Information on the research group relevant to the training programme

TITLE OF THE PROJECT (ACRONYM): Transport and retention of anthropogenic particulate organic matter (APOM) in Mediterranean streams under global change (APOM-cycling)

The PhD candidate will become a member of the project research team. The APOM-cycling research team will include specialized technicians, PhD students, young researchers and senior researchers with internationally recognized expertise in ecotoxicology, biofilm ecology, dynamics of particulate and soluble forms of organic matter and nutrients, and associated biogeochemical processes in Mediterranean river ecosystems. The whole team will contribute to the doctoral training and implementation of the project, which is organized in three work packages and seven specific objectives (see chart below).

WP1. Influence of land-uses on APOM	**SO1.1** Examine how transport and storage of APOM in biotic and abiotic stream compartments vary among streams subjected to different land-use pressures (leader EM).
	SO1.2 Characterize the capacity to retain MicP of streams subjected to different land-use pressures, and the hydro-morphological factors that govern it (leader EM).
	SO1.3 Evaluate the influence of nutrients and grazing on the capacity of biofilms to retain MicP (leader HG).
	SO1.4 Evaluate the trophic transfer of MicP from biofilms to grazers (leader HG).
WP2. Influence of hydrology on APOM	**SO2.1** Quantify the contribution of floods and droughts on transport and retention of APOM (leader HG).
	SO2.2. Evaluate the influence of droughts on the capacity of biofilms to retain MicP. (leader EM)
WP3. Integrative model	**SO3.1** Develop a conceptual model on transport and retention of APOM in Mediterranean streams, considering the role of hydromorphology, trophic status and hydrological extremes as global-change modulating factors (leaders EM & HG)

The scientific scope and the multidisciplinary character of the team members (Table 1) ensure that the training program will be done successfully. Specifically, the project will count with the support and participation of two specialized technicians (Miquel Ribot and Sara Castellar); four young researchers (Steffanie Merbt and Berta Bonet from CEAB; Joaquin Cochero from Argentina and Alexandra Kroll from Switzerland); two senior researchers (Gaël Le Roux and Tim Hoellein); and two late-stage PhD students (David Pineda and Henar Margenat). The two PIs (Helena Guasch and Eugènia Martí) have long-term experience as PIs of projects from international and national research calls; and thus, have robust skills to lead the present project. In particular, in the context of the APOM-cycling proposal, Helena Guasch has been the coordinator of two international projects dealing with the study of plastics in fluvial ecosystems (PLASTIC0PYR) and the in-stream interaction between microplastics and biofilms (PlasticinBiofilms). These projects are strongly related with the aims of APOM-cycling and also include the participation of experts from international institutions. Eugènia Martí is also involved in these projects assessing the functional responses of biofilms developed on plastic and bioplastic substrata and developing a model of plastic transport and storage in high mountain streams. The work team will also benefit from the participation of well recognized experts in plastic research. Tim Hoellein is a reference researcher in the dynamics of plastics in fluvial ecosystems. He has developed the field methodology that will be applied in APOM-cycling to quantify the contribution of floods and droughts on the transport and retention of APOM in streams (SO2.1). He will also participate in the tasks involved in the development of the APOM dynamics model (SO3.1). Gaël Le Roux is a biogeochemist specialized in the transfers among atmosphere-soil-organisms, with experience in the study of the smaller portion of MicP in atmospheric samples. Henar Margenat is a PhD student dedicated to understand the spatial distribution of MicP in pristine mountain areas, and has experience in the use of Raman, micro FTIR and Nyle red staining for MicP analysis. The contribution of Gaël and Henar will be of great value in the intercalibration of methods for MicP analysis among laboratories (SO1.4.). Alexandra Kroll is an expert for risk assessment of micro-pollutants, pharmaceutics and

micro/nanoplastic in the aquatic environment. She has developed a groundbreaking method for the detection and quantification of MicP in complex biological matrices. She will participate in tasks involved in SO1.4 and the intercalibration of methods. Joaquin Cochero, is an expert in social engagement related with plastic pollution; and in the study of the effects of MicP on biofilms. He will participate in the development of citizen science activities and the analysis of MicP in biofilms (SO1.4). This international collaboration will also contribute to the validation of methods addressed to identify, quantify and characterize the nature of MicP in complex samples (i.e., biofilms and snails).

Table 1. *List of personnel involved in the project, indicating their professional status and expertise. Codes for the personnel names are used in the description of the methodology (section 3.2) of the proposal to indicate their involvement in research tasks as Principal Investigator (PI); Research Team (RT) member; or Work Team (WT) member and in which specific objectives (SO) they are involved. Leaders of particular SO are highlighted in bold.*

Name	***Code***	***Position***	***Team invol.***	***Expertise***	***SO Participation***
Stephanie Merbt	SN	Doctora fuera de Convenio CSIC	RT	Microbial ecology, ecotoxicology, biofilms, trophic transfer	1.3; 1.4; 2.1; 3.1
Berta Bonet	BN	Doctora, programa Confuturo, CSIC	WT	Nanoparticles, microplastics, stress ecology, ecotoxicology, biofilms	1.3; 1.4; 2.1; 3.1
Alexandra Kroll	AK	Tenure track Scientist at Centre Ecotox (Switzerland)	WT	risk assessment of pharmaceutics and micro/nanoplastic in the aquatic environment.	1.3; 1.4; 3.1
Joaquín Cochero	JC	Investigador Adjunto CONICET (Argentina)	WT	Biofilms, urban impacts, biogeochemistry	1.2.; 1.3; 1.4; 2.2; 3.1
Miquel Ribot	MR	Técnico contrato indefinido CSIC	RT	Stream biogeochemistry, nature based solutions and restoration	1.1; 1.2; 2.2; 3.1
Sara Castelar	SC	Contrato PTA	WT	Técnico de apoyo en el Urban River Lab	1.1; 1.2; 1.3; 2.1; 2.2; 3.1
David Pineda	DP	FPU fellowship PhD student	WT	Role of biofilms in the dynamics of phosphorus in impacted rivers	1.1; 1.2; 1.3; 2.1; 2.2; 3.1
Henar Margenat	HM	PhD student. LEFE (France)	WT	Upstream ecology, contaminant biogeochemistry	1.1; 1.4; 2.1, 3.1
Tim Hoellein	TIM	Assoc. Prof. Loyola University (USA)	WT	Urban ecology, biogeochemistry, and plastic pollution	1.1; 1.2; 1.4; 2.1; 3.1
Gael Le Roux	GL	Professeur de Recherce, LEFE (France)	WT	Biogeochemistry, plastic characterization	1.1; 1.4; 2.1; 3.1
Helena Guasch	HG	Científica Titular CSIC	PI	Fluvial ecotoxicology, biofilms, plastic pollution	1.1; 1.2; **1.3; 1.4**; **2.1;** 2.2; **3.1**
Eugènia Martí	EM	Investigadora Científica CSIC	PI	Stream biogeochemistry and global change pressures	**1.1; 1.2;** 1.3; 1.4; 2.1; **2.2; 3.1**

Due to the long-term trajectory of the research team on the study of fluvial ecotoxicology, biogeochemistry, biofilm ecology, and experimental ecology, the team has most of the equipment for the planned field and laboratory work. In addition to the availability of indoor and outdoor channels,

our research group has the following equipment: multi probes of dissolved oxygen, pH and conductivity (for in situ water quality assessment); Benthotorch (to measure algal biomass in situ); manta net with mesh size to collect particles >300µm (to sample MicP from the water column); sieves (from 60 µm to - 5cm particle size); peristaltic pump, and a device to measure stream flow. For biofilm analysis we have a Pulse Amplitude Modulated fluorometer, Walz (to analyze the photosynthetic performance of algae in biofilms); a Fibox4 Oxymeter, microsensor spots and a set of winklers (to measure biofilm metabolism). In addition, CEAB-CSIC has a laboratory of plastics to process samples and analyze the composition of plastics with a Nicolet Summit FTIR Spectrometer (polymer's identification); stereo-microscope zoom 1:10 with EpiFluorescence HBO 100W (for image analysis and quantification of MicP in environmental samples). There is also an analytical service of water chemistry, which includes auto-analyzers for nutrient concentrations, a HPLC, and a spectrofluorometer (for characterization of content and quality of dissolved organic matter); a TOC and TN Shimazu autoanalyzer. Other CEAB-CSIC facilities that may help the development of the proposed tasks are laboratories for a) metagenomic and molecular biology analyses, b) microscopy observations, and c) the CBL service with a high-performance computational cluster for modelling and analysis of large data sets. A fleet of vehicles is available at the CEAB-CSIC to be used for fieldwork.

CV of Eugénia Martí: see: ORCID 0000-0002-6910-4874; CV of Helena Guasch: see ORCID 0000-0002-1264-5346.