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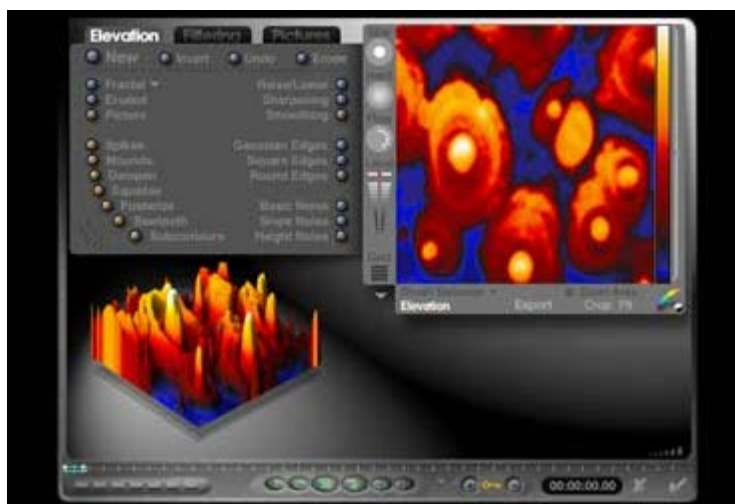


Photo by: Jack and Sue Drafahl

### 3D Underwater Macro

Jack and Sue Drafahl

In early 2000, NASA sent up a space shuttle to re-map the entire Earth and create Digital Elevation Maps (DEM). You are probably scratching your head wondering just what this has to do with underwater photography? Believe it or not, much of the technology used in underwater exploration comes from spinoff technologies related to space exploration. Often it comes in the form of computer software and hardware that share applications useful to underwater research.



As software reviewers for several photography magazines, we recently ran across a program called Bryce 4 from Corel Corp that uses DEM files to create 3D maps of different parts of the United States. We quickly realized that we could apply this same technology to underwater macro pictures. The surface of small underwater animals like the skin of a starfish, sea cucumbers and coral all resemble land masses on Earth. Right?

We loaded a couple of images and watched to see how the program converted these macro landscapes into 3D images. They looked great! After extensive experimentation, we found that with the help of Adobe Photoshop, we could create full-color DEM images. We were able to convert two-dimensional 35mm images into 3D digital files that could be rotated and viewed from any angle.

So why stop there? We found that we also could fly through a scene and create a high-

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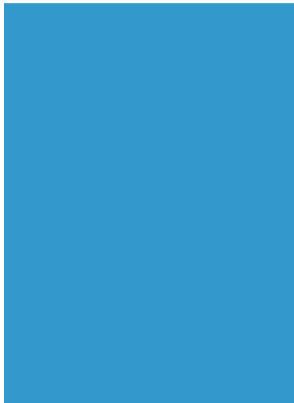
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resolution video. Wow! We took a single shot of a brain coral, scanned it into the computer and imported it into Corel Bryce 4. The DEM converter then was used to create a 3D image of the brain coral. Next, we created a short movie, where we flew towards the brain coral, turned 90 degrees, and coasted down one of the ridges formed by the coral. What a ride! Best of all, we found that we could also add water visibility, control the angle of the light or its fall-off and generate extremely high-resolution images.

Granted, the images are not a perfect representation of the actual shapes, but they are interesting since they provide a depth of field beyond any known laws of photographic physics. We will continue to experiment, so stay tuned as we provide updates on this and other future spinoff technologies.



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### Starfish



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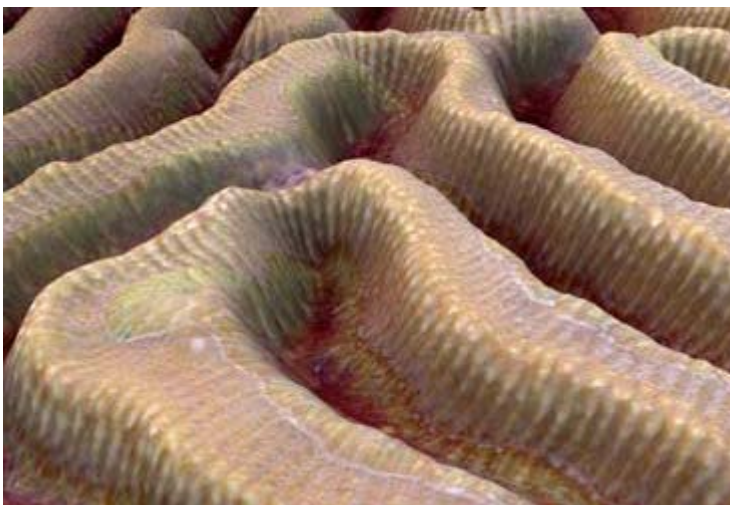
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### Coral



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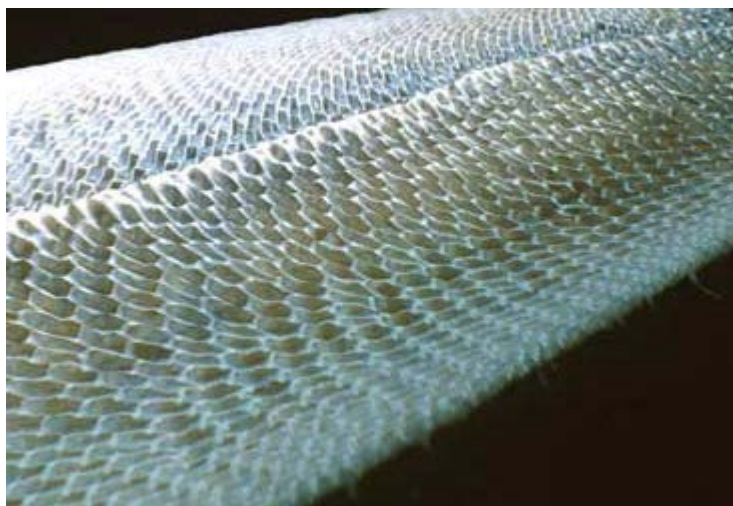
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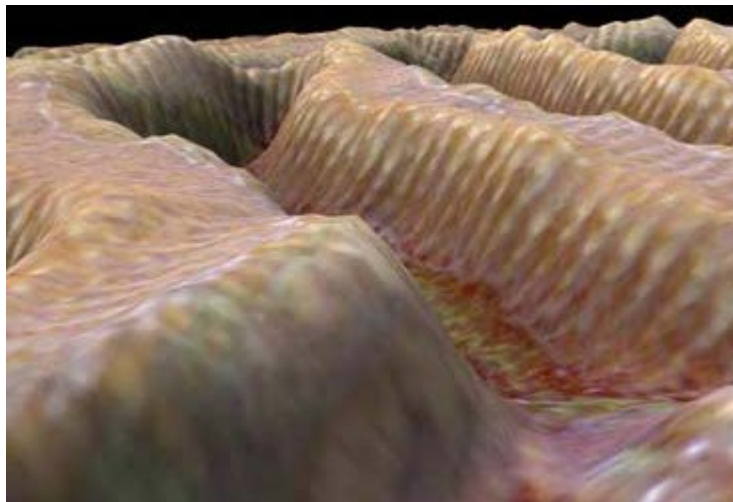


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