AUautomatic (AU1), Aarhus University

Research topics:	The research farm currently houses 210 dairy cows, heifers and calves. 70 cows are Danish Jersey and 140 cows are Holstein with an average milk production per year of 11.300 kg ECM. The cows are kept in loose housing with cubicles for both lactating and dry cows. The last three weeks before expected calving dry cows are kept on deep straw bedding. The barn has state-of-the art equipment for automatic recording of feed intake, behaviour (eating, lying, standing, walking, rumination, visit to robots, visit to specific feeders) in combination with milk samples, cow weight and methane in the robot at every milking for groups of cows (approximately 60 cows/group). Automatically recorded data together with manual recorded data from any treatment, lameness score, body condition score, analysis of milk content and feed is updated in a daily database. Cows can be fixated for sampling blood, saliva etc. The installation has been used for a variety of projects on the effects of nutrition, management and housing on production, efficiency, animal welfare and milk quality. Due to the many different measures, the installation is obvious for phenotyping of cows and development within the area of precision livestock farming. Website: http://kfc-foulum.dk/sider/english.html **Henriksen,** J.C.S, Munksgaard, L & M.R. Weisbjerg. 2018, Short-term responses in production and behavior during periods of change in the concentrate allowance for dairy cows. Accepted J.dairy sci. **Gaillard**,C. Sørensen, M.T. Vestergaard,M , Weisbjerg, M.R., Basar, A., Larsen, M.K., Martinussen, H. Kidmose, U. & J. Sehested. 2017. Effect of substituting soybean meal and canola cake with dried distillers grains with solubles at 2 dietary crude protein levels on feed intake, milk production, and milk quality in dairy cows. J. Dairy Sci. 100:8928–8938 **Hellwing**, A.L.F., Messerschmidt, U., Larsen,M. & M. R. Weisbjerg. 2017. Effects of feeding sugar beets, ensiled with or without an additive, on the performance of dairy cows. Livestock Science 206:37-44. **Campler**, M. , Munksgaard, L. & Jensen, M.B. 2015. The effect of housing on calving behavior and calf vitality in Holstein and Jersey dairy cows. J. Dairy Sci. 98(3):1797-804
Activities and services currently offered by the infrastructure/installation:	Skilled technicians work together with the barn staff to collect and validate data to secure data quality. Scientists have at least weekly meetings with the barn staff. The users are supported in writing a protocol based on their ideas, experimental objectives and the practical possibilities. The technicians are responsible for the follow of that protocol during the experiment, and they also support the integration of the collected data into the type of file/database defined together with the user, Special agreement can be made with the animal keepers and the technicians regarding sampling, feeding, management etc.

	Information Technology educated staff is responsible for maintaining the database, and produces datasets to an accessible website in any form the user want, and SmartCow data can therefore be provided in a form that allow their integration into the cloud-based database (WP3 NA3). Data are presented in nearly real time (normally daily updates) on project related webpages. The Department of Animal Science has an animal welfare committee, which support users in fulfilling the law on the use of experimental animals. Currently, a number of companies have installed equipment and collaboration with both SME's and larger companies and the Industry have been on-going for many years at AU1 and AU2.
Description of the access to be provided under SmartCow TNA calls:	The unit of access for each installation is defined as **one cow week**. One typical access for a project consists in 480 units, which is equal to all cows in a group for 2 month. One typical access covers the preparatory work, access to the installation and data recorded for a pre-planned period. More specifically, it includes the discussion of research plans and protocols with users, and introduction to the facilities and database including preparation of a specific "webpage" for each project, where there will be access to the data updated daily and eventually graphic presentation of results for easy following. The access includes supplying animals, animal housing, preparation, feeding and daily care as well as delivering data to the specific "webpage".
Animal types, diets, housing and experimental conditions that can be worked on in this infrastructure/installation:	Studies can be performed in loose housing with cubicles for both lactating and dry cows with equipment for automatic recording of feed intake, behavior(eating, lying, standing, rumination, visit to robots, visit to specific feeders) in combination with milk samples, cow weight and methane in the robot at every milking for groups of cows (approximately 60 cows/group). Automatically recorded data together with manual recorded data from any treatment, lameness score, body condition score, analysis of milk content and feed is updated daily in a database. Cows can be fixated for sampling blood, saliva etc. There are currently two groups Holstein-Frisian and one group of Jersey cows kept in loose housing with cubicles and each group with access to a Delaval robot. Each group consists of approximately 60 cows. Diets will consist of concentrate in the robot and a PMR at the feeders. Composition of the diet can vary from experiment to experiment. Cows can be feed individually from Insentec RIC feeders. Feed intake and eating behavior can be delivered as well as visits to the robot, milk yield and composition of the milk.
Travel and subsistence costs:	
Infrastructure/installation ethical rules:	According to Danish Law, all experiments involving animals, where the severity of the involved procedures are considered more severe than an injection, are evaluated ethically by the National Authority (https://www.foedevarestyrelsen.dk/Dyr/dyrevelfaerd/Dyreforsoegstilsynet/Sider/Ansoegning-og-indberetning.aspx), and licences issued. All persons – researchers, students, barn staff – who take part in the collection of samples from studies under license must have taken part in a course in Animal Experimentation, corresponding to 2.5 ECTS credits, and accredited by FELASA and the Danish authorities. At the Institute of Animal Science ; Aarhus university, the head of the local Animal Welfare body Mette S. Herskin (email mettes.herskin@anis.au.dk) can be contacted.