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

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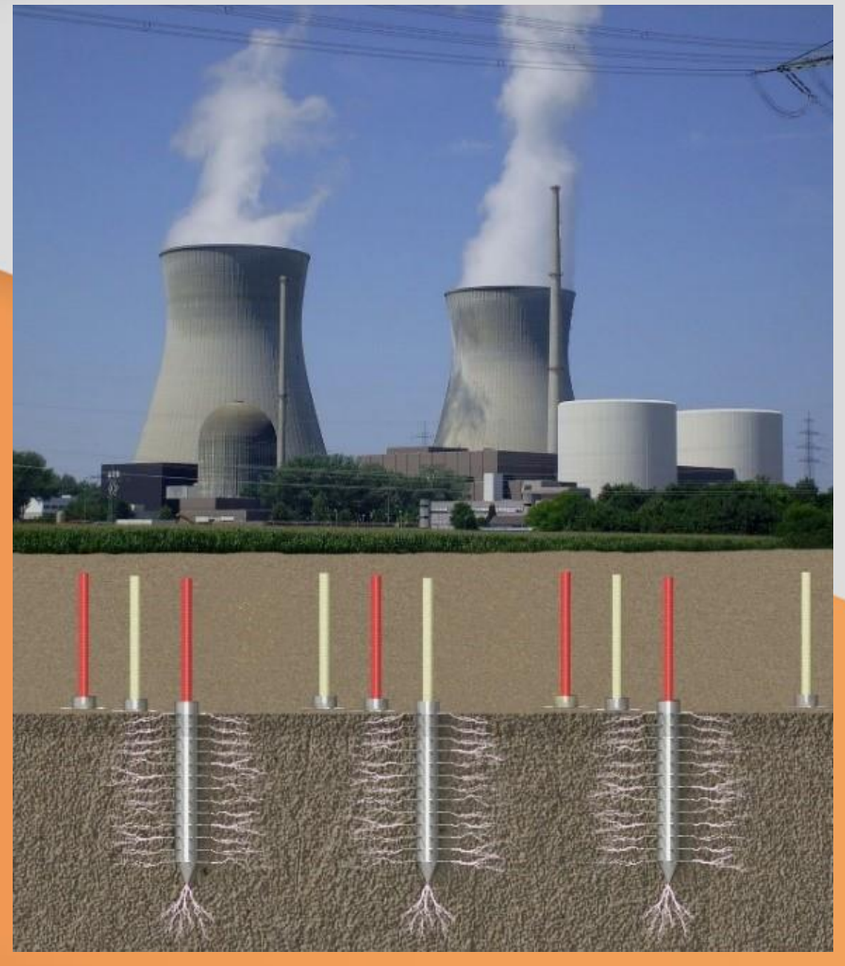
Research Project Title:

In Situ Soil Remediation by Non-Thermal Plasma

Principal Investigator:
Christos Aggelopoulos



Popular Title:
In situ soil treatment by lightning

Scientific Field:
Environment Studies

Host Institution:
Foundation for Research and Technology-Institute of Chemical Engineering Sciences

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The goal of the project is to examine the applicability of non-thermal plasma (NTP) discharge techniques as advanced oxidation methods for the resource-efficient, sustainable and cost-effective in-situ remediation of soil contaminated by recalcitrant organic pollutants. Studies of plasma discharge techniques will be performed on lab-scale reactors by testing the possibility to remove several classes of recalcitrant / persistent organic pollutants (e.g. pesticides, chlorinated solvents, PAH) from two specific soil types. Plasma discharge reactors will be designed, constructed and tested for the in situ treatment of polluted soils by NTP. Parametric studies with respect to soil properties, pollutant type/concentration, moisture content, oxidant type, and flow conditions will be performed.

A macroscopic numerical simulator of pollutant oxidation by plasma will be developed by coupling mass-transfer with reactive processes in porous media. Based on lab-scale studies and numerical modeling, a pilot plant will be designed for the in situ remediation of soils by NTP. Technical, economic and environmental factors will be accounted for benchmarking and assessing the lifecycle viability, sustainability and cost-effectiveness of soil remediation with plasma oxidation methods.

Project Impact on Society

The technology of the present research contributes significantly to the improvement of everyday life as the rapid, efficient and inexpensive rehabilitation of heavily-polluted areas will lead to (i) improving the health of citizens through the food chain and (ii) land use constraints, resulting in increased land availability for various socio-economic activities. In addition, it will contribute significantly to the sustainability of the ecosystem by: (i) maximizing soil decontamination efficiency by minimizing environmental footprint and energy consumption; and (ii) allowing land reuse either directly in the agricultural sector (food production) or indirectly as raw material for the creation of industrial products.

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

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This funding gives me an opportunity for autonomous research based on the following possibilities: acquiring equipment and materials for the creation of a new lab where cold plasma will be tested as innovative technology to address environmental problems; creating a research team consisting of Postdoctoral researchers, PhD candidates, postgraduate students and technical staff.
In addition, funding from H.F.R.I. can serve as a springboard for acquiring new knowledge in the field of environmental systems that will lead to new ideas / research proposals / programs contributing to further personal research development as well as development of the Institute hosting this research activity.

The Principal Investigator,
Christos Aggelopoulos

Funding

Amount: **155,000 €**

Duration: **36 months**

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

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