Livia Lantini | University of West London, UK

STUDENT PROFILE

Livia Lantini

Course
PhD in Civil Engineering

Year completed
2021

Title of thesis
Health monitoring of trees and investigation of tree root systems using ground penetrating radar (GPR)

Evidence suggests that trees and forests around the world are constantly being threatened by disease and environmental pressures. Over the last few years, new pathogens have spread rapidly in European forests, and quarantine measures have mostly been unable to contain these outbreaks. As a result, millions of trees were infected, and many of these have already died. It is therefore vital to identify infected trees on time in order to track, control and prevent the spread of disease.

In addressing these challenges, the available solutions often include cutting branches, incremental coring of trunks, or felling trees. However, these conventional techniques are destructive, difficult to implement and, mostly, unsuitable for a comprehensive information collection on trees' health.

In recent years, the application of non-invasive testing techniques has been accepted and valued in the arboriculture and forestry management sectors. Amongst these, ground penetrating radar (GPR) technology has increasingly been, given its flexibility, rapidity of data collection and cost-efficiency. Livia's research project aimed at addressing a major challenge within the context of the early identification of tree decay and disease control using GPR. Livia's PhD thesis addressed two main areas, namely, the characterisation of the internal structure of tree trunks and the assessment of tree root systems' architecture.

The approach proposed by Livia was transformative for the field and a departure from previous methods. Livia's research was recognised to have contributed to the development of novel methodologies for tree health monitoring using GPR. Her work has led to novel data collection, processing and interpretation techniques, with an important contribution to practical and theoretical work.

Livia's research has been published in numerous international peer-reviewed journals and presented at several international conferences, and received with interest by the scientific community. Livia was the recipient of a distinguished award for the 'Best Paper at the IEEE 2020 43rd International Conference on Telecommunications and Signal Processing'. She has also given invited presentations at prestigious national events and forums, such as a Business Breakfast event at the House of Lords, in February 2020. Livia is also a dedicated team member of Women in Science, Technology, Engineering and Mathematics (WInSTEM) at the School of Computing and Engineering at UWL, where she actively contributes to encouraging women to pursue careers in STEM subjects.

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Supervisors:

Professor Amir M. Alani and Professor Fabio Tosti

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