

# How To Export A Fractal From Mandelbulb 3D

Programs you need : Mandelbulb 3d v1.99 or latest version for best results

<https://fractalforums.org/index.php?action=downloads;sa=view;down=2>

Meshlab 2016 <http://www.meshlab.net/>

Fiji (Method 2) <https://imagej.net/Fiji/Downloads>

Blender 3D <https://www.blender.org/> (or the 3d software of your choice)

I should start by mentioning that before you export your fractal, there are 3 main methods I will go over to get your object ready for use in another 3d program, like Blender. I will give a quick overview of the 3 main methods I have used.

**Method 1:** Use the Bulbtracer option to turn the fractal directly into an .OBJ file

**Method 2:** Use the Voxelstack option and compile the image stack in Fiji, then export as an .OBJ file

**Method 3:** Use the Bulbtracer option to turn the fractal into a point cloud. It can then be turned into a mesh using Meshlab 2016

All of these methods have their own pros and cons so it is up to you to find the method that works for you and your fractals. This is just intended to be a template you can start with.

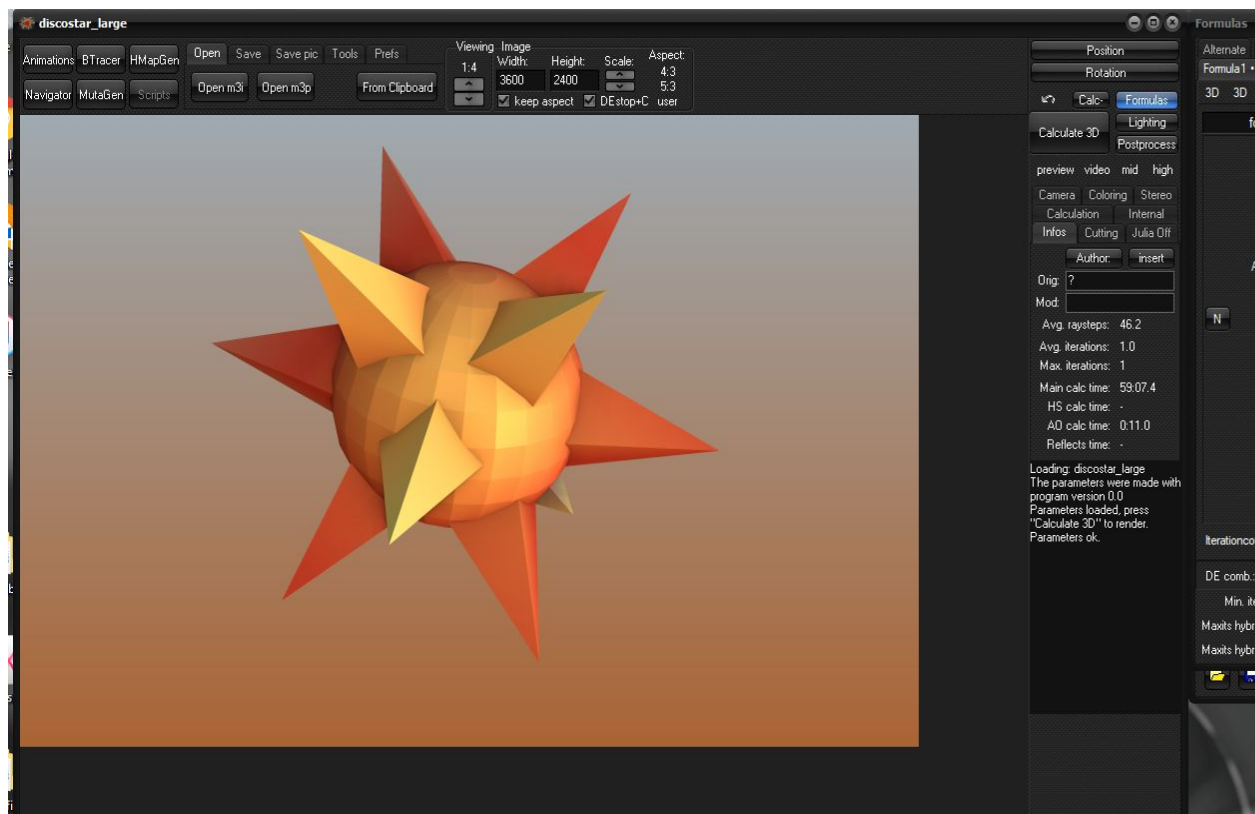
[Method 1: Bulbtracer to .OBJ](#)

[Method 2: Voxel Stacks](#)

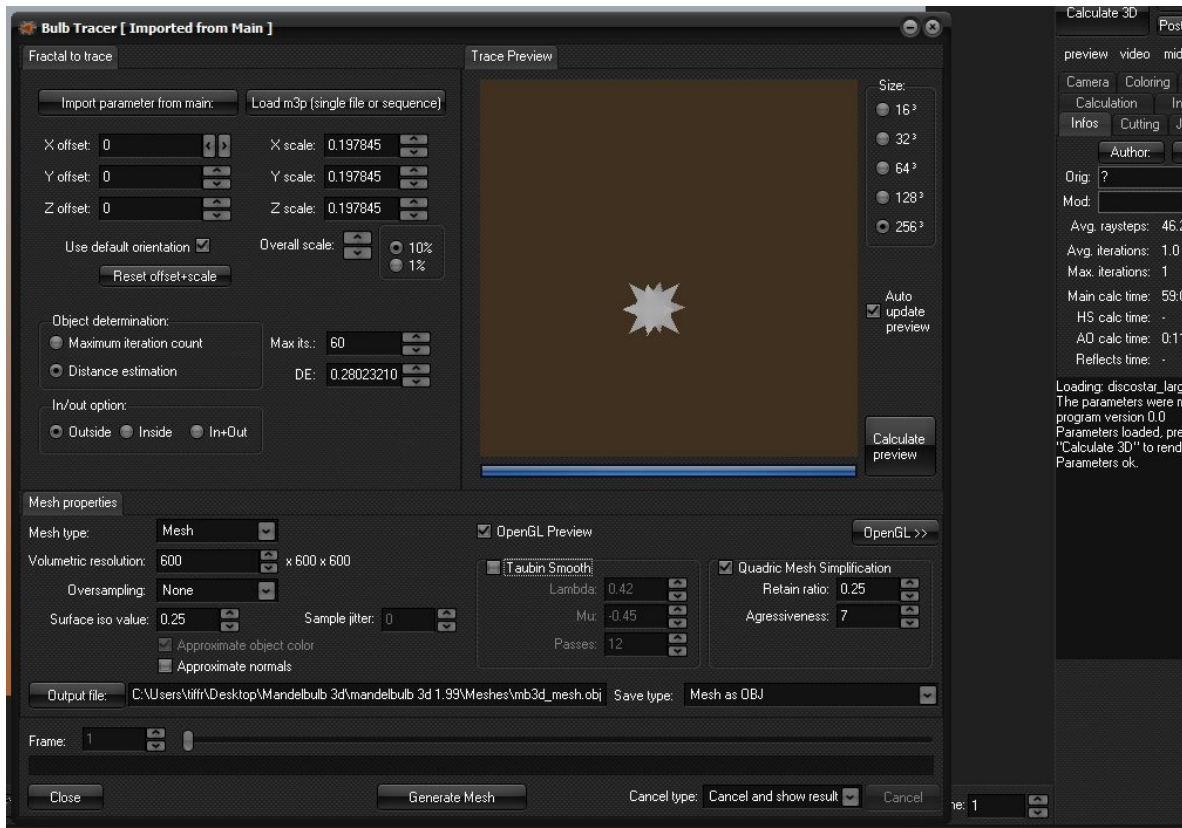
[Method 3: Point Clouds](#)

## Method 1: Bulbtracer to .OBJ

**Step 1: Create your fractal.** Click on the BTracer button.



**Step 2: Mesh Properties**



1) Import your parameters from the main window. If necessary, decrease overall scale until you see your whole fractal in the preview window. Set preview size to  $256^3$  for the highest resolution preview.

2) Mesh properties settings:

*Mesh type:* Mesh

*Volumetric Resolution* could be anywhere from about  $400 \times 400 \times 400$  to  $1000 \times 1000 \times 1000$ , but the higher the number, the more faces and vertices it will produce. Find a size that works best for your fractal.

uncheck taubin smooth, save type: Mesh as OBJ

3) Click “Generate Mesh”. This may take a while. When its finished, it will save to your Mandelbulb 3d Meshes folder by default.

### Step 3: Meshlab

Open your .OBJ file in **Meshlab** and follow the cleaning steps....

- Filters -> Cleaning and Repairing -> Merge Close Vertices. Apply
- Filters -> Cleaning and Repairing -> Remove duplicate faces. Apply
- Filters -> Cleaning and Repairing -> Remove duplicated vertex. Apply

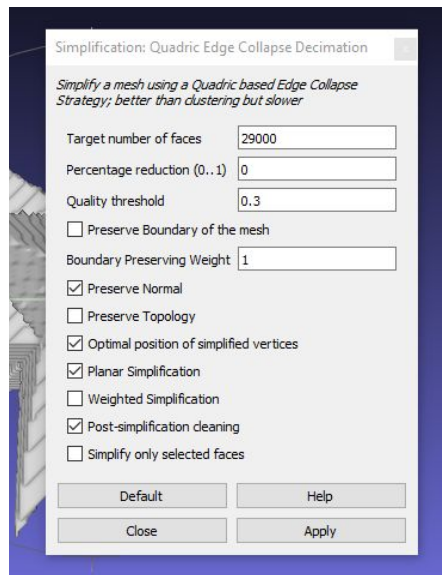
- Filters -> Cleaning and Repairing -> Remove zero area faces. Apply
- Filters -> Cleaning and Repairing -> Remove unreferenced vertices. Apply
- Filters -> Cleaning and Repairing -> Remove faces from non manifold edges. Apply
- Filters -> Remeshing, Simplification and Reconstruction -> Close Holes. Apply
- Filters -> Normals, Curvature and Orientation -> Re-Orient All faces Coherently

Some of these cleaning steps may seem redundant or unnecessary for your fractal. Experiment until you find what works best.

\*Optional - Your mesh may have turned out to have millions of faces and vertices. To reduce the total number of polygons to make it a little easier to work with, you can then go to...

- Filters -> Remeshing, Simplification and Reconstruction -> Simplification: Quadric Edge Collapse Decimation. Enter your desired target number of faces. Check the boxes Preserve Normal, Optimal Position of Simplified Vertices, Planar Simplification, Post-simplification cleaning, and Uncheck all of the rest. Apply

When doing this, you will lose some of the detail of your fractal because you are changing the overall geometry.



- Filters -> Cleaning and Repairing -> Remove faces from non manifold edges. Apply

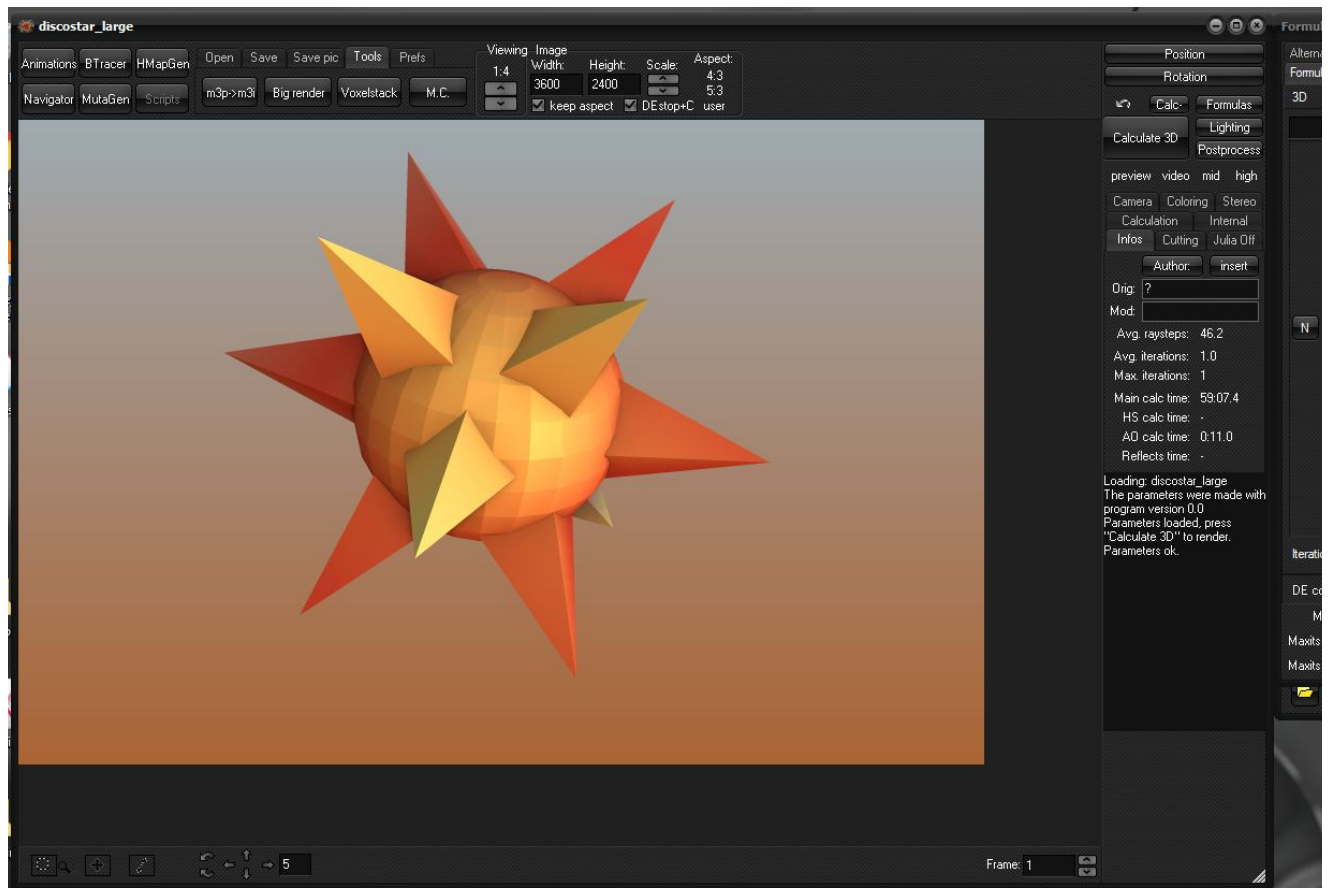
If your mesh looks a bit jagged or rough, you can smooth it out, but you may lose some of the fine details. Go to...

- Filters -> Smoothing, Fairing, and Deformation -> HP Laplacian Smooth. Apply

When you are satisfied with your mesh, go to File ->Export

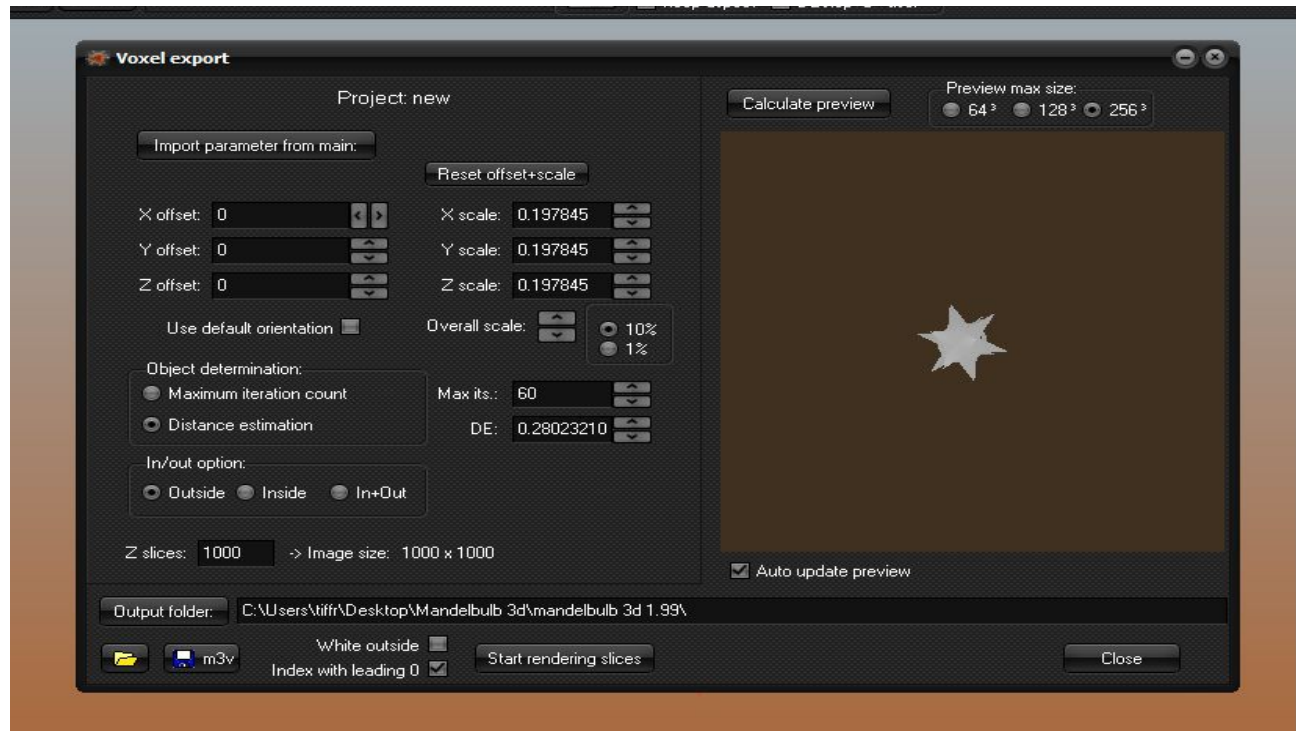
## **Method 2: Voxel Stacks**

**Step 1: Create your fractal.** Click the Tools Tab, then the Voxelstack button.



## Step 2: Mesh Properties

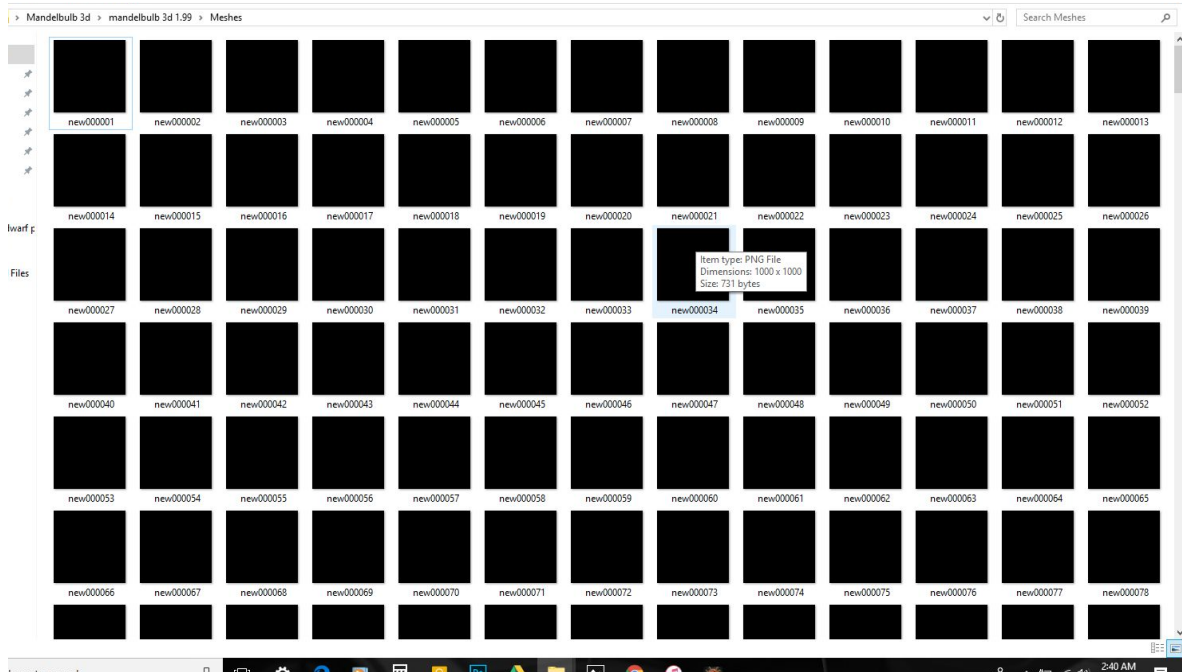
1) Import your parameters from the main window. If necessary, decrease overall scale until you see your whole fractal in the preview window. Set preview size to  $256^3$  for the highest resolution preview.



2) Mesh properties settings:

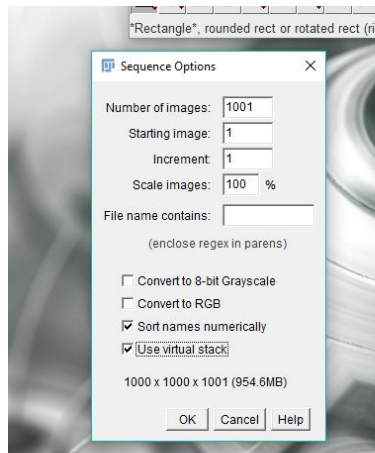
*Z slices (Volumetric Resolution)* could be anywhere from about 400x400x400 to 1000x1000x1000, but the higher the number, the more faces and vertices it will produce. Find a size that fits for your fractal.

3) Click “Start rendering slices”. This may take a while. They will save to your Mandelbulb 3d folder by default.



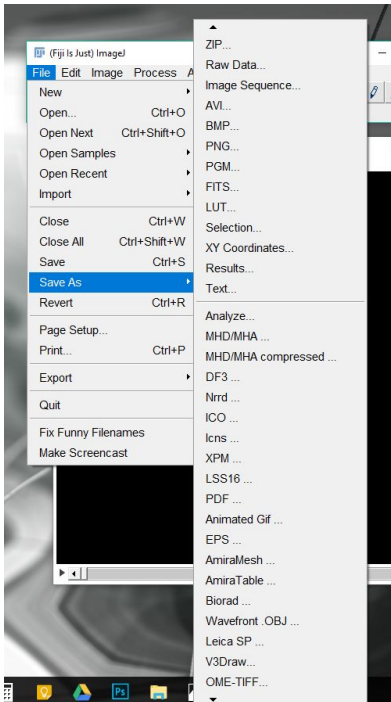
### Step 3: Fiji ImageJ

- Import your voxel stacks in Fiji: File -> Import -> Image Sequence. Choose the first image in the sequence that was rendered and click open.

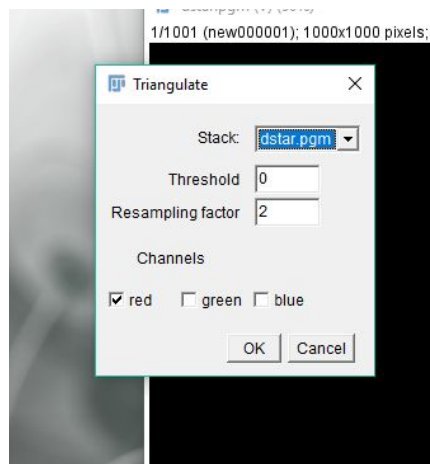


- Check Use Virtual Stack and click ok.
- Go to File -> Save As -> PGM. You can save it in a folder of your choice.





- Go to File -> Save As -> Wavefront .OBJ. Set Threshold to 0, UNcheck Green and UNcheck Blue and click ok.



Once you save the file, Fiji will start compiling the images. You will see a progress bar fill up but check the size of your file. When the file size stops increasing, you will know it has finished writing the file.

#### Step 4: Meshlab

Open your .OBJ file in **Meshlab** and follow the cleaning steps....

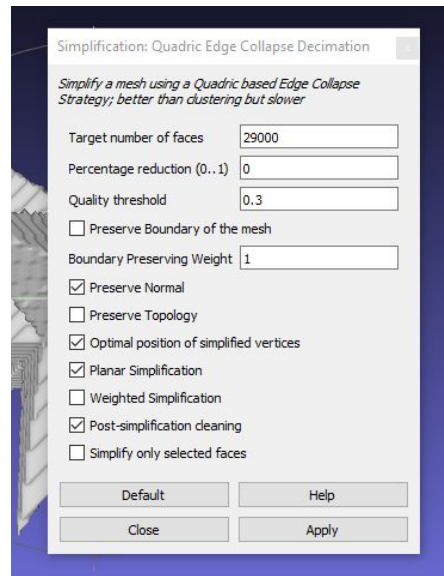
- Filters -> Normals, Curvature and Orientation -> Invert Face Orientation. Apply
- Filters -> Cleaning and Repairing -> Merge Close Vertices. Apply
- Filters -> Remeshing, Simplification and Reconstruction -> Close Holes. Apply
- Filters -> Normals, Curvature and Orientation -> Re-Orient All faces Coherently



\*Optional - Your mesh may have turned out to have millions of faces and vertices. To reduce the total number of polygons to make it a little easier to work with, you can then go to...

- Filters -> Remeshing, Simplification and Reconstruction -> Simplification: Quadric Edge Collapse Decimation. Enter your desired target number of faces. Check the boxes Preserve Normal, Optimal Position of Simplified Vertices, Planar Simplification, Post-simplification cleaning, and Uncheck all of the rest. Apply.

When doing this, you will lose some of the detail of your fractal because you are changing the overall geometry.



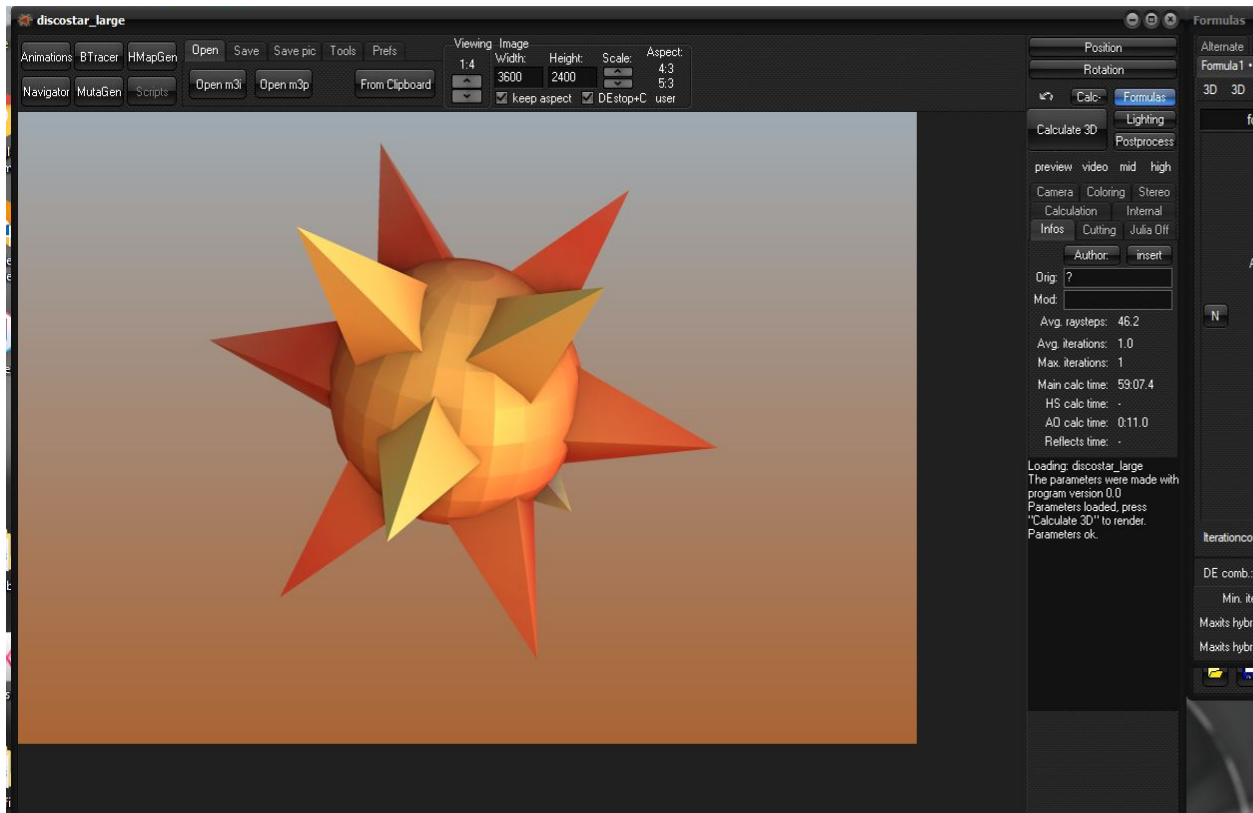
- Filters -> Cleaning and Repairing -> Remove faces from non manifold edges. Apply  
If your mesh looks a bit jagged or rough, you can smooth it out, but you may lose some of the fine details. Go to...

- Filters -> Smoothing, Fairing, and Deformation -> HP Laplacian Smooth. Apply

When you are satisfied with your mesh, go to File ->Export

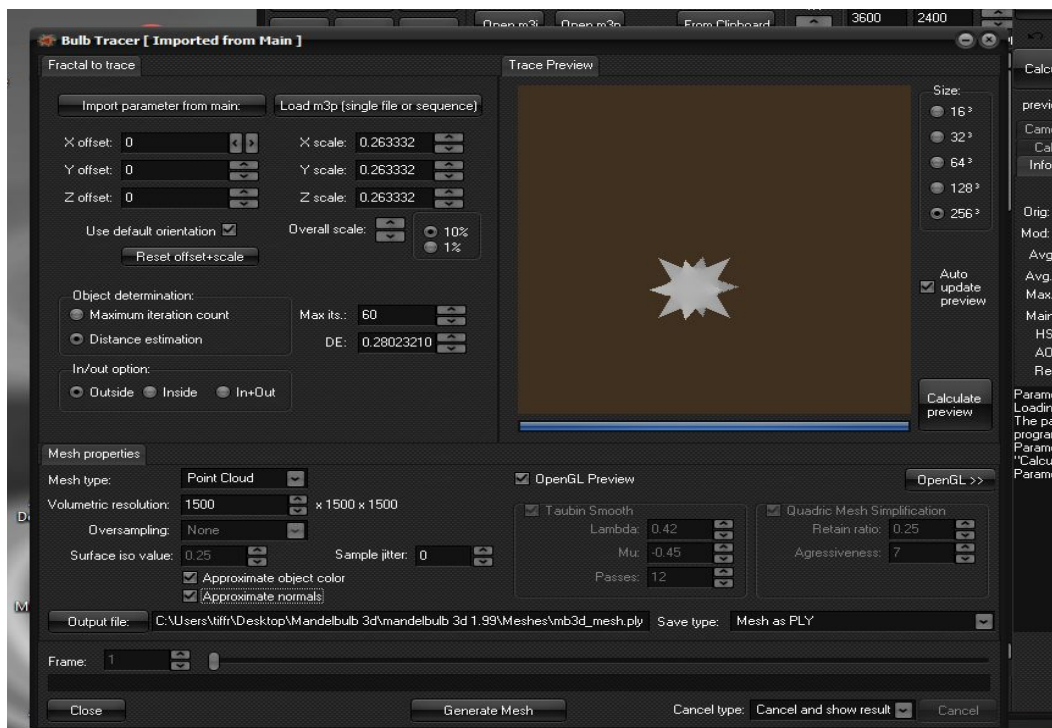
## **Method 3: Point Clouds**

**Step 1: Create your fractal** in Mandelbulb 3d 1.99 or the most current version. Click on the BTracer button.



## Step 2: Mesh Properties

1) Import your parameters from the main window. If necessary, decrease overall scale until you see your whole fractal in the preview window. Set preview size to  $256^3$  for the highest resolution preview.



2) Mesh properties settings:

*Mesh type:* Point Cloud

*Volumetric Resolution* could be anywhere from about 1000x1000x1000 to 2000x2000x2000, but the higher the number, the more faces and vertices it will produce. Find a size that works best for your fractal.

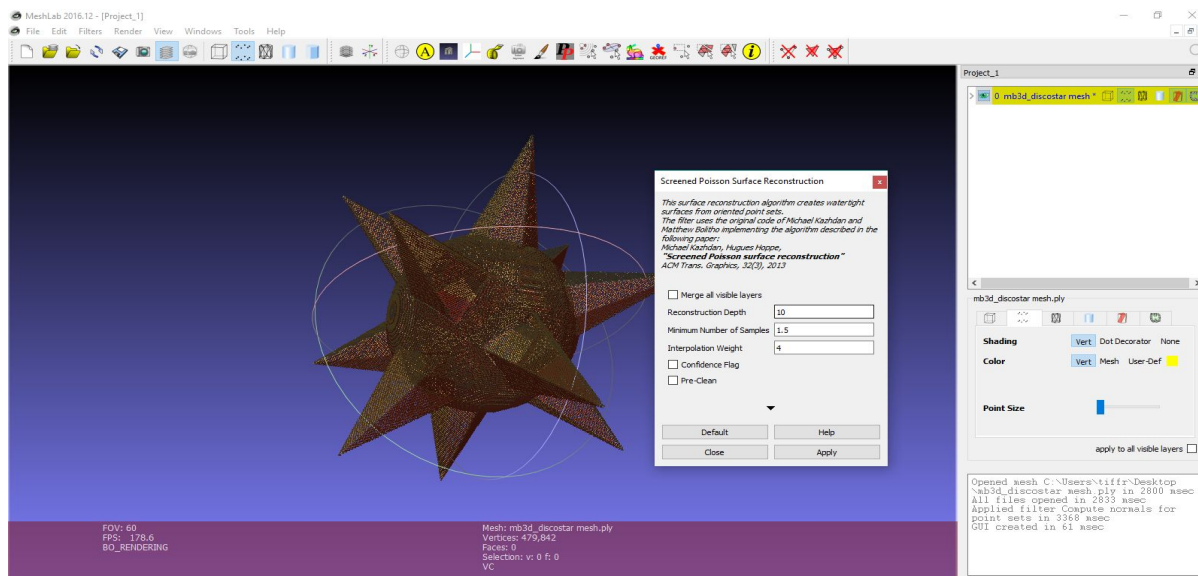
Check approximate normals, save type: Mesh as PLY

3) Click “Generate Mesh”. This may take a while. When its finished, it will save to your Mandelbulb 3d Meshes folder by default.

### Step 3: Meshlab

Go to **Meshlab** and follow the steps for your PLY (Point Cloud) file

- Filters -> Normals, Curvature, and Orientation -> Compute normals for point sets. Apply
- Filters -> Remeshing, Simplification, and Reconstruction -> Screened Poisson Surface Reconstruction. Apply (Reconstruction depth controls the level of detail in the reconstruction. It can be raised slightly, but it will take longer to process.)



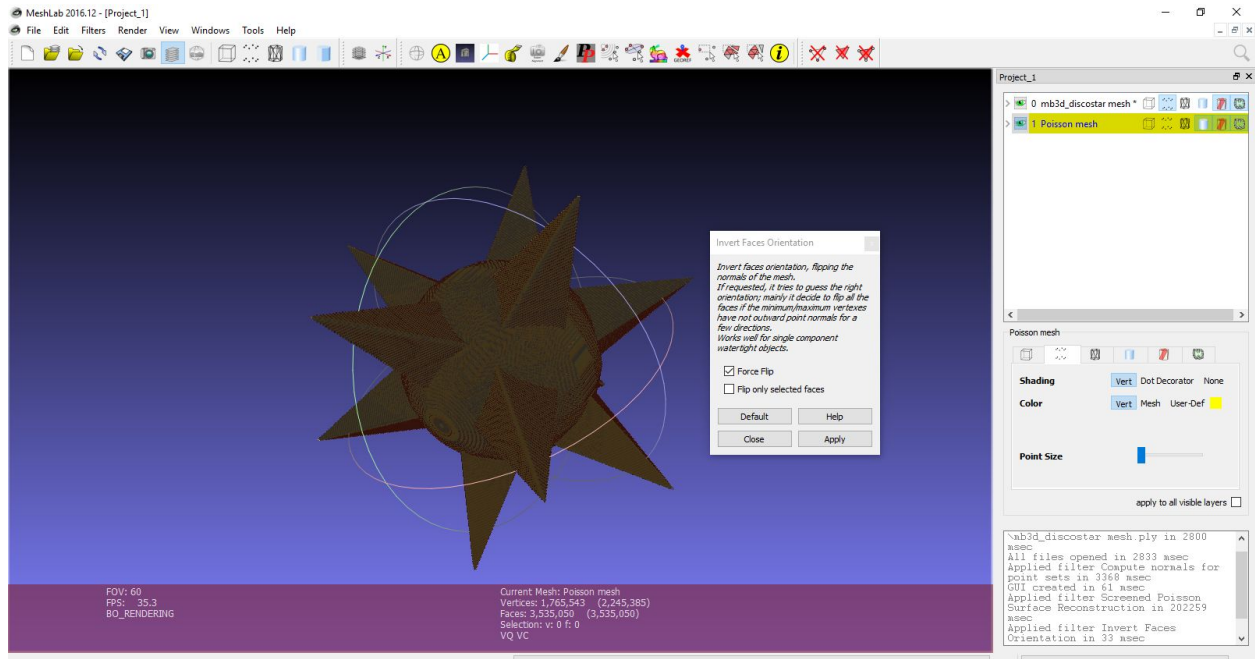
Sometimes this process can create extra geometry, and your mesh may look blown up like a balloon. It seems you can avoid this by making sure your normals are correct before you reconstruct your mesh. To try to delete the extra geometry, you can go to:

- Filters > Selection > Select faces with edges larger than... (Check preview and select threshold amount; {ex. 0005}). Delete Selection

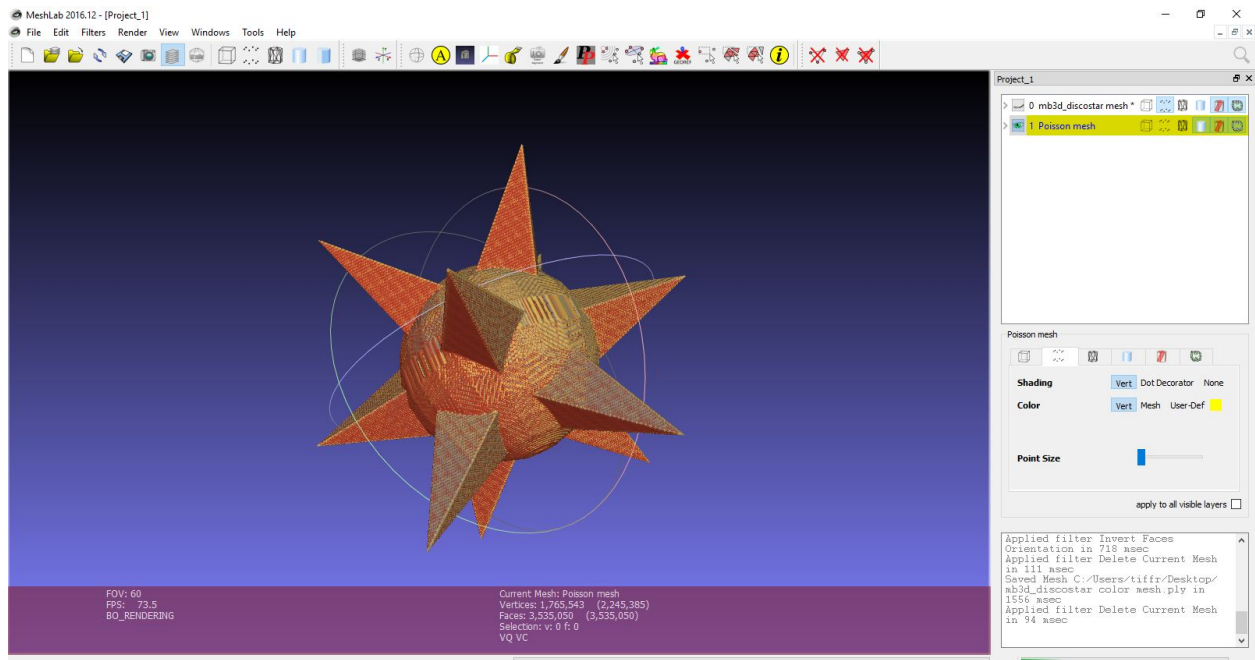
Or...

- Filters > Selection > Select by Vertex quality (Check preview and select a min/max quality; Apply. Delete Selection

If your mesh looks unusually dark, you may have to flip normals



- Filters -> Normals, Curvature and Orientation -> Invert Face Orientation. Apply. (Make sure you have the poisson mesh selected.)
- Filters -> Sampling -> Vertex Attribute Color (check transfer color, normals). Apply (Source: M3D PLY, Target: Poisson Mesh). Apply. After you transfer normals to the new mesh, you may have to flip them again. If so, go...
- Filters -> Normals, Curvature and Orientation -> Invert Face Orientation. Apply. (Make sure you have the poisson mesh selected.)



If your mesh looks a bit jagged or rough, you can smooth it out, but you may lose some of the fine details. Go to...

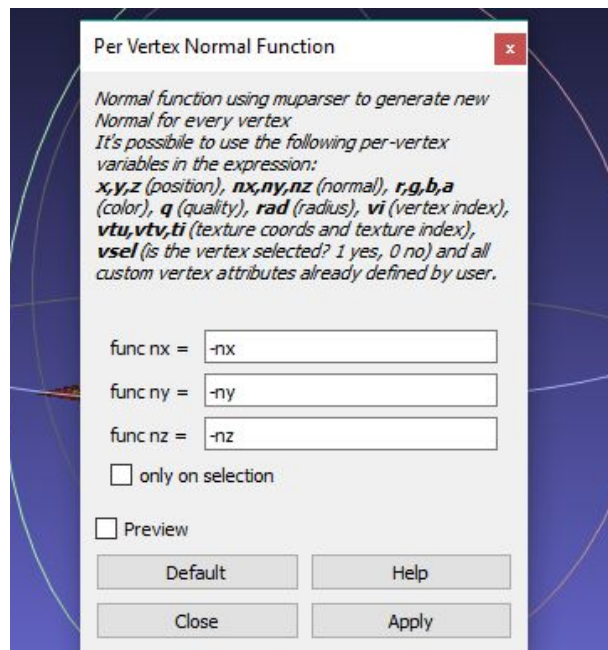
- Filters -> Smoothing, Fairing, and Deformation -> HP Laplacian Smooth. Apply

When you are satisfied with your mesh, go to File -> Export Mesh As. Name the file, click save and ok. Saving as a ply file will preserve the color data.

*Note:* Sometimes point clouds with over approx. 1,000,000 vertices will not compute all normals correctly.

If you are having trouble with your normals, start over with this method:

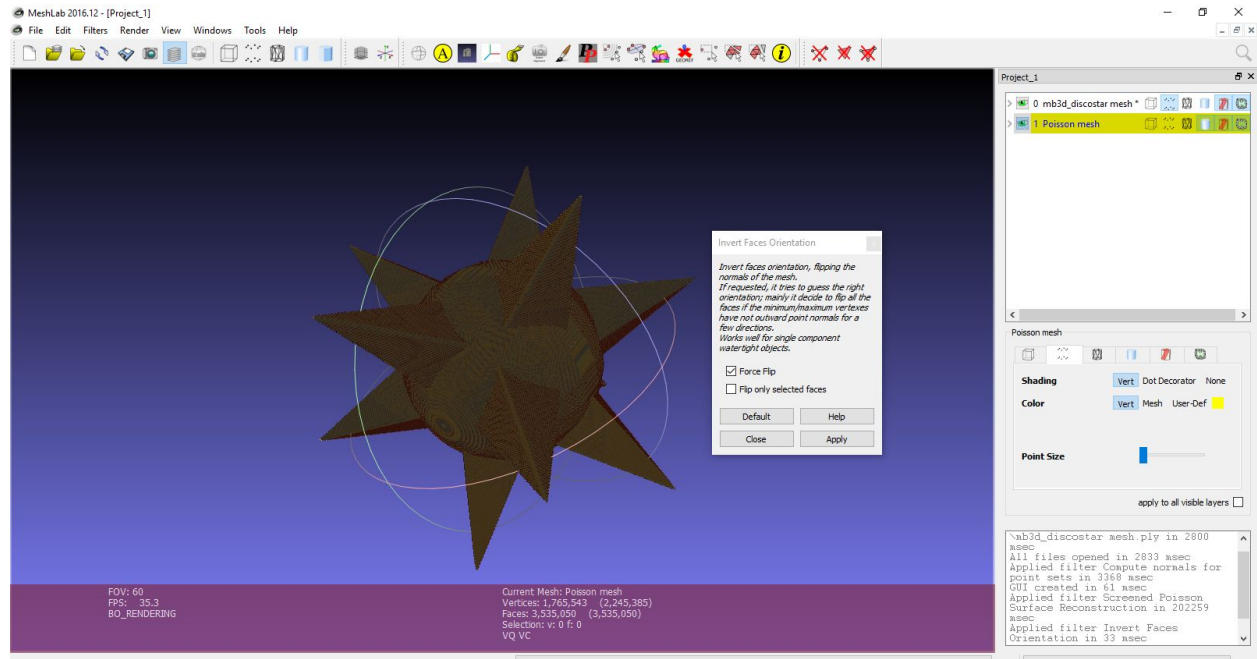
- Filters -> Normals, Curvature, and Orientation -> Per Vertex Normal Function. Keep default settings and Apply. It will compute normals on every vertex so they are all facing inward.



- Filters -> Remeshing, Simplification, and Reconstruction -> Screened Poisson Surface Reconstruction. Apply (Reconstruction depth controls the level of detail in the reconstruction. It can be raised slightly, but it will take longer to process.)

If your mesh still looks unusually dark, you will have to flip normals

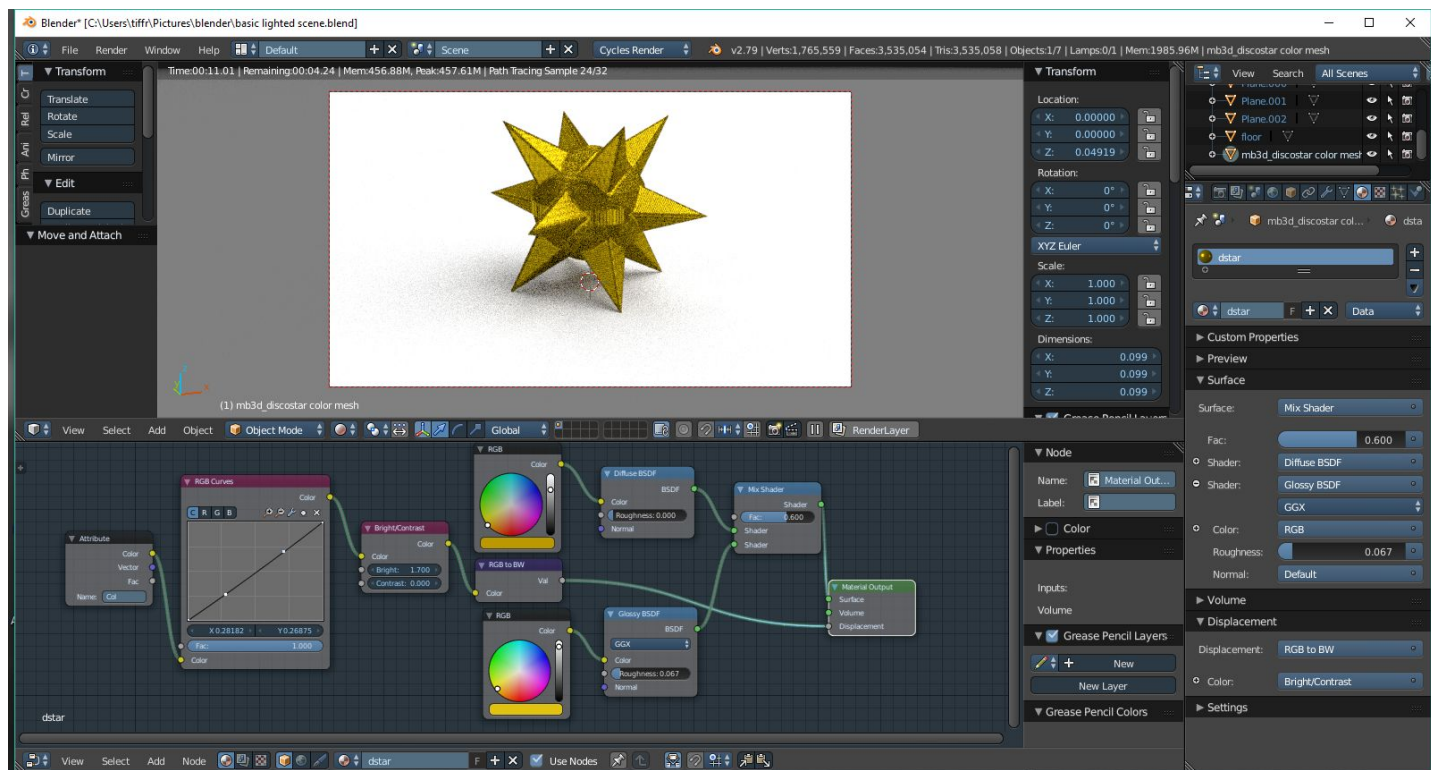




- Filters -> Normals, Curvature and Orientation -> Invert Face Orientation. Apply. (Make sure you have the poisson mesh selected.)
- Filters -> Sampling -> Vertex Attribute Color (check transfer color). Apply (Source: M3D PLY, Target: Poisson Mesh).

When you are satisfied with your mesh, go to File ->Export. Name the file, click save and ok. Saving as a ply file will preserve the color data.

**NOTE:** When exporting as a point cloud the color data can, but won't always, transfer completely to your satisfaction on some fractals. You can always re-color your mesh in the 3d program of your choice. Here, I am using Blender for example:

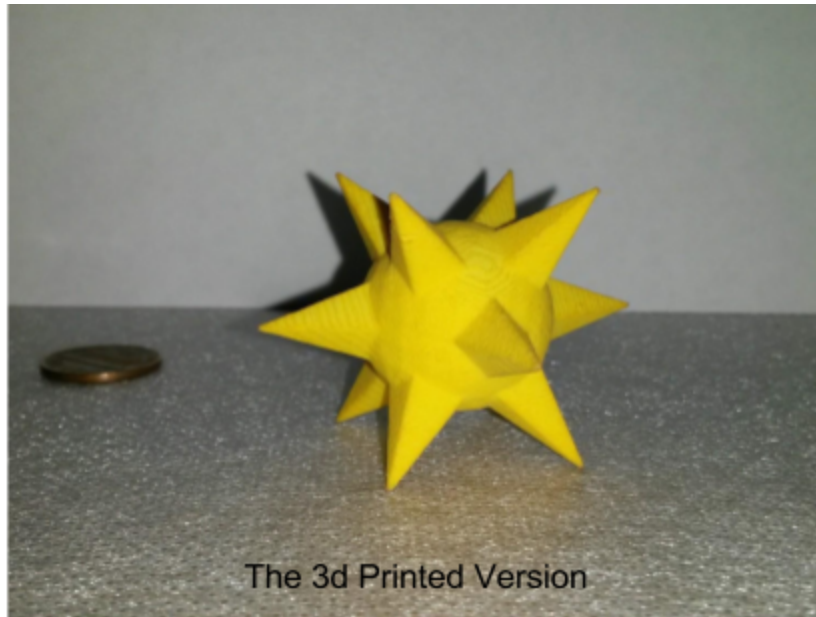


Now you can let your imagination take over!



A Trio of Discostars





And there you have it. A special thanks to Don Whitaker, Nic022 (RIP), Mandelwerk, Michael A. Prostka, Harry Rose, Andreas Maschke, and the rest of Mandelbulb 3D community for the support and inspiration!

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