



IEEE Conference on AgriFood Electronics (CAFE)

23th-25th September 2026

University of Cagliari, Italy

CONFERENCE PROGRAMME



Sponsor and Patrons



PROGRAMME AT A GLANCE

Each paper has a 12-minute slot: 10 minutes of presentation and 2 minutes of questions.

WEDNESDAY, SEPTEMBER 23

08:15 – 08:45	Registration
08:45 – 09:00	Opening
09:00 – 09:45	Keynote Prof. Roberto Confalonieri
09:45 – 11:15	Session 1 Advanced Sensing Technologies
11:15 – 11:45	Coffee break
11:45 – 13:00	Session 2 Advanced Sensing Technologies
13:00 – 14:30	Lunch
14:30 – 16:00	Session 3 IoT, Edge Computing & Embedded Systems in Agrifood
16:00 – 16:30	Coffee break
16:30 – 18:00	Session 4 IoT, Edge Computing & Embedded Systems in Agrifood
19:00 – 21:00	Welcome cocktail and Poster Session A 11 posters

THURSDAY, SEPTEMBER 24

09:00 – 13:00	IAFE Forum 2026.ieee-cafe.org/iafe-forum
13:00 – 14:30	Lunch
14:30 – 16:00	Session 5 AI & Image Processing in Agrifood
16:00 – 16:30	Coffee break
16:30 – 18:00	Session 6 AI & Image Processing in Agrifood
18:30 – 19:30	Transfer to Cantina Su'Entu
19:30 – 23:00	Social dinner and Poster Session B 12 posters

FRIDAY, SEPTEMBER 25

09:00 – 09:45	Keynote Michaela Margida, PhD
09:45 – 11:15	Session 7 IoT, Edge Computing & Embedded Systems in Agrifood
11:15 – 11:45	Coffee break
11:45 – 13:15	Session 8 RF, MW, THz Technology in Agrifood
13:15 – 14:30	Lunch
14:30 – 16:00	Session 9 RF, MW, THz Technology in Agrifood (2) Robotics & Automation in Agrifood (4) Renewable Energy Technology in Agriculture(1) ·
14:30 – 17:30	SmartAg Workshop — part 1
16:00 – 16:20	Coffee break
16:20 – 16:40	Closing and awards

SATURDAY, SEPTEMBER 26

09:00 – 13:00 **SmartAg Workshop — part 2**

13:00 End of the conference

TECHNICAL PROGRAMME — ORAL SESSIONS

Papers are listed in presentation order.

SESSION 1 · — Advanced Sensing Technologies

Wednesday, September 23 · 09:45 – 11:15

Time	Paper	Presentation
09:45	#5066	Fluoride Fiber Interferometer for Mid-Infrared AgriFood Monitoring Francesco Anelli; Antonella Maria Loconsole; Federico Moscatelli; Francesco Prudeniano
09:57	#5041	Dry Matter Content Estimation in Cassava Tubers Using Nuclear Magnetic Resonance Smaran Panth Kulakarni; Ivan Keresztes; Amal El-Ghazaly
10:09	#5044	Non-Destructive Ultrasonic Monitoring of Spoilage Induced Changes in Plant-Based Soy Milk Shubhra Shekhar; Sylvia Chen; Andrew Penton; John Ashton; Shuai He; Chun Tung Chou; Francisco J. Trujillo
10:21	#5124	A Variable-Path-Length NDIR Spectrometer for Dense, Low-Cost Mapping of Soil N₂O Hotspots Zachary Holt; MD Shaad Mahmud
10:33	#5109	Graphene/Cu-BTC/ZIF-8 Hybrid Gas Sensor for Agricultural Ammonia Monitoring Zining Tang; Owen J. Guy; Joseph Paul-Taylor; Tom Dunlop; Zari Tehrani; James E. McCormack; Danielle M. Goodwin; Yin Cheung Lau
10:45	#5050	Coplanar Capacitive Sensors for Non-Destructive Permittivity Assessment of Food Powders L. Bauduffe; M. Sebeloue; R. Covis; M. Rube; M. Modika; O. Tamarin
10:57	#5093	A Segmented Cluster Electrode for Enhanced Sensitivity in Agricultural Gas Detection Adif Alam; Hayden Staples; Haleh Nazemi; Youssef Elnemr; Arezoo Emadi

SESSION 2 · — Advanced Sensing Technologies

Wednesday, September 23 · 11:45 – 13:15

Time	Paper	Presentation
11:45	#5080	An Experimental Approach to Exploit a Millimeter Wave Radar for Vegetation Proximity Sensing Emanuele Setale; Antonio Sorrentino; Andrea Buono; Samiullah Yousaf; Alessandro Fanti; Maurizio Migliaccio
11:57	#5074	Electrical Conductivity Transducer Design for Hydroponic Nutrient Solutions Diego Tapia Tecruceno; Luis Arturo Soriano; Carlos Alberto Villasenor Perea; Angel Garduno Garcia; Josue Vicente Cervantes Bazan; Jose Francisco Marin Camacho
12:09	#5090	Monitoring Plant Electrical Activity with Magnetically connectable Tattoo Electrodes Arianna Melis; Andrea Spanu
12:21	#5131	Differential UiO-66-NH₂ Capacitive Humidity Sensor for Drift-Resilient Precision Agriculture Seerat Sekhon; Maryam Habibollahi; Vikramjeet Singh; Andreas Demosthenous
12:33	#5100	Ion Selective Time Domain EIS with a Membrane-Free OECT for Precision Agriculture Israel Corbacho; Edoardo Graiani; Michele Caselli; Juan M. Carrillo; Andrea Boni
12:45	#5129	Distributed Sensing Platform for Precision Irrigation Applied to Mediterranean Viticulture Riccardo Collu; Silvia Loddo; Luigi Raffo; Massimo Barbaro

SESSION 3 · — IoT, Edge Computing & Embedded Systems in Agrifood

Wednesday, September 23 · 14:30 – 16:00

Time	Paper	Presentation
14:30	#5019	Integrated Monitoring of Plant Water Stress and Stomatal Dynamics Using a LoRa-Enabled Sensor System Fabio Baldini; Ettore Mondino; Stefano Calvo; Umberto Garlando; Danilo Demarchi
14:42	#5112	An IoT Low-Power Sensor for Precision Apple Fruit Growth Monitoring: a Preliminary Orchard Deployment Alessandro Torrisi; Michele Gullino; Emiliano Valentini; Paolo Lugli; Luisa Petti
14:54	#5007	Preliminary Study of Photoperiod-Induced Stress on Tobacco Plants Using Stem-Impedance Measurements Vincenzo Giannone; Luca Rolle; Chiara Antonini; Federico Cum; Umberto Garlando
15:06	#5006	An Energy Autonomius Wireless Sensor Node for In-Vivo Stem Electrical Impedance Monitoring with LoRa Connectivity Stefano Calvo; Danilo Loiacono; Umberto Garlando; Danilo Demarchi; Roberto La Rosa
15:18	#5088	A Multi-Sensor Platform with in-Vivo Plant Monitoring and Soil Sensing for Efficient Irrigation Edoardo Graiani; Michele Caselli; Andrea Boni
15:30	#5068	Nitrate Detection in Soil Using a Compact Embedded Potentiostat for In-Situ Monitoring Celia Boko; Arthur Ohl; Vincent Elhorga; Elise Saoutieff; Iris Vogeler; Henk Smit; Patryk Kalkowski; Nivedha Surendran; Axel Wille; Han Shao; Alan O'Riordan
15:42	#5125	Energy-Improvement Control of Latching Solenoid Valves Using Supercapacitor Precharge and Battery Management Diego Quiroga; Alfredo Arnaud; Matias Miguez; Joel Gak; Jesus Martinez

SESSION 4 · — IoT, Edge Computing & Embedded Systems in Agrifood

Wednesday, September 23 · 16:30 – 18:00

Time	Paper	Presentation
16:30	#5083	Implementation of a Low-Power 65 nm ASIC for the Acoustic Detection of Banana Weevil Juan Fernando Posso-Calderon; Pierina Amelia Miraba-Flores; Luis Miguel Procel; Silvana Guitarra; Eduardo Holguin; Victor Grimblatt
16:42	#5071	Machine-Learning-Based Prediction of Dissolved Oxygen in an IoT-Enhanced Airlift Aeration System Wancong Song; Ruochen Wang; Medhat Moussa; Wael H. Ahmed
16:54	#5081	From Sheep to Cattle: Adapting OVIS Platform for Extensive Livestock Research in Australia R. Cabral; T. Williams; Mark G. Trotter; J. Oreggioni
17:06	#5107	Design and Development of a Modular IoT System for Smart Beehive Monitoring Jesus Yanez; Uziel Perez; Pablo Stuardo; Jorge Marin; Sebastian Fingerhuth; Daniel Yunge; Karen Yanez; Ariel Munoz; Luis Arturo Soriano
17:18	#5055	A Feasibility Study of Edge-Centric Digital Twin for Autonomous Agricultural Decision Support Francesco Falchi; Giovanni Pettorru; Virginia Pilloni; Marco Martalo
17:30	#5089	An Autonomous Wireless Node with Gas Sensing and Insect Detection for Grain Silo Monitoring Edoardo Graiani; Jeremy Basha; Hadrien Roussel; Michele Caselli; Andrea Boni
17:42	#5031	No Cloud, No Problem: On-Device Grapevine Leaf Health Detection with AIoT Pietro Riccardo Ferrario; Matteo Nardello

SESSION 5 — AI & Image Processing in Agrifood

Thursday, September 24 · 14:30 – 16:00

Time	Paper	Presentation
14:30	#5085	Machine Learning-Assisted Prediction of Chlorophyll-Related Ripening Index in Gala Apples Using Bioimpedance Spectroscopy Sundus Riaz; Aurora Polo-Rodriguez; Ahmed Rasheed; Ciro Allara; Paolo Lugli; Angelo Zanella; Almudena Rivadeneyra; Luisa Petti; Javier Medina-Quero; Pietro Ibba

14:42	#5067	Time-Series Machine Learning for Early Forecasting of Downy and Powdery Mildew in Viticulture Olga Litvyak; Gregor Eibl
14:54	#5098	Non-Destructive Assessment of Tartaric-to-Malic Acid Ratios and Grape Maturity in Rondo, Zweigelt and Kerner Using Hyperspectral Imaging for Precision Winemaking Khin Nilar Swe; Araki Tetsuya
15:06	#5095	An IoT-Based Decision Support System for Multi-Cultivar Hop Cones Harvesting Optimization Giulia Oddi; Laura Belli; Martina Galaverni; Margherita Rodolfi; Luca Davoli; Tommaso Ganino; Gianluigi Ferrari
15:30	#5118	Full-Spectrum Reflectance Classification of Water-Stressed Lettuce by Stress Day Using PLS-Da and Machine Learning Nicola DiIillo; Elena Belcore; Ilaria Orlandella; Silvia Fiore; Alessandro Leone; Maurizio Rebaudengo; Renato Ferrero
15:42	#5076	Non-Destructive Biomass Estimation Using RGB-D Imaging and Growth Ode Models Luis Gerardo Chavez Covarrubias; Jose Francisco Artega Alarcon; Luis Arturo Soriano; Dennise Anaidee Jose Montiel; Haydee Xanat Tellez Hernandez
15:18	#5102	Automated Mushroom Mass Prediction Using RGB Images and a U-Net-Based Segmentation Model Sari Nuwayhid; Meiqing Wang; Dimitrios Argyropoulos

SESSION 6 — AI & Image Processing in Agrifood

Thursday, September 24 · 16:30 – 18:00

Time	Paper	Presentation
16:30	#5087	AI-Enabled Multi-Modal Sensing for Cassava Growth Modelling Temitope Odedeyi; Kohtarō Iseki; Chike Ugoji; Olalekan Kolawole; Toye Ayankanmi; Ismail Rabbi
16:42	#5106	Spi-Cow: SNN-Based Cattle Behavior Classifier on a Low-Power FPGA Paola Busia; Samuele Floris; Paolo Meloni; Gianluca Leone
17:06	#5059	Long-Term Identity Preservation in Dense Cattle Herds via Tracklet-Level Re-Identification <i>Voncarlos Marcelo De Araújo, Hayda Marcia Soares Almeida, Marjorie Cellier, Elsa Vasseur, Abdoulaye Baniré Diallo</i>
17:18	#5064	An Autonomous Ground Rover for Mustard Field Diagnostics Using a Two-Stage Vision Pipeline Prerna Saurabh; Husain Kanchwala
17:30	#5048	Evaluating Vision-Language Models for Tomato Disease Diagnosis: a Comparative Study of Prompting Strategies Muhammad Fahad Nasir; Mashood M. Mohsan; Irfan Hussain; Yusra Abdulrahman
17:42	#5024	CARLA: a UAV-Based Framework for AI-Driven Weed Detection, Localization, and Density Mapping in Rangelands Javier Martin Pizarro; Amparo Quinones; Joao Valente
16:54	#5060	UAV RGB-Based 3D Reconstruction of Indoor Oyster Mushroom Cultivation Scenes Using SfM-MVS and NeRF Yuqiao Ren; Dimitrios Argyropoulos

SESSION 7 — IoT, Edge Computing & Embedded Systems in Agrifood

Friday, September 25 · 09:45 – 11:15

Time	Paper	Presentation
09:45	#5030	How Much Does Firmware Implementation Matter? a C/Rust Comparative Case Study on LoRaWAN Smart Farming Nodes Nicola Rozzi; Gabriele Penzotti; Stefano Caselli
09:57	#5119	An Energy-Efficient Edge AI Framework for Federated Learning Over LoRaWAN in Smart Irrigation Zohra Dakhia; Mariateresa Russo; Massimo Merenda
10:09	#5130	Toward On-Device Spiking Neural Networks for Agricultural Pest Classification on Edge Microcontrollers Emmanouil Stavroulakis; Athanasios Passias; Konstantinos Rallis; Xanthoula Eirini Pantazi; Georgios Ch. Sirakoulis

10:21	#5021	Throughput approximation of 802.11s wireless links in agricultural machine-to-machine communication using the free-space model Henri Hornburg; Sven Peets; Niclas Wolniak; Timo Oksanen
10:33	#5121	Lightweight Embedded Leaf-Trigger Localization from GenX320 Event Histograms Alessia Lazzaro; Francesca Larosa; Massimo Merenda
10:57	#5026	Grape Bunch Detection from UAV Imagery on the Jetson Orin Nano: a Scale-Stratified Evaluation Zhen Cao; Lammert Kooistra; Joao Valente
10:45	#5056	Edge-Ai for Precision Agriculture: Fusing YOLO-Based Canopy Isolation with RGB Stress Indices Selim Halabi; Akin Dere; Baykal Sarioglu; Yigit Daghan Gokdel

SESSION 8 — RF, MW, THz Technology in Agrifood

Friday, September 25 · 11:45 – 13:15

Time	Paper	Presentation
11:45	#5039	A Millimeter-Wave Imaging and Classification System for Automated Hazelnut Inspection Calin Ion Maraloiu; Laurent Brochier; Jorge Alberto Tobon Vasquez; Francesca Vipiana; Marco Ricci; Claire Migliaccio
11:57	#5061	77 GHz MIMO FM-CW Radar with Digital Elevation Beamforming for High-Speed Vinerow Scanning in Precision Viticulture Etienne Dedic; Dominique Henry, Hervé Aubert
12:09	#5025	Dielectric Properties of Semisolid and Powder Food Materials at Microwave Frequencies Marta Cavagnaro
12:21	#5084	Instrumentation-Free Wood Moisture Estimation by Self-Oscillating Microwave Sensors and DC Bias Monitoring Simone Trovarello; Alessandra Di Florio Di Renzo; Oumaima Afif; Diego Masotti; Marco Tartagni; Alessandra Costanzo
12:33	#5069	Low-Cost RF Sensing and Machine-Learning Classification for Tangelo Orange Ripeness Assessment Omar Ferney Alvarez Herrera; Julio Sebastian Diaz Leon; Sergio Andres Lozano Avila; Sergio Raul Rivera Rodriguez; David O. Rodriguez-Duarte
12:45	#5005	Assessment of Gluten-Free Doughs via Microwave Dielectric Spectroscopy and Multi-Pole Models Luigi Di Michele; Matteo Bruno Lodi; Giacomo Muntoni; Andrea Melis; Gabriele Atzeni; Ferdinando Nunziata; Giuseppe Mazzarella; Alessandro Fanti
12:57	#5063	Dielectric Spectroscopy Study on Extra Virgin Olive Oils Marco Murgia; Luigi Di Michele; Matteo Bruno Lodi; Giacomo Muntoni; Andrea Melis; Gabriele Atzeni; Giuseppe Mazzarella; Alessandro Fanti

SESSION 9 — RF, MW, THz Technology in Agrifood (2) · Robotics & Automation in Agrifood (4) · Renewable Energy Technology in Agriculture (1)

Friday, September 25 · 14:30 – 16:00

Time	Paper	Presentation
14:30	#5043	Digital Twin-Assisted Distributed Path Planning and Autonomous Navigation for Mobile Agricultural Robots Zhenghong Jiang; Shieru Otsuka; Kuniaki Uto; Kui Wang; Kei Sakaguchi
14:42	#5101	Field Evaluation of a Plant Microbial Fuel Cell for Autonomous Wireless Soil Monitoring Fabiana Del Bono; Luca Rolle; Eline Rivabella; Danilo Demarchi; Umberto Garlando; Alessandro Sanginario
14:54	#5049	A Robotic Hand for Gentle and Damage-Free Grasping of Grapes and Delicate Fruits Marco Vacca; Sofia Giannoccaro; Alessandro Varaldi; Christian Conti; Massimo Ruò Roch
15:06	#5028	Vision Guided Autonomous Harvesting of Root Vegetables Using Monocular Depth Estimation and Robotic Manipulation Rakesh M D; M V Prathvi Raj; Rudraswamy S B
15:18	#5073	¹H NMR Spectroscopy for Honey Type Classification: Towards Portable Low Field NMR for Honey Adulteration Research Joseph Ridge; Morgan Madec; Baudouin Dillmann; Philippe Bertani; Luc Hebrard

15:30	#5123	Portable Water Bowl System for Measuring Water Intake in Individual Cattle Diego Quiroga; Jesus Martinez; Yazmin Bentancourt; Alfredo Arnaud
15:42	#5054	Microwave-Based Soil Treatments: Effects on <i>Portulaca oleracea</i> and <i>Eruca sativa</i> Seed Germination Fulvio Schettino; Gaetano Chirico; Rita Massa; Alessio Esposito; Francesca Lodato; Francesca Di Sio; Nicola D'Ambrosio

TECHNICAL PROGRAMME — POSTER SESSIONS

POSTER SESSION A

Wednesday, September 23 · 19:00 – 21:00 · welcome cocktail

Paper	Presentation
#5045	Framework for Validation of Soil Sensors Luca Colombi; Gerd Simons; Franco-Peter Weibel
#5051	Electrical bioimpedance, a Simple and field-Based Method for the Early Diagnosis of Abiotic Stress Damage in Vegetable Crops <i>Antonio Hector Dell'Osa, Andrea Manuello Bertetto, Filippo Tocco, Andrea Fois, Rinaldo Pinna, Alberto Concu</i>
#5052	Experimental Analysis on the Sensitivity of Millimeter Waves to Soil Moisture and Temperature Antonio Sorrentino; Emanuele Setale; Samiullah Yousaf; Andrea Buono; Alessandro Fanti; Maurizio Migliaccio; Andrea Melis; Matteo Bruno Lodi; Giuseppe Mazzarella
#5077	Assessing the Effect of Organic Matter on Soil Hydration Monitoring Anthony Alhadchiti; Panos Ioakim; Michael B Powner; Iasonas F Triantis
#5103	Screen-Printed Activated Carbon Ink Based Flexible Humidity Sensor for Plant Leaf Microclimate Monitoring Azeem Khan; Ajay Beniwal; Temitope Odedeyi; Izzat Darwazeh
#5116	Comparative Analysis of Sensing Techniques for Portable Water Salinity Detection in Precision Agriculture Gloria Isabel Guerrero Roman; Luis Arturo Soriano; Luis Gerardo Chavez Covarrubias; Marco Antonio Islas Herrera
#5120	Development of a Rapid Low-Cost Electronic Nose for SO₂, H₂S, and C₄H₈O₂ Detection in Wine Dominik Grochala; Stanislaw Karcz; Anna Paleczek; Matuesz Kocon; Magdalena Gebicka; Artur Rydosz
#5053	If the Future of Sustainable Agriculture Is Digital, Then It Should Be Self-Obviating Emile Egretteau-Druet; Doreid Ammar; Laurent Lefevre; Nathalie Mitton
#5108	Identification of Subclinical Anomalies for Bovine Hematology Carlos Antonio Angel Ocana; Roberto Gonzalez Garduno; Luis Gerardo Chavez Covarrubias; Marco Antonio Islas Herrera; Luis Arturo Soriano
#5079	A Machine-Learning Surrogate of the Aquacrop Model for Real-Time Irrigation Scheduling on Low-Cost Edge Devices Arun Karthik Sundararajan, Yogesh Rethinapandian, Smrithi Prakash, Kaushik Kumar
#5127	Comparative Assessment of Equivalent-Circuit Models for Impedance Spectroscopy of Hydrangea Leaves Under Irrigation Stress Riccardo Collu; Claudio Frongia, Nasreddine Makni; Luigi Raffo; Massimo Barbaro

POSTER SESSION B ·

Thursday, September 24 · from 19:30 · social dinner, Cantina Su'Entu

Paper	Presentation
#5092	A Portable NMR Relaxometry System for Rapid Characterization of Oils, Dairy, and Beverages Pritam Pal; Arup Polley
#5008	Architecture for a LoRaWAN-Based Agricultural IoT Monitoring Network with Energy-Aware Relay Selection and Hash-Chained Data Integrity Nicolas Cardenas Bernal; Jose D. Velasco Melo; Carlos A. Gonzalez Amarillo
#5017	Wireless Sensor Network for Local Parameter Control in the Greenhouse Christian Fragner; Omar El Ouahabi; Andreas P. Weiss; Christian Krutzler

#5029	Value of Information Based Semantic Scheduling for Crop Disease Event Transmission in Bandwidth-Constrained IoT Networks Rakesh M D; Rudraswamy S B
#5032	OVIS Farm Platform: from Controlled Experiments to Autonomous Field Deployment R. Cabral; H. Cardoso; R. Ungerfeld; J. Oreggioni
#5062	TinyTCN-Based Soft Sensing for Dissolved Oxygen Prediction in Fish Farming Systems Ruochen Wang; Wancong Song; Medhat Moussa; Wael H. Ahmed
#5117	Design and Evaluation of an Open-Source RTK System for Precision Agriculture Applications Mildreth Jimena Perez Trejo; Santiago Hernandez Hernandez; Jaime Abraham Rios Diaz; Luis Arturo Soriano
#5020	On the Sensitivity of Microwaves to Plastic items: a Controlled Experiment Anna Verlanti; Luigi Di Michele; Angelo Gifuni; Ferdinando Nunziata; Andrea Buono; Maurizio Migliaccio; Marco Murgia; Alessandro Fanti
#5094	Initial Assessment for the Microwave Dielectric Characterization of Olive Pomace Extracts Mohammad Omki; Giulia D'Agostino; Roberto Dima; Maria Antonia Maisto; Alessandro Alberto Casazza; Raffaele Solimene; Andrea Randazzo
#5027	A Michaelis-Menten-Based MPC Framework for Resource-Efficient Nutrient Management in Decoupled Aquaponic Systems Mazen Zeno; Dirk Soffker
#5040	Recognition of Fruits and Vegetables Using Tactile Images and Contact Masks Mashood M. Mohsan; Ahmed Abubakar; Muhammad Fahad Nasir; Irfan Hussain
#5082	Towards a Recalibration-Free Moisture Sensor for Agricultural Applications Diego Barrettino; Ashkhen Yesayan; Jean-Michel Sallese