

Description of Funded Research Projects

1st Call for H.F.R.I. Research Projects
to support Post-Doctoral Researchers



H.F.R.I.
Hellenic Foundation for
Research & Innovation

Research Project Title:
**Detection of engineered,
incidental, and natural
nanoparticles in marine waters,
in the proximity of islands**

Principal Investigator:
Andreas Gondikas



Popular Title:
**Nanoparticles in the marine environment:
products of nature and wastes of human
activity**

Scientific Field:
Natural Sciences

Host Institution:
**National and Kapodistrian
University of Athens**



The development of nanotechnology has introduced significant advancements in materials sciences and several companies, taking advantage of the unique properties of nanomaterials, are developing nano-enabled products that have already entered the market. Cosmetics, sunscreens, paints, automotive parts, tools, fabrics/clothes, toys, and many others are just a few examples. Due to the increasing development and use of nano-enabled products, release of nanoparticles in the environment is considered unavoidable.

Quantifying this release is a challenging task, due to the lack of standardized methods of analysis for environmental samples, and the mixing of manufactured with natural nanoparticles in the environment. Natural particles are produced through bio-geo-chemical reactions in the environment, such as volcanic activity, the corrosion of rocks by wind and rain, etc.

The NanolIsland project aims to apply methods of quantifying the release of manufactured nanoparticles in the marine environment of Santorini Island. The quantities and physical-chemical characteristics of anthropogenic nanoparticles will be compared to those of natural nanoparticles, produced by the volcanic activity in the Caldera of Santorini Island and the climate conditions of the Aegean Sea. Santorini Island is a unique natural environment for the detection of nanoparticles in the sea, because the circular shape and depth of its caldera forms a natural trap for anthropogenic and natural particles. Furthermore, the impact of human activities is multiplied during the tourist season, due to intensified transportation and the massive arrival of tourists on the island. The study of nanoparticles during this season will reveal a new dimension of human impact in the marine environment of Santorini Island.

The presence of anthropogenic and natural nanoparticles in the sea of Santorini will be studied during the NanoIsland project. The project data will be shared in international databases in order to be utilized in ecotoxicological studies and for developing regulations for nanotechnology on a national and international level. The quantification of anthropogenic nanoparticles in the natural environment remains largely unexplored and the NanoIsland project will reveal its impact in the marine environment of popular tourist destinations. The results are applicable to many areas in the Mediterranean and offer a point of reference for areas wetted by other seas and oceans.

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Having studied and worked for eight years in the U.S.A., three years in Austria, two years in Sweden, and one year in Germany, I have always tried to find a way to return to Greece. With the grant from ELIDEK I can now achieve this goal and work in the field of my expertise.

Although salaries for the whole team are a fraction of corresponding salaries abroad, I am given the chance to create a new team for two years, with the help and guidance of renowned scientists in Greece. Furthermore, I am given the chance to maintain international collaborations and explore ways of collaborating with Greek companies and institutions in order to establish myself in my homeland, adjusting my knowledge and experiences to the Greek environment.

*The Principal Investigator,
Andreas Gondikas*

Funding

Amount: **172,700 €**

Duration: **24 months**

Foundation: **H.F.R.I.**





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CONTACT

127, Vasilissis Sofias Avenue
115 21 Athens, Greece
info@elidek.gr
www.elidek.gr



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