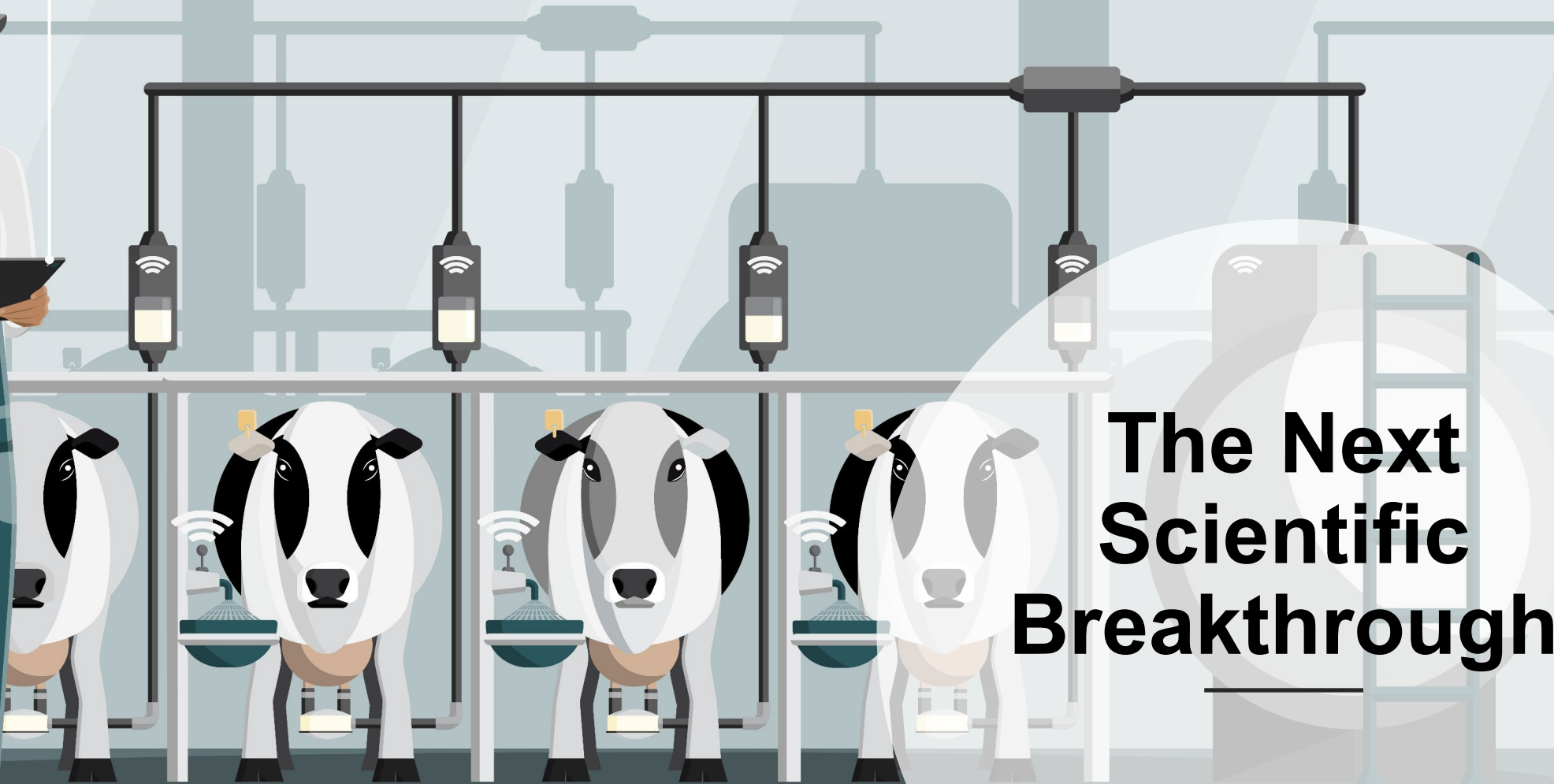


# Artificial Intelligence: The Other Dairy “AI”



AI

Jeffrey Bewley, PhD, PAS  
Analytics and Innovation Scientist  
Holstein USA, Inc.



**The Next  
Scientific  
Breakthrough**

# LIVESTOCK TECH LANDSCAPE 2018

## LIVESTOCK HEALTH

### Fertility / Breeding



### Activity Tracking / Wearable



### Disease Detection / Prevention



### Cattle Herd Management



## LIVESTOCK MANAGEMENT

### Nutrition / Feed



### Barn / Stall / Pasture Tech



## LIVESTOCK OPERATIONS

### Operations Management



### Automation/Robotics

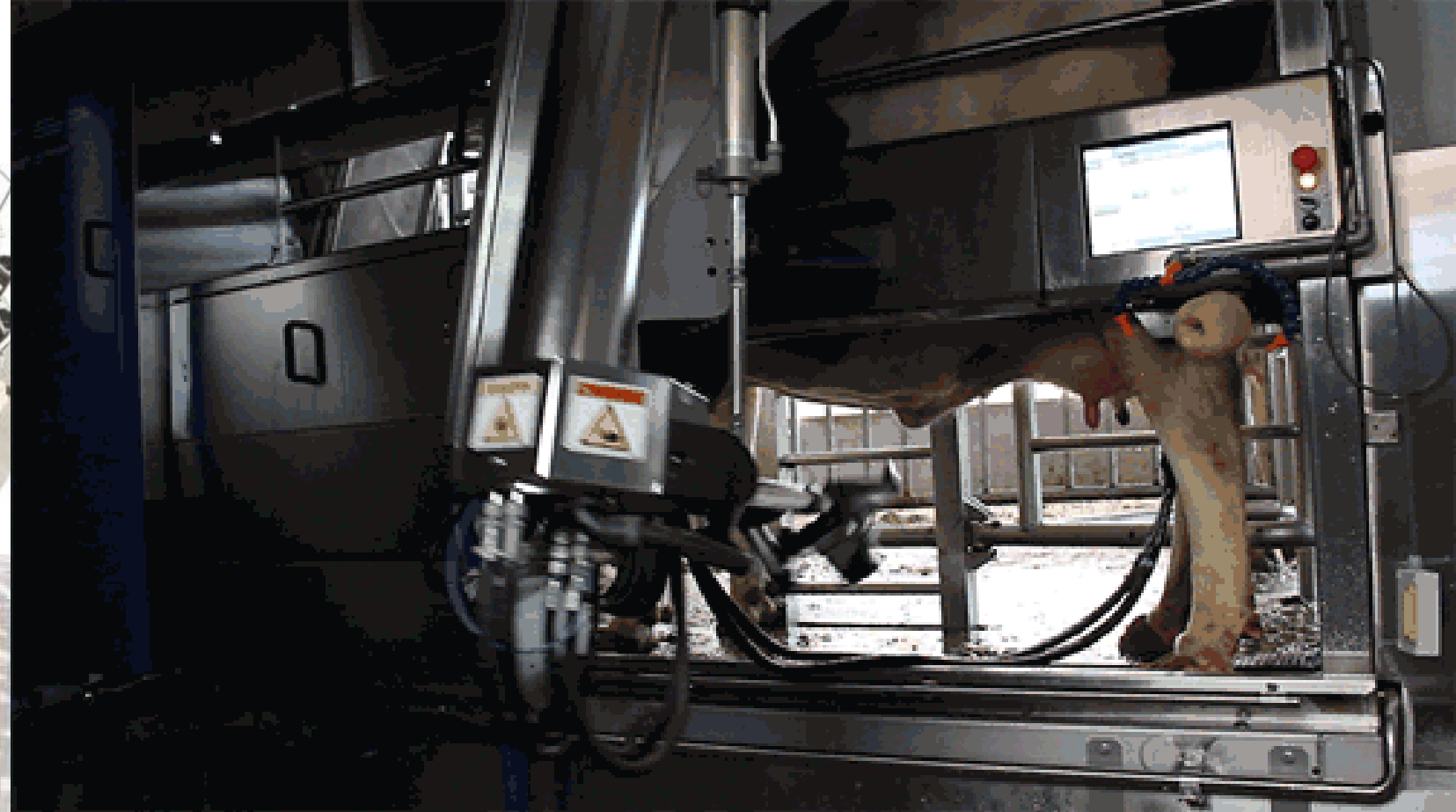
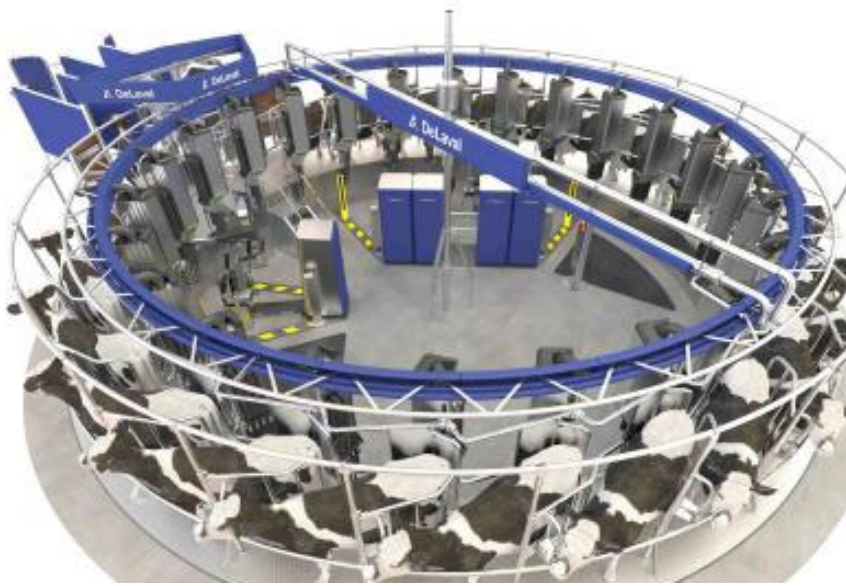


### Livestock Management



### Livestock Trading





# Automated Milking Systems



## Automated Calf Feeding

# Precision Feeding



# Feed Management Software



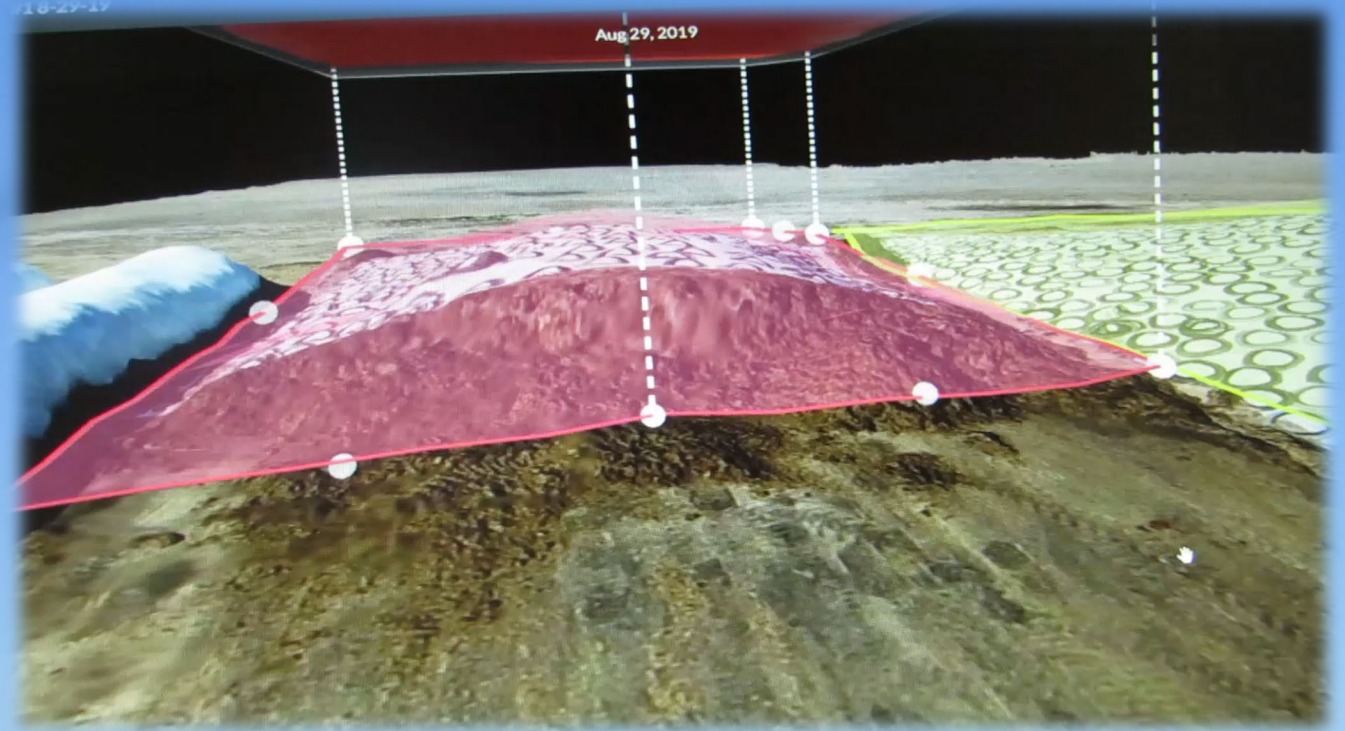


# Real Time Dry Matter Adjustments





# Silage Inventory with Drones





# Imaging for Inventory Control



# Manure Management



**Virtual Reality**





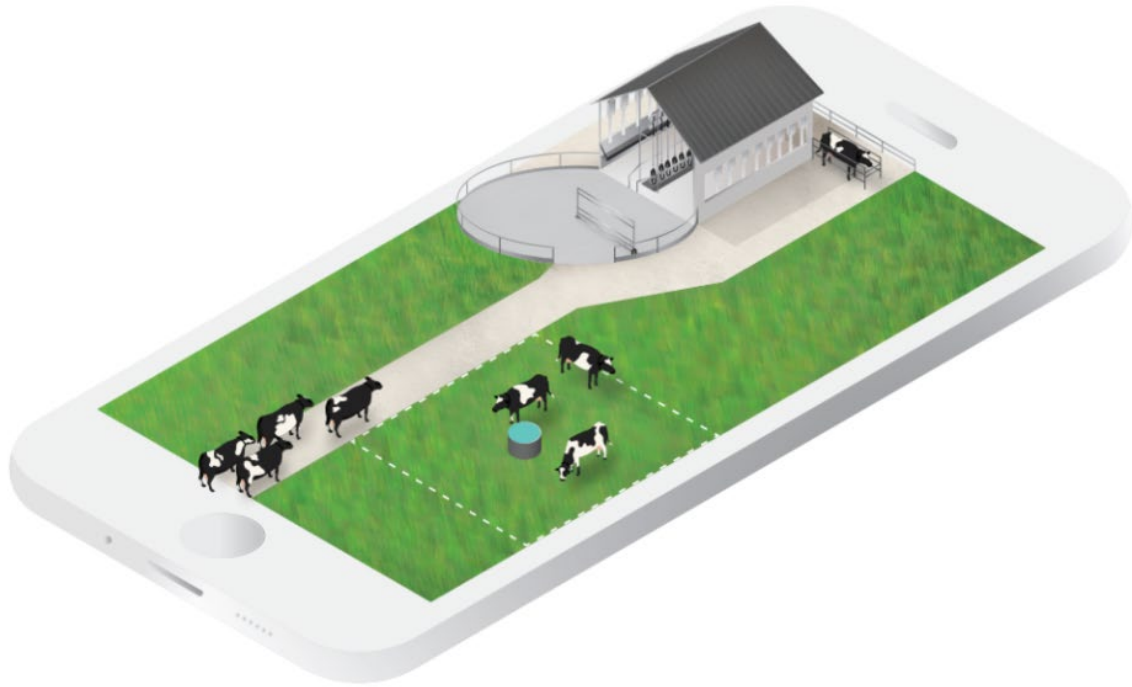
WEARABLE TECH | [LEER EN ESPAÑOL](#)

## A smart shirt for cows helps fight the heat in Japan

A Japanese apparel company designed a shirt for cows to help them beat the summer heat so they keep producing milk.

BY ZOEY CHONG | JUNE 30, 2017 4:47 AM PDT

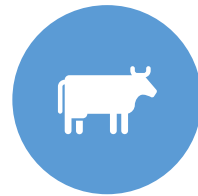
# Virtual Fences



H A L T E R



# Precision Dairy Monitoring



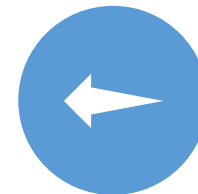
Milk



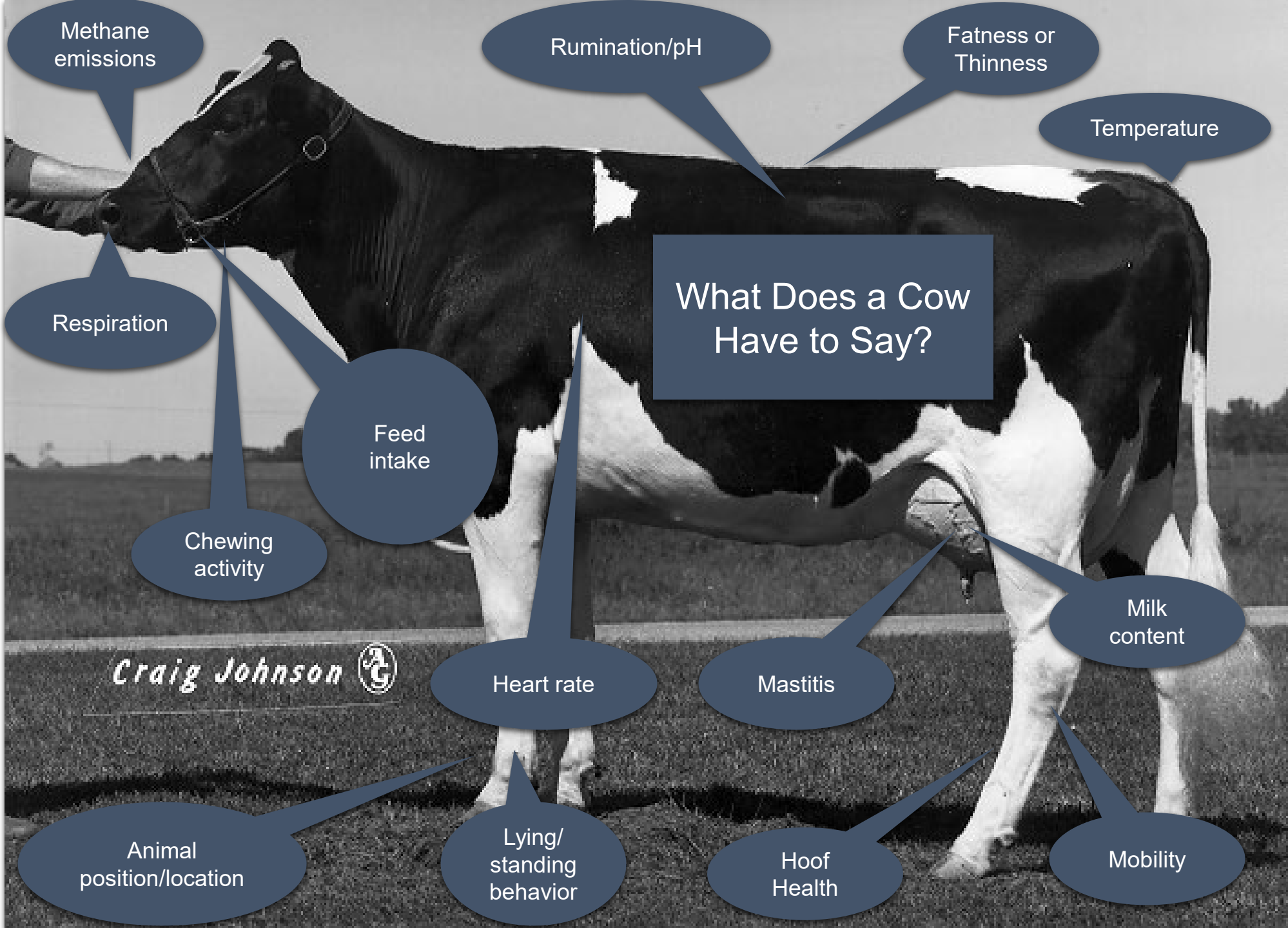
Behavior



Physiology



Conformation



Methane emissions

Rumination/pH

Fatness or Thinness

Temperature

What Does a Cow Have to Say?

Respiration

Feed intake

Chewing activity

Heart rate

Mastitis

Milk content

Animal position/location

Lying/standing behavior

Hoof Health

Mobility

Craig Johnson 

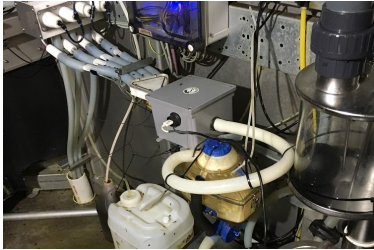




# Precision Dairy Monitoring Applications

- Estrus Detection
- Mastitis Detection
- Fresh Cow Disease Detection
- Lameness Detection
- Calving Detection
- Genetic Traits
- Management Monitoring

# Wearables, Images, and Milk Analyses





Beth Herges

**SMARTBOW**<sup>®</sup>  
YOUR COWS. YOUR BUSINESS.



**Real Time Location Systems**

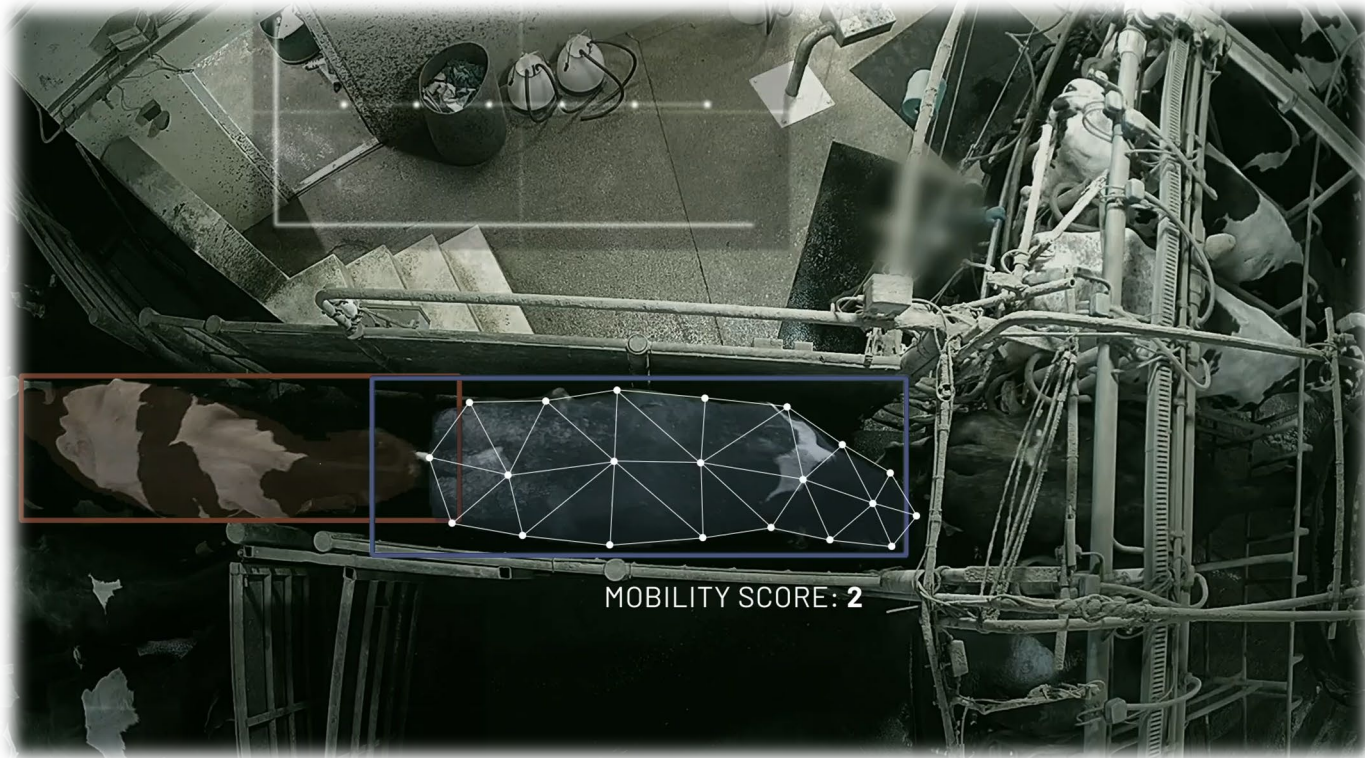
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# Cow Responsive Environments





# Future is Image and Milk Analysis





# SomaDetect







# Bactacam

**Quick test results on milk samples - without leaving the farm!**

Take milk samples, cultivate on your farm and get a result within 24 hours. Using a mobile camera and machine learning Bactacam identifies milk bacteria.

- ✓ A tailor-made and preventive strategy for the animal health on your farm
- ✓ Routines, instructions & templates facilitating an efficient handling of risk animals
- ✓ A comprehensive overall concept



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# Computers and Electronics in Agriculture

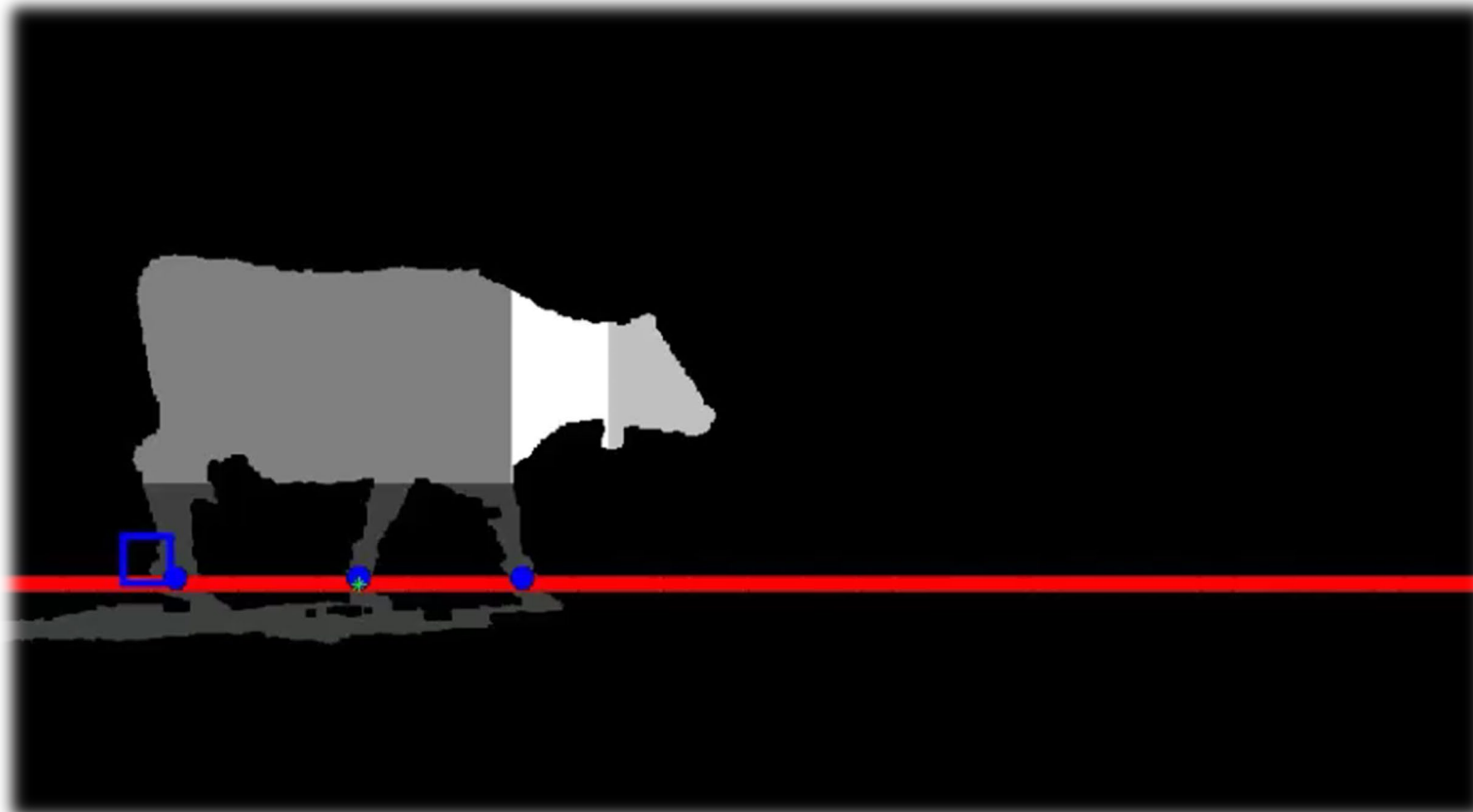
journal homepage: [www.elsevier.com/locate/compag](http://www.elsevier.com/locate/compag)



Original papers

## Automatic lameness detection in dairy cattle based on leg swing analysis with an image processing technique

K. Zhao<sup>a,b</sup>, J.M. Bewley<sup>c</sup>, D. He<sup>a,d,e,\*</sup>, X. Jin<sup>b</sup>





J. Dairy Sci. 99:386–391

<http://dx.doi.org/10.3168/jds.2014-8964>

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## ***Short communication: Measuring feed volume and weight by machine vision***

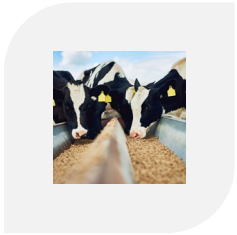
A. N. Shelley,\* D. L. Lau,\* A. E. Stone,† and J. M. Bewley†<sup>1</sup>



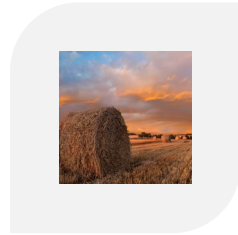
# Video Behavior



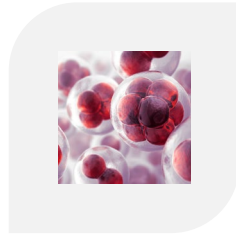
# Better Decisions with AI



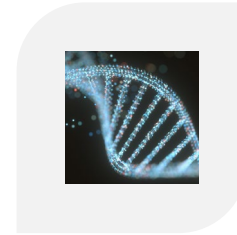
FEEDING



FORAGE  
QUALITY



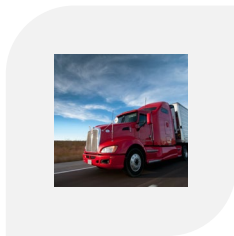
REPRODUCTION



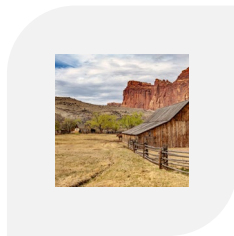
GENETICS



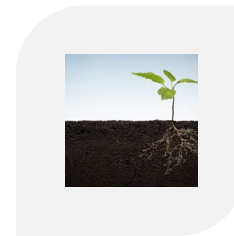
DISEASE  
PREVENTION



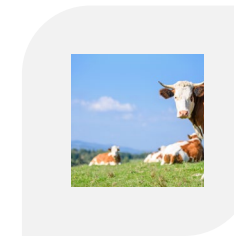
CULLING



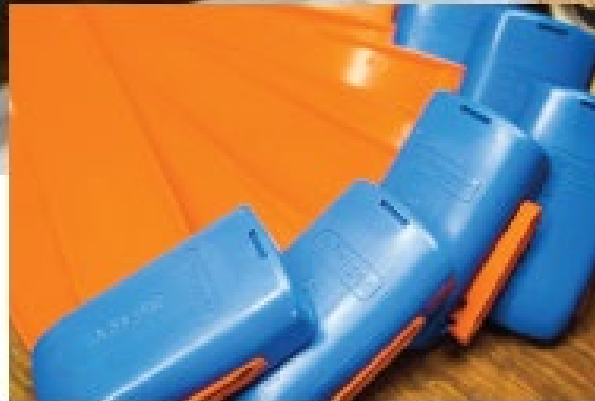
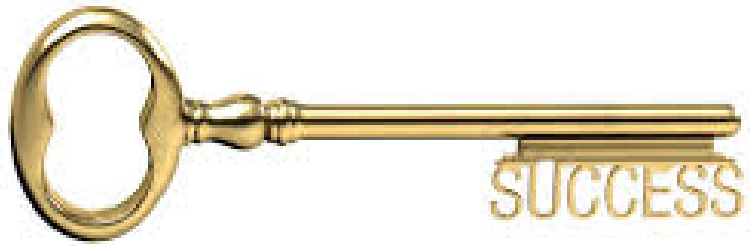
BARN  
CONTROL



NUTRIENT  
MANAGEMENT



ANIMAL  
WELFARE



David Corbin (top) is able to track the health of his dairy herd with RFID trackers on the cow's legs.



**U.S. Registered Holsteins**  
FOR MAXIMUM PROFIT



HOLSTEIN ASSOCIATION USA, INC.



## Traceability

- Animal care
- Animal disease
- Bacteria
- Hormone
- Antibiotics
- Biosecurity

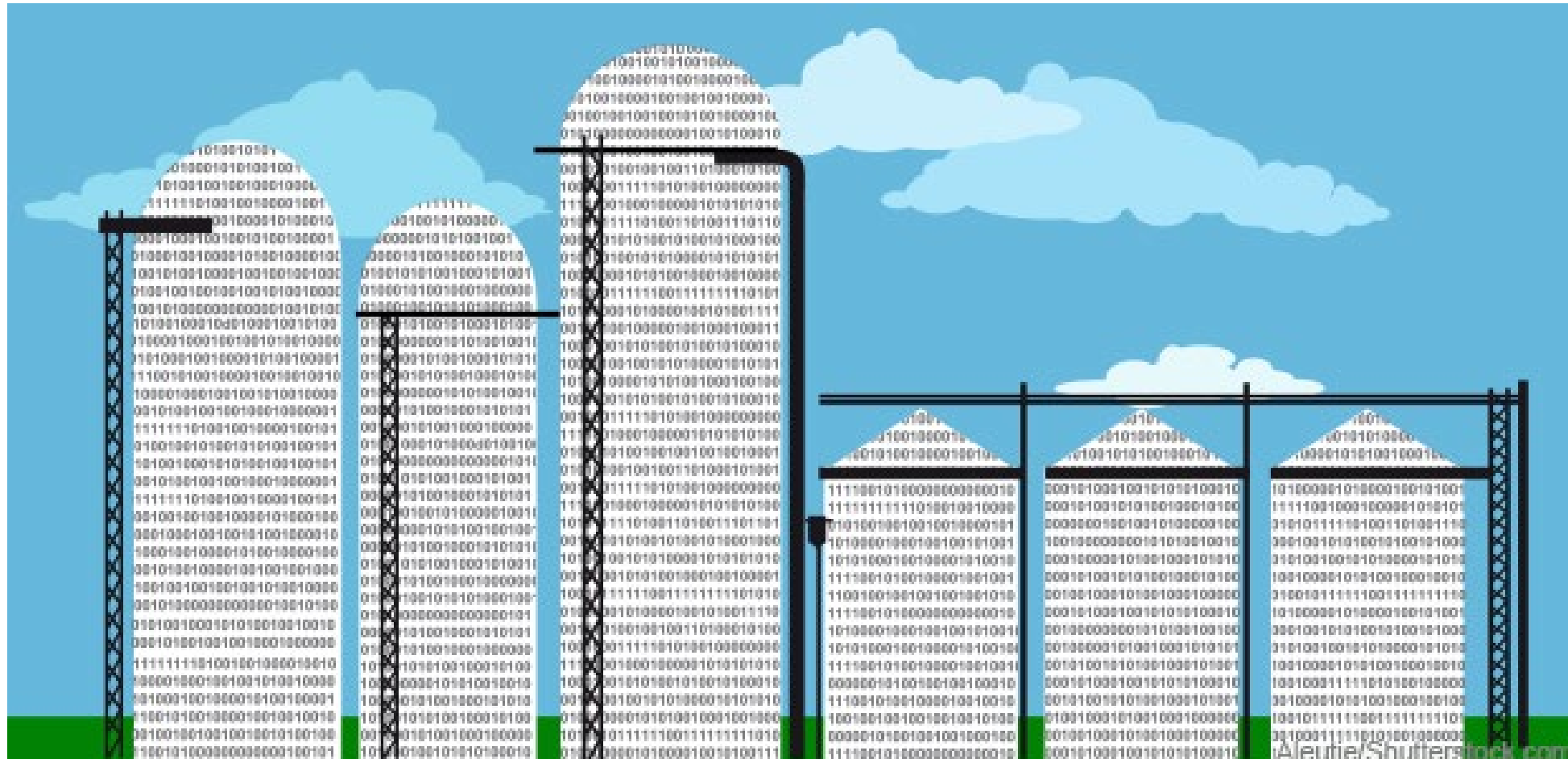


The Missing Link?



WHO OWNS THE DATAP?  
WHO OWNS THE DATA?

# Data Silos



DHIA

Sensors

Genetics

Milk Buyer

Nutrition

Financial

# Data Integrators



# The Future

A 3D cutaway of the Earth, showing the continents of Africa and Europe. The top half of the globe is open, revealing a green grassy field inside. Several black and white cows are standing in the field. The bottom half of the globe is solid and shows the Earth's surface.

- 
- More efficient, sustainable production system
  - Connected cows
  - Automated decisions through AI
  - Transparency and traceability
  - Challenges ahead
  - Cow and farmer are keys



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 @bewleydairy

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