

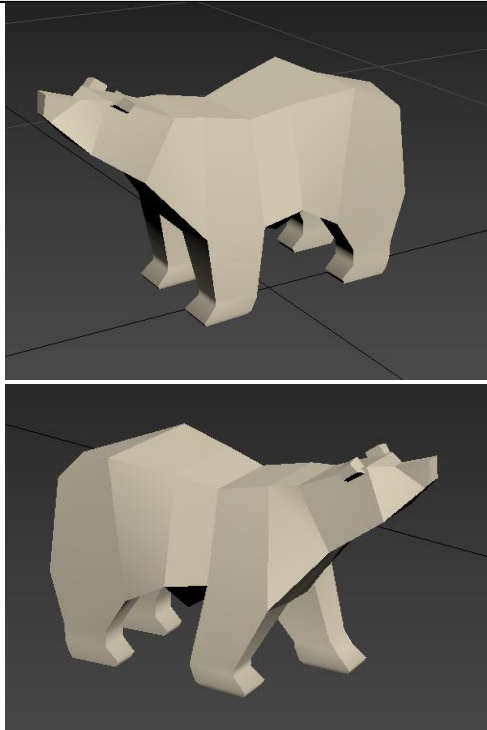
Reach for the North

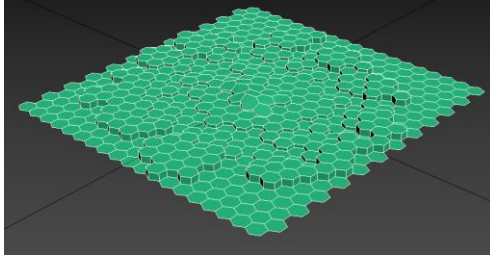
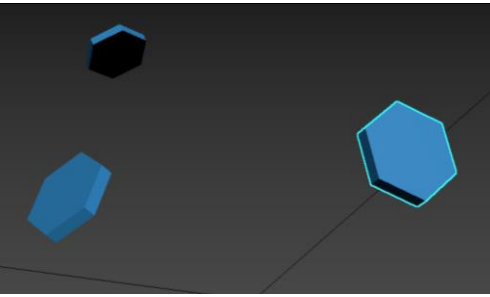
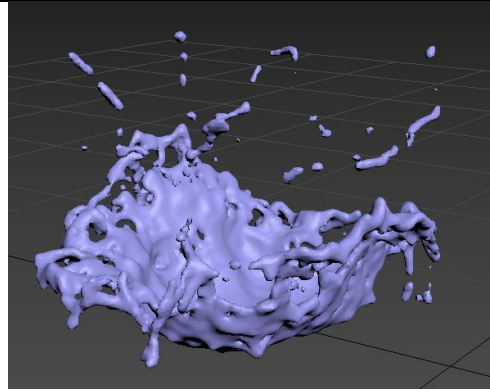
Lucy Zhu (lzhu21)

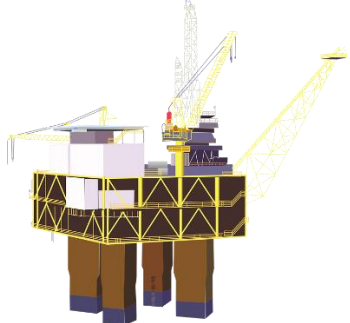
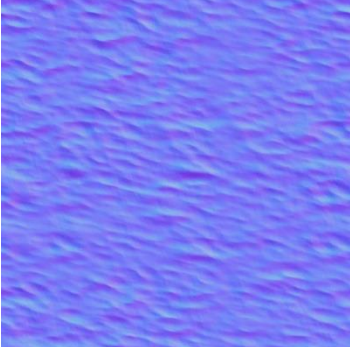
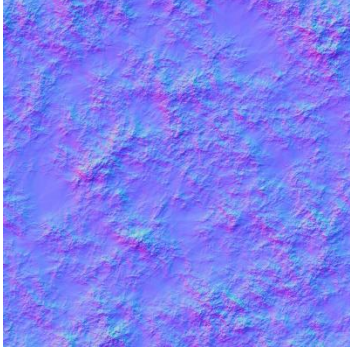


I wanted to base my project off an artwork I did several years ago. My intent was to portray how oil rigging companies were threatening the inhabitants of the arctic, among which were the polar bears (represented in the image as massive, oily hands dwarfing a small family of polar bears).

Assets

Created (models created on 3DS Max)	
Bear – looked at various google references for “polar bear” in the process of making this; used a combination of transmission and reflection to make them crystal-like in the final image as well as a saturated ambient color (aimed for a semi-glow effect as the bears are reflected onto the ice + add a crystalline appearance to maximize contrast with the smooth, murky appearance of the hands)	

Ice – created a plane and split it into a grid of hexagons from which I then was able to generate varying heights of hexagon pillars	
Ice Shards – individually created hexagon prism arranged to simulate ice breaking outwards	
Star – sphere (it's... supposed to glow, but I decided to put two point lights on each side of the sphere and add the ice normal map to imitate the glittering of a star)	
Oil – done with fluids simulator on 3DS Max	
Downloaded	
Background (https://www.pixel-creation.com/9352/10-latest-northern-lights-wallpaper-1920x1080-full-hd-1080p-for-pc-background/) – set as ambient map over a plane & edited on Adobe Photoshop Elements 9	

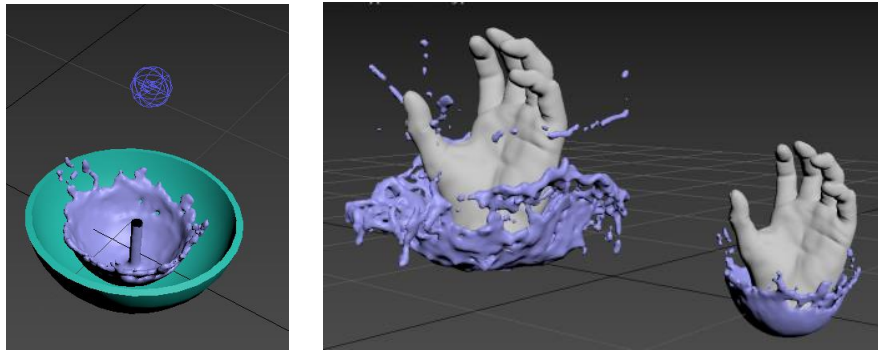
Oil Rig (http://pluspng.com/img-png/oil-rig-png-hd-oil-rig-rig-platform-derrick-offshore-indu-740.png) – photoshopped onto background image	
Hand (https://free3d.com/3d-model/key-ring-wall-mount-hand-v1—271512.html) – edited it to remove the base	
Water Normal Map (https://stackoverflow.com/questions/28942180/normal-mapping-on-flat-water-surface-produces-incorrect-specular-highlights) – used it on the water	
Ice Normal Map (https://80.lv/articles/developing-artistic-ice-in-unreal-engine-4/) – used it on the ice and star	

Technical Contributions

To create the models and edit the downloaded models, I mainly used 3DS Max and Maya. Maya was used mostly for setting up lighting and camera location/angle as well as the textures.

Speeding up the raytracing was done through implementing threading via OpenMP. While I did experience reductions in time, I believe it would have been reduced further if Visual Studio 2017 supported a compiler that could run OpenMP 3.0+, which would enable the use of “collapse(2)” for nested loops (only could thread the outer loop).

Utilized 3DS Max fluid simulations to create the oil splash. In order to achieve the shape I wanted for the splash, I had to use a sphere with shell modifier to form a bowl for the fluid to splash outwards from. However, the fluid splash that was used in the final project was obtained from a random experiment in which I tried to dump fluid into the opening at the hand's wrist. When flipping the hand and the fluid over, I realized that I preferred its chaotic nature over the tamer bowl splashes (as seen below).



As for the background, I used Adobe Photoshop Elements 9 to do minor editing such as removing the mountains and adding the oil rig in.

Original



Final (and the little itty bitty oil rig)



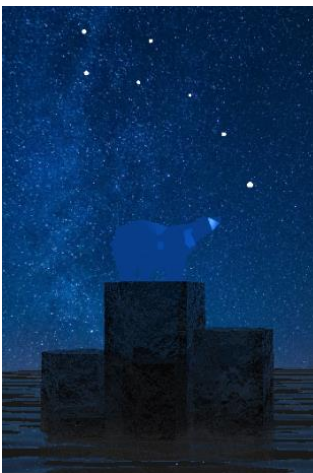
Progression of Image

Thought it would be cool to have a compilation of all the images I went through before settling on the final one.



I had no idea how I was going to tackle my final project at this point in time. However, I did experiment around with the fluid simulator and raytracing settings that really helped me a lot when I was making the actual final image.

Even though the ambient were the default colors set by 3DS Max, I liked the combination of the reds and blues (even if went against my graphic design background).



I wasn't sure if I could pull off the image I envisioned in my mind (my computer was making dying chicken noises as I coaxed it to keep running for the sake of the raytracer), so I did a back-up image on the side, just for in case. Only the background was implemented along with normal map for the ice. This image was inspired by the Ursa Minor constellation.