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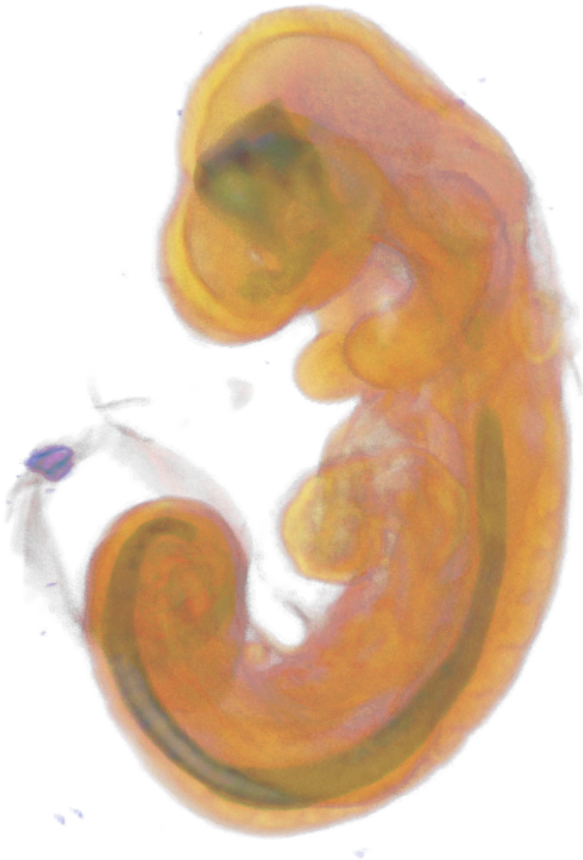
INSTITUTE OF GENETICS
& MOLECULAR MEDICINE

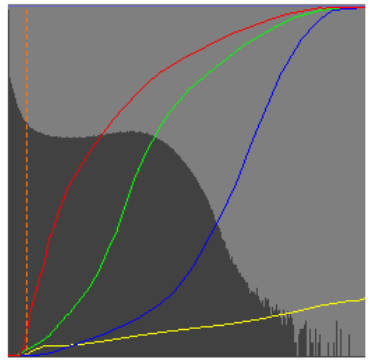
MARender: A Simple JavaScript Library for Biomedical Visualisation

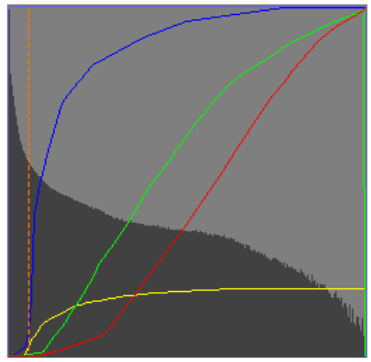
Bill Hill and Richard A. Baldock

Visualisation of 3D Data

- Volume Rendering
- Surfaces
- Sections
- Point Clouds







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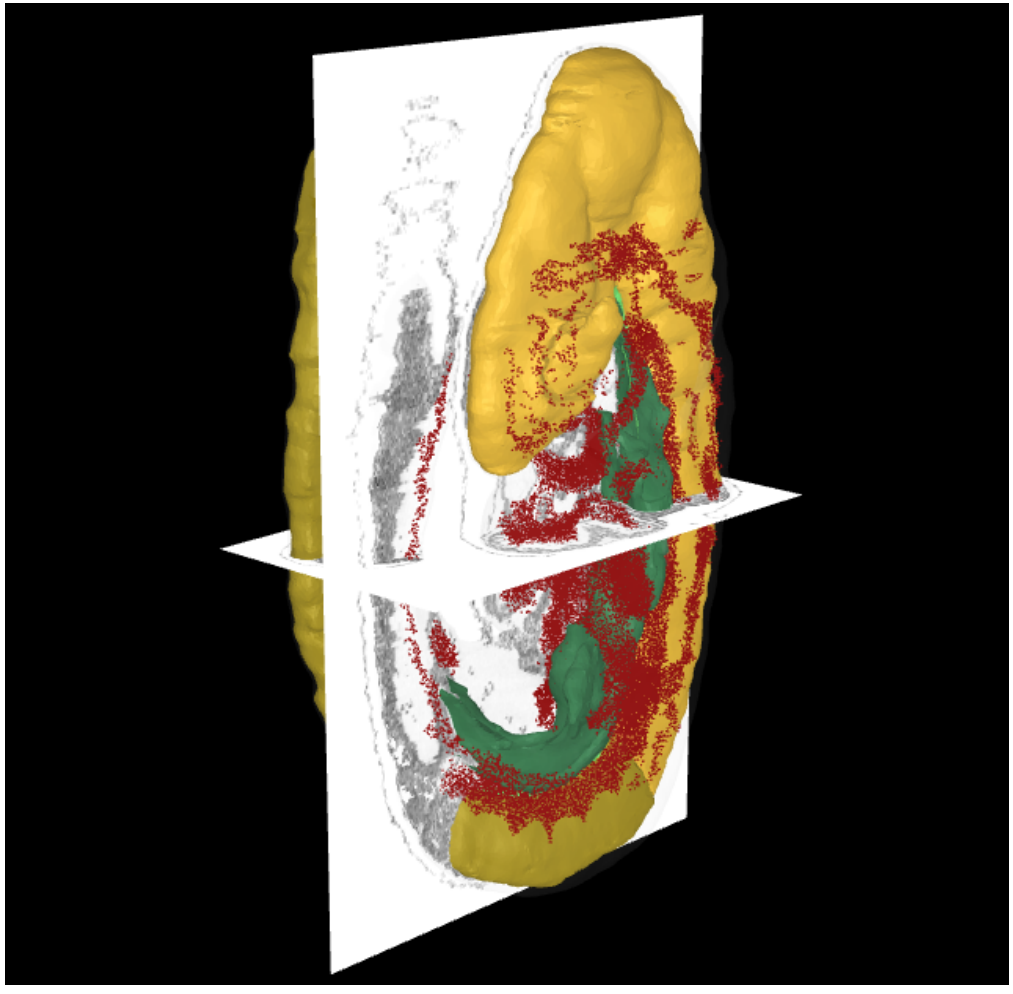

Programming Interface

- JavaScript (based on three.js)
- MARenderer
- Models: Add/Update/Remove
- Animate

```
var con = document.
    getElementsByName('div')[0].
    value;
var ren = new MARenderer(window,
    con);
ren.init();
ren.addModel({name:  'emb',
  path:  'models/emb_srf.vtk',
  color:  0xc0c0c0,
  transparent:  true,
  opacity:  0.5});
ren.addModel({name:  'neu',
  path:  'models/neu_pts.vtk',
  color:  0xa0f010,
  mode:  MARenderMode.POINT});
ren.animate();
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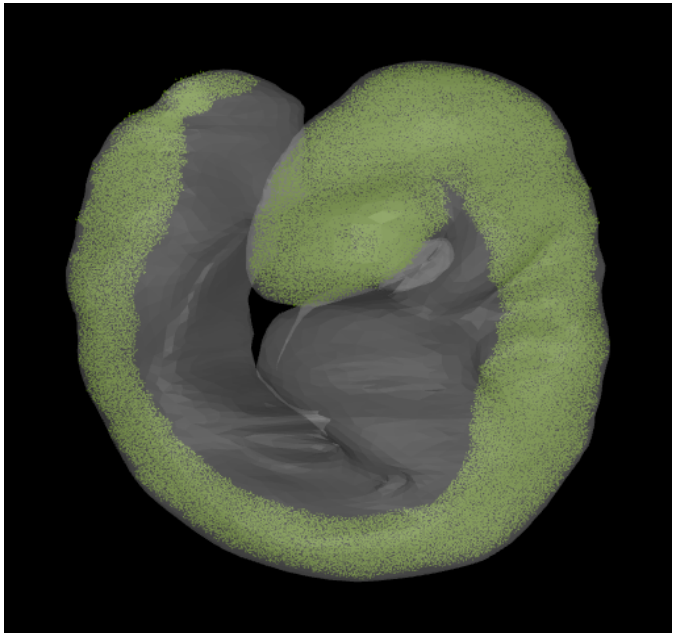

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Programming Interface

MARenderer Methods

addModel()	-	adds a new model
updateModel()	-	updates named model
removeModel()	-	removes named model
animate()	-	starts rendering the scene
goHome()	-	camera to home position
setHome()	-	sets camera home
setCamera()	-	sets camera position
getIIP3DBBVertices()	-	vertices corresponding to IIP3D
opacityIncrement()	-	increments all opacities
pointSizeIncrement()	-	increments all point sizes

Programming Interface

IIP3D Integration

```
var u = url + '&dst=' + dst +
  '&pit=' + pit + '&yaw=' + yaw;
var v = ren.getIIP3DBBVertices(u,
  new THREE.Vector3(0.34, 0.34, 2));
var t = u + '&sel=0&cvt=png';
ren.addModel(name:  'plane',
  mode:  MARenderMode.SECTION,
  vertices:  v,
  color:  0xffffff,
  opacity:  1.0,
  transparent:  true,
  texture:  t);
```

Default Mouse/Keyboard Inputs

left mouse	-	rotate camera
scroll wheel	-	zoom camera
right mouse	-	pan camera
!	-	diagnostics
?	-	pick models
<	-	decrement opacity
>	-	increment opacity
C	-	set camera and go home
H	-	set home
h	-	go home
p	-	increment point size
q	-	decrement point size
s	-	phong render surfaces
w	-	wireframe render surfaces

Data Preparation

- Surfaces
- Point Clouds
- Voxel Data

Data Preparation

ImageJ, ITKSnap, VTK or Woolz

- Surfaces
- Point Clouds
- Voxel Data

```
WlzDomainToVTKSurf.py -m 20000 -f
-x -o surf.vtk dom.wlz
```

Data Preparation

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WlzPointsFromDomain

```
WlzPointsFromDomain -d 3 -D -o
    points.wlz -x dom.wlz
WlzExtFFConvert -o points.vtk
    points.wlz
```

Data Preparation

- Surfaces
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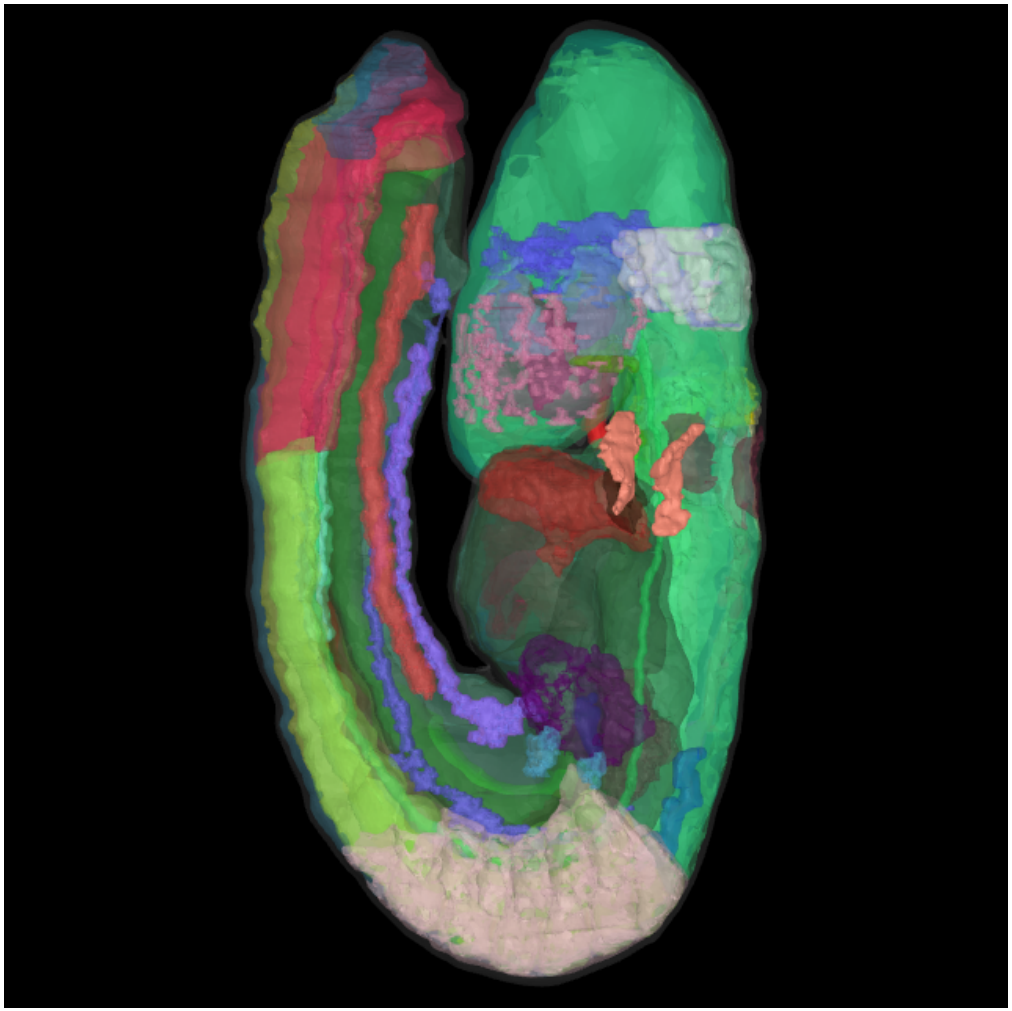
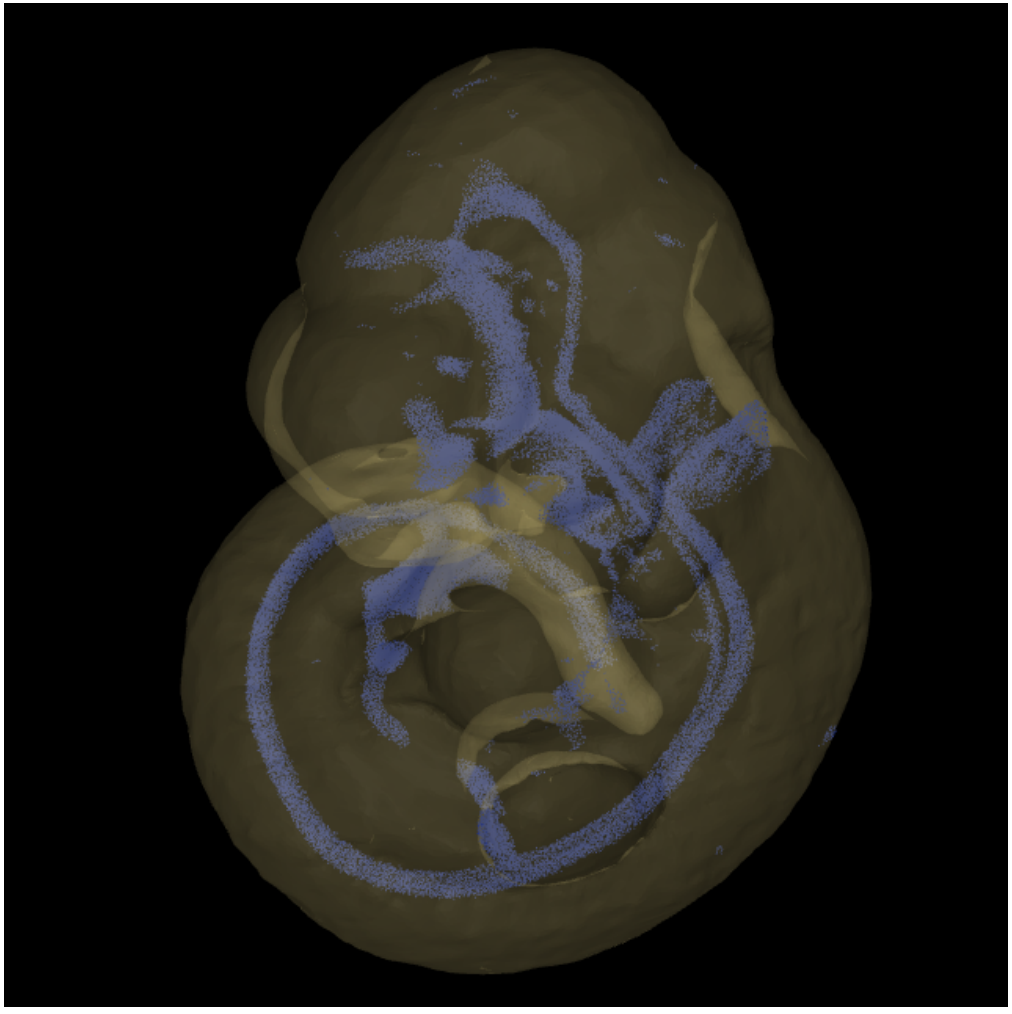
Static images, IIP, ..., IIP3D

Examples of MARender in Use

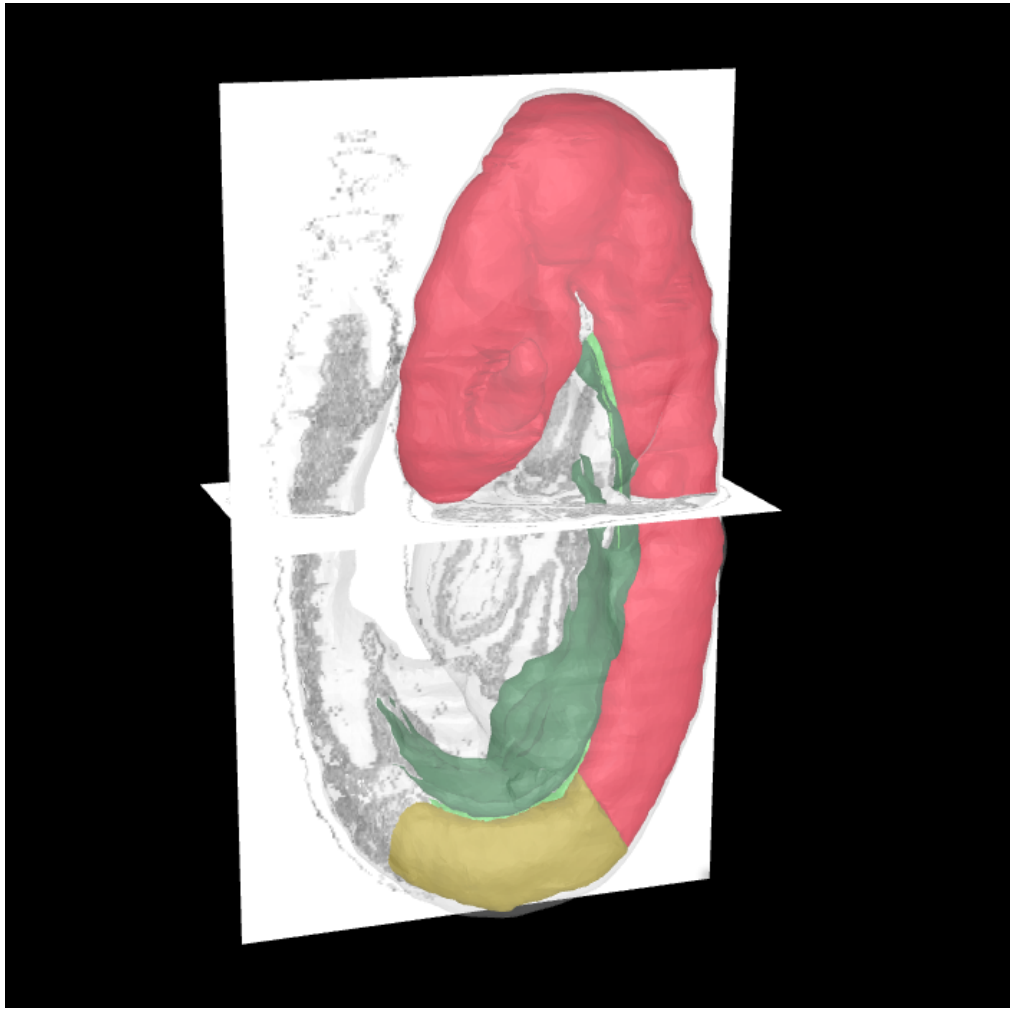
Example 1



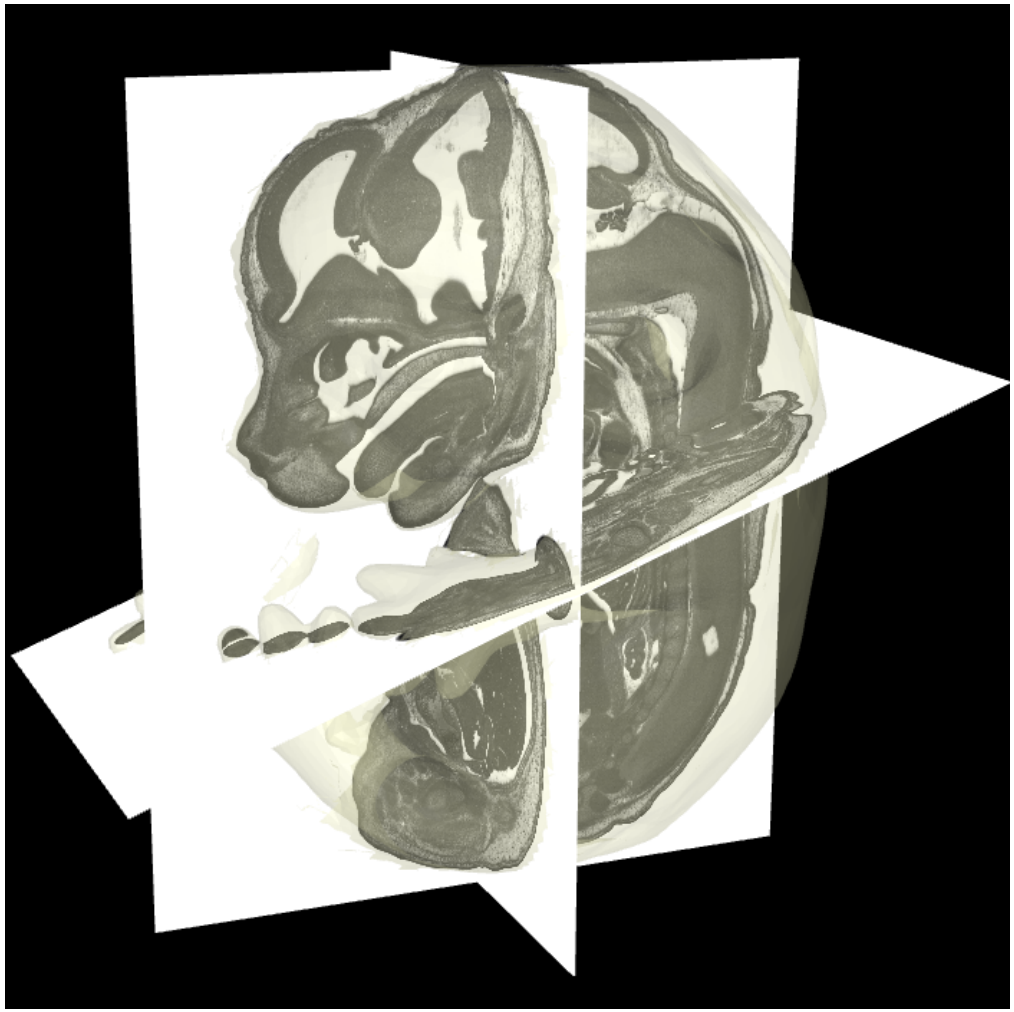
Example 2



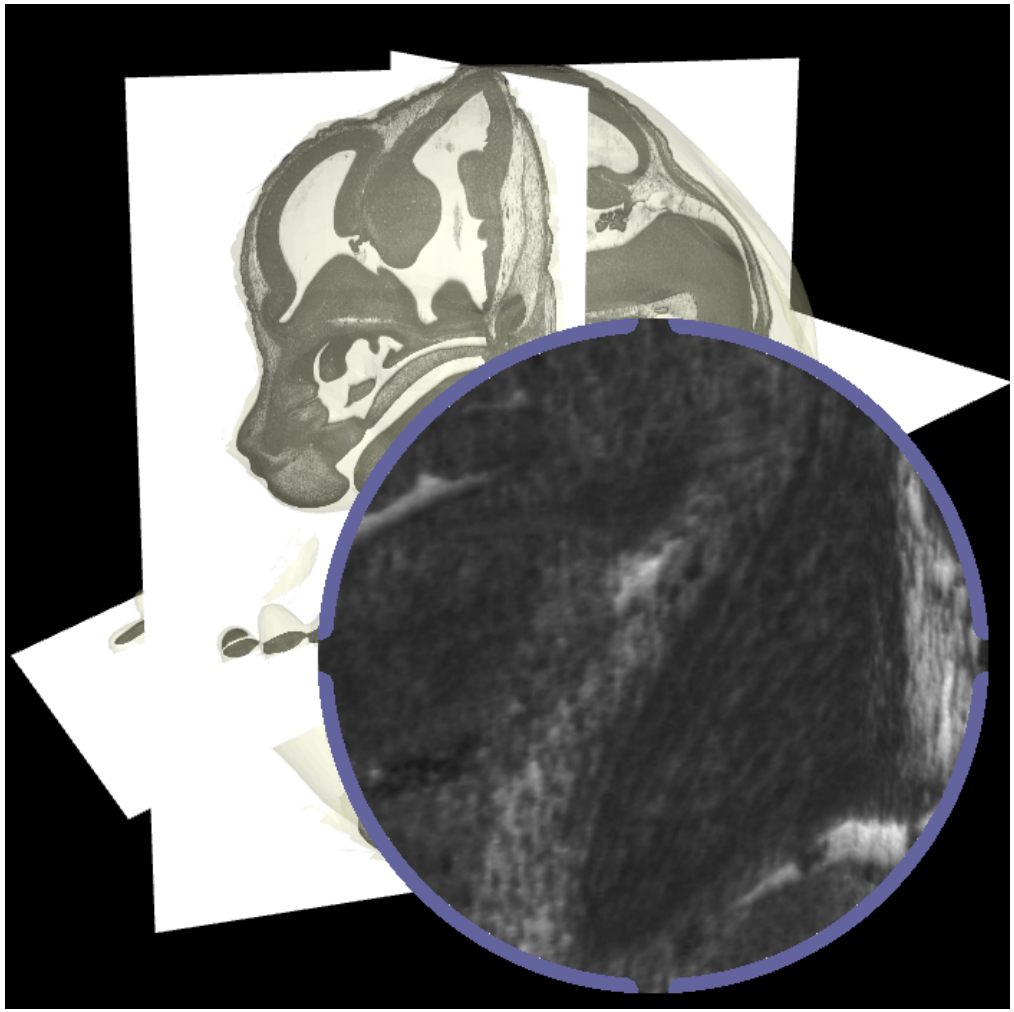
Example 3



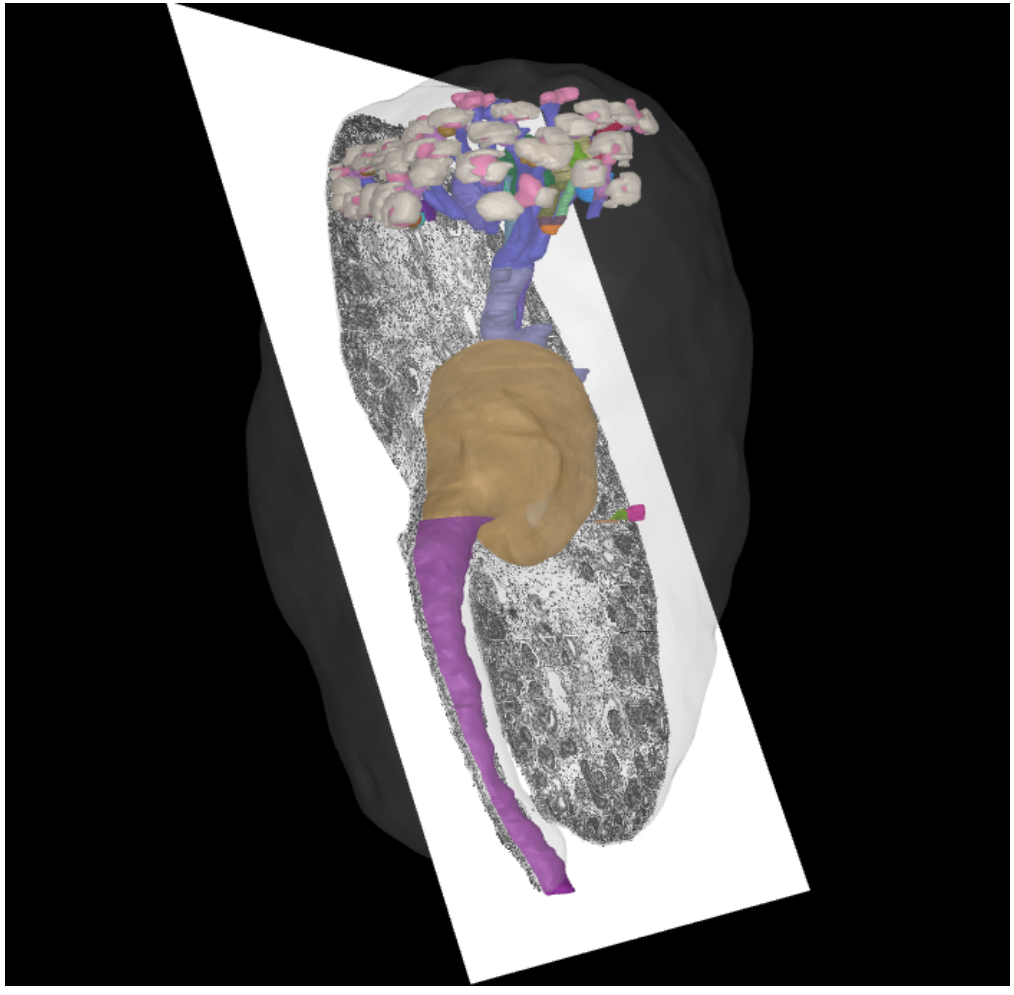
Example 4



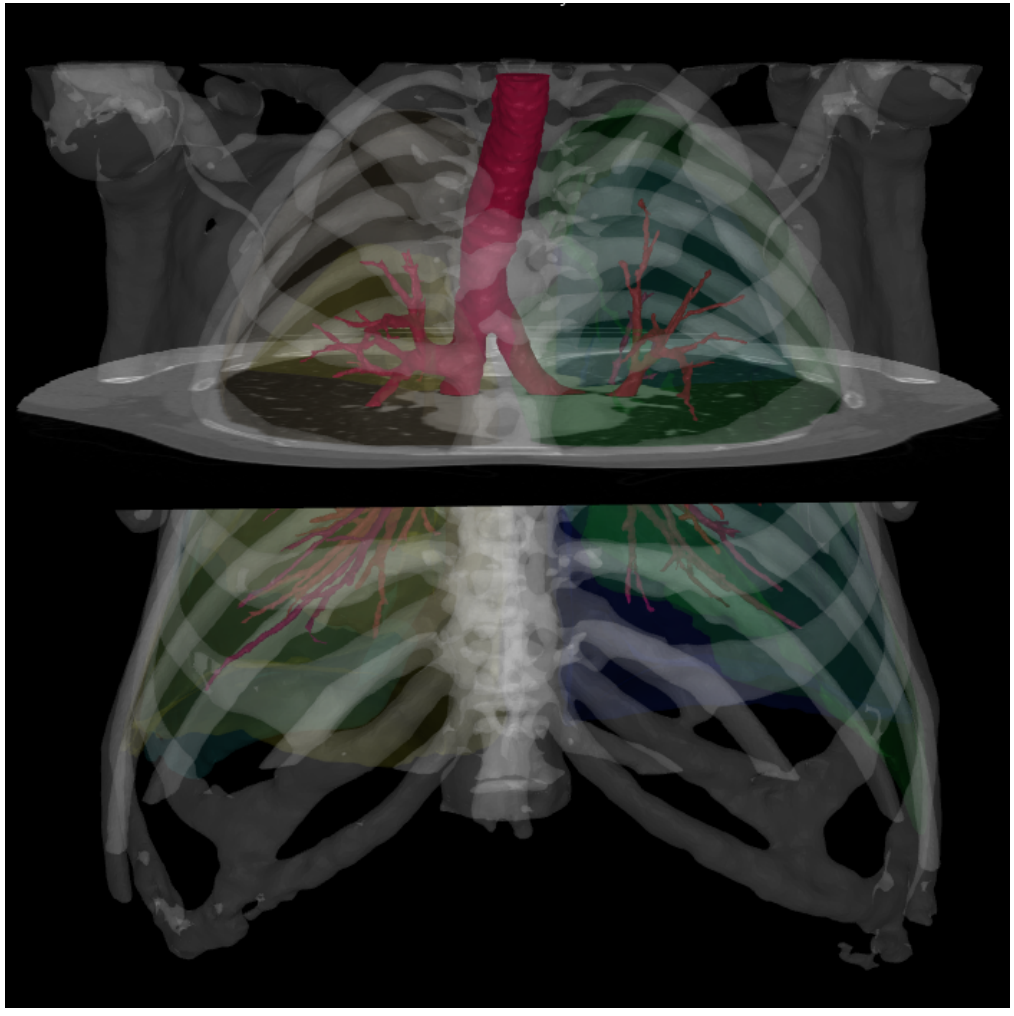
Example 4



Example 5



Example 6



Examples and Downloads

http://aberlour.hgu.mrc.ac.uk/MARenderTests/ema27-test.html
http://aberlour.hgu.mrc.ac.uk/MARenderTests/test-plane.html
http://aberlour.hgu.mrc.ac.uk/MARenderTests/ema107-test.html
http://aberlour.hgu.mrc.ac.uk/MARenderTests/ema103-test.html
http://www.emouseatlas.org
http://www.emouseatlas.org/eAtlasViewer_ema/
application/ema/anatomy/EMA27.php

https://github.com/ma-tech

http://threejs.org/