

# Substance Painter

So what we're looking at today is Adobe Substance Painter, and what we're going to talk about is how we can accelerate texture baking with GPUs. So right now we have a lizard here, but he doesn't have a lot of detail. That's where texture baking becomes really important. Because you need the flexibility to be able to work on a scene with a low-poly asset -- a high-poly asset could make things really slow.

So what you can do is you can bake out high-poly textures onto a low-poly asset. To do that, it's really easy inside of Substance Painter. There's a simple button you can click called "bake mesh maps", and in here you have a whole bunch of texture baking presets at your disposal to use. So let's go ahead and bake out some of the maps that we would commonly use to get details in our scene. If I hit "bake" what you're going to see is that we kick off our baking dialog. And here we can see our normal bake, world space normal bake, ambient occlusion (which is one of our heavier processes using ray tracing), curvature, position, and thickness.

In this particular version of Painter, you're going to see a drastic improvement in texture baking, particularly when looking at ambient occlusion and thickness because those are actually light-driven maps so you have to trace rays of light to determine where you're not going to see rays of light or where light is going to pass through an object.

Once I bake those maps, you can see that the character looks a lot more detailed. And all we have to do to add in more detail is to paint over these crevices and cracks. Now, I already have a texture map applied to my character and as you can see, we are able to get a lot more fidelity in our model while painting.

So a little bit more about texture maps and baking is that they can drive a lot of appearance factors in your character. So example, if we zoom in on this chameleon you can see that he has very defined scales. If I go ahead and remove one of my baked maps you'll see that the character becomes a little blurrier. So we lose a lot of definition. A lot of people think that baked maps are only good for high-poly to low-poly baking, but in reality, they help a texture artist create better work faster. And they [also] let us implement and build on our ideas so we don't have to be worried about painting exact, precise maps, and we can use our new baked maps to give us more precision and more control over our artistic designs.

All of this is running on an Asus laptop with the Quadro RTX5000 in it. Substance Painter uses a lot of GPU memory and so it's important that you have a good card to drive your interactivity in the scene. So not only are you using your GPU to get amazing, high fidelity textures inside your viewport, you are also using it to get fast texture bakes and to improve your overall workflow and speed up your design process.

So on the left is a CPU bake test. And on the right is a GPU bake test. And we can actually see the exact speedup here for a simple 1024 map. And at first, they start off the same. It sends all of the information to the system to start baking, but you'll see at the ambient occlusion, the GPU starts really accelerating and outperforming the CPU. So we're at 32% on the CPU and on the GPU we're almost done. This means that can easily go and change our character and continue developing our iterative processes all while this is still baking. So you're seeing a drastic improvement in speed and time and that just frees you up as an artist to do more. So that's one thing.

Now Substance Painter is also a system that uses NVIDIA GPUs to give you enhanced viewport options, and OGL options, and it also has IRAY available to render as well to see more realistic materials. Substance Painter uses a lot of GPU in pretty much every aspect that it does. It has a lot of materials and things that can be enhanced by GPUs. It has texture baking enhanced by GPUs. Viewport uses GPU memory, so having a good card with good memory is really, really important. And you can visualize your scene inside of IRAY which is what we are doing here.

This scene, currently, as it is, is using about 14.9GB of GPU memory just for the OGL viewport. Now that's because this character actually has a lot of layers in it, and it's using texture baking and things like that. So all of these different layers are being calculated [in] real-time. So the more layers you have, the more UDINs you have, the more tiles you have, the more memory you're going to need to be able to drive your artistic process. So you can definitely benefit from an RTX8000 when working in this scene, but you will not be constrained if you have something like an RTX4000 or 3000 driving your system. Because as long as you have a GPU, you're going to have a fluid experience inside of Painter.