

Event Topic: Electromagnetic-Based Technologies for Agriculture and Water Resources

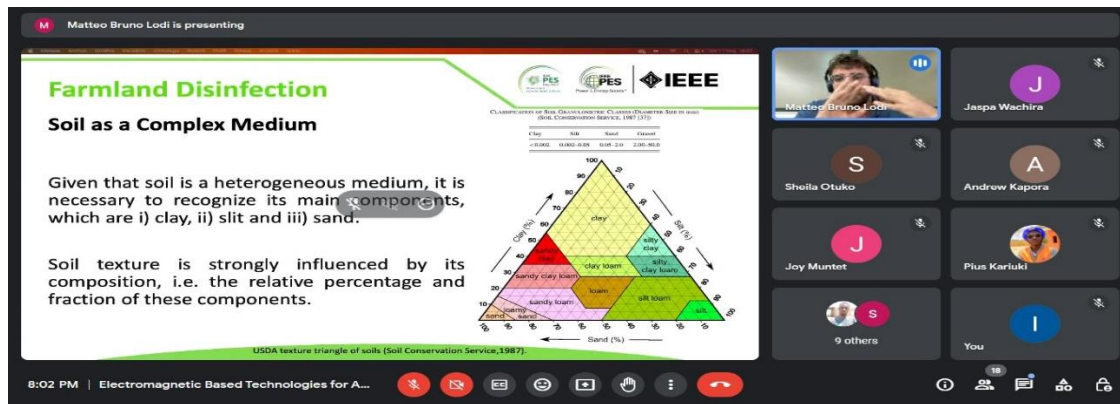
Date: 11th May 2023

Time: 7:30 PM – 9:00 PM EAT

Speaker: Dr Matteo Bruno Lodi

Venue: Virtual

Attendance: 18 attendees



HIGHLIGHTS FROM THE TALK

The webinar a collaboration of three PES student branches; PES Kenyatta University, PES Dedan Kimathi and PES Multimedia University aimed at PES Day 2023 celebration. The talk focused on the potential applications of electromagnetic technologies in the **Agriculture and Water Sectors and covered some Research Activities** that are still in progress which aim at inspiring new engineering and technological pathways to face the challenges of climate change and energy transition, rather than providing solutions to the problem.

The speaker dived into various sub-topics which included:

Farmland Disinfection – focused on the need to disinfect the soil, gave currently available methods such as solarization, use of pesticides, bioremediation and fumigation. Introduced a new concept, microwave disinfection; use of electromagnetic energy, and in particular, microwave frequencies.

He talked about his research and the various ways they have used microwaves to disinfect soils and explored details of various calculations and their applications on the same. He also talked

about an engineering approach for microwave disinfection, soil as a complex medium, soil electromagnetic properties, the nonlinear problem and the resolution scheme.

He demonstrated a model based on electromagnetic propagation and discretization and explained how the telegrapher's equation and heat transfer equation are applied in this model. He discussed a proposed approach using bio-effects and treatment quality to predict the dielectric permittivity profile and simulate microwave heating to study farmland disinfection. He finished off the agriculture part of the talk with different case studies, their results and future challenges in this field.

Water Defluoridation – started with causes of water fluoridation such as natural pollution and its distribution in various parts of the world, especially in Africa. He discussed fluoride ions and their effects on human health and gave various defluoridation technologies such as precipitation, membrane, electrochemical and adsorption.

He then introduced the use of electromagnetic technologies in water fluoridation by covering the elastic reactor, modelling of the electrostatic-based defluoridation, an overview of the simulations, their results and future perspectives.

CONCLUSION

The goal was achieved as it we were able to understand the various ways in which electromagnetic technologies could be used in agriculture and water resources to help in mitigating climate change.

The webinar was generally interactive and our eyes were opened up to ways in which we could use the knowledge we are taught in class and apply it to real life innovations and inventions.

Prepared by,

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