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HABILITATION THESIS

SUMMARY

STUDIES AND RESEARCH RELATED TO THE SELF-CLEANING AND SOIL CLEANING PROCESSES

DOMAIN: ENVIRONMENTAL ENGINEERING

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A. SUMMARY

The habilitation thesis entitled "STUDIES AND RESEARCH RELATED TO THE SELF-CLEANING AND SOIL CLEANING PROCESSES" summarizes the results of the teaching, professional and research activities, from the period after the doctoral internship (2007-2008), the PhD thesis (2011) and after obtaining the scientific title of Doctor (2011-2023).

This habilitation thesis presents multidisciplinary thematic directions addressed and developed so far, current and prospective, within the field of Environmental Engineering. The thematic research directions addressed both before and after obtaining the scientific title of PhD, were/are a continuation of the PhD thesis theme, namely: soil as a filtering material, i.e. the influence of soil physical, chemical and mechanical properties in the process of self-cleaning and cleaning; and soil as an ecosystem in the process of self-cleaning and cleaning. The structure of the habilitation thesis is based on the two research directions outlined above but interdisciplinary directions that have been addressed throughout teaching and research career are also discussed.

The first research direction: **Soil as a filtering material**, was developed based on the term "soil as a filtering material", i.e. the subject of the PhD thesis - the influence of soil properties in the process of self-cleaning and cleaning-, but also on the establishment of connections between sources and factors of pollution for soil, the influence of pollution on soil quality, the dispersion of pollutants in the soil, the remaining soil pollution, the monitoring of soil quality indicators, etc. The second research direction: **Soil seen as an ecosystem in the process of self-cleaning and cleaning**, was initiated based on the continuation of the research of the PhD thesis, namely by continuing research in the field of soil science, namely soil seen as an ecosystem in the process of self-cleaning and cleaning.

Other research directions have involved in research topics specific to the field of Environmental Engineering or interdisciplinary such as: studies and research on membrane ultrafiltration process, domestic wastewater treatment, modification of river flows, circular economy, etc.

The teaching activity started with the completion of undergraduate studies and the beginning of master studies (October 2007). Following the public defense, in October 2011, of my PhD thesis entitled "INFLUENCE OF SOIL PHYSICAL AND MECHANICAL PROPERTIES IN THE PROCESS OF SELF-CLEANING AND CLEANING", I obtained my

PhD degree. In 2010 I completed a three-month doctoral internship at the Polytechnic University of Turin, Italy, Department of Environmental Engineering and Geotechnology.

The promotion to the post of academic assistant represented, in addition to fulfilling the specific tasks of the job description, a stage in which diploma projects were coordinated in the IPMI and EPI specialisations. Also, during this period I participated as a member of the organising collectives of various student activities (e.g. organisation of student scientific communication sessions).

Since 2015 I have been working in the IMIM department as head of works, which has meant the extension of teaching activities by teaching courses specific to the research field addressed, namely soil science, coastal engineering. During this period I was also part of several PhD supervision committees, which allowed me to expand my study topics and collaborate in complex research teams, and since 2021 I am associate professor in the same department.

Since 2011 and until now, the scientific research activities have resulted in: **Scientific papers published: 37 scientific articles in ISI indexed/coded journals of which 16 as main author (first author or corresponding author); 11 articles published in ISI/SCOPUS indexed proceedings; 24 scientific articles in BDI indexed journals; Published books: 8 books published of which first author on three; Research contracts with economic agents - member in 31 contracts; Other research activities (visibility of research activity): 279 citations (including self-citations), h index 10, according to Google Academic; 251 citations (including self-citations), h index 10, according to Scopus (ID 55596123900); 124 citations (including self-citations), h index 7, according to Web of Science (ID: A-9446-2015); 164 citations (without self-citations) in ISI journals; member of the editorial board of an international journal: Journal of Engineering Studies and Research; responsible for Scientific Research Management and National and International Relations in the Department.**

The research activity is generally aimed at proposing and solving scientific topics that can be solved in a short period of time, as well as extended topics involving several participants including from outside academia. Taking into account the professional experience gained in the research areas addressed, namely: Soil Science, Coastal Engineering, Natural Resources, Ecological Soil Reconstruction, Rehabilitation of Industrial Sites, Soil Remediation Technologies, the main research directions I intend to develop are: **Development of research activities in the research laboratories of the university and other related university centres, in the economic environment, namely:** identification within the university of laboratories in which specific research activities can be carried out; proposal and

implementation of new techniques by which the research activity in the specialist laboratories can be recognised at national and international level; expansion, where appropriate, of both the activities in the laboratories and the laboratory itself by attracting funds from research activity (R&D projects); strengthening existing collaborative links with other universities in the country and abroad; establishing new links with other universities where there are areas of common interest with those of the university and involving them in research projects; establishing collaborative links with various economic agents interested in research activity; involving students/masters/doctoral candidates in research activity by extending internships in collaboration with economic agents; **Exploitation of research results through the production and publication of scientific works:** publication of articles in specialized journals (ISI, BDI); publication of books in CNCSIS recognized publishing houses; participation in scientific events and conferences and publication of papers in their proceedings.

Future development of the proposed research directions in the field of Environmental Engineering, both nationally and internationally will lead to the development of the university/faculty/department by expanding research areas, creating new laboratories, establishing new collaborative links and increasing international recognition.