Florence, 06/10/2023

Request of Approval**: 14/2023**

Irene Costantini is currently a researcher at the Department of Biology, University of Florence, associated with LENS, the European Laboratory for Non-Linear Spectroscopy, under a research funded by NIH where she pursued her research activity on three-dimensional reconstructions, with cellular resolution, of volumetric samples using light sheet fluorescence microscopy (LSFM) and two-photon fluorescence microscopy (TPFM). To this aim, she is developing new clearing methods to obtain transparent biological samples that are macromolecule-permeable and compatible with fluorescence immunostaining. Her work in the field of tissue imaging on setting up experiments for high-resolution three-dimensional reconstruction of cleared biological specimens led to the publication of 36 scientific articles in peer-reviewed newspapers. Although her main background is in biotechnology, her long experience at LENS (Irene Costantini obtained her PhD in Atomic and Molecular Photonics at LENS in 2016 and performed her post-doc as LENS affiliated) allowed her to acquire knowledge of microscopy, optics, and in general biophysics. These capabilities, during the last three years of work, allowed the creation of collaborations with other scientists of the Department of Biology permitting the exploitation of LENS equipment in various fields. In particular, TPFM imaging was used to visualize nanocapsule penetration in plant roots, a work published on Methods Mol Biol. (2566:345-353) in 2023 entitled "Fluorescent Labeling of Lignin Nanocapsules with Fluorol Yellow 088" by Cheli et al. Moreover, the development of a tissue clearing method (iDISCO) for honey bee brain preparation allowed us to verify the presence of microplastics in bee brains. The work is now under submission and a preprint is available on bioRxiv with the title "Microplastics reach the brain and interfere with honey bee cognition" by Pasquini et al. Finally, the collaboration was also pursued in training activities: a gain supervision of a master student of "Biologia Molecolare e Applicata" between Irene Costantini and Elena Pilli, assistant professor at Biology Department as Forensic Molecular Anthropologist, led to a thesis entitled "3D Histology and DNA Extraction: a combined analysis set-up for forensic purposes".
For this reason, I believe, together with her group leader Prof. Francesco S. Pavone, that the current work of Irene Costantini, performed during her temporary position of a researcher, is strategic for LENS due to the character of her interdisciplinary research and for the connections with several departments of the university of Florence interested to collaborate with LENS on those topics. Currently, her contract is going to expire on the 31st of March 2024, and could be renewed for another two years. We suggest using available funds at LENS for that purpose. We suggest using funds not subject to reporting at LENS for that purpose such as Nanomax.
The amount of the sum to be transferred to the Department of Biology corresponds to 102.169,10 Euro to renew her position for two years.

Thank you for a prompt answer.

The Director
Prof. Elisabetta Cerbai

Approved by
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Paolo De Natale
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