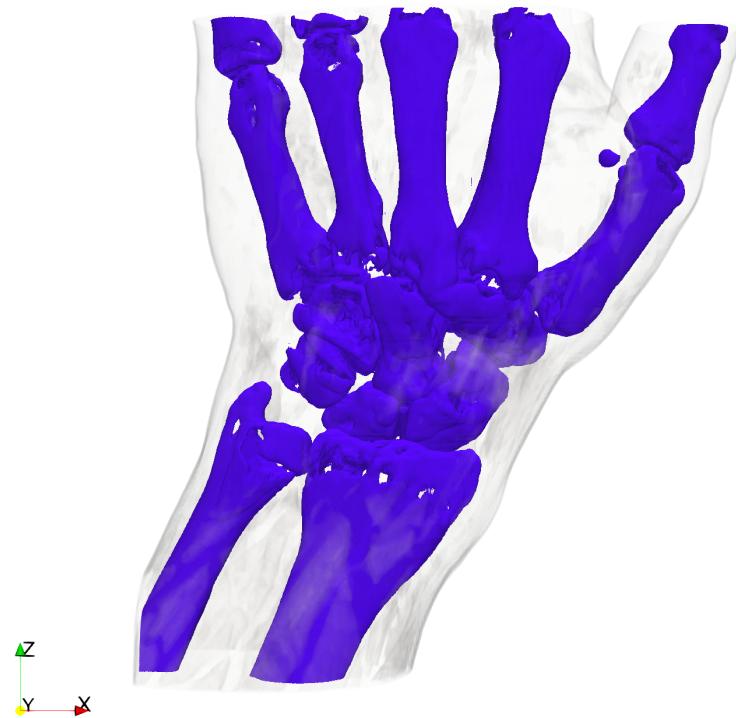


CS 6635 - Assignment 3

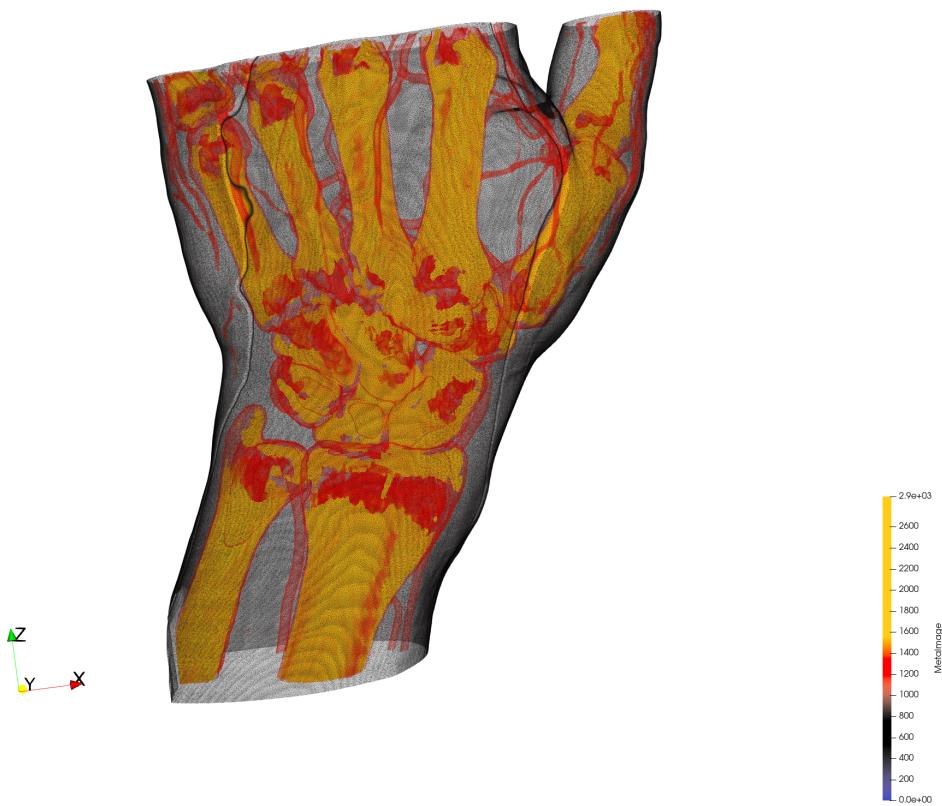
Question 1:



The above image is of skin.



The above image is of bone and transparent skin.



The above image is of bones, blood vessels and transparent skin.

It is to be noted that all of the above images have been obtained by manipulating the 1D transfer functions with the attempt to get closest to the images given in the assignment.

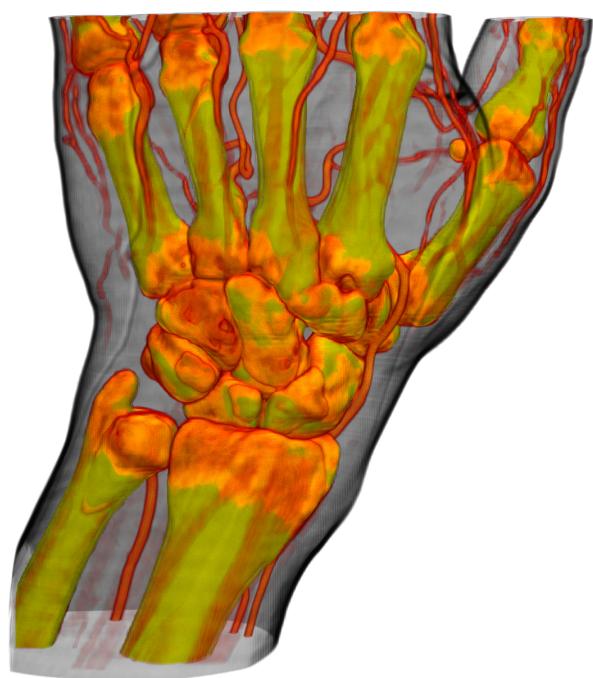
Question 2



The above image is of skin.



The above image is of bone and transparent skin.



The above image is of bones, blood vessels and transparent skin.

It is to be noted that the above three images have been generated by manipulating the 2D transfer functions with the attempt to get closest to the images given in the assignment.

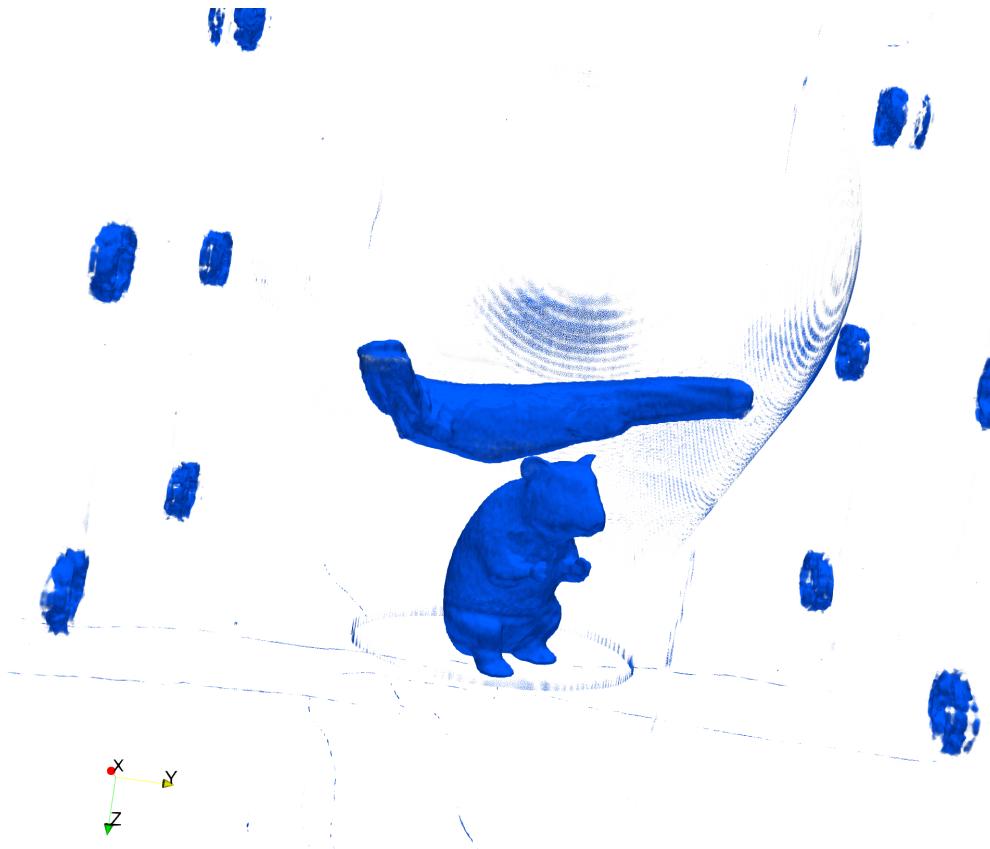
I personally felt that 1D transfer function was more intuitive and it took me lesser time to use it. So I feel the pros of 1D transfer function are that it is more intuitive and takes lesser time.

At the same time, once I got used to 2D transfer function I understood that this provides us with more control. For instance, in the case of 1D transfer function boundaries with the same function value are always extracted together but in 2D transfer function one can visualise one boundary without the other. So, I think a huge pro for 2D transfer functions is that it gives more control.

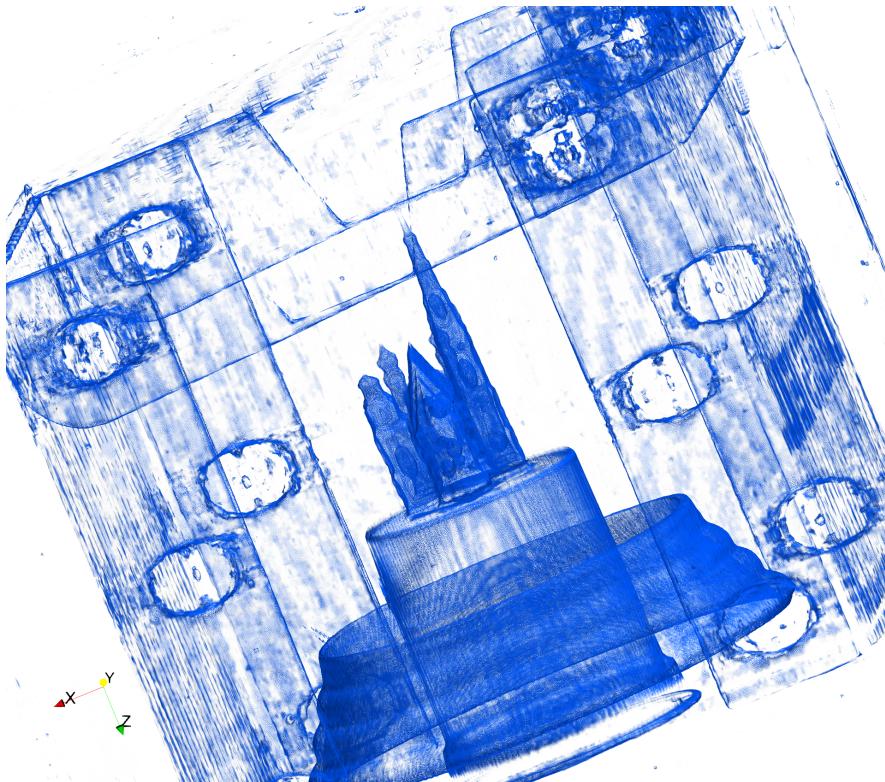
Question 3



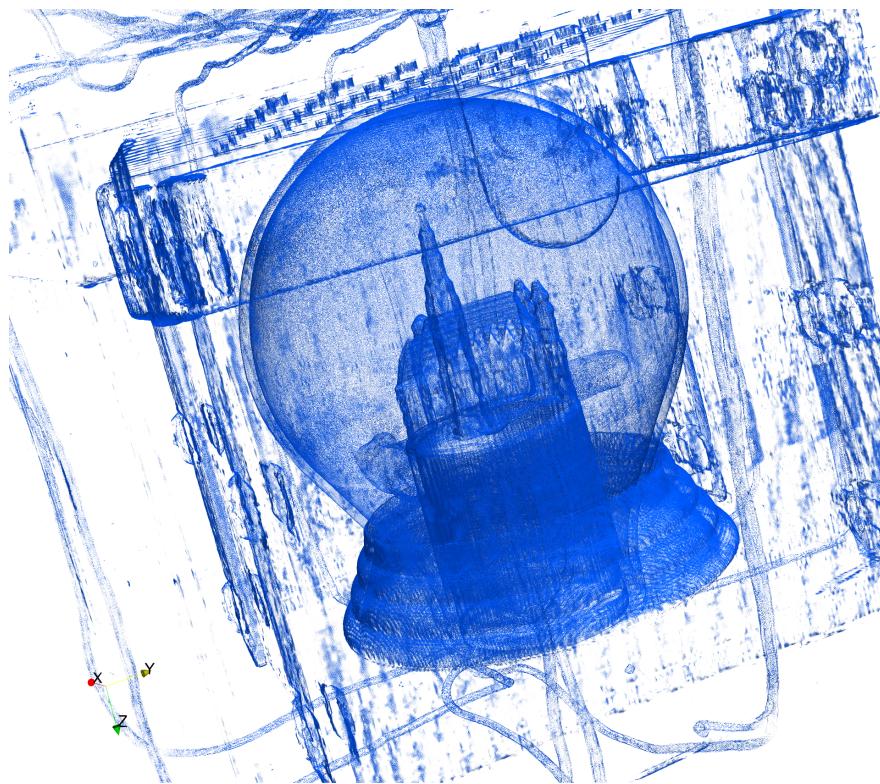
The above is the image of the present along with the gift wrap and ribbon. It is to be seen that the gift wrap has a star pattern as well. This has been obtained by manipulating the 1D transfer function.



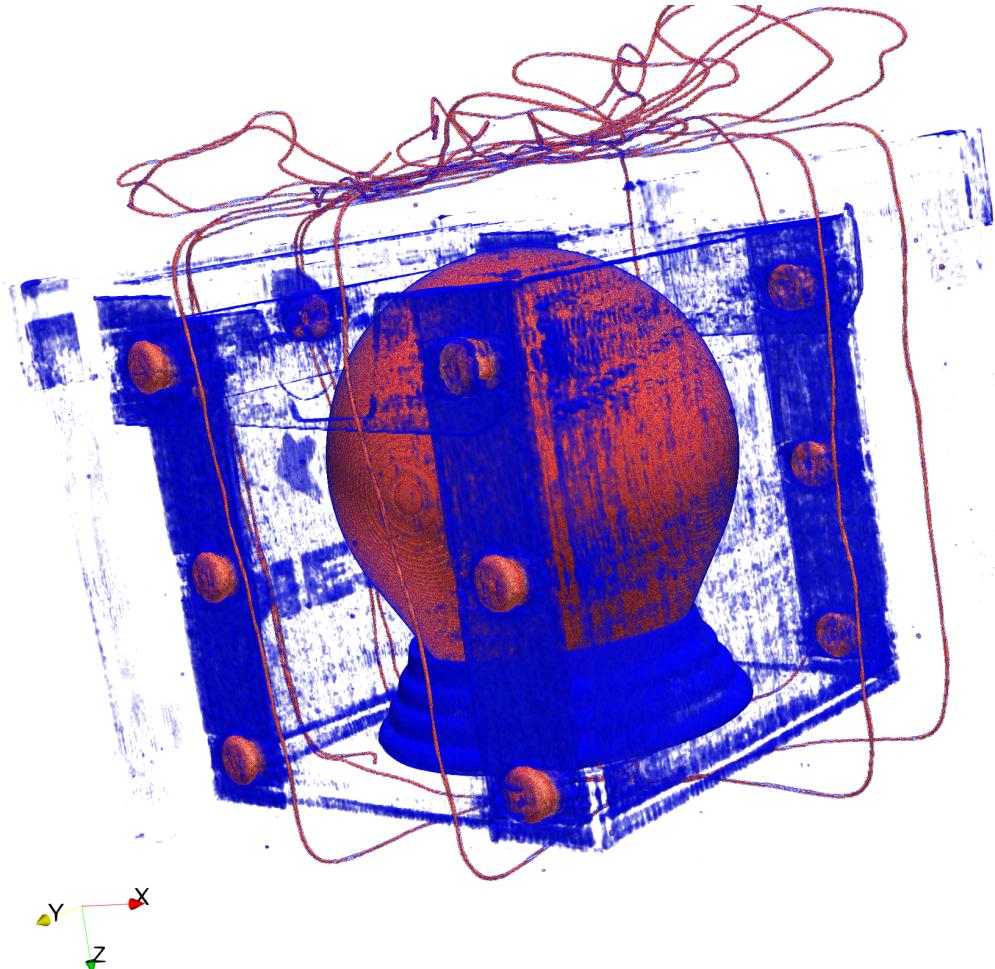
This image has been obtained by manipulating the 2D transfer function. It clearly shows that the given dataset seems to have a rat and a lizard-like animal inside it.



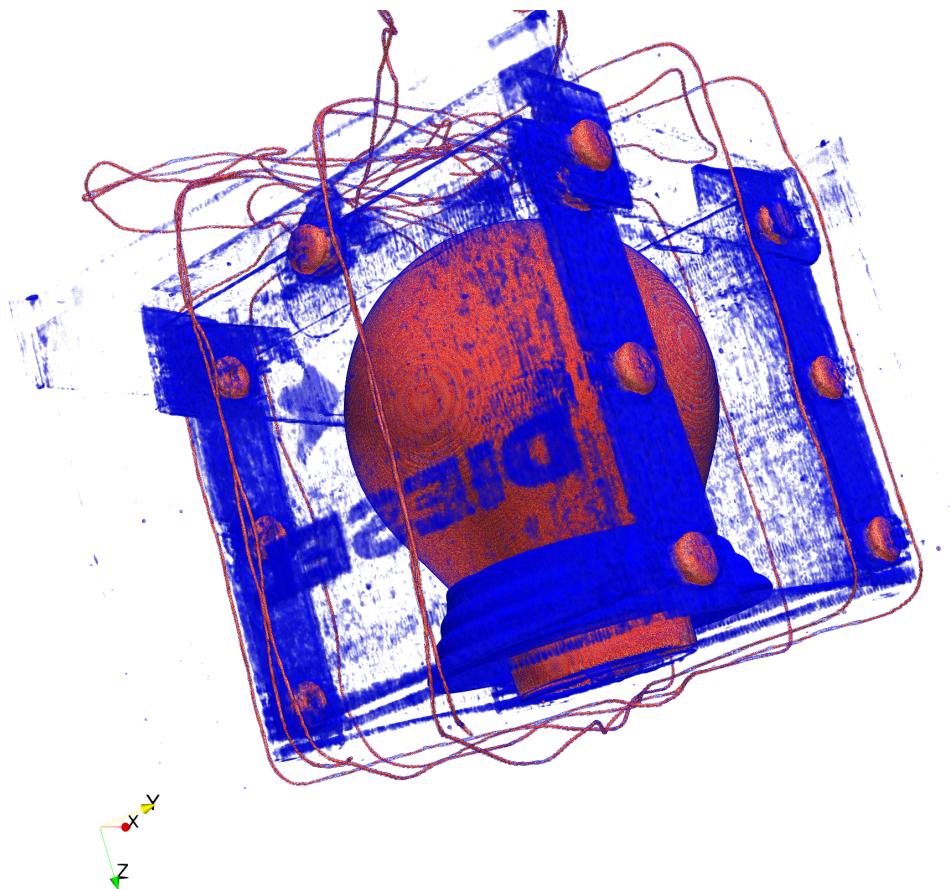
The above image has been obtained by manipulating the 2D transfer function. It looks like the dataset has a palace inside it.



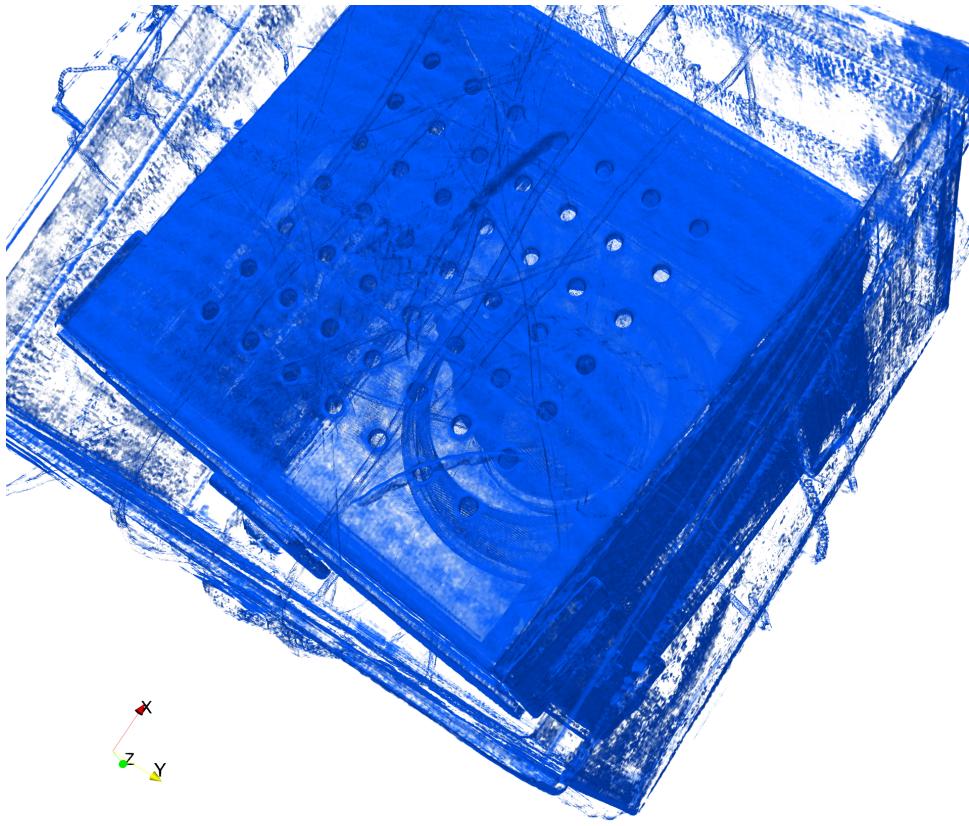
The above image has been obtained by manipulating the 2D transfer function. It looks like the data set has a light bulb-like thing inside (I am not sure about this object).



Again, the above image has been obtained by manipulating the 2D transfer function. From this image it seems that all of the above mentioned objects are inside a smaller box which is inside the large present box. The nails/screws of this smaller box are evident in the above image. Further, the light-bulb shaped object is clearly visible in this image.

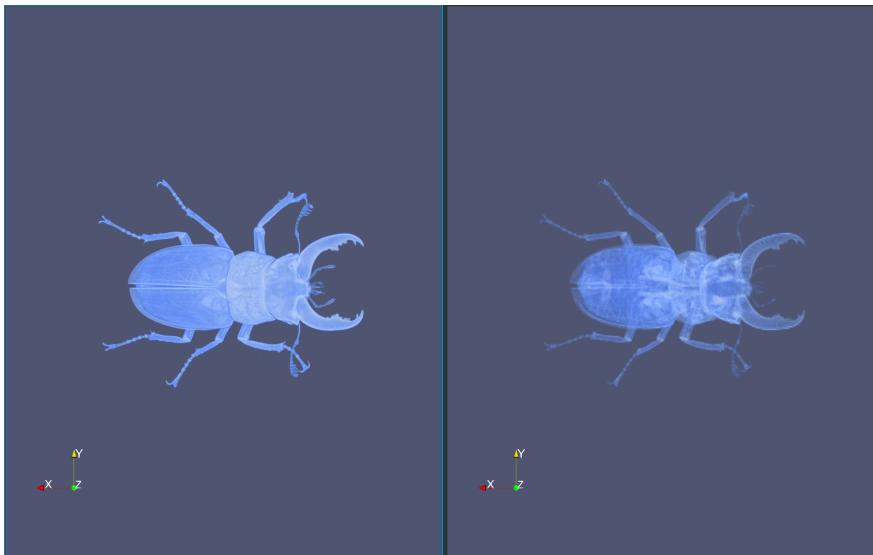


The above image has been obtained by manipulating the 2D transfer function. It seems like the word 'DIESEL' is written on the smaller box.



The above image has been obtained by manipulating the 2D transfer function. This shows that one of the faces of the smaller box seems to have small holes.

Question 4

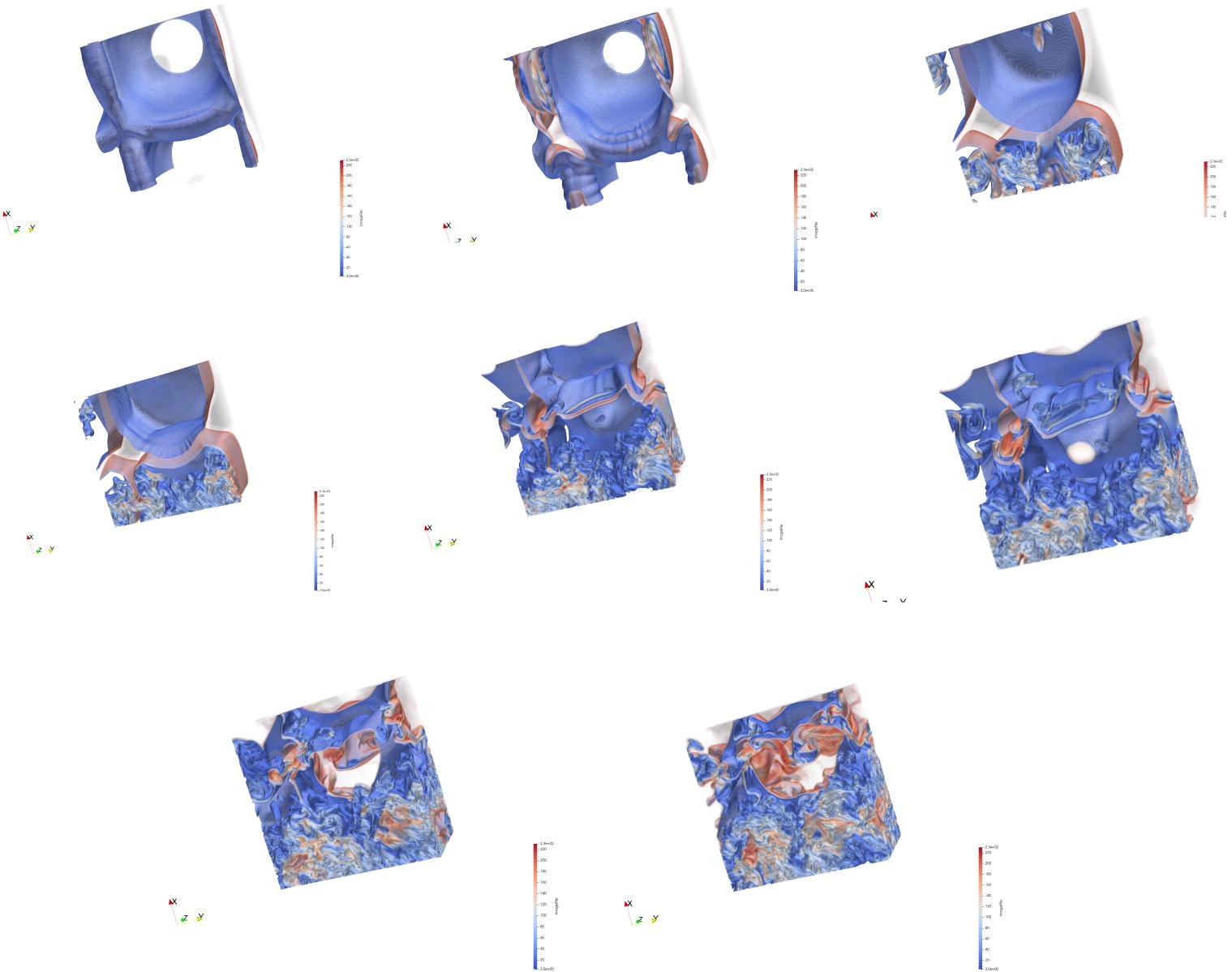


As the question asks, the above image has been generated by converting the .dat files to .raw files. The code is present in the attached GitHub repo (convert.py). The left side shows the data set with 832X832X494 and the right side shows the data set with 208X208X123.

There is stark difference in the quality of the visualisation. The features are more sharply visible in the image of higher resolution. Further, if one wants to study finer details about the stag beetle it would be better to use the high resolution data set since it gives better precision to details.

At the same time, during interactive visualisation the higher resolution data set may result in performance issues if the machine is not of decent specifications.

Question 5



The above images are the images obtained from the unknown data given in the assignment - they have been placed in order.

It seems to be a time-varying dataset of some kind of simulation of combustion fumes. This may not be evident clearly from the still images but is quite clear when played together as a video. You may look at the video in the state file (5.pvsm) attached.

Remarks: I have attached the state files for Q1 and Q2 if one wants to see the transfer functions used. The .pvsm file names correspond to the question numbers.

<https://github.com/DhruvMeduri/CS6635.git>