



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

**Description of the funded research project**  
**1st Call for H.F.R.I. Research Projects to Support Faculty**  
**Members & Researchers and Procure High-Value**  
**Research Equipment**

**Title of the research project: REactive oxyGEN Species in aerosols: assEssing the health effect of paRticulAte matter (Acronym: REGENERATE)**

**Principal Investigator: Nikolaos Mihalopoulos**

**Reader-friendly title: REGENERATE**

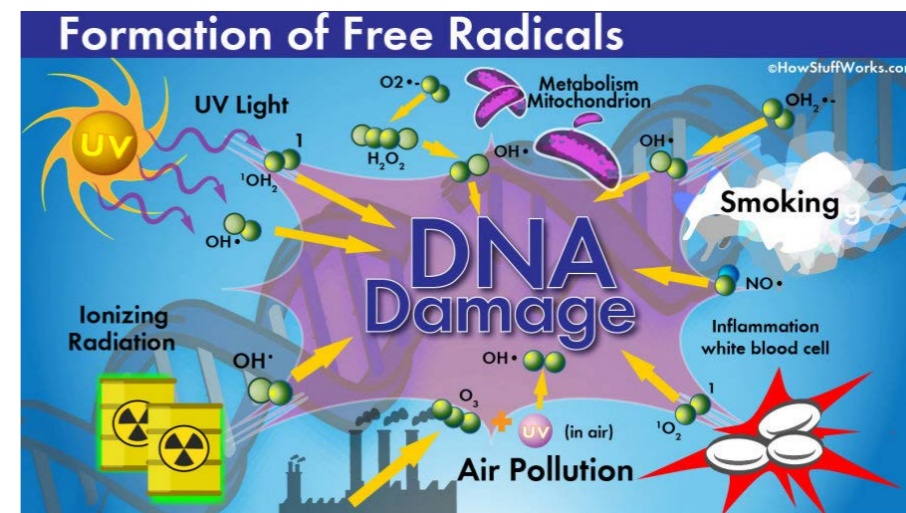
**Scientific Area: Environment & Energy**

**Institution and Country: National Observatory of Athens, Greece**

**Host Institution: Institute for Environmental Research & Sustainable Development**

**Collaborating Institution(s): Aerosol & Particle Technology Laboratory, Centre for Research and Technology- Hellas**

**Project webpage (if applicable):**



<https://science.howstuffworks.com/life/cellular-microscopic/free-radicals.htm>



**Budget: 170,000 Euros**

**Duration: 36 months**

## Research Project Synopsis

**It is well established that increased particulate matter (PM) concentrations are adversely linked to cardiovascular disease, acute respiratory disorders and oxidative stress. Under physiological conditions, free radicals are naturally produced in the human body through non-enzymatic processes, metabolic processes and during immune responses. Nevertheless, many aspects of modern life, such as diet, lifestyle and environmental factors such as pollution can cause excess of those radicals, also known as Reactive Oxygen Species (ROS) with the body being forced to cope with unnatural amounts, leading to oxidative stress.**

**The main goal of the proposed work is to assess the potential health impact of aerosols in Athens and other major cities in Greece via the characterization of their ROS activity, using a combination of field and laboratory studies complemented by statistical interpolation and attribute this activity to specific aerosol sources. The findings will be used to inform the public and policy makers of the importance of the results in order to take measures to reduce human exposure to these sources.**

## Project originality

**Apart from the fact that the determination of ROS activity is quite novel itself not only for Greece but also worldwide, the possible expansion to a large scale experiment that will include the analysis of samples collected at other major cities in Greece will provide the mapping of ROS levels within Greece.**

**Sources and source origin of ROS will be identified using advances statistical analysis tools, providing the contribution of the various PM sources on ROS activity in Athens on an annual basis.**

**Finally, the toxicity, expressed by the intrinsic activity, of specific sources can be estimated, with the use of laboratory samples collected under controlled conditions, representative of specific sources, such as traffic, biomass burning, and aged/processed aerosol.**

## Expected results & Research Project Impact

**REGENERATE will result in an extensive environmental database of numerous environmental and pollution-relevant components which will be available in several (inter)national open access data repositories and will become a reference baseline that will serve in the near future a large scientific community of end-users to address issues related to aerosol sources and impacts.**

**Research actions will be paired with a dissemination and communication program to help raising awareness among the general public and local governmental officials. REGENERATE will pave the way for the definition of the most efficient local abatement actions (traffic, domestic heating, etc.) with expected impacts on life quality but also on national economy (medical costs, productivity through working days lost, etc.).**

**Finally, the project will assist in further establishing the Host Institute as a regional center of excellence in environmental products and services.**

## The importance of this funding

**Funding from H.F.R.I. will allow young post-doctorate and PhD students to stay in Greece and perform high quality research at a cutting edge subject, that of health impact of aerosols with important societal and economic impacts.**



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## COMMUNICATION

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