***oVert MorphoSource uploading guide***

This document was created by **D. Boyer** and reviewed/edited/approved by **D. Blackburn**, **E. Stanley**, **J. Winchester**, and **C. Thompson**. It provides suggestions/recommendations for values to use in each MEDIA GROUP and MEDIA FILE metadata field for oVert institutions. Please also see Youtube tutorials for creating media, as well as Boyer et al. (2016) for more details/instructions for preparing data for MorphoSource and uploading it.

**Tutorials as of 7-21-18**

1. Logging in or Creating a MorphoSource User Account: https://youtu.be/bVNpm_vArmE
2. Creating and Maintaining a Project: https://youtu.be/wOziYLBL9KE
3. Requesting Contributor Privileges: https://youtu.be/FiwP-ZUucZw
4. What is a MorphoSource Specimen and How Do I Create One? https://youtu.be/HWzT0gNm95o
5. What is a MorphoSource Media Group & How Do I Create One? https://youtu.be/mXgrAhwSYzk
6. Required Metadata for Media: https://youtu.be/xlfmSYBImRM
7. Non-required Metadata for Media: https://youtu.be/AraccrdcM4k
8. Media Group Creation Example: https://youtu.be/238U4PnTZeU

**Boyer et al. (2016)**

**https://www.researchgate.net/publication/316669746_Morphosource_Archiving_and_sharing_3-d_digital_specimen_data**

## 1. MEDIA GROUP metadata

**Description:**

"microCT volume and derivatives"

Note - do NOT use this field to give specific information on the anatomical parts, taxonomy, or specimen number as there are specific fields for this information elsewhere.

**Publication status:**

This is up to the museum/collection institution: 2nd option recommended if museum does not want to review downloads, 3rd option recommended if it does.

**Download requests reviewed by:**

This is only applicable when Publication status is 'Published / available in public search / users must request download permission"

**Description/Element:**

"whole body" or other correct anatomical description of what was scanned

Note - As a counter example, 'preservation/preparation type' (e.g., "formalin-fixed") are permanent features of the specimen and should ideally be communicated in the specimen description field not here or in the notes field.

**Side:**

"Not applicable" for "whole body"

**Notes:**

Enter anything not covered in other fields but deemed important. Here some examples:

*Chirality:* 'reversed chirality' for a scan where left/right have been reversed due to technical issues (better to fix such issues before uploading though)

*Non-specimen material in scan:* 'scan contains partial, cropped imagery of a second specimen"

*Preparation of physical specimen related specifically to scanning event, but which does not permanently affect/represent the specimen*: e.g., iodine stained, ammonium chloride coated, etc. As a counter example, 'preservation/preparation type' are permanent features of the specimen and should ideally be communicated in the specimen description field not here or in the media description field.

**Grant support:**

"oVert TCN; NSF DBI-1701714; NSF DBI-grant to scanning institution; DBI-grant to institution from which collection originated, if different from first two" (please use semicolons to separate grant names). Note that 1701714 is the number of the lead institution award and should always be included.

**Media citation instructions:**

1 - [lead PIs of grants listed above, and/or cognizant museums]

2 – [most likely just delete "originally appearing in" unless the scans already appeared in a published paper]

3 – add the three grant numbers to the end of ", the collection of which was funded by NSF"

**Is this media copyrighted?**

Check "yes" (even if you don't know).

Note - For those worried about whether copyright assertions will be legally binding for CT scans, please note that when scans are downloaded users must also agree to usage limitations that do not refer to and are not contingent on copyright, but emulate the restrictions imposed by CC-BY-NC-SA. In the next version of MorphoSource we will implement a wider array of options for describing ownership and use restrictions.

**Copyright permission:**

Select "Permission to use media on morphosource granted by copyright holder"

**Copyright license:**

Select “CC-BY-NC-SA”

Note - This is the license preferred by oVert generally, but make sure your museum is okay with this, and/or check whether it prefers a less restrictive license.

**Find the facility this media file was created at:**

Select your facility or go to the upper right ‘facilities’ tab to create it if it does not yet exist

**Choose scanner used:**

Select your scanner.

Note - if creating a new facility, you must add scanners to your facility before scanners will be available for selection

**X, Y, Z res:**

Add the correct values from your metadata file.

Note - the units are millimeters. A typical range for microCT pixel resolution is between 0.01-0.1mm. If the numbers you see are much smaller or bigger than this they are likely wrong or there is an issue with units.

**Voltage:**

This is kv. And represents the beam voltage setting when the scan was run.

Note - most scans will be between 50-200kv. The max is either 225 or 440, depending on which facility the scan was taken at.

**Amperage:**

The units are actually microAmps.

Note - again, this is the amperage used when the scan was made.

**Watts:**

This is the power of the scan and is simply the product of kv and Amps. The exact formula is W = kv*(0.001*uA).

**Exposure time:**

This is the duration of xray exposure used to create each projection.

Note - Usually between 0.2-3.0 seconds. Though it can definitely be longer or shorter.

**Filter**

Report the material and thickness of any filters used to pre-harden x-rays, e.g. Cu 0.5mm

**Projections**

This is the number of x-ray images captured during a full (or partial) rotation of the specimen over the course of the scan.

**Frame averaging:**

This is the number of times the same projection view was created and then averaged. If no frame averaging was done then "1" is the correct value.

**Wedge:**

This is the material the specimen was packed in.

**Calibration options:**

Check the scanner metadata or ask technician (not critical if left blank)

**Calibration description:**

This is for any other details about other kinds of calibration (e.g. for accuracy). E.g., "calibration balls scanned with object had error of <0.0001 mm" or "pixel scale was set using calibration balls (accuracy of $\pm 0.1\ \mu m$) scanned with object" etc.

**Technicians:**

All individuals who helped with scanning, processing, or uploading (in the next version of morphosource we will have more detailed metadata for describing roles of various individuals who helped create the scan

## 2. MEDIA FILE metadata

**Title:**

Describe the format of the file: eg "zipped 16 bit tiff stack", "zipped dicom stack", "mesh file", "2D preview of dicom stack" etc.

**Select a file for upload from your computer:**

Select a zip file (if microCT image stack) of mesh file (like stl, ply, obj) depending on what you intend to upload.

Note - only third party compression software should be used for making zips (7zip, WinRAR, winzip). Do not use the windows or mac native archiving tools.

**Image to use as preview:**

Please have a 2D snapshot of your mesh file ready for this. No preview is required for zip files, as one will be automatically generated. If you wish to show a preview of your volume, we recommend uploading a third separate image of the volume rendering. However the need for creating previews of any sort will go away in MorphoSource 2.0. But PLEASE at least upload previews of your mesh files for now.

**Side:**

"left, right, etc."

Note - this may or may not be the same information as that entered for "side" in the media group form. The reason is that you could be loading the mesh file representing just the right humerus from the whole body scan that is the raw file of the group.

**Description/Element:**

Again this may or may not be the same information as for the media group. See above.

**File type:**

Raw or derivative. Zipped image stacks will usually be the raw file unless projection files are also included. If 'derivative' is selected, you will have the opportunity to select the source file of the derivative from among the other files in the same media group.

Note - if you are loading raw and its derivatives at the same time, you will have to wait until all the files successfully upload before you can back into the media file editing form and specify the raw file as the source. Also note that media groups should only contain 1 raw file. If you think there is more than one, that indicates a misunderstanding of the structure of media groups and an error in data curation. You should ask someone for clarification.

**Publication status:**

Same options as at the group level.

Note - when left blank, media files inherit the status of the group. When a status different from that specified for the group is used, the file-specific status takes priority.

**Notes:**

Processing activities are a good use of notes field, including software used, etc. Otherwise info like 'chirality' can also be reported here.

Note - MorphoSource 2.0 will include more explicit and detailed fields for describing different kinds of processing events (eg to describe how a mesh file was created from a tiff stack).