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

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Research Project Title:

Determination of the self-healing capabilities of the Eastern Mediterranean Sea from accidental deep-sea oil releases

Principal Investigator:
Evangelia Gontikaki

Popular Title:
Recovery of deep-sea ecosystems from oil pollution

Scientific Field:
Environment and Energy

Host Institution:
Technical University of Crete

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As exploration for new oil and gas fields moves to progressively deeper waters, the risk of oil spills originating in the deep sea is bound to increase in the future. The recent Deepwater Horizon (DWH) oil spill at 1500m in the Gulf of Mexico was a stark reminder of the risks attached to human activity in largely unknown extreme environments and has evidently demonstrated the shortcomings of current response strategies in tackling accidental oil releases in the deep sea.

In recent years, several major offshore oil and natural gas deposits have been discovered in the Eastern Mediterranean that could be translated into economic growth and energy security for associated countries. However, a similar to DWH incident in the eastern Mediterranean would have disproportionate consequences due to the semi-enclosed nature and the concentrated economic activity along the Mediterranean coast. Today we know that deep-water microbial communities play a pivotal role in oil spill remediation. Understanding the structure and function of microbial communities under the high pressure and low temperature conditions of the deep ocean, is the first step in developing innovative oil spill monitoring and bioremediation solutions. Thus far, lack of advanced experimental systems operating at a range of pressure and temperature conditions has been a critical obstacle in obtaining meaningful data.

A unique high-pressure experimentation system capable of simulating the discharge of crude oil in deep waters has recently become available at the host institute, the Technical University of Crete (School of Environmental Engineering, Biochemical Engineering and Environmental Biotechnology Laboratory) and will be used in this project to generate the first ever experimental data, on the self-healing capabilities of the Eastern Mediterranean Sea from accidental deep sea oil releases at typical offshore drilling depths (>1000 m). The outcomes of this project will be used to inform the Greek National Contingency Plan for marine pollution.

Project Impact on Society

By increasing oil spill preparedness and advising Greek authorities on the most appropriate response measures in the event of a deep-sea oil spill in the Eastern Mediterranean, this project will contribute to the protection of coastal ecosystems and economies as well as human health against oil pollution. For example, the effectiveness and necessity of chemical dispersant use in deep-sea oil spills will be assessed, in order to avoid the unnecessary use of chemicals potentially toxic to marine life.

The quantitative data generated in this project can also be used in oil spill models to predict the movement, spreading and dissipation of oil. This research is of interest to the general public who are major stakeholders in cases of oil spills, as well as to the Oil & Gas industry operators who are legally responsible for covering the cost of environmental damage resulting from their activities. The public will be engaged in the research through the comprehensive public outreach plan of the proposal.

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To me, H.F.R.I. funding would mean...

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The founding of the Hellenic Foundation for Research and Innovation (HFRI) was a breath of fresh air for Greek research. Great effort has been dedicated for H.F.R.I. to function similarly to national funding bodies abroad, and this has been achieved to a great extent. The H.F.R.I. call for postdoctoral researchers offered me the opportunity to conduct high profile research in my home country, a combination that has always been a challenge for Greek scientists.
Research and innovation could be a driving force for the recovery of the Greek economy in the near future and I sincerely hope H.F.R.I. will continue to play a central role towards this goal.

The Principal Investigator,
Evangelia Gontikaki

Funding

Amount: **155,000 €**

Duration: **36 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

HELLENIC REPUBLIC
MINISTRY OF DEVELOPMENT AND INVESTMENTS

GSRT
GENERAL SECRETARIAT FOR RESEARCH AND TECHNOLOGY