FORUM | 10 DEC 2020 AT 15:30 CET

PARNTER NETWORKS

MATCHMAKING SESSION TO FIND RELEVANT PARTNERS TO BRING YOUR RESEARCH INNOVATIONS TO MARKET.

OBJECTIVE OF THIS ICT-AGRI-FOOD NETWORKING EVENT

This ICT-AGRI-FOOD partnership event aims to introduce 19 selected ICT-AGRI-FOOD research projects to partners in the international agrifood ecosystem that can support the go-to-market of their research results. Therefore, ICT-AGRI-FOOD is inviting a diverse international audience of research institutes, equipment manufacturers, ICT service companies, governmental bodies and agrifood actors.

Our aim is to foster the creation of partnerships in product development, validation, communication, distribution and funding to accelerate the uptake of impactful and sustainable solutions that can help to make European agriculture more efficient and to reach the ambitious goals the Green New Deal and the Farm-to-Fork strategy.

NETWORKING – PARTNERS FOR GOING TO MARKET

Timeline and setup of the session on 10 December at 15:30 CET

MODERATION

ALEXANDER BERLIN
BERLIN THINKING

TIMELINE OF THE SESSION

WELCOME AND INTRODUCTION

15:30 – 15:40

Brief welcome and introduction to the ICT-AGRI-FOOD Partnership Event

SPEAKER: DR JOHANNES PFEIFER, ICT-AGRI-FOOD

KNOWLEDGE INCUBATOR

15:40 – 15:50

Introduction to the Knowledge Incubator concept of ICT-AGRI-FOOD

SPEAKER: ICT-AGRI-FOOD

ICT-AGRI-FOOD PROJECT PITCHES

15:50 – 16:50

Short pitches of all 19 selected research projects of ICT-AGRI-FOOD

SPEAKER: PROJECT COORDINATORS

TOPICAL NETWORKING

16:50 – 17:30

Product Development & Validation

JOIN THIS ROOM IF YOU CAN SUPPORT WITH TEST FARMS, HARDWARE, SOFTWARE

Communication

JOIN THIS ROOM IF YOU CAN SUPPORT IN COMMUNICATION OF RESEARCH RESULTS

Sustainability

JOIN THIS ROOM IF YOU CAN SUPPORT TO PROVE AND IMPROVE SUSTAINABILITY

CLOSING & NETWORKING

17:30 – OPEN

Wrap-up of the event & upcoming activities in 2021
Open Virtual Networking

SPEAKER: DR JOHANNES PFEIFER, ICT-AGRI-FOOD

SELECTED RESEARCH PROJECTS

Here are the 19 excellent research projects supported by ICT-AGRI-FOOD

ADCATER

ADVANCED DIGITAL SOLUTIONS FOR PROFESSIONAL FOOD AND NUTRITION CATERING SERVICES

ADCATER will develop advanced ICT technologies and integrate them into a **Smart Food Catering Supply Chain platform** that provides: economic efficiencies to growers and suppliers; personalized nutrition accuracy to diners/patrons, wholesalers and caterer; and verification of personal, organizational and global nutritional policies. This will be achieved by **harnessing computer vision & deep learning technologies to identify and decode images of prepared food "served to plate before meal" and "left in plate after meal"**, applying advanced analytics to derive valuable information such as: served meal ingredients, the degree of adjustment and dietary gaps to the diner profile, batch traceability data, effective and up-to-date nutritional supervision, food waste, and correlation between consumer consumption and health.

CHALLENGES: Food Waste, Personalized Nutrition **Value Chain**: Farmer, Wholesaler, Catering, Consumer

ADDFerti

A DATA-DRIVEN PLATFORM FOR SITE-SPECIFIC FERTIGATION

ADDFerti aims to design and develop a **fully-automated ICT-based data driven platform for VRFI**. Given the increasing demands for water and food under global warming, one of the great challenges is how to increase food production by using less water for irrigation. Another issue is the homogeneous application of not only water but N, P and K by the majority of farmers in Europe and beyond. This results in over- and under-applications over different parts of the field, leading to poor yield and management of farm input, and negative environmental consequences, e.g., N and P leaching, or water scarcity. The **solution would be adopting variable rate fertigation (VERI), to apply the right rate at the right time**, and place using advanced sensing, modelling and control technology.

CHALLENGES: Precision Farming **Value Chain**: Service Provider, Machine Manufacturer, Farmer

ANTONIO

MULTIMODAL SENSING FOR INDIVIDUAL PLANT PHENOTYPING IN AGRICULTURE ROBOTICS

ANTONIO develops and implements advanced perception systems based on **multi-sensor platforms and sensor processing algorithms to enable agricultural vehicles** to perform plant phenotyping and precision agriculture tasks, such as precise local application of pesticides. The envisaged idea is based on an **integrated sensor network, including mobile sensors mounted onboard of robotic vehicles and drones, stationary sensors deployed in the field, and smart insect traps.** Information coming from the fixed sensing devices as well as robots and drones will flag "attention spots" in the crop for further local investigation by the robotic platforms. This approach will lead to precise detection of pests and weeds/plants, and this narrow temporal and spatial scale of detection ability can treat the specific site instead of the entire crop or field.

CHALLENGES: Precision Farming **Value Chain**: Service Provider, Machine Manufacturer, Farmer

BeeConnected

ANTICIPATING MECHANISMS OF HONEYBEE COLONY MORTALITY WITH CONNECTED BEEHIVES

BeeConnected aims at **understanding mechanisms underlying winter mortality risk of honeybee colonies** and to identify early-warning indicators that could help beekeepers limiting colony losses and related economic deficits. We will combine our expertise in various scientific fields, including behavioural ecology, molecular biology, engineering, computer science, and modelling. In close collaboration with beekeepers, we will carry out a **large-scale monitoring of beehives along combined gradients in climate (continental, temperate and Mediterranean) and landscape**. The monitoring will combine traditional field observations with automated systems using multiple low-cost sensors to track the bee swarm in real time and in three dimensions inside the beehives. The final goal is to derivate decision-support tools for beekeepers to sustain their professional activity.

CHALLENGES: Honeybee Mortality **Value Chain**: Beekeeper

FINDR

FAST AND INTUITIVE DATA RETRIEVAL

FINDR's objective is to provide universal, transparent, and unifying **access to Earth Observation (EO) data** for sustainable and resilient food production. The project will implement an ICT platform to enable faster and better-informed decisions by making existing EO data sources directly comparable and inter-compatible. This is reached by the implementation of **data-finding, data-forecasting, and data homogenization algorithms**, leveraging the technological advantages of cloud computing, big data, and machine learning. The overall vision is to unlock many of the most immediate potential benefits, like more efficient use of water in irrigated agriculture, optimized fertilizer use, automated irrigation management, that are still waiting for their adoption on large scales by the food producers.

CHALLENGES: Access to Satellite Data **Value Chain**: Service Providers, Farmers

GOHYDRO

A SMART-SENSING AI-DRIVEN PLATFORM FOR SCALABLE, LOW-COST HYDROPONIC UNITS

GOHYDRO aspires to culminate in the production of a platform that will be a shifting paradigm of how **AI-driven technological innovation can become an affordable, accessible-by-all tool applicable to all forms of urban farming**. In a nutshell, the proposal aims at creating a form of an easy-to-use e-agronomist which will assist any grower to fine-tune and optimize her hydroponic production. Within this framework, GOHYDRO aims at developing a cost-efficient smart-sensing ICT platform capable of monitoring the crops' health and nutrient content of hydroponically cultivated microgreens in order to optimize the cultivation process and allow the harvest of the best possible products. Hydroponics has emerged as one such solution, as it requires no arable land, reduces the usage of clean water and can be used in any urban setting.

CHALLENGES: AI, Urban Farming **Value Chain**: Service Providers, Farmers

HALY.ID

TOOLS FOR MONITORING & MANAGEMENT OF THE BROWN MARMORATED STINK BUG & OTHER PESTS

HALY.ID aims to replace the current **monitoring of the brown marmorated stink bug** (Halyomorpha halys) by non-reliable traps with an **autonomous monitoring system based on new emerging technologies like drones, computer vision and IoT devices**. The brown marmorated stink bug (Halyomorpha halys), an invasive Asian species, in 2019 has already reached 28 European countries, causing damages for millions of euros. The final goal is to collect images of the most dangerous pests in our countries (H. Halys, Psila rosae) with vision chips carried by unmanned vehicles, mined via machine learning on the edge-devices, in order to direct interventions. We also intend to exploit hyperspectral vision for detecting pest damages non-visible in the marketable fruits. By logging this information and making it available across the value chain to provide transparency and quality assurance toward the consumer.

CHALLENGES: Disease Detection **Value Chain**: Farmer

IMPPeach

INTEGRATED MODEL AND DIGITAL PLATFORM FOR HARVEST PREDICTION OF CANNED PEACHES

IMPPeach develops a **digital platform for the harvest prediction for canned fruits**, powered by a predictive model based on Machine Learning, Remote Sensing and IoT. The platform will provide remote sensing (satellite) data of the orchards and corresponding vegetation indexes to derive parameters like plant vitality and other phenological parameters. It provides also climatic, soil conditions, cultivation and fruit data (e.g. irrigation, size, growth rate) by an IoT sensor network and manual field scouting. This data feeds into a prediction model for harvest dates and yields based on the data analysis by AI/ML algorithms and into a distributed FMIS that integrates all collected data, supports data exchange between farmers and the fruit canning business and integrates the predictions with the MRP process.

CHALLENGES: Precision Farming, AI **Value Chain**: Service Provider, Farmer

LivestockSense

ENHANCING SUSTAINABILITY OF LIVESTOCK FARMS BY REMOVING BARRIERS FOR ADOPTION OF ICT

LivestockSense aims to **draw farmer's attention on the importance of environmentally friendly animal housing**, especially air quality and its impact on health, welfare and productivity of livestock. In relation to sociological research, the project wants to understand the real causes of resistance to precision livestock farming (PLF) systems, i.e. exploring the attitude of farmers to PLF systems, their requirements for the operation of these systems and the provision of information, as well as their **knowledge of the decision-making roles ICT technologies** can play on farms. Demonstrate the role of PLF systems can play in delivering economic and environmental benefits through building a data-driven ICT tool

CHALLENGES: Precision Farming, Education **Value Chain**: Farmer (livestock)

MERIAVINO

MULTISCALE SENSING FOR DISEASE MONITORING IN VINEYARD PRODUCTION

MERIAVINO project advocates a multidisciplinary approach, which is based on several scientific fields to address the problem of disease and yield estimation in vineyard. The proposed methodology consists of inter-combining and implementing IoT, **remote sensing and big data with a multi-scale approach in order to interconnect the vineyard parcels**, as well as to develop a non-invasive, eco-friendly and low-cost technology for vine disease detection/warning. In order to reduce economic loss of both quantity and quality, and the environmental impact, various sensors, data fusion techniques and artificial intelligence and machine learning methods are combined along with the development of re-printable sensors for effective vineyard monitoring. The project results are then analysed and geo-visualised on compatible MobApp for end-users for decision-making and early prevention.

CHALLENGES: Precision Farming, AI **Value Chain**: Farmer (vineyard)

MUSHNOMICS

UNLOCKING DATA-DRIVEN INNOVATION FOR IMPROVING PRODUCTIVITY IN MUSHROOM VALUE CHAIN

MUSHNOMICS aims to demonstrate the feasibility of dynamic data-driven analytics for multidomain mushroom production environments in order to **optimize yield, lower costs and improve the economic viability** of this agrifood sector. The project will develop ICT technologies for use in the agrifood domain exclusively focusing on mushroom value chain, combining smart sensors, AI, Deep Learning and Big Data analytics. The multi-factor, multi-discipline MUSHNOMICS team will lead to the development **of ICT platform in the mushroom value chain**, which will be demonstrated at TRL7 for post-project exploitation by the SMEs. The project team constitutes has a wide geographical spread with partners from Ireland, Denmark, Romania and Hungary

CHALLENGES: Indoor Farming, Precision Farming, AI **Value Chain**: Farmers (Mushrooms)

PLAN P

DIGITAL SPECTRAL TOOLS FOR THE PRODUCTION OF SUSTAINABLE FOOD WITH PLANT PROTEINS

PLAN P develops a digital solution for the conception and production of sustainable food based on plant proteins. Data linked to the **external and internal quality of the dispersed systems such as emulsions and foams will be acquired by hyperspectral analysis, an efficient and non-invasive technology**. Instead of using Deep Neural Networks in regards of AI, the project will use a multi-model approach, where a set of components, each using different machine learning methodologies, will be trained and evaluated. The development of sensors will ensure online a quality diet with reduced waste. The multidisciplinary approach of the partnership will ensure the transfer of the innovations to companies.

CHALLENGES: AI, Quality Assurance, Spectral **Value Chain**: Food Processors

POSHMyCo

POTENTIAL OF SELECTIVE HARVEST BASED ON MYCOTOXINS CONTENT ASSESSMENT IN CEREAL CROPS

POSHMyCo developes a **system to evaluate the spatial distribution of mycotoxin contamination** by Fusarium. Recommendation will be made for selective harvest and preventive site-specific spraying of fusarium fungicide aiming at **reducing the risk of mycotoxin contamination in wheat and barley grains**, which is expected to maximize the yield price, while minimize the risk to human health and livestock. Fusarium species are the main cause of trichothecene type B contamination in cereals. Mycotoxins are considered to have a significant impact on food and feed safety. Currently producers do not have a validated methodology to **determine toxin contamination levels before harvesting the grain**.

CHALLENGES: Disease Detection **Value Chain**: Farmer (Arable)

SHEET

SUNBURN AND HEAT PREDICTION IN CANOPIES FOR EVOLVING A WARNING TECH SOLUTION

SHEET aims to analyse the apparent **temperature distribution at the fruit surface employing terrestrial remote sensing with automated conveyor in apple, sweet cherry, and grapes**. Furthermore, the project wants to validate the findings on fruit damage considering the peak and duration of radiation and temperature degrees and develops a prototype of a warning **IoT solution to inform growers on the risk of damage**. The varying training systems of woody plants and efficacy of physical protection measures based on shielding effects have an effect on the heat distribution in the canopies and crop damage in varying climate conditions. Time series analysis of fruit temperature in heat periods due to global warming are needed.

CHALLENGES: Quality Assurance, Food Waste **Value Chain**: Farmer (Fruits)

SoCoRisk

IMPLEMENTATION OF SOIL COMPACTION RISK ASSESSMENT SYSTEM

SoCoRisk aims to generalize the use of the decision support tool for prevention of soil compaction called Terranimo. Therefore, the project will identify and address potentials and barriers of using the decision support tool in Europe through a transdisciplinary approach with the involvement of soil scientists, agronomists, and social scientists. End-users will have a central role in the project: 4 to 5 farms will be chosen as case studies in each the five participating countries (Norway, Sweden, Denmark, Switzerland, Italy). Soil quality is threatened due to traffic with modern agricultural machinery. Compaction of the subsoil is effectively persistent. Soil ecosystem services related to protection of the environment are significantly affected by subsoil compaction.

CHALLENGES: Soil Compaction **Value Chain**: Farmer

SPECTROFOOD

AGRIFOOD QUALITY ESTIMATION USING SPECTRAL TECHNIQUES

SPECTROFOOD aims to enhance the monitoring of fruits and vegetables quality, with advanced monitoring, using **hyperspectral imaging** in both pre- and post-harvest stages. This will identify links at temporal and spatial relations between **production practices and quality characteristics in post-harvest and storage**. The collected data and generated relations will be stored in a user-friendly and interactive platform, which will be created to present the monitoring data at the different supply-chain stages. Four use-cases have been identified in four countries to **monitor leeks, mushrooms, sweet cherries and apples, as well as broccoli.** The specific needs to be monitored will be identified with close cooperation with the relevant stakeholders.

CHALLENGES: Quality Assurance **Value Chain**: Farmer, Food Processor, Retailer, Consumer

SustainIT

RELEASING THE POTENTIAL OF ICT FOR SUSTAINABLE MILK AND BEEF CATTLE VALUE CHAINS

SustainIT aims to identify institutional, economic and social barriers of widespread adoption of ICT, and **develop conceptual governance, innovation ecosystems and business models for releasing the full potential of ICT** in milk and beef cattle value chains. The project uses action research methods in the living lab setting to co-design the study frameworks and survey questions, test validity of the propositions, develop conceptual solutions. Living labs will include ICT developers, technology providers, farmers, processing industry, retailers, consumers, policy makers, researchers, and innovation brokers. The SustainIT project involves five partners from Estonia, Finland, Sweden and Germany.

CHALLENGES: Education, Adoption Barriers **Value Chain**: Farmers (livestock, dairy)

TailBiteAdvice

AN ICT-BASED REAL-TIME ADVISORY TOOL TO MINIMISE TAIL BITING IN FATTENING PIGS

TailBiteAdvice aims to research, develop and demonstrate an on-farm **advisory tool for assisting the farmer in the reduction of tail biting by combining multiple remote detection algorithms** for both tail biting and several adjustment parameters including enrichment engagement, aggression, feeding and drinking behaviour, and climate. Further, the project aims to identify and discuss opportunities and barriers to the implementation of this in combination with previously developed abattoir tool (TailCam® developed by DMRI) for automatic detection of tail lesions and tail length by including multiple actors across nationalities. Combined, the two tools will create a data driven ICT-based approach to provide the farmer and other stakeholders with knowledge on how to prevent tail biting and as a result, lower the need for tail docking.

CHALLENGES: Animal Monitoring **Value Chain**: Farmer (pigs)

UTOPIA

AUTOMATED OPEN PRECISION FARMING PLATFORM

UTOPIA will focus on **a single (standardized) platform where (robotic) paths, monitoring strategies can be set and the drones/USV's/AGV's automatically deployed** when certain conditions are met. Precision-farming needs large-scale adoption to increase production at such a level that it significantly contributes to minimizing the gap between actual and required world-production of food. Increasing the measurement and actuation intervals of e.g. monitoring for pests and watering are expected to contribute to e.g. increased yields. This would also increase the burden on the farmer, as the measurement-time and data-processing time increases significantly. This can be mitigated with Automated (cooperative) Precision Farming with the use of autonomous driving vehicles, vessels, drones and dedicated installations mounted on regular agricultural machinery.

CHALLENGES: Precision Farming, Drones **Value Chain**: Farmer