Lung Anatomy + Particle Deposition (lapd) Mouse Archive

for Modeling and Computational Toxicology

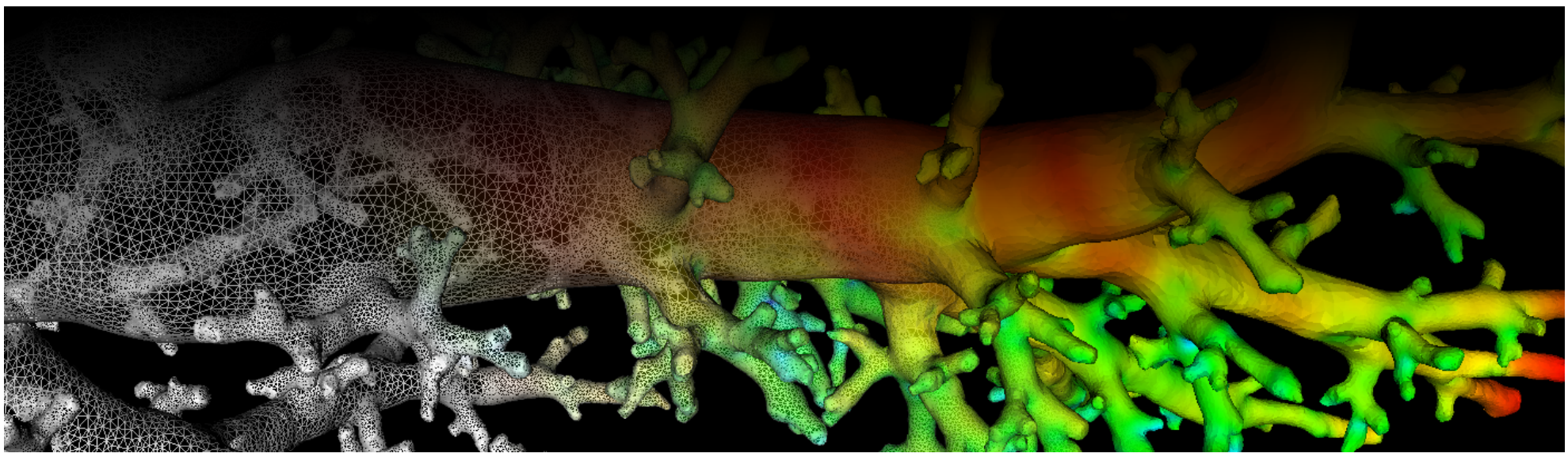
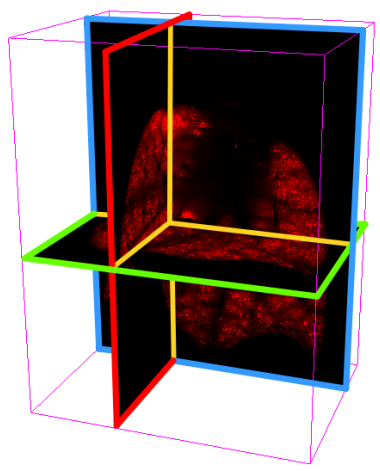


Image volume *_AerosolNormalized*.mha



Normalized aerosol deposition image volume.

Normalized aerosol deposition image volume utilized for all deposition measurements. (Fig. 1). The full resolution image ***_AerosolNormalized.mha** as well as versions downsampled by by factor 2 and 4 in each dimension are stored in files ***_AerosolNormalizedSub2.mha** and ***_AerosolNormalizedSub4.mha**, respectively.

The aerosol deposition volumes (before as well as after deconvolution) *_Aerosol*.mha and *_AerosolDeconv*.mha show a large variability in total aerosol deposition between mice, dependent on the fraction of aerosol that remained in the mouse lung after exposure. To allow for a better comparsion of aersol deposition patterns between mice, we normalize the aerososol deposition volumes. Segmentation masks of lobes and airways are combined and dilated, resulting in one image mask containing all tissue of interest. The average aerosol deposition after deconvolution *_AerosolDeconv*.mha inside this mask is calculated. Then, all voxels of *_AerosolDeconv*.mha are normalized (divided) by this average value and voxels outside the mask are set to zero, resulting in the normalized aerosol deposition image volume ***_AerosoNormalized.mha**. Consequently, a voxel value <1 indicates below average deposition and a value >1 above average deposition. This image volume is utilized for all deposition measurements.

Fig. 1: Coronal image slice of image volume showing normalized aerosol deposition.

The size and resolution of the resulting image volumes ***_AerosolNormalized.mha** vary slighly from mouse to mouse, but the full resolution images have a resolution in the range of 9x9x9µm and size in the range of 2000x2000x2500 voxels, resulting in an image volume >20GB per mouse when stored with 32 bit precision per voxel. The size and spacing is identical to their corresponding image volumes * Aerosol*.mha, * AerosolDeconv*.mha and * Autofluorescent*.mha.

Code Example

This examples shows how to read and write a volumetric image such as ***_AerosolNormalized*.mha** using C++ and ITK.

readWriteImage.cpp hosted with ♥ by GitHub view raw

```
/*
Example how to read and write intensity images used in lapdMouse project using ITK.

```bash
./readWriteImage m01_AerosolSub2.mha out.mha
```
*/

// ITK includes
#include <itkImage.h>
#include <itkImageFileReader.h>
#include <itkImageFileWriter.h>

int main(int argc, char**argv)
{
  if (argc!=3)
  {
    std::cerr << "Usage: " << argv[0] << " input output" << std::endl;
    return -1;
  }

  // typedef for volumetric images used in lapdMouse project
  typedef itk::Image< float, 3 > ImageType;
```

Related Data Structures

* RawCryomicotomeData | * Aerosol*.mha | * AerosolDeconv*.mha | * Autofluorescent*.mha

Related Code Examples

readWriteImage.cpp | imageLabelStatistics.cpp

Updated: 7/24/19
2018 r2b