PhD-Day at ATB Potsdam, Tuesday, 30 November 2021, Online-Conference

Time	Topic	Speaker	Supervisor ATB	Supervisor University
09:00	Welcome	Prof. Barbara Sturm Dr. Ulrike Praeger		
9:15	Water productivity assessment of milk produced in different production systems on dairy farms located in southern Brazil	Sofia Zanella Carra	PD Dr. Katrin Drastig	PD Dr. Katrin Drastig, HU Berlin
9:40	Determination of the structural and compositional changes in hydrothermal carbonization products over the storage time	Nader Marzban	Dr. habil. Judy Libra	Prof. Vera Susanne Rotter, TU Berlin
10:05	N_2O emissions as response of process related soil microbial activity to different irrigation and fertilization regimes in potato cropping	Laura Storch	Dr. Susanne Theuerl	
10:30	Break			
10:45	Group photo PhD researchers			
10:50	Development and validation of a control system for temperature-tunable modified atmosphere storage container for fresh produce	Dr. Ali Jalali	Dr. Pramod Mahajan	Prof. Cornelia Weltzien, TU Berlin
11:15	Multi-sensor data fusion for collision avoidance of a four-wheel steering rover inside berry orchards	Dr. Redmond Shamshiri	Prof. Cornelia Weltzien	Prof. Cornelia Weltzien, TU Berlin
11:40	3D-point cloud analysis for precise structure change detection in trees	Marius Hobart	Dr. Michael Schirrmann	Prof. Cornelia Weltzien, TU Berlin
12:05	Break			
13:35	Greenhouse gas mitigation via increased nitrogen efficiency in corn production in Iowa	Daniel Tudela Staub	Thünen Institute of Farm Economics, Braunschweig	PD Dr. Andreas Meyer-Aurich, HU Berlin
14:00	Change and trajectories of grasslands in the bioeconomy	Richard Orozco	PD Dr. Philipp Grundmann	PD Dr. Philipp Grundmann, HU Berlin
14:25	Break			
14:45	Working opportunities for scientists on the labor market in Brandenburg	Agata Riehm Katharina Luther	Economic Development Agency / Wirtschaftsförderung Brandenburg (WFBB)	
16:15	Break			
16:30	Alumni report on their career after doctorate/employment at ATB	Dr. Lukas Scholz Apl. Prof. Dr. Daniel Pleissner	Gemüsering Thüringen GmbH Institut für Lebensmittel- und Umweltforschung e.V. und Leuphana Universität Lüneburg	
17:30	End Get together in Potsdam			

Short Abstracts

Water productivity assessment of milk produced in different production systems on dairy farms located in southern Brazil

Sofia Zanella Carra

The goal of this study is twofold. First it aims to assess water productivity of milk (kg Fat Protein Corrected Milk [FPCM] m^{-3} (%blue water/%green water)) produced in three different production systems (grass-based, semi-confined, confined) on 68 dairy farms located within the watershed Lajeado Tacongava, Rio Grande do Sul State, southern Brazil. Second, analyze the water productivity in a large scale (watershed). This study intend to: evaluate the influence of dairy system type in the water productivity and investigate the causes that explain the differences in this indicator; identify dairy productive aspects to water conservation; determine the impact of different diet patterns (upper, middle and lower) on the water productivity in the watershed. This is the first study to apply the FAO LEAP Guidelines "Water use in livestock production systems and supply chains" to assess water productivity of milk produced in Brazil and considering different production systems.

Determination of the structural and compositional changes in hydrothermal carbonization products over the storage time

Nader Marzban

Hydrothermal carbonization (HTC) is a promising technology for converting wet biomass into hydrochar and a process liquid, both contain a variety of organic and inorganic compounds. Although many studies have investigated the hydrothermal transformation of lignocellulosic biomass, little is known about the changes in HTC products over time. Such knowledge is important not only for planning research studies, but also for post-processing. Here we investigate the effect of sample handling, storage temperature (20, 4, and -18°C) and time (week 1-12) on structural and compositional changes of organic and inorganic HTC products in the hydrochar and liquid phase. The change in the content of individual compounds in both phases was compared to the control values measured directly after the HTC process.

N_2O emissions as response of process related soil microbial activity to different irrigation and fertilization regimes in potato cropping

Laura Storch

Nitrous oxide (N_2O) is not only a greenhouse gas with a 289times higher warming potential than carbon dioxide, it is also involved in the disruption of the ozone layer. Hence mitigation of N_2O emissions, in particular from agricultural soils is of global concern. Currently, emissions are expect to further increase due to population growth resulting in a rising demand of agricultural products. Within the project, I investigate the effects of different fertilization and irrigation regimes on N_2O emissions with special emphasis of the underlying microbial processes. The aim is to guarantee an efficient agricultural production with minimizing N_2O.

Development and validation of a control system for temperature-tunable modified atmosphere storage container for fresh produce

Dr. Ali Jalali

A system was developed to actively control gas concentration inside a storage box. A mini blower exchanging air between the container and external atmosphere regulates the internal gas concentration. This is done with the help of a thin and long tube, which largely prevents air from entering the container but facilitates air exchange when the blower is switched ON. The ON/OFF frequency of the air blower was modelled as a function of storage temperature with the aid of computer simulations, taking the type and amount of fruit, blower and tube properties and the target gas concentration into account. The model was then used in programming a micro controller to control the blower in response to real-time measurement of storage temperature. The developed gas control system was then validated by storage of different fruits.

Multi-sensor data fusion for collision avoidance of a four-wheel steering rover inside berry orchards

Dr. Redmond Shamshiri

Autonomous steering of mobile robot platforms with obstacle avoidance capability in unstructured and high-density orchards proposes serious challenges due to the extreme variations in the bushes and the limitations in the GPS-based navigation system. The objective of this research was to generate correction steering and velocity command signals based on the input data received from multiple distance detection sensors that were implemented on the left, right, and front of a robotic mower platform. A dynamic model of the robot with the exact sensor setup was designed and used in the simulation environment for experimenting with the machine-learning algorithm. Preliminary results in the simulation and the actual environment showed that the approach is promising for driving and stabilizing the mobile robot from an offset point inside the orchard row to the middle of the row while avoiding random obstacles.

3D-point cloud analysis for precise structure change detection in trees

Marius Hobart

Photogrammetry for structure delineation in tree crops is a common way to get spatial information about phenotypic characteristics. Unmanned aerial vehicle (UAV) based, this method combines advantages in a good resolution of large covered areas. However, photogrammetry can be challenging for grass covered orchards, if the tree wall is not opaque. My first findings show underestimated tree heights along the tree wall. This was dedicated to missed fine shoots, which were not resolved in the 3D point cloud.

Greenhouse gas mitigation via increased nitrogen efficiency in corn production in Iowa

Daniel Tudela Staub

Nitrogen fertilizer is essential to ensure farm profitability, yet its application triggers the release of greenhouse gases. This study assesses the mitigation potential of increasing the nitrogen efficiency in corn production in Iowa. Three levels of efficiency are used to calculate the fertilizer reduction potential and the economic repercussions at farm-level. In two cases, the additional costs are estimated to be lower than the savings generated from the reduction in the fertilizer rate. Thus, increasing the nitrogen efficiency results in a win-win scenario, as the emissions and costs are overall reduced. Only when the lowest nitrogen efficiency is assumed, the strategy results in net additional costs.

Change and trajectories of grasslands in the bioeconomy

Richard Orozco

Grasslands are one of the most challenging study objects of research due to their spatio-temporal dynamics and the wide range of public goods and services they provide. A key challenge for grassland farming is to design production systems and management strategies in such a way that multiple functions and services are adequately fulfilled or provided. Using a variety of methods and approaches, which include case studies and machine learning algorithms, I investigate the interdependencies between grasslands and their business environments in Europe. This empirical work will underpin discussions around policy recommendations for more sustainable grassland management and bioeconomy transitions.

Working opportunities for scientists on the labor market in Brandenburg

Agata Riehm, Katharina Luther (Team WFBB Arbeit - Fachkräfte & Qualifizierung)

Are you interested in a job in Brandenburg or have you always wanted to know how the job market and the economy are organized in the state of Brandenburg, which companies have settled here and what topics are being worked on for the future? The state of Brandenburg has seen positive labor market development in recent years - find out what opportunities are available to you in the Berlin-Brandenburg metropolitan region, which industries and companies define the economy and where you can find potential employers.