



CONFERENCE PROGRAM

2025 IEEE INTERNATIONAL WORKSHOP ON

Metrology for **Agriculture** and **Forestry**

BOLOGNA / OCTOBER 28-30, 2025



MetroAgriFor

BOLOGNA 2025

TABLE OF CONTENTS

TABLE OF CONTENTS	1
IEEE MetroAgriFor 2025 Committee	2
IEEE MetroAgriFor 2025 Keynote Speakers.....	5
IEEE MetroAgriFor 2025 Tutorial.....	10
IEEE MetroAgriFor 2025 Venue	12
IEEE MetroAgriFor 2025 Social Events.....	13
IEEE MetroAgriFor 2025 Sponsors.....	14
Program Schedule - Tuesday, Oct 28.....	15
Program Schedule - Wednesday, Oct 29	16
Program Schedule - Thursday, Oct 30	16
Technical Program - Tuesday, Oct 28	17
Technical Program - Wednesday, Oct 29.....	25
Technical Program - Thursday, Oct 30.....	33

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IEEE MetroAgriFor 2025 Keynote Speakers

Plenary Session - Tuesday October 28 - H 10:30



Printed and Stretchable Electronics: frontiers in agricultural applications

Wim Deferme

*Hasselt University, Institute for Materials Research (IMO-
IMOME), Belgium*

ABSTRACT

Printed and stretchable electronics are revolutionizing precision agriculture by enabling real-time, non-invasive monitoring of crop health and environmental conditions. These flexible, conformable devices can be seamlessly integrated into various agricultural settings, providing continuous data on critical parameters such as temperature, humidity, soil moisture, and plant growth dynamics.

Our research focuses on the development of screen-printed and liquid metal-based stretchable sensors tailored for agricultural applications. Utilizing materials like silver nanowire inks and eutectic gallium-indium alloys embedded in elastomeric substrates, we have created sensors capable of enduring the mechanical stresses of dynamic agricultural environments. These sensors are designed to monitor parameters including fruit expansion, stem elongation, and microclimatic variations, offering valuable insights for crop management.

Building upon our previous work in biomedical sensing—specifically, stretchable devices for wound monitoring—we have adapted these technologies for plant health assessment. For instance, our stretchable bioimpedance sensors, initially developed for monitoring tissue healing, can be repurposed to evaluate plant tissue integrity and hydration levels. Similarly, our temperature and strain sensors, validated in dynamic biological systems, are applicable for tracking plant growth and stress responses.

The fusion of advanced sensor technology with precision agriculture practices holds the promise of optimizing resource use, improving crop yields, and promoting sustainable farming. In this presentation, we will delve into the materials science, fabrication techniques, and sensor designs underpinning our work, and discuss their potential to transform agricultural monitoring and management.

SPEAKER BIOGRAPHY

Wim Deferme obtained an engineering degree in Applied Physics at the Technical University of Eindhoven in The Netherlands in 2003. He obtained a Ph.D. in Materials Physics at Hasselt University in 2009 on the surface termination of synthetic diamond. In 2009, as a postdoc, he started research in the field of Printable Electronics. Since February 2014, he has been a Professor at Hasselt University, heading a group of 1 post-doc, 6 Ph.D. students, two full-time researchers, and several bachelor and master students in the field of “Engineering of Functional Materials.” His research activities are focused on the printing of functional materials. Printing techniques such as inkjet printing, screen printing, and ultrasonic spray coating, investigating coating deposition targeting applications such as Organic Electronics, printed sensors for health monitoring, and stretchable electronics are among his expertise!

The Functional Materials Engineering (FME) research group, headed by Prof. Wim Deferme, is focused on the printing and coating of functional materials on a wide variety of substrates by applying techniques such as inkjet printing, screen printing, ultrasonic spray coating, spin coating, and blade coating. It is the aim of the FME group to optimize printing and coating techniques in combination with the engineering of functional materials for applications such as Organic Light Emitting Devices, printed sensors for health care, and stretchable electronics applications. The group focuses on the deposition of these devices on non-rigid and/or non-flat substrates such as paper, textiles, and 3D structures.

Plenary Session - Wednesday October 29 - H 11:00



Data Platforms for Precision and Digital Agriculture: Opportunities and Challenges

Matteo Golfarelli

DISI - University of Bologna, Italy

ABSTRACT

10 years behind other industries, digitization is also entering the agricultural sector. The convergence of the evolution of innovations in robotics, sensing and artificial intelligence may lead to an exponential acceleration of the digitization process. The accumulated experiences allow us to say that one of the main driver of digitization is the availability of data, which allows processes to be automated and information and knowledge to be extracted. But working with data is not easy, and in order to ground the value of digital in a low-margin sector such as farming, it is essential to make the right choices. What are the data architectures and applications with real added value? What are the impediments to enhancing the value of data? What are the mistakes not to be repeated?

SPEAKER BIOGRAPHY

Matteo Golfarelli is a Full Professor at the University of Bologna, Department of Computer Science and Engineering, where he coordinates the International Master's Degree in Digital Transformation Management. His primary areas of teaching and research focus on data processing and analysis, including Machine Learning, Business Intelligence, and Big Data.

Throughout his career, he has led numerous research projects and collaborated with major national and international institutions, actively participating in initiatives that combine theory with practical data applications. He has authored over 150 publications in international journals and conferences.

Over the past 10 years, one of the areas in which he has placed particular emphasis is on Agritech where he has been able to transfer expertise in digital transformation and processing of large datasets and application of artificial intelligence techniques. He is the title of a patent for a precision irrigation system.

Golfarelli is also active in the industrial sector, working with companies to translate his research into practical, advantageous solutions that address current market challenges.

Plenary Session - Thursday October 30 - H 09:00



Smart Farms, Ag Cyber physical Systems and Metrology

Lav R. Khot

Washington State University, USA

ABSTRACT

This keynote will explore the transformative potential of smart farming through the integration of agricultural cyber-physical systems, enabling near real-time, site-specific crop production management. Using case studies in fruit and berry crops grown in Washington State (USA), the discussion will underscore the pivotal role of metrology in precision agriculture, addressing the practical challenges of implementing continuous weather and crop stressor monitoring systems. The talk will also examine how AI/ML-driven edge and cloud computing enhances these cyber-physical systems, enabling data-driven insights for proactive decision-making.

Since 2019, the author has played a leading role in advancing smart farm innovations through public-private partnerships, establishing multiple commercial smart apple orchard and vineyard testbeds. This presentation will highlight the experiential learning opportunities these testbeds provide, fostering collaboration among private industry partners, university researchers, and grower stakeholders to drive meaningful technology development and adoption.

SPEAKER BIOGRAPHY

Dr. **Lav R. Khot** is the Professor of Precision Agriculture and Director of AgWeatherNet at Washington State University. His research and extension program in precision agriculture focuses on integrating advanced sensing and automation technologies to improve the efficiency of irrigated and tree fruit crop production. He has advised over 30 graduate students, postdocs, Fulbright and international scholars as well as over 20 undergraduate interns. He has authored over 200 peer-reviewed research and extension articles (google scholar citations: 5,337, h-index of 33) and has developed several weather-guided decision support tools and smartphone applications to help growers effectively mitigate crop stressors. Under his leadership, AgWeatherNet, a network of over 360 weather stations, is being overhauled to provide crucial weather data and decision support to enhance the resilience of Washington's agriculture, animal, and human health systems. Dr. Khot is playing a leadership role in bringing AI-driven tools into Washington agriculture through the USDA-NIFA funded AgAID Institute, where he co-leads the Farm Operations Intelligence thrust efforts. He is also leading collaborative efforts that

have established the public-private partnership-driven 'Smart Apple Orchard Testbed(s)' in commercial settings for effective smart ag-tech evaluation and grower education. He continues to serve as an Associate Editor of the Journal of ASABE and has been co-organizing special sessions at the IEEE MetroAgriFor past few years.

IEEE MetroAgriFor 2025 Tutorial

Tutorial Session - Wednesday October 29 - H 16:30



The development of sensor systems in Agriculture, or how engineers and agronomists can speak the same language

Lorenzo Mistral Peppi

DEI - Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione, ARCES - Università di Bologna, Italy

ABSTRACT

Agriculture 5.0, sensorization, IoT and digital twins are just a few of the terms being increasingly used to describe new and modern paradigms intended to achieve agricultural management more and more respectful of the environment, health and resources - while keeping an eye to sustainable economic management. The implementation of such paradigms cannot be achieved without the implementation of electronic systems aimed at data and parameters acquisition related to the environment, climatic conditions and physiology of the plants to be monitored. However, just as the designers of these systems are often unaware of the users' needs, some of the people involved in the agricultural sector have no perception of the real added value and usefulness that the exploitation of such systems could determine. Therefore, more than an understanding problem, it has become a language problem: how can we enable engineers and farmers to untangle themselves in the maze of the Tower of Babel and, finally, speak the same language?

SPEAKER BIOGRAPHY

Lorenzo Mistral Peppi received M.S. degree in electronic engineering in 2019 at the University of Bologna, Italy, where he has been a Research Fellow until 2023. At the same university he is currently pursuing the Ph.D. degree in engineering and information technology for Structural and Environmental Monitoring and Risk Management (EIT4SEMM). His research interests focus on the development and test of embedded, autonomous systems and the implementation of edge solutions. Other activities concern the development of wearable biomedical systems and the design and implementation of safety systems in the railway sector. His research interests focus on development, testing and realization of electronic systems for a more sustainable environment, infrastructural sector, and industry.

Among his various interests agriculture is an atavistic passion, while the quest for a healthier life almost a requirement. On the other hand, his interest in electronics had a very strong influence on his life choices, enough to embark a study and work path that theoretically very far away from farming. The crasis came naturally: why not combine the two aspects, the two passions, in a synthesis that could lead to the concrete realisation of useful, easy-to-use and inexpensive devices, intended as a decision support element for farmers, in the spirit of giving a tiny contribution while hoping for a better world?

IEEE MetroAgriFor 2025 Venue

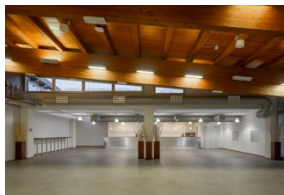
IEEE MetroAgriFor 2025 will be held at the **UNAHOTELS Bologna San Lazzaro - Via Luigi Fantini 1 - San Lazzaro di Savena (BOLOGNA)**.



ADDRESS

Via Luigi Fantini, 1
San Lazzaro di Savena (BOLOGNA)

UNAHOTELS Bologna San Lazzaro Congress Center stands in a wide park it rises to 200 mt from the hotel. The center can host every type of event: from meetings to conventions, from theatrical productions to fashion shows to art and trade exhibitions. The 1,400 mq. meter center offers a full, versatile range of setups. Some of the sound-proofed meeting rooms have abundant natural lighting and all are equipped with the most advanced audio/video technologies and there are wi-fi internet connections throughout the facility.



IEEE MetroAgriFor 2025 Social Events

Welcome Party - Tuesday, October 28

The IEEE MetroAgriFor **Welcome Party** will be held at “*UNAHOTELS Bologna San Lazzaro - Conference Center*” - Conference Venue - on Tuesday, October 28 - 19:00.

Gala Dinner - Wednesday, October 29

The IEEE MetroAgriFor **Gala Dinner** will be held at *Podere Riosto Cantina e Agriturismo* - Pianoro (Bologna) on Wednesday, October 29

A shuttle service will be available for conference attendees.

The bus will depart at 18:30 from the Conference Venue.

ADDRESS - Via di Riosto 12, Pianoro (BO)



IEEE MetroAgriFor 2025 Sponsors



Program Schedule - Tuesday, Oct 28

TUESDAY OCTOBER 28			
10:00 - 10:30	OPENING CEREMONY - WELCOME ADDRESSES		
10:30 - 11:20	KEYNOTE LECTURE - Wim Deferme, Hasselt University, Institute for Materials Research (IMO-IMOMEC), Belgium Printed and Stretchable Electronics: frontiers in agricultural applications		
11:20 - 11:40	COFFEE BREAK		
	Room #1	Room #3	Room #4
11:40 - 13:20	S1.1 - Special Session #4: Robotics for Agro-Forestry and Landscape Applications	S1.2 - Special Session #11: Precision Horticulture Technologies - PART I	S1.3 - Special Session #12: Geomatics, GeoAI and geospatial data analysis in precision agriculture and forestry applications
13:20 - 14:30	LUNCH		
	Room #1	Room #3	Room #4
14:30 - 16:10	S2.1 - Special Session #03: Optical measurements empowered by AI for agriculture and food applications	S2.2 - Special Session #07: Sensing and Data Platforms: what is ahead of us	S2.3 - Special Session #10: Advancements on Agriculture using Electromagnetic-based Techniques and Devices
16:10 - 16:30	COFFEE BREAK		
16:30 - 17:50	S3.1 - Special Session #14: Multi-Source Methods for Forest Disturbance Detection, Measurement and Monitoring	S3.2 - General Session - PART I	
19:00	WELCOME PARTY - UNAHOTELS Bologna San Lazzaro Conference Center		

Program Schedule - Wednesday, Oct 29

WEDNESDAY OCTOBER 29			
	Room #1	Room #3	Room #4
09:00 - 10:40	S4.1 - Special Session #08: Digital technologies and AI for sustainable agriculture: Meeting practitioners' and societal needs	S4.2 - Special Session #13: Advanced farming and sustainability	S4.3 - Special Session #6: Smart Agriculture Metrology: Leveraging the Internet of Things and Artificial Intelligence
10:40 - 11:00	COFFEE BREAK		
11:00 - 11:50	KEYNOTE LECTURE - Matteo Golfarelli, DISI - University of Bologna, Italy Data Platforms for Precision and Digital Agriculture: Opportunities and Challenges		
11:50 - 13:00	POSTER SESSION		
13:00 - 14:20	LUNCH		
	Room #1	Room #3	Room #4
14:20 - 16:00	S5.1 - Special Session #02: Innovative Monitoring, Control and Sensing Solutions for Biosystems Facilities	S5.2 - Special Session #09: Emerging GNC Technologies for Autonomous Robotic Platforms in Disease Detection and Precision Crop Treatment	S5.3 - Special Session #06: Smart Agriculture Metrology: Leveraging the Internet of Things and Artificial Intelligence
16:00 - 16:30	COFFEE BREAK / POSTER SESSION		
16:30 - 17:10	TUTORIAL SESSION - Lorenzo Mistral Peppi, DEI - Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione, ARCES; Università di Bologna, Italy The development of sensor systems in Agriculture, or how engineers and agronomists can speak the same language		
18:30	SHUTTLEBUS DEPARTURE - GALA DINNER - Podere Riesto Cantina e Agriturismo - Pianoro (Bologna)		

Program Schedule - Thursday, Oct 30

THURSDAY OCTOBER 30			
09:00 - 09:50	KEYNOTE LECTURE - Lav R. Khot, Washington State University, USA Smart Farms, Ag Cyber physical Systems and Metrology		
09:50 - 10:20	COFFEE BREAK / POSTER SESSION		
	Room #1	Room #3	Room #4
10:20 - 12:00	S6.1 - Special Session #11: Precision Horticulture Technologies - PART II	S6.2 - General Session - PART II	S6.3 - Special Session #01: Exploring New Horizons in Agriculture 4.0 using Computer Engineering
12:00 - 12:30	CLOSING AND AWARD CEREMONY		
15:00 - 18:00	EUFRI Working Group on Digital Orchard – Annual Meeting		

Technical Program - Tuesday, Oct 28

09:30 - 18:00	Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center REGISTRATIONS
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10:00 - 10:30	Hall #1 OPENING CEREMONY - WELCOME ADDRESSES
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10:30 - 11:20	Hall #1 PLENARY SESSION - KEYNOTE LECTURE Chairs: Luigi Manfrini, <i>University of Bologna, Italy</i> Dario Mengoli, <i>University of Bologna, Italy</i> Luca Corelli Grappadelli, <i>University of Bologna, Italy</i>
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Printed and Stretchable Electronics: frontiers in agricultural applications

Wim Deferme, *Hasselt University, Institute for Materials Research, Belgium*

11:20 - 11:40	Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center COFFEE BREAK
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11:40 - 13:20	Hall #1 Session 1.1 - Robotics for Agro-Forestry and Landscape Applications Chairs: Dario Mengoli, <i>University of Bologna, Italy</i> Sofia Matilde Luglio, <i>University of Pisa, Italy</i>
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11:40 Comparative Analysis of Two LiDAR-Driven Methods for Autonomous Navigation in Orchard Rows
Denis Tognolo (Polytechnic University of Bari, Italy); Cyrille Pierre (Université Clermont Auvergne, France); Francesco Visentin (Università di Verona, Italy); Roland Lenain (Université Clermont Auvergne, France); Riccardo Muradore (Università di Verona, Italy)

12:00 Validation of a Custom-Built Software for Measuring Trajectory Overlap and No Cut Areas in Autonomous Turfgrass Mowing
Sofia Matilde Luglio and Marco Fontanelli (University of Pisa, Italy); Mattia Fontani (University of Florence, Italy); Christian Frasconi, Michele Raffaelli, Andrea Peruzzi and Lorenzo Gagliardi (University of Pisa, Italy)

12:20 Assessing Operative Parameters of Four Different Machines for Weed Management in Vineyard

Mattia Fontani (University of Florence, Italy); Christian Frascioni, Andrea Peruzzi, Michele Raffaelli, Lorenzo Gagliardi, Sofia Matilde Luglio and Marco Fontanelli (University of Pisa, Italy)

12:40 Assessing the Efficiency of Three Different Mowing Patterns for an Autonomous Mower in a Golf Course

Mattia Fontani (University of Florence, Italy); Christian Frascioni, Tommaso Federighi, Marco Volterrani, Michele Raffaelli, Sofia Matilde Luglio, Lorenzo Gagliardi and Marco Fontanelli (University of Pisa, Italy)

13:00 Precision 3D Mapping of Forests and Crops Using a Visual-LiDAR System Mounted on a Rover

Laura Chilin (Space Systems Solutions (S3) Ltd, Cyprus); Sebastiano Chiodini (University of Padova, Italy); Federico Toson (University of Padova & CISAS G. Colombo, Italy); Carlo Bettanini (University of Padova, Italy); Adam Młynarczyk and Marcello Coradini (Space Systems Solutions (S3) Ltd, Cyprus); Carmelo Maucieri (University of Padova, Italy); Francesco Pirotti (University of Padua, Italy); Giacomo Colombatti (University of Padova, Italy)

11:40 - 13:20 Hall #3

Session 1.2 - Precision Horticulture Technologies - PART I

Chairs: Lav Khot, *Washington State University, USA*

Luigi Manfrini, *University of Bologna, Italy*

11:40 Inductive Sensor for Real-Time, Autonomous and Non-Destructive Fruit Size and Growth Monitoring

Lorenzo Mistral Peppi (DEI, ARCES - University of Bologna, Italy); Alessandro Gallo (CIRI-MAM, Italy); Luigi Manfrini and Luca De Marchi (University of Bologna, Italy)

12:00 Initial Validation of Biomimetic Sensing Flowers: Integrating Acoustic, Visual, and Vibrational Monitoring for Pollinator Conservation

Valerio Coppola, Matteo Zauli, Vera Maioli and Luca De Marchi (University of Bologna, Italy)

12:20 Preliminary Study for a Digital Twin Approach Driving CO₂ Enrichment in a Greenhouse for the Cultivation of Sweet Basil

Fatjon Cela (University of Pisa, Italy); Carlo Bibbiani (Università di Pisa, Italy); Alberto Lodovico Ghiberti (Politecnico di Torino, Italy); Stefano Benni and Carlos Alejandro Perez Garcia (University of Bologna, Italy); Enrico Fabrizio (Politecnico di Torino, Italy); Alberto Barbaresi (University of Bologna, Italy); Luca Incrocci (University of Pisa, Italy)

12:40 Assessing the Ability of the Dendrometer-Derived Index 'Tree Water Deficit' to Monitor Olive Tree Water Status

Simone Nesi and Giovanni Caruso (University of Pisa, Italy)

13:00 Evaluating Orchard Fruit Quality from Monocular and Stereo RGB-D Imagery: A Comparative Study

Mirko Piani (University of Bologna, Italy); Alessio Scalisi (Tatura SmartFarm - Agriculture Victoria, Italy); Gianmarco Bortolotti, Dario Mengoli and Luigi Manfrini (University of Bologna, Italy)

11:40 - 13:40

Hall #4

Session 1.3 - Geomatics, GeoAI and geospatial data analysis in precision agriculture and forestry applications

Chairs: Andrea Masiero, *University of Padova, Italy*
Valerio Baiocchi, *Sapienza University of Rome, Italy*
Francesca Giannone, *Niccolò Cusano University, Italy*
Raffaella Brigante, *University of Perugia, Italy*

11:40 Water Stress Assessment in Mediterranean Citrus Orchards Using Machine Learning and Remote Sensing

Stelios Pygmalion Neophytides (Eratosthenes Centre of Excellence, Cyprus & Cyprus University of Technology, Cyprus); Eleni Neofytou and Marinos Eliades (Eratosthenes Centre of Excellence, Cyprus); Diofantos Hadjimitsis (Cyprus University of Technology, Cyprus); Michalis Mavrovouniotis (Eratosthenes Centre of Excellence & Cyprus University of Technology, Cyprus)

12:00 A Soil Water Balance Model Assessment Using Remote Sensing and Reanalysis Data: A Case Study in an Irrigated Sicilian Citrus Orchard

Dario De Caro (University of Palermo, Italy); Olivier Merlin, Vincent Rivalland, Vincent Simonneaux and Gilles Boulet (University of Toulouse, France); Matteo Ippolito and Fulvio Capodici (University of Palermo, Italy); Carmelo Cammalleri (Politecnico di Milano, Italy); Giuseppe Cirao (University of Palermo, Italy)

12:20 Multi-Index Vegetation Monitoring and Stress Detection for Smallholder Rice Farms in Telangana Using Sentinel-2

Raghu Chaliganti (Fraunhofer -HHI, Germany); Sebastian Bosse (Fraunhofer Heinrich Hertz Institute, Germany)

12:40 Correcting Thermal Drift: a Field-Validated Model for UAV Surveys in Agriculture

Fabiana Di Ciaccio and Erica Isabella Parisi (University of Florence, Italy); Andrea Masiero (University of Padova, Italy); Irene Cortesi (University of Bologna, Italy); Grazia Tucci (University of Florence, Italy)

13:00 Eco-Pedagogical Microforests: A Technological and Educational Strategy for Urban Sustainability in Rome

Valerio Baiocchi, Tullia Valeria Di Giacomo, Fabiola Fratini, Francesco Muzi and Giuseppe Piras (Sapienza University of Rome, Italy)

13:20 **Update of Land Cover Maps for Watersheds of Small Reservoirs**

Silvia Di Francesco (Niccolò Cusano University, Rome, Italy); Stefano Casadei and Sara Venturi (University of Perugia, Italy); Ginevra Coluccio and Francesca Giannone (Niccolò Cusano University, Italy)

13:20 - 14:30 *Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center*
LUNCH

14:30 - 16:10 *Hall #1*

Session 2.1 - Optical measurements empowered by AI for agriculture and food applications

Chairs: Simone Pasinetti, *University of Brescia, Italy*

Jordi Gené-Mola, *Institute of Agrifood Research and Technology, Spain*

14:30 **Mobile Multi-Camera System for 3D Fruit Tree Scanning and Apple Size Estimation**

Jordi Gené-Mola (Institute of AgriFood Research and Technology (IRTA), Spain); Jochen Hemming (Wageningen University and Research, The Netherlands); Eduard Gregorio López (University of Lleida, Spain)

14:50 **VISAR: Intelligent Video Frame Selection for Agricultural 3D Plant Reconstruction**

Mehran Tarif and Elisa Fasani (University of Verona, Italy); Davide Quaglia (Università di Verona, Italy)

15:10 **Design and Development of a Vision-Based Measurement System for Root Growth Monitoring in Olives Trees**

Simone Pasinetti and Cristina Nuzzi (University of Brescia, Italy); Elena Brunori, Roberto Mancinelli and Rosario Muleo (University of Tuscia, Italy); Matteo Soprani (Prospecto, Italy)

15:30 **OmniPlantSeg: Species Agnostic 3D Point Cloud Organ Segmentation for High-Resolution Plant Phenotyping Across Modalities**

Andreas Gilson (Fraunhofer Institute for Integrated Circuits (IIS), Germany & University of Bamberg, Germany); Lukas Meyer (Friedrich-Alexander University (FAU) Erlangen-Nürnberg, Germany); Oliver Scholz (Fraunhofer Institute for Integrated Circuits (IIS), Germany); Ute Schmid (Otto-Friedrich-Universität Bamberg, Germany)

15:50 **Grapevine Leaf Phenotyping Using Deep Learning Based on Three-Dimensional Point Cloud**

Dimitrios-Tilemachos Davarakis and Yuqiao Ren (University College Dublin, Ireland); Nikolaos Tsoulas (Geisenheim University, Germany); Marco Bignardi (Hochschule Geisenheim University, Germany); Dimitrios S. Paraforos (University of Geisenheim, Germany); Dimitrios Argyropoulos (University College Dublin, Ireland)

14:30 - 16:10**Hall #3****Session 2.2 - Sensing and Data Platforms: what is ahead of us****Chairs:** Enrico Casella, *The Pennsylvania State University, US*Manlio Bacco, *T.1 Digital Economy Unit, Joint Research Centre (JRC), Ispra***14:30 Let Me Sleep! a Machine Learning Approach for IoT Wake-Up Mechanism for Insect Detection**

Lorenzo Palazzetti, Francesco Betti Sorbelli and Cristina M. Pinotti (University of Perugia, Italy)

14:50 Stretchable Sensor for Sustainable Precision Agriculture

Asad Ullah (Hasselt University, Institute for Material Research (IMO) Belgium, Belgium); Sander Vijgen (Hasselt University, Institute for Material Research (IMO), Belgium); Gudrun Nowicki and Kelly Vannitsen (Hasselt University, Materials and Packaging Research & Services (MPR&S), Belgium); Lennert Purnal and Maximilian Krack (Hasselt University, Institute for Material Research (IMO) Belgium, Belgium); Thijs Vandenryt, Dieter Reenaers and Ronald Thoelen (Hasselt University, Institute for Material Research (IMO), Belgium); Wim Deferme (Hasselt University, Belgium)

15:10 Highly Stretchable, Fully Screen-Printed Resistive Strain Sensor for Apple Fruit Growth Monitoring

Michele Gullino (Free University of Bozen-Bolzano, Italy); Dieter Reenaers (Hasselt University, Institute for Material Research (IMO), Belgium); Lennert Purnal (Hasselt University, Institute for Material Research (IMO) Belgium, Belgium); Pietro Ibba, Paolo Lugli and Luisa Petti (Free University of Bolzano, Italy); Walter Guerra (Laimburg Research Centre, Italy); Luigi Manfrini (University of Bologna, Italy); Wim Deferme (Hasselt University, Belgium)

15:30 Development of a 4-Point Resistance Meter with Wireless Communication for Fruit Growth Monitoring

Sander Vijgen (Hasselt University, Institute for Material Research (IMO), Belgium); Asad Ullah (Hasselt University, Institute for Material Research (IMO) Belgium, Belgium); Thijs Vandenryt (Hasselt University, Institute for Material Research (IMO), Belgium); Wim Deferme (Hasselt University, Belgium); Ronald Thoelen (Hasselt University, Institute for Material Research (IMO), Belgium)

15:50 From Sensors to Simulation: a Digital Twin of a Pear Orchard Towards Halyomorpha Halys Control

Federico Corò (University of Padova, Italy); Lorenzo Palazzetti and Cristina M. Pinotti (University of Perugia, Italy)

14:30 - 15:50**Hall #4****Session 2.3 - Advancements on Agriculture using Electromagnetic-based Techniques and Devices****Chair:** Matteo Bruno Lodi, *University of Cagliari, Italy*

- 14:30 Investigation of the Vine Trunk Anatomy Through MRI Imaging**
Thomas Quirin (University of Applied Sciences and Arts Northwestern Switzerland (FHNW), Switzerland); Julie Chong (University of Haute Alsace, France); Elodie Breton (University of Strasbourg - CNRS, France); Céline Giraudeau (IHU-strasbourg, France); Chrystelle Po (University of Strasbourg - CNRS, France); Luc Hebrard (University of Strasbourg, France); Benedetto Berardi (University of Applied Sciences and Arts Northwestern Switzerland, Switzerland); Clément Javerzac (University of Applied Sciences and Arts Northwestern Switzerland - FHNW, Switzerland); Joris Pascal (University of Applied Sciences Northwestern Switzerland, Switzerland)
- 14:50 UAV High-Resolution Hyperspectral Imaging for Monitoring Phomopsis Stem Canker in Sunflowers**
Matteo Sali (University of Milano Bicocca, Italy); Lorenzo Pippi and Samuele Risoli (University of Pisa, Italy); Micol Rossini, Roberto Garzonio and Beatrice Savinelli (University of Milano-Bicocca, Italy); Lorenzo Cotozzy (University of Pisa, Italy); Sergio Cogliati (University of Milano, Italy)
- 15:10 Microwave-Based Quality Control for Bread Production**
Marco Murgia (University of Cagliari, Italy); Luigi Di Michele (Università Degli Studi di Cagliari, Italy); Matteo Bruno Lodi, Giacomo Muntoni, Andrea Melis, Giuseppe Mazzarella and Alessandro Fanti (University of Cagliari, Italy)
- 15:30 An Innovative Methodology to Measure the Electric Charge on Honeybees**
Francesco Rigo (University of Firenze, Italy); Alessandro Pozzebon (University of Padova, Italy); Susanna Spinsante (Università Politecnica Delle Marche, Italy); Stefania Cecchi (UNIVPM, Italy); Ada Fort (University of Siena, Italy)
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- 16:10 - 16:30 Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center**
COFFEE BREAK
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- 16:30 - 17:30 Hall #1**
Session 3.1 - Multi-Source Methods for Forest Disturbance Detection, Measurement and Monitoring
Chair: Andrea Bragagnolo, *LINKS Foundation*
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- 16:30 Detecting Forest Disturbances in Mid-Latitude Ecosystems Using Sentinel-2 Time Series of Functional Traits Anomalies**
Erika Piaser (University of Milan-Bicocca, Italy); Cinzia Panigada and Beatrice Savinelli (University of Milano-Bicocca, Italy); Giulia Tagliabue (University of Milano-Bicocca, Italy); Luigi Vignali (University of Milano-Bicocca, Italy); Fabian Fassnacht (Freie Universität Berlin, Germany); Micol Rossini (University of Milano-Bicocca, Italy)
- 16:50 Preliminary Measurements of Mammal and Bird Community Dynamics Using Camera Trapping and Passive Acoustic Monitoring in a Mediterranean Oak Forest Reserve**

Paolo Viola (Italy); Pedro Girotti (Università Degli Studi Della Tuscia, Italy); Pierluca Gaglioppa (Selva del Lamone Nature Reserve, Italy); Lorenzo Cinelli (University of Tuscia, Italy); Angela Rositi and Federico Notarfonso (Italy); Flavio Monti (National Research Council of (CNR), Italy); Carlo Maria Rossi (University of Tuscia, Italy); Riccardo Primi (Università Degli Studi Della Tuscia, Italy)

17:10 EyeLand-Sentinel 2 Data: Adaptation of the Citizen Science Approach for a Fine-Scale Urban Green Space Assessment in Fermo, Italy

MD Abdul Mueed Choudhury (Mediterranea University of Reggio Calabria, Italy & Marche Polytechnic University, Italy); Jiang He, Fan Xinyu, Liu Chenyang, Tian Hao, Zhang Yang and Zuo Zhuoyuan (Marche Polytechnic University, Italy); Ernesto Marcheggiani (Università Politecnica Delle Marche, Italy)

16:30 - 18:30 Hall #3

Session 3.2 - General Session - PART I

Chairs: Pasquale Losciale, *University of Bari, Italy*

Gianluca Allegro, *University of Verona, Italy*

16:30 Characterisation of the Transpiration Responses and Ecophysiological Regulation of Two Apple Varieties

Camilo Chiang, Sarah Boutillier, Romain Salamin, Silvina Dayer, Philippe Monney and Danilo Christen (Agroscope, Switzerland)

16:50 Development of a Variety-Specific Regional Decision Support System for Grapevine Phenology

Iride Volpi and Diego Guidotti (AEDIT srl, Italy); Fabio Pietrangeli (Servizio Supporto Specialistico all'Agricoltura Regione Abruzzo, Italy); Nadia Di Bucchianico (Servizio Supporto all'Agricoltura Regione Abruzzo, Italy); Domenico Giuliani (Servizio Supporto Specialistico all'Agricoltura Regione Abruzzo, Italy); Simone Bregaglio (CREA, Italy)

17:10 Multi-Object Tracking for Apple Counting in Orchards Using Stereo Vision

Jiahua Wei (Technical University Hamburg, Germany); Ermin Kevric (Hamburg University of Technology (TUHH), Germany)

17:30 Oblique Trellised Apple Orchard Photogrammetry for Early Phenology Tracking of Individual Plants

Michael R. Chang (Free University of Bolzano, Italy); Christian E Gunning (Veridist LLC, USA); Marco Camurri (Free University of Bozen-Bolzano, Italy)

17:50 EVA Twisting: A Soft Gripper for Apple Harvesting with Vacuum and Twisting

Matteo Maggi (Fondazione italiana istituto di tecnologia, Italy); Alessio Mondini (Bioinspired Soft Robotics Lab, Italy); Barbara Mazzolai (Istituto Italiano di Tecnologia, Italy)

18:10 Annual Variation of Carbon Fluxes and Water Use Efficiency in a Laurel Cloud Forest
Axel Ritter (University of La Laguna, Spain); Carlos M Regalado (Instituto Canario de Investigaciones Agrarias (ICIA), Spain); María León-González (University of La Laguna, Spain)

19:00	<i>Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center</i> WELCOME PARTY
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Technical Program - Wednesday, Oct 29

08:30 - 17:00 *Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center*
REGISTRATIONS

09:00 - 10:40 *Hall #1*
**Session 4.1 - Digital technologies and AI for sustainable agriculture:
Meeting practitioners' and societal needs**
Chairs: Alexander Kocian, *University of Pisa, Italy*
Chiara Mannari, *National Research Council, Italy*

- 09:00** **Characterization of Rice Irrigation Status at Bay Level in Semi-Arid Australia**
Brenno Tondato de Faria, Gustavo Tercete, John Hornbuckle and Carlos Ballester Lurbe
(Deakin University, Australia); Rodrigo Filev Maia (Deakin University, Austria)
- 09:20** **Interoperable Traceability from Laboratory to Practice: Strategy and Experience of the AGRITECH Project**
Alexander Kocian (University of Pisa, Italy); Giovanni Farina (Niccolò Cusano University, Italy); Roberto Malfagia (Ianus srl, Italy); Gianluca Brunori (University of Pisa, Italy); Stefano Chessa (Universita' di Pisa, Italy)
- 09:40** **A Geometric Approach for Grapevine Shoot Length Estimation Using Time-Lapse RGB Cameras**
Yuqiao Ren and Dimitrios-Tilemachos Davarakis (University College Dublin, Ireland); Marco Bignardi (Hochschule Geisenheim University, Germany); Nikolaos Tsoulas (Geisenheim University, Germany); Dimitrios S. Paraforos (University of Geisenheim, Germany); Dimitrios Argyropoulos (University College Dublin, Ireland)
- 10:00** **Socio-Technical Challenges Impacting Data Quality in Agriculture: An Integrated Review**
Leidiane Da Silva, Fjolla Berisha, Zohreh Pourzolfaghar and Markus Helfert (Maynooth University, Ireland)
- 10:20** **A Framework Integrating Agile Software Development Principles for Co-Design and Participatory Cost-Benefit Evaluation in Digital Agriculture**
Fabio Lepore, Daniele Vergamini and Livia Ortolani (University of Pisa, Italy); Chiara Mannari (National Research Council, Italy); Alessio Ferrari (National Research Council (CNR), Italy); Manlio Bacco (European Commission, Joint Research Centre (JRC) & National Research Council (CNR), Italy); Gianluca Brunori (University of Pisa, Italy)

09:00 - 10:20

Hall #3

Session 4.2 - Advanced farming and sustainability

Chairs: Alessia Cogato, *University of Padova, Italy*

Francesco Marinello, *University of Padova, Italy*

09:00 Finding the Right Lens to Understand Farmers' Adoption of Risk Management Innovations

Elisa Giampietri, Alice Stiletto and Samuele Trestini (*University of Padova, Italy*)

09:20 Development and Validation of a Sensor-Based System for Measuring Tractor-Implement Interaction Forces in Field Conditions

Luigi Bianco, Massimiliano Varani, Leonardo Angelucci, Gianvito Annesi and Michele Mattetti (*University of Bologna, Italy*)

09:40 Satellite-Derived Indices and Intensity of Agricultural Practices Can Be Integrated into a GIS-AHP Framework for Mapping Susceptibility to Soil Compaction

Deepak Kumar Yadav (*University of Padova, Italy*)

10:00 Irrigation-Driven Vineyard Resilience to Climate Variability: a Sentinel-2-Based Analysis

Alessia Cogato, Alessandro Zanchin, Marco Sozzi, Lucia Bortolini and Francesco Marinello (*University of Padova, Italy*)

09:00 - 10:40

Hall #4

Session 4.3 - Smart Agriculture Metrology: Leveraging the Internet of Things and Artificial Intelligence - PART I

Chair: Reinaldo Bianchi, *FEI University Center, Brazil*

09:00 The Power of TimeLLM for Greenhouse Microclimate Mapping

Elia Brentarolli, Ashraf Sharifi, Matteo Ruaro and Sara Migliorini (*University of Verona, Italy*)

09:20 Real-Time Canopy Temperature-Driven Automated Fogging for Heat Stress Mitigation in Vineyards

Dattatray G. Bhalekar, Srikanth Gorthi, Lav Khot and Markus Keller (*Washington State University, USA*)

09:40 Deep Learning-Based Early Yield Prediction via Automatic Inflorescence Detection in Vineyards

Gabriele Valentini, Filippo Casini, Alice Moffa, Alberto Zanini, Suraj Lamsal and Ilaria Filippetti (*University of Bologna, Italy*)

10:00 From Field to Chain: a Blockchain-Based Automatic Insurance Framework for Smart Agriculture

Ivan Zyrianoff, Lorenzo Gigli and Marco Di Felice (*University of Bologna, Italy*); Vasilios A. Siris (*Athens University of Economics and Business, Greece*); Thanasis G. Papaioannou (*National and Kapodistrian University of Athens (NKUA), Greece &*

Athens University of Economics and Business, Greece); Federico Montori (University of Bologna, Italy)

10:20 Traceability and Research in the Agricultural Chain of Medicinal and Aromatic Plants (MAPs): an IoT-Based Approach

Ivan Zyrianoff, Andrea Iannoli, Federico Montori, Luca Sciuillo and Luciano Bononi (University of Bologna, Italy); Alice Baldissara, Beatrice Brintazzoli and Enrico Dall'Olio (Agribioservice, Italy); Mattia Alpi, Rocco Enrico Sferrazza, Giovanni Dinelli, Ilaria Marotti and Marco Di Felice (University of Bologna, Italy)

10:40 - 11:00 Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center
COFFEE BREAK

11:00 - 11:50 Hall #1
PLENARY SESSION - KEYNOTE LECTURE
Chairs: Luigi Manfrini, *University of Bologna, Italy*
 Dario Mengoli, *University of Bologna, Italy*
 Luca Corelli Grappadelli, *University of Bologna, Italy*

**Data Platforms for Precision and Digital Agriculture:
 Opportunities and Challenges**

Matteo Golfarelli, *DISI - University of Bologna, Italy*

11:50 - 13:00 Hall #2
POSTER SESSION

PS01 Coupling Satellite and Reanalysis Data with Crop Growth Models: a Comparative Analysis of AquaCrop and SAFY-E Outputs for Estimating Irrigation Needs and Yield
 Anna Pelosi (University of Salerno, Italy); Angeloluigi Aprile, Oscar Rosario Belfiore, Guido D Urso and Giovanni Battista Chirico (University of Naples Federico II, Italy)

PS02 Plasma Pre-Treatment for Maximizing Bioenergy Production: Overview and Preliminary Results
 Andrea Pezzuolo, Illya Kulyk and Francesco Marinello (University of Padova, Italy)

PS03 Comparative Analysis of Deep Learning for Olive Tree Crown and Shadow Segmentation Towards Biovolume Estimation
 Wondimagegn Abebe Demissie (University of Sant'anna Pisa, Italy); Stefano Roccella (Scuola Superiore Sant'Anna, Italy); Rudy Rossetto and Antonio Minnocci (Scuola Superiore Sant'Anna, Italy); Andrea Vannini (The BioRobotics Institute, Scuola Superiore Sant'Anna, Italy); Luca Sebastiani (Scuola Superiore Sant'Anna, Italy)

PS04 A Low-Cost Portable Spectrophotometer for Precision Agriculture Based on HAMAMATSU C12880MA

Mariagrazia Leccisi ("Roma Tre" University, Italy); Federico Fina (Roma Tre University, Italy); Fabio Leccese ("Roma Tre" University, Italy)

PS05 Enhanced Edge Computing in Smart Agriculture

Anna Pelosi (University of Salerno, Italy); Angeloluigi Aprile, Oscar Rosario Belfiore, Guido D Urso and Giovanni Battista Chirico (University of Naples Federico II, Italy)

PS06 Enhancing Precision Agriculture Tools for Optimised Nitrogen Management in Open-Field Borettana Onion (*Allium Cepa* L.) Cultivation

Bizuwork Tafes Desta, Francesco Morari, Carlo Nicoletto and Nicola Dal Ferro (University of Padova, Italy)

PS07 Out-of-Band over-the-Air-Update for LoRaWAN-Based Sensor Networks Using BLE

Florian Jung (IMMS Institut für Mikroelektronik- und Mechatronik-Systeme gemeinnützige GmbH, Germany); Silvia Krug (Mid Sweden University, Sweden & IMMS GmbH, Germany); Tino Hutschenreuther (IMMS, Germany)

PS08 Living Labs for Sustainable Buffalo Farming: The Agritech Experience in Campania Region

Francesco Bonavolontà (Università di Napoli Federico II, Italy); Maria Teresa Verde and Annalisa Liccardo (University of Naples Federico II, Italy); Matteo Santinello (University of Naples, Italy); Roberta Matera and Gianluca Neglia (University of Naples Federico II, Italy)

PS09 Data Fusion Methodology for a Hyperspectral-LiDAR System

Marco Bignardi (Hochschule Geisenheim University, Germany); Nikolaos Tsoulas (Geisenheim University, Germany); Burawich Pamornnak (Hochschule Geisenheim University, Germany); Dimitrios S. Paraforos (University of Geisenheim, Germany)

PS10 Segmenting Woody Structure by Means of LiDAR in Apple Trees

Leon Steiert (Hochschule Geisenheim University, Germany); Nikolaos Tsoulas (Geisenheim University, Germany); Marco Bignardi (Hochschule Geisenheim University, Germany); Dimitrios S. Paraforos (University of Geisenheim, Germany)

PS11 Smart IoT Sensor System for Continuous and on-Plant Monitoring of Apple Fruit Growth

Alessandro Torrisi, Michele Gullino, Alessia Gelmini and Emiliano Valentini (Free University of Bozen-Bolzano, Italy); Paolo Lugli and Luisa Petti (Free University of Bolzano, Italy)

PS12 Three Different Mowing Machines on Kentucky Bluegrass: Evaluation of the Operative and Qualitative Performances

Lorenzo Gagliardi, Marco Fontanelli, Giuliano Sciusco, Tommaso Federighi, Simone Magni, Marco Volterrani, Christian Frascioni, Michele Raffaelli and Sofia Matilde Luglio (University of Pisa, Italy)

PS13 Multi-Source Decision Support System for Cold Stress Management in Dairy Buffalo Farming Using Heterogeneous Data, IoT Sensors, and Milking Robot Information: Development and Validation

Maria Teresa Verde (University of Naples Federico II, Italy); Francesco Bonavolontà (Università di Napoli Federico II, Italy); Annalisa Liccardo (University of Naples Federico II, Italy); Matteo Santinello (University of Naples, Italy); Roberta Matera and Gianluca Neglia (University of Naples Federico II, Italy)

PS14 Comparison Between TLS and viDoc RTK for High Resolution Geometric Characterization of Hazelnut Plants

Raffaella Brigante and Laura Marconi (University of Perugia, Italy); Sara Zollini (University of L'Aquila, Italy); Simona Lucia Facchin, Chiara Traini and Alessandra Vinci (University of Perugia, Italy); Daniela Farinelli (Università degli Studi di Perugia, Italy)

**13:00 - 14:20 Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center
LUNCH**

**14:20 - 16:00 Hall #1
Session 5.1 - Innovative Monitoring, Control and Sensing Solutions for Biosystems Facilities
Chairs: Andrea Pezzuolo, University of Padova, Italy
Carlo Bibbiani, University of Pisa, Italy
Alberto Barbaresi, University of Bologna, Italy**

14:20 More and More Smart Sheep. Digital Technology for Possible Coexistence Between Wolves and Livestock

Alessia Di Rosso (University of Pisa, Italy); Carlo Bibbiani (Università di Pisa, Italy); Lucia Casini (University of Pisa, Italy); Huw Evans (Beehero Inc Tel-Aviv Israel); Sandra Evans (Apidea Ltd, United Kingdom (Great Britain)); George Clouston (Beehero Inc, Israel); Giuseppe Vecchio and Daniele Scarselli (Agrofauna Srls, Wildlife Management and Research, Italy); Chiara Benedetta Boni, Francesca Coppola and Antonio Felicioli (University of Pisa, Italy)

14:40 Design and Implementation of a Low-Cost CO₂ Supply Control System in an Experimental Greenhouse

Carlos Alejandro Perez Garcia (University of Bologna, Italy); Fatjon Cela and Luca Incrocci (University of Pisa, Italy); Carlo Bibbiani (Università di Pisa, Italy); Marco Bovo, Enrica Santolini and Alberto Barbaresi (University of Bologna, Italy)

15:00 Wind Tunnel Tests for the Evaluation of Leaf Area Density and Drag Coefficient Influencing Canopy Morphology

Enrica Santolini, Alberto Barbaresi, Marco Bovo, Beatrice Pulvirenti, Patrizia Tassinari and Daniele Torreggiani (University of Bologna, Italy)

15:20 Data-Driven Exploration of the Soil-Plant-Atmosphere Continuum Through Multisensor Acquisition and Processing
Mariana V Chiozza, Luis Sánchez-Fernández, Gregorio Egea and Manuel Pérez-Ruiz (University of Sevilla, Spain)

15:40 A GIS-Based Model to Enhance Agro-Waste for Sustainable Green Building Materials
Monica Parlato (University of Padua, Italy); Francesca Valenti (University of Bologna, Italy); Lorenzo Guerrini and Anna Perbellini (University of Padua, Italy); Andrea Pezzuolo (University of Padova, Italy)

14:20 - 16:00 Hall #3
Session 5.2 - Emerging GNC Technologies for Autonomous Robotic Platforms in Disease Detection and Precision Crop Treatment
Chair: Elisa Capello, *Politecnico di Torino, Italy*

14:20 In-Field Autonomous UV-B Irradiation and Phenolic Compounds Optical Detection of Lettuce Crops by an Agricultural Rover Prototype
Filippo Micheletti (Italian National Research Council - CNR, Italy); Giovanni Agati (CNR, Italy); Simone Cremasco, Francesco Visentin and Riccardo Muradore (Università di Verona, Italy)

14:40 Smart Sensing in Agriculture: a UAV Platform for Bio-Inspired Environmental Mapping
Giorgia Giacalone, Riccardo Enrico, Mauro Mancini, Stefano Primatesta and Elisa Capello (Politecnico di Torino, Italy)

15:00 Vision-Based UAV Navigation in Vineyards Using a Disturbance-Aware NMPC
Riccardo Enrico, Petre Ricioppo, Stefano Primatesta, Mauro Mancini and Elisa Capello (Politecnico di Torino, Italy)

15:20 Ant Colony Optimization for Drone Formation Deployment in Agriculture
Salvatore Rosario Bassolillo and Egidio D'Amato (University of Naples Parthenope, Italy); Immacolata Notaro (University of Campania Luigi Vanvitelli, Italy)

15:40 Mining Scientific Abstracts for Pesticide-Related Health Risks
Roushnaty Ali Yamani (Ibn Tofail University, Morocco); Naira Abdou Mohamed (Institut National de Statistique et d Economie Appliquée, Morocco)

14:20 - 16:00 Hall #4
Session 5.3 - Smart Agriculture Metrology: Leveraging the Internet of Things and Artificial Intelligence - PART II
Chair: Reinaldo Bianchi, *FEI University Center, Brazil*

- 14:20 COSMIC-SWAMP: Internet of Things Irrigation Platform Using Neutron and Capacitive Probes**
Patrick Stowell (University of Sheffield, United Kingdom (Great Britain)); Carlos Alberto Kamienski (Universidade Federal do ABC, Brazil); Andre Torre, Neto (EMBRAPA, Brazil); Ladislau Rabello (Brazilian Agricultural Research Corporation, Brazil)
- 14:40 Distributed Smart Agriculture Monitoring over the IoT Computing Continuum**
Carlos Alberto Kamienski (Universidade Federal do ABC, Brazil); Ivan Zyrianoff (University of Bologna, Italy); Lei Xue (Sun Yat-sen University, China); Marco Di Felice (University of Bologna, Italy)
- 15:00 Estimating Vegetation Response Lag to Soil Moisture in Irrigated Coffee Using Porous-Matrix Sensor and Satellite Data**
Ednaldo J Ferreira (Brazilian Agricultural Research Corporation (Embrapa) - Embrapa Instrumentation, Brazil & Center for Artificial Intelligence - C4AI, Brazil); Eduardo Speranza and Carlos Vaz (Brazilian Agricultural Research Corporation, Brazil); Andre Torre, Neto (EMBRAPA, Brazil); Luis Basso and Ladislau Rabello (Brazilian Agricultural Research Corporation, Brazil); Juliana Polizel (Pitaya Irrigation, Brazil); Reinaldo Bianchi (Centro Universitário FEI - São José dos Campos - Brasil, Brazil); Gabriela Biondi (FEI, Brazil); Fabíola M. C. de Oliveira and Ronaldo Prati (Federal University of ABC, Brazil); Carlos Alberto Kamienski (Universidade Federal do ABC, Brazil)
- 15:20 P4-Enabled Smart Gateways for Agriculture: Selective Sensor Cloning for Edge Inference Without Traffic Disruption**
Dener Silva and Bruna Cunha de Carvalho (Federal University of ABC, Brazil); Alexandre Heideker (University of Bologna, Italy & Federal University of the ABC, Brazil); Lucas Trombeta (Federal University of ABC, Brazil); João Henrique Kleinschmidt (Universidade Federal Do ABC, Brazil); Carlos Alberto Kamienski (Universidade Federal do ABC, Brazil)
- 15:40 Review of SDI-12 Standard and an Innovative IoT-Based Electronics for Edaphic and Environmental Data Collection**
Andre Torre, Neto (EMBRAPA, Brazil); Jeferson R Cotrim (Universidade Estadual de Campinas, Brazil); Ladislau Rabello (Brazilian Agricultural Research Corporation, Brazil); Carlos Alberto Kamienski (Universidade Federal do ABC, Brazil)

16:00 - 16:30 Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center
COFFEE BREAK / POSTER SESSION

16:30 - 17:10

Hall #1

TUTORIAL SESSION

Chair: Lav Khot, *Washington State University, USA*

The development of sensor systems in Agriculture, or how engineers and agronomists can speak the same language

Lorenzo Mistral Peppi, *DEI - Dipartimento di Ingegneria dell'Energia Elettrica e dell'Informazione, ARCES; University of Bologna, Italy*

18:30

Podere Riostro - Cantina e Agriturismo - Pianoro (Bologna)

SHUTTLE BUS DEPARTURE FOR THE GALA DINNER

The shuttle bus for the Gala Dinner will depart at 18:30 from the Conference Venue.

Technical Program - Thursday, Oct 30

08:30 - 12:00 Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center
REGISTRATIONS

09:00 - 09:50 Hall #1
PLENARY SESSION - KEYNOTE LECTURE
Chairs: Luigi Manfrini, *University of Bologna, Italy*
Dario Mengoli, *University of Bologna, Italy*
Luca Corelli Grappadelli, *University of Bologna, Italy*

Smart Farms, Ag Cyber physical Systems and Metrology

Lav R. Khot, *Washington State University, USA*

09:50 - 10:20 Foyer - UNAHOTELS Bologna San Lazzaro - Congress Center
COFFEE BREAK / POSTER SESSION

10:20 - 12:00 Hall #1
Session 6.1 - Precision Horticulture Technologies - PART II
Chairs: Lav Khot, *Washington State University, USA*
Luigi Manfrini, *University of Bologna, Italy*

10:20 Modulated Red/Blue Balance from LED Lighting Affects Growth and Quality Parameters in Greenhouse Grown Crops
Karl-Johan Bergstrand (Swedish University of Agricultural Sciences, Sweden); Geni Zanol and Jorge Solis (Karlstad University, Sweden); David Olsson and Magnus Nilsson (Glava Energy Center, Sweden)

10:40 Quantifying Elemental Carbon by Means of Point Cloud Analysis in Vineyards
Nikolaos Tsoulas (Geisenheim University, Germany); Marco Bignardi (Hochschule Geisenheim University, Germany); Dimitrios S. Paraforos (University of Geisenheim, Germany)

11:00 Individual Tree-Specific, Automated Assessment of Flowering Intensity in Apple Cultivation as a Basis for Prescription Maps for Thinning
Moritz Wilhelm Hentzschel (Obstbauversuchsring des Alten Landes e.V., Germany); David Berschauer (Fraunhofer-Institut für Fertigungstechnik und Angewandte Materialforschung IFAM, Germany); Dirk Köpcke (Chamber of Agriculture of Lower Saxony, Germany)

11:20 Comparative Analysis of Temperature Monitoring Methods and Their Impact on Growing Degree Day Accumulation in Apple Orchard Management: A Multi-Sensor Approach

Helene Fotouo Makouate (Leibniz Institute for Agricultural Engineering and Bioeconomy, Germany); Nicolas Tapia-Zapata (Leibniz Institute for Agricultural Engineering and Bioeconomy, Germany); Manuela Zude-Sasse (Leibniz Institute for Agricultural Engineering and Bioeconomy, Germany)

11:40 Intra-Leaf Hyperspectral Analysis Method for Reflectance Variability Identification

Elisa Cioccolo (University of Viterbo, Italy); Pierluigi Rossi, Giuseppe Colla and Mariateresa Cardarelli (University of Tuscia, Italy)

10:20 - 11:40 Hall #3

Session 6.2 - General Session - PART II

Chairs: Pasquale Losciale, *University of Bari, Italy*

Gianluca Allegro, *University of Verona, Italy*

10:20 Non-Invasive Thermal Monitoring of Dairy Cows' Core Body Temperature with Multi-Modal Sensing

Mireia Molins and Camilla H. K. Hughes (The Pennsylvania State University, USA); Enrico Casella (Pennsylvania State University, USA)

10:40 Suitability of Radio Communication Technologies for Smart Orchards Considering Seasonal Effects

Silvia Krug (Mid Sweden University, Sweden & IMMS GmbH, Germany); Falk Eisenreich and Tino Hutschenreuther (IMMS, Germany)

11:00 Low-Cost Plant Height Estimation: A Comparison of Image Processing and Deep Learning Methods

Cristian Bua, Lorenzo Bianchi and Stefano Giordano (University of Pisa, Italy)

11:20 Validating a Method for Characterizing Rainfall Simulators Using Parsivel² Measurements and Raindrop Velocity Relationship

Roberto Caruso (University of Palermo, Italy); María Fernández-Raga (University of León, Spain); María Angela Serio and Vito Ferro (University of Palermo, Italy); Ángel Raga-Martín (University of León, Spain); Francesco Giuseppe Carollo (University of Palermo, Italy)

10:20 - 11:40 Hall #4

Session 6.3 - Exploring New Horizons in Agriculture 4.0 using Computer Engineering

Chair: Annalisa Milella, *National Research Council, Italy*

- 10:20 Aphrophoridae Foam Detection Using YOLOv11 for Sustainable Management of Xylella Fastidiosa Vectors**
Angelo Cardellicchio and Michele Elia (STIIMA CNR, Italy); Arianna Rana (CNR, Italy); Antonio Petitti (National Research Council, Italy); Francesco Paciolla (Università degli Studi di Bari, Italy); Simone Pascuzzi (University of Bari Aldo Moro, Italy); Vito Renò (STIIMA CNR - Bari, Italy); Annalisa Milella (National Research Council, Italy)
- 10:40 A Study on the Influence of Training Parameters in CNN and Transformer Architectures for Semantic Segmentation in Vineyards**
Annaclaudia Bono and Cataldo Guaragnella (Politecnico di Bari, Italy); Tiziana D'Orazio (Consiglio Nazionale delle Ricerche, Italy)
- 11:00 Tomato Plants Instance Segmentation via Numerical Uniform Colour Space for Drought Stress Resilience Estimation**
Massimiliano Nitti (CNR STIIMA, Italy); Angelo Cardellicchio (STIIMA CNR, Italy); Francesco Cellini (Metapontum Agrobios Research Center - ALSIA, Italy); Angelo Petrozza (Centro Ricerche Metapontum Agrobios ALSIA, Italy); Stephan Summerer (ALSIA Metapontum Agrobios' Research Centre Matera, Italy); Filomena Carriero (ALSIA Centro Ricerche Metapontum Agrobios, Italy); Vito Renò (STIIMA CNR - Bari, Italy)
- 11:20 Depth Estimation for Oyster Mushrooms Using a CBAM-Enhanced U-Net to Support Growth Monitoring**
Meiqing Wang, Sari Nuwayhid and Dimitrios Argyropoulos (University College Dublin, Ireland)

12:00 - 12:30	Hall #1
CLOSING AND AWARD CEREMONY	

15:00 - 18:00	Hall #1
EUFRIN Working Group on Digital Orchard – Annual Meeting	

