

### Pre-defined project #1: ray-casting

Implement a ray-casting volume renderer that uses compositing for its ray function. The volume renderer should work on rectilinear grids, should be able to cast rays using perspective projection (i.e., like the slides in class) from arbitrary camera positions. The specifications (data set, transfer functions, camera positions, and image size) are available on the class website.

You should work with the data structures for a camera and a transfer function posted to the web as part of the project, as that is how I will specify the final images to make.

Your deliverables are two-fold:

- (1) your code
- (2) the image your code produces

### Pre-defined project #2: make a movie

Make a movie using VTK or using VisIt.

There is an online tutorial on VisIt:

[http://visitusers.org/index.php?title=Short\\_Tutorial](http://visitusers.org/index.php?title=Short_Tutorial)

The aneurysm and water flow data sets can be found here:

[http://www.visitusers.org/index.php?title=Tutorial\\_Data](http://www.visitusers.org/index.php?title=Tutorial_Data)

Some climate data sets can be found here:

<https://climatedataguide.ucar.edu/climate-data>

(I don't have experience with these data sets, but I can attest that VisIt works with NetCDF data. Probably VTK too.)

The movie will consist of many still frames that you will encode into a video format (i.e., MPEG). Your movie should animate things in the data set ... isovalue, colors, camera position, etc. It will be graded on how polished the movie appears, and how well you convey the nature of the data.

If you don't show a movie by Friday March 16<sup>th</sup>, then you should upload it to YouTube and send me a link.