PhD-Day at ATB Potsdam, Wednesday, 18 November 2026, Hybrid-Conference; Room Z003 and Zoom

Time	Topic	Speaker	Supervisor ATB	Supervisor University
09:30	Welcome	Dr. Thomas Hoffmann Dr. Ulrike Praeger Annika Mahn		
Healthy Foods				
09:45	Dynamic Storage Conditions and Cereal Grain Stability: Experimental Investigation of Quality and Microbial Changes	Annika Mahn	Prof. Dr. Barbara Sturm Dr. Ahmed Abdelfattah	Prof. Dr. Barbara Sturm Humboldt Universität zu Berlin
Individualized Livestock Production				
10:05	Real-Time Individual Cow Tracking and Posture Monitoring with Deep Learning	Aswath Ganapathi Arumugam	Dr. David Janke	Prof. Dr. Matthias Rottmann Prof. Dr. Tim Römer Osnabrück University
10:25	Coffee Break			
Diversified Crop Production				
10:50	ExSoiL: An Interpretable, Expert-Guided Soil Quality Index via Self-Supervised Learning	Abdulrahman Alsatouf	Prof. Dr. Marina Höhne	Prof. Dr. Marina Höhne Prof. Dr. Anna-Lena Lamprecht University of Potsdam
11:10	Process Monitoring of Autonomous Agricultural Machinery in the Field	Daniel Suhr	Prof. Dr. Cornelia Weltzien	Prof. Dr. Cornelia Weltzien Technische Universität Berlin
Multifunctional Biomaterials				
11:30	Ensilation Effect on Hop Biomass Leftovers: Chemical Characterization and Mechanical Properties of Resulting Composites	Saurav Nepal	Dr. Hans-Jörg Gusovius	Prof. Dr. Carsten Mai Georg-August-Universität Göttingen
11:50	Flowability and Fiber Breakage Behaviour of Reed Canary Grass Along a Twin-Screw Extruder	Shaikh Shahsharif Mohammadshafi	Dr. Thomas Hoffmann	Prof. Dr. Harald Kruggel-Emden Technische Universität Berlin
12:10	Group photo			
12:15	Lunch Break			
13:15	Game	Doctoral researchers ATB		
14:00	Discussion on Career Path to Professorship	Prof. Dr. Marina Höhne	Head of Department Data Science in Bioeconomy ATB / Institute of Computer Science, University of Potsdam	
14:45	Coffee Break			
15:15	Discussion on Career Paths after Doctorate - to Industry, Public Authorities or Research	Dr. Alejandro Vergara	CEO of the startup company ODOS Tech, End-to-end sustainability platform for livestock supply chains	
16:00		Dr. Theresa Kabakeris	Officer, Fruit & Vegetable Producer Organisations, Ministry of Agriculture, Food, Environment and Consumer Protection Brandenburg (MLEUV)	
16:30		Dr. Nikolaos Tsoulias	Senior Researcher, Deputy Head of Department, Department of Agricultural Engineering Hochschule Geisenheim University	
17:00	Get-together			

Abstracts

Dynamic Storage Conditions and Cereal Grain Stability: Experimental Investigation of Quality and Microbial Changes

Annika Mahn

Cereal grain storage is increasingly challenged by changing environmental conditions and fluctuating temperature and moisture. While storage stability is strongly influenced by these factors, most experimental studies rely on constant conditions that insufficiently represent realistic storage environments. This doctoral project investigates how dynamic temperature and initial grain moisture affect the physical, chemical, and microbiological quality of wheat and maize during storage. Controlled experiments will compare constant and fluctuating temperature regimes at different initial moisture contents. Continuous monitoring of storage conditions will be combined with destructive and non-destructive analyses of grain quality, microbial dynamics, and potential mycotoxin formation. The results will support the development of realistic experimental storage systems.

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Real-Time Individual Cow Tracking and Posture Monitoring with Deep Learning

Aswath Ganapathi Arumugam

Continuous, non-invasive monitoring of individual dairy cows enables precision livestock farming, but robust identity tracking in real barns remains difficult due to occlusions, visual similarity between animals, and cameras that only partially and non-continuously cover the barn. We present a vision pipeline combining detection (YOLOv11n, fine-tuned with semi-automatic Grounding DINO annotation), multi-object tracking, and posture classification (active, resting, excreting) across four NVR cameras in an experimental dairy barn housing roughly 25–30 cows. Beyond single-camera tracking, the pipeline targets the harder problem of cross-camera re-identification: DINOv2-based visual fingerprinting embeds cow crops drawn from per-camera trajectories and is trained via triplet learning so identity is preserved as cows move between camera views. Running the full pipeline across all four cameras yields per-cow trajectory and posture time series, with embedding quality assessed qualitatively via UMAP. An initial round of triplet training reduced loss substantially but used only single-camera positive pairs, so cross-camera re-identification is not yet reliably solved. This is the specific gap a second training round, using manually confirmed cross-camera pairs, is being built to close.

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ExSoiL: An Interpretable, Expert-Guided Soil Quality Index via Self-Supervised Learning

Abdulrahman Alsatouf

Assessing soil quality is essential for sustainable agriculture, yet it remains challenging due to soil variability and the absence of a universal definition of healthy soil. We present ExSoiL, an expert-guided self-supervised learning framework trained on 23,191 global and regional soil samples integrating physical, chemical, and biological indicators. Its latent space is structured into three functional

components and guided by expert knowledge of agronomic soil quality. ExSoiL quantifies soil quality as a continuous, nonlinear score (0–100) based on the distance to reference samples representing optimal soil conditions. Across independent datasets, ExSoiL provides consistent, interpretable estimates, thereby offering a scalable and transferable alternative to conventional soil quality indices.

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Process Monitoring of Autonomous Agricultural Machinery in the Field

Daniel Suhr

Autonomous agricultural machinery generates large volumes of data during field operations, offering valuable insights into machine behavior and process performance. This presentation introduces concepts for detecting and analyzing anomalies at both machine and process level. Rather than relying solely on data-driven methods, measurement data are considered in combination with dynamic system models to improve interpretability and robustness. The presentation provides an overview of the motivation, challenges, and potential concepts for systematic anomaly detection in autonomous field operations, without presenting results.

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Ensilation Effect on Hop Biomass Leftovers: Chemical Characterization and Mechanical Properties of Resulting Composites

Saurav Nepal

The hop biomass leftovers have shown potential as a source of bast fibers, where the major challenges associated with post-harvest storage and processing have been addressed through the use of wet preservation storage technique and robust extrusion processing method. The wet preservation method has been effective in limiting the growth of fungi, with the formation of acids. This approach has allowed for the preservation of structural constituents like cellulose and hemicelluloses, and lignin. After extrusion, the resulting fibers are suitable to manufacture composites, which have shown improved mechanical properties and potential applications.

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Flowability and Fiber Breakage Behaviour of Reed Canary Grass Along a Twin-Screw Extruder

Shaikh Shahsharif Mohammadshafi

Efficient mechanical processing of lignocellulosic biomass is crucial for valorising paludiculture crops. This study investigated axial changes in the flowability and structural transformation of Reed Canary Grass (*Phalaris arundinacea*) during twin-screw extrusion. Samples from six axial positions were analysed using ring shear testing. Flow behaviour transitioned from highly cohesive in the feeding and early compaction zones to improved flowability in the defibration zone, where unconfined yield strength decreased by approximately 70% and the flow function coefficient reached ~4.6. Bulk density increased from 98 to 187 kg/m^3, indicating progressive consolidation, fragmentation, and re-compaction toward discharge.