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Newsletter BioBusiness

WHEN BIOLOGY MEETS TECHNOLOGY

http://www.bio-business.eu/

BioBusiness is a Marie Curie Training Program based upon the collaboration of animal scientists and engineers to create technological solutions through applied research and innovation for the livestock industry.

Joint European Conference on Precision Livestock Farming

This year the BioBusiness Consortium is organizing the **European Conference on Precision Livestock Farming 2013 (EC-PLF 2013) in Leuven from September 10th - 12th.** This conference combines:

- The 6th European Conference on Precision Livestock Farming (EC-PLF)
- EU BioBusiness Project – Final workshop
- EU-PLF Project – First workshop
- All-Smart-Pigs Project - First workshop

The conference will focus on how to use technology for continuous automated monitoring of livestock to improve animal health, welfare, performance and environmental impact.

More than **100 papers** were received and are currently in the review process. Each paper will be reviewed by 3 reviewers from a team of **76 independent international reviewers**.

For more information, please visit **http://www.ecplf2013-leuven.eu/**

Provincial House, Leuven conference location

Grote Markt Leuven landmark

KU Leuven Library Leuven landmark

CONSORTIUM

ANIMAL SCIENCES GROUP WAGENINGEN UR | KU LEUVEN | RVC Royal Veterinary College University of London | Fancom | Agricultural Research Organization (ARO) Israel | DeLaval | PETERSIME | anses

EVENTS WITH BIOBISINESS CONTRIBUTION IN 2013

ICANN Meetings
24th - 25th January, 2013, Amsterdam - Netherlands
http://meetings.icann.org/

Maciej Oczak (1st Author)	Classification of aggressive behavior of pigs by multilayer feed forward neural network

Les Journées de la Recherche Avicole.
26th - 28th March, 2013, La Rochelle - France
http://www.journees-de-la-recherche.org/

Hakim Bergoug	Effet de la durée du transport des poussins d'un jour sur les performances des poulets de chair

XVIth International Congress on Animal Hygiene
5th - 9th May, 2013, Nanjing - China.
http://isah2013.njau.edu.cn/

Gunel Ismayilova	Can Aggressive behaviour among piglets be stopped by a sound signal and reward treatment?
Qin Tong	The relationship between physiological status and the hatching time in the newly hatched broiler chicks.

47tn Congress of the International Society for Applied Ethology.
2nd - 6th June, 2013, Florianopolis - Brazil.
http://isae2013.ufsc.br/

Anna Johansson	Assessment of human-animal relationship in broilers with automatic recording of activity
Lilia Sonoda	Reducing aggressive behaviour in young piglets by cognitive environmental enrichment

Joint ADSA-ASAS Annual Meeting
8th - 12th July, 2013, Indianapolis - USA
http://jtmtg.org/2013/

Tom Van Hertem	Automatic lameness detection by computer vision and behavior and performance sensing

ASABE Annual International Meeting
21st - 24th July, 2013, Kansas City- USA.
http://www.asabemeetings.org/

Carlos Eduardo Bites Romanini	Computer vision attempts to the improvement of an automated lameness detection system for dairy cows
Stefano Viazzi	Using a 3D camera to evaluate the back posture of dairy cow

International Conference on Lameness in Ruminants
11th - 14th August, 2013, Bristol - England.
http://www.bristol.ac.uk/vetscience/lamenessconf/

Andrés Schlageter-Tello	Within and between observer agreement for specific levels in a five levels locomotion score.

XVIIItn Congress of the World Veterinary Poultry Association
19th – 23rd August, 2013, Nantes - France.
http://www.wvpac2013.org/

Hakim Bergoug	Effect of hatch time and chick quality on growth performances, welfare and mortality of broilers during rearing period

64tn Annual Meeting of the European Federation of Animal Science
26nd – 30rd August, 2013, Nantes - France.
http://www.eaap2013.org/

Lilia Sonoda	Reducing aggressive behaviour by an cognitive enrichment tool for young piglets

European conference on Precision Livestock Farming
10th - 12th September, 2013, Leuven - Belgium
http://www.ecplf2013-leuven.eu/

Carlos Eduardo Bites Romanini	Hatching detection and its thermodynamics by monitoring the eggshell
Maciej Oczak	Classification of aggressive behavior of pigs by activity index and multilayer feed forward neural network
Gunel Ismayilova	Acoustic reward learning as a method to reduce the incidence of aggressive and abnormal behaviours among newly mixed piglets
Andrés Schlageter-Tello	Gold standards concepts for automatic lameness assessment systems in dairy cows
Lilia Sonoda	Reducing aggressive behaviour by an electronic feeding system used as environmental enrichment tool for young piglets
Tom Van Hertem	Automatic lameness detection based on consecutive 3D-video recordings
Stefano Viazzi	Automatic back posture evaluation in dairy cow by using a 3D camera

BioBusiness YearBook – "Chicken Group"

Monica's Chinese name is Qin Tong and she was born in beautiful city of Wuhan in the central of China in 1983. Monica obtained a Masters in Molecular Biology and Breeding in 2009 from Huazhong Agricultural University. In 2010, Monica moved to the United Kingdom to begin the BioBusiness Project at RVC where she unravels the complexities of embryogenesis as the broiler embryo expert on the project. Monica adds natural components currently absent in artificial incubation and measures the impact on the embryos' developmental process and the hatch window. "BioBusiness was a great opportunity for me", says Monica, "not only to live abroad and continue my studies in biology, but also to impact the lives of animals on such a large scale".

Hakim was born in 1982 in Blida, The City of Roses, situated between the mountains of Atlas and the Mediterranean Sea in Algeria. Hakim is a natural born scientist and contemplator of life's bigger questions. In addition to Arabic and French, Hakim learned Spanish to study and obtain his Masters in Animal Production at the Mediterranean Agronomic Institute of Zaragoza in 2009. Hakim examines how different egg incubation conditions impact broilers throughout their lives. In each trial at Anses, Hakim incubates nearly twenty thousand broiler eggs, rears the birds until market weight, tracks specific birds and randomly samples individuals on age-related measurements. The rest of the chicken group often wonders how he manages to organize the massive data set that comes with his research. On his experience so far, Hakim responds: "BioBusiness is the best opportunity to work in a multidisciplinary group joining animal science with engineering. It has also provided a cultural exchange with my colleagues from five continents".

Eduardo is our group's bubbly Brazilian, born in the countryside state of Sao Paulo in 1982. He holds a Masters in Agricultural Engineering from University of Campinas and was involved in broiler egg incubation research in Brazilian hatcheries. Eduardo was the first fellow to join the project - good natured and creative, he was the perfect fellow to welcome, orientate and settle the rest of the project's fellows. Eduardo works within the M3-BIORES lab at KU Leuven where he offers input into the group's experimental designs and calculates algorithms and models from the data sets. Eduardo's breakthrough piece was discovering a simple way of measuring chick hatch time via distinct drops in egg shell temperature and the thermodynamics behind the hatching process. Eduardo says: "I saw BioBusiness as an interesting life experience for me and a must for a future career in R&D. I have also enjoyed travelling to many beautiful places in Europe".

Nancy was born in Belleville, Canada in 1982 and spent her childhood romping around the forests of Ontario. Her compassion and curiosity for animals was evident from an early age. Nancy obtained a Bachelor of Science Honours from Queen's University in 2006 and a Masters of Poultry Science in Animal Behaviour and Welfare from the University of Guelph in 2010. Nancy represents Petersime NV on the project and brings a diverse set of skills to the group in experimental design, project management, business planning and balancing the needs of all stakeholders. She is a natural leader with a knack for effective and creative communication. "BioBusiness was a unique opportunity for me to gain experience with a leading global supplier of hatchery equipment and to broaden my perspective through international collaboration. Belgium has been a great home the last few years and I will miss it dearly when the project is complete."

Anna was born in the small town of Enköping, Sweden and spent most of her childhood on horseback or in the stable. In 2003, Anna began her studies in animal science at the Swedish University of Agricultural Sciences and completed her Bachelor's degree in 2007 and Masters in 2011. During her studies she specialized in poultry production: spanning the production chain from hatchery to grocery store product. Before beginning her PhD, Anna worked for the largest poultry meat producer in Sweden as the on-farm production advisor to farmers. Anna's PhD uses the poultry Welfare Quality protocol to develop automatic measuring techniques to assess welfare in broilers. She focuses on video recording and image analysis. Anna joined BioBusiness to collaborate and compliment her PhD project.

Research Progress and Product Development

Automatic Lameness Detection in Dairy Cows

The aim of the cow group is to develop a prototype that can detect lameness in a fully automatic way by means of computer vision techniques. The system measures the back posture of walking cows as an indicator of lameness by extracting different geometric parameters of the cow's back. After having extensively tested the proof of concept in a commercial farm in Israel, the group is now building the first prototype in order to validate the automatic lameness detection system. The new setup is located in the north of Flanders on a farm with more than 200 cows and a rotary milking parlour. The idea of this new stage is to have the system integrated with the management system of the farm to automatically identify and score the cow as they pass after milking. The system will provide a report of the lame cow after scoring the cows twice a day. This report will be compared to the visual locomotion score of the expert to validate the results. Moreover the reports will also be analysed by the farmer to have the feedback from the end user in order to improve the final system.

Automatic Monitoring of Pig Aggression

The objectives of the pig group were (1) to better understand causes and pattern of execution of violent aggressive behaviour of weaned pigs, particularly after mixing, (2) to develop algorithms which describe such behaviours and which can be automatically recognised via video observations, (3) to design and test an intervention method by which violent actions among pigs can be stopped or at least reduced and (4) to develop a product which can be used on commercial farms to mitigate violent aggression among pigs. The pig group has finished the field experiments and developed a first product to reduce the level of aggression among mixed pigs using the intelligence of the animals. With the developed algorithms 78 % of aggressive interactions between two pigs could be identified by video observation. Presently the fellows are working hard to improve the accuracy of the algorithms which form the heart of the monitoring tool. In current experiments an innovative approach is being tested to verify whether 3D cameras can be included in the final product to improve early detection of aggressive interactions.

Improving Conditions for Incubating Eggs

The chicken group is heading into the last leg of the project. Most of the data has been analysed and transferred between RVC, Anses and KU Leuven with a final secondment period scheduled this summer to integrate the findings. This spring, the group is digging deeper to discover the biological reasoning behind some of their results. For instance, after applying a light treatment with the aim to stimulate the hatching process and shorten the hatch window, Monica is analysing light-related hatching hormone concentrations. The last days of incubation are also critical for proper gut development. After applying different hatching programs at Anses, Hakim is analysing the gut health of grown birds from the two treatment groups. At KU Leuven, Eduardo previously found that a drop in eggshell temperature correlated well with the chick's hatch time. He is currently looking into the thermodynamic properties behind these results. Nancy continues to coordinate and organize the group's activities. They complete individual and group deadlines through strict task record keeping and a good dose of humour.

Role of Fellows in Each Product Group

Automatic Lameness Detection in Dairy Cows

Tom Van Hertem
Image pre-processing & modelling behaviour for lameness detection

Daniel Rozen
Project management & product development

Andrés Schlageter Tello
Selection of golden standard, scoring and labelling

Automatic Monitoring of Pig Aggression

Gunel Ismayilova
Labelling

Lilia Sonoda
Field experiments & on-farm observations

Maciej Oczak
Product development

Improving Conditions for Incubating Eggs

Qin Tong
Improvement of incubation conditions & monitoring embryonic development

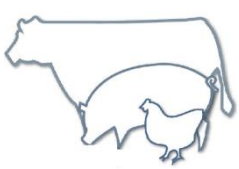
Nancy Roulston
Chick welfare, project management & product development

Hakim Bergoug
Assessing whether incubation profiles have lasting effect during rearing

Anna Johansson
Determination of welfare indicators at early post-hatch (Collaboration with SLU)

Model and control development

Stefano Viazzi



Carlos Eduardo Bites Romanini