IEEE

Università degli Studi di Padova

TESAF Dipartimento Territorio e Sistemi Agro-Forestali Università di Padova

2024 IEEE INTERNATIONAL WORKSHOP ON

Metrology for Agriculture and Forestry

PADOVA, ITALY / OCTOBER 29-31, 2024

MetroAgriFor PADOVA 2024

[FINAL PROGRAM]

TABLE OF CONTENTS

IEEE MetroAgriFor 2024 Committee 2
IEEE MetroAgriFor 2024 Keynote Speakers 5
Plenary Session - Tuesday October 29 - H 10:00 5
Plenary Session - Tuesday October 29 - H 14:00 7
Plenary Session - Wednesday October 30 - H 11:00 8
IEEE MetroAgriFor 2024 Tutorial 10
Tutorial Session - Thursday October 31 - H 11:00 10
IEEE MetroAgriFor 2024 Venue 12
IEEE MetroAgriFor 2024 Social Events 14
Welcome Party - Tuesday, October 29 14
Gala Dinner - Wednesday, October 30 14
IEEE MetroAgriFor 2024 Patronages 15
IEEE MetroAgriFor 2024 Sponsors 15
Program Schedule - Tuesday, October 29 16
Program Schedule - Wednesday, October 30 17
Program Schedule - Thursday, October 31 18
Technical Program - Tuesday, October 29 19
Technical Program - Wednesday, October 30 27
Technical Program - Thursday, October 31 37

IEEE MetroAgriFor 2024 Committee

HONORARY CHAIR
Enrico Primo Tomasini, Polytechnic University of Marche, Italy

GENERAL CHAIRS
Francesco Marinello, University of Padova, Italy
Dimitrios Paraforos, Ochschule Geisenheim University, Germany

TECHNICAL PROGRAM CHAIRS
Luigi Sartori, University of Padova, Italy
Paolo Tarolli, University of Padova, Italy
Andrea Pezzuolo, University of Padova, Italy

PUBLICATION CHAIRS
Lorenzo Guerrini, University of Padova, Italy
Nebojša Nikolić, University of Padova, Italy

SPECIAL SESSIONS CHAIRS
Jacopo Bacenetti, University of Milano, Italy
Tomas Norton, KU Leuven, Belgium

AWARD CHAIRS
Stefano Grigolato, University of Padova, Italy
Luigi Manfrini, University of Bologna, Italy
Alessia Cogato, University of Udine, Italy

DEMO SESSION CHAIR
Stefania Pindozzi, University of Naples Federico II, Italy

POSTER CHAIRS
Marco Sozzi, University of Padova, Italy
Luca Marchi, University of Padova, Italy

INDISTRIAL CHAIRS
Annachiara Berardinelli, University of Trento, Italy
Marco Bietresato, University of Udine, Italy
Cristina Nuzzi, University of Brescia, Italy

TREASURER
Francesco Picariello, University of Sannio, Italy

INTERNATIONAL PROGRAM COMMITTEE

Rita Acquistucci, CREA, Italy
Matt Aitkenhead, James Hutton Institute, Scotland UK
Leopoldo Angrisani, University of Naples Federico II, Italy
Alfonso Jose Calera Belmonte, University of Castilla La Mancha, Spain
Giuliano Bonanomi, University of Naples Federico II, Italy
Jose Blasco Valencian, Valencian Inst. for Agricultural Research, Spain
Gerardo Caja, University of Barcelona, Spain
Maria Grazia Cappai, University of Sassari, Italy
Giovanni Caruso, University of Pisa, Italy
Raffaele Casa, University of Tuscia, Italy
Paolo Castiglione, METER Group inc., USA
Chiara Cevoli, University of Bologna, Italy
André Chanzy, INRA, Avignon
Gherardo Chirici, University of Florence, Italy
Concetta Condurso, University of Messina, Italy
Simona Consoli, University of Catania
Antonio Coppola, University of Basilicata, Italy
Elena Sara Crotti, University of Milan, Italy
Quirijn de Jong van Lie, University of São Paulo, Brasil
Maria Teresa dell'Abate, CREA, Italy
J.A.M. Demattê, University of São Paulo, Brazil
Veronica De Micco, University of Naples Federico II, Italy
Annie Deslauriers, Université du Québec à Chicoutimi, Canada
Guido D'Urso, University of Naples Federico II, Ariespace srl, Italy
Massimo Faccoli, University of Padova, Italy
Giannino Francesco, University of Naples Federico II, Italy
Emanuele Frontoni, Polytechnic University of Marche, Italy
Marco Fusi, King Abdullah Univ. of Science and Technology, Saudi Arabia
Paolo Gay, University of Torino, Italy
Emilio Gil, Polytechnic University of Catalonia, Spain
José Manuel Gonçalves, Instituto Politécnico de Coimbra, Portugal
Alfred Hartemink, University of Wisconsin- Madison, USA
Jon Hempel, Natural Resources Conservation Service, USA
Gerard Heuvelink, ISRIC-Wageningen, The Netherlands
Naftali Lazarovitch, Ben-Gurion University of the Negev, Israel
Craig Lobsey, University of Southern Queensland, Australia
Otoniel Lopez, Miguel Hernández University of Elche, Spain
Matteo Lorito, University of Naples Federico II, Italy
Paolo Menesatti, CREA-IT, Italy
Mario Minacapilli, University of Palermo
Budiman Minasny, University of Sydney, Australia
Giovanni Molari, University of Bologna, Italy

Rosario Napoli, CREA-AA, Italy
Giacomo Palai, University of Pisa, Italy
Anna Pelosi, University of Salerno, Italy
Andrea Petroselli, University of Tuscia, Italy
Stefania Pindozzi, University of Naples Federico II, Italy
Andrea Pitacco, University of Padova, Italy
Simone Priori, CRA-ABP-Crea, Italy
Amauri Rosenthal, University of Campinas, Brazil
Federica Rossi, IBIMET, Italy
Vittorio Rossi, University of the Sacred Heart, Piacenza, Italy
Youssef Rouphael, University of Naples Federico II, Italy
Fabrizio Sarghini, University of Naples Federico II, Italy
Luca Sebastiani, Scuola Superiore Sant'Anna, Italy
Gerardo Severino, University of Naples Federico II, Italy
Zhou Shi, Zhejiang University, China
Oliver K. Shluter, ATB, Pstdam, Germany
Marco Sozzi, University of Padova, Italy
Markus Steffens, Technical University of Munich, Germany
Da-Wen Sun, University College Dublin, Ireland
Di Tian, Auburn University, USA
Francesca Todisco, University of Perugia, Italy
Marco Trevisan, University of the Sacred Heart, Italy
Antonella Verzera, University of Messina, Italy
Francesco Vuolo, Boku, Austria
David C. Weindorf, Texas Tech University, USA
Pablo J. Zarco-Tejada, The University of Melbourne, Australia

IEEE MetroAgriFor 2024 Keynote Speakers

Plenary Session - Tuesday October 29 - H 10:00

The Role of Geometrical Metrology in Manufacturing - An Update

Leonardo **De Chiffre**
Technical University of Denmark (DTU), Denmark

ABSTRACT

Many products in the industrialized world would not exist without engineers having access to modern, advanced geometrical metrology as the decisional basis for controlling design, manufacture, and function. For instance, a gear's form, dimensions, and surface topography have an enormous impact on the noise in a gearbox, and the dimensional and form accuracy of a drug-delivery device is paramount for the correct treatment of a patient. The presentation updates a previous keynote, giving a short overview of the role of geometrical metrology in modern manufacturing with focus on the industrial situation in Europe. Based on trends and issues in modern manufacturing, a bird's-eye view of measuring techniques and quality assurance methods is given concerning component design, process optimization, and tolerance verification. The role of written standards, metrological infrastructures, and education is emphasized. Economic aspects of metrology are briefly discussed. It is shown how geometrical metrology is the decisional basis for controlling design, manufacture, and function. Modern manufacture is highly dependent on the availability of metrological tools, often hidden in the production means or provided by a not-always-visible infrastructure. Modern manufacturing across countries depends on the availability of written standards that provide a common language and a metrological infrastructure that assures comparable measurements. Metrology, which is connected with modern manufacturing, is strongly influenced by the capacity of the people involved, which makes education a factor of paramount importance. Metrology is a prerequisite for high-end technologies such as micro and nano technologies. Metrology is a value-adding activity in all phases of production.

SPEAKER BIOGRAPHY

Leonardo De Chiffre holds M.Sc. (1974), Ph.D. (1979), and D.Sc. (1990), all in Manufacturing Eng.ng, from DTU. Professor Emeritus, DTU Civil and Mechanical Engineering since 2019. Full professor in Process Technology – Geometrical Metrology, DTU Mechanical Engineering 2002-2019. Director, Centre for Geometrical Metrology, DTU, 1992-2016. Area manager, Metal Cutting and Manufacturing Metrology, IPU (private foundation), 1994-2004. Associate professor, DIMEG, University of Padova, Italy, 1992-2002. Reader 1988-2002, IPL, DTU. Associate Professor 1983-1988, IPL, DTU. External Lecturer, Copenhagen Business School, 1974-1988. Research Associate 1974-1982, IPL, DTU. Consultant to a number of industrial companies in Denmark and abroad since 1974. Responsible for teaching and research activities in Metal Cutting and Geometrical Metrology. Initiator and coordinator of major framework programs. Responsible for installation and management of National Instrument Centre for Geometrical Metrology. Technical Manager of accredited calibration and testing laboratory at national primary level. Responsible of teaching technical Italian language at CBS. He has also created and directed during 1992-2002 the Laboratory of Industrial and Geometrical Metrology at the University of Padova and initiated a transnational virtual institute for geometrical metrology between DTU and Padova University. Fellow (Emeritus) of the International Academy for Production Engineering (CIRP) since 1999 (Member 1986-1999). Foundation Committee Member of European Society for Precision Engineering and Nanotechnology (EUSPEN) since 1997. Fostered 3 Taylor Medals from CIRP. Founder & President of ARSID (Association of Italian Researchers and Scientists in Denmark) since 2021.

Plenary Session - Tuesday October 29 - H 14:00

Recent advancements for sensors and technologies in horticultural crops

Manuela **Zude-Sasse**

Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB), Germany

ABSTRACT

Describing the plant status in digital format has been approached in recent decades by means of in-situ data acquisition and development of digital shadows. The new information may provide valuable knowledge for sustainable fruit production. From a farmers' perspective "farming with sensors is so much easier", since knowledge on the crop in real-time assists precise management decisions, avoiding errors and gaining management flexibility. To meet these goals, sensors should collect plant data in-situ and apply the data as input variables in physiological models. On one side, tools of information and communication technology (ICT) - such as satellites, drones, autonomous platforms, wireless networks, data management techniques - exist for all scales to support the data acquisition by means of remote, close-range remote, and proximal sensors directly in the production and postharvest process. On the other hand, the translation of sensor data into information on the crop and knowledge of the process is still challenging. Sensor data frequently provide plant data and artefacts, which is still challenging in the data acquisition under field conditions. Subsequently, the plant information needs to be turned into knowledge for supporting the decision making in the agronomic process, e.g. by means of a digital twin with several submodels. Examples show that this concept may support sustainable fruit production.

SPEAKER BIOGRAPHY

Manuela Zude-Sasse obtained a PhD at the Technical University Berlin, became Associate Professor at Humboldt University with habilitation in "Applied Plant Physiology", and subsequently Professor at the Beuth University of Applied Science Berlin, Germany. Presently, she serves as group leader for PRECISION HORTICULTURE at the Leibniz Institute for Agricultural Engineering and Bioeconomy, meanwhile publishing >100 IF papers, editing several special issues of international journals and a book on optical methods for crop sensing. The author works in the areas of sensor development, and turning the signals into plant information. The information obtained can potentially be used in the agronomic processes. Specific interests are the physical properties of fresh fruit; in-situ assessment of fruit and vegetables by means of spectral-optical analyses; application of sensor data in precision Horticulture.

Recent advancements in decision support systems/modeling

Davide **Cammarano**

Department of Agroecology, Climate and Water section, iClimate, CBIO, Aarhus University, Denmark

ABSTRACT

Crop simulation models, and decision support tools have been developed and applied for a variety of scientific fields, such as in precision agriculture. The latter is a discipline that started in the mid-80s as a mean to manage field's variability. Several aspects of the agronomic management of the fields have been subject to site-specific optimization using different types of technologies. Despite the initial success there has been a plateau on this technology for a number of years. In the last 10 years, there has been an increasing interest in "precision agriculture" with many companies and startup offering digital solutions and support systems for the agronomic management. Despite doing so the global adoption of proper precision agriculture management is rather low and the reasons for that must be found in several aspects, expectations and training of people working in this particular scientific field.

Going forward, climate change and increased climate variability poses additional challenges to managing agricultural fields and therefore precision agriculture can be a relevant technology in mitigating and adapting to climate change.

This presentation will critically address the past, present and future directions of modeling and decision support tools and offer an overview of what they can contribute to.

SPEAKER BIOGRAPHY

My scientific expertise includes precision agriculture, agronomy, application and development of crop models, remote sensing, crop and soil sciences, climate change and climate forecasts in agriculture, understanding the role of agriculture in local and global food safety and security.

I have graduated in Agricultural Science and Technology from the University of Basilicata (Italy). During my PhD at the University of Melbourne (Australia) I have worked on spatially integrating crop simulation model and remote sensing for nitrogen management on wheat. After the PhD I worked at Queensland University of Technology (Institute for Sustainable Resources) on measuring greenhouse gas emissions from cotton and wheat; and as Postdocotoral Associate at the University of Florida (USA) working on the impacts of climate change on agriculture and how

to model it. After this, I was a Research Scientist at the James Hutton Institute (Dundee, U.K.) working in precision agriculture and modelling the impacts of climate change in agriculture. From Jan 2020 to Jan 2022, I was an as Associate Professor in Digital Agriculture at the Department of Agronomy, Purdue University. Now I am a Professor in Environmental Crop Science at Aarhus University, Department of Agroecology. I am currently Chief Editor of Precision Agriculture, and President Elect of the International Society of Precision Agriculture.

IEEE MetroAgriFor 2024 Tutorial

Tutorial Session - Thursday October 31 - H 11:00

Contact and optical measurements for freeform shaped parts

Sofia **Catalucci**

Precision Manufacturing Group, Department of Industrial Engineering - University of Padova

ABSTRACT

In the age of Industry 4.0, the use of highly precise and fast inspection solutions in manufacturing has become critical. More specifically, the measurement of complex, freeform shaped parts presenting non-standard geometries, prevalent in sectors such as aerospace, automotive, biomedical, and environmental is shifting traditional contact measuring methods towards an increased use of non-contact, optical approaches. Optical techniques such as laser-based and structured light scanning offer significant advantages in terms of speed and flexibility compared to contact methods, and their ability to capture detailed surface information without physical contact is paramount, making them ideal for the inspection of delicate parts. Despite their advantages, optical technologies do not provide highly accurate results compared to tactile ones, which in turn perform at slower measurement rates and can be limited by the complexity of part geometries. During this tutorial, a variety of cutting-edge contact and optical measurement technologies available at the Geometrical and Industrial Metrology laboratory in Padova will be showcased. Attendees will gain insights of functionality and application of the proposed instruments. The focus of the demonstration will be the measurement of freeform shaped parts relevant for the agriculture and forestry communities. Through a series of practical examples, participants will have the opportunity to learn both the advantages and limitations of each category of instruments, understanding how these technologies can be employed, and highlighting scenarios where one method may outperform the other or where a hybrid approach could be beneficial. Overall, the tutorial aims to highlight the importance of metrology in supporting industries, with a particular emphasis on improving outcomes for agriculture and forestry applications.

SPEAKER BIOGRAPHY

Dr Sofia Catalucci is a Research Fellow at the Department of Industrial Engineering (DII), Università degli Studi di Padova. As a former member of the Manufacturing Metrology Team (MMT) at the University of Nottingham (UK) from Oct 2017 till Dec 2022, she obtained her PhD in Manufacturing Engineering titled "Automated assessment of measurement performance in optical coordinate metrology" and spent the following years working in the same group with a Postdoctoral position dedicated to the development of in-process optical sensing in metrological applications. Her activities focussed in the development of knowledge-driven algorithmic point cloud processing solutions and identification of quality metrics in optical coordinate metrology for application in flexible manufacturing environments. She is currently an Associate member of MMT and continues to support PhD students as external academic supervisor. After her experience abroad, since March 2023 she is part of the Precision Manufacturing Group at Padova. Her work focuses in the development of trustworthy Digital-Metrological Twins for machine vision systems and emerging measurement technologies in digital manufacturing applications. She is currently co-supervising PhD and Master students in Mechanical Engineering and she is the lecturer of the course Quality and Manufacturing Engineering to the second cycle degree in Materials Engineering.

IEEE MetroAgriFor 2024 Venue

IEEE MetroAgriFor 2024 will be held at **Best Western Plus Hotel Galileo**.

ADDRESS

Via Venezia, 30
Padova

Hotel Best Western Galileo in Padova is an elegant 4 stars hotel located near the center of Padova. All the most interesting and evocative city sites are within a short walking distance. Starting from the Hotel you can visit the city center, the Scrovegni Chapel painted by Giotto, the Astronomical observatory of Galileo and much more.

HOW TO REACH US

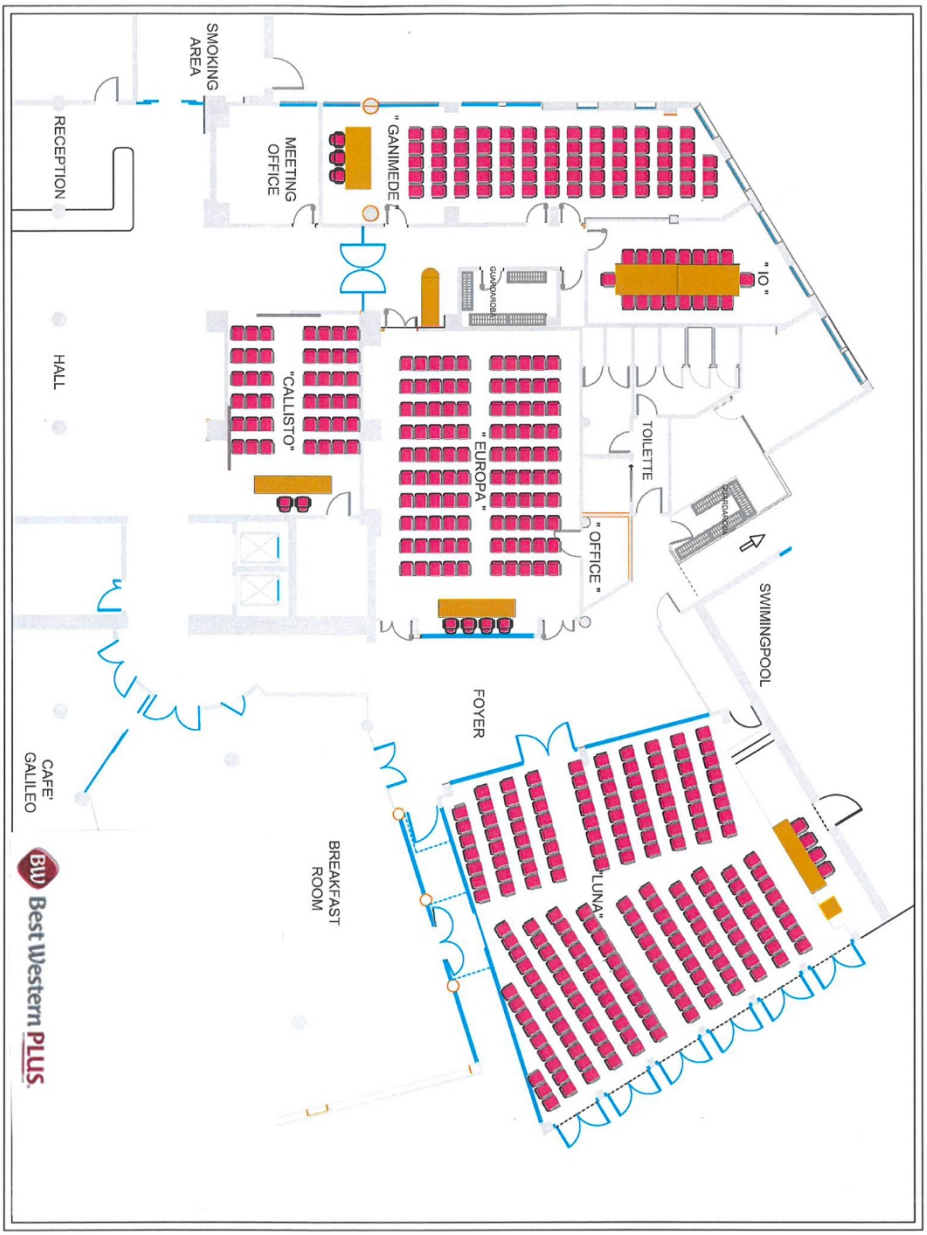
BY CAR
Drive to viale Venezia 30, Padua. Hotel Galileo is located outside the restricted traffic zone and parking is free.

BY TRAIN
From the station you can walk to the hotel (it is about 900 meters) or take a taxi. Alternatively, you can take bus 10 or 7 and stop at “PADOVA FIAT”.

VENUE HALLS

Technical / Poster Sessions will be held in

- Sala Luna - Ground Floor
- Sala Ganimede - Ground Floor
- Sala Panorama - 7th Floor
- Sala Europa - Ground Floor - Poster and Exhibitors


SMOKING AREA
RECEPTION
MEETING OFFICE
" GANIMEDE "
" IO "
HALL
"CALLISTO"
" EUROPA "
TOILETTE
" OFFICE "
SWIMINGPOOL
FOYER
"LUNA"
BREAKFAST ROOM
CAFE' GALILEO
Best Western PLUS

IEEE MetroAgriFor 2024 Social Events

Welcome Party - Tuesday, October 29

The IEEE MetroAgriFor **Welcome Party** will be held at "*Caffè Pedrocchi*" on Tuesday, October 29 - 19:00.

ADDRESS - Via VIII Febbraio, 15 - Padova


Gala Dinner - Wednesday, October 30

The IEEE MetroAgriFor **Gala Dinner** will be held at Restaurant "*Zairo*" on Wednesday, October 30 - 20:00.

ADDRESS - Prato della Valle, 51 - Padova



IEEE MetroAgriFor 2024 Patronages

IEEE MetroAgriFor 2024 Sponsors

Program Schedule - Tuesday, October 29

TUESDAY, OCTOBER 29			
09:30 - 10:00	OPENING CEREMONY - WELCOME ADDRESSES - Sala Luna		
10:00 - 11:00	KEYNOTE SPEAKER - Leonardo De Chiffre The Role of Geometrical Metrology in Manufacturing - An Update		
11:00 - 11:20	COFFEE BREAK - Breakfast Room		
	Sala Luna	Sala Ganimede	Sala Panorama
11:20 - 12:40	S1.1 - Contactless Measurements and Computer Vision for Agriculture, Forestry and Zootechnics - PART I	S1.2 - Soil monitoring	S1.3 - Data Analytics-Driven Precision Horticulture Engineering - PART I
12:40 - 14:00	LUNCH - Breakfast Room		
14:00 - 15:00	KEYNOTE SPEAKER - Manuela Zude-Sasse Recent advancements for sensors and technologies in horticultural crops		
15:00 - 16:20	COFFEE BREAK / POSTER SESSION - Sala Europa		
	Sala Luna	Sala Ganimede	Sala Panorama
16:20 - 17:40	S2.1 - Contactless Measurements and Computer Vision for Agriculture, Forestry and Zootechnics - PART II	S2.2 - New Advancements For Monitoring Hydrological Processes And Supporting The Sustainable Management Of Agro-Forest Systems - PART I	S2.3 - Data Analytics-Driven Precision Horticulture Engineering - PART II
19:00	WELCOME PARTY - Caffè Pedrocchi		

Program Schedule - Wednesday, October 30

WEDNESDAY, OCTOBER 30				
	Sala Luna	Sala Ganimede	Sala Panorama	SMACT Competence Center
09:00 - 10:40	S3.1 - New Advancements For Monitoring Hydrological Processes And Supporting The Sustainable Management Of Agro-Forest Systems - PART II	S3.2 - Digital technologies and sustainable agriculture: Meeting practitioners' and societal needs	S3.3 - Robotics for Agro-Forestry and Landscape Applications	S3.4 - Measurement tools and statistical methods ensuring food safety and quality in post-harvest
10:40 - 11:00	COFFEE BREAK - Breakfast Room			
11:00 - 12:00	KEYNOTE SPEAKER - Davide Cammarano Recent advancements in decision support systems/modeling			
	Sala Luna	Sala Ganimede	Sala Panorama	
12:00 - 13:20	S4.1 - New Advances in Digital Technologies for Sustainable Livestock Farming - PART I	S4.2 - Soil Erosion Analysis, Monitoring, And Mapping At Different Spatial Scales - PART I	S4.3 - Measurements and modelling of mass and energy fluxes in agricultural and forest ecosystems	
13:20 - 14:30	LUNCH - Breakfast Room			
14:30 - 16:10	S5.1 - Livestock gaseous emissions from animal housing to the field: New advancement from Agritech center	S5.2 - Machine vision and AI for Agri&Food applications	S5.3 - Optimizing the Integration of Agriculture 4.0 in Winery Production	
16:10 - 16:50	COFFEE BREAK / POSTER SESSION - Sala Europa			
16:50 - 18:10	S6.1 - New Advances in Digital Technologies for Sustainable Livestock Farming - PART II	S6.2 - Soil Erosion Analysis, Monitoring, And Mapping At Different Spatial Scales - PART II	S6.3 - Vineyards and orchards	
20:00	GALA DINNER - Restaurant Zairo			

Program Schedule - Thursday, October 31

THURSDAY, OCTOBER 31				
	Sala Luna	Sala Ganimede	Sala Panorama	
09:00 - 10:40	S7.1 - Navigation, mapping and geospatial data analysis in precision agriculture	S7.2 - Sensing and Data Platforms: what is ahead of us	S7.3 - Precision sensing	
10:40 - 11:00	COFFEE BREAK - Breakfast Room			
	Sala Luna	Sala Ganimede	Sala Panorama	University of Padova, Department of Industrial Engineering
11:00 - 12:20	S8.1 - Mechanization and practice	S8.2 - Remote sensing	S8.3 - Data processing	TUTORIAL - Contact and optical measurements for freeform shaped parts
12:30 - 13:00	CLOSING AND AWARD CEREMONY - Sala Luna			

Technical Program - Tuesday, October 29

09:30 - 18:00	*Best Western Plus Galileo - Foyer* **REGISTRATIONS**

09:30 - 10:00	*Sala Luna* **OPENING CEREMONY - WELCOME ADDRESSES**

10:00 - 11:00	*Sala Luna* **PLENARY SESSION - KEYNOTE SPEAKER** **Chairs**: Pasquale Daponte, *University of Sannio, Italy* Francesco Marinello*, University of Padova, Italy*

The Role of Geometrical Metrology in Manufacturing–An Update

Leonardo De Chiffre, *Technical University of Denmark (DTU), Denmark*

11:00 - 11:20	*Breakfast Room* **COFFEE BREAK**

11:20 - 12:40	*Sala Luna* **Session 1.1 - Contactless Measurements and Computer Vision for Agriculture, Forestry and Zootechnics - PART I** **Chair:** Alessandro Annessi, *Università Politecnica delle Marche, Italy*

11:20 **Rapid Monitoring of Maize Plant Status Using UAV-Based Multispectral and Hyperspectral Data**
Massimiliano Gargiulo, Claudia Savarese, Marco De Mizio, Francesco Tufano and Sara Parrilli (CIRA - Italian Aerospace Research Centre, Italy)

11:40 **An Energy-Based Approach to Cushioning Material Selection for Table Olive Mechanical Harvesting**
Alessandro Annessi, Francesco Belluccini, Vittoria Medici, Veronica Giorgi and Enrico Maria Lodolini (Università Politecnica Delle Marche, Italy); Milena Martarelli and Paolo Castellini (Università Politecnica delle Marche, Italy); Davide Neri (Università Politecnica Delle Marche, Italy)

12:00 **Deciphering the Role of UAV Flight Height and Sensor Inclination in the Prediction of Table Grape Production Through Computer Vision Techniques**
Ana Maria Codes Alcaraz and Herminia Puerto Molina (University Miguel Hernandez & Centre for Agri-Food and Agro-Environmental Research and Innovation CIAGRO,

Spain); Carmen Rocamora Osorio (University of Miguel Hernandez & Centre for Agri-Food and Agro-Environmental Research and Innovation CIAGRO, Spain); Nicola Furnitto (Università degli studi di Catania, Italy); Sabina Failla (University of Catania, Italy); Juan Miguel Ramírez Cuesta (Università degli Studi di Catania, Italy)

12:20 **Olive Tree Metrics Assessment by UAV Photogrammetric Approach**
Francesco Belluccini and Alessandro Annessi (Università Politecnica Delle Marche, Italy); Roberta Cacciatore (Università Politecnica delle Marche, Italy); Veronica Giorgi and Enrico Maria Lodolini (Università Politecnica Delle Marche, Italy); Milena Martarelli and Paolo Castellini (Università Politecnica delle Marche, Italy); Davide Neri (Università Politecnica Delle Marche, Italy)

11:20 - 12:40 *Sala Ganimede*
Session 1.2 - Soil monitoring
Chair: Francesco Marinello, *University of Padova, Italy*

11:20 **Experimental Investigations on the Conditions Where Radial Expansion Benefits Soil Penetration for Plant Root-Inspired Diggers**
Venkata Rithwick Puranam (Scuola Superiore SantAnna, Italy); Jules Sebastiaan de Ruiter (Delft University of Technology, The Netherlands); Serena Rosa Maria Pirrone (Italian Institute of Technology & Scuola Superiore Sant'Anna, Italy); Emanuela Del Dottore (IIT, Italy); Barbara Mazzolai (Istituto Italiano di Tecnologia, Italy)

11:40 **Predictive Modeling of Soil Chromium Content Using Hyperspectral Spectroscopy**
Mariam Alcibahy and Abdel Rahman Satei Hussein Alsaleh (Khalifa University, United Arab Emirates); Hamed Al Hashmi (UAE Space Agency, United Arab Emirates); Bayan Athamneh (Environment Agency Abu Dhabi, United Arab Emirates); Ali Al Hammadi and Lakmal Seneviratne (Khalifa University, United Arab Emirates); Maryam Rashed AlShehhi (Khalifa University, Civil, Infrastructure and Environmental Engineering & MIT, United Arab Emirates)

12:00 **Advances in Soil Compaction Characterization Through Applied Geophysics**
Alberto Carrera, Francesco Morari, Luca Peruzzo, Ilaria Barone, Mirko Pavoni, Jacopo Boaga, Matteo Longo, Nicola Dal Ferro and Giorgio Cassiani (University of Padova, Italy)

12:20 **Detection of Existing Skid Trails Based on Geodata as a Basis for Their Optimization**
Sravani Dhara (Fraunhofer Institute for Factory Operation and Automation IFF, Germany); Joshua Dominic Moritz and Denny Schmelz (Fraunhofer-Institut für Fabrikbetrieb und -automatisierung IFF, Germany); Ina Ehrhardt and Gesa Götte (Fraunhofer Institute for Factory Operation and Automation, Germany)

11:20 - 12:40	*Sala Panorama - 7th floor* **Session 1.3 - Data Analytics-Driven Precision Horticulture Engineering - PART I** **Chairs:** Luigi Manfrini*, University of Bologna, Italy* Dario Mengoli, *University of Bologna, Italy* Manuela Zude-Sasse, *Leibniz Institute for Agricultural Engineering and Bioeconomy, Germany* Lav khot, *Washington State University, USA*

11:20 **Populating Digital Orchards: Evaluation of a 3D Positioning Algorithm for Semi-Automated Data Collection and Spawning**
Antonella Simini, Mirko Piani and Gianmarco Bortolotti (University of Bologna, Italy); Alberto Martinez Sanchez (Instituto Valenciano de Investigaciones Agrarias, Spain); Dario Mengoli and Luigi Manfrini (University of Bologna, Italy)

11:40 **Potential of Different Optical Methods in Estimating Chili Pepper Growth Under Field Conditions**
Giacomo Fontanelli (CNR-IFAC, Italy); Silvia Traversari (National Research Council (CNR), Italy); Sonia Cacini (Council for Agricultural Research and Economics, Italy); Daniele Massa (CREA, Italy); Francesca Rossi and Simone Pettinato (CNR-IFAC, Italy); Manuele Scatena (CNR-IRET, Italy); Lorenza Tuccio (CNR, Italy)

12:00 **Combining Convolutional and Recurrent Neural Networks to Improve Greenhouse Microclimate Mapping**
Ashraf Sharifi and Sara Migliorini (University of Verona, Italy); Davide Quaglia (Universita di Verona, Italy)

12:20 **A Real Time DSS Based on SimulHydro Software for Prediction of Water Consumption and Ion Composition of the Recirculating Nutrient Solution of Two Closed-Loop Soilless Tomato Crops**
Fatjon Cela and Giulia Carmassi (University of Pisa, Italy); Antonio Affinito and Emanuele Varriale (EVJA, Naples, Italy); Luca Incrocci (University of Pisa, Italy)

12:40 - 14:00	*Breakfast Room* **LUNCH**

14:00 - 15:00	*Sala Luna* **PLENARY SESSION - KEYNOTE SPEAKER** **Chairs**: Luigi Manfrini, *University of Bologna, Italy* Pasquale Daponte*, University of Sannio, Italy*

Recent advancements for sensors and technologies in horticultural crops

Manuela Zude-Sasse, *Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB), Germany*

15:00 - 15:30	*Breakfast Room* **COFFEE BREAK**

15:00 - 16:20	*Sala Europa* **POSTER SESSION**

PS01 **Exploring the Potential of Supervised Classification Approaches for Esca Disease Detection in UAV Hyperspectral Images**
Massimiliano Gargiulo, Claudia Savarese, Sara Parrilli and Marco De Mizio (CIRA - Italian Aerospace Research Centre, Italy); Cesario Vincenzo Angelino (CIRA - the Italian Center for Aerospace Research, Italy); Francesco Tufano (CIRA - Italian Aerospace Research Centre, Italy)

PS02 **Symmetrized Dot Pattern Representation of Audio Measurements for Queen Bee Presence Classification**
Linda Senigagliesi and Gianluca Ciattaglia (Università Politecnica delle Marche, Italy); Valeria Bruschi (Marche Polytechnic University, Italy); Laura Falaschetti (Polytechnic University of Marche, Italy); Alessandro Terenzi (Università Politecnica delle Marche, Italy); Stefania Cecchi (UNIVPM, Italy)

PS03 **Gas Box System to Measure the Effects of Low-Density Polyethylene Microplastics on Rumen Activity**
Abid Khalil, Salvatore Barbera, Sara Glorio Patrucco, Hatsumi Kaihara and Sonia Tassone (University of Turin, Italy)

PS04 **Design of A Low Cost Three Dimensional Anemometer Device for Carbon Flux Measurement**
Melvi Ulvan (The University of Lampung & Czech Technical University in Prague, Indonesia); Ardian Ulvan (University of Lampung & Czech Technical University in Prague, Indonesia); Mona Arif Muda (University of Lampung, Indonesia); Heru Pranoto (Universitas Sumatera Utara, Indonesia); Setiawan Margo Waluyo (University of Lampung, Indonesia); Irfan Mirda, Jr (University of Lampung & USA, Indonesia); Muhammad Rafif Musyaffa (Universitas Lampung, Indonesia)

PS05 **Detection of Powdery Mildew Disease on Hazelnut Leaves by UV/VIS Fluorescence**
Manuel Greco ("Roma Tre" University, Italy); Giuseppe Schirripa Spagnolo (University of "Roma Tre", Italy); Francesca Bonfigli, Antonia Lai and Emilio Giovenale (ENEA, Italy); Fabio Leccese ("Roma Tre" University, Italy)

PS06 **Rotary Tiller Performance Tests Based on Different Power and Rotary Tiller Parameters**
Kaihua Liu, Mutong Li and Lu Zhu (Guangdong Institute of Modern Agricultural Equipment, China); Xianliang Wang (Shandong University of Technology, China);

Mingyu Gao, Xiaodong Guan, Changhong Chai and Lin He (Guangdong Institute of Modern Agricultural Equipment, China)

PS07 **An IoT Platform for Smart Hydroponics: Building Blocks and Open Challenges**
Mino Sportelli (National Research Council (CNR), Italy); Antonino Crivello (Institute of Information Science and Technologies - CNR, Italy); Davide La Rosa (National Research Council, Italy); Manlio Bacco (European Commission, Joint Research Centre (JRC) & National Research Council (CNR), Italy); Luca Incrocci (University of Pisa, Italy); Paolo Barsocchi (ISTI-CNR, Italy)

PS08 **Impact Simulation of Posidonia Oceanica (L.) Delile Planting for CO2 Storage in Lazio Region**
Valerio Baiocchi, Flavia Cianfanelli and Valerio Maria Marzaioli (Sapienza University of Rome, Italy)

PS09 **Monitoring the Greenhouse Gas Emissions in Dairy Cattle Farms. the MITIgA Project**
Giuseppe Modica (University of Messina, Italy); Luigi Liotta, Vincenzo Chiofalo and Vincenzo Lopreiato (Università degli studi di Messina, Italy); Massimo Merenda (University Mediterranea of Reggio Calabria, Italy); Salvatore Pratico (University of Reggio Calabria, Italy)

PS10 **Can Remote Sensing Technologies Be Suitable for Monitoring and Estimating "Sulla" Grazing?**
Nicola Furnitto (Università degli studi di Catania, Italy); Sabina Failla, Giuseppe Sottosanti and Marcella Avondo (University of Catania, Italy); Matteo Bognanno (Università degli Studi Mediterranea di Reggio Calabria, Italy); Juan Miguel Ramírez-Cuesta (University of Catania, Italy)

PS11 **Measurement Method of Rainfall Energetic Characteristics Applying the Weibull Drop Size Distribution**
Francesco Giuseppe Carollo, Maria Angela Serio, Roberto Caruso, Costanza Di Stefano, Vito Ferro and Vincenzo Pampalone (University of Palermo, Italy)

PS12 **From AI Based Object Detection Model to Grape Yield Mapping for Precision Agriculture Applications**
Lindo Nepi and Marco Fiorentini (Università Politecnica delle Marche, Italy); Adriano Mancini (Dipartimento di Ingegneria dell'Informazione, Università Politecnica delle Marche, Italy); Luigi Ledda and Roberto Pierdicca (Università Politecnica delle Marche, Italy)

PS13 **Robotisation Evaluation of the Essential PDOs for the Veneto Region, Italy**
Alessandro Zanchin (University of Padua, Italy); Marco Sozzi and Francesco Marinello (University of Padova, Italy)

PS14 **Livestock Manure Digestate Treatments to Reduce GHG and NH3 Emissions and Meet Crop Nutrients Requirement: The Limit DGGAS Project Experience**

Ester Scotto di Perta, Alessandra Apostolico and Elena Cervelli (University of Naples Federico II, Italy); Elio Dinuccio (University of Turin, Italy); Nunzio Fiorentino (University of Naples Federico II, Italy); Raffaele Grieco (University of Bologna, Italy); Lucia Ottaiano and Anna Verde (University of Naples Federico II, Italy); Laura Zavattaro (University of Turin - DSV, Italy); Stefania Pindozzi (University of Naples Federico II, Italy)

PS15 **Comparing NeRF and LiDAR-Based Plant Reconstruction**
Andrea Masiero (University of Padova, Italy); Erica Isabella Parisi (University of Florence, Italy); Alberto Guarnieri and Francesco Pirotti (University of Padua, Italy)

PS16 **State of the Art and Perspectives in Ammonia and Particulate Matter Measurement in Pig Houses**
Antonio Mautone (Università degli Studi di Milano, Italy); Alberto Finzi (Università Degli Studi di Milano, Italy)

PS17 **Low-Cost Multispectral Sensor for Monitoring Vine Leaf Density**
Mariagrazia Leccisi and Manuel Greco ("Roma Tre" University, Italy); Giuseppe Schirripa Spagnolo (University of "Roma Tre", Italy); Eduardo De Francesco (SETEL, Italy); Fabio Leccese ("Roma Tre" University, Italy)

PS18 **Reliability of Turbulent Fluxes Measurements Provided by a Novel Sensor on a Pistachio Orchard**
Juan Miguel Ramírez Cuesta (Università degli Studi di Catania, Italy); Juan Manuel Sánchez and José González Piqueras (University of Castilla-La Mancha, Spain); Francisco Montoya (Instituto Técnico Agronómico Provincial (ITAP), Spain); Ignacio Buesa Pueyo, Diego S. Intrigliolo and Ramon López-Urrea (Desertification Research Center, CIDE- CSIC-UV-GVA, Spain)

PS19 **WineryFarming4.0: definition of smart solutions for the effective implementation of Agriculture 4.0 in winery production**
Giocapelli F., Assettati L., Zoli M., Zanchin A., Rossi P., Bacchetti A., Vieri M., Monarca D., Pessina D., Bacenetti J.

PS20 **Development of a light cable-suspended sensing platform for vineyard monitoring**
Didonna G., Iodice F., Sozzi M.

PS21 **Animal health and welfare: an Italian perspective on digital technologies**
Pezzuolo A., Marinello F.

16:20 - 17:40	*Sala Luna* **Session 2.1 - Contactless Measurements and Computer Vision for Agriculture, Forestry and Zootechnics - PART II** **Chair:** Alessandro Annessi, *Università Politecnica delle Marche, Italy*

16:20 **ML-Based Forest Road Classification Based on Car Attached Ultrasonic Sensors**
Gesa Götte (Fraunhofer Institute for Factory Operation and Automation, Germany); Simon Baier (iFOS GmbH, Germany); Andreas Herzog (Fraunhofer Institute for Factory Operation and Automation, Germany); Martin Ziesak (Bern University of Applied Sciences, Switzerland); Ina Ehrhardt (Fraunhofer Institute for Factory Operation and Automation, Germany)

16:40 **Long-Term Land Restoration Assessment Using Remote Sensing in Mediterranean Ecosystems**
Tom Avikasis Cohen (The Spectroscopy and Remote Sensing Laboratory, School of Environmental Sciences University of Haifa, Israel); Anna Brook and Ghadir Zbedat (School of Environmental Sciences, Israel)

17:00 **Remote Sensing to Monitor Regulated Deficit Irrigation Effects in Soybean**
Giovanni Trevisanuto, Francesco Morbidini and Alessia Bado (University of Padova, Italy); Federico Toson (University of Padova & CISAS G. Colombo, Italy); Sebastiano Chiodini, Giacomo Colombatti and Carlo Bettanini (University of Padova, Italy); Anna Dalla Marta (University of Florence, Italy); Carmelo Maucieri and Maurizio Borin (University of Padova, Italy)

17:20 **Comparative Analysis and Optimization of Detection Algorithms for Apples on Orchards with Complex Backgrounds**
Ermin Kevric (Hamburg University of Technology (TUHH), Germany); Jiahua Wei (Technical University Hamburg, Germany)

16:20 - 17:40 *Sala Ganimede*
Session 2.2 - New Advancements for Monitoring Hydrological Processes and Supporting The Sustainable Management Of Agro-Forest Systems - PART I
Chairs: Arianna Facchi, *University of Milano, Italy*
Gabriele Barone, *University of Bologna, Italy*

16:20 **Monitoring Salinization Processes Through Ground-Based Sensors and Remote Sensing in the Po River Delta (North-East Italy)**
Aurora Ghirardelli and Paolo Tarolli (University of Padova, Italy)

16:40 **On the Use of Remote Sensing Vegetation Indices for Agricultural Zones' Delineation**
Gunay Hasanli (Alma Mater Studiorum - University of Bologna, Italy); Sadra Emamalizadeh (University of Bologna, Italy); Riccardo Mazzoleni (Università Degli Studi di Bologna, Italy); Lorenzo Ferlin (University of Bologna, Italy); Saida Aliyeva (ADA University, Azerbaijan); Elton Mammadov (The Ministry of Agriculture of Azerbaijan, Azerbaijan); Gabriele Baroni (Università Degli Studi di Bologna, Italy)

17:00 **Monitoring Flood Dynamics in 2022 in the North River Basin (China)**
Junliang Qiu (University of Padua, Italy); Xiankun Yang (Guangzhou University, The Netherlands); Paolo Tarolli (University of Padova, Italy)

17:20 **Treated Wastewater: Environmental Pressure or Water and Nutrient Resource?**
Anna Maria De Girolamo (National Research Council, Italy); Vito Buono (SYSMAN Progetti e Servizi srl, Italy); Marianna Leone (National Research Council, Italy); Giuseppe Gatta (University of Foggia, Italy); Alfieri Pollice (National Research Council, Italy)

16:20 - 18:00	*Sala Panorama - 7th floor* **Session 2.3 - Data Analytics-Driven Precision Horticulture Engineering - PART II** **Chairs:** Luigi Manfrini*, University of Bologna, Italy* Dario Mengoli, *University of Bologna, Italy* Manuela Zude-Sasse, *Leibniz Institute for Agricultural Engineering and Bioeconomy, Germany* Lav khot, *Washington State University, USA*

16:20 **Optical Sensors for Optimizing Nitrogen Application in Broccoli Seedlings Production**
Sonia Cacini and Giulia Arati (Council for Agricultural Research and Economics, Italy); Silvia Traversari (National Research Council (CNR), Italy); Giacomo Fontanelli (CNR-IFAC, Italy); Daniele Massa (CREA, Italy); Beatrice Nesi and Gina Rosalinda De Nicola (Council for Agricultural Research and Economics, Italy); Francesca Vannucchi (National Research Council, Italy); Lorenza Tuccio (CNR, Italy)

16:40 **AI-Driven Soil Moisture Forecasting for Enhanced Precision Agriculture**
Paolo Grazieschi (Fondazione Bruno Kessler, Italy); Fabio Antonelli (Fondazione Bruno Kessler, Ital, Italy); Massimo Vecchio (OpenIoT Research Unit at FBK, Italy); Miguel Pincheira (Fondazione Bruno Kessler, OpenIoT Unit & Trento, Italy)

17:00 **Enhancing Climate Prediction in Smart Greenhouse: Synergy of Neural Network and Granular Computing to Reduce Computational Complexity**
Cristian Bua and Francesco Fiorini (University of Pisa, Italy); Davide Adami (CNIT Pisa Research Unit, University of Pisa, Italy); Stefano Giordano and Michele Pagano (University of Pisa, Italy)

17:20 **Localized Crop Physiology Sensing System Driven Apple Fruit Color Progression Monitoring**
Basavaraj Amogi, Lav Khot and Bernardita V Sallato (Washington State University, USA)

17:40 **Modeling Grape Berry Temperature for Effective Heat Stress Management in Vineyards**
Srikanth Gorthi, Dattatray G. Bhalekar, Lav Khot and Markus Keller (Washington State University, USA)

19:00	*Caffè Pedrocchi* **WELCOME PARTY**

Technical Program - Wednesday, October 30

08:30 - 17:00	*Best Western Plus Galileo - Foyer* **REGISTRATIONS**

09:00 - 10:40	*Sala Luna* **Session 3.1 - New Advancements for Monitoring Hydrological Processes and Supporting The Sustainable Management Of Agro-Forest Systems - PART II** **Chairs:** Arianna Facchi, *University of Milano, Italy* Gabriele Barone, *University of Bologna, Italy*

09:00 **Using Sentinel-2 Images to Delineate Management Zones for Variable Rate Drip Irrigation in Vineyards**
Bianca Ortuani, Davide Bianchi and Alice Mayer (Università degli Studi di Milano, Italy); Giovanna Sona (Politecnico di Milano, Italy); Lucio Brancadoro (Università degli Studi di Milano, Italy); Arianna Facchi (University of Milan, Italy)

09:20 **A DSS Based on Remote Sensing, Field Sensors, Agro-Hydrological Modelling and Automation to Support Precision Irrigation Under Different Irrigation Methods**
Arianna Facchi, Alice Mayer, Daniele Masseroni and Bianca Ortuani (Università degli Studi di Milano, Italy); Edoardo Reguzzoni (Hortus srl, Italy); Enrico Capedri (Agrostar srl, Italy); Leonardo Ciolina (Brixia Irrigation srl, Italy); Fabiola Gangi (Università degli Studi di Milano, Italy); Giuseppe Meazza (Rubicon Water, Italy)

09:40 **Enhancing Irrigation Management at the Sub-District Level by Combining Irrigation Volume Monitoring Data With an Agro-Hydrological Model**
Rachele Eliana Riva, Michele Carlo Polletta and Olfa Gharsallah (Università degli Studi di Milano, Italy); Fabio Olivotti and Stefano Roverato (ANBI Lombardia, Italy); Lorenzo Sanguanini, Claudio Gandolfi and Daniele Masseroni (Università degli Studi di Milano, Italy)

10:00 **Geophysical Characterization of the Spatiotemporal Variability of Agricultural and Forest Soils: Some Common Methodological Issues**
Luca Peruzzo and Alberto Carrera (University of Padova, Italy); Benjamin Mary (CSIC, Spain); Giorgio Cassiani and Francesco Morari (University of Padova, Italy)

10:20 **Comparing Throughfall Variability in Mediterranean Oak and Beech Forests**
Marco Dionigi, Paolo Filippucci and Silvia Barbetta (National Research Council, Italy); Daniele Penna and Matteo Verdone (University of Florence, Italy); Domenico De Santis (National Research Council, Italy); Christian Massari (CNR, Italy)

09:00 - 10:40 *Sala Ganimede*
Session 3.2 - Digital technologies and sustainable agriculture: Meeting practitioners' and societal needs
Chair: Alessio Ferrari, *National Research Council, Italy*

09:00 **Overview and Assessment Approaches of Energy Consumption and GHG Emissions Through the Development and Application of Artificial Intelligence - an Example from the Agricultural Sector**
Jens Henningsen (Fraunhofer IESE, Germany); Stefan Rilling (Fraunhofer IAIS, Germany)

09:20 **Towards a Toolkit for Socio-Technical Process Modelling in Agriculture: A Pilot Study**
Chiara Mannari (National Research Council, Italy); Mino Sportelli (National Research Council (CNR), Italy); Ogochukwu Felicitas Okoye (University of Pisa, Italy); Manlio Bacco (European Commission, Joint Research Centre (JRC) & National Research Council (CNR), Italy); Alessio Ferrari (National Research Council (CNR), Italy); Alessio Malizia and Gianluca Brunori (University of Pisa, Italy)

09:40 **Automatic Tomato Seedling Segmentation for Genotypic Assessment via Gaussian Mixture Models**
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)

10:00 **IoT-Based Bee Colony Health Monitoring: A Focus on Energy Impact and Audio Feature Extraction**
Andrea De Simone, Luca Barbisan, Giovanna Turvani and Fabrizio Riente (Politecnico di Torino, Italy)

10:20 **Needs, Challenges and Opportunities of Digital Livestock Farming in a Cheese Supply Chain**
Fabio Lepore and Livia Ortolani (University of Pisa, 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 - 10:40 *Sala Panorama - 7th floor*
Session 3.3 - Robotics for Agro-Forestry and Landscape Applications
Chairs: Marco Fontanelli, *University of Pisa, Italy*
Francesco Crocetti, *University of Perugia, Italy*
Dario Mengoli, *University of Bologna, Italy*

09:00 **Learning-Based Artificial Potential Field Path Planning for Agricultural UGVs**
Petre Ricioppo, Mauro Mancini and Elisa Capello (Politecnico di Torino, Italy)

09:20 **A Robotic Platform for Autonomous Plant Identification and Monitoring for Orchards**
Francesco Visentin, Simone Cremasco, Denis Tognolo and Riccardo Muradore (Università di Verona, Italy)

09:40 **SHD-O2D: A Novel Image Dataset for Super-High-Density Olive Orchard Yield Estimation**
Alessandro R. Denarda, Francesco Crocetti, Gabriele Costante and Mario Luca Fravolini (University of Perugia, Italy); Paolo Valigi (Unipg, Italy); Damiano Marchionni and Franco Famiani (University of Perugia, Italy)

10:00 **Trunk Based Monitoring and Data Collection System on Real-World Orchards: A Case Study**
Mirko Piani, Gianmarco Bortolotti, Simone Rossi, Nicolò Omodei, Luigi Manfrini and Dario Mengoli (University of Bologna, Italy)

10:20 **Measuring Trampling in Autonomous Mowers With Systematic Trajectories: Comparison With the Ordinary Random Patterns**
Marco Fontanelli, Patrizia Carlomagno, Lorenzo Gagliardi, Christian Frasconi, Michele Raffaelli, Andrea Peruzzi, Giuliano Sciusco and Sofia Matilde Luglio (University of Pisa, Italy)

09:00 - 10:40 *SMACT Competence Center*
Session 3.4 - Measurement tools and statistical methods ensuring food safety and quality in post-harvest
Chairs: Lorenzo Guerrini, *University of Padova, Italy*
Annachiara Berardinelli, *University of Trento, Italy*
Eleonora Iaccheri, *University of Bologna, Italy*
Zicheng Gao, *China Agricultural University, China*

The session will be held at **SMACT Competence Center**, entrance from Ingresso - Fiera Porta S, Via Niccolò Tommaseo, 59 (500 m from the Best Western Hotel).
Meeting point for attendees: 08:50 at the Registration Desk (*Foyer - Best Western Hotel*).

09:00 **Image Processing Based Fruit Damage Recognition: Thermal Imaging, Color Measurement and 3D Reconstruction**
ShiChao Li and alessandro zanchin (University of Padova, Italy); Lorenzo Guerrini (University of Padua, Italy)

09:20 **NIR Spectroscopy and Vis/NIR Hyperspectral Imaging for Determining the Geographical Origin of Pistachio**
Chiara Cevoli and Angelo Fabbri (University of Bologna, Italy)

09:40 **Nondestructive Assessment of FRED® Pear Internal Quality**
Eleonora Iaccheri (University of Bologna, Italy); Annachiara Berardinelli (University of Trento, Italy); Gianni Ceredi (Apofruit Soc. Coop. Ar. L., Italy); Luigi Ragni (University of Bologna, Italy)

10:00 **Moisture Content Determination in Walnuts by Using a Sound Detector: Preliminary Results**
Aref Sepehr, Hend Mohamed and Francesco Marinello (University of Padova, Italy); Lorenzo Guerrini (University of Padua, Italy)

10:20 **A Novel System to Monitoring Food Waste in School Canteens Based on RGB-D Images**
Yuanyuan Jia, Ying Shi, Chengfang Wan, Zicheng Gao and Yonghua Huang (China Agricultural University, China); Francesco Marinello (University of Padova, Italy); Lorenzo Guerrini (University of Padua, Italy); Hao Guo (China Agricultural University, China)

10:40 - 11:00	*Breakfast Room* **COFFEE BREAK**

11:00 - 12:00	*Sala Luna* **PLENARY SESSION - KEYNOTE SPEAKER** **Chairs**: Dimitrios Paraforos, *Ochschule Geisenheim University, Germany* Francesco Marinello*, University of Padova, Italy*

Recent advancements in decision support systems/modeling

Davide Cammarano, *Department of Agroecology, Climate and Water section, iClimate, CBIO, Aarhus University, Denmark*

12:00 - 13:20	*Sala Luna* **Session 4.1 - New Advances in Digital Technologies for Sustainable Livestock Farming - PART I** **Chairs:** Alberto Barbaresi, *University of Bologna, Italy* Marco Bovo, *University of Bologna, Italy*

12:00 **Near-Infrared Spectroscopy to Predict Nutritional Factors of Green Forage**
Alessandro Benelli, Chiara Evangelista, Raffaello Spina, Riccardo Primi, Daniele Pietrucci, Marco Milanesi, Giovanni Chillemi, Umberto Bernabucci and Roberto Moscetti (University of Tuscia, Italy)

12:20 **Continuous Multi-Zone Prediction Model to Monitor THI in Dairy Cattle Farms**
Carlos Alejandro Perez Garcia, Marco Bovo, Daniele Torreggiani and Patrizia Tassinari (University of Bologna, Italy)

12:40 **Enhancing Sensor Precision Through Calibration: A Case Study in Agricultural Monitoring Systems**
Mattia Ceccarelli, Marco Bovo, Enrica Santolini, Patrizia Tassinari, Daniele Torreggiani and Alberto Barbaresi (University of Bologna, Italy)

13:00 **Cattle Beef Farms and Climate Resilience: An Investigation in Sardinia (Italy)**
Antonio Ledda, Andrea De Montis, Giovanna Calia and Vittorio Serra (University of Sassari, Italy)

12:00 - 13:20 *Sala Ganimede*
Session 4.2 - Soil Erosion Analysis, Monitoring, And Mapping at Different Spatial Scales - PART I
Chairs: Lorenzo Vergni, *University of Perugia, Italy*
Vincenzo Pampalone, *University of Palermo, Italy*
Giovanni Francesco Ricci, *University of Bari, Italy*

12:00 **Change in Hydrological and Erosion Dynamics in an Alpine River Basin Affected by Forest Cover Change: Field Data Collection and Modeling, the Case of Vaia Windstorm**
Giovanna Nordio, Kenta Koyanagi and Andrea Andreoli (University of Bolzano, Italy); Francesco Comiti (University of Padova, Italy)

12:20 **Soil Loss Estimation Under Different Soil Management Using a Multispectral UAV**
Alessandra Vinci, Raffaella Brigante and Lorenzo Vergni (University of Perugia, Italy)

12:40 **Setting Up the Sediment Delivery Distributed (SEDD) Model: The Carapelle Watershed Case Study**
Addolorata Maria Netti, Giovanni Francesco Ricci and Ossama M. M. Abdelwahab (University of Bari, Italy); Vincenzo Pampalone, Costanza Di Stefano and Vito Ferro (University of Palermo, Italy); Francesco Gentile (University of Bari, Italy)

13:00 **Effects of Bacteria Inoculation on Soil Hydrology and Erosion Processes of a Clay Loam Soil**
Gaetano Guida, Antonino Lucchese, Alessio Nicosia, Vincenzo Palmeri, Vincenzo Pampalone and Vito Ferro (University of Palermo, Italy)

12:00 - 13:20 *Sala Panorama - 7th floor*
Session 4.3 - Measurements and modelling of mass and energy fluxes in agricultural and forest ecosystems
Chair: Nadia Vendrame, *University of Trento, Italy*

12:00 **Estimating Leaf Wetness: From Electronic Sensor Outputs to Real Leaves in a Cherry Orchard**
Camilla Destefanis and Francesco Reyes (University of Modena and Reggio Emilia, Italy)

12:20 **Assessing Carbon Flux Through Micrometeorological Method in a Mediterranean Grapevine**
Giuseppe Montanaro and Antonio Carlomagno (University of Basilicata, Italy); Andrea Pitacco (University of Padova, Italy); Nadia Vendrame (University of Trento, Italy); Vitale Nuzzo (University of Basilicata, Italy)

12:40 **Mass and Energy Flows Modelling: Part I - Assessment of Forest Primary Productivity and Transpiration Trends**
Kristina Micalizzi (Sapienza University of Rome, Italy); Danilo Lombardi and Marcello Vitale (University of Rome La Sapienza, Italy)

13:00 **Mass and Energy Flows Modelling: Part II - Exergy-Based Assessment of Forest Efficiency**
Danilo Lombardi (University of Rome La Sapienza, Italy); Kristina Micalizzi (Sapienza University of Rome, Italy); Marcello Vitale (University of Rome La Sapienza, Italy)

13:20 - 14:30	*Breakfast Room* **LUNCH**

14:30 - 16:10	*Sala Luna* **Session 5.1 - Livestock gaseous emissions from animal housing to the field: New advancement from Agritech center** **Chairs:** Marco Bovo, *University of Bologna, Italy* Francesco Marinello, *University of Padova, Italy*

14:30 **Predicting Equivalent Temperature Index in a Cattle Barn With NeuralProphet Model**
Carlos Alejandro Perez Garcia, Marco Bovo, Alberto Barbaresi, Enrica Santolini, Daniele Torreggiani and Patrizia Tassinari (University of Bologna, Italy)

14:50 **Long-Term Experiment on Gas Concentration Distribution in an Open Dairy Barn**
Provvidenza Rita D'Urso (University of Catania, Italy); Grazia Cinardi (Università di Catania, Di3A, Italy); Claudia Arcidiacono and Giovanni Cascone (University of Catania, Italy)

15:10 **Gas Concentrations and THI Monitoring in a Naturally Ventilated Buffalo Farm: First Results With Advanced Multi-Sensor Node**
Alessandra Apostolico and Ester Scotto di Perta (University of Naples Federico II, Italy); Raffaele Grieco (University of Bologna, Italy); Elena Cervelli and Stefania Pindozzi (University of Naples Federico II, Italy)

15:30 **Forecasting Dissolved Oxygen Level in Land-Based Fish Farms Using a Context-Aware Recurrent Neural Network**
Claudio Tomazzoli and Sara Migliorini (University of Verona, Italy); Roberto Pastres (Ca Foscari University of Venice, Italy)

15:50 **Design of Eddy Gas Analyzer as Carbon Sensing Device to Measure CO2 Gas in Oil Palm Plantation**
Ardian Ulvan (University of Lampung & Czech Technical University in Prague, Indonesia); Hana Yunus Putri (Universitas Lampung, Indonesia); Mona Arif Muda (University of Lampung, Indonesia); Melvi Ulvan (The University of Lampung & Czech Technical University in Prague, Indonesia); Heru Pranoto (Universitas Sumatera Utara, Indonesia)

14:30 - 16:10 *Sala Ganimede*
Session 5.2 - Machine vision and AI for Agri&Food applications
Chairs: Cristina Nuzzi, *University of Brescia, Italy*
Simone Pasinetti, *University of Brescia, Italy*
Jordi Gené-Mola, *Institute of Agrifood Research and Technology, Spain*

14:30 **Hyperspectral Imaging Combined With Machine Learning to Classify Flavescence Dorée Symptoms**
Cristina Nuzzi and Massimiliano Micheli (University of Brescia, Italy); Giulia Papa, Ilaria Negri and Erica Saldi (Catholic University of the Sacred Heart, Italy); Simone Pasinetti (University of Brescia, Italy)

14:50 **Performance Assessment of Machine Learning Algorithms for Yellow Rust Wheat Disease Classification With UAV RGB Images**
Fatemeh Khalesi (University of Sannio, Italy); Amin Talaeizadeh (Advanced Research Lab for Control and Agricultural Robotics, Iran); Aria Alasty (Sharif University of Technology, Iran); Pasquale Daponte, Luca De Vito and Francesco Picariello (University of Sannio, Italy)

15:10 **Early Crop Type Classification and Mapping Using Sparse and Multi-Year Remote Sensing Data**
Jordi Gené-Mola, Magí Pamies-Sans, César Minuesa, Jaume Casadesús and Joaquim Bellvert (Institute of AgriFood Research and Technology (IRTA), Spain)

15:30 **Metrological Assessment of RGB-D Cameras for 3D Orchard Reconstruction**
Bernardo Lanza (University of Brescia, Italy); Marc Felip-Pomés (Universitat de Lleida (UdL), Spain); Jordi Gené-Mola (Institute of AgriFood Research and Technology (IRTA), Spain); Cristina Nuzzi (University of Brescia, Italy); Ricardo Sanz-Cortiella (Universitat de Lleida, Agrotecnio CERCA Center, Spain); Simone Pasinetti (University of Brescia, Italy); José M. Plata-Moreno (Agrotecnio-CERCA Center, Spain); José A. Martínez-Casasnovas and Alexandre Escolà (Universitat de Lleida, Agrotecnio CERCA Center, Spain); Jaume Lordan (Institute of AgriFood Research and Technology (IRTA), Spain); Eduard Gregorio López (University of Lleida, Spain)

15:50 **Automating Grapevine LAI Features Estimation With UAV Imagery and Machine Learning**
Muhammad Waseem Akram, Marco Vannucci, Giorgio Buttazzo, Valentina Colla and Stefano Roccella (Scuola Superiore Sant'Anna, Italy); Andrea Vannini (The BioRobotics Institute, Scuola Superiore Sant'Anna, Italy); Giovanni Caruso (University of Pisa, Italy); Simone Nesi (Universita di Pisa, Italy); Alessandra Francini (Scuola Superiore Sant Anna, Italy); Luca Sebastiani (Scuola Superiore Sant'Anna, Italy)

14:30 - 16:10 *Sala Panorama - 7th floor*
Session 5.3 - Optimizing the Integration of Agriculture 4.0 in Winery Production
Chairs: Jacopo Bacenetti, *University of Milan, Italy*
Alessandro Zanchin, *University of Padova, Italy*

14:30 **Leveraging ISOBUS TIM-Based Communication to Connect Smart Weeding Implements and Autonomous Robots**
Galibjon M Sharipov (University of Hohenheim, Germany & University of Geisenheim, Germany); Trim Bresilla (Wageningen University and Research, The Netherlands); Amar Benrais (AgreenCulture, France); Andreas Heiß and Dimitrios S. Paraforos (University of Geisenheim, Germany)

14:50 **How Agriculture 4.0 Solutions Can Reduce the Environmental Impact of Viticulture?**
Lorenzo Rossi (Fondazione Edmund Mach); Michele Zoli, Francesco Giacopelli and Jacopo Bacenetti (Università degli Studi di Milano)

15:10 **Optimising Tractor Telemetry: From Raw Data to Accurate Information in Vineyard Field Activities**
Riccardo Alemanno, Pierluigi Rossi and Danilo Monarca (University of Tuscia, Italy)

15:30 **Remote Sensing and GIS-Based Assessment of Vineyard Pruning Residues for Bioenergy and Biochar Production**
Federica D'Acunto and Francesco Marinello (University of Padova, Italy); Filippo Iodice (Uptoearth GmbH, European Union); Andrea Pezzuolo (University of Padova, Italy)

15:50 **Canopy Digital Twin and Digital Data as Tools for Implementing Variable Crop Protection in Viticulture**
Andrea Pagliai, Daniele Sarri, Carolina Perna, Celine Russo, Niccolò Rimbotti, Riccardo Lisci and Marco Vieri (University of Florence, Italy); Simon-Paolo Kartsiotis and Niccolò Bartoloni (Agrobit srl, Italy)

16:10 - 16:50 *Breakfast Room*
COFFEE BREAK

16:10 - 16:50	*Sala Europa* **POSTER SESSION**

16:50 - 18:10	*Sala Luna* **Session 6.1 - New Advances in Digital Technologies for Sustainable Livestock Farming - PART II** **Chairs:** Andrea Pezzuolo, *University of Padova, Italy* Hao Guo, *China Agricultural University, China* Alexey Ruchay, *Chelyabinsk State University, Russia*

16:50 **Adaptive Dynamic Parallelization of Animal Tracking Applied to Kinematic Features in Precision Poultry Farming**
Alberto Carraro, Francesco Marinello, Mattia Pravato, Francesco Bordignon, Angela Trocino, Gerolamo Xiccato and Andrea Pezzuolo (University of Padova, Italy)

17:10 **Integrated Monitoring and Control System for Oxygen Distribution in a Land-Based Aquaculture Facility**
Carlo Bibbiani (Università di Pisa, Italy); Riccardo Tonasso (Cosa - Società Agricola, Italy); Lorenzo Rossi (University of Pisa, Italy); Marco Gentili (Cosa - Società Agricola, Italy); Baldassare Fronte (University of Pisa, Italy)

17:30 **Comparison of SMAL and hSMAL Parametric Reconstruction of Horse Based on Point Cloud**
Hexiao Lu, Bingxue Wei and Hao Guo (China Agricultural University, China); Battsetseg Damjin (Research And Development Center of Food Agriculture Light Industry, Mongolia); Alexey Ruchay (Chelyabinsk State University, Russia); Yannick Le-Cozler (Agro Rennes-Angers, France); Andrea Pezzuolo (University of Padova, Italy)

17:50 **Mamba-MSQNet: A Fast and Efficient Model for Animal Action Recognition**
Edoardo Fazzari (Scuola Superiore Sant'Anna, Italy); Donato Romano (Scuola Superiore Sant Anna, Italy); Fabrizio Falchi (CNR, Italy); Cesare Stefanini (Dean, Italy)

16:50 - 18:10	*Sala Ganimede* **Session 6.2 - Soil Erosion Analysis, Monitoring, And Mapping at Different Spatial Scales - PART II** **Chairs:** Lorenzo Vergni, *University of Perugia, Italy* Vincenzo Pampalone, *University of Palermo, Italy* Giovanni Francesco Ricci, *University of Bari, Italy*

16:50 **Erosion Dynamics and Tracer-Based Characterization of the Water Sources in an Alpine Catchment**
Girma Berhe Adane, Enrico Marin, Chiara Marchina, Francesco Bettella, Marco Martini and Giulia Zuecco (University of Padova, Italy)

17:10 **Identifying Sediment Source Areas in an Agricultural Mediterranean Basin**
Rose Mary, Giovanni Francesco Ricci and Ossama M. M. Abdelwahab (University of Bari, Italy); Ersilia D'Ambrosio (ARPA Puglia, Italy); Anna Maria De Girolamo (National Research Council, Italy); Francesco Gentile (University of Bari, Italy)

17:30 **A Novel Approach for Measuring the Energetic Characteristics of Drip-Type Rainfall Simulators**
Francesco Giuseppe Carollo, Roberto Caruso, Maria Angela Serio and Vincenzo Pampalone (University of Palermo, Italy)

17:50 **Timely Monitoring of Events Over a Finite Time Horizon for Smart Agriculture**
Maksim Lukashkou (University of Padova, Italy); Leonardo Badia (Università degli Studi di Padova, Italy)

16:50 - 18:10 *Sala Panorama - 7th floor*
Session 6.3 - Vineyards and orchards
Chair: Marco Bietresato, *University of Udine, Italy*

16:50 **Vision-Based Aphrophoridae Foam Detection for Sustainable Management of Xylella Fastidiosa Vectors**
Annalisa Milella (National Research Council (CNR), Italy); Arianna Rana (CNR, Italy); Antonio Petitti (National Research Council, Italy); Rosa Pia Devanna (STIIMA CNR, Italy); Francesco Porcelli (UNIBA, Italy); Simone Pascuzzi (University of Bari Aldo Moro, Italy)

17:10 **Frost and Drought Indices for Assessing Production Risk in Viticulture and Developing Innovative Risk Management Tools**
Mahshid Kalantari (University of Padua, Italy); Alice Stiletto and Samuele Trestini (University of Padova, Italy)

17:30 **Computer Vision-Based Autonomous Navigation for UAV Vineyard Row Following**
Riccardo Enrico, Petre Ricioppo, Mauro Mancini and Stefano Primatesta (Politecnico di Torino, Italy)

17:50 **Comparative Analysis of Soil Moisture Interpolation Techniques in Apple Orchards of Trentino Region**
Romeo Silvestri (Fondazione Bruno Kessler, Italy); Massimo Vecchio (OpenIoT Research Unit at FBK, Italy); Miguel Pincheira (Fondazione Bruno Kessler, OpenIoT Unit & Trento, Italy); Fabio Antonelli (Fondazione Bruno Kessler, Ital, Italy)

20:00 *Restaurant Zairo - Prato della Valle, 51 - Padova*
GALA DINNER

Technical Program - Thursday, October 31

08:30 - 12:00	*Best Western Plus Galileo - Foyer* **REGISTRATIONS**

09:00 - 10:40	*Sala Luna* **Session 7.1 - Navigation, mapping and geospatial data analysis in precision agriculture** **Chairs:** Raffaella Brigante, *University of Perugia, Italy* Andrea Masiero, *University of Padova, Italy* Valerio Baiocchi, *Sapienza University of Rome, Italy*

09:00 **GNSS NRTK-UAV Photogrammetry and LiDAR Point Clouds for Geometric Features Extraction of Olive Orchard**
Raffaella Brigante, Roberto Calisti, Laura Marconi, Primo Proietti, Fabio Radicioni and Alessandra Vinci (University of Perugia, Italy)

09:20 **Agrivoltaics: The Simulated Possibilities in Lazio Region (Italy) on Two Test Municipalities**
Valerio Baiocchi, Flavia Cianfanelli and Valerio Maria Marzaioli (Sapienza University of Rome, Italy)

09:40 **Validation and Error Characterization in UAV-Based Thermal Mapping**
Erica Isabella Parisi and Fabiana Di Ciaccio (University of Florence, Italy); Andrea Masiero (University of Padova, Italy); Alberto Guarnieri (University of Padua, Italy); Grazia Tucci (University of Florence, Italy)

10:00 **A Data Collection Framework for Precision Agriculture: Addressing Data Gaps and Overlapping Areas With IoT and Artificial Intelligence**
Gagan Narang (Università Politecnica delle Marche, Italy); Alessandro Galdelli (Università Politecnica Delle Marche, Italy); Rocco Pietrini, Francesco Solfanelli and Adriano Mancini (Università Politecnica delle Marche, Italy)

10:20 **Comparative Analysis of Real-Time and Post-Processed GNSS Data in Precision Agriculture Using the State Space Representation**
Paolo Dabove and Milad Bagheri (Politecnico di Torino, Italy)

09:00 - 10:40	*Sala Ganimede* **Session 7.2 - Sensing and Data Platforms: what is ahead of us** **Chairs:** Manlio Bacco, *European Commission - Joint Research Centre* Federico Coro', *University of Padova, Italy*

09:00 **A Feasibility Study on Microwave Imaging for Domestic Compost Production Monitoring**
David O. Rodriguez-Duarte, Melania Fiore, Andrea De Simone, Fabrizio Riente, Giovanna Turvani, Francesca Demichelis, Tonia Tommasi and Francesca Vipiana (Politecnico di Torino, Italy)

09:20 **Federated Learning for Data Spaces: A Privacy-Enhancing Strategy Based on Data Visiting**
Manlio Bacco (European Commission, Joint Research Centre (JRC) & National Research Council (CNR), Italy); Margherita Di Leo (Arcadia SIT, under contract with the European Commission, JRC); Albana Kona (European Commission, Joint Research Centre, European Union); Mattia Santoro (National Research Council of Italy, Italy); Paolo Mazzetti (Institute of Atmospheric Pollution Research - National Research Council, Italy)

09:40 **Multispectral Imaging Supervised by Optical Spectrometry for Close Acquisition in Precision Agriculture**
Dumitru Scutelnic (University of Verona, Italy); Riccardo Muradore (Università di Verona, Italy); Claudia Daffara (University of Verona, Italy)

10:00 **Spatiotemporal Analysis for Enhanced Drought Monitoring and Agricultural Applications in the Ebro Basin Spain**
Eirini Trypidaki (Grumets Research Group. Universitat Autònoma de Barcelona and CREAF. Spain); Lluís Pesquer and Cristina Domingo-Marimon (Grumets Research Group. CREAF. Spain)

10:20 **A DF-LCA Modeling and Evaluation Case Study on an Agricultural Pests and Diseases Knowledge Graph Based Q&A System**
Wang Xu (Sichuan Agricultural University, China); Qi Gao (Dipartimento Territorio e Sistemi Agro-Forestali Università degli Studi di Padov, Italy); Youzhi Tao (Sichuan Agricultural University, China); Francesco Marinello (University of Padova, Italy); Qiang Huang (Sichuan Agricultural University, China)

09:00 - 10:20 *Sala Panorama - 7th floor*
Session 7.3 - Precision sensing
Chair: Luigi Manfrini, *University of Bologna, Italy*

09:00 **Chemoelectrical Transduction in "Living Sensor Effects of UV-A Radiation Exposure on Root Exudation of Sansevieria Cylindrica**
Carlo Trigona, Sergio Terrazino, Andrea Baglieri, Ivana Puglisi and Anna M Gueli (University of Catania, Italy)

09:20 **Integrating High-Resolution Imaging and Water-Sensitive Paper for Enhanced Agricultural Spray Droplet Characterization**

Marco Sozzi and Qi Gao (University of Padova, Italy); Alessandro Zanchin (University of Padua, Italy); Cristiano Baldoin and Francesco Marinello (University of Padova, Italy)

09:40 **Standardized Sensor Infrastructure for Seasonal and Multi-Seasonal Data Collection in Orchard Management**
Frederick Blome and David Berschauer (Fraunhofer-Institut für Fertigungstechnik und Angewandte Materialforschung IFAM, Germany); Benjamin Schulze (Fraunhofer IFAM, Germany)

10:00 **Plant Root Growth Responses to Mycorrhizal Fungi: In Vivo Characterization Through Time-Series Microscopy Analysis**
Giulia Raffaele (Istituto Italiano di Tecnologia, Italy & Università di Napoli Federico II, Italy); Marilena Ronzan and Carlo Filippeschi (Istituto Italiano di Tecnologia, Italy); Emanuela Del Dottore (IIT, Italy); Barbara Mazzolai (Istituto Italiano di Tecnologia, Italy)

10:40 - 11:00 *Breakfast Room*
COFFEE BREAK

11:00 - 12:20 *University of Padova, Department of Industrial Engineering*
TUTORIAL - Contact and optical measurements for freeform shaped parts

The tutorial will be held at the **University of Padova, Department of Industrial Engineering**, Via Venezia 1 (300 m from the Best Western Hotel).
Meeting point for attendees: 11:00 at the Registration Desk (*Foyer - Best Western Hotel*).

11:00 - 12:20 *Sala Luna*
Session 8.1 - Mechanization and practice
Chair: Marco Sozzi, *University of Padova, Italy*

11:00 **Mechanization of Field Plot Experiments Designed to Test Different Intercropping Layouts**
Marco Sozzi (University of Padova, Italy); Alessandra Virili (University of Udine, Italy); Wendy C Vernaza-Cartagena and Giacomo Manera (University of Padova, Italy); Rino Gubiani and Elisa Marraccini (University of Udine, Italy); Vittoria Giannini (University of Padova, Italy); Marco Bietresato (University of Udine & Free University of Bozen-Bolzano, Italy)

11:20 **Evaluating the Impact of Various Agronomic Management Practices on Food Loss at the Primary Production Stage Using Proximal and Remote Sensing**
Chiara Rivosecchi (Sapienza University of Rome & Polytechnic University of Marche, Italy); Adriano Mancini (Polytechnic University of Marche, Italy); Luigi Ledda (Università Politecnica delle Marche, Italy); Marco Bianchini, Annamaria Cuscianna,

Paola Antonia Deligios, Marco Fiorentini and Matteo Francioni (Polytechnic University of Marche, Italy); Federico Mammarella (Sapienza University of Rome, Italy); Marco Fattorini (Università Politecnica delle Marche, Italy)

11:40 **Experimental Method for the Assessment of ISO Reference Nozzles by N60 Shadowgraph**
Saba Amin (Free University of Bolzano-Bozen, Italy); Lorenzo Becce (Libera Università di Bolzano, Italy); Ayesha Ali (Free University of Bozen Bolzano, Italy); Fabrizio Mazzetto (University of Bolzano-Bozen, Italy)

12:00 **Exploring a New Technique for Measuring the Plant's Sap Flow Based on an Optical Fiber**
Francesca Todisco (Universta' di Perugia, Italy); Jennifer Bertuzzi and Grazia Tosi (Universita' di Perugia, Italy); Lorenzo Vergni (University of Perugia, Italy); Giulia Rossi (Università di Perugia, Italy); Sara Fabri (Universita' di Perugia, Italy); Lorenzo Capponi (Universita' Politecnica delle Marche, Italy); Giulio Tribbiani (Univerista' di Padova, Italy); Gianluca Rossi (University of Perugia, Italy)

11:00 - 12:20 *Sala Ganimede*
Session 8.2 - Remote sensing
Chair: Nebojša Nikolić, *University of Padova, Italy*

11:00 **Estimating Forest Above-Ground Biomass Using Sentinel-2 and SDGSAT-1 With Predictive Regression Models**
Eren Gursoy Ozdemir (Bartın University, Turkey); Saygin Abdikan (Hacettepe University, Turkey)

11:20 **Training Weed Recognition Models for Integrated Weed Management in Precision Agriculture Through Advanced Remote Sensing Technologies**
Nebojša Nikolić and Roberta Masin (University of Padova, Italy)

11:40 **Exploring Sentinel-1 and Sentinel-2 Time Series Sensitivity to Rice Height**
Saygin Abdikan (Hacettepe University, Turkey); Dessislava Ganeva (Bulgarian Academy of Sciences, Bulgaria); Omer Gokberk Narin (Afyon Kocatepe University, Turkey); Aliihsan Sekertekin (Igdir University, Turkey); Zlatomir Dimitrov (Space Research and Technology Institute & Bulgarian Academy of Sciences, Bulgaria); Caglar Bayik (Zonguldak Bulent Ecevit University, Turkey); Milen Chanev (Bulgarian Academy of Sciences, Bulgaria); Lachezar H Filchev (Space Research and Technology Institute, the Bulgarian Academy of Sciences (SRTI-BAS), Bulgaria); Mustafa Ustuner (Artvin Coruh University, Turkey); M. Tolga Esetlili (Ege University, Turkey); Fusun Balik Sanli (Yildiz Technical University, Turkey); Yusuf Kurucu (Ege University, Turkey)

12:00 **Vegetation Characteristics and the Estimation of Above-Ground Biomass and Carbons Stock in Petengoran Mangrove Forest, Lampung Bay, Indonesia**
Ladiva Nirmala Ulvan (Institut Teknologi Sepuluh November, Indonesia); Indah DT (Institut Teknologi Sepuluh Nopember, Indonesia); Melvi Ulvan (The University of

Lampung & Czech Technical University in Prague, Indonesia); Ardian Ulvan (University of Lampung & Czech Technical University in Prague, Indonesia)

11:00 - 12:20 *Sala Panorama - 7th floor*
Session 8.3 - Data processing
Chair: Lorenzo Guerrini, *University of Padova, Italy*

11:00 **The Impact of LoRaWAN Relay Mode on IoT End Node Energy Consumption**
Poonam Maurya, Troels B. Sørensen and Himanshu Sharma (Aalborg University, Denmark)

11:20 **PCA-Based Maximum Correntropy Kalman Filter Application for Agricultural Unmanned Aerial Vehicle**
Fethi Candan (Erciyes University, Turkey & University of Idaho, USA); Johnny (Liujun) Li (University of Idaho, USA)

11:40 **AI and IoT Innovations in Agriculture: Comprehensive Analytical Review of Use Cases**
Raghu Chaliganti (Fraunhofer -HHI, Germany); Ramy A. Fathy (National Telecommunication Regulatory Authority (NTRA), Egypt); Sebastian Bosse (Fraunhofer Heinrich Hertz Institute, Germany)

12:00 **Leveraging Random Access Techniques for Finite Horizon Uncoordinated Status Sensing**
Emilija Đokanovic (University of Padova, Italy); Leonardo Badia (Università degli Studi di Padova, Italy)

12:30 - 13:00 *Sala Luna*
CLOSING AND AWARD CEREMONY