ECPA
BOLOGNA 2023

14th European Conference on Precision Agriculture

Bologna - Italy, 2-6 July 2023

Congress Center - Hotel Savoia Regency

UNLEASHING THE POTENTIAL OF PRECISION AGRICULTURE

PROGRAM

Avenue media®
Conference & Expo

CONVENERS

Maurizio Canavari, Michele Mattetti, Giuliano Vitali

CONVENER ADVISORS

Gianluca Allegro
Lorenzo Barbanti
Alberto Barbaresi
Gabriele Baroni
Stefano Benni
Marco Bittelli
Marco Bovo
Luca Camanzi
Nicoletta Contaldo
Luca Corelli Grappadelli
Marcello Di Bonito
Ilaria Filippetti
Matteo Francia
Matteo Golfarelli
Luigi Manfrini
Francesco Marinello
Giovanni Molari
Francesco Orsini
Barbara Padalino
Giorgio Prosdocimi
Francesco Spinelli
Patrizia Tassinari
Daniele Torreggiani
Attilio Toscano

INTERNATIONAL SCIENTIFIC COMMITTEE

- **Viacheslav I. Adamchuk** (McGill University, Canada)
- **Georgios Adamides** (Agricultural Research Institute, Cyprus)
- **Ben Aernouts** (KU Leuven, Belgium)
- **Bahattin Akdemir** (Tekirdag Namik Kemal University, Turkey)
- **Victor Alchanatis** (Agricultural Research Organization - Volcani Institute, Israel)
- **Lucas Amaral** (Universidade Estadual de Campinas, Brazil)
- **Yiannis Ampatzidis** (University of Florida, USA)
- **Christian Andreasen** (DPES-University of Copenhagen, Denmark)
- **Thomas Anken** (Agroscope, Switzerland)
- **Diogenes Antille** (CSIRO, Australia)
- **Dimitrios Argyropoulos** (University College Dublin, Ireland)
- **Jaume Arnó Satorra** (Universitat de Lleida, Spain)
- **Paolo Balsari** (University of Turin, Italy)
- **Véronique Bellon-Maurel** (INRAE, France)
- **Juliane Bendig** (Forschungszentrum Jülich, Germany)
- **Remigio Berruto** (University of Turin, Italy)
- **Thomas Bishop** (University of Sydney, Australia)
- **Jose Blasco-Ivars** (Instituto Valenciano de Investigaciones Agrarias, Spain)
- **Lorenzo Boccia** (University of Naples Federico II, Italy)
- **Rob Bramley** (CSIRO, Australia)
- **Lucia Briamonte** (CREA - Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Italy)
- **Guilhem Brunel** (Institut Agro Montpellier, France)
- **Gianluca Brunori** (University of Pisa, Italy)
- **Davide Cammarano** (Aarhus University, Denmark)

- **Antonio Canatàrio Duarte** (School of Agricolture/IPCB, Portugal)
- **Javier Jose Cancela Barrio** (Universidade de Santiago de Compostela, Spain)
- **Paul Carter** (Washington State University, USA)
- **Raffaele Casa** (Università degli Studi della Tuscia, Italy)
- **Annamaria Castrignanò** (University of Chieti-Pescara, Italy)
- **Tim Chamen** (CTF Europe, UK)
- **Tao Cheng** (Nanjing Agricultural University, China)
- **Mikolaj Cieslak** (Univ.Calgary, Canada)
- **Yafit Cohen** (Agricultural Research Organization - Volcani Institute, Israel)
- **Simon Cook** (Murdoch University, Australia)
- **Katarzyna Dąbrowska - Zielińska** (Institute of Geodesy and Cartography, Poland)
- **Ana de Castro** (CSIC, Spain)
- **Anita Dille** (Kansas State University, USA)
- **Jorge Ricardo Ducati** (Universidade Federal do Rio Grande do Sul, Brazil)
- **Luis Emmi** (CAR-CSIC, Spain)
- **Àlex Escolà Agustí** (University of Lleida, Spain)
- **Jochem Evers** (Wur, The Netherlands)
- **Juan A. Fernández Hernández** (Universidad Politecnica de Cartagena, Spain)
- **Carla Ferreira** (Stockholm University, Sweden)
- **Adele Finco** (Università Politecnica delle Marche, Italy)
- **Spyros Fountas** (Agricultural University of Athens, Greece)
- **Angelo Frascarelli** (University of Perugia, Italy)
- **John Fulton** (Ohio State University, USA)
- **Markus Gandorfer** (Bayerische Landesanstalt für Landwirtschaft, Germany)
- **Paolo Gay** (University of Turin, Italy)
- **Christelle Gée** (Institut Agro Dijon, France)
- **Jakob Geipel** (NIBIO, Norway)
- **Theofanis Gemtos** (University of Thessaly, Greece)
- **Christian Germain** (Bordeaux sciences Agro, France)
- **Pablo Gonzales de Santos** (CAR-CSIC, Spain)
- **Andreas Gronauer** (Universität für Bodenkultur Wien, Austria)
- **Ittai Herrmann** (Hebrew University of Jerusalem, Israel)
- **Suzanne Higgins** AFBI - Agri-Food and Biosciences Institute Northern Ireland, UK)
- **Eija Honkavaara** (Finnish Geospatial Research Institute, Finland)
- **Jose Blasco-Ivars** (Instituto Valenciano de Investigaciones Agrarias, Spain)
- **Gawain Jones** (Institut Agro Dijon, France)
- **Hazaël Jones** (Institut Agro Montpellier, France)
- **Konstantinos Karantzalos** (National Technical University of Athens, Greece)
- **Ruth Kerry** (Brigham Young University, USA)
- **Rajiv Khosla** (Kansas State University, USA)
- **Lav R. Khot** (Washington State University, USA)
- **Stefan Kopfinger** (Bayerische Landesanstalt für Landwirtschaft, Germany)

- **Angela Kross** (Concordia University, Canada)
- **Pamela Lattanzi** (University of Macerata, Italy)
- **Corentin Leroux** (Aspexit, France)
- **José Lima** (Polytechnic Institute of Bragança, Portugal)
- **James Lowenberg-DeBoer** (Harper Adams University, UK)
- **José Antonio Martínez Casasnovas** (University of Lleida, Spain)
- **Alessandro Matese** (CNR, Italy)

  Marco Medici (UniLaSalle, France)
- **Jihua Meng** Chinese Academy of Sciences, China)
- **Moshe Meron** (MIGAL Galilee Research Institute, Israel)
- **Yuxin Miao** (University of Minnesota, USA)
- **Gábor Milics** (Hungarian University of Agriculture and Life Sciences, Hungary)
- **Jose Paolo Molin** (University of São Paulo, Brazil)
- **Enrique Moltó García** (Generalitat Valenciana, Spain)
- **Francisco Jesús Moral García** (Universidad de Extremadura, Spain)
- **Francesco Morari** (University of Padua, Italy)
- **Eiji Morimoto** (Tottori University, Japan)
- **Abdul M. Mouazen** (Ghent University, Belgium)
- **David Mulla** (University of Minnesota, USA)
- **Olivier Naud** (INRAE, France)
- **Michael Nørremark** (Aarhus Universitet, Denmark)
- **Tomas Norton** (KU Leuven, Belgium)
- **Roberto Oberti** (University of Milan, Italy)
- **Mark O'Connell** (DJPR, Australia)
- **Margaret Oliver** (University of Reading, UK)
- **Jean-Noêl Paoli** (Institut Agro Dijon, France)
- **Dimitrios Paraforos** (Hochschule Geisenheim University, Germany)
- **Matti Pastell** (Natural Resources Institute Finland (Luke), Finland)
- **Simon Pearson** (University of Lincoln, UK)
- **Søren Marcus Pedersen** (University of Copenhagen, Denmark)
- **Jose M Peña** (CSIC, Spain)
- **Manuel Pérez Ruiz** (Universidad de Sevilla, Spain)
- **Raffaella Pergamo** (CREA - Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Italy)
- **Léo Pichon** (Institut Agro Montpellier, France)
- **Ivan Plašćak** (Josip Juraj Strossmayer University of Osijek, Croatia)
- **Jurij Rakun** (University of Maribor, Slovenia)
- **Jacek Reiner** (Wrocław University of Science and Technology, Poland)
- **Stefan Rilling** (Fraunhofer Institute, Germany)
- **Francelino Rodrigues** (Lincoln Agritech, New Zealand)
- **Joan Ramon Rosell Polo** (Universitat de Lleida, Spain)
- **Daniele Rossi** (Copa-Cogeca, Belgium)
- **Victor Rueda Ayala** (Agroscope, Switzerland)
- **Gonzaga Santesteban** (Universidad Pública de Navarra, Spain)

- **Alessio Scalisi** (Tatura SmartFarm, Agriculture Victoria, Australia)
- **James Schepers** (University of Nebraska-Lincoln, USA)
- **John K. Schueller** (University of Florida, USA)
- **Elia Scudiero** (University of California Riverside, USA)
- **Mats Söderström** (Swedish University of Agricultural Sciences, Sweden)
- **Claus Aage Grøn Sørensen** (Aarhus Universitet, Denmark)
- **John Stafford** (Silsoe Solutions, UK)
- **Silvius Stanciu** (``Dunărea de Jos`` University of Galați, Romania)
- **James Taylor** (INRAE, France)
- **Behiç Tekin** (Ege University, Turkey)
- **Bedir Tekinerdogan** (Wageningen University & Research, the Netherlands)
- **Alex Thomasson** (Mississippi State University, USA)
- **Bruno Tisseyre** (Institut Agro Montpellier, France)
- **Jorge Torres-Sánchez** (CSIC - Spanish National Research Council, Spain)
- **Joao Valente** (Wageningen University & Research, The Netherlands)
- **Jacob van Bergeijk** (AGCO Corporation, USA)
- **Jürgen Vangeyte** (ILVO, Belgium)
- **George Vellidis** (University of Georgia, Usa)
- **Ivan Vidović** (University of Osijek, Croatia)
- **George Vlontzos** (University of Thessaly, Greece)
- **Francesco Vuolo** (Universität für Bodenkultur Wien, Austria)
- **Christian Weber** (Universidad Nacional de la Plata, Argentina)
- **Brett Whelan** (University of Sydney, Australia)
- **Merve Wollweber** (Laser Zentrum Hannover, Germany)
- **F.Javier Zarazaga-Soria** (University of Saragoza, Spain)
- **Pablo J. Zarco-Tejada** (University of Melbourne, Australia)
- **Ivo Zdrahal** (Mendel University in Brno, Czech Republic)
- **Uroš Žibrat** (Agricultural Institute of Slovenia, Slovenia)
- **Monika Zovko** (University of Zagreb, Croatia)
- **Manuela Zude-Sasse** (Leibniz-Institut für Agrartechnik und Bioökonomie, Germany

PROGRAM

SUNDAY 2 JULY 2023

17.00 – 18.00	Participants' Registration
18.00 – 19.30	Welcome Cocktail

MONDAY 3 JULY 2023

ROOM 1

09.00 -11.00	**PLENARY SESSION**
09.00	CONVENERS OPENING & PRESENTATION OF THE CONFERENCE
09.20	WELCOME ADDRESS
09.30	KEY LECTURE: THE FUTURE OF PRECISION AGRICULTURE Raj Khosla (Kansas Univ., United States)
10.10 – 10.55	GENERAL PERSPECTIVES
10.10	*What is the adoption of Precision Agriculture over Europe? A case study on remote sensing* T. Pavlenko (Geisenheim, Germany)
10.25	*A monitoring system to track adoption of digital technologies in agriculture over time* A. Gabriel (Technische Universitat Munchen, Germany)
10.40	*Precision Agriculture: Addressing Adoption Gaps with Open-Source System Design* M. L. Everett (University of Idaho, United States)
11.00	COFFEE BREAK
11.30 – 15.00	AUTONOMOUS VEHICLES
11.30	*Drivers for robot use in field crop farming: farmers' perspectives from four case areas in Europe* T. W. Tamirat (University of Copenhagen, Denmark)
11.45	*Economics of autonomous machines for regenerative agriculture* A. Al Amin (Harper Adams University, United Kingdom)
12.00	*Optimal use of an agricultural robot in an arable crop rotation: a case study in the Netherlands* J. E. Ørum (University of Copenhagen, Denmark)

MONDAY 3 JULY 2023

ROOM 1

12.15	*Strawberry flower and fruit detection based on an autonomous imaging robot and deep learning* W. S. Lee (University of Florida, Unites States)
12.30	*Follow the leader: A trajectory generator and controller for precision tree scanning* C. Grimm (Oregon State University, United States)
12.45	*Collaborative Smart-Robot for Yield Mapping and Harvesting Assistance* M. N. Conejero (Consejo Superior Investigaciones Cientificas, Spain)
13.00	LUNCH
14.30	*Enhancing navigation benchmarking and perception data generation for row-based crops in simulation* M. Martini (Università di Torino, Italy)
14.45	*Fields2Cover open-source library: A modular approach to agricultural coverage path planning* G. Mier (Wageningen University and Research, Netherlands)
15.00 – 16.00	EDUCATION AND TRAINING
15.00	*How to design relevant PA training courses for technical advisors* L. Pichon (Institut Agro Montpellier, France)
15.15	*How to teach precision agriculture through reverse engineering pedagogy?* B. Ploteau (Institut Agro Montpellier, France)
15.30	*Gamification for communicating the advantages of precision farming: The Farming Simulator case* D. S. Paraforos (Geisenheim, Germany)
15.45	*Towards a digital twin for optimal field management* M. Pastell (Natural Resources Institute Finalnd, Finland)
16.00 – 16.30	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00 – 18:00	POSTERS
	Session: General perspective
	Session: Education and training
18.00 – 19.00	GROUP & SOCIETY MEETINGS

MONDAY 3 JULY 2023

ROOM 2

09.00 -11.00	**PLENARY SESSION – (see schedule from ROOM 1)**
11.00	COFFEE BREAK
11.30 – 13.00	SURFACE CHARACTERISATION
11.30	*Crop recognition at orchard level in Mediterranean conditions using time series of spectral indexes* H. Izquierdo (Instituto Valenciano de Investigationes Agrarias, Spain)
11.45	*Impact of changing attributes on the management zones for integrated crop-livestock system* H. Oldoni (University of Campinas, Brasil)
12.00	*Technological approach to evaluate the livestock trampling effect on soil compaction* J. M. Serrano (Universidade de Évora, Portugal)
12.15	*Long-term evaluation of the Grassmaster II probe used to estimate productivity of dryland pastures* J. R. Marques da Silva (Universidade de Évora, Portugal)
12.30	*Quantifying real-time opening disk load to assess compaction and potential for planter control* A. Sharda (Kansas State University, United States)
12.45	*Forecasting tree crop yield with limited data - a macadamia case study* J. Brinkhoff (Armidale, Australia)
13.00	LUNCH
14.30 – 15.45	SURFACE CHARACTERISATION
14.30	*Spatio-temporal clustering analysis of soil moisture and vegetation indices for zone delineation* B. V. Ortiz (Auburn University, United States)
14.45	*Can the spatial structure of soil health indicators aid in Soil Health assessment?* E. M. Pena-Yewtukhiw (West Virginia University,, United States)
15.00	*A Novel Approach of Map-Sensor-based Site-specific Nitrogen Fertilization in Winter Wheat* M. A. Munnaf (Ghent University, Ghent, Belgium)
15.15	*Unleashing precision agriculture data for improve soil carbon accounting* T. Bishop (The University of Sydney, Australia)
15.30	*Farmer-led on-farm experimentation enhanced with digital agronomy* L. Longchamps (Ithaca, United States)

MONDAY 3 JULY 2023

ROOM 2

15.45 – 16.15	POSTER PRESENTATION
16.15	COFFEE BREAK
16.45 – 18.00	POSTERS
	Session: Probes
	Session: Sensing
	Session: Surface Characterisation
	Session: Field Crop Characterisation & Monitoring
18.00 – 19.00	GROUP & SOCIETY MEETINGS

ROOM 3

09.00 -11.00	**PLENARY SESSION – (see schedule from ROOM 1)**
11.00	COFFEE BREAK
11.30 - 13.00	GENERAL METHODOLOGY
11.30	*Limits of Grain Yield Monitor Data to Evaluate Treatment Differences within On-farm Experimentation* J. P. Fulton (The Ohio State University, United States)
11.45	*Introducing Bayesian priors to semi-variogram parameter estimation using fewer observations* Y. L. Zhang (Institut Agro Montpellier, France)
12.00	*A Bayesian Network approach for grain protein content prediction of winter wheat* M. Karampoiki (University of Hohenheim, German)
12.15	*A novel approach for field sampling optimization incorporating a generic operational cost constraint* M. Dumont (Institut Agro Montpellier, France)
12.30	*Changing How Agronomic Trials are Conducted: Modulated On Farm Response Surface Experiments (MORSE)* S. J. Shirtliffe (University of Saskatchewan, Canada)

MONDAY 3 JULY 2023

ROOM 3

12.45	*Proximal and remote sensing to define different management zone and site-specif of durum wheat crops* E. Romano (CREA, Italy)
13.00	LUNCH
14.30 – 16.00	SPATIAL METHODOLOGIES
14.30	*Multitemporal validation of remote and proximal sensing for vineyard management zone identification* A. Deidda (Università di Sassari, Italy)
14.45	*Comparative Study of Interpolation Methods for Low-Density Sampling* F. Hoffmann Silva Karp (McGill University, Canada)
15.00	*A statistical test to evaluate the relevance of auxiliary time-series to predict another time series* B. Oger (Institut Agro Montpellier, France)
15.15	*How to best compare remote sensing data versus proximal sensing data* Y. Valloo (Institut Agro Montpellier, France)
15.30	*A scalable approach to nowcasting soil water at the within-field scale* N. S. Wimalathunge (The University of Sydney, Australia)
15.45	*A new metric to evaluate spatialized crop model performances* D. Pasquel (INRAE, France)
16.00 – 16.30	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00	POSTERS
	Session: General Methodology
	Session: Spatial Methodologies

TUESDAY 4 JULY 2023

ROOM 1

09.00 – 12.30	WEED & PEST MANAGEMENT
09.00	*Trends and beliefs of precision farming technologies to reduce pesticide use and risks* S. Fountas (Agricultural University of Athens, Greece)
09.20	*How can Precision Agriculture contribute to the 50 % pesticide reduction of Farm-to-Fork strategy?* A. Escolà (Universitat de Lleida, Spain)
09.35	*Plant health assessment with thermal and multi-spectral UAV imagery in winter rye crops* M. Schirrmann (Leibniz Inst. Agricultural Engineering and Bioeconomy, Germay)
09.50	*Sugar beet disease detection based on remote sensing data and artificial intelligence* Y. Lebrini (UniLaSalle, France)
10.05	*Potato plant disease classification by using deep learning and sparse sensing* A. Vončina (Agricultural Institute of Slovenia, Slovenija)
10.20	*Detection of Fusarium oxysporum by hyperspectral imaging in strawberry plants* M. Perez-Ruiz (University of Seville, Spain)
11.00	COFFEE BREAK
11.30	*Almond orchards pest management using remote sensing for targeted pest control and sanitation* A. Chen (The Hebrew University of Jerusalem, Israel)
11.45	*Establishment of a UAV-based phenotyping method for European Pear Rust in fruit orchards* S. Reim (Julius Kuhn Institute, Germany)
12.00	*Comparing satellite and high-resolution imagery for freeze damage detection in California vineyard* B. Sams (E&J Gallo Winery, United States)
12.15	*Evaluation of the competition between barley and different weed species from RGB images* C. Gée (INRAE, France)
13.00	LUNCH

TUESDAY 4 JULY 2023

ROOM 1

14.30 – 16.00	PESTICIDE SPRAYING
14.30	*Second-generation ultrasonic sensor in precision spraying: testing and actuation range refinement* A. Pagliai (Università di Firenze, Italy)
14.45	*Studying the pneumatic system of an air-assisted sprayer for adjusting pesticide dose variations* A. Vigo-Morancho (Universitad de Zaragoza, Spain)
15.00	*Efficient and safe spraying applications with UAVs in viticulture: The experimental field DIWAKOPTER* B. Poss (Hochschule Geisenheim University, Germany)
15.15	*Effects of canopy density-based airblast fan airflow adjustment on vines spray deposit* M. Grella (Università di Torino, Italy)
15.30	*Comparison between 60° and 30° hollow cone nozzles for targeted UAV-spray applications in vineyards* A. Biglia (Università di Torino, Italy)
15.45	*Adapting a conventional sprayer for real-time volume adjustment in vineyards* M. Gatti (Università di Piacenza, Italy)
16.00	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00	POSTERS
	Session: Weed & Pest Management
	Session: Pesticide Spraying
18.00 – 19.00	GROUP & SOCIETY MEETINGS

ROOM 2

09.00 – 11.00	NUTRIENTS MANAGEMENT
09.00	*Determining Site-Specific Corn Nitrogen Rate and Timing using APSIM Model* L. Thompson (UNL Extension, United States)
09.15	*Evaluation of crop model-based MNR maximizing N application rates on site-specific level in maize* E. Memic (University of Hohenheim, Germany)

TUESDAY 4 JULY 2023

ROOM 2

09.30	*Variable rate nitrogen in a potato-wheat-wheat cropping system* E. A. Flint (Utah State University, United States)
09.45	*Implementation of variable rate of inputs in winter crops under rainfed conditions* M. Videgain (Universitad de Zaragoza, Spain)
10.00	*Variable-rate fertiliser application to manage spatial variability in hilly vineyard of Prosecco PDO* M. Sozzi (Università di Padova, Italy)
10.15	*Impact of public policy strategies on the adoption of precision agriculture: the case of the Greek potato agricultural system* G. V. Vlontzos (University of Thessaly, Greece)
11.00	COFFEE BREAK
11.30 – 16.00	FIELD CROP CHARACTERISATION & MONITORING
11.30	*Vegetation indices from Sentinel-2 and PlanetScope images and their relationship with soybean yield* L. R. Amaral (University of Campinas, Brazil)
11.45	*Assessing the effectiveness of UAV-based multispectral imaging for detecting high-yielding varieties* M. P. Camenzind (Technische Universitat Munchen, Germany)
12.00	*After harvest yield mapping of winter wheat using data from satellites and combines* O. Alshihabi ((SLU, Sweden)
12.15	*How accurate is straw cereal plant density estimation from spectral measurements at early stages* T. Yang (INRAE, France)
12.30	*Yield prediction in winter wheat using machine learning; improving implemented farm management tool* M. K. Langgaard (SEGES Innovation P/S, Danmeark)
12.45	*Assessing within-field soybean yield variability using textures over Sentinel images* R. G. Freitas (University of Campinas, Brazil)
13.00	LUNCH

TUESDAY 4 JULY 2023

ROOM 2

14.30	*Dynamic tracking of wheat senescence based on UAV multispectral imaging and leaf spectroscopy* X. Song (Technische Universitat Munchen, Germany)
14.45	*Using digital soil mapping tools to assess the soil spatial variability impact on irrigated cotton* L. N. Lacerda (University of Georgia, United States)
15.00	*UAV remote sensing of agronomic parameters and yield in chickpea and lentil* D. Marusig (Università di Trieste, Italy)
15.15	*Per-parcel high-resolution mapping of critical crop-growth parameters with proximal & remote sensing* Z. Kandylakis (National Technical University of Athens, Greece)
15.30	*A generalised approach to downscale areal-averaged yield data: a use-case in cotton quality* M. Tilse ((The University of Sydney, Australia)
15.45	*Pasture quality monitoring based on proximal and remote sensors: case study in the Montado ecosystem* J. Serrano (Universidade de Évora, Portugal)
16.00	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00	POSTERS
	Session: Nutrients Management
	Session: Water Management
	Session: Woody Crop Characterisation & Monitoring
	Session: Vineyard Characterisation & Monitoring
18.00 – 19.00	GROUP & SOCIETY MEETINGS

ROOM 3

09.00 – 16.00	MACHINE LEARNING
09.00	*Integrating neural networks, clustering analysis, and remote sensing for peanut maturity prediction*
09.15	*A novel machine learning approach to map 3D soil constraint variability* P. Filippi (The University of Sidney, Australia)

TUESDAY 4 JULY 2023

ROOM 3

09.30	*Early prediction of durum wheat yield in Italy using a machine learning modelling framework* M. Fiorentini (Università Politecnica delle Marche, Italy)
09.45	*Use of unsupervised algorithms and auxiliary information to improve potato yield estimation* A. Uribeetxebarria (NEIKER, Spain)
10.00	*Automatic diagnosis of a multi-symptom grapevine disease by decision trees and graph neural network* A. Tardif (I IMS, France)
10.15	*Grape counting in RGB videos – comparing two instance segmentation models* M. Ariza-Sentís (Wageningen University and Research, Netherlands)
11.00	COFFEE BREAK
11.30	*Generalization of deep learning models to the semantic segmentation of natural images in vineyards* R. Marani (Università di Bari, Italy)
11.45	*Data augmentation techniques for grape bunch segmentation in natural images* R. Escobedo (Universitad de La Rioja, Spain)
12.00	*Cassava Detection under Real Field Conditions using YOLOv5* E. C. Nnadozie (Technische Universitat Munchen, Germany)
12.15	*Quantifying Wheat Spikes through Smartphone Camera and YOLOv5 under open field conditions* F. Marinello (Università di Padova, Italy)
12.30	*Apple fruit sizing through low-cost depth camera and neural network application* G. Bortolotti (Università di Bologna, Italy)
12.45	Improving the Generalization Ability of Random Forest for Potato Chlorophyll Estimation Y. Haibo (Technische Universitat Munchen, Germany)
13.00	LUNCH
14.30	*Novel chestnut tree crowns segmentation method by UAV oblique photogrammetry* L. Comba (Università di Torino, Italy)
14.45	*SiaPy – user friendly software for hyperspectral image segmentation of hyperspectral images* J. Lapajne (Agricultural Institute of Slovenia, Slovenija)

TUESDAY 4 JULY 2023

ROOM 3

15.00	*Weed25: a weed database for machine learning* P. Wang (Southwest University, China)
15.15	*Wheat weeds recognition using AI architecture, an open plant phenotype database and field conditions* R. Dainelli (Università di Firenze, Italy)
15.30	*Real-time Detection and Counting of Weeds in Winter Wheat Using YOLOv4 with Attention Module from UA* P. Alirezazadeh (Leibnz Inst.Agricultural Engineering and Bio-economy, Germany)
15.45	*Detecting and localizing mushroom clusters by a Mask R-CNN model in farm environment* C. Charisis (University College Dublin, Greece)
16.00	POSTER PRESENTATION
16.30	COFFEE BREAK
17.00	POSTERS
	Session: Machine Learning
18.00 – 19.00	GROUP & SOCIETY MEETINGS

WEDNESDAY 5 JULY 2023

ROOM 1

09.00- 09.20	*The Italian Agritech research ceter for precision and sustainable agriculture* Attilio Toscano (Università di Bologna)
09.20 – 09.30	*Interoperability: a key for the future of agriculture* Alessio Bolognesi (FederUnacoma)
09.30 – 13.00	WATER MANAGEMENT
09.30	*Stay-green monitoring for maize drought tolerance under field environments using hyperspectral data* H. El Sharawy (Technische Universitat Munchen, Germany)
09.45	*Estimating Crop evapotranspiration for small plots via data fusion of spectral and SAR data* T. Shilo (Manna Irrigation, Israel)
10.00	*On-Farm Evaluation of Variable Rate Irrigation for Winter Wheat in Semi-arid Western U.S.A.* N. C. Hansen (Brigham Young University, United States)
10.15	*Defining Temporally Variable Urban Turfgrass Irrigation Zones with Thermal IR or ECa data* R. Kerry (Brigham Young University, United States)
10.30	*Monitoring chickpea physiological traits by Sentinel-2 imagery to support irrigation management* O. Perach (The Hebrew University of Jerusalem, Israel)
10.45	*Assessment of indices calculated from remote and proximal sensing to discriminate irrigation levels* A. Matese (Università di Firenze, Italy)
11.00	COFFEE BREAK
11.30	*Grape yield prediction based on vine canopy morphology obtained by 3D point clouds from UAV images* A. Šupčík (Bratislava, Slovakia)
11.45	*A new Leafiness-LiDAR index to estimate light interception in intensive olive orchards* L. Sandonís-Pozo (Universitad de Lleida, Spain)
12.00	*Using a vegetation index to define homogeneous zones for variable rate irrigation in vineyard* M. Bolognini (Università di Milano, Italy)

WEDNESDAY 5 JULY 2023

ROOM 1

12.15 *Precision monitoring of vine water stress using UAVs and open-source processing chains*
V. Burchard-Levine (Spanish National Research Council, Spain)

12.30 *Grapevine water status in a variably irrigated vineyard with NIR hysperspectral imaging from UAV*
L. Brillante (Department of Viniculture and Enology, United States)

12.45 *Water status estimation using thermal imagery at different scales in the vineyard*
I. Bahat (ARO, Israel)

13.00 - 14.00 LUNCH

14.00 – 18.00 **FIELD VISIT**

SIDE EVENT BY CONFAGRICOLTURA Confagricoltura

14.30 – 18.00 **EU R&I Projects on Precision Agriculture: the Confagricoltura Partnership**

Opening: The Pact for Skills and the P.A.
Dr. Daniele Rossi – Delegate R&I Confagricoltura

- Valpropath (Teagasc – Ireland 07020)
- Eco-Ready (CZU – Czech University of Prague 07027)
- Life Future Farming (AguroTech BV – The Netherlands 07026)
- H-Alo (CNR – Italy 07066)
- Waste4Soil (CERTH – Greece 07030)

Final Remarks
Francesca Marino – EU Projects Area Confagricoltura

20.00 *Gala Dinner*

At Hotel Savoia Regency

WEDNESDAY 5 JULY 2023

ROOM 2

09.00 – 11.00	WOODY CROP CHARACTERIS
09.00	*An online fruit counting application in apple orchards* D. Mengoli (Università di Bologna, Italy)
09.15	*UAV photogrammetry vs mobile terrestrial laser scanning for woody crops characterization* J. Torres-Sánchez (Institute for Sustainable Agriculture, Spain)
09.30	*Automatic estimation of trunk cross sectional area using deep learning* C. Grimm (Oregon State University, United States)
09.45	*Delimiting VRI management zones in an olive grove under complex soil and terrain variability* Vanderlinden, K. (IFAPA Centro Alameda del Obispo, Spain)
10.00	*Evaluating the application of multispectral proximal sensing on Ground Vehicle in an olive orchard* C. Perna (Università di Firenze, Italy)
10.15	*PRECISIONPOP: a multi-scale integrated system for poplar plantation monitoring* M. Brambilla (CREA, Milano)
11.00	COFFEE BREAK
11.30 -13.00	CROP MODELS
11.30	*Does sensor choice matter for assessment of vineyard spatial variability?* S. F. Di Gennaro (Università di Firenze, Italy)
11.45	*Predicting grapevine harvest yield variables: application of a multivariate multiblock modelling* A. Cheraiet (INRAE, France)
12.00	*Mapping grape yield with low cost vehicle tracking devices* J. P. Gras (Institut Agro Montpellier, France)
12.15	*Investigating factors influencing within-vineyard variability under different pedological contexts* F. Graziosi (Università di Piacenza, Italy)
12.30	*Redesigning spatial On-Farm Precision Experiments for innovative vineyard crop protection* O. Naud (INRAE, France)
13.00 - 14.00	LUNCH

WEDNESDAY 5 JULY 2023

ROOM 2

14.00 – 18.00 **FIELD VISIT**

SIDE EVENT BY CREA crea Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

14:30 – 18:00 **Poster Session by CREA**

20.00 *Gala Dinner*

At Hotel Savoia Regency

WEDNESDAY 5 JULY 2023

ROOM 3

09.00 – 13.00 RS SENSING

09.00 *Field-scale winter wheat growth monitoring and yield forecasting using SAR and optical data fusion.*
B. Buszke (Wasat sp., Poland)

09.15 *Sensing management from space: predicting harvest dates*
S. Y. Han (The University of Sydney, Australia)

09.30 *Evaluating the spectral response of cotton and corn to different cover crops using UAV imagery*
J.M.P. Czarnecki (Mississippi State University, United States)

09.45 *Estimation of agronomic soil properties from multitemporal PRISMA satellite imaging spectroscopy*
R. Casa (Università di Viterbo, Italy)

10.00 *Hyperspectral sensing and mapping of soil fertility for amending within-field heterogeneity*
Y. Inoue (University of Tokio, Japan)

10.15 *Visible-Near Infrared Diffuse Reflectance Spectra for Predicting Soil Nitrogen Mineralization Rate*
F. Y. Ruma (Ghent University, Belgium)

11.00 COFFEE BREAK

WEDNESDAY 5 JULY 2023

ROOM 3

11.30	*Using cover crops as reflectors of the spatial variation in soil nutrient availability* S. I. Futerman (Hebrew University of Jerusalem, Israel)
11.45	*Target-N: Sentinel-2 based nitrogen optimisation in Swedish winter wheat production* K. Persson (Swedish University of Agricultural Sciences, Sweden)
12.00	*Satellite-based analysis of biomass yields in heterogeneous fields* L. Hagn (Technische Universitat Munchen, Germany)
12.15	*Modeling the canopy reflectance to forecast tomato biomass for the precise nitrogen management* V. A. Cerasola (Università di Bologna, Italy)
12.30	*Potential of the dark green color index for dynamic monitoring of N requirements in wheat crop* A. S. Voisin (INRAE; France)
12.45	*Practical methods for aerial image acquisition and reflectance conversion using consumer cameras* C. Yang (USDA-ARS, United States)
13.00 - 14.00	LUNCH
14.00 – 18.00	**FIELD VISIT**

SIDE EVENT BY AGRITECH

14:30 – 18:00	**Session by AgriTech**
20.00	*Gala Dinner* *At Hotel Savoia Regency*

THURSDAY 6 JULY 2023

ROOM 1

09.00 – 10.00	WATER MANAGEMENT
09.00	*Testing Irrigation Management Based on an Unoccupied Aerial Vehicle and an Artificial Neural Network* O. Rozenstein (Agricultural Research Organization - Volcani Institute, Israel)
09.15	*Smart irrigation system for precision irrigation in yellow fleshed kiwifruit* E. Baldi (Università di Bologna, Italy)
09.30	*An optical trapezoid model for actual evapotranspiration based on SWIR portion of the spectrum* A. Mokhtari (Technische Universitat Munchen, Germany)
09.45	*Smart Irrigation Approach to Stimulate Agro-Forestation of Native Trees in Dry Mediterranean Ecosyst* I. Litaor (LITEOR, Israel)
10.30	COFFEE BREAK
11.00 – 12.30	PLENARY SESSION
11.00	Invited Speakers
11.30	Awards & Conclusion Org. Committee

ROOM 2

09.00 – 10.15	CROP MODELS
09.00	*Combining crop growth modeling, active sensing and machine learning for precision N management* K. Kusnierek (Norwegian Institute of Bioeconomy Research, Norway)
09.15	*Integration of mechanistic model outputs as inputs into data-driven models for yield prediction* D. Al-Shammari (The University of Sydney, Australia)
09.30	*Synthetic data for site-specific crop response model using WOFOST and geostatistical simulation* T. Tanaka (Gifu University, Japan)
09.45	*Predicting plant-level cabbage yield using the assimilation of UAV-derived LAI into WOFOST* Y. Yokoyama (Gifu University, Japan)
10.00	*Evaluation of the PROMET model in on-farm research at the "Experimental Field BeSt-SH"* B. Brandenburg (FuE Zentrum FH Kiel GmbH, Germany)

THURSDAY 6 JULY 2023

ROOM 2

10.30 COFFEE BREAK

11.00 – 12.30 PLENARY SESSION – *(see schedule from ROOM 1)*

ROOM 3

09.00 – 10.45 PROBES

09.00 *Evaluation of portable tools for fast field assessment of winter wheat grain quality*
B. Morandin Figueiredo (Swedish University of Agricultural Sciences, Sweden)

09.15 *Instrumentation for On-the-Spot Measurement of Soil Health Indicators*
V. Adamchuk (McGill University, Canada)

09.30 *Evaluation of the Soil Quality of Chilean Orchards using SoilOptix Technology*
R. A. Ortega (Universidad Tecnica Federico Santa Maria, Chile)

09.45 *Assessment of new non-invasive roving techniques for mapping soil spatial variabilities*
S. Gianessi (Università di Bologna, Italy)

10.00 *Parameters to increase LiDAR mounted UAV efficiency on agricultural field elevation measurements*
L. Bernabe Santos (, Louisiana State University, United States)

10.15 *A Low cost sensor to improve surface irrigation management*
S. Moinard (Institut Agro Montpellier, France)

10.30 COFFEE BREAK

11.00– 12.30 PLENARY SESSION – *(see schedule from ROOM 1)*

POSTERS' LIST

Session: General perspective

P.1 *Future Crop Farming*
O. Spykman (Bavarian State Research Center for Agriculture, Germany)

Session: Education and training

P.2 *Data and Connectivity to Foster Smallholder and Urban Farming. Farmer Charlie*
B. Bonnardel (Farmer Charlie, United Kingdom)

P.3 *Developing a continuum of education and training pathways in integrative precision agriculture*
T. Bourlai (University of Georgia, USA)

P.4 *Extended Classroom in Precision Agriculture as a Tool for Engineering Education*
J. A. Cardona-Gil (Universidad Pontificia Bolivariana, Colombia)

P.5 *Resilient Smart Farming a conceptual and technological opportunity to strengthen resilience*
D. Eberz-Eder (Dienstleistungszentrum Ländlicher Raum Rheinhessen-Nahe-Hunsrück, Germany)

P.6 *Enhancing Production Efficiency and Farm Profitability through Participatory Research*
D. Rudnick (Univesity of Nebraska-Lincoln, USA)

Session: AutonomousVehicles

P.7 *Tractor Guidance Improves Environmental and Economic Gains for Pasture and Smallholder Farmers*
A. Ashworth (USDA ARS PPPSR Un. Of Arkansas, USA)

P.8 *Legal challenges about the use of drones in PA*
B. Baldoni (University of Macerata, Italy)

P.9 *Small robot for localized spraying using ISOBUS protocol*
J. M. Bengochea-Guevara (CSIC, Spain)

P.10 *Autonomous coordination between UAVs and UGVs for weed detection and removal*
S. Bhandari (California State Polytechnic University, USA)

P.11 *Allometric relationships for biomass estimation of persimmon trees using a field robot, LiDAR and photogrammetry*
J. Blasco (Instituto Valenciano de Investigationes Agrarias, Spain)

P.12 *Evaluation of a low-cost drone sensor to discriminate water stress levels in ornamental plants*
I. Borra-Serrano (Institute of Agricultural Sciences, Spain)

P.13 *The aerial application of pesticides by drones: challenges and regulatory issues*
P. Lattanzi (University of Macerata, Italy)

P.14 *Uncertainty analysis of a LiDAR-based MTLS point clouds using a high-resolution ground-truth*
B. Lavaquiol (Universitat de Lleida, Spain)

P.15 *Performance of a Smart Autonomous Vehicle in vineyard pesticide application*
G. Piovaccari (Università of Bologna, Italy)

P.16 *Is it possible to use current auto steering system in viticulture?*
B. Tisseyre (Institut Agro Montpellier, France)

P.17 *An AI-empowered, Autonomous Weed Removal Robotic Platform for Precision Agriculture*
F. Visentin (Università degli Studi di Verona, Italy)

P.18 *An IoT electronic fence for agri-robots*
G. Vitali (University of Bologna, Italy)

P.19 *Laser safety during laser-based weed control with autonomous vehicles*
M. Wollweber (LZH, Germany)

Session: Probes

P.20 *Farmers Friendly Digital Portable Soil Testing Device*
A. Araf (IDEB Research & Technological Institute, Dhaka, Bangladesh)

P.21 *Multichannel LiDAR supported Simultaneous Localization and Mapping In Complex Natural Environment*
E. Rihter (Faculty for Agriculture and Life sciences, Hoče, Slovenija)

Session: Sensing

P.22 *Multispectral camera system performing real-time VRA applications toward sustainable wheat production*
N. Georgiadis (Augmenta Agriculture Technologies, Greece)

Session: Surface Characterisation

P.23 *Soil prospection and aerial imagery in management zone delineation in a hazelnut grove in Italy*
L. Barbanti (University of Bologna, Italy)

P.24 *Utilizing functional soil maps for precision management for Smallholder Farmers*
P. Owens (USDA-ARS-SEA Dale Bumpers Small Farms Research Center, Booneville, USA)

P.25 *Evaluating management, environment and spectrometer type impacts on soil texture prediction via gamma spectrometry*
S. Pätzold (University of Bonn, Germany)

P.26 *Multilayer data and artificial intelligence for the delineation of corn management zones*
M. Pérez-Ruiz (University of Seville, Spain)

P.27 *Satellite Remote Sensing Detects the Legacy Effects of Crop Rotation on Subsequent Crops*
J. Wang (Technical University of Munich, Germany)

P.28 *Comparing machine learning approaches for the prediction of clay content via proximal gamma spectrometry under varying geopedological conditions*
R. Wehrle (Universitat Bonn, INRES Soil Science and soil ecology,Germany)

Session: Field Crop Characterisation & Monitoring

P.29 *Inoculation with biostimulants for improved plant performance under stress conditions*
K. Bradacova (University Hohenheim, Germany)

P.30 *Quantifying within-field spatial variability in Canola Flowering for Yield Estimation*
H. Fernando (University of Saskatchewan, Canada)

P.31 *Assessment of high cadence remote sensing data for providing phenology of key crops in Germany*
M. Grady (Planet Labs Germany GBMH, Germany)

P.32 *Ongoing Qualitative Observations and Field Scale Maize Yield Prediction*
J. Grove (University of Kentucky, USA)

P.33 *New methods for rapidly measuring the effect of agronomic treatments on grass growth*
E. Guest (ADAS, United Kingdom)

P.34 *Efficient site-specific management approach using multispectral, soil, and rice based cropping data*
C. I. Jaramillo Barrios

P.35 *Eco-innovative weeding with laser. New oppportunities for improving sustainability in agriculture*
J. Krupanek (Instytut Ekologii Terenów Uprzemysłowionych, Poland)

P.36 *Determining What Counts: Applying UAV imagery to estimate canola emergence*
K. Krys (University of Saskatchewan, Canada)

P.37 *Application of precision farming technologies in organic farming*
M. Mittermayer (Technische Universitat Munchen, Germany)

P.38 *UAV multi-temporal thermal imaging to evaluate wheat drought resistance*
W. Qin (Technische Universitat Munchen, Germany)

P.39 *High-throughput spectral phenotyping of drought response in spring wheat*
R. Sadeh (Hebrew University, Israel)

P.40 *Precision agricultural management of rice terraces using UAV in Japan*
H. Umeda (College of Bioresource Sciences, Nihon University, The Netherlands)

P.41 *Identification of potato cultivars using multispectral imaging*
A. Vojnović (Agricultural Institute of Slovenia, Slovenia)

P.42 *Predicting maize grain yield using UAV-based remote sensing across varieties, row spacings, and irrigation*
H. Zhang (USDA, United States)

Session: General Methodology

P.43 *E-Crops DSS: software architecture, technologies, main functions and examples of application*
B. Vito (Sysman Progetti &Servizi srl, Italy)

P.44 *Stakeholders' needs and barriers to adoption of advanced digital tracking tools*
R. Addorisio (University of Bologna, Italy)

P.45 *Does the use of multi-year data improve wheat yield prediction?*
A. Aizpurua (NEIKER, Spain)

P.46 *Working times classification through CAN-BUS data analysis*
F. Bettucci (University of Padova, Italy)

P.47 *Preliminary Study for the Development of Variable-Tillage Implements for Precision Farming*
A. Biglia (Università di Torino, Italy)

P.48 *Blockchain Implementations in Precision Agriculture*
L. Camanzi (Università di Bologna, Italy)

P.49 *Data Models in Precision Agriculture: From IoT to Big Data Analytics*
M. Francia (Universià di Bologna, Italy)

P.50 *Assessing the environmental footprint of digital agriculture: research perspectives*
C. Huck (INRAE, France)

P.51 *On the use of the driver-in-the-loop simulator approach to demonstrate the benefits of precision agriculture*

E. Leo

P.52 *Low-cost terrestrial photogrammetry for orchard sidewards 3D reconstruction*
J. A. Martínez-Casasnovas (Universidad de Lleida, Spain)

P.53 *Facilitating Economic Analyses of Digital Agriculture: The Role of National Statistcal Offices (NSOs) and Data Collection at Scale*
J. McFadden

P.54 *Data fusion for the decision-making process for a digitized experimental farm in Hungary*
G. Milics (Magyar Precizios Gazdalkodasi Egyesulet, Hungary)

P.55 *Development of depth-of-tillage control system with data linkage*
E. Morimoto (Kobe University, Japan)

P.56 *Data to Decisions: Efficient Implementation of Eco- Schemes, a Use Case for AI in Agriculture*
S. Ramm (FuE Zentrum FH Kiel GmbH, Germany)

P.57 *Low-cost 3D modelling of crop-weed interactions*
V. Rueda-Ayala (Agroscope, Switzerland)

P.58 *Farmwissen an innovative concept and platform for competence enhancement in Smart Farming*
E. Wölbert (Dienstleistungszentrum Ländlicher Raum Rheinhessen-Nahe-Hunsrück, Germany)

Session: Spatial Methodologies

P.59 *Site-Specific Yield Prediction of Red Fescue (Festuca rubra L.)*
C. Andreasen (University of Copenhagen, Denmark)

P.60 *Yield and texture based management zones in a heterogeneous Old Morainic landscape*
E. Bönecke (Leibniz institute of vegetable and ornamental crops, Germany)

P.61 *Cropland Reference Ecological Unit for Comparative Soil Studies*
B. Maharjan (University of Nebraska – Lincoln, USA)

Session: Weed & Pest Management

P.62 *Monitoring of insect pests and their interactions with the environmental conditions in vineyards*
V. Beranová (Comenius University Faculty of Natural Sciences, Slovakia)

P.63 *DIGINVASIVE: a digital system to map invasive weed plants*
A. I. de Castro Megías (Spanish National Institute for Agricultural and Food Research and Technology, Spain)

P.64 *A Processing Method for Adhesive Droplets on Images of Water-sensitive Papers*
Q. Gao (Università di Padova, Italy)

P.65 *Implementing image vision and actuation for online weed management with the aid of ISOBUS*
G. Peteinatos

P.66 *Early assessment of tomato bacterial spot through proximal hyperspectral sensing*
M. Reis Pereira (Campus da FEUP, Portugal)

P.67 *High power 2 µm wavelength fiber laser for precision weeding*
P. Fuhrberg (Futonics, Germany)

P.68 *How do farmers prefer laser-weeding? A pan-European survey*
D. Tran (Ghent University, Belgium)

P.69 *Development and validation of a method for detection of four NTX-related pesticides in plant foods*
J. Zhang (Technische Universitat Munchen, Germany)

Session: Pesticide Spraying

P.70 *Importance of Unmanned Aerial Vehicles Settings for Spray Bait Treatments on Citrus Orchards*
P. Chueca (Instituto Valenciano de Investigaciones Agrarias, Spain)

P.71 *Efficiency of a smart spraying technology in a fodder crop production*
L. Conceição (Polytechnic Institute of Portalegre, Portugal)

P.72 *Development of a new Cotton Defoliation Sprayer using Unmanned Ground Vehicle*
J. M. Maja (Clemson University, USA)

P.73 *Can UAV spraying system assist in precision crop protection?*
L. Sánchez-Fernández (Universidad de Sevilla, Spain)

Session: Nutrients Management

P.74 *Enhancing nitrogen management through remote sensing and self-driving robots for precise nitrogen application to reduce leaching*
V. Antoniuk

P.75 *Site-specific nitrogen management in winter wheat*
S. Heshmati (University of Hohenheim, Germany)

P.76 *Optimal input efficiency in cotton using multispectral camera system performing real-time VRA*
V. Maggidis (Augmenta, Greece)

P.77 *Application of model-based dynamic prescription maps for optimizing variable rate irrigation*
F. Morari (Università di Padova, Italy)

P.78 *Improving estimates of plant-available phosphorus through sensor data fusion at field scale*
S. Post (Eberswalde University of Sustainble Development, Germany)

P.79 *Investigations of spatial nitrate leaching, the basis of innovative approaches in groundwater protection*
J. Schuster ((Technische Universitat Munchen, Germany)

Session: Water Management

P.80 *Innovative proximal soil moisture sensor for supporting irrigation scheduling in a walnut orchard*
R. Mazzoleni (Università di Bologna, Italy)

P.81 *Variable rate drip irrigation in vineyard: a case of study in Franciacorta area*
D. Modina (Università di Milano, Italy)

P.82 *In-season crop model autocalibration for variable rate nitrogen fertilization in winter wheat*
F. Morari (Università di Padova, Italy)

P.83 *High-resolution soil moisture mapping in micro-irrigated orchards by on-the-go microwave radiometry*
E. Scudiero (University of California - Riverside, USA)

P.84 *Use of remote sensing and machine learning techniques to study the impact of climate extremes of crop evapotranspiration*
V. Sharda (Kansas State University, USA)

Session: Woody Crop Characterisation & Monitoring

P.85 *Development of a high-troughput monitoring system for fire blight in fruit orchards*
V. Maß (Leibniz Institute for Agricultural Engineering and Bioeconomy, Germany)

P.86 *High-efficiency harvesting of jujube by air suction harvester: suction pipe gas MHD acceleration control*
J. Nie (Shihezi University, China)

P.87 *Yield prediction in different fruit species using systematic sampling*
R. Ortega (Universidad Tecnica Federico Santa Maria, Chile)

P.88 *Automated apple orchard blossom mapping from drone image analysis*
M. Piani (Università di Bologna, Italy)

P.89 *Quantifying temperature on apple surface by means of thermal point cloud*
N. Tsoulias (Leibnz Institute of Agricultural Engineering and Bio-economy, Germany)

P.90 *Automatic detection of woody crop diseases combining aerial-ground robots and network sensors: An upscaling remote sensing approach*
J. Valente (Wageningen University and Research, Netherlands)

P.91 *Detection of Citrus bark cracking viroid (CBCVd) on hop (Humulus lupulus) using multispectral imaging*
U. Žibrat (Agricultural institute of Slovenia, Slovenia)

Session: Vineyard Characterisation & Monitoring

P.92 *A novel fruit-zone cooling system to face multiple summer stress in Pignoletto cv*
G. Allegro (Univeristà di Bologna, Italy)

P.93 *Complementarity between manual measurements and image analysis for grape yield estimation.*
C. Germain (Laboratoire IMS, France)

P.94 *Vinelapse: an autonomous grapevine observation image sensor*
F. Rançon (Bordeaux Sciences Agro, France)

P.95 *Detection of damaged white grape bunches*
A. Ribeiro (Centre for Automation and Robotics, Spain)

P.96 *Early detection of Botrytis cinerea infection in plants by pulsed thermography*
M. Rippa

P.97 *LIDAR and Multispectral 3D data fusion for identifying fungal disease traits in vineyards*
S. Vélez (Wageningen University and Research, Netherlands)

Session: Machine Learning

P.98 *Machine learning based prediction of soil total nitrogen by using hyper-spectral data in laboratory*
Y. Afrasiabian (Technische Universitat Munchen, Germany)

P.99 *Development of an On-line Object Detection Neural Network for weed detection in Tomato Crops*
D. Andujar (Consejo Superior Investigaciones Cientificas, Spain)

P.100 *Machine Learning regression for Leaf Nitrogen Content Prediction throughout the entire lifecycle of Sugarbeet crops in Spain*
R. Fortes (HEMAV, Spain)

P.101 *Sub-field Scale Soil Salinity Prediction using Machine Learning Algorithms with Remotely Sensed Data in the Prairie Area of Saskatchewan, Canada*
T. Ha (University of Saskatchewan, Canada)

P.102 *Machine Learning image classifier: autonomous fertilization management of indoor baby leaf lettuce*
M. Landolfo

P.103 *Development of a prototype mobile app for crop weight estimation using AI techniques*
W. S. Lee (APEC Climate Center, Republic of Korea)

P.104 *A Non-invasive Method of Monitoring the Growth of Individual Melons using UAVs and Machine Learning*
P. Majewski (Wroclaw University of Science and Technology, Poland)

P.105 *Detection of Conyza spp in a hedgerow olive orchard by deep learning convolutional neural networks*
F. J. Mesas-Carrascosa (Institute for Sustainable Agriculture, Spain)

P.106 *Cognitive computing for classification of six weed species in tomato and maize crops.*
G. Mesías-Ruiz (Spanish National Research Council, Spain)

P.107 *A mobile phone-based tomato maturity monitoring system using identification markers*
K. Morita (University of Tokyo, Japan)

P.108 *Transfer and zero-shot learning for weed species detection with small datasets and unseen classes*
J. M. Peña (Spanish National Research Councin, Spain)

P.109 *Development of multimodal machine learning model for wheat traits assessment under climate change*
A. Pivchenko (The Hebrew University of Jerusalem, Israel)

P.110 *Seed Spacing Estimation using CNNs and Seed Localization Sensing System*
A. Sharda (Kansas State University, USA)

P.111 *Using shape and color to identify weeds. A review for Eastern and Central Europe*
C. D. Utoiu

P.112 *Optimization algorithms for plant segmentation of point clouds onboard agricultural robots*
C. Valero (Universidad Politecnica de Madrid, Spain)

P.113 *Active vision and multi-view perception to efficiently tomato target part in high clutter scenario*
W. Xin (Wageningen University and Research, Netherlands)