PhD-Day at ATB Potsdam, Tuesday, 06 December 2022, Hybrid-Conference; Room Z003 and Zoom

Time	Topic	Speaker	Supervisor ATB	Supervisor University
9:00	Welcome	Prof. Dr. Barbara Sturm Dr. Ulrike Praeger		
9:10	The potential for biogas production from autumn tree leaves to supply energy and reduce greenhouse gas emissions – a case study from the city of Berlin	Andres Vargas	Dr. Ulrich Kreidenweis	Prof. Dr. Annette Prochnow, HU Berlin
9:35	Co-evolution of grass-based businesses and their environments in the Bioeconomy - Archetypical processes of grassland change in Germany	Richard Orozco	PD Dr. Philipp Grundmann	PD Dr. Philipp Grundmann, HU Berlin
10:00	Break			
10:20	Exploring the potential of house crickets (Acheta domesticus) in future agri-food systems	Marios Psarianos	Dr. habil. Oliver Schlüter	Prof. Dr. Andreas Vilcinskas, Justus-Liebig-University Giessen
10:45	Waste valorization for insect cultivation: the case of black soldier fly on fish manure	Giacomo Rossi	Dr. habil. Oliver Schlüter	Prof. Dr. Andreas Vilcinskas, Justus-Liebig-University Giessen
11:10	Collaborative Aerial and Ground-based Orchard Monitoring and Maintenance	Tjark Schütte	Dr. Volker Dworak	Prof. Dr. Cornelia Weltzien, TU Berlin
11:35	Advancing Deep Learning for Vision Based Agricultural Monitoring: How to Overcome Challenges of Agricultural Image Processing	Pendar Alirezazadeh	Dr. Michael Schirrmann	Prof. Dr. Cornelia Weltzien, TU Berlin
12:00	Course offers of Potsdam Graduate School (PoGS), Uni Potsdam	Isabel Schröder		
12:30 13:30	Lunch break Group photo			
13:40	Assessment of treatments (e.g. composting) to reduce the occurrence of AMR bacteria in chicken manure	Aleksandra Atanasova	Dr. Tina Kabelitz	Prof. Dr. Thomas Amon, FU Berlin
14:05	Assessment of the influencing factors on methane emissions from liquid livestock manure combining experiments and modelling	Julio Hilgert	Prof. UZ Dr. Barbara Amon, Dr. Christiane Herrmann	Prof. Dr. Thomas Amon and Prof. Dr. Vitaly Belik, FU Berlin
14:30	Break			
14:40	Sustainability of dairy production systems in Europe: From the tools to the results	Xabier Diaz de Otálora Aguirre	Prof. UZ. Dr. Barbara Amon	Prof. Dr. Agustin Del Prado, bc^3 Basque centre for climate change, Prof. Dr. Fernando Estellés, Uni Valencia

Time	Topic	Speaker	Supervisor ATB	Supervisor University
15:05	Process-based modelling approaches for integral assessment of the impact of feeding management on greenhouse gas and nitrogen emissions in dairy cattle production systems	Latifa Ouatahar	Prof. UZ. Dr. Barbara Amon	Prof. Dr. Thomas Amon and Prof. Dr. Jürgen Zentek, FU Berlin
15:30	Break			
15:40	Alumni report on their career after doctorate at ATB	Dr. Martin Penzel, Thuringian State Office for Agriculture and Rural Areas, Horticulture and Experimental Horticulture, Department of fruit growing, Erfurt		
		Dr. Simone Kraatz, Sustainability manager in the field of agriculture and forestry		
	Marie Skłodowska-Curie postdoctoral Fellowship	Dr. Ojha Shikha, postdoctoral scientist, ATB		
17:00	Get together			

Short abstracts

The potential for biogas production from autumn tree leaves to supply energy and reduce greenhouse gas emissions – a case study from the city of Berlin

Andres Vargas

Autumn tree leaves are residues that are generated annually and usually composted, but can also be used as a feedstock for biogas production. Three scenarios were analysed in this study using BIORIM to evaluate the utilization of tree leaves from the city of Berlin: composting, biogas production, and the pretreatment of leaves before biogas production. The overall comparison showed that the biogas-related scenarios had a better performance in terms of greenhouse gas emissions than composting. However, further research is needed regarding costs and logistical feasibility for proper implementation. Using this residue for biogas production would represent an alternative energy source which could reduce the share of fossil fuels and electricity imports.

Co-evolution of grass-based businesses and their environments in the Bioeconomy - Archetypical processes of grassland change in Germany

Richard Orozco

Grasslands are an important socio-ecological system in Europe, covering more than a third of the European agricultural area. Yet, determinants of change and trajectories of grassland systems are distributed heterogeneously and remain poorly understood. Given the great diversity of grassland systems in Europe, designing appropriate policies requires a solid understanding of region-specific dynamics in order to improve environmental and socioeconomic sustainability. To fill this knowledge gap, we use data from the Farm Accountancy Data Network (F.A.D.N) of the European Commission. We consider indicators that integrate ecological, social, economic and

political information and apply self-organizing maps to illustrate grass-land-system archetypes for the years 1992, 2013 and 2019 in Germany. Our findings reveal regions in which similar policy tools could be allocated to develop regionalized, context-specific land management policies aimed at encouraging the provision of environmental services by grassland. We help identify the most suitable regions for the development of grass-based businesses and aim to foster the achievement of several Sustainable Development Goals (SDGs), in particular SDG 15-Life on Land.

Exploring the potential of house crickets (Acheta domesticus) in future agri-food systems

Marios Psarianos

House crickets are an important candidate for utilization in the future agri-food systems. The cricket production chain starts from rearing, then harvesting, processing and then generation of a food product.
A LED/UV-B illumination regime, at different conditions of intensity, was evaluated for inclusion in the cricket rearing.
At a post harvesting production stage, non-thermal processing was applied to insects that can enhance conventional food processes, like drying and extraction of intracellular compounds and improve product quality. Finally, chitosan was produced from crickets by applying green technologies and this chitosan was evaluated for possible applications.

Waste valorization for insect cultivation: the case of black soldier fly on fish manure

Giacomo Rossi

Aquaculture waste are nutrients rich materials, which may present a severe treat for the environment wheter not properly disposed. Black soldier fly (BSF, Hermetia illucens) has been described to play a crucial role in the circular economy by upgrading several kinds of biological waste into valuable nutrients. Therefore, ability of BSF larvae on growing and converting aquaculture sludge was tested. Nine substrates with different proportion of sludge were prepared. Results showed that BSF can conveniently grow on aquaculture waste, although the high level of indigestible fibre in the sludge requires mixing with other easy-to-degrade material.

Collaborative Aerial and Ground-based Orchard Monitoring and Maintenance

Tjark Schütte

Visual sensors like LiDAR, RGB or RGB-D cameras attached to unmanned aerial vehicles can provide data with high information density. Using this data to plan and execute tasks with ground-based robots requires analysis and semantic interpretation. The data needs to be georeferenced or registered in a shared coordinate system to allow operations of the ground-based mobile robot. In this talk, we present the example of deriving obstacle maps and crop positions of a blueberry orchard from UAV imagery with the goal of positioning a mobile robot optimally to perform tasks like weeding, plant protection application or harvesting.

Advancing Deep Learning for Vision Based Agricultural Monitoring: How to Overcome Challenges of Agricultural Image Processing

Pendar Alirezazadeh

Smart agriculture, comprising precision agriculture, digital agriculture, and other new concepts in agricultural research and practice, has gained increasing attention in recent years due to the rising importance of sustainable food production and resource management, as well as to the opportunity offered by the emergence of several digital hardware and software technologies. Accordingly, the development of geospatial information technology, robotics, artificial intelligence, and data analytics applications plays an essential role in modern farm management. Smart agriculture, based on sensor technology, machine learning (deep learning), and high-performance computing can benefit from these opportunities and can address the new food production challenges related to cropping system optimization for improving productivity and reducing environmental impacts.

Assessment of treatments (e.g. composting) to reduce the occurrence of AMR bacteria in chicken manure

Aleksandra Atanasova

This work is a part of the ENVIRE project, which investigates interventions to control the dynamics of antimicrobial resistance from chickens through the environment. There are several ways to achieve this goal. One of those we will consider in ATB in cooperation with FU Berlin. It includes different treatments of chicken manure for reduce AMR bacteria. Through manure, bacteria easily can get to agricultural land and then to human organisms. We will study storing, composting and anaerobic digestion treatments, as they are the main processes performed on chicken farms. We also consider impacts of different additivities like an additional easy-digestible carbon source . During all of those processes, will correlations between different parameters as temperature, pH or moisture on the amount of AMR bacteria. Based on that the results, we will choose the best conditions for chicken manure treatment to reduce certain AMR bacteria.

Assessment of the influencing factors on methane emissions from liquid livestock manure combining experiments and modelling

Julio Hilgert

Manure management is an essential source of greenhouse gas emissions, mainly methane. According to the Intergovernmental Panel on Climate Change (IPCC), the atmospheric methane level was responsible for a 0.5°C increase in the global temperature until 2019, compared to the levels from 1850-1900. This study investigates the influencing factors of methane emissions from dairy cows and fattening pig slurry, for instance, storage temperature, chemical composition, and storage period combining experimental and mathematical modeling approaches. The obtained results show that storage temperature affects microbial activity and induces changes in chemical composition that are key influences in methane emissions.

Sustainability of dairy production systems in Europe: From the tools to the results

Xabier Diaz de Otálora Aguirre

Dairy production systems (DPS) face major environmental, economic, and social challenges. Analyzing their sustainability is vital for the future of the sector. My doctoral thesis presents possible solutions to these challenges by improving knowledge on reducing the sector's negative impacts and improving its sustainability. To this end, relevant modeling tools for sustainability analysis of DPS were evaluated in detail, looking for their strengths and weaknesses. Furthermore, the complexity and diversity of the European dairy production sector were analyzed, and the effect of adapted emission mitigation measures were modeled.

Process-based modelling approaches for integral assessment of the impact of feeding management on greenhouse gas and nitrogen emissions in dairy cattle production systems

Latifa Ouatahar

Feed management decisions are crucial elements in managing greenhouse gas and nitrogen emissions from livestock farming systems. Process-based simulation models can provide greater insight into the impact of biotic and abiotic drivers on greenhouse gas and nitrogen emissions. Using data from well-monitored case study farms, the integral GHG farm budget including direct and indirect GHG emissions, and carbon sequestration was assessed using a set of process-based models from different components of the manure management chain.