

# $\mu$ -VIS X-ray Imaging

## Centre

At the University of Southampton

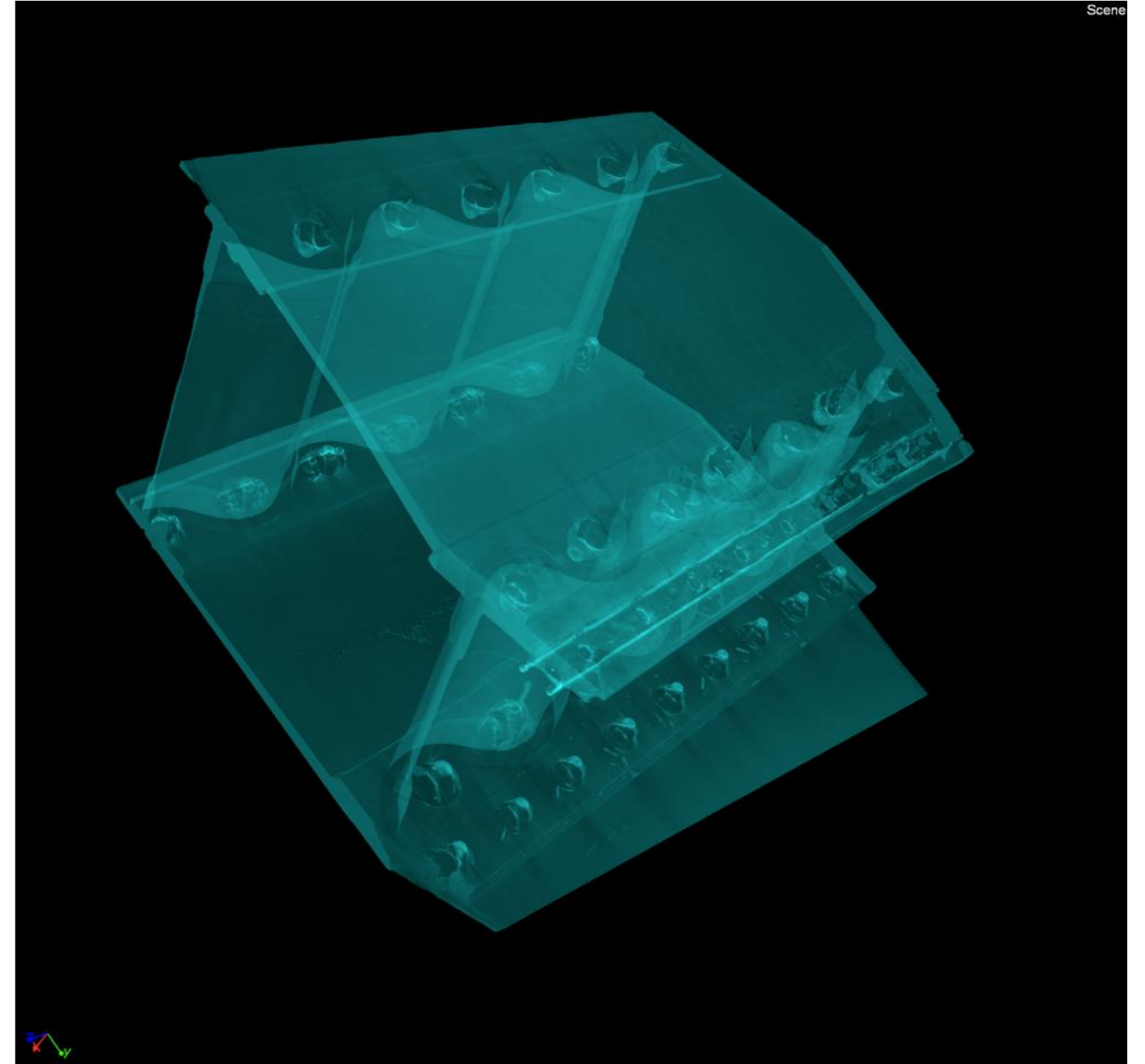
# Our Facilities

# Computed Tomography (CT)

- The  $\mu$ -VIS Centre incorporates five advanced X-ray CT systems.
- The flagship scanner, based in engineering, represents one of the largest and highest energy CT systems in the UK at present.
- It produces high resolution 3D images of the internal structure of objects.
- The process is identical to that employed in conventional hospital CAT scanners, but at much higher energies and resolution levels.

# Computed Tomography

- Materials that have been scanned by  $\mu$ -VIS range from aircraft wings (damage analysis), fossils (for biomechanical modelling), animal bones (developmental origins of health studies), and rock cores (for oil reservoir simulation).



# World Class Facilities

- The University has invested over £2m in the newly launched  $\mu$ -VIS high resolution X-ray computed tomography (CT) facilities.
- The facility offers state-of-the-art equipment and brings together teams of engineers and scientists that have immediate need of CT imaging, with world-leading experts in high performance computing and the art of image processing.

# The Benefits Offered by CT Scanning

- Ability to comprehensively visualise the internal structure of materials and objects in 3D.
- High resolution capabilities are essentially non-destructive which means that objects which either cannot be dismantled or are too fragile to take apart can be examined in great detail.
- The 3D characterisation produced is valuable for subsequent modelling.





Researcher preparing a fossil  
for scanning

# Multidisciplinary Research

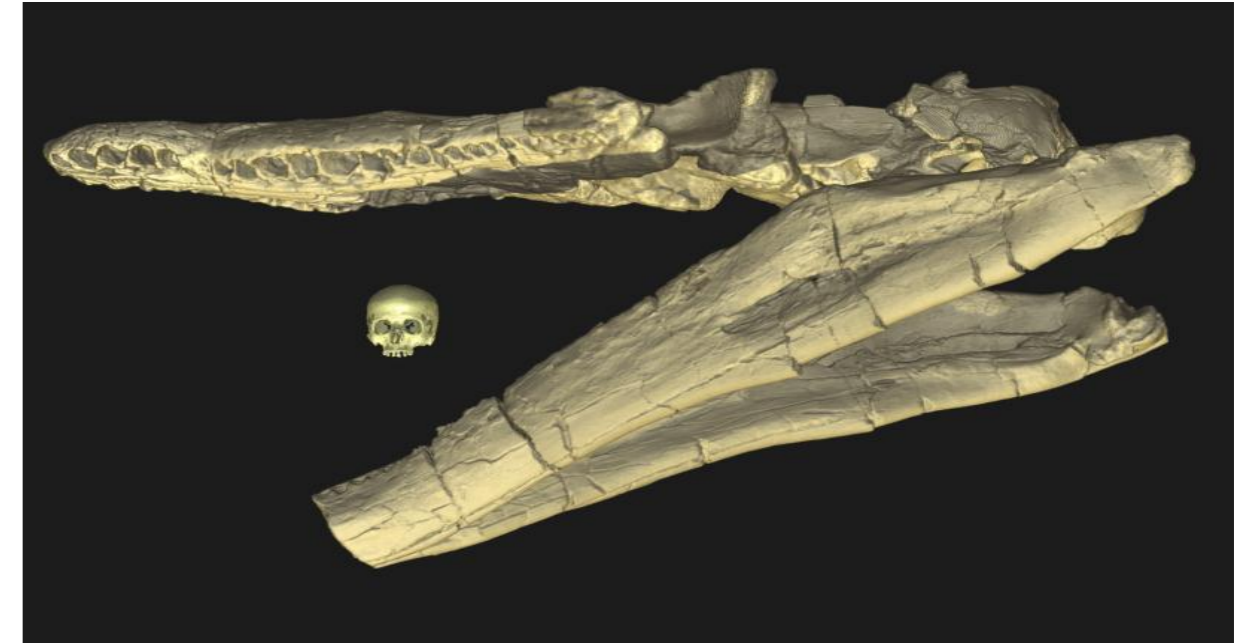


# Multidisciplinary Research

- The Jurassic Pliosaur – Archaeology
- Roman Coins
- Baroque Recorder
- Carbon fibres - Engineering
- Plant roots – Environmental

# The Jurassic Pliosaur

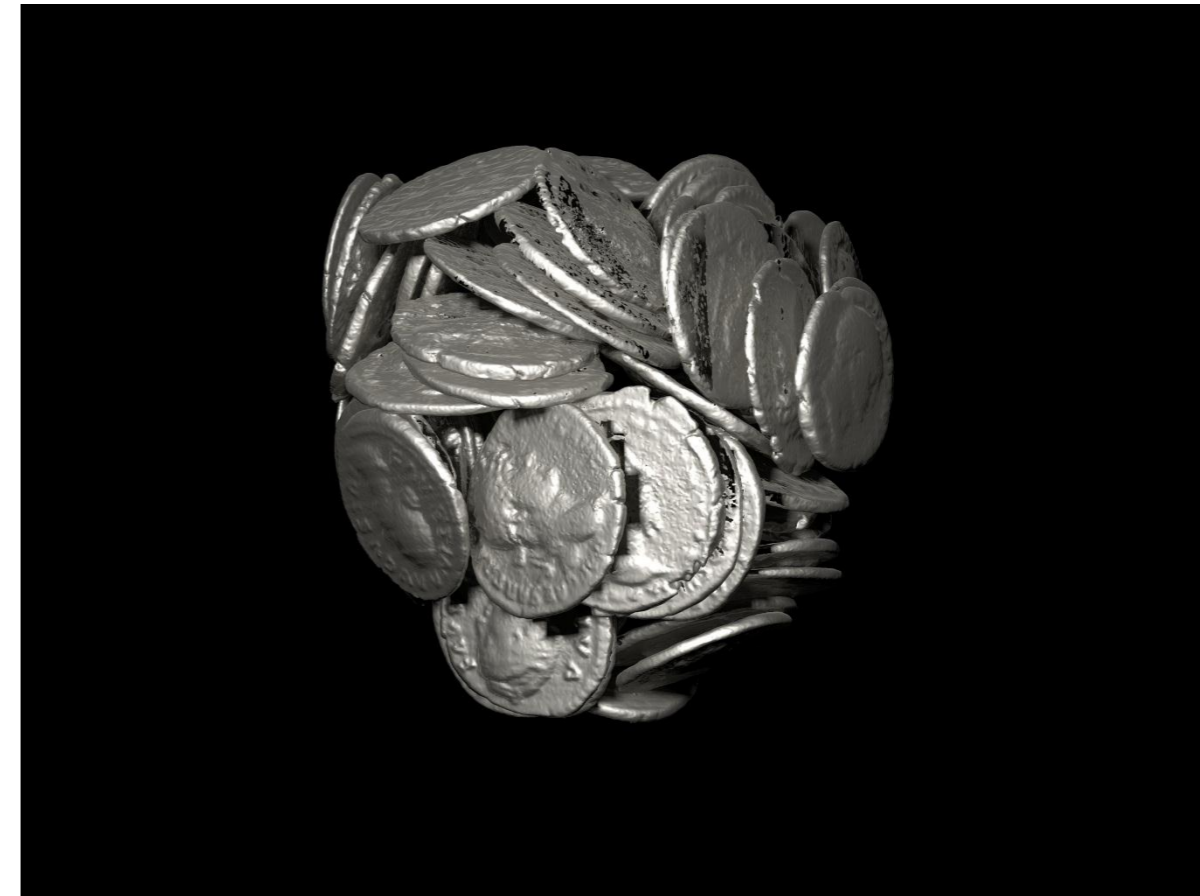
- In collaboration with Archaeology, the research centre scanned the fossilised skull of a Pliosaur, an extinct marine reptile of the Jurassic and Cretaceous periods.
- Scans revealed the internal structure of the bones and are being used by Bristol University in the building of a computer model of the skull.
- This model will allow researchers to estimate the biting power of this immense carnivore



Large marine fossil  
(Weymouth Pliosaur)

# Roman Coins

- Archaeologists and engineers from the University of Southampton are collaborating with the British Museum to examine buried Roman coins using the latest X-ray imaging technology.
- It has been possible to use 3D computer visualisation capabilities to read inscriptions and identify depictions of emperors on the faces of the coins - for example on some, the heads of Claudius II and Tetricus I have been revealed.



An estimated 30,000 Roman coins were discovered in Bath, dating to around AD270 and concreted together in a large block weighing over 100 kilograms.

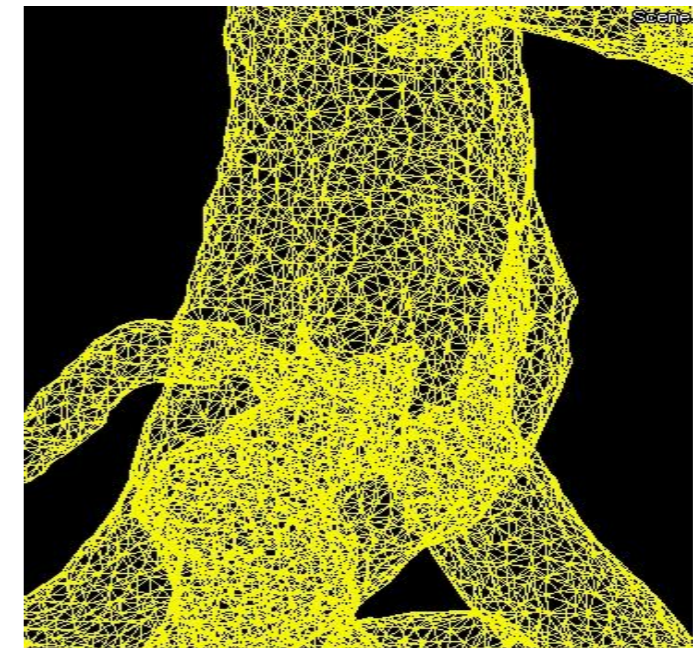
# The Bressan Treble Recorder

- In collaboration with the Bate Collection museum, researchers at  $\mu$ -VIS have been able to examine the condition of the historical musical instrument and determine to what extent it might be playable. They have produced an exact replica of the recorder using 3D printing capabilities at the University.
- Additionally, if a series of scans are taken, researchers can make accurate measurements of the extent that instruments deteriorate over time.



# Engineering and the Environment

- Combined investigation with Engineering has involved the study of carbon fibre composites in aircraft parts, to aid in the design and optimisation of aircraft wings and airframes.
- Work with Environmental research groups has involved the study of delicate plant roots which may be affected by climate change.



# The Future with $\mu$ -VIS

- With its training and user outreach components, the centre will support the next generation of application-led scientists and engineers in the opportunities that rapidly evolving 3D imaging presents and provide a vibrant focus for interdisciplinary development.