Automatic tracking to inform animal breeding and improve health and welfare

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# The challenge





#### • Identity

• Behaviour

### • Health

- Social interactions
- Resilience



### Breed4Food

Consortium of four major breeding companies and Wageningen University & Research (<u>http://breed4food.com/</u>)

- Cobb-Europe
- CRV
- Hendrix Genetics
- TopigsNorsvin



Research topic: Precision Phenotyping (in all species)





# PhenoLab project

- Automatic recording of individual phenotype in group-housed hens
  - Location
  - Activity
  - Proximity
  - (distance to others)











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### Basic set-up testroom at Carus



# Three different systems

The Observer: `traditional' video recordings for manual behaviour recording

Ethovision: automatic video tracking (indiv/group)

TrackLab: ultra wideband (UWB) tracking of active tags

All three systems linked together, allowing to validate UWB system for automated phenotyping





### Ultra-wideband sensors TrackLab





Sensor detection: time of arrival, angle of arrival







## Ultra-wideband sensors TrackLab

Active tags placed on the birds

Location of each bird is determined twice per sec

- Time of arrival
- Angle of arrival

Each tag contains a 12V battery (3.5 x 3.5 cm; 29 grams, 5 wk battery life)





### Data acquisition in TrackLab

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### Output TrackLab



X,y,z coordinates are transferred to TrackLab 1.3 ® Noldus

# Average speed, distance moved are calculated

# Future: distance between various individuals





# Validation using individual animals

Distance moved: 96% similar (24 tracks)



 Group setting: only UWB allows correct tracking individuals (same data corrections as for individual)





# How we have used it

### Selection lines:

- High Feather Pecking
- Low Feather Pecking
- Control
- High Feather Peckers hyperactive
- Feather peckers more attracted to litter or feathers





# Activity pattern per line (FP selection)



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# Phenotypic differences



# UWB tracking promising tool

- UWB tracking corresponds well to individual video track
- Line differences in activity confirmed
  - High feather line more active + further apart
- Able to detect individual differences within a group
  - Peckers more active than victims

Fixed identity makes that method suits breeding





# Follow-up



PhD student on development of methods for tracking individual animals in groups

- Activity poultry
- Social interactions pigs
- Use of space in dairy cows

PhenoLab

Sensor-based recording of location, activity and proximity in laying hens











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# Thank you!

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