



Università
Ca'Foscari
Venezia

PROJECT ACRONYM AND TITLE: ICELEARNING - Artificial Intelligence techniques for ice core analyses

FUNDING PROGRAMME: H2020 Marie-Sklodowska Curie Actions Individual Fellowship

CALL: H2020-MSCA-IF-2018-European Fellowship – Marie Skłodowska-Curie Individual Fellowships

SCIENTIFIC FIELDS: Environmental and Geosciences

HOST DEPARTMENT: DAIS – Department of Environmental Sciences, Informatics and Statistics

SCIENTIFIC RESPONSIBLE: Carlo Barbante

FELLOW: Niccolò Maffezzoli

FINANCIAL DATA:

Project total costs	Overall funding assigned to UNIVE
€ 171.473,28	€ 171.473,28

ABSTRACT:

The detection of insoluble particles trapped in ice or sediment cores, like pollen grains, foraminiferal and diatom assemblages, volcanic and dust particles represents the basis for paleo-research on the biosphere, volcanism and oceanic and atmospheric realms. To date, except for ice core dust, this analytical goal is achieved during years of particle observations by manual microscopy. Artificial Intelligence predictive models are already applied to several research fields within geoscience, but up to date its implementation to paleoclimate is missing. With ICELEARNING, I aim to develop a two-phase routine for the automatic quantification of insoluble particles trapped in ice cores. The routine is based on a commercial Flow maging Microscope producing particle images from within melted ice samples. The images are then analyzed by Pattern Recognition algorithms which will be developed for automatic particle classification and counting. The routine will be specifically developed in order to be implemented in Continuous Flow Analysis (CFA) systems, therefore surpassing the traditional methods by providing continuous particle records from ice cores. ICELEARNING methodology is suitable to any diluted sample, thus representing a ground-breaking analytical advancement from ice core science to marine geology. This innovative routine is automatic and non-destructive, imperative prerequisites for the future Antarctic ice core project analytical measurements, aiming to retrieve a continuous climatic and environmental record covering the last 1.5 Myr. ICELEARNING will be developed at Ca' Foscari University of Venice with Prof. Carlo Barbante, leading expert in trace and ultra-trace level impurity detections in ice cores and with the University of Bergen, a top institution in marine geology and paleoceanography. This unique synergy, in addition to the proposer's knowledge of CFA systems and machine learning techniques will provide the best preconditions for the project success.

Planned Start date	Planned End date
1 st September 2019	31 st August 2021

PARTNERSHIP:

1. Ca' Foscari University

Italia

Coordinatore
