team.
 A high level of motivation and independent thinking skills.
 Ability and eagerness to learn new skills outside their own discipline.
 Presentation skills and ability to meet deadlines.

Work Program / Duties / Responsibilities

Main responsibilities include:

Operating a customized optical setup used for printing
Determining the optimal colloidal conditions for printing
Synthesis, surface modification, and characterization of nanoparticles
Characterization of printed assemblies of nanoparticles, including techniques such as:
- Electron microscopy (SEM)
- Surface enhanced Raman scattering spectroscopy (SERS)
Developing a theoretical understanding of the mechanism involved in the printing process

Additional responsibilities:

Writing of manuscripts
Presenting work at national/international conferences
Maintaining optical setup and all optical components
Working closely with collaborators

Finally:

The predoctoral researcher will be incorporated at BCMaterials under the supervision of Eric Hill, Ikerbasque Associate Research Professor.
The candidate will be in close contact with several renowned international groups in the field of nanoparticle synthesis and assembly in Europe and abroad.

Application Procedure

Apply by submitting a motivation letter and a CV (in English) using the "Contact" button at the corresponding offer, at the "Join Us" area on BCMaterials' portal (<https://www.bcmaterials.net/join-us>).
Your name and email address will be required for further contact too.

Other Relevant Information

Include contact details for 2 referees.
Interviews will be conducted soon after the deadline.
The preferred starting date to join is July 1, 2025.