



# CT Scanning services at SRUC



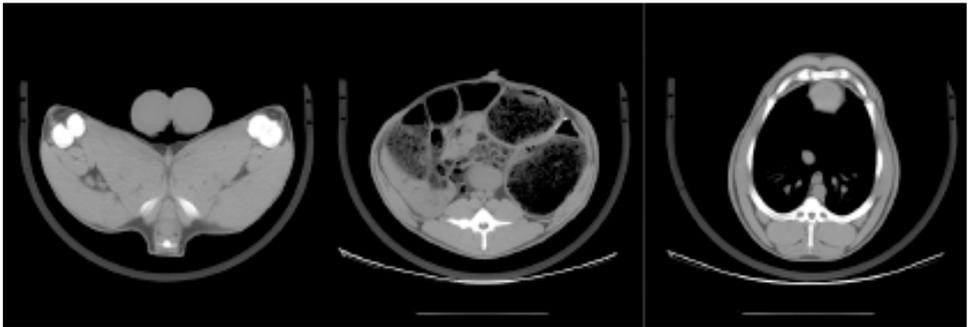
*CT is a medical imaging technique which produces images of body cross-sections, using low dose X-rays, without harming the animal. The detailed images produced allow very accurate estimation of body composition and tissue distribution.*

# Sheep

## Why CT scan your sheep?

In combination with on farm back fat scanning, CT can produce:

- More accurate identification of 'elite' individuals with superior carcass composition in a flock.
- Information on additional characteristics that can't be measured by ultrasound eg. killing out %, muscle shape.
- Overall breed/flock benefits, by improving product quality and increasing profits.



*Back of pelvis*

*5th lumbar vertebra*

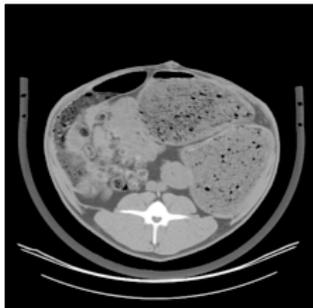
*8th rib*

Measurements from these 3 images enable accurate predictions of carcass tissue weights (fat 98%, muscle 96%, bone 89%), which allow selection of terminal sires with higher genetic values, within co-ordinated breeding programmes, producing faster genetic gain.

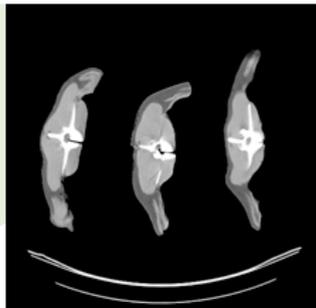
# Meat Quality

## How can CT measure meat quality?

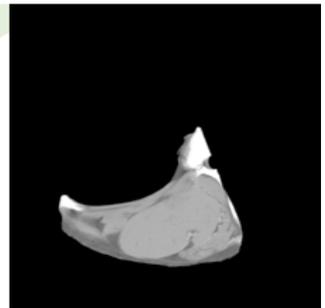
- CT measures changes in the intensity of X-rays as they pass through objects/bodies, thereby measuring the density of the tissues.
- Fat laid down within the muscle reduces the average density of the muscle, which can be measured.
- Fat carries flavour and therefore some level of fat (optimum 3-5% in lamb) within the muscle/meat will enhance the flavour and quality of the meat.



*Live lamb loin CT scan*



*Lamb loin cuts*



*Sirloin of beef*

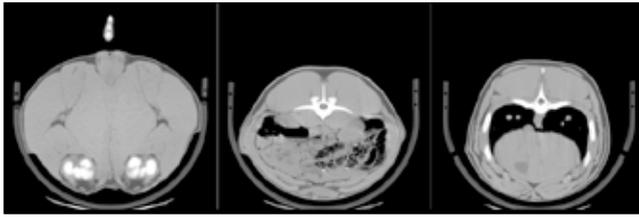
CT information from live lambs can accurately predict intramuscular fat content and therefore is an important aspect of meat quality.

CT measures in butchered meat cuts (lamb / beef etc.) can predict intramuscular fat in a non-destructive and food safe way.

# Pigs

Carcass traits in live pigs can also be measured and utilised in breeding programmes.

Changes in muscle and fat depots can be measured in the growing pig across time. This has been used at SRUC in trial work examining optimum protein levels in the diet to maximise performance and reduce environmental impacts.



# Fish

CT scanning can be used to look at carcass traits in live fish (eg. Salmon / Tilapia), to measure the fillet shape and size and to predict the level of fat.

A novel method of scanning 6 fish at a time, and producing composition measurements for each individual fish, has been developed. This can also be used for other small items eg. lamb loins, mice etc.



# Other common measurement examples

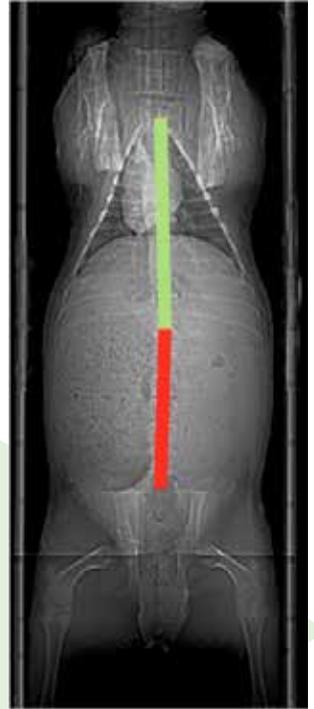
## Spine characteristics

Consistent selection for body length in pigs has led to:

- 2-4 more vertebrae in commercial pigs compared to their ancestors
- increase in body length leading to overall increase in meat yields

CT allows length and vertebrae number to be measured in specific regions of the spine (eg *lumbar* or *thoracic*).

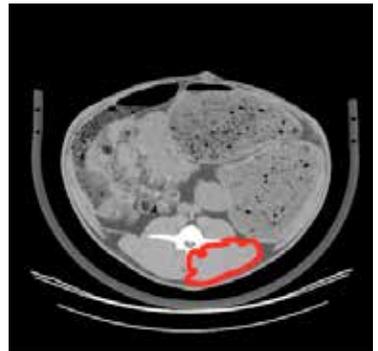
Incorporating this information into selection programmes in sheep could produce economic benefits in terms of increased production



## Muscularity measures

Linear measurements of individual muscles and muscle groups from CT images can give an idea of muscle shape.

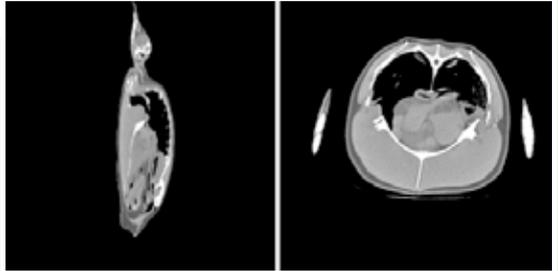
Muscle areas can also be measured to give a better idea of size and shape of specific muscles.



# Examples of other possible work incorporating CT

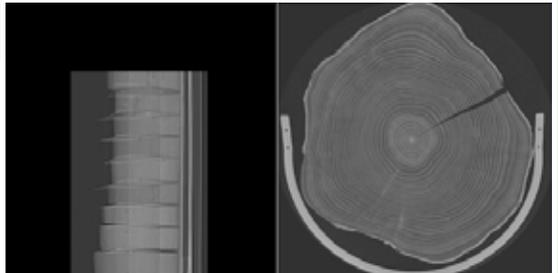
## Zoological

eg. to locate external landmarks to fine tune treatment of respiratory problems in captive penguins.



## Forestry

eg. wood quality assessment, internal weaknesses highlighted, portable “in field” equipment calibrated.



## Also:

Chickens, mice, soil cores, bones, and many other creatures and objects can be investigated in a non-destructive way using CT.

# Service offered

The SRUC-BioSS CT scanning service is based near Edinburgh, but through our mobile scanning service, we offer a UK wide service for commercial livestock and research purposes.

## CT charges

CT scanning charges are calculated for individual projects, but involve a charge to cover the actual scanning and any image analysis and production of data required.

## Contact details

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