



Specimen CT Imaging/3D  
Modeling at MCZ

Andrew Williston  
MCZ Ichthyology

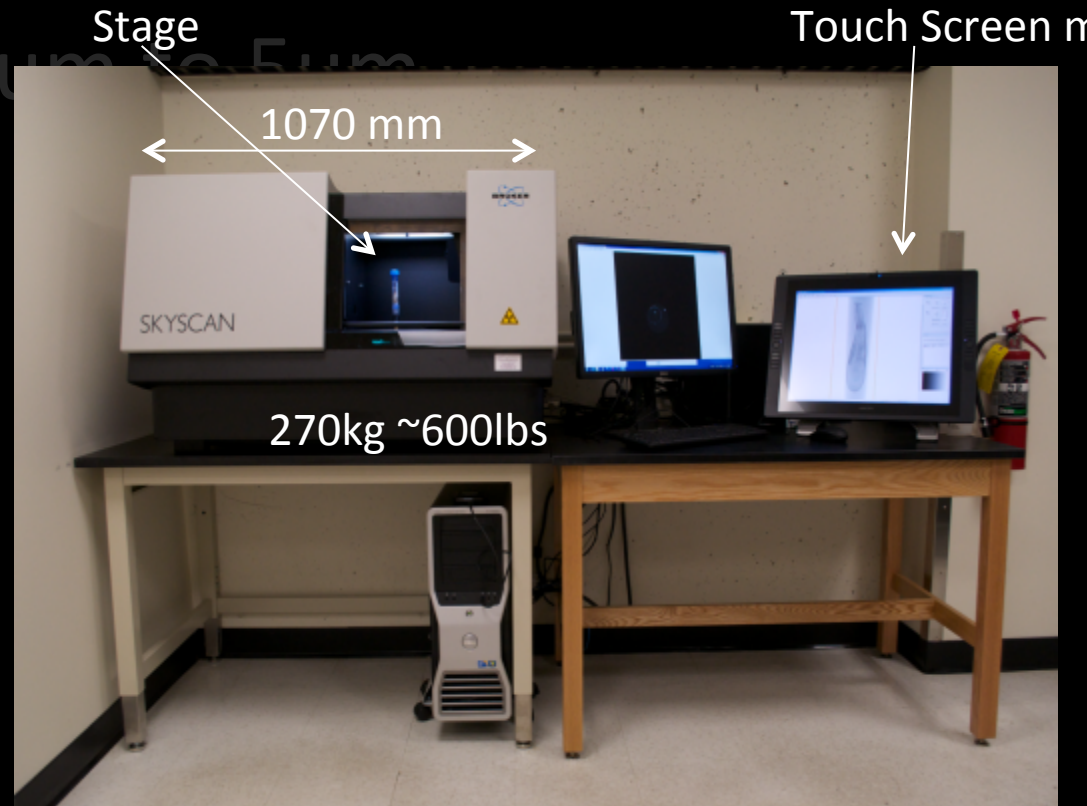
# $\mu$ CT in MCZ collections

## Bruker SkyScan 1173

– Desktop system

– Scans from 70  $\mu$ m to 5  $\mu$ m

– Sample size



# $\mu$ CT in MCZ collections

## Bruker SkyScan 1173

- Desktop system
- Scans from 70 $\mu$ m to 5 $\mu$ m
- Sample size



Source: [www.skyscan.be/products/1173.htm](http://www.skyscan.be/products/1173.htm)

# $\mu$ CT in MCZ collections

## Bruker SkyScan 1173

- Desktop system
- 70 $\mu$ m to 5 $\mu$ m
- Sample size



Source: [www.skyscan.be/products/1173.htm](http://www.skyscan.be/products/1173.htm)

# $\mu$ CT in MCZ collections

## Bruker SkyScan 1173

- Desktop system
- Scans from 70 $\mu$ m to 5 $\mu$ m
- Medium sample size

8"

5½"



# Bruker SkyScan 1173

- Desktop system
- Scans from 70um to 5um
- Medium sample size



# $\mu$ CT in MCZ collections

## Bruker SkyScan 1173

- Desktop system
- Scans from 70 $\mu$ m to 5 $\mu$ m
- Sample size
- Software

$\mu$ CT and collection management



# μCT in collection management

Making rare  
collections more  
available

Powerful dataset

Facilitate research



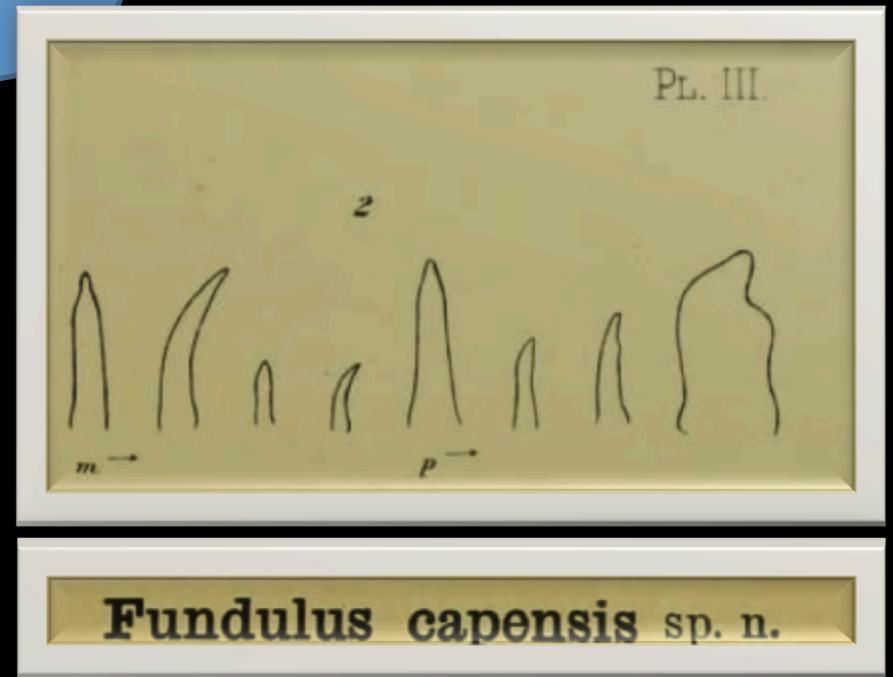
*Fundulus capensis*

Increase Access & Reduce handling

# μCT in collection management

“*Fundulus capensis* sp. n.

Form resembling that  
of *F. heteroclitus*...”



# μCT in collection management

*Fundulus capensis* sp. n.

Form resembling that  
of *F. heteroclitus*...



# μCT in collection management

Rare collections  
more available

**Powerful dataset**

Facilitate research



**Reduce handling**

# μCT in collection management

Making rare  
collections more  
available

Permanent 3D  
representation

Facilitate research

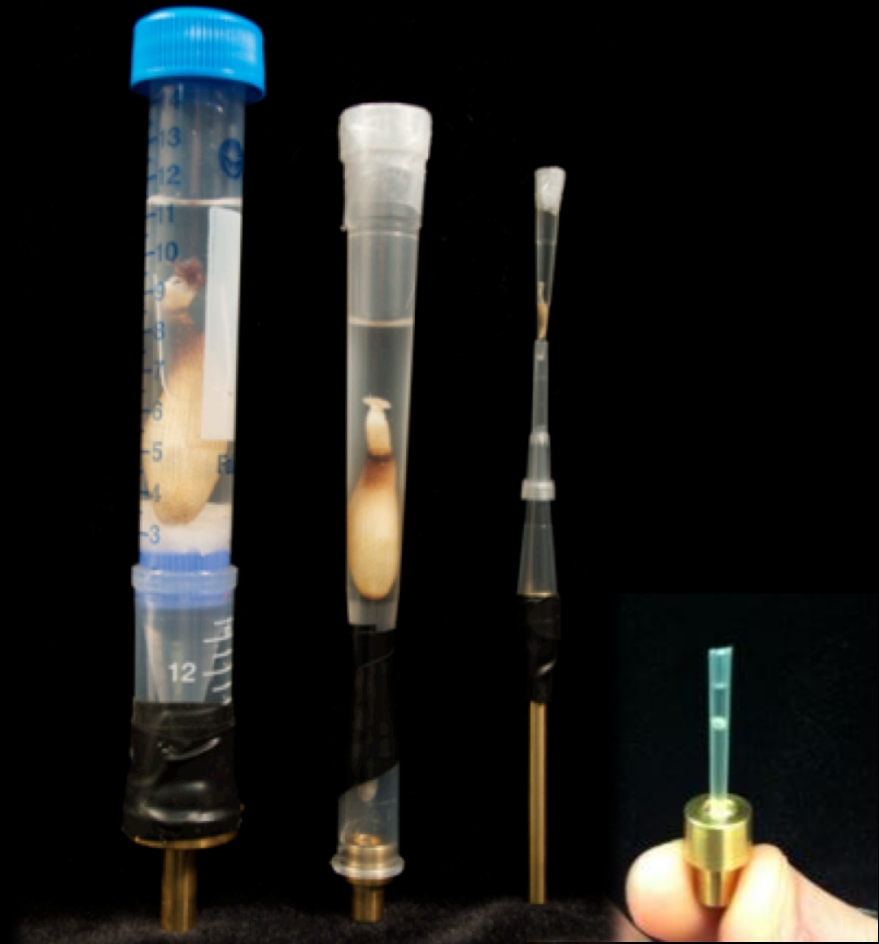


# Challenges for $\mu$ CT in collection management

Specimen  
preparation

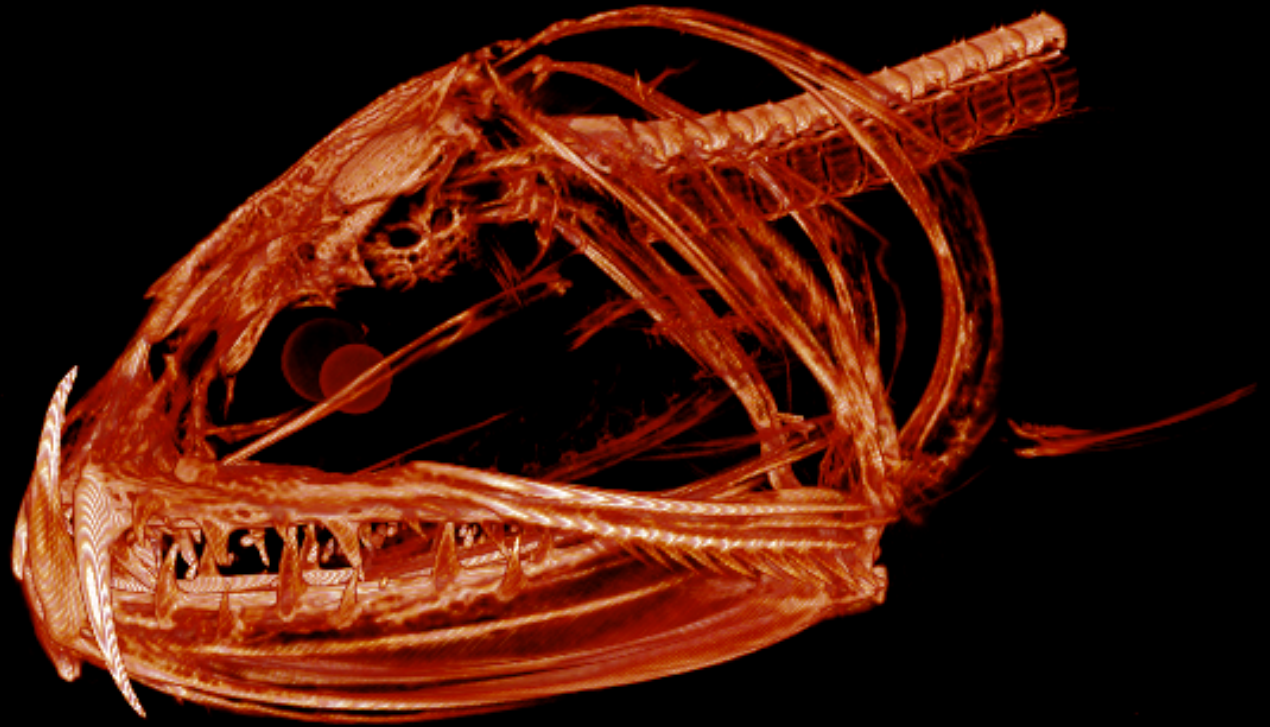
Data storage/  
archiving

Distributing data



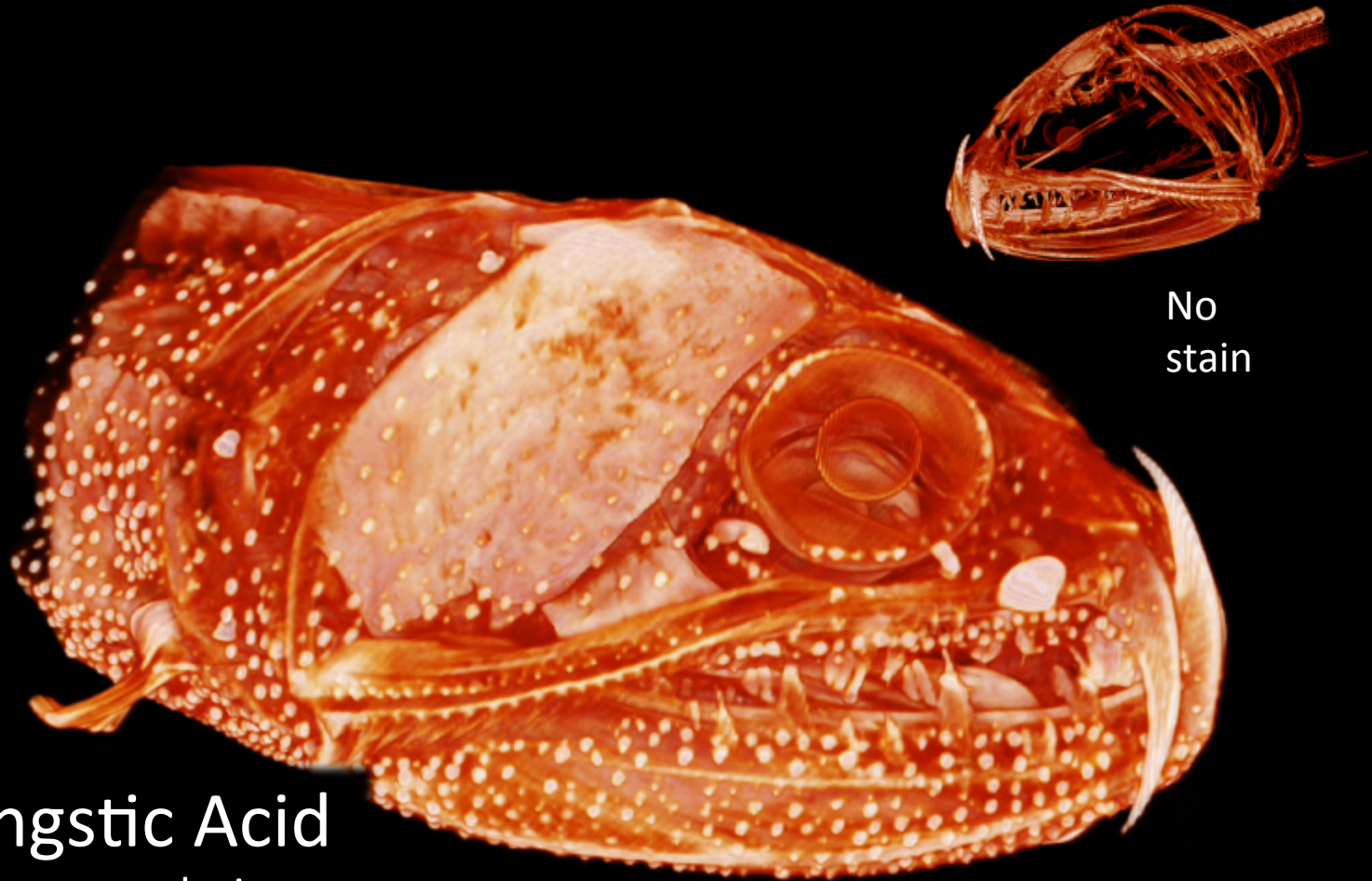
# Challenges for $\mu$ CT in collection management

*Astronesthes niger*  
(Snaggletooth fish)



Specimen  
preparatic  
Data stora  
archiving  
Distributin

# Challenges for $\mu$ CT in collection management



No  
stain

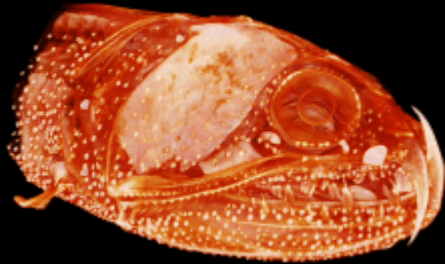
## Phosphotungstic Acid

**Pro:** Strong soft tissue resolution  
Stains unique structures

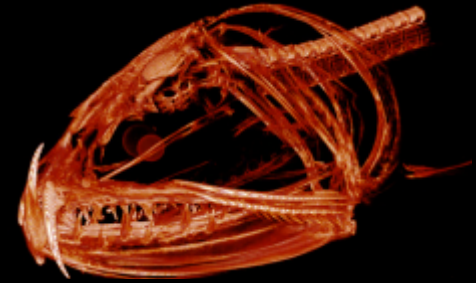
**Con:** Specimen damage?



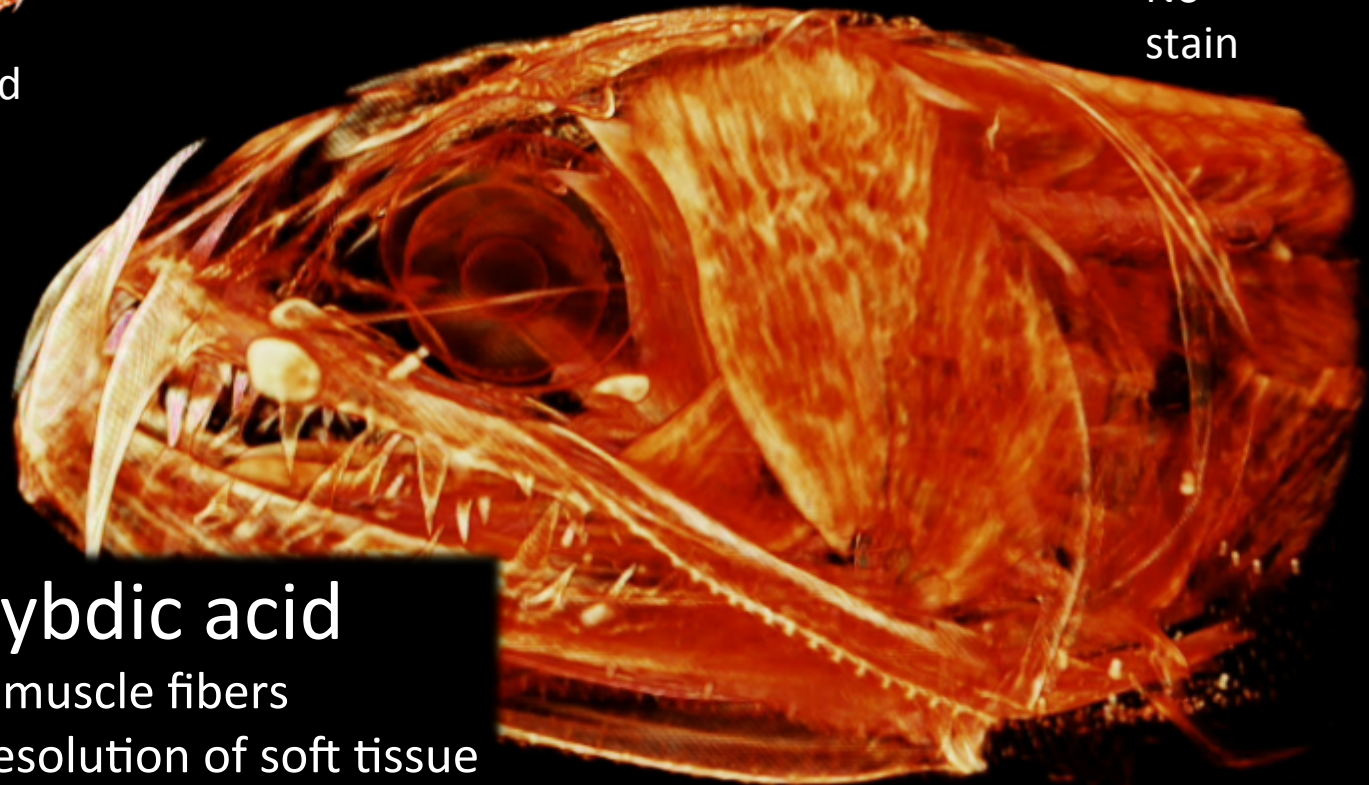
# Challenges for $\mu$ CT in collection management



Phosphotungstic Acid



No stain

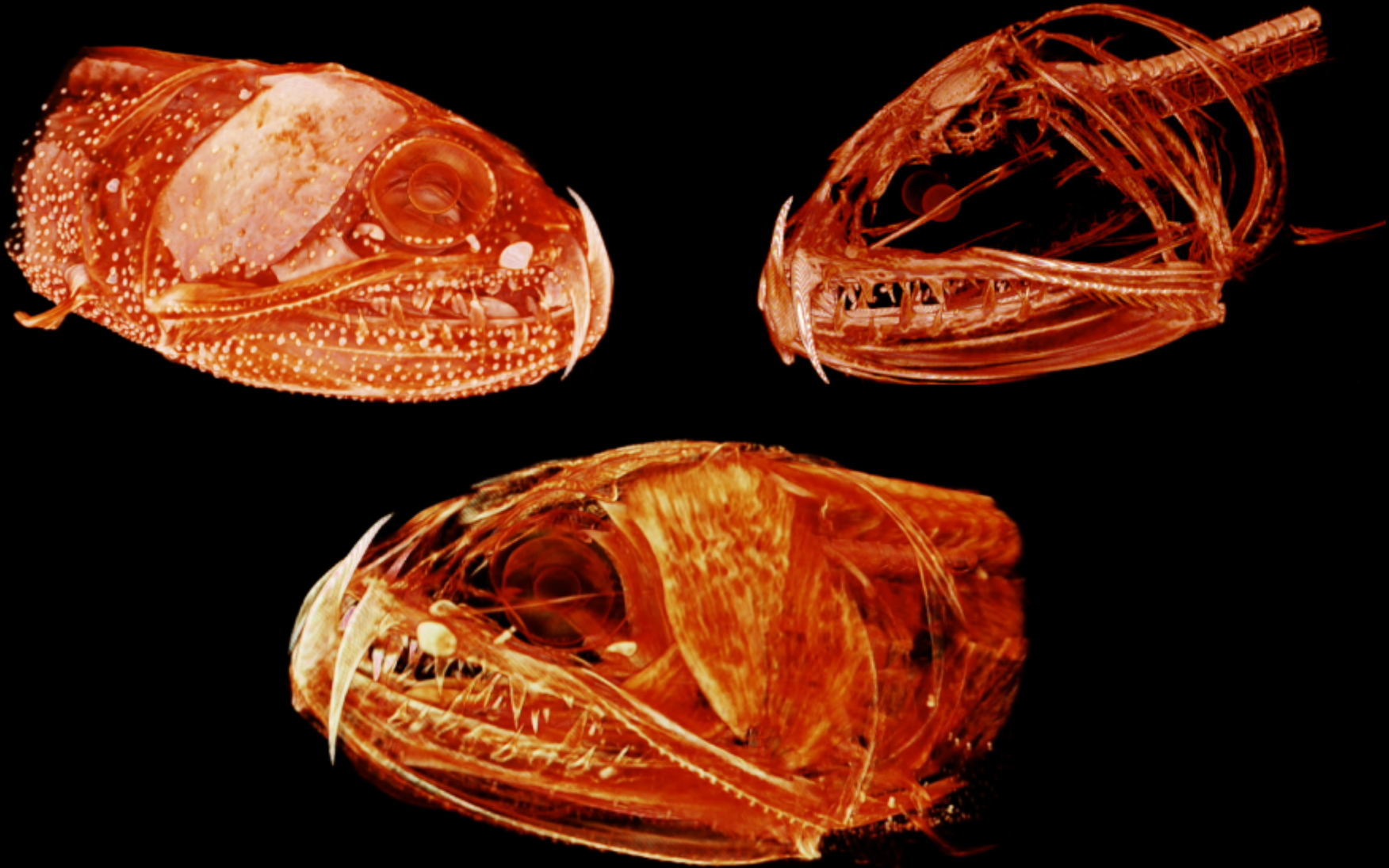


## Phosphomolybdic acid

**Pro:** Resolution of muscle fibers

**Cons:** Less overall resolution of soft tissue  
Clear physical effects on specimen

# Challenges for $\mu$ CT in collection management

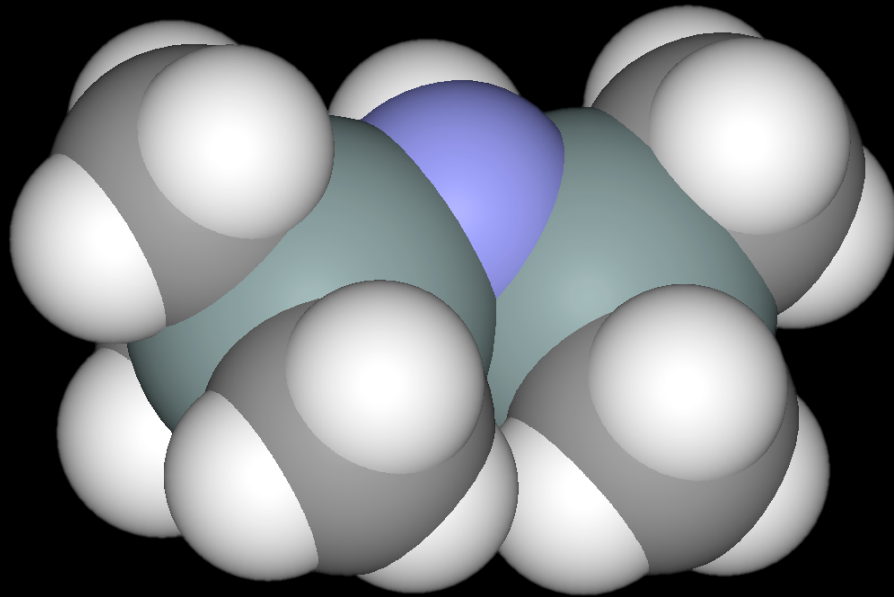


# Challenges for $\mu$ CT in collection management



Challenges for  $\mu$ CT in collection management

## Hexamethyldisilazane (HMDS)



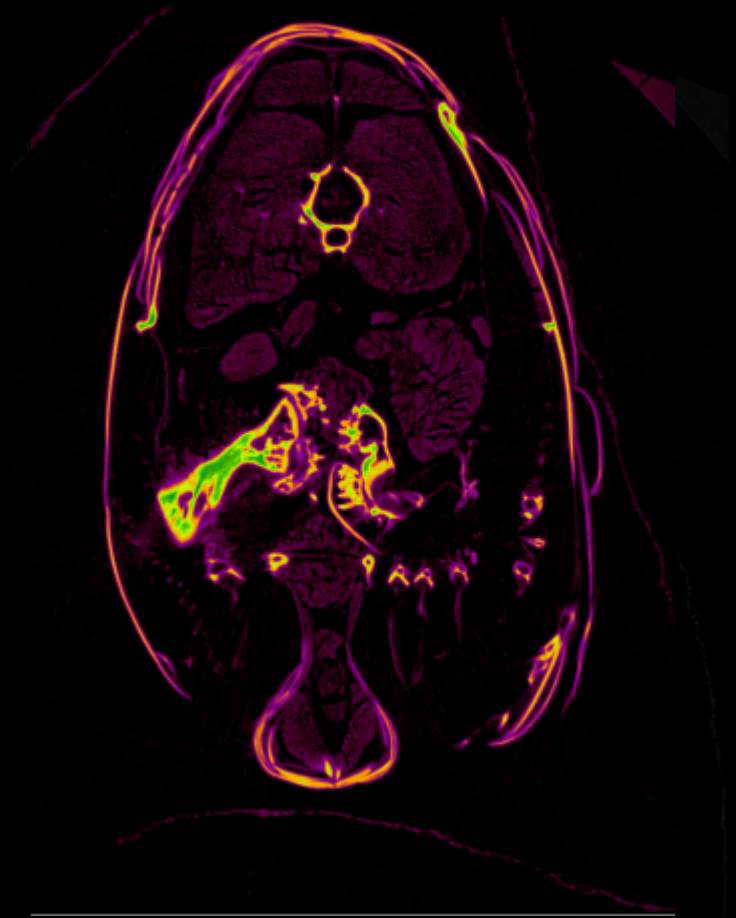
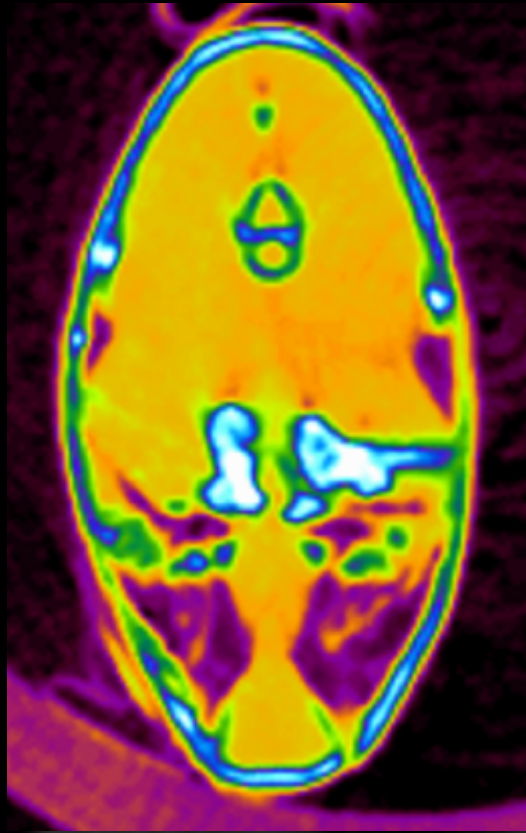
Challenges for  $\mu$ CT in collection management

## Hexamethydisilazane (HMDS)



Challenges for  $\mu$ CT in collection management

## Hexamethyldisilazane (HMDS)



# Challenges for $\mu$ CT in collection management



Challenges for  $\mu$ CT in collection management

## Rehydration



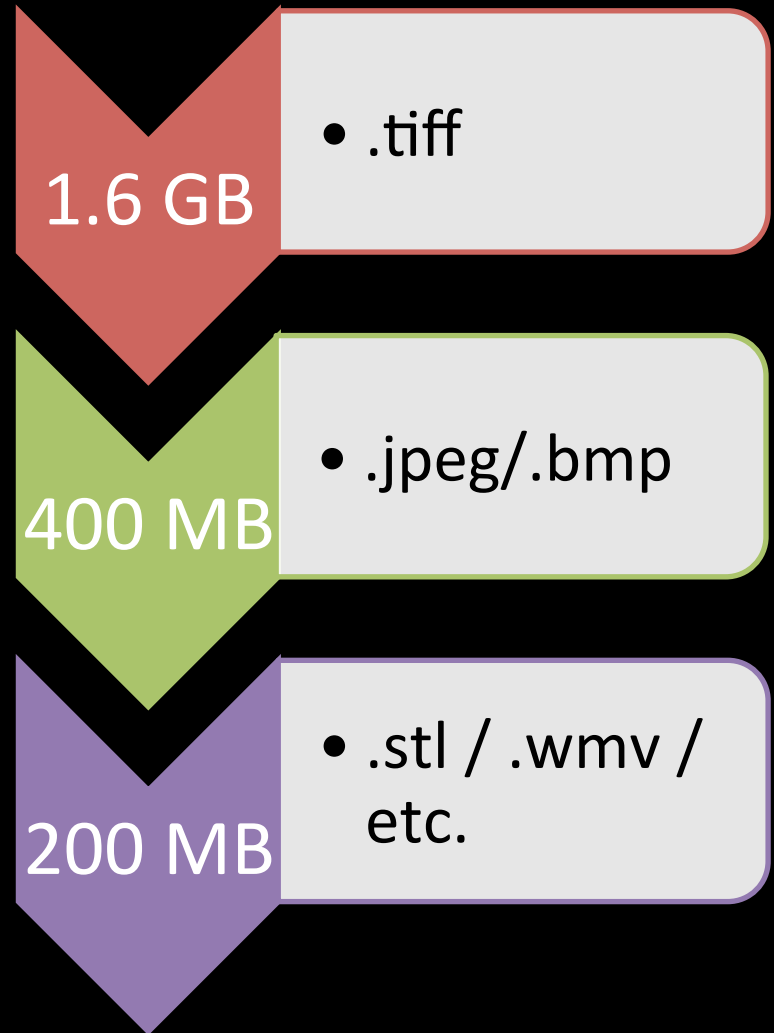


# Challenges for $\mu$ CT in collection management

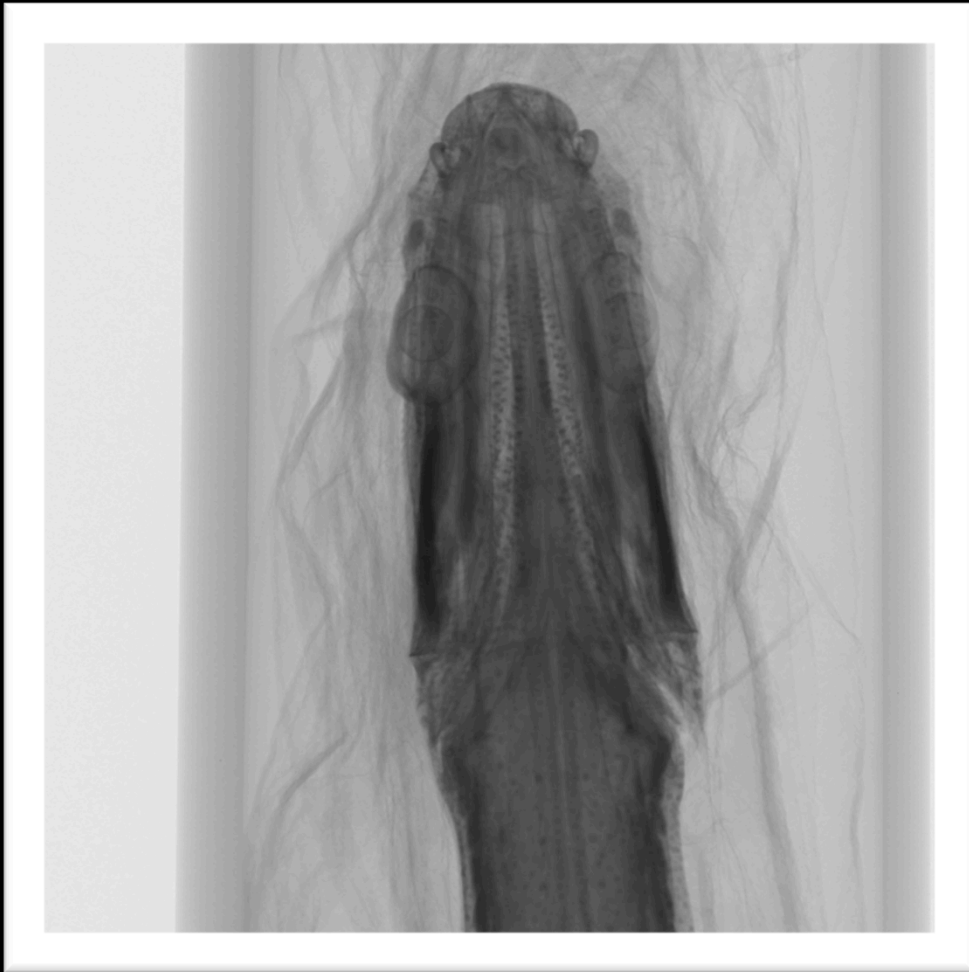
Specimen  
preparation

Data management

Distributing data



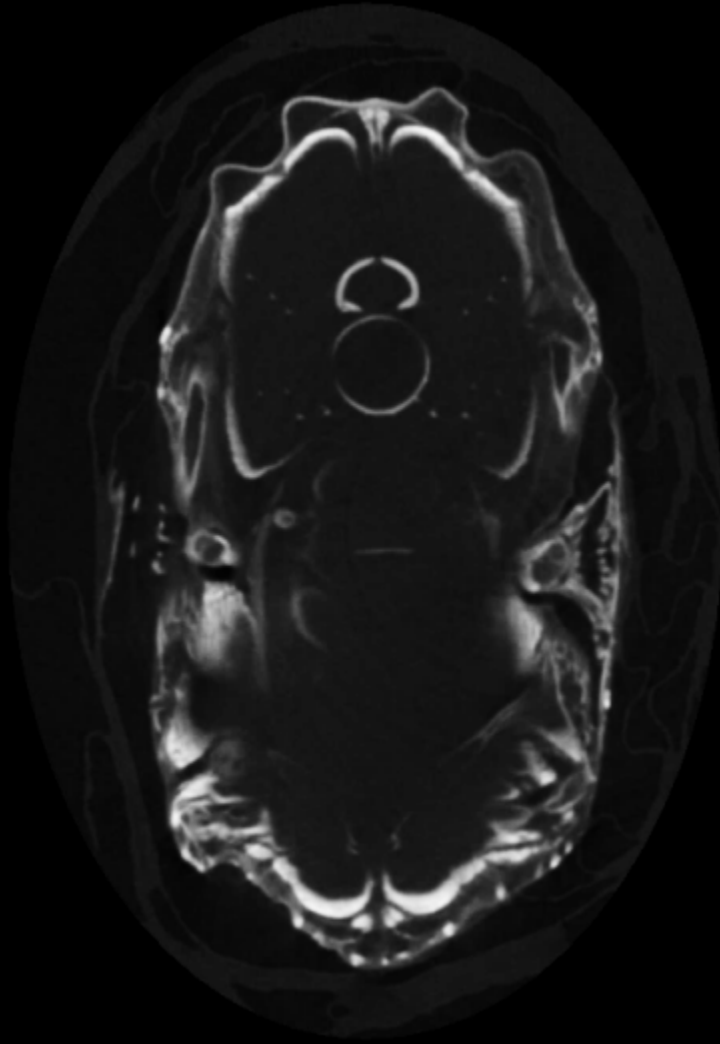
# Challenges for $\mu$ CT in collection management



1.6  
GB

● .tiff

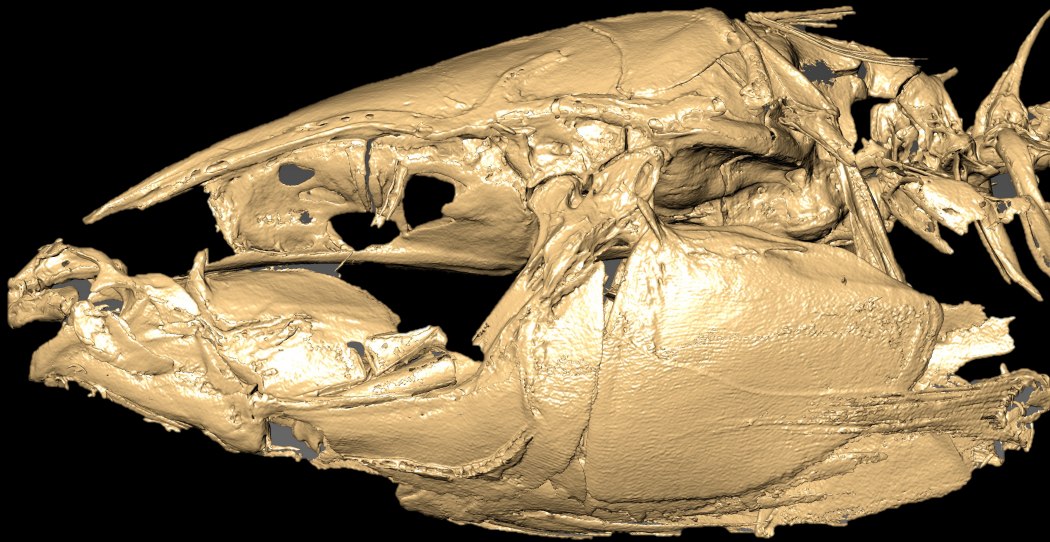
# Challenges for $\mu$ CT in collection management



305  
MB

- .jpeg/
- .bmp

# Challenges for $\mu$ CT in collection management



791MB

- .stl / .wmv /  
etc.

# Challenges

Specimen preparation

Data storage/archiving

Distributing data

# Challenges

Specimen preparation

Data storage/archiving

**Distributing data**

Issues:

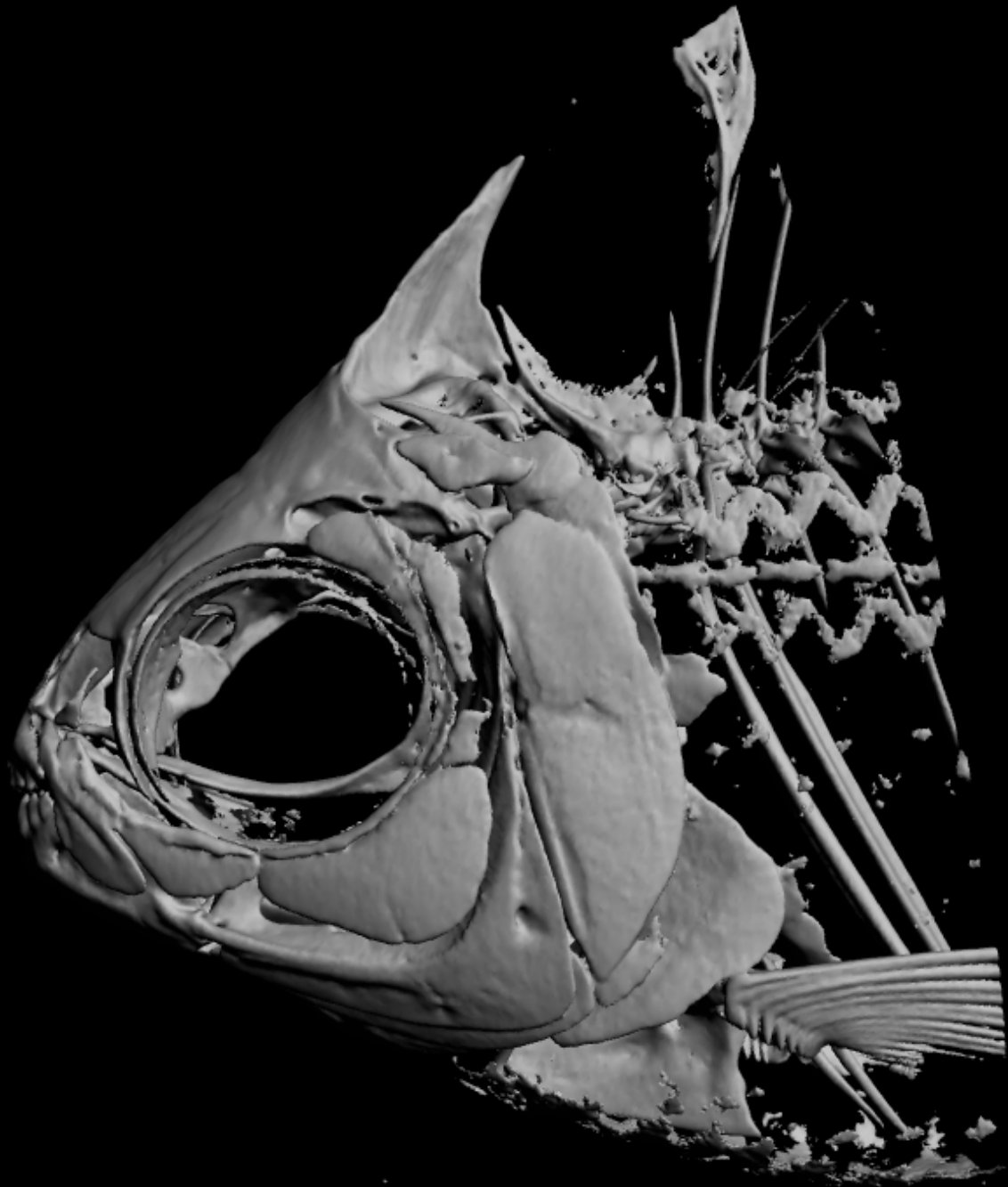
Size of datasets

Control of data

Usability

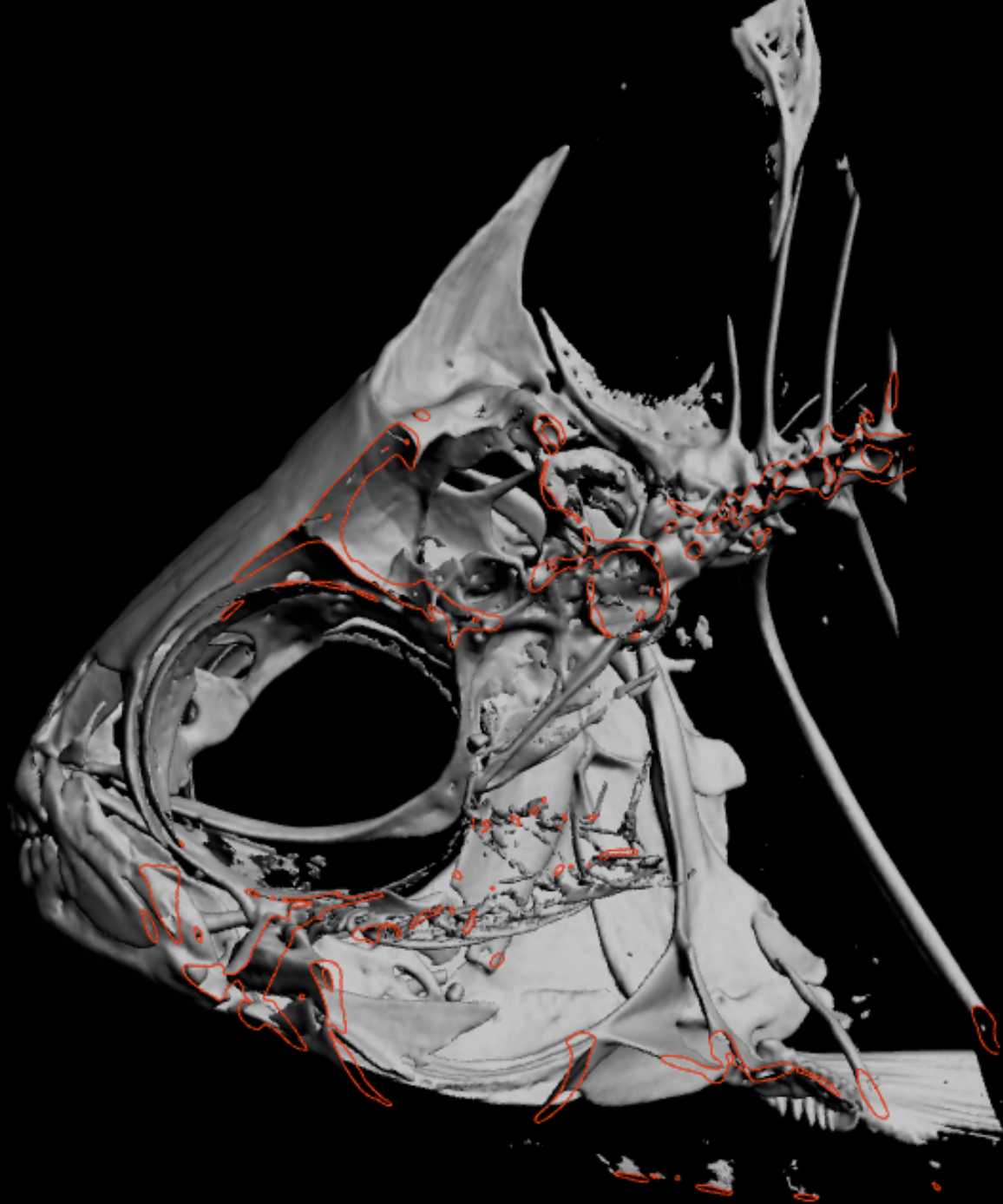
3D .pdf

PDF



3D .pdf

PDF





Thanks and appreciation

Karsten Hartel & George Lauder

Linda Ford, John Woodward and  
Collections operations at the MCZ

Dr. James Hanken

Chris Kenaley, Jenn Lennihan

SL	41.83	38.83	41.3				
HL	9.67	8.9	9.7				-0.07172
BD	9.09	8.61	9.09		1.07726		
BW	3.83	3.25	3.67				
EW	2.66	2.47	2.65				