



AGENDA

2nd US Precision Livestock Farming Conference (USPLF2023)

	BALLROOM	ROOM 406
7:00 – 8:00	Breakfast each day (<i>Dining room 404</i>)	
Pre-conference events, by invitation: IDEAS PD meeting; NC1211 meeting		
Sunday, May 21		
17:00 – 19:00	Conference registration (<i>Atrium</i>); Put up posters	
18:00 – 20:00	Welcome reception with heavy hors d'oeuvres (<i>Atrium</i>)	
Monday, May 22		
07:15 – 10:00	Conference registration (<i>Atrium</i>)	
08:00 – 8:35	Conference Opening and Welcoming Remarks (<i>Ballroom</i>)	
08:35 – 10:05	Keynote Addresses: Angelica Van Goor & Kalyn Reed	
10:05	Break; Put up posters (<i>Atrium; Hallway</i>)	
10:30	Vision	Social dimensions and impacts
12:30 – 13:30	Lunch (<i>Dining room 404</i>)	
13:30 – 15:00	“Lightning Session” for poster presenters (<i>Ballroom</i>)	
15:00 – 15:30	Break (<i>Atrium</i>)	
15:30 – 17:45	Disease monitoring	Data-modeling
18:00 – 19:00	Reception & Poster Viewing (poster presenters at their posters) (
Tuesday, May 23		
8:00 – 8:45	Keynote Address: Dries Berckmans	
8:45 – 10:00	Weight and dimensions	PLF systems
10:00 – 10:30	Break (<i>Atrium</i>)	
10:30 – 12:00	Broiler welfare & applications	Heat stress
12:00 – 13:30	Student Mentoring Lunch (<i>Rm 403</i>)	Lunch (<i>Rm 404</i>)
13:30 – 15:15	Beef cattle applications	Identification
15:15 – 15:45	Break (<i>Atrium</i>)	
15:45 – 17:00	Industry Discussion Panel (<i>Ballroom</i>)	
17:00 – 18:15	Producer Discussion Panel (<i>Ballroom</i>)	
18:15 – 19:15	Reception and Meet with the Vendors (<i>Atrium</i>)	
19:15 – 20:45	Group dinner (<i>Dining room 404</i>)	
Wednesday, May 24		
8:00 – 9:30	Ventilation, IAQ, and Emissions	Wearables and Behavior
9:30 – 10:00	Break (<i>Atrium</i>)	
10:00 – 11:45	Applications and Sensors, Swine	Applications: Laying Hens, Aviaries
12:00 – 12:30	Closing session (<i>Ballroom</i>)	
12:30 – 12:45	Break and Field Tour participants pick up lunches	
12:45 – 17:30	Field Tour (pre-registration required) (<i>buses load on Locust St.</i>)	

See subsequent pages for details of each session.

MONDAY, May 22, 2023 (Continued)

Ballroom	Room 406
<p>Vision Moderator: <i>Yang Zhao</i></p>	<p>Social Dimensions and Impacts Moderator: <i>Janice Siegford</i></p>
<p>10:30 Estimating body weight of individual beef heifers using point-cloud reconstruction and machine learning <i>Yijie Xiong</i></p>	<p>10:30 The shape of welfare: using precision livestock farming to promote value pluralism in animal welfare <i>Ian Werkheiser.</i></p>
<p>10:45 Posture identification for stall-housed sows using convolutional neural network <i>Ziteng Xu</i></p>	<p>10:45 Current perceptions, use, and needs of precision poultry farming systems amongst academia <i>Tanner Thornton</i></p>
<p>11:00 Occlusion-resistant locomotion analysis of piglets using amodal instance segmentation <i>Haiming Gan</i></p>	<p>11:00 Public perceptions of precision livestock farming use in the dairy industry: a narrative review <i>Brad Kelly</i></p>
<p>11:15 Determining size of shoulder lesions in sows using computer vision <i>Shubman Bery</i></p>	<p>11:15 Full-scale precision livestock farming demonstration systems <i>Robert Burns</i></p>
<p>11:30 Automatic position detection and posture recognition of grouped pigs based on deep learning <i>Hengyi Ji</i></p>	<p>11:30 Swine industry stakeholder perceptions of PLF technology: A Q-methodology study <i>Babatope Akinyemi</i></p>
<p>11:45 Suitability of a passive infrared sensor system for detecting individual calf activity <i>Johanna Ahmann</i></p>	<p>11:45 A framework for transparency in precision livestock farming <i>Ian Werkheiser</i></p>
<p>12:00 Evaluating broiler performance, feather coverage, activity and feeding hours as affected by growth rate and stocking density <i>Shengyu Zhou</i></p>	<p>12:00 Democratizing the access to artificial intelligence solutions for under-represented and non-expert communities <i>Rafael Ferreira</i></p>
<p>12:15 Analysis of drinking behavior of beef cattle using computer vision <i>Md Nafiu Islam</i></p>	<p>12:15 A summary of U.S. midwestern feedlot producer responses to precision livestock management technologies <i>Yijie Xiong</i></p>
<p>12:30 Lunch – Dining Room 404</p>	

MONDAY, May 22, 2023 (Continued)

12:30 Lunch – Dining Room 404

Ballroom

Ballroom

Lightning Session -- Oral Synopses of Poster Presentations (3-minutes each)

Moderators: *Tami Brown-Brandl & Yijie Xiong*

13:30 Evaluating the environmental impact of a dairy cattle farm equipped with pedometers <i>Daniela Lovarelli (1)</i>	14:20 Assessment of gait following locking plate fixation of a tibial segmental defect and cast immobilization in goats <i>Kristin Bowers (16)</i>
13:33 Effect of THI on activity in dairy cows <i>Judith Roelofs (2)</i>	14:23 Open-source Wearable Sensors for Behavioral Analysis of Sheep Undergoing Heat Stress <i>Barbara Roqueto dos Reis (17)</i>
13:36 Detection of feeding activity of dairy cows through depth image processing <i>Luana Benicio (3)</i>	14:26 Automatically measurements of heart rate in heat-stressed sheep using photoplethysmography technology <i>Barbara Roqueto dos Reis (18)</i>
13:39 Air source heat pump equipped with low frequency mechanical ventilation improved calf barn environment and calf performance <i>Wei Hao (5)</i>	RESET
13:42 Application of a novel discrete grey model for forecasting indoor air temperature in livestock building <i>Yang Wang (6)</i>	14:35 Measuring lamb activity during artificial rearing by actigraphy <i>José-Alfonso Abecia (19)</i>
13:45 An electronic system for estrus detection in swine <i>Jeni Bushman (8)</i>	14:38 Trimming extremely overgrown hooves in sheep does not improve their welfare as measured by actigraphy <i>José-Alfonso Abecia (20)</i>
13:48 Sequential behavior patterns to assess the broilers thermal comfort <i>Daniella Moura (9)</i>	14:41 Actigraphy reveals higher circadian activity in light-induced sexually active rams in spring than in rams subjected to the natural photoperiod <i>José-Alfonso Abecia (21)</i>
RESET	14:44 Use of implantable bio-loggers for the analysis of temperature and heart rate variation in hormonally-estrous synchronized ewes during seven days post-treatment <i>José-Alfonso Abecia (22)</i>
14:05 Multi-tracking system based on Kalman filter for laying hens <i>Allan Siriani (10)</i>	14:45 Calculation of daily distance walked by grazing cattle using real-time activity and position data collected by LORA-WAN sensors <i>Shelemia Nyamuryekung'e (23)</i>
14:08 Publicly available datasets for computer vision in precision livestock farming: A review <i>Juan Steibel (11)</i>	14:48 Training beef cattle to use virtual fence systems. <i>Shelemia Nyamuryekung'e (24)</i>
14:11 Superhydrophobic paper-based dual field-effect biosensor functionalized with semiconducting SWNT and DNAzyme for hypocalcemia diagnosis <i>Hui Wang (13)</i>	
14:14 Photoplethysmography pulse sensors designed for measuring horse heart rates <i>Katherine Amirault (14)</i>	
14:17 Horse jump trajectory parameters associated with horse and rider experience level <i>Katherine Amirault (15)</i>	

15:00 Break – Atrium

MONDAY, May 22, 2023 (Continued)

Ballroom		Room 406	
Disease Monitoring <i>Moderator: James Koltes</i>		Data Modeling <i>Moderator: Isabella Condotta</i>	
15:30	Modeling long-distance airborne transmission of highly pathogenic avian influenza carried by dust particles <i>Xuan Dung Nguyen</i>	15:30	Impact of parity and days in milk on fetch cow status in automated milking systems <i>Abby Mccalmon</i>
15:45	A reliable and efficient deep learning model integrating convolutional neural network and transformer structure for fine-grained classification of chicken Eimeria species <i>Pengguang He</i>	15:45	Improving dairy herd performance with data integration: A guide to continuously monitor feed efficiency, income over feed cost, and other key metrics <i>Tadeu de Silva</i>
16:00	24/7 Monitoring of respiratory illness in pig farms using artificial intelligence and edge computing <i>Saba Samiei</i>	16:00	Cloud computing to automate phenotype collection and data analyses in dairy systems <i>Rafael Ferreira</i>
16:15	Relationship between respiratory health status (ReHS) and PCR Ct values from testing oral fluids and air samples following multiple respiratory disease challenges <i>Dale Polson</i>	16:15	Measuring, modeling, and managing a dairy farm's dynamic responses using the internet of things (IoT) <i>Bharath Sudarsan</i>
16:30	Danish Entry 3.0: AI enabled biosecurity system for enhanced protection <i>Felipe Picchi</i>	16:30	Construction of intelligent service platform of livestock house facility environment based on internet of things <i>Mulin Liu</i>
16:45	Application of convolution neural networks in the detection and quantification of tick burdens on cattle <i>Fhulufhelo Mudau</i>	16:45	Progress report on the Coordinated Innovation Network for Advancing Computer Vision in precision livestock farming <i>Juan Steibel</i>
17:00	Management changes when using indwelling rumen temperature monitoring technology in dairy calves <i>Jason Hartschuh</i>	17:00	Computer vision on the edge: A computing framework for high-throughput phenotyping in livestock operations <i>Tiago Bresolin</i>
17:15	In-line detection of clinical mastitis by identifying clots in milk using images and a neural network approach <i>Glenn Van Steenkiste</i>	17:15	Field implementation of forecasting models for predicting nursery mortality in one Midwestern US swine production system <i>Edison Magelhaes</i>
17:30	The use of a light scattering-based sensor in precision dairy farming (PDF) <i>Satish Despande</i>		
18:00	Reception and Poster Viewing <i>Atrium & Hallway</i> (poster presenters at their posters)		
19:00	Dinner on your own in Knoxville		

TUESDAY, May 23, 2023

07:00 Breakfast - Dining Room 404	
Ballroom	Room 406
08:00 Keynote Lecture: Challenges in bringing PLF from research to commercial field use <i>Dries Berckmans</i>	No sessions
Weight and Dimensions Moderator: <i>Joao Costa</i>	PLF Systems Moderator: <i>Maria Cambra-Lopez</i>
08:45 Estimating backfat depth, loin depth, and intramuscular fat percentage from ultrasound images in commercial swine <i>Zack Peppmeier</i>	08:45 Precision feeding technologies require multidisciplinary precision nutrition tools to boost efficiency in monogastric animals <i>Maria Cambra-Lopez</i>
09:00 Deep learning model to predict finishing pig weight using point clouds <i>Shiva Paudel</i>	09:00 Calf welfare monitored using physiologically based PLF technology during different sampling techniques of the respiratory tract <i>Florian Debruyne</i>
09:15 Late-finishing pig body weight estimation using extrapolation from side surface point clouds <i>Ryan Jeon</i>	09:15 Estimating in-control time for optimizing forage sampling practices <i>Jorge Barrientos Blanco</i>
09:30 Hind leg angle and step length measured by 3-D imaging account for variance of locomotion score and growth performance of cattle in slatted feeding facilities <i>Joshua McCann</i>	09:30 Development of a methodology for the standardized economic assess-ment of SoundTalks for detection and response to a detectable respiratory disease outbreak in swine <i>Dale Polson</i>
09:45 Implications for daily body weight data on beef cattle grazing extensive rangelands <i>Jameson Brennan</i>	09:45 Integration of a real-time wastewater pond leak detection with precision livestock systems <i>Bryan Woodbury</i>
10:00 Break – Atrium	

TUESDAY, May 23, 2023 (Continued)

Ballroom	Room 406
Broiler Welfare & Applications Moderator: <i>Lilong Chai</i>	Heat Stress Moderator: <i>Tami Brown-Brandl</i>
10:30 Continuous monitoring of broiler welfare through audio analytics <i>Tom Darbonne</i>	10:30 Development of a thermoregulatory model for predicting cow physiological responses under high temperature conditions <i>Andre Aarnink</i>
10:45 Estimating the feeding time of individual broilers via convolutional neural network and image processing <i>Amin Nasiri</i>	10:45 Evaluating the effects of a voluntary soaking system on the behavior, physiology, and production of dairy cows milked in voluntary milking systems <i>Gustavo Mazon</i>
11:00 Predicting the effect of environmental enrichment (music and light) in leg disorders on broiler chicken <i>Irenilza Naas</i>	11:00 Using image analysis and Fast Fourier Transform to predict respiration rate in unrestrained dairy cows <i>Raphael Mantovani</i>
11:15 Broiler mobility assessment via a semi-supervised deep learning model and Neo-DeepSort algorithm <i>Mustafa Jaihuni</i>	11:15 Effects of a sprinkler and cool cell combined system on cooling water usage, bird performance, and indoor environment of broiler houses <i>Jonathan Moon</i>
11:30 Characterizing Spatiotemporal and Three-dimensional Locomotive Behaviors of Individual Broilers in the Three-point Gait Scoring System <i>Guoming Li</i>	11:30 Towards an automated method to monitor respiration rate for group-housed pigs by contactless video analysis <i>Meiqing Wang</i>
	11:45 Design of precise air supply system based on convection heat dissipation of pig body <i>Cao Xiaojie</i>
12:00 Lunch – Dining Room 404	Student & Young Professionals Mentoring Lunch – Dining Room 403 <i>Pre-registration required; Student and mentor seating is assigned</i> Ends at 13:30

TUESDAY, May 23, 2023 (Continued)

Ballroom	Room 406
<p>Beef Cattle Applications Moderator: <i>Morgan Hayes</i></p>	<p>Identification Moderator: <i>Juan Steibel</i></p>
<p>13:30 Training and adaptation of beef calves to precision supplementation technology for individual supplementation in grazing systems <i>Luke Jacobs</i></p>	<p>13:30 Joint multi-attention cascaded LSTM model for pig face expression recognition <i>Changji Wen</i></p>
<p>13:45 Non-invasive assessment of heat stress in cattle based on thermal signature <i>Alex Vinicius da Silva Rodrigues</i></p>	<p>13:45 Self-supervised domain adaptation in crowd counting <i>Pha Nguyen</i></p>
<p>14:00 Resource use and proximity technology in extensive systems - getting useful information on livestock at lower costs? <i>Tony Waterhouse</i></p>	<p>14:00 Identification of cattle facial features via deep learning <i>Anna Chlingaryan</i></p>
<p>14:15 Use of feed and water precision measurement in beef cattle under heat stress in a tropical environment <i>Luciane Martello</i></p>	<p>14:15 I-PICS: Illinois pig identification through computer vision system <i>Isabella C.F.S. Condotta</i></p>
<p>14:30 Pen-side diagnostics for bovine respiratory disease <i>Mohit Verma</i></p>	<p>14:30 Identifying dairy cows using body surface keypoints through supervised machine learning <i>Guilherme Menezes</i></p>
<p>14:45 Monitoring beef cattle resilience through a measure of growth variability <i>Faysal Mehedi Hasan</i></p>	<p>14:45 Computer vision system for identification of Holstein cattle during growth and across different physiological stages <i>Ariana Negreiro.</i></p>
<p>15:00 Precision beef dry matter intake estimation on extensive rangelands <i>Hector Menendez</i></p>	<p>15:00 PigLife: An open-source image and video dataset for pig identification and behavior for benchmarking computer vision and learning model applications <i>Angela Green-Miller</i></p>
<p>15:15 Break – Atrium</p>	
<p>Industry Panel Discussion Moderator: <i>Daniel Berckmans</i></p>	
<p>15:45 <i>Meredith Harrison, Lynne Parker, Dale Polson</i></p>	
<p>Producer Panel Discussion Moderator: <i>Robert Burns</i></p>	
<p>17:00 <i>Walter Aschoff, Brandon Conley, William Herring, John Stinn, Craig Uden</i></p>	
<p>18:15 Reception with entertainment by UT School of Music Ensemble Meet with vendors - Atrium</p>	
<p>19:15 Group dinner – Dining Room 404 (ends at 20:45) <i>Executive Chef Greg Eisele</i></p>	

WEDNESDAY, May 24, 2023

07:00 Breakfast - Dining Room 404	
Ballroom	Room 406
Ventilation, IAQ, and Emissions Moderator: <i>André Aarnink</i>	Wearables and Behavior Moderator: <i>Daniel Morris</i>
08:00 PLF air quality abatement systems to improve animal welfare in piggeries: A case study <i>Cecilia Conti</i>	08:00 Robust animal activity recognition using wearable sensors: A correlation distillation-based information recovery method toward data having low sampling rates <i>Axiu Mao</i>
08:15 Simulation of air internal circulation dehumidification system for livestock house in northern cold region based on machine learning <i>Ping Zheng</i>	08:15 Automated recording of waiting time in front of AMS and the effect of dominance in dairy cows on waiting time <i>Gerben Hofstra</i>
08:30 Model development and validation for estimating methane and ammonia emissions from fattening pig houses: Effect of manure management system <i>Paria Sefeedpari</i>	08:30 Development of a design for a real time internal pulse and respiration monitoring device for sows <i>Samantha Neeno</i>
08:45 Integrated solutions to reduce gaseous emissions from pig production <i>Andre Aarnink</i>	08:45 Real-time individualized animal welfare monitoring using physiological data from wearables <i>Daniel Berckmans</i>
09:00 A long short-term memory-based prediction model for gas concentrations and thermal environment conditions in a closed pig building <i>Qiuju Xie</i>	09:00 The relationship between dairy calf personality traits and precision technology-based measures of feeding behavior, activity, and production: a narrative review <i>Megan Woodrum Setser</i>
09:15 Spatial and temporal analysis of air speeds in equine indoor arenas <i>Staci McGill</i>	09:15 Could wearable sensor data be helpful in identifying more feed efficient dairy cattle? <i>JE Koltes</i>
09:30 Break – Atrium	

WEDNESDAY, May 24, 2023 (continued)

Ballroom	Room 406
Applications & Sensors - Swine Moderator: <i>Brett Ramirez</i>	Applications for Laying Hens Moderator: <i>Eileen Fabian Wheeler</i>
10:00 Developing a sow estrus detection system using computer vision and deep learning <i>Jianfeng Zhou</i>	10:00 Numerical modeling of ventilation options of cage-free hen housing for precision environment management <i>Eileen Fabian Wheeler</i>
10:15 Using sound location to monitor farrowing in sows <i>Lenny van Erp-van der Kooij</i>	10:15 Monitoring cage-free laying hens on litter floor with machine vision <i>Xiao Yang</i>
10:30 Can nonlinear heart rate variability analysis be used to characterize the sow social hierarchy within group-housed gestation systems? <i>Christopher Byrd</i>	10:30 Spatial behavior monitoring system based on radio frequency identification for laying hen in large cage aviary unit system <i>Peng Yin</i>
10:45 Digital imaging techniques to assess welfare at a cull sow harvest facility <i>William Taylor</i>	10:45 The search for positive welfare indicators – Precision Poultry Farming tracking activity in pullets <i>Inga Tiemann</i>
11:00 Real-time implementation of computer vision based farrowing prediction in pens with a possibility of temporary sow confinement <i>Maciej Oczak</i>	11:00 Monitoring mislaying behaviors of hens with deep learning models <i>Ramesh B Bist</i>
11:15 Significance of having a large sound dataset for pig cough classification <i>Sreenivasa Upadhyaya</i>	11:15 Floor egg detection with machine vision in cage-free houses <i>Sachin Subedi</i>
11:30 Feasibility of a UHF RFID system to identify nursery pigs moving through a hallway <i>Rachel Hodges</i>	11:30 Eggshell Biometrics for individual egg identification based on convolutional neural networks <i>Zhonghao Chen</i>
11:45 Break – Atrium	
Closing Session Moderator: <i>Robert Burns</i>	
12:00 Key takeaways from the conference; Student award presentations; the next USPLF Conference	
12:30 Break – Registered FIELD TOUR PARTICIPANTS PICKUP “TO GO” LUNCHES	
12:45 Field Tour: (pre-registration required) Johnson Research and Teaching Unit & Little River animal and Environmental Unit Buses load on Locust Street at 12:45 and depart at 13:00. Buses return by 17:30	
Any-Time Field Tour	Virtual tour of Middle Tennessee Research and Education Center Access the tour by QR code or this link: https://tiny.utk.edu/MTREC-tour

