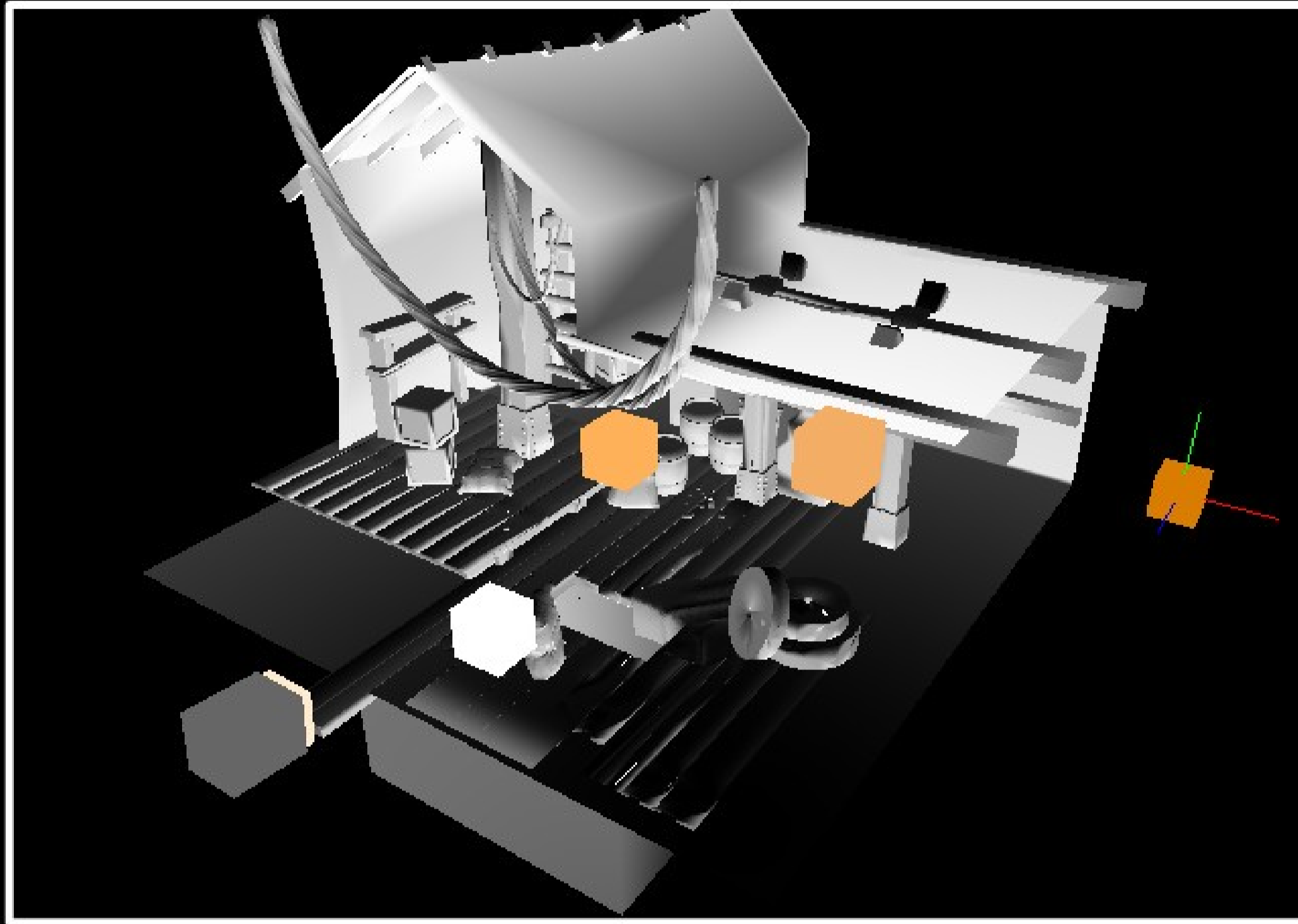


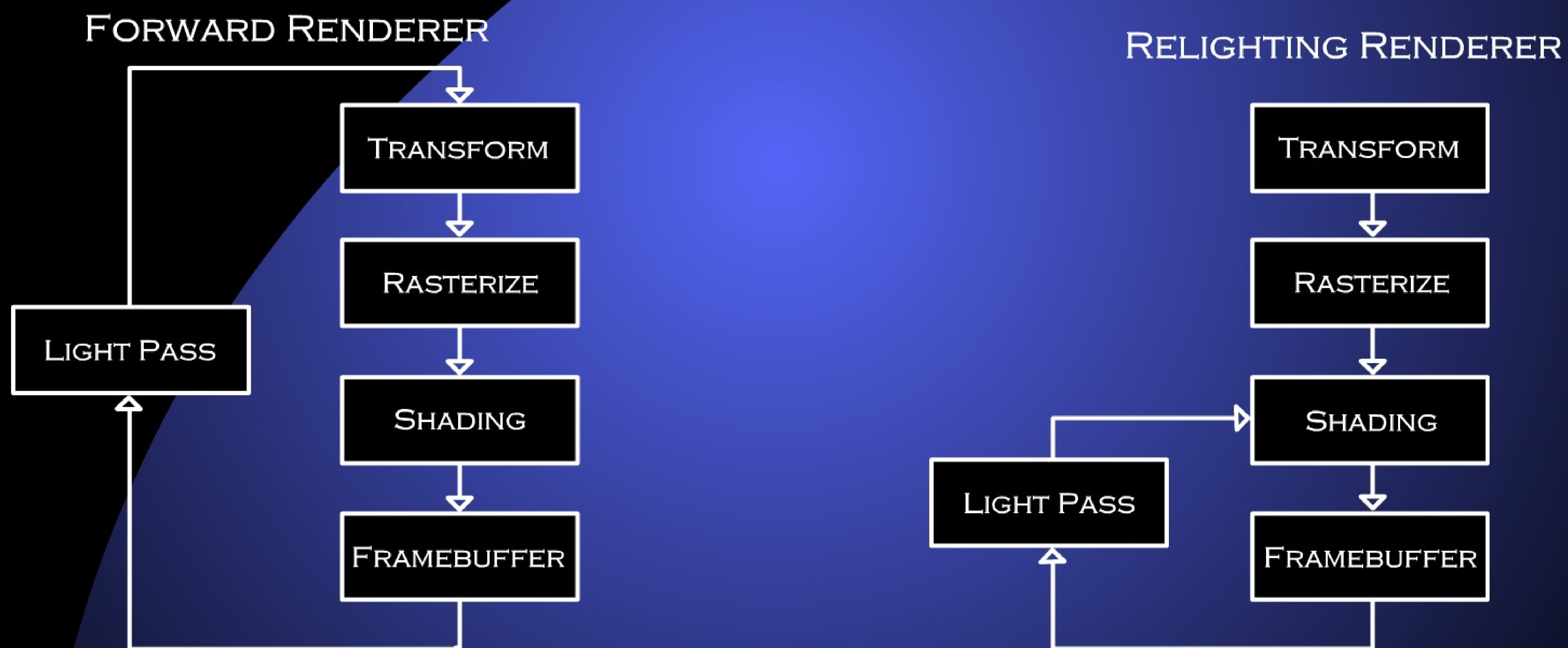
RELIGHTING

MIKKEL ADAMSEN
ADAMSEN@DIKU.DK

ONE OF THE MAIN BOTTLENECKS OF DOING COMPUTER ANIMATED FILMS IS THE LIGHTING DESIGN. USING THE RADITIONAL SHADING METHOD, WHICH WE WILL REFER TO AS FORWARD RENDERING, EVERY TIME YOU MANIPULATE A LIGHTSOURCE, IT CAN TAKE HOURS TO SEE THE RESULT. ESPECIALLY IN LARGE SCENES THAT CONTAINS TENS OF MILLIONS OF POLYGONS. TO SOLVE THIS PROBLEM WE WILL USE A TECHNIQUE CALLED DEFERRED SHADING. DEFERRED SHADING USES A DEEP-FRAMEBUFFER, TO CACHE INTERMEDIATE DATA. IN A LATER PASS WE CAN ILLUMINATE OUR SCENE, BY CALCULATING THE LIGHT OF EACH PIXEL IN THE DEEP-FRAMEBUFFER, USING THE DATA IN THE DEEP-FRAMEBUFFER.



FOR EACH LIGHT WE HAVE A LIGHT PASS. USING THE FORWARD RENDERER WE WOULD HAVE TO DO THE TRANSFORM AND RASTERIZE STEP FOR EACH LIGHTSOURCE. IN THE RELIGHTING RENDERER WE CREATE A DEEP-FRAMEBUFFER. WE THEN RENDER A QUAD THAT HAS THE SAME SCREEN SIZE AS THE DEEP-FRAMEBUFFER. WE GIVE THE DEEP-FRAMEBUFFER TO THE PIXELSHADER AS A TEXTURE. FOR EACH PIXEL WE THEN DO A LOOKUP IN THE DEEPFRAMEBUFFER TO THE VARIABLES, SUCH AS THE POSITION AND NORMAL, THAT WE NEED. WE THEN USE THESE TO DO THE LIGHTING AS WE WOULD DO IN THE FORWARD RENDERING.



THE IDEA OF THE DEEP-FRAMEBUFFER IS THAT WE DO NOT WANT TO RECALCULATE THE DATA THAT WE NEED FOR THE LIGHTING PASS. WE DO THIS BY FIRST RENDERING THE SCENE AS NORMALLY, BUT INSTEAD OF RENDERING OUT TO THE SCREEN WE RENDER TO MULTIPLE RENDERTARGETS. THE DATA THAT WE NEED TO CACHED, IS THE NORMAL AND THE POSITION OF THE POINT. WE CAN ALSO SAVE MATERIAL PROPERTIES SUCH AS THE DIFFUSE COLOR, THE SPECUCULAR CONTRIBUTION OR THE SPECULAR ROUGHNESS.

