RYANHAWKINS'S

VERTEX

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Featured Artists

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John Park

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- **Color Theory**

ON THE RADAR

Here are some of the great artists to watch.

These artists have shown what it takes to make it in this industry and have all shown the community top quality work.

Aidan Wilson

Ryan Smith

Alan Van Ryzin

Joshua Stubbles

Fanny Vergne

About The Editor

Previously know as Aftermath, Ryan Hawkins was an Administrator at GameArtisans.org as well as a key contributor and co-organizer of world renowned contests and challenges for them and for other online game-art communities.

His passion to contribute to the game-art community is unparalleled and is always looking for ways to give artists more exposure and to give them opportunities to prove themselves and improve their skill sets.

Because of this, he was invited to join the Polycount.com Team to assist in helping develop and improve the contests and challenges for Polycount and was heavily involved with developing the *BRAWL* and *Darksiders II*contests.

On top of all of this, he has spent over a year investing his own time and effort developing *VERTEX*, with the assistance of a cavalcade of talented artists and game-art veterans to bring you one of the most comprehensive resources that belongs in every game-artists' library.

-Emil Mujanovic

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Ryan Hawkins, Editor
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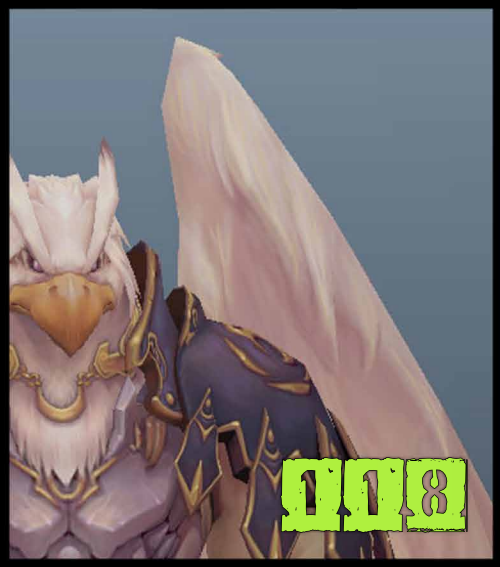
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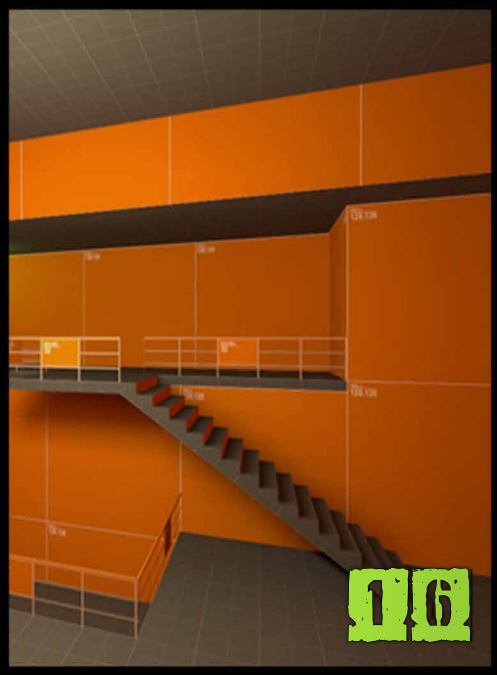
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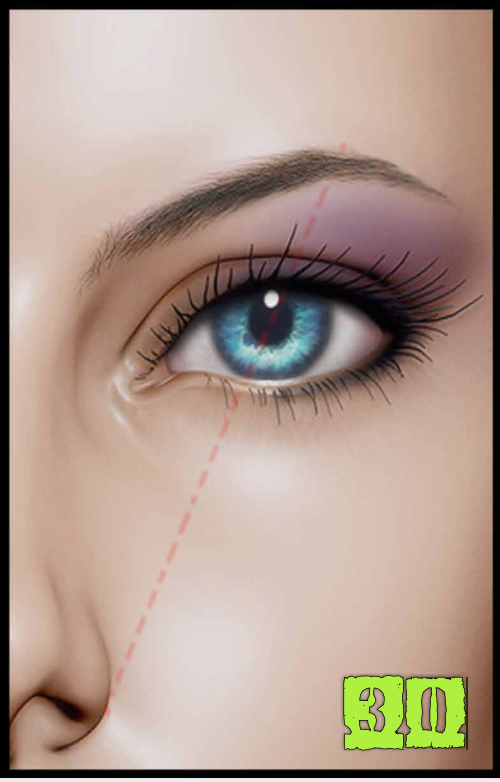
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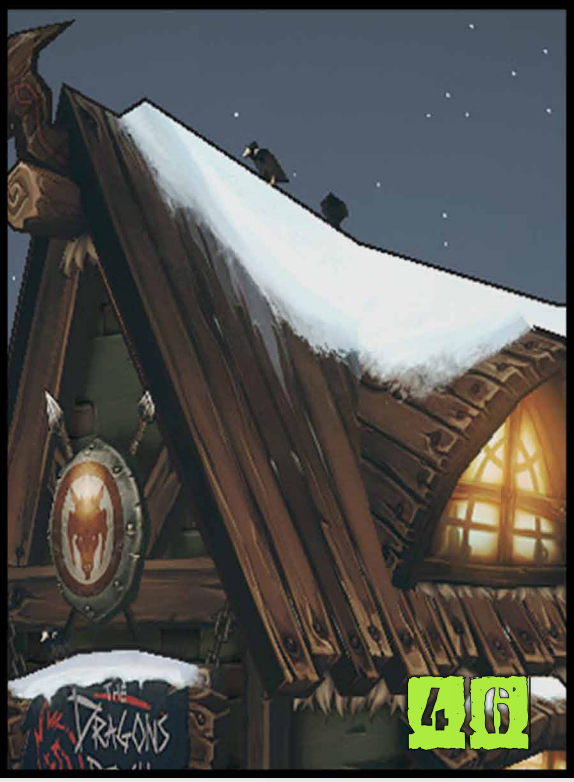
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DIABLO

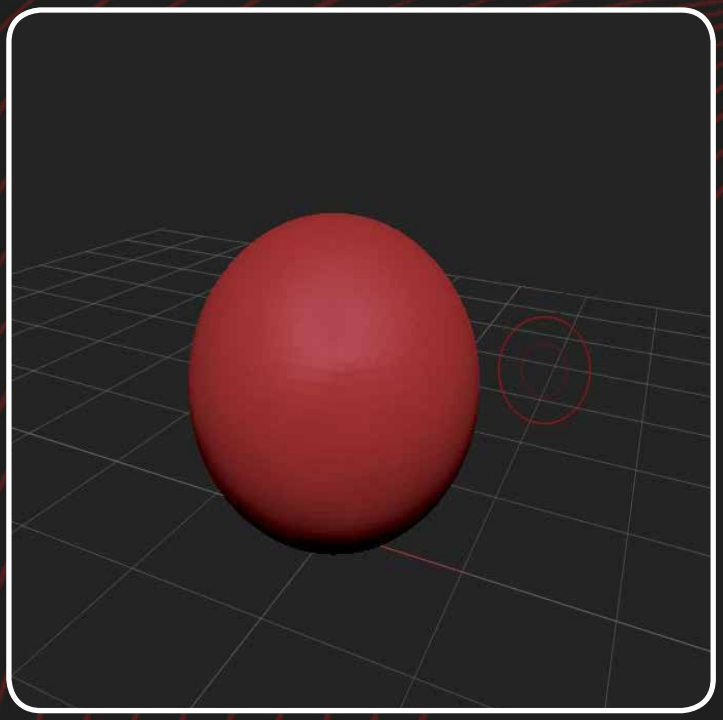
ZBrush Tips & Tricks By: **Sam Yang**

I've always been passionate about art ever since I was a kid; I wanted to turn my hobby into a fun and enjoyable career someday in the future. I ended up going into an art school right after I graduated from high school to pursue my career in digital art. I realize that 3D was the most flexible in terms of how many other industries it branches off into. 3D basically gives you the opportunity to create and design anything you want in the digital world. You can be a car designer or even a fashion designer if you wanted! So with that being said, in addition to making games, I've always wanted to try and print my very own toy line someday. When our company gave us this opportunity to print this Diablo Bust out for Blizzcon, I was super excited! This was my very first printed figure from ZBrush, and it felt like it's also the start of a new chapter in my career.

A lot of people asked me about where I get my inspiration from? I pretty much get ideas from watching movies, travelling to other countries, playing games and even just listening to music. I also love checking out forums like cghub.com and polycount.com, just to watch how other artists approach their work. I also enjoy entering online 3D art competitions like Dominance War and Comicon Challenge. Entering these art contests annually was actually how I got hired at Blizzard.

I never applied because I knew it would just be flooded with everybody else who is also trying to get in. Entering contests was great for me to learn new techniques and definitely a great way to get your name out there in the public so recruiters find you instead. I am very grateful to be able to contribute to Blizzard at the age of 21. Some of the most influential games that got me into this industry in the first place were from playing the good old Final Fantasy series from VII to X! Diablo and StarCraft also made a huge impact in my life! All these games have gorgeous art, amazing story and fun/easy game mechanics that really brings out the quality of a game.

For those of you who are new to sculpting, ZBrush is definitely one of the most powerful modeling tools out there for the movie and game industries today. There is no doubt about it. In this tutorial I will be covering simple and optimized steps for new artists to learn by using the new feature, DynaMesh. It's always a pleasure to be able to have this opportunity to share my knowledge and experiences with everyone. If you guys have any questions or comments, feel free to send me an email anytime!



The ViewPort

"How do I navigate around in ZBrush?"

First of all, I know there are tons of 3D programs out there like Maya, 3dsmax, XSI, Modo, and many others that use different setups when it comes to moving around in the scene. I want you guys to learn the very basics of camera movements in ZBrush first before we move onto anything else.

Getting used to any interface is very important. As you learn where things are in a program, your workflow will gradually become faster and tasks will get easier as you practice. Here are some of the main interface movements we need to use inside ZBrush's viewport. You can also use the menu on the right side.

The Core Movement

"Learning to Navigate the Viewport"

Rotation:

Simply holding the Left Mouse on the canvas and drag.

Panning:

Hold Alt and Left Mouse and drag.

Zoom In:

Hold Alt > hold Left Mouse > let go of Alt and drag your mouse.

Snap to View:

Hold Shift if you need to snap onto specific angles.

Perspective View:

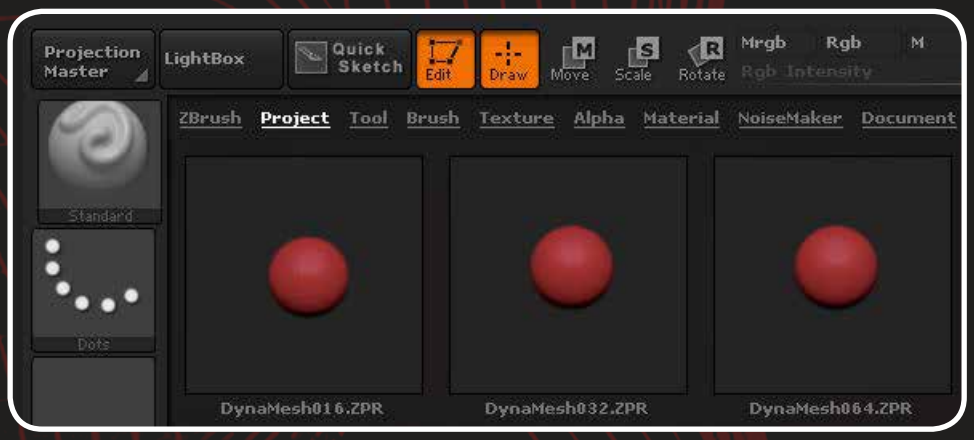
Press P to switch to Perspective view and again to go back to isometric.

Centering your Object:

Press F to focus and center your model.

Using Dynamesh

"Keeping things simple and fun!"



So what's the best way to do a quick concept for your boss to see in 3D from scratch? The answer to that question is DynaMesh. This new feature is great for starting your base mesh in ZBrush.

There are also many other ways to build your model like using Maya, 3dsmax and XSI, but this method is probably one of the fastest ways to pump things out.

- To load up this feature, go up to the top left and hit LightBox.
- This will bring up a menu with a whole bunch of folders.
- Under the Project tab, scroll to the right and you will see DynaMesh.
- Let's click on one of them to get things started!

The Subdivisions

"So what makes the density of your mesh?"

- **On the top menu, click Tool > Geometry You will find Divide which creates a new subdivision level that multiplies the density of your mesh by 4.**
- **Lower Res and Higher Res lets you control which subdivision level you want to work on.**
- **Under DynaMesh, there is also a scroll bar for Resolution. What this thing does is, it lets you set the density of the DynaMesh.**
- **Turning off Smt will let you subdivide your mesh without smoothing it. I usually use it for lower poly models to fix textures or simply for poly painting.**

The Brushes

"Finding those key brushes we need."

- Let's open the Brush tab that currently says "Standard," or press b to bring up the brush menu.
- As you can see, there's a huge variety of brushes to choose from.
- Sure, all these brushes can be intimidating, but we only need to find the key ones for now.
- We don't really need to use all of them, so I will briefly talk about the ones I personally use the most in my modeling process.

Clay - Clay Buildup - Clay Tubes

- The Clay brushes are great for that carved look that clay sculptures have.
- I personally prefer using this set instead of just using the Standard Brush.

Magnify - Inflat

- I recommend these to be used after your proportions are nailed down, because they do tend to stretch the polygons on your mesh if you're not careful.
- It is also great for exaggerating veins and wrinkles for organic stuff.

Pinch

- This is another one that should be used afterwards, it does the opposite where polygons can sometimes squash too much and ruin topology of your mesh.
- It's awesome for cleaning up edges and really pushes that corner cut.

Move

- I use this a lot throughout my modeling process.
- Mainly to tweak the proper proportions of my model to get the base silhouette done within ZBrush in the early stages and any scale adjustments in general.

Dam Standard

- This would be my favorite brush of all time =)
- It's when all the fun wrinkle lines get created in the modeling process.

Trim Dynamic

- The Trim Dynamic brush is also awesome for flattening hard surfaces or making chiseled edges.
- It's great for rocks, spikes, and other hard surfaces.

Smooth

- Smooth brush is pretty self-explanatory; it simply smooths out the surface of your model.
- Unlike Trim Dynamic, this is simpler and gives you more of a rounded smoothness.

Snakehook

- I use this occasionally for blocking out long spikes or even hair for characters.
- It basically hooks a small portion of the surface and you can drag it out for whatever distance you want. It's close to the Move brush, but it's just more fluid.

MaskPen

- You can get this brush simply by holding ctrl and it will automatically switch to it.
- What this Brush does is, it masks portions of what you painted so the surface doesn't accept any new changes or adjustments you make until it's removed.

Building a strong Silhouette

"Proportions are important at the start of any model."

Proportions and silhouette are very important at the start of the modeling process. If you look at the basic shape of Diablo's head, it's very close to the shape of a boomerang. This Diablo Bust was constructed with a total of 3 DynaMesh spheres. A head, body, and a shoulder that's been mirrored over across the X axis. If you guys take a look at the menu screenshot, you will find Activate Symmetry under the Transform tab in the top menu.

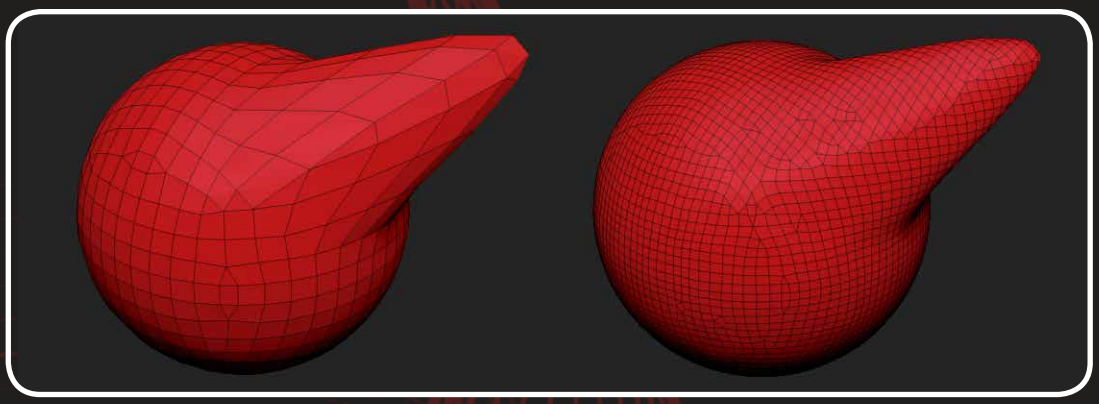
- **With Activate Symmetry turned on for the X axis, this will mirror all the changes you create to the other side of the model so you don't have to work on the same thing twice.**
- **So with DynaMesh loaded up, Use the Move Brush or the Snakehook Brush to adjust the basic overall shape of your model before getting into any crazy detail.**

DynaMesh's Potential

"What makes DynaMesh so powerful?"

I believe DynaMesh has already revolutionized our way of making 3D models. This is a feature that makes sculpting even faster for us to all learn and use.

Pixologic has always continued to impress us with more and more ways to make things easier to use.



- **As you move the mesh around, you will notice your wireframe is all stretched and deformed.**
- **Look for the resolution amount under the geometry tab.**
- **Change the Resolution amount to a higher value.**
- **And now, hold Ctrl and drag on the canvas.**
- **This will rebuild the topology of your mesh so that the surface is more even to sculpt on.**
- **This feature alone will massively improve your workflow and pipeline.**
- **Keep refining your DynaMesh until you're happy with the result.**

Avoiding Noise

"Building a good composition in your work."

- Keep this in mind as your pushing and pulling out muscle shapes with the Clay Brush.
- Mesh Flow is basically how everything is tied together as a whole.
- Anatomy and muscle structure directions would be a good example of Mesh Flow.
- You need to have a good understanding of how different directions of lines intersect with each other so they flow properly and make sense to the audience.
- Another good example of mesh flow on this Diablo Bust is the line from the tip of the horn leading your eye to the eyebrow.
- When good Mesh Flow is applied and thought out properly, it also helps build a strong composition.
- Now how much detail do you need on a model? It usually depends on how it's being presented. If the model is meant for something really small and there aren't any close up shots, then we probably shouldn't spend crazy amounts of time making details our eyes can't even see.
- Having variety in the details on your model is important as well. Sometimes artists tend to overdo and spam the details evenly all over their model head to toe, making it too busy or noisy. Make sure you have a good sense of contrast of detail and clean space for your eyes to rest.

Dam Standard Brush

"Daymnn! That's one fine brush."

- After all the proportions, basic shapes are correct and blocked out using the Move, Clay, and Snake-hook Brushes. Zoom out a bit and always check the big picture.
- Are the shapes reading okay at a distance? When your happy with it, move on to the next step!
- Select the Dam Standard Brush
- What this brush does is, it carves and pinches at the same time creating a sharp cut. This brush is fantastic for generating all types of wrinkles on your model.
- It really helps sell that realistic look for organic elements.

SubTools

"How do I manage all the pieces?"

- The SubTool menu is a basically the "Properties" Tab for all your pieces in the scene. If you want to adjust model visibility, or just organize your pieces, this would be the tab to do it.
- As you can see, I have renamed all my subtools so it's much easier to find. It's always a good habit to rename your subtools, because a full character can get pretty complex. In the end it will be less stressful to manage =).
- To add a new subtool, simply click Append on the lower right, and select the one you created inside the menu that pops up.
- Delete will delete the selected subtool.
- All Low and All High forces ZBrush to lower or raise the level of detail you subdivided under geometry for all your subtools.
- I use it to export and import meshes that need to be adjusted or baked down in 3dsmax or Maya.

Trim Dynamic Brush

"Adding that stylized look."

- This Brush can also be used as a smoothing Brush if it's used properly.
- Stylized artwork like Team Fortress will most likely use this all the time for their characters.
- As I mentioned earlier, the Trim Dynamic Brush is also great for rocks, spikes, and other hard surfaces, creating that hard line on your edges.
- For the Diablo Bust, I used it mostly on the top of the horns to break it up a bit and tp add that chiseled look.

BPR Rendering

"Photoshop in ZBrush."

- I used to take screenshots of rendered layers into Photoshop to composite my final image. But it was such a hassle to make further adjustments. With BPR Rendering, you can set up all your layers like, Blur, Sharpen, Overlay, Color filters and all that within ZBrush now!
- You control the mask by typing in a positive or a negative number depending on how much offset you want the "perpendicular plane" in your scene to shift from the origin of your scene.

Revisiting

"Art is never flawless and perfect"

- There's always going be an endless stream of changes you wish you could've done on a piece of artwork after revisiting it later on.
- Creating art has always been more of a learning process for me.
- So what could I possibility improve?
- Well some of the things I can think on top of my head are definitely improving the lighting. With a stronger rim light, this piece can look more appealing.
- Applying a wax skin shader for the light to bleed in from behind would look great too!
- Depth of field is another thing I could've added.
- Also, a black background isn't really the best choice.

The Conclusion

I hope this tutorial was helpful for those of you who are new to ZBrush and needed a helping hand to guide you through the basics. This is also my first tutorial I've written so far, so please let me know if you guys have any questions or comments! Also feel free to let me know what other tutorials you guys want to see in the future and maybe I can help make that happen! Anyways, thank you all for your time! Now let's see all the amazing ideas you guys can all come up with!

About Me

My name is Sam Yang, I'm currently working at Riot Games as a 3D Artist on League of Legends. So a little bit about myself! I was born in Taiwan, my family and I moved all the way to Vancouver in Canada where I grew up. I've worked on Smallville: Season 7 and many other projects involving VFX, Aviation, Interior De-signing, Commercial and also Flash Animation. I worked at Blizzard on StarCraft 2 before joining the Riot Games Team.

As a young artist, I wanted to try out everything I can in my early years so I could figure out what I enjoy doing most. Choosing to work in the game industry was probably the best choice out of them all. It just feels much more vibrant and has also given me a lot of creative freedom.

I've always been passionate about art ever since I was a kid; I wanted to turn my hobby into a fun and enjoyable career someday in the future. So I ended up going into an art school right after I graduated from high school to pursue my career in digital art. I realize that 3D was the most flexible in terms of how many other industries it branches off into. 3D basically gives you the opportunity to create and design anything you want in the digital world.

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Sam Yang

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COMBAT

Designing Combat Areas by: **Magnar Jenssen**

In this article I intend to show you some things which are good to keep in mind when designing combat areas in an FPS level. The examples below are targeted towards single player design, but most of the ideas can be applied to multiplayer design as well.

It's hard to say "this is how you design something which will work", instead I'll list things which can contribute to creating a fun gameplay environment. Also keep in mind that there's no point in trying to force all of these elements into each combat scenario, instead use them as tools when you're designing an area and the gameplay is lacking in some way. Towards the end of the article we will put these things into practice and design a combat environment.

Getting Started

So let's get started with an example of a poor combat scenario. In the screenshot below, the player will enter through the door at the bottom. They will see the enemies inside the room, and they will most likely do what any smart person would do and pull back to hang out near the door, letting the enemies come to them.

The player is starting out in a clearly disadvantageous position, with no prior knowledge of the area they are entering, so the most boring solution is also the best one. This tactic ensures that the player will win with the least risk to themselves, even though it will hardly be a fun couple of minutes spent waiting for the enemies to wander into their gun sights.

The Options

Another thing to try and avoid is when the player always has Line of Sight (LOS) to the enemies. If you allow the AI to slip away from the player for a while (along with giving the AI options), then the enemy has a chance of doing surprising things which makes the fight a bit more unpredictable. It might also give the player the impression that the AI is smarter than it really is, since it's been given a chance to perform some simple choices.

Of course, if you are fighting in what is essentially a box, the AI won't be able to do anything surprising even if they are given the chance. If possible, design the area so that both the player and the AI have possibilities for flanking each other. If the player is intent on digging in and being immobile then he's at a disadvantage, and the enemies should be able to exploit that. If you don't give the player any incentive to move around the fight might become more akin to a turret section.

When creating your flanking paths, remember to keep them balanced. The player should use the flanking paths as a way to get into a better position in the main area, the path itself shouldn't be so safe that the player will decide to stay.

The Bribery

Another great way to get the player moving is to give them rewards for daring to move into the combat area. These can be ammunition, health, anything worth taking a risk for. These rewards can offer the player a tradeoff, such as drawing the player out into the open while leaving a safe position behind. Of course, risk doesn't have to be tied to the reward. It can simply be used as an incentive to get the player moving and exploring the space.

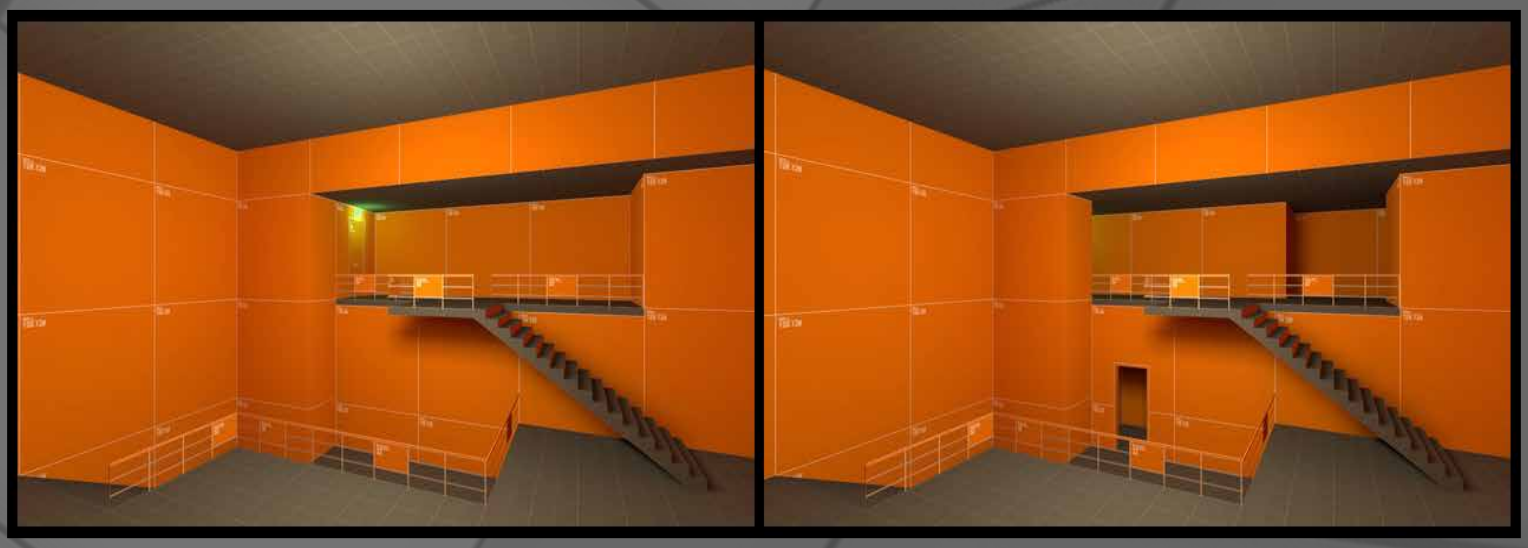
Another thing which can draw the player in is a clearly advantageous position, such as a raised platform or a controllable turret. These will give the player an edge in combat and will tip the odds in their favor. Therefore, there can be risks associated with getting to these spots since once the player gets there the battle is more or less decided.

Through the Door

Getting the player to commit to the combat area can be tricky. If the player has been given a chance to get comfortable with the area, it's easier to make decisions regarding cover, alternate routes, etc. This can be done by previewing of areas (seeing places before you get to them, such as a window overlooking a yard which will later hold a battle) or backtracking (playing the same portion of a level twice).

If the player enters a combat area and can plainly see the exit, they will most likely try to make their way to it as efficiently as possible. If the player can skip past combat encounters and continue on his way with no challenge, then the feel and pacing of the level will suffer overall. With this in mind, the route leading to the exit should be well thought out to prevent the player from bypassing all enemies and skipping the encounter entirely.

If an exit is not immediately visible (around a corner etc.), the player will be forced to get acquainted with the area and commit to the combat, since it might be risky to make a run for it when they don't know where to go.



If the environment allows it, try to add some height differences to your combat area. Making the player look up or down during the fight keeps the player active and on their toes. This can also force the player to make evaluations and decisions on the fly. If an enemy is on the same level as the player, but further away than an enemy on a catwalk, it might still be more important to take out the enemy which is able to get to the player.

It's a good idea to draw the player into the area before starting the battle, since the player will have some knowledge of where to take cover and what the different movement options are. If the player is confronted with a completely new space with some enemies in it, there's a high chance they will stay in the zone they are comfortable with and not commit to the combat area. This will either result in a boring combat scenario or a scenario which doesn't fully utilize the area it's been designed for. One way to get the player to leave their comfort zone is by offering rewards to draw them in, or having the player start out in a position where they are at a disadvantage.

Try to see the area from the enemy's perspective as well. Don't get locked into the point of view of the player. The enemies should have options, not every path should spring out from the players starting position. Of course we are creating a battle that the player will (or should) win in the end, but the enemies should be given a fair chance.

Alright, let's try to keep these things in mind, and let's get started on creating the combat area itself!

Putting it into Practice

The first thing to do is to get acquainted with your enemy characters. You should design to their strengths, and before you can do that you need to know exactly what they are capable of.

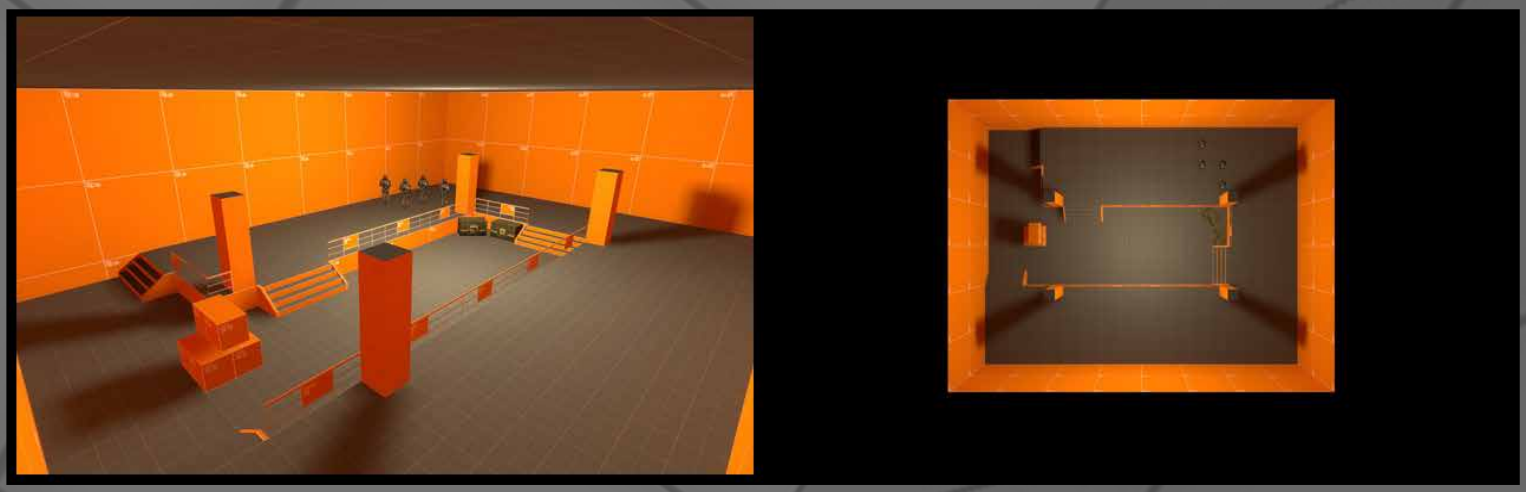
For the sake of keeping this article pretty straightforward we'll only use one type of enemy character. However, I recommend designing combat scenarios with a combination of different enemy types to keep things interesting.

Let's have a look at our main enemy character; the Combine soldier. To the right you will see three enemy soldiers.

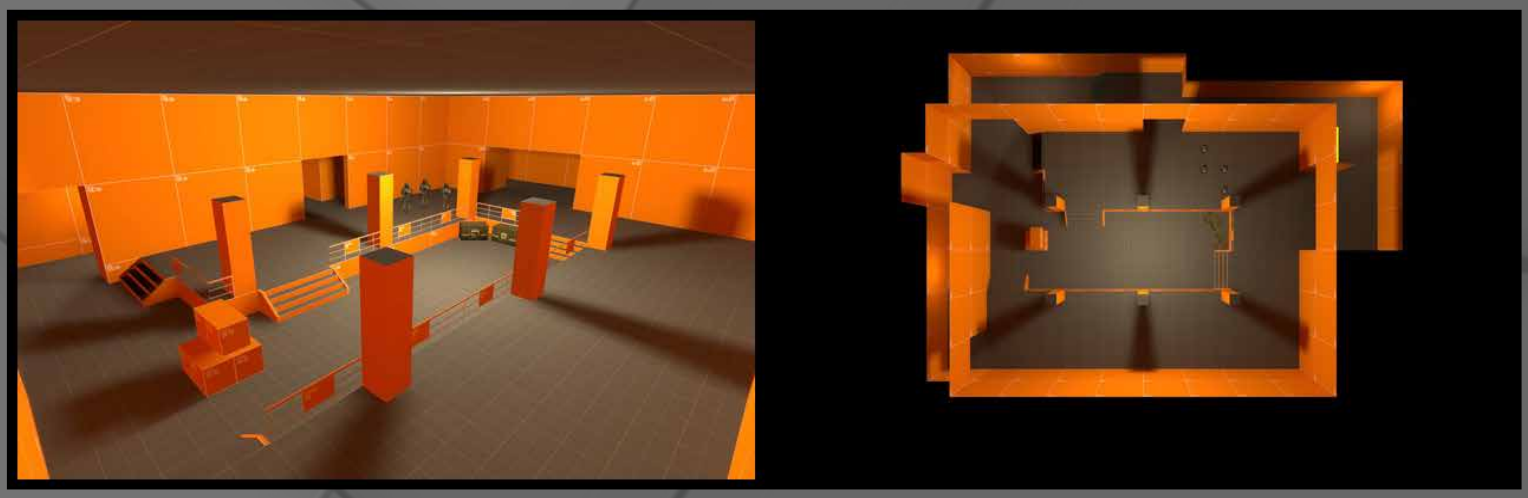
They are the same size as the player character, which means that wherever the player can go, so can they. As for weaponry, they have a rifle which requires a clear line of sight towards the player, along with grenades, which can be used to flush out the player. They also have squad AI, which means that several soldiers can work together to take down the player.

So, summing up our enemy character; They have the same capabilities as the player which gives us a great opportunity to create a layout with a lot of movement. Since the player and the enemies can switch positions during the fight, a position which works for one side will work for the other side as well. Let's make a quick mockup of such a layout.

Of course, in this first version, all areas are pretty much equally valuable. That means that there's no incentive to the player to actually move around the area since no area gives any advantage. Let's add something to the area to make the player more motivated to move around. In this example, both sides start out in the same position and have the same options for movement and cover. This will lead to a boring and predictable fight. Let's try to fix that by offsetting the balance of the room a bit, so that there are pros and cons and the player has to make a choice. To better motivate the player to put himself in the risk zone, we will add a cache of weapons, which can push the player to make decisions towards his navigation through the room.



Now then, the arena has become more interesting. Let's further improve the fight by blocking the players Line Of Sight, which will force the player to actively keep track of the enemies. At the same time, let's give both the player and the AI some options to move around the room whilst staying out of the main area.



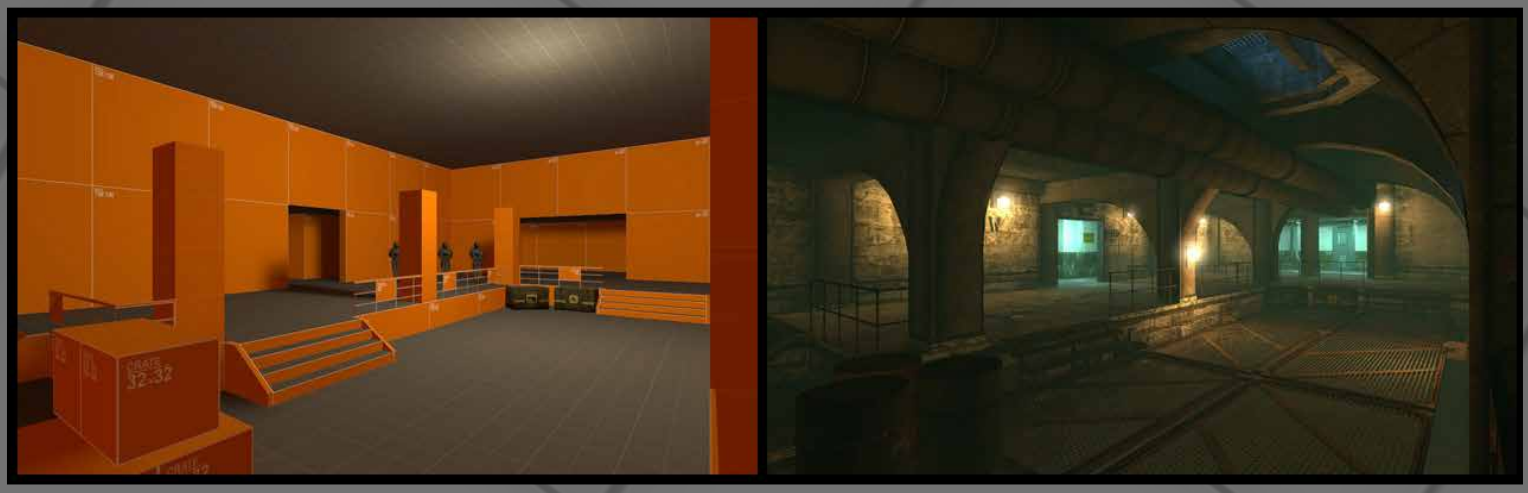
Now that we have a fully featured layout working it's time to have others playtest it. Don't get too attached to a layout while it's in this mockup state, since things are bound to change when you receive your first feedback. When playing your own level you are able to identify a lot of the major problems with flow and gameplay, however you know the level inside out, so the sooner you can get new eyes on the level the better.

Maybe you have a preferred way of approaching the battle, but when a new player tries out the level they will make other choices which can expose flaws in the layout and/or scripting. When testing it's a good idea to start out with a somewhat small pool of testers at first, then introduce more people to the level as you make new iterations.

This will get you feedback regarding your progress but also fresh feedback regarding the overall gameplay of the level. I usually start out with 2-3 testers in the first batch, then introduce one more in each major iteration. This ensures a steady flow of recursive feedback ("did the thing I tried to fix work?") along with fresh feedback.

Wrapping Up

We've successfully designed, iterated and scripted a fun combat area. The testers are happy and you feel confident in the level. Now comes the time to take it out of the mockup stage and get it up to par graphics-wise. When art-passing an area it's likely that things will change slightly. Large and bulky geometry often doesn't translate well to impressive graphics. However, the initial idea of the area and the flow of combat should remain more or less the same. Don't make too many compromises for the sake of graphics because poor gameplay will sour the impression no matter how nice it looks.



Here we can see the initial layout all dressed up in the three archetypical FPS styles ; sewer, office and industrial. You can see that the initial layout has been slightly tweaked in spots to support the art style, but nothing so major that it will affect the gameplay.

It's important to keep playtesting through this stage so that you don't get carried away and make sweeping changes just for the sake of graphics. If you can't fit a doorway in somewhere in the art-passed version then try to find a different solution to the problem while keeping the initial layout.

That wraps up this article about combat area design. I hope you've found this article interesting and maybe even learned something.

About Me

My name is Magnar Jenssen, I'm currently working at Avalanche Studios as a level designer on an as-of-yet unannounced game.

I'm originally from Norway but in 2006 I moved to Stockholm, Sweden to pursue a career in the videogame industry. Before starting my career, I spent close to a decade doing level design as a hobby, making levels for games such as Duke Nukem 3D and Half-Life.

Magnar Jenssen

I've always enjoyed being creative, when I was a kid I played with Legos a lot, now that I'm an adult I find the same enjoyment in creating levels for videogames. I enjoy it so much so that I still do it as a hobby along with having it as my full-time job. I've now spent almost 6 years in the industry, and I'm certain that there will be many more to come.

The great thing about being a level designer is that you'll never design the same level twice. Each project comes with its own challenges and rewards, and you always continue learning and developing your skills. As videogames continue to become more and more advanced, I believe that level designers will move more towards becoming gameplay designers and focus more on layout and gameplay scenarios. I hope you've enjoyed the article, and if you're just starting out with level design, I wish you the best of luck!

BAM-BU

Introduction

Have you ever come home from a work day intent on starting your own film or game? Determined to draw every night, or write, or compose? Most creative professionals (in and out of the industry) have dreams that extend beyond their day jobs.

Bam-Bu is a group of working artists dedicated to making those dreams come true. We help each other stay sharp and busy outside of our careers. We do this because we all know how hard it is to try to make art alone after a day of work.

The struggle to make personal work is somewhat strange. We are creative professionals who create an absurd amount of artwork day after day at our jobs and yet we don't always make our own artwork. You'll hear us complain about frustrating limitations, crappy clients, clueless bosses, and demanding deadlines, but when we get home from a long day of work we rarely take advantage of our creative freedom.

What's worse is we all carry around a mental array of "amazing ideas" and "personal projects" but they rarely get past a few baby steps. We are tired, we have families, we get stressed, and we get lazy. Call us pathetic, but making art after work is damn hard.

The Bam-Bu team is a group of 10 people. We all have demanding day jobs and some of us have families but we got sick of seeing our "great ideas" gather dust and decided to do something about it. We have only just begun, but our experience so far has led us to some insightful methods to stay motivated.

By carefully choosing people to work with, avoiding endless revision, and embracing artistic limitations, we have come across a team dynamic that helps us stay inspired and maintain momentum as we work on our web series.

Dragon Weaver

Dream Team

"Finding a Dream Team."

Brad Marques (the Founder of Bam-Bu) gathered together a team of amazingly talented people to help him on his project, but it wasn't as easy as just grabbing all of his friends. Brad was often tempted to ask everyone he met to help him with his project. It was easy to think "another artist on the project can't hurt!"

Instead, Brad was patient and sought out people who would naturally compliment his idea. He found that just grabbing random talented people wasn't always smart. Brad had these thoughts on choosing his team:

"I had a list of key questions to guide my choices for a team: Will this person push my work ethic? Is this person pro-active in their discipline? Does this person speak my 'art love-language'? Is their a mutual trust in each other?"

Essentially, Brad is looking for people to become a part of his idea. Instead of finding talented people and then conforming them to his idea, Brad finds people who he trusts enough to allow his idea to conform to them. The result is a team full of people who trust each other and feel connected to the project.

This trust allows team members to feel more like they are being "set loose" on an idea, rather than being "assigned" to an idea. It sounds almost too perfect, and it is. Obviously there will be differing opinions even in such a carefully chosen group. Brad had to learn to let go and allow his idea to change and grow as more people got their hands on it.

The Grind

"Avoiding the Grind."

One of the most challenging aspects of personal work is keeping it rolling along. We never want to feel like we are running in circles or endlessly revising. On the Bam-Bu team, we have identified a couple obstacles that kill momentum, and kill our motivation. These obstacles are originality, perfection and addition. We avoid all three as much as possible. The following paragraphs explain why:

Let's start with being "original". Originality is an extremely vague word and defining it often results in setting unrealistic expectations such as: "Something unexpected" or "Something that has never been done before". Defining "originality" as "something that has never been done" is an extremely harmful frame of mind. On the Bam-Bu team, we prefer the word: Specificity.

Instead of avoiding "cliche" and trying to find "something new," we embrace cliche and delve into the specifics of the context. In fact, cliches are great! Their very definition is that they communicate an idea extremely clearly. A cliche gesture of shaking one's fist in anger is an extremely clear gesture.

We actively use cliche's to tell our story and make our ideas clear. Where cliches fall short, they are boring and unconnected to a situation. So, once we have our cliche moment, we go in and think about specificity: what context is our character shaking their fist in?

A large character will shake their fist differently from a small character. A character holding a sword will shake their fist very differently from a character holding a cup of coffee. In the end, it is still a cliche gesture but the specifics can make it interesting.

It is important to note that applying specificity to a cliche rarely results in "perfection." Perfection is another vague word that we avoid on the Bam-Bu team. When we critique each other's work, it is easy to get swept up in thousands of "better options". Animation (and any art) can turn into a real drag if you keep chasing a new approach or a better idea in hopes of getting closer to perfection.

At Bam-Bu, we brainstorm and plan, but once we settle on an idea we run with it. We accept that we will think of different ideas as we go (and some of those ideas might even be way better than what we have!) but if we let new ideas derail our progress we will never finish anything we start.

Feature Creep

"Avoiding Feature Creep."

Not only do we try to avoid new ideas (after we've made a decision) but we also try to avoid adding more "stuff" to the ideas we already have. It is very tempting to lengthen a shot or cram it full of more characters/effects but addition is another way to stop momentum. Any time something more is added to a project the finish line gets further away. We at Bam-Bu are huge proponents of shortening, stripping and subtracting as much as we possibly can. Anything that does not help us tell our story, or sell our main idea, we cut from the project.

We never ask "What can we add?" We instead ask "What can we take away?" Once we can't find anything to remove, we consider the idea complete (more or less). The concept of subtraction is not unique to Bam-Bu, but we embrace it as if it were our own.

Ultimately, adding more stuff or obsessing over perfection and originality are surefire ways to turn a fun art project into a vicious loop of endless revisions. Momentum is our golden rule. We embrace our initial instinct and run with it. Why is that so important? Each team member is coming off of a full day at work- they are sacrificing free time for this side project. The turn-around has to be quick or else the creative spark will fizzle out. If our most of our time and talent is spent chasing multiple options we will probably never finish. We embrace our mistakes and do once over revisions but ultimately we trust that the whole will be greater than the sum of the parts. We want a finished product, mistakes and all.

Artistic Choices

"Limitations"

It takes a huge amount of discipline to set artistic limitations. Every member of the Bam-Bu team is a high level professional artist. We are capable of making extremely detailed and intricate work.

We can make epic explosions, majestic paintings, thousands of characters, insane animations, and incredibly detailed sculptures, but just because we CAN do a lot of these things does not mean we SHOULD. In fact, we set limits early on to make sure we stay balanced and (once again) keep our momentum.

One huge example was the idea to animate the Dragon Weaver series on 2's with step keys (12-15 keyframes a second instead of 24-30). We love the style, and we hope to use it to help the way the story is told. We make sure we have artistic CHOICES behind our decision to animate on 2's, but heck, it's also just plain efficient!

Our animators animate all day at work so it is nice to come home to a more limited style they can breeze through. The focus for the animators becomes bringing the characters to life instead of making the movement perfectly fluid.

Our Animation Director, Rylan Davies (Blue Sky Studios, Omation, Blizzard Entertainment) has this to say about our animation style:

" The animation style has to play nice with all of the other elements of the story: The models, the rendered look, the method of storytelling all affect choosing an animation style. A soft light-hearted story with pillow-like characters would probably warrant flowing movement and constant easing- while a story with fast pacing and angular characters might have wild poses, fast overshoots, and tight moving holds. There are no hard rules on choosing an animation style- but the choices behind an animation style should always have strong reasons."

You make your own rules/guidelines and try to keep them consistent. Break your rules only when you have a good reason (like a pivotal moment in a character's arc).

Those rules might be something like:

-Tight snappy overshoots during fast movements
-Very subtle moving holds
-Consistency in silhouette for specific characters
-Use of smear frames during fast movements

Finding a Posture

"A character's "default" posture"

"In terms of character behavior, I always ask myself where the character is in their arc. I like to ask myself things like, 'Where has the character been before this scene and where is the character going?', 'What are the character's needs or desires?', and 'What decision is the character trying to make right now?' Asking these sorts of questions helps give meaning to their actions and helps establish rules for how they will behave."

"Animation is an extremely broad medium- today's films and games have barely scratched the surface of what animation can do for storytelling. One of the great things about what Bam-Bu is doing is embracing the limitations of animation and turning them around into something fresh and new. I find that really exciting."

Bam-Bu is all about setting up "rules" as early as possible. Many artists struggle because they want to keep as many "doors" open as possible and have a hard time committing to a limitation. At Bam-Bu, we love to commit. Once we have our limits, we can set about pushing up against them and getting stuff done!

In Conclusion

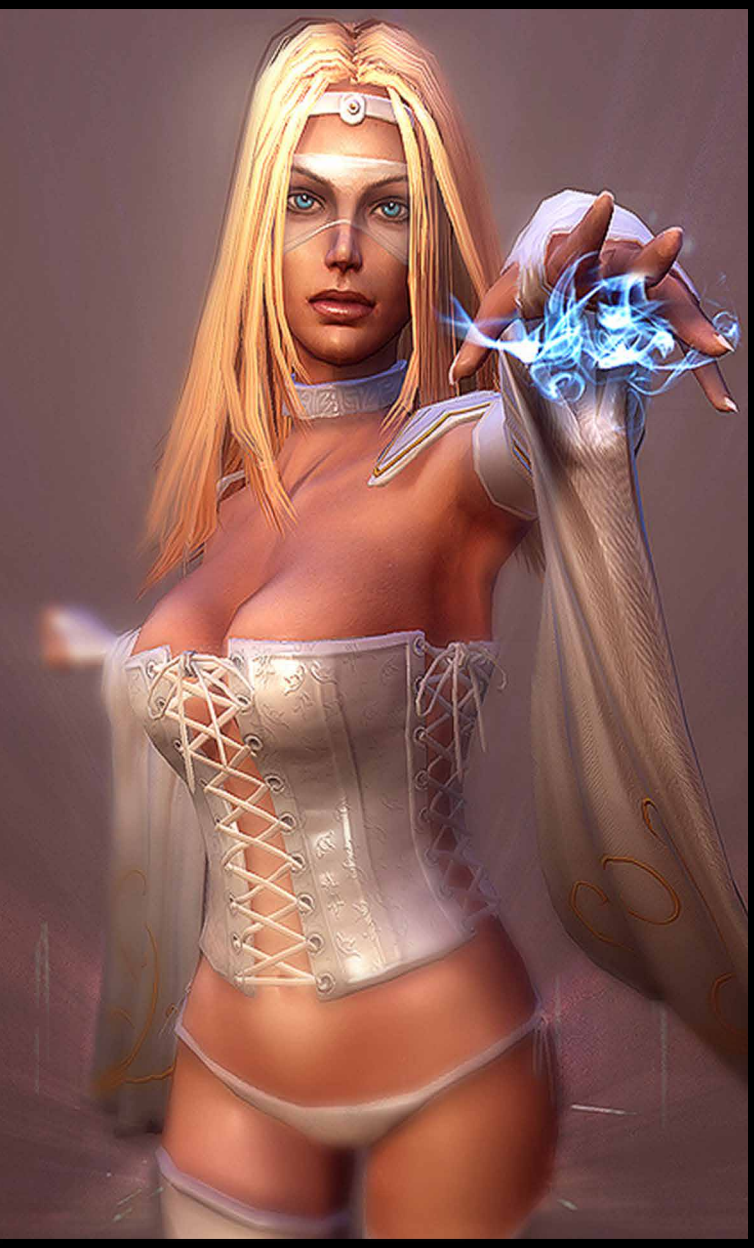
All in all, Bam-Bu is about creating an environment that keeps us creative. We believe that our motivation is a product of our surroundings and we are actively trying to create the best surroundings we can. We are still figuring it out, and we certainly are far from getting it "perfect", but if we are making art in the mean time, we won't stress on that!

Visit our blog at www.bambublog.com, and keep an eye out for DragonWeaver- a slick new web series coming soon!

-The Bam-Bu Team

Brad Marques, Tomas Jech, Rylan Davies, Pio Ravago, Jeremy Robins, Jesse Baumgartner, Gino Whitehall, Te Wilson, Josh Singh, Kim Gilbert, Matt Genovese, James Peterson

BAM-BU



Jon-Troy Nickel

www.kalescentstudios.com/troyfolio/Main.htm

The Female Face

The Female Face By: **Jon-Troy Nickel**

This article is a departure from the traditional 'step by step' or 'how to' explanation and instead more of a glimpse into the thought processes that I go through when working on a female face.

As such, I'll be using examples of faces I've done in the past, and some I am currently working on instead of 1 single face from start to finish.

I've worked this way for as long as I can remember, but tweaked and refined it as I learn new things that yield better results. If this helps anyone create better female faces, I not only want to hear about it but I want to see where it helped you, so hit me up with your awesomeness!

(30 – 60 min value studies from photo-ref)

(Reference sheet)

Research & Reference

The first thing I do is Research & Reference gathering...

Don't rush it! I spend the better part of a day looking at 3d, photos, and pieces of concept art that I find visually appealing. At this point I'm looking for interesting shapes, colors, and special traits. They don't need to be images I want to replicate, but they need to express emotion or give off a sensation that I'm looking to capture in my piece.

Regardless of the end style, I often venture into obscure or extreme styled references. I think it increases the likelihood of subconsciously adding something into the piece I might never have otherwise. Doing this on a constant basis also helps me discover new artists or photographers and subsequently, I'll always pick up nuances in the face that I didn't see before!

I'll then make up a reference page and tailor the images I've gathered to the task at hand. In my experience, every idea tends to get watered down and lose impact as it moves through the process of creation. So to counteract, I'll always pick the best or most extreme example of a particular trait as my starting point.

Jump Into ZBrush

Once I've got my reference page done I'll jump straight into ZBrush...

I use a generic head base mesh that I built some years ago, but I do think my faces may start to look derivative over the long term, so I may stop working this way in the near future!
It's at this point I make the decision on whether I want to push for a more stylized or idealized realistic approach. Historically I tend to hover in a grey area somewhere in between the two, which is something I think I need to work on.

Once I've got a rough block-in of the proportions it becomes a process of refinement. I'll separate each feature and work on it for roughly 15 min at a time on a constant loop. Starting with the lips then moving to the eyes then nose and finally the face as a whole. I'll keep repeating this loop until I see the face moving in a direction that I'm happy with.

(Stylized or Idealized Realism?)

(Final Fantasy XII Fran Fanart – Features isolated for loop workflow.)

- **It's important to be constantly looking at what you're sculpting from every possible angle, as this will help find problems with the forms. Initially I pay special attention to the front and profile views of the head and then shift to ¾ views to add volume to the forms.**
- **Swapping matcaps while you work is like instantly changing your lighting setup and will often highlight problem areas very quickly.**
- **Get some proxy's going for eyeballs, eyelashes, and teeth if the mouth is open. Eyeballs and lashes will help you create an appealing structure around the eye. Teeth will give her open mouth some depth.**

Starting to Polypaint

Once the sculpt reaches a point I'm happy with, its straight into polypaint...

(Chun-Li was looking too 'mousey' on the left – though in hindsight I like it more now!)

- **I always start with the eyes as I think they are the most important part of a female face, getting these right will light the way for the rest of the face.**

(2-3 hours of polypaint & photoshop for a couple of different looks)

PaintOvers

I quickly polypaint the rest of the face at this point as it provides a new perspective on the direction I've chosen and reaffirms that I made the right choices. Sometimes though, I realize I haven't! My Cyber Chun-Li was a good example of this.

I do this because over time it helped me build foresight and confidence in decisions I make at the sculpting stage that a particular form, feature, or trait will look cool at the finished stage. If you spend a couple of hours, it can also act as a visual target to hit on your final model. Again, I will always start with the eyes.

- **Play with things like hairstyles, makeup, and color palettes to find something that you like. It's much faster to paint and change things very quickly at this stage. I find this is a good way to provide an Art Director with whole pages of choices to yay or nay.**

After this is complete, I've got myself a concept / target to hit. I will finish sculpting in zbrush, retopologise my high poly in 3dcoat, and bake my normal and ambient occlusion maps in xnormal. I'll then paint her texture doing my best to hit the quality level in my polypaint / photoshop mockup. There are plenty of tutorials out there covering these phases of development so I won't be covering them in this article.

- **Everything must work together when creating a pretty female face, good forms, nice proportions, eyes, lips, nose, jawline, cheekbones, chin, neck, and finally an accompanying hairstyle. It is extremely easy to break the female face completely even with the smallest of changes to just one of the above areas.**

The Hair

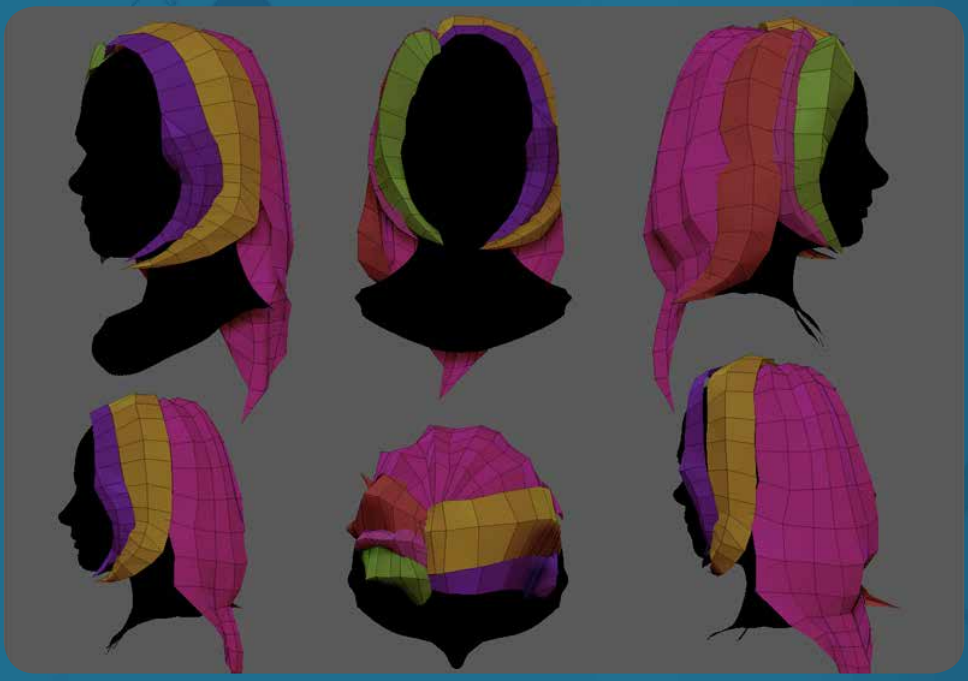
Creating a hairstyle...

How well a particular hairstyle works with the female face has a lot to do with the overall shape of the head and the position of the eyes and eyebrows. It's also one of areas you can use to really bring out the personality of the character. It has a significant impact on silhouette and can often be one of the, if not the most, standout and memorable features of a female character.

I refer to the mockups I painted in Photoshop at this stage and spend some time gathering photographic reference for hairstyles that resemble the look I was aiming to hit.

- **Build a few rough shells to give an overall volume at the back front and sides. Check the volume by looking at your model from every angle, and compare it with your reference photos and mockups.**

  I often apply a solid black material to my head and hair models as it also helps assess the silhouette. At this stage I also leave out the fringe and any hair around the front of the face and deal with that separately.

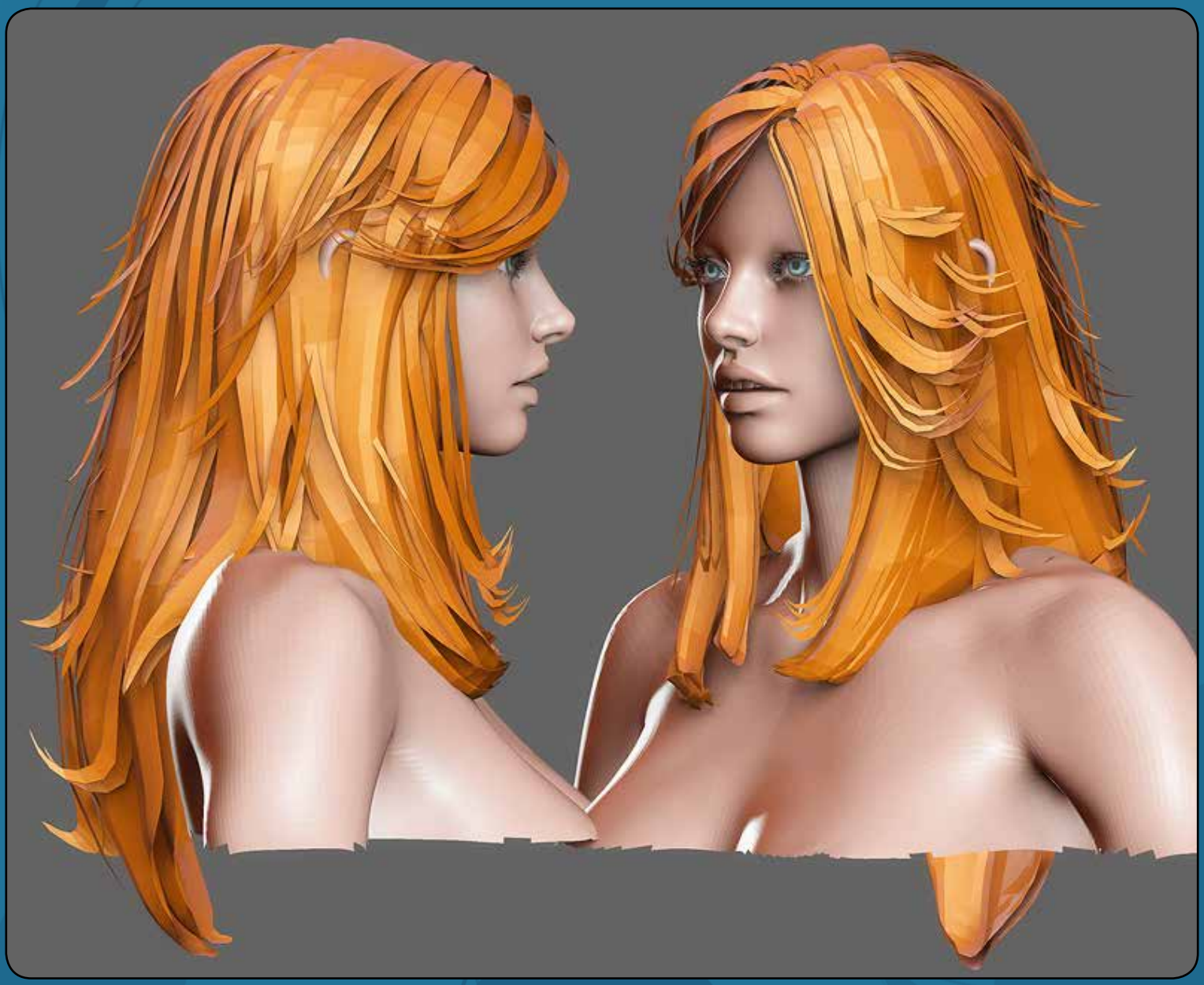


(Blocking in a potential hairstyle)

Once I've got a rough volume, I export those shells into zbrush and use the move brush to further finesse it into something I want.

I then move to the next level of detail with smaller strands and tackle the fringe area and any hair that's falling in front of the face. I make 4 or 5 smaller and thinner shells and export those into zbrush. I duplicate and place them around to build up more volume and shape. I prefer to do the placement and duplication in zbrush as its super quick to shape and move strands via polygroup.

- **UVW map these shells before exporting to zbrush if you plan on using them as your final hair model, especially if you're doing things like twists and curls as it can save you unwrapping time later.**



(Added thinner strands and shaped the whole hairstyle)

- **Eyelashes can be tackled the same way as hair, make one eyelash and then duplicate that in zbrush and place them around the lids. Use a much thicker lash at the base and far fewer strands than would naturally occur. I only do this for an approximation to help get a better feel for the whole eye area as I'm working in zbrush. Generally, painting some eyelashes on to a single sided 1 bit alpha plane for the actual game model will suffice.**

- **Naturally, eyelashes clump together at the tips, do your best to express that!**

Eyes & Eyebrows

Lastly some tips about eyes and eyebrows...

(Eyelashes for proxy sculpt on the left, and a realtime example on a 1bit alpha plane on the right)

For me the whole eye area is the most enjoyable part of the face to work on. There are a few things that I think can really make them pop and help give them a pleasing / alluring quality.

- **Make sure the lowest part of the iris is just touching the lower eyelid, while the upper eyelid should pass about half way through the distance between the top of the pupil and the top of the iris. Closing the upper lid more can give a sleepier / sultrier the look depending on what you do with the rest of the face.**
- **The very outer edge of the iris should be a darker hue of the chosen iris color and there should never be a hard transition where the pupil meets the iris or where the iris meets the sclera.**
- **Don't forget the wetness on the lower lid! I like to paint it straight into the specular map.**
- **Never dilate the pupil, but don't over constrict it either. A good rule of thumb is to make the diameter of the iris around 3 pupils wide.**
- **The Iris should be darkened and slightly desaturated from about the middle of the pupil and up, but saturated and lighter from the middle of the pupil down.**
- **If your hand painting a highlight into the eye, place it above the center of the pupil, rather than to one side. You can also paint a hemisphere into the specular map of the eyeball to simulate reflections, or even a combination of both.**
- **Take a screenshot of your model from straight on, draw a line from the outside of the nostril, up through the center of the pupil and continue the line on. Where the line intersects the brow is where the top arch of the eyebrow should be.**

You can build up forms and strongly define features in a male to add a gnarly factor, and create a more weathered / epic look. The further you go down this road the more badass he looks. Defining in this case is very much a process of addition.

A female face however, is all about smoothing and rounding out forms instead of defining them, it's about building mass, but then polishing it into a nice appealing shape. One hard definition line is too many! Refining in this case is a process of subtraction.

Final Thoughts

Mastering the female face is the biggest yet most rewarding challenge I've faced in my career so far. Each new face teaches me new things and I feel like a n00b all over again. There are so many complexities to learn, study and put into practice, and although I have a penchant for exaggerating certain traits beyond the normal, (especially the eyes) I can't stress the importance of drawing or painting faces or parts of faces from good photo reference or anatomy books whenever you can to get a solid grounding in reality before pushing the boundaries.

If I could show a progression of all the failed models and sculpts I've made along the way it would probably fill this magazine! So don't be disheartened if at first things just aren't clicking, because believe me, things did not go well for me at all for many, many years!! I hope there are some useful tips here, and again, if they do help, show me some before and after's! Happy arting!

About Me

Born and Raised in New Zealand, I liked 3 things growing up: Games, Art and Aircraft. In 2001 I moved to Australia and studied at Qantm College in Brisbane back in 2002-2003 to complete a diploma in Games Programming (C++) where I also met Steph who is now my awesome Wife! Not long after I graduated, I got my first paid gig, and very soon after became so busy with freelance work that I needed to hire on help to keep up. I opened an outsourcing studio with Steph and fairly soon we had a team of 5 or so other friends working on projects for clients all over the world. After 3 years of being a 'manager' I missed art. I decided to go back to being a grunt in the front lines, so I got an in-house at Fuzzyeyes Studios working on Edge of Twilight as a Character Artist. I was eventually elevated to a lead position, and ended up staying there for almost 3 years. Those were easily some of the best times in my career so far.

I got the opportunity to help Trion Worlds in sunny California, back in late 2009 on their Debut MMO Rift. I started as a Senior Character Artist and was promoted to Lead Character artist. It was very difficult to leave, but I'm very proud of how highly the game scored in the graphics department and how well received the character art has been by fans of the game!!

Jon-Troy Nickel

Freelance 101

Tips & Tricks on Freelancing by: **Ben Regimbal**

When I started freelancing many years ago, I was shocked by how little information there was along with how the few other 3d freelancer would keep their work ethic and tricks very secret. Nowadays it's a bit different as there is a ton of information.

However not much of that is very pertinent nor do they come from experienced sources. Hence this little Intrusion into my world.

Step One

What kind of freelancer are you?

The 2 main paths are Solo and Outsourcing Companies. Working with Outsourcing companies take a huge load off your shoulders. It's good for part time and full time freelancers. No client search, bids, estimates, or having to deal with the back and forth emails with the clients.

The Solo path is a bit more complex. You have to find your clients, determine your prices, make bids and estimates. You have to deal with contracts, meetings, fixes, back and forth, Keeping track of payment, and more often than not, deal with multiple clients and deadlines at the same time. Hell if you are into it, deal with your own employees. Of course doing all that while making the actual art .

This path is the path I will focus on. It's what I chose when I started freelancing and I haven't looked back.

How Much?

How Much Do I Charge For This?

Before hunting for clients, you have to figure out what and how you will charge. What's your worth? How much should I charge? This is the question I am asked sooo often. There is no easy magic number here. There are a few things to do before figuring that out.

Your Monthly Expenses

(Rent, mortgage, food, kids, bills, and extra money)

Taxes

What are the taxes law in your country, You need to save some money on each payment you receive.

Retirement & Emergency

You never know, and remember you don't have healthcare, all those fancy things you get as a full time employee.

Once you have a rough number, it's a bit easier to see how much you need monthly. From here with a bit of math you can come up with an hourly price. Having an hourly quote is something for yourself. Use it to determine an asset's price, not to give away to clients. It's useless on its own.

When setting a price for a client make sure you have the following information regarding the assets needed: polycount, texture size (# of textures), if it requires a rig/skin , does it require export to an engine, the time frame, and any other information that seems appropriate to understand what is expected. Remember the more you know, the fewer surprises you will get (and you will get many.)

Figuring out the time frame of creation demands experience, otherwise it's a bit of a guess work. I know how many hours it will take me to create a low poly with a1024x1024 texture fully rigged, Do you?

With time it gets easier to understand your speed. In your quotes, include 1-2 more hours in case fixes are needed and for emails back and forth.

Hours of creation/fixes x Hourly quote = Asset price.

If you are making a bid for 10-30 assets of the same style, remember that your speed will increase after the first few assets and you will get used to the work and the clients. It's important to consider that when making your bid.

It will lower your overall cost making you more appealing to the client, and you still make a profit.

Black Book

There are a whole lot of ways to find more work, like finding an on-site job. You have to market yourself, even more since it will feel like you are finding a new job every few weeks or months, until you are well set-up and known.

-An easy to use Portfolio is key. I suggest pictures of your work right away. No fancy clicking, just art and quick contact info so they can reach you.

-Linkedin. Get on board guys, it is a very fast way to get known to potential clients/artist.

-Cg Forums. Many forums like Polycount, CGhub , and CGtalk offer a job section. Keep watch but remember you will be fighting many many others.

-Introduce yourself to companies that have a style that interests you. Don't go overboard with this but just a quick note to put yourself on their radar.

-Post art. Get on the Cghub Frontpage, cgtalk, etc. The more people see you and know your name and your art, the easier it gets to find work.

Once you have a well established name and contact database it's much more enjoyable. If you keep up the good work, clients will come back, and employees that change companies will keep in touch. Trust me.

The Contact

Like I mentioned earlier, Before making a bid or signing a contract, you need to know as much information as you can. I know that when you get your first potential contract you will be tempted to jump in right away. Be careful, Information is needed.

-An example of actual art. You need to know about the genre and style in case it's a turn off. Even to see the level of quality, maybe you will need more time to match it

-Specifics of the assets. Polycount, number of textures and their size. What kinds of maps, diffuse only? What about spec, normal, or shaders? Does it need to be rigged and skinned? What about exporting? Even name changes and folder creation are things that will affect your timing. You may think that exporting to the engine will take a matter of minutes, No, sometimes it's a pain (I do not do this anymore, it can be very time consuming.)

-Time frame. You don't want any surprises. Remember that sometimes hearing back from a client may take time, you have to consider that.

-Start Date, again, no surprises. It's better to have a week day start, you don't want the client to know you work on the weekend.

Do a bit of detective work and find out a bit more about the artist, lead, and producers you will work with. A history of egos and pickiness will impact the time frame.

I advise to not start any work before a contract as been looked at carefully and signed by both parties. This also includes information about payment. Paid at completion of work? Or approval? twenty days after the invoice was sent? And so on.

Actual Work

When everything is on paper, agreed on and such, Its time to start the work. Keep your client updated on your progress to ease the clients worry and well, to avoid mistakes. A Mesh WIP, Texture Wip, Sculpt and so on, Don't overdo it. Yes it's better to have the client aware of what you are doing, but be smart. When Sending Files to client, final or wip,keep them clean. Proper naming, no surprise hidden mesh or weird texture paths. Be professional, or at least look the part.

Invoice

Once the work as been completed and approved, Send in an invoice. It's good to keep a record on both sides, and its easier to keep track of your payments this way. Invoices themselves don't have to be very fancy. The name of your client and your name, the date, asset info and their pricing, total, and the date sent.

Tips for Dealing with Clients

Even with a well thought out plan and all the information possible, problems will arise. You have to remember that you are not sitting next to the lead, producer, etc. Even though you are making the art, it's not yours. Don't get angry or short tempered. With new clients you have to get used to their way of doing things, and same goes for them. Think carefully before sending an email. Be smart, you want to end every contract in a good way, so they can contact you again.

Sometimes you will be required to have phone meetings/ conferences (I'm totally against this. it's a huge time waste but some clients have this need to know you are real.) When those meetings and phone calls start, never agree to anything unless you ask for an email copy.
You really don't want to play a game of he said she said when money is involved.

Multi Tasking

It's important to plan ahead. Even if right now you have a contract, you don't want to have nothing when it's done. You have to set things in motion, plant mines. With time you might have, or want, to do more than one project at a time. That's tricky and not everyone can handle it, because it demands careful planning and being able to switch styles in a matter of hours, everyday...

If you are willing to do it, you cannot let it effect your work. With any of your clients, remember it's a relationship. You want it to end on good terms (like in life.. erm..) Having your client used to receiving WIP or files at the same time each day or so will come in handy. Set up different times for each client, and respect them, so they don't have to worry. Know your limits. I have seen many artists explode from doing this. Handle with care, and don't do this right away. Find time to know your speed and figure out ways to work faster and better.

The Payments

There is multiple ways to do this. Have it all settled before getting started. It's a worry you do not want. I prefer being paid at the approval of the work. With long term clients, I invoice at the end of each month. It can take a few weeks before the invoice is processed if they follow their payment system. Payment after approval of each asset is possible, but I advise against it if there are multiple assets. The client doesn't want to receive a new invoice every day.
Some people prefer splitting the payment in 3 parts (for bigger contracts, or longer time frames) Initial payment, middle payment and at the completion of the work. Not every client is comfortable with this.

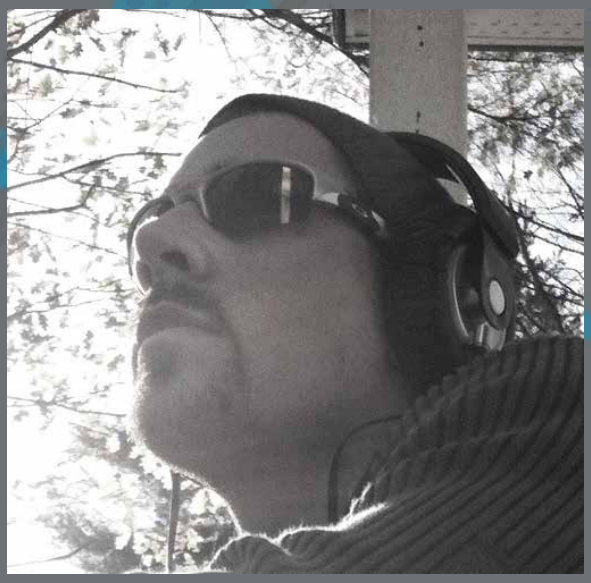
About Me

I'm a 11 year Veteran of the Game industry. Canadian Born, living in Seoul , Korea with my Artist wife. I enjoy the low poly work and painting my texture old school style. Freelance for 7 years and I left my mark, big or small, on over 60 games.

Check and wire transfers are the only two methods I enjoy using. Checks, only for local work or smaller amounts. Wire Transfer is quick, easy, cheap, and no fuss, Contact your bank to receive the necessary information. Paypal is used by some, but I advise against it with bigger companies.

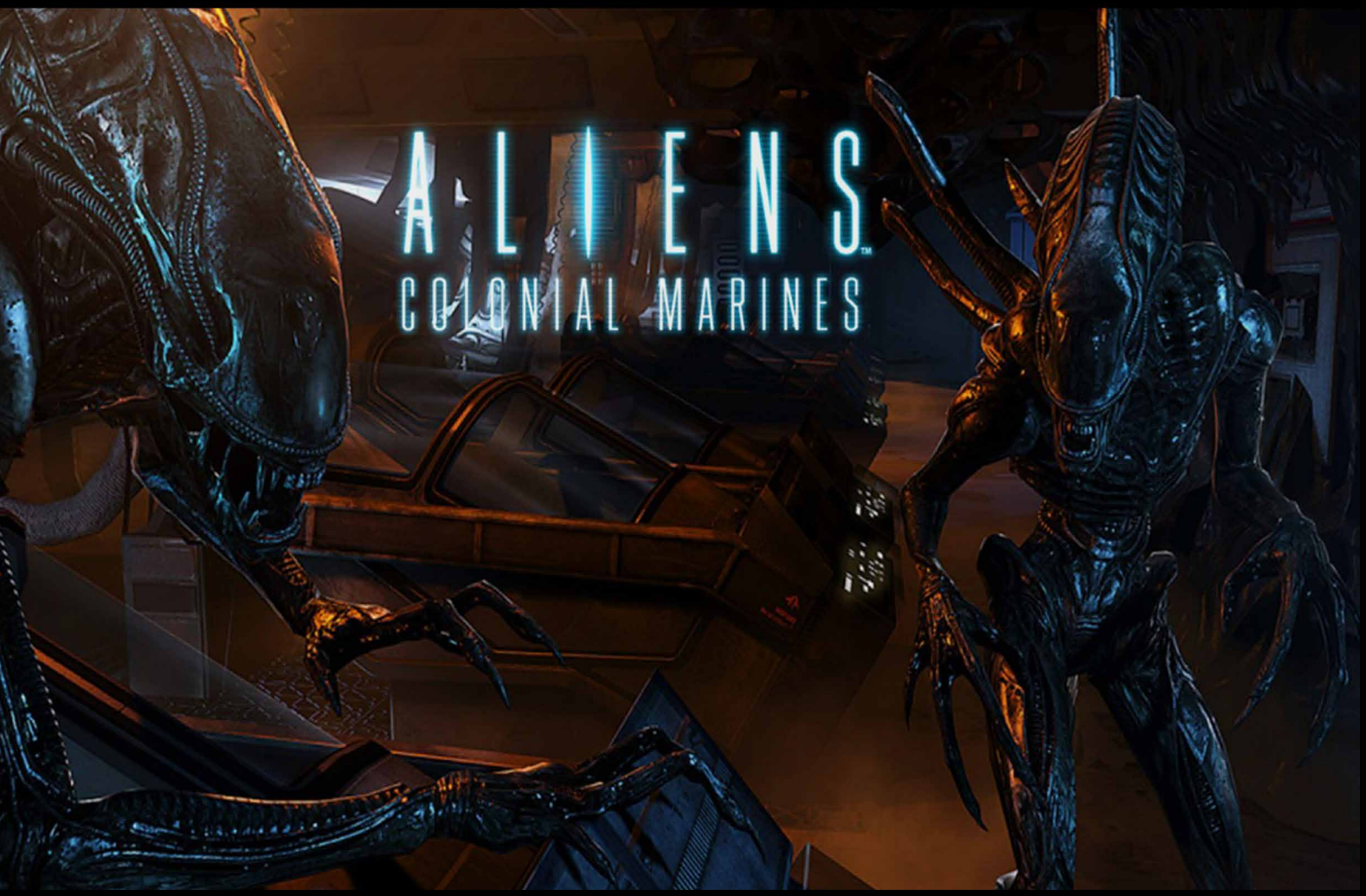
The key to be a successful freelancer and to survive in this business for many years without being hungry is to be professional. I know many people believe freelance is an easy way out. Where you can wake up whenever you want, work as little as you want, be free and carefree, but it won't get you anywhere. Maybe you will make it for a few months, but times will get hard. Plan your work, make a schedule and follow it. It's much easier for your client if you deliver work and WiP at the same time. Don't treat freelance like it's just a thing to do before you get a full time job. It is a full time job, and for me it has been a career.

Be professional, don't miss deadlines, market yourself, don't over book yourself and don't give up. I'm always open for questions, and I will be glad to do a follow up article with answers.



Ben Regimbal

SECTION 8
PREJUDICE


ALIENS
COLONIAL MARINES

The GLUE

Life as a Technical Artist by: **Ali Mayyasi**

The Technical Art department is the critical glue between the different game studio departments. It is the keeper of "Memory and Performance", the defender of "Best Practices", and the promoter of "Content Organization". The following commentary briefly describes each of the aforementioned areas. The articles are intended as both general insight into the world of Technical Art, as well as specific reading aimed at fledgling Technical Artists. References are made to the Unreal Engine because of its free availability and open documentation.

The Guts

"Memory and Performance"

The Level Pipeline

A level (or map) usually undergoes several phases throughout its lifetime. The following is a simplified overview of the level pipeline: The first phase is the "Block-out" phase, in which placeholder meshes and simplistic lighting are used to establish the space, scope and mood. "Gameplay" then follows, in which pacing, combat and encounters are all set up. "Art Deco" then follows, in which the Artists and Level Designers fully decorate the entire level. Visual Effects (particles, fog, light shafts…) and Sound Effects (music, ambience) also fall into this phase. The "Optimization" phase follows, and heavily involves Technical Artists.

Additional reading:
http://udn.epicgames.com/Three/CreatingLevels.html

Asset Budgets

Given how memory is limited, it is very easy for the game content to exceed the 256 MB hardware limit and cause "Out Of Memory" crashes. Game engines usually have developer tools to diagnose and track memory data. On all of my previous titles, I worked closely with the Engine programmers in order to create memory budgets for all the asset types. Together, we developed a memory tool which tracks and regularly writes out detailed memory information for all the different assets types as a player runs through the game. This allowed us to quickly determine what was over budget. The Technical Art department established Blockout, Gameplay and Deco budgets and was able to verify that levels were at budget at different stages of the pipeline. This prevented the unpleasant situation where Art receives a Block-out map that is already over budget. It also helped catch layout problems early on in the level pipeline, like areas that are too expansive or areas that have very long view lines. Adjusting an area's layout before it has been decorated is significantly more feasible than after it's been decorated.

Additional reading:
http://udn.epicgames.com/Three/PerformanceHome.html
http://udn.epicgames.com/Three/MemoryProfilingHome.html

Memory

Developing for consoles is very rewarding, but it is also quite challenging. The PS3 and the Xbox 360 have fixed memory: 512 MB. Memory is more restrictive on the PS3 because it is split evenly between System Memory and Video Memory, whereas Xbox 360 memory is shared by the CPU and GPU. If a studio is developing a game for both consoles, then the playable area has to fit in 256 MB of system memory at all times. This includes the operating system, the game code, geometry (world, characters, weapons, vehicle…), user interface, sound effects, voice, music, pathing information, shaders, lighting information, animation data, physics data, particles, fragmentation… This is quite the challenge when working on AAA titles that are constantly trying to up the ante. That is why game engines make heavy use of "Streaming": they unload old data from memory while loading in new data from disk into memory as the game runs. Streaming seamlessly loads in new content while the game progresses, keeping the player feeling immersed.

Additional reading:
http://stackoverflow.com/questions/3770457/what-is-memory-fragmentation
http://users.ece.gatech.edu/lanterma/mpg/ece4893_xbox360_vs_ps3_4up.pdf
http://udn.epicgames.com/Three/LevelStreamingHome.html

Content Validation and Optimization

Once an art asset is imported into the game engine, the content developer still has to adjust many settings. Many of those settings can dramatically affect the asset's impact on performance or memory in non-obvious ways. For example: enabling dynamic shadow casting on a light has major GPU and CPU implications; setting a weapon fire effect as "looping" can cause a memory leak if the effect is not hooked up correctly in script.

Additional reading:
http://udn.epicgames.com/Three/VFXOptimization.html
http://udn.epicgames.com/Three/TextureOptimizationTechniques.html

Content Tools

Technical Artists are in a great position to detect pipeline inefficiencies and to propose solutions to such inefficiencies. Lighting can have big implications on performance. Dynamic shadow-casting lights are a common performance hog on console CPUs as well as the GPUs; if gone unchecked, they can quickly bring framerates to a crawl. Lighters often copy and paste existing lights to quickly light a large scene. Consequently, it is easy, and common, for a dynamic shadow casting light to get accidentally duplicated all over a map. In an attempt to mitigate this issue: I worked with the Tools department to implement a feature where light actor icons clearly determine the lights' status: static, dynamic, shadow casting... This solved the problem of accidental copy/paste. It also made lighting optimization more straightforward as the shadow casters and dynamic lights were immediately obvious in the scene.

Additional reading:
http://udn.epicgames.com/Three/LightingReference.html

Oversight

Sentinel is an Unreal performance and memory tracking tool. Typically, the Quality Assurance department regularly plays through levels with Sentinel tracking enabled. As testers play the game, the Sentinel database gets populated automatically. Some of the key statistics include Game Thread, Draw Thread, GPU Thread, System Memory, and Video Memory. The Technical Artist department maintains oversight of all maps and tracks their progress. It regularly reviews the Sentinel data and creates action items to optimize any levels that are over budget.

Additional reading:
http://udn.epicgames.com/Three/GameMaintenance.html

The Rendering

Three dimensional game environments need a lot of high quality meshes to look believable, engaging and immersive. The quality of a mesh depends highly on the number of its vertices, the complexity of its shaders, and the quality of its textures. The following section briefly describes the rendering pipeline, as well as some of the performance concerns that usually come up during rendering.

Scene Complexity

Games need to render at least 30 frames per second to remain believably interactive. This gives a single frame at most 33 milliseconds to get processed by the CPU and rendered by the GPU. GPU cost of meshes that are off-screen are normally insignificant and should not incur any performance overhead.

Additional reading:
http://en.wikipedia.org/wiki/Frame_rate
http://udn.epicgames.com/Three/PerformanceDebugging.html

Visibility

Game engines need to be optimized for determining what meshes are visible, so that no processing power is wasted on irrelevant , and potentially complex, meshes. Scene processing is commonly handled via an octree, which is a data structure used to partition three dimensional space. The set of visible meshes is narrowed down using frustum culling. The CPU then has to process all visible meshes in the scene, and submit each one to the GPU for rendering. With thousands of meshes making up a viewed scene, the number of meshes can quickly tax the CPU.

Additional reading:
http://en.wikipedia.org/wiki/Octree
http://en.wikipedia.org/wiki/Clipping_%28computer_graphics%29
http://en.wikipedia.org/wiki/Z-buffering

Shaders

A shader is a little program that runs on a GPU, and controls how polygons and pixels are rendered. Once a mesh is submitted to the GPU, each vertex is processed via the vertex shader, to determine its final position in 3D space, and subsequently, screen-space. Each of the mesh's triangles is then rasterized, and each of its pixels is processed via the pixel shader to determine the final color on-screen.

With thousands of vertices making up a single mesh, the number of vertices can quickly tax the GPU. Similarly, with pixel shaders getting exceedingly more complex, the GPU is further taxed.

The Xbox 360 GPU has a unified shading architecture, which means each pipeline is capable of running either pixel or vertex shaders. The PS3 GPU by comparison, has independent pixel/vertex shader architecture, which means that there are dedicated pipes for vertex and shader processing. As a result, vertex processing can be more of a bottleneck on the PS3 when a scene is vertex heavy.

Additional reading:
http://en.wikipedia.org/wiki/Shader
http://en.wikipedia.org/wiki/RSX_%27Reality_Synthesizer%27
http://en.wikipedia.org/wiki/Xenos_%28graphics_chip%29

Content Organization

The following section briefly discusses how game content is organized and processed during development.

Package Size Implications

Content in Unreal is stored in packages. Package organization has major development and back-end implications, especially package size and package dependency. In practice, we've found that having 30-100 MB packages provide a reasonable workflow balance.

Build Times

When doing console development in Unreal, game content has to be "cooked" for the target console before it can run. Cooking is the process where packages are reformated and optimized to run on the console's specific hardware. When a package is cooked, all the packages which that package depends on also get cooked. The more scattered a package's dependencies are, the more packages are needed to get cooked, and consequently, the longer the cooking takes. Longer "cook times" imply longer "build times". The "build" is a snapshot of the game at any point in development. When a build is requested, the entire game's latest code and content are compiled, cooked then deployed to the team so that they can work with the latest features, content and tools available. Build turnaround time is quintessential for iteration, deployment, and stabilization. Major bugs often get introduced, which prevent developers from testing or running the game. When such a work-stopping bug is fixed, a new build is immediately requested so that the team can resume normal development.

Additional reading:
http://udn.epicgames.com/Three/ContentCooking.html
http://udn.epicgames.com/Three/ContentHome.html
http://udn.epicgames.com/Three/UnrealPackages.html
http://udn.epicgames.com/Three/ContentBrowserReference.html

Regression Testing

Near the end of the project, all content packages get locked to prevent new edits. This content lock allows Programmers and Technical Artist to work on stabilizing and optimizing the game. Quality Assurance testers have to regression-test all edits to ensure that no new bugs are introduced. The wider the package dependency of edited, the longer it takes the testers to verify a single edit.

Additional reading:
http://en.wikipedia.org/wiki/Regression_testing

Source Control Server Space

Every time a package is edited, a new revision of that package is saved on the source control server. Large packages incur wasted server disk space when relatively small edits are made. For example, if there is a 300 MB package containing 30 meshes, and a small edit is made to one mesh, a full new 300 MB revision of that package gets added, most of which is redundant and thus wasted.

Additional reading:
http://udn.epicgames.com/Three/SCCIntegration.html

Source Control Bandwidth

Source control bandwidth dramatically affects internal and external sync times. Internally, Ethernet download speeds can reach 100 Mbps. Externally, download speeds can reach 6 to 15 Mbps for cable modems. When developers sync to source control, they get the latest copies of all the project's files. Internally, content developers typically sync to source control multiple times a day. Long sync-times hurt momentum and slow down production. When an edit is made to a 300 MB package, then all content developers in the studio will sync down that 300 MB over the network.

Concurrency

Concurrency is another important factor to consider when it comes to package organization and size. In Unreal, packages can only be edited by one person at a time. The more assets are in a package, the greater the potential of two people needing to edit it at the same time.

About Me

Ali Mayyasi

I'm Ali Mayyasi, and I'm from Lebanon. Growing up with limited access to video games, I was blown away when I first saw Donkey Kong Country on the SNES. I knew then that 3D was my calling. I graduated with a Computer Science bachelor's in Beirut, and moved to California. I landed my first job as a Tools programmer at the Jim Henson Company in Hollywood. By working closely with the content developers there, I found myself increasingly passionate about 3D production. I decided to formally peruse this fascination and eagerly signed up at the Vancouver Film School. By experiencing the full breadth and depth of the pipeline, I knew without a doubt that I wanted to become a technical artist. After graduating, I was hired by TimeGate as their first Technical Artist. I helped with communication, workflow, planning, prototyping, scripting, shaders and VFX. I have since become the Lead Tech Artist. It has been a remarkable journey, and I look forward to the fun problem solving to come.

Jonathan Fletcher

www.artpanda.co.uk

DRAGON'S PERCH

A Walkthrough on Stylized Painted Textures by: **Jonathan Fletcher**

This is The Dragon's Perch Tavern, a model I have recently finished, and an in depth walkthrough and explanation of what is one of my favourite art styles.

This walkthrough will go over some style guidelines, various techniques and useful tips for creating stylized hand painted diffuse-only textures. Basically, the kind of stuff you'd see in a game like World of Warcraft, Diablo 3, Torchlight etc.

Keep in mind however that what appeals to some may not appeal to others. Everyone has their own preferences and ways about their texturing. So don't take anything to heart, and I encourage you to find your own ways of doing things, because I'm no super-artist, but maybe I can help! The 3 things I find most important about painted textures are the following (In no order)

Edgework is how well defined the edges in your textures are. It's really simple and can really make shapes stand out visually.

Gradients are obviously the transition of one colour or value to another. Again, very simple, yet it helps draw the eye where you want it to. It highlights areas and brings 'warmth' and variation to your textures.

Bevels are simply introducing some 3d into your texture, adding thickness and volume to a surface as well as being a substitute for simple surface details.

These are the main things I concern myself with whilst making painted textures, as I feel that for the most part, that's all that is needed to make them look nice (depending on the style of course).

1) Here, the edges of the wood are highlighted to strengthen the shape and help it read at a distance. You can define them further with darker areas on the inside of the edge.

2) Here, the gradient on the roof draws the eye down to the center of the building, adds contrast between the snow and the wood and sells the impression that it is cold and weathered.

3) Here, I have treated the wood grain as simple cuts and bevels, they add to the impression that the planks are actually 3d and give that thick, "chunky" feel.

Iteration and the big picture:

For this style, and for most game art in general, it's best to focus on the bigger picture and not concentrate on micro details.

Making Iterations

Throughout the construction of this model I was constantly hopping back and forth from different textures to make them work well with one another. I never get them right the first try.

I find that capturing the overall style and mood of what I am working on is an extremely iterative process that I spend more time on that actually texturing certain elements. Iteration is very important, at no point should you feel truly done with a texture or feel bad about going back to it. As you will see shortly, my initial interpretation of how this would look was catastrophically wrong, But by focusing on the overall scene and not the individual texture I feel I managed to pull it into a state I'm much happier with.

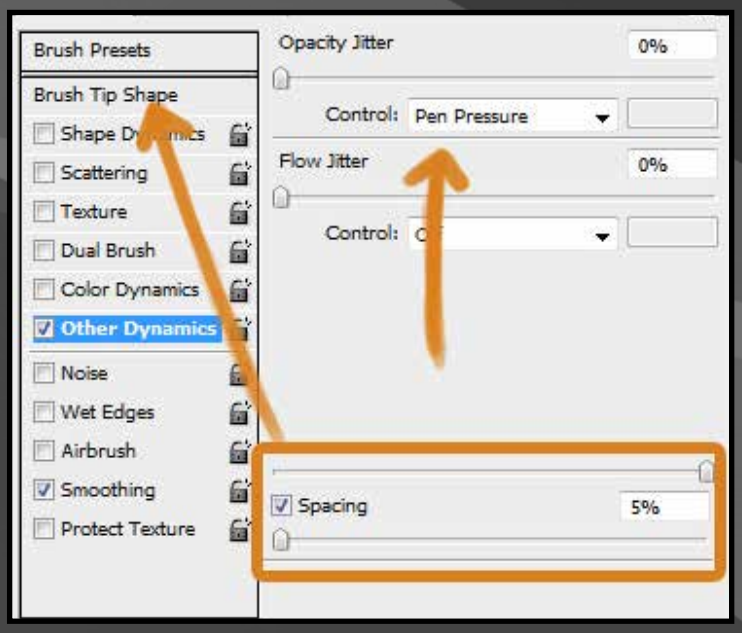
Finding the Brush

This is more specific to your preferences and your own style, but here is what I use:

90% of the time I use a standard, hard edge brush.

I rarely use soft edge brushes unless the task specifically requires it (such as creating a soft mask, or the eraser in some cases.)

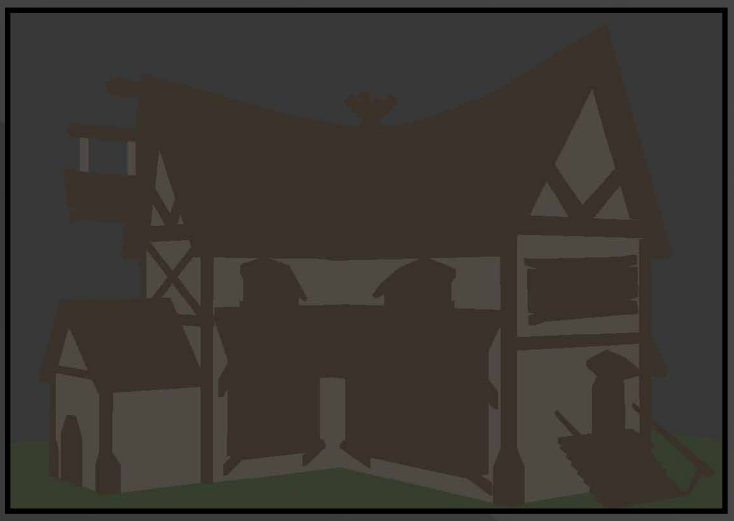
I find it much easier to define things with a harder brush, and just in general, it's much simpler to just paint over something and not worry about the falloff. Even for gradients, I think it's best to stick with hard brushes.

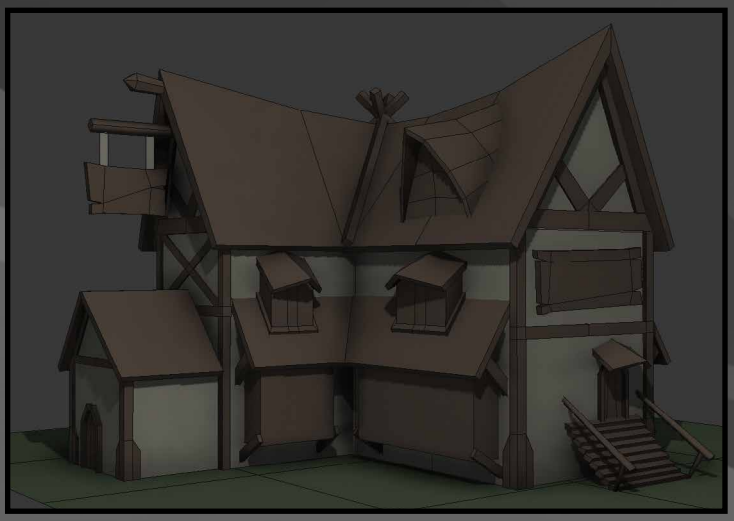


So...yeah, it's just the standard brush with pen pressure opacity, moving on!

Base Colors

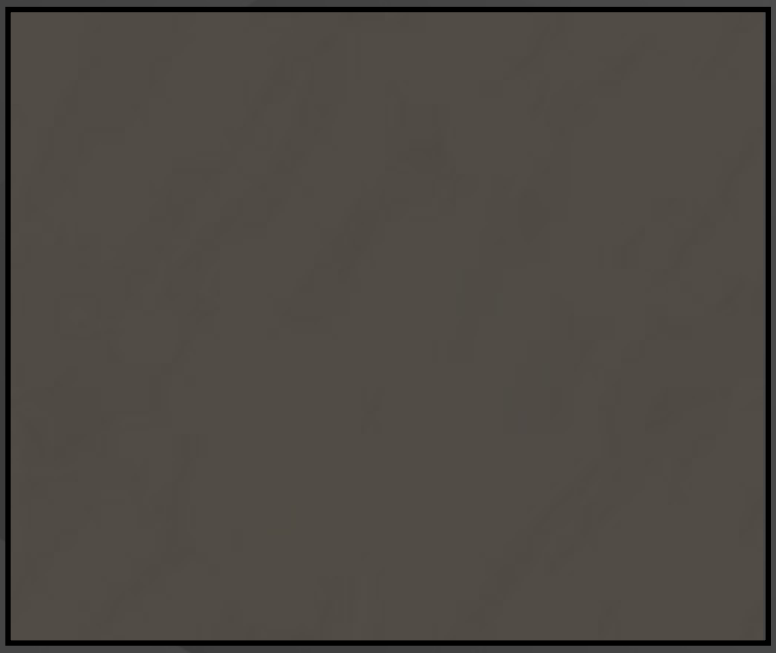
Before you get into anything you're going to want to make sure your materials are set to 100% self illumination, with no specular highlights. This will make it so you're only seeing the diffuse. Apply some base colours in your materials (They don't have to be perfect, just a simple starting point) and you should be ready to roll.





Starting Brickwork

Here's our base colour. This texture will be 256x256 in dimension and will need to tile. I've added some very subtle variation to get started.



Next it's a good idea to rough out some edges to get the shape of our bricks, I recommend doing this freehand as it can give some nice, subtle distinctions in the shape of the bricks and stop things from very quickly becoming generic.

You can use the Offset filter in Photoshop to check seams, clean them up, and then offset to return to the normal positioning. This makes tiling textures a lot easier.

Now let's start to add some basic bevels, to define these shapes and make things a bit more three dimensional.

Adding a dark gradient next to the highlight will help them pop out more.

I prefer to start working in a low contrast, then progress by adding darker and lighter values. As you see in this next step, I wash out what I've just done but it stands as a good base to start refining the cracks.

You can easily tone things down with a large brush stroke with less pressure.

With a smaller brush, I've started to add contrast to the cracks.

Variation

Now we're getting somewhere! Here I've started to add variation to the bricks. You can do this in a number of ways, I prefer to just paint some new colour directly onto them or use a subtle blending mode layer such as overlay to bring out some different colour.Simply adding a dark gradient to the top of the brick instead of the bevel highlight can fake the appearance of the brick being indented into the wall. Likewise, a stronger highlight will make it appear as if the brick is popping out. Adding these elements of 3d is what really defines the style and easily increases believability from a distance.

Adding a couple cracks will provide nice variation and make it appear as a stone structure. Add highlights and shadows to the cracks so they don't just appear as simple lines. Remember when doing smaller details like this to consider how they appear from a distance. If they become too much noise, maybe you can inflate their size, or just get rid of them, whatever works best.

The Woodwork

This texture will be for the Roof of the building, and will be sourced elsewhere later on. It will also provide a nice base for wooden planks everywhere else throughout the model to save time and not have to repaint them.

So to start, like the bricks, we want to draw in some rough lines again. Freehand with some distortion provides a nice bit of variation. Paint in some darker areas around the side of the planks, as our lighting will be from above most of the time. Add a simple edge to get started.

Now, with a brush size equal to the width of the planks, pick a brighter colour and gently brush in some basic gradients. Leaving some planks darker, or having a higher or lower gradient, provides a nice bit of variation and gives the appearance that some planks are stuck out further than others, or even curved outwards.

Now we can wash out any extremes, and start to refine some of the edges a bit more. Some simple cracks going inwards from the bottom of the planks are good to kick things off, use the colour/values from the side in which the cracks are coming from, to keep it consistent. Don't go overboard with these cracks just yet.

Now we can start to define the edges further with the cracks in mind. Keep it to the ends of the planks for now as adding extremely defined edges to every part of the planks can get noisy very fast. With the new inner edges we can start to see some nice bevels forming in between the planks!

Now we can clean things up a bit, start to add more variation to the planks, and define the bevels. With a smaller brush, start to add some thinner highlights to the edges to create bevels and fill in one side of the cracks so that they appear 3d. As you can see, every crack on the texture gets this treatment and they all have a light and a dark side so it appears as an actual bevel, not just a surface detail. I've gone ahead and added some simple bolts as well. They have been dulled down so that they don't appear as noise. Here is a quick tip for painting simple metal bolts very fast:

1) Start with a dark base. Traditionally with very reflective materials you want to start dark so that your specular highlights appear more vivid.

2) Add your main specular hotspot, and another (fake reflection) underneath, but lighter, with a softer falloff.

3) Kill some contrast if needed, depending on the size of the bolt in the texture you may want to just stop at step 2

4) Strengthen the specular and the reflective hotspots and darken the edges. Experiment with adding some alternative colour to the reflection spot. (orange/blue is usually good)

5) Done, it doesn't need to be more complicated than this, and I'll cover metal again later on a larger scale. If you want though, you can add a simple indent and then bevel it to make it look like a screw.

Snow! I'll cover this too, but for the most part this is extremely simple. First off you'll want to grab a near white colour that has a baby blue hue and block out the snow covered area. To give thickness to the snow we're going to want to make it appear bevelled, with a darker, shadowed area. Pick a slightly darker and more saturated blue colour, and with a thick, hard brush, start to brush around the edges of the snow gently. Brush inwards to give the appearance of layers but maintain the same light and dark values.

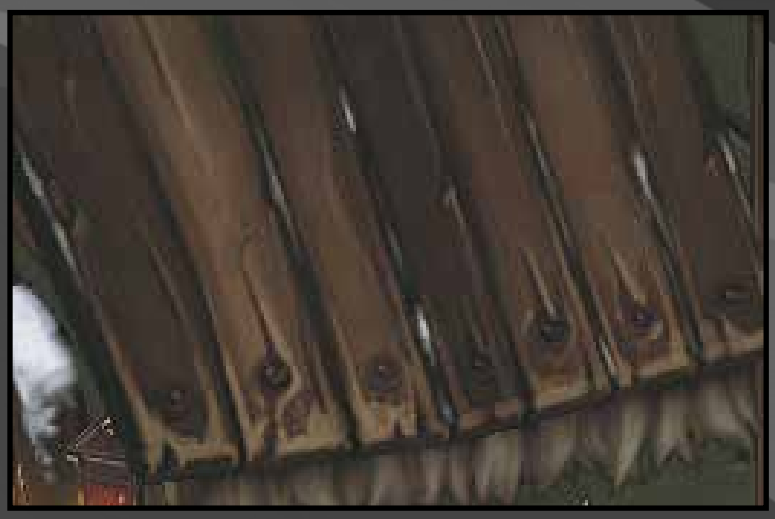
Due to snow's very bright colour you may need to kill some contrast after this. Keep it looking very subtle. Don't worry too much about the snow popping out like crazy, a subtle clean gradient will do. For the most part, you want to keep it looking quite flat. No shadow should be visible.

Now with a smaller brush add some very small bevels so that it looks like matter that has been clumped up, and not just smooth like cloth.

You may also want to add a Colour Dodge or Overlay blending mode layer to boost the white values so that the whole thing becomes much brighter and the gradients more saturated.

Also experiment with a scattered brush to add some flaky areas where the snow is slightly crumbled. From a distance these small clusters of snow that contrast nicely with the values of the wood underneath can appear very crisp.

You can make great use of cavities by filling them with subtle pockets of snow. A quick brush stroke and in return you get some very nice contrasting elements.



At this point I decided to make a few adjustments to the mesh to really pop out the planks and make the snow appear much thicker by having it jutting out and actually affecting the silhouette.

While true that I could have anticipated this before starting the texture, I believe that you should never feel bad about going back and adjusting your mesh as you progress forward. In fact, this entire walkthrough is an example of just how drastically I changed things as I moved forward and realised some elements could look a bit different or could contribute to what I wanted to do at the time within the texture.

The Fur/Hair

thought it would be cool to have fur stuffed underneath the roof planks as if the occupiers of this place used animal pelts for insulating. If you don't buy that reason, then what the hell, they look cool and it gives me a chance to go over how to paint up some quick fur!

First off we're going to want to paint some very basic strands with a thicker base and a sharp tip. For this you may want to switch back to a brush with pen pressure set to brush size instead of opacity, as we will making the silhouette of the fur first and we will need it to have full opacity. With these basic yet varied strands, duplicate them to form clusters until you have something this dense: Because of the size of this texture and how we need it to hold up well at a good distance, it's best to form thicker, stylized fur clusters. From our last point, begin to paint into some of the gaps whilst leaving a few left over thinner strands for a bit of variation. We now have a good base to go into a bit more detail, and a nice mask that we can just crank up to white and plop into our alpha channel for opacity.

Switch back to your normal brush with pen pressure opacity and start to paint some thin highlighted strands that flow with clusters we have already set up. Do not break the silhouette that we have already made by painting over the edges, we want to keep this.

When done, you'll want to blur these strands so that the highlights are not so sharp. This will give us some nice smooth strands that won't become noise at a distance. (Despite the fact that we are blurring these, you'll still want to use a hard edged brush)

Now we can start to add a gradient so that the base of the fur is darker. This will draw your eye to the top, and also give it nice warm values. It also works well as some fake ambient occlusion shadows, as I will be stuffing the base of these fur planes underneath the roof planks.

Finally, it can be best to kill the contrast of the texture so that the fur appears much softer and matted, with very little specular to it.

For the most part you want to keep fur quite clean in your texture. It isn't something that needs a crazy amount of definition or fine detail, but a subtle amount of variation in the strands will work perfectly.

You may also notice that I tinted the shadows of the fur texture. For this (in the same process of eliminating contrast) I used a layer blending mode set to lighten and filled it with a dark blue colour. This will tint your darker values to your desired colour and also lighten them up.

Windows & Glowing Lights

For the lit up windows you can either paint the light directly as you imagine it, or you can start by painting an unlit window underneath and experimenting with additional layers of blending modes and opacity. For these windows I decided to do the latter. Remembering what we learned from painting the wood, we can block in an average base value where the glass will be and add some simple window support beams.

Now we can start to paint in some light to the window. Start by painting some dull yellow into the center of the panes.

Then create a new layer with a colour dodge blending mode and paint yellow into the panes again with a falloff going into the darker regions.

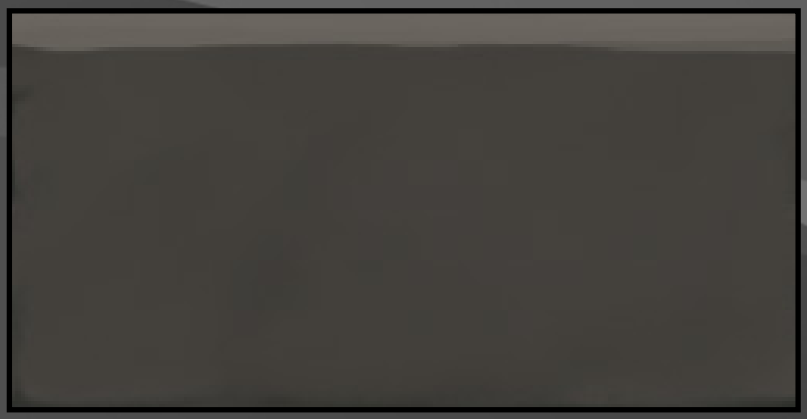
The result you will see is a more saturated and shifted hue in the darker areas. You can repeat this with more layers/intensity.

Again, we can use a colour dodge layer and a low opacity normal layer to paint a much larger glow that tints the overall window and the wood around it. This makes the light from the window appear much warmer in contrast to its surroundings.

Finally I painted some very simple shapes and silhouettes with a standard brush underneath the light layers with no detail whatsoever so it looks like they are behind the window on the inside of the building.

The Ground Trim

This texture will be used as a trim along the bottom of the building to add a bit more variation. Let's paint in our base colour and main bevel to get started:



Now we paint in further, exaggerated bevels to give it some thickness and start on some simple edgework where it is needed most. This being the brick's side edges, where there is less contrast between the base colour and the bevels than elsewhere.

Now paint in some subtle dark gradients bordering the edges to give the edges further contrast. Like we learned earlier, feel free to get a couple cracks going but nothing overkill at the moment. This texture will be tiling horizontally an awful lot, so we must be careful with smaller details and stick to just defining the larger forms. You can see here also that chamfering corners whilst working with your edges can make the stone look much thicker, and exposes a larger bevel which will look great a distance

Now to pop out the shape of the brick and give it more exposure, boost the brightness of the center areas so they don't look perfectly flat.

We can experiment with some more details and different elements. Because this trim is touching the snow covered ground, I imagined some snow would get bunched up against the wall. Doing this in the textures gives us the chance to make it really pop out three dimensionally.

To start, I washed out some contrast by lightly painting over the whole texture. Next we can grab a colour from our already defined edges and paint in some subtle bevels as surface details

to the stone, as well as some small chips along the edges where they are more exposed to wear.

As for the snow we can start by just setting up a new layer, grabbing that very near-white blue colour, and create a base to paint on. Now we can start to add some details. You might notice a change in overall colour from the last image. I tweaked this so that it looked better in place with the rest of the textures in the scene. Keep looking back and forth at your scene and look for areas that may need more contrast, values and certain colour to make them fit.

As for the details, I began to define some areas of the snow, adding a subtle bevel where it meets the stone brick and gave it that cold blue shadow. Additional clumps of snow provide some nice variation as the snow tiles. I also painted some basic grass behind the snow as an additional detail that I imagined would come from the ground. Thinking three dimensionally like this can help you make some really awesome stuff where the texture alone pops out and feels more like a painting than something you're slapping on a model.

It gives you a great sense of perspective and the ability to paint what you believe you would see, as opposed to staying in the mindset that you're texturing onto a surface that is doing the geometrical thinking for you. Finally I painted some AO where the texture would be meeting other surfaces. This last image is the final texture, which I adjusted quite a bit during a near final pass on all textures, which I will get to later.

The Miscellaneous

For a lot of the more unique areas, I decided I would create a larger texture sheet and combine them all; this included the other windows, various signs, props, the door, and left over wooden beams.

Starting off was fairly easy, we have already made a whole bunch of wood in our textures, so we can just directly copy them and paint over our adjustments. This helps with consistency as well as saving time. I've already gone ahead and made a bit of headway with some of the beams, as well as a wooden dragon head that will be mantled at the ends of the roof.

The corner beam (top left of the texture) has a very well defined edge along the middle as there is a 90 degree bend at that point which we can to pop out. Also, you may notice one side is slightly darker than the other. While this can create problems when you want to copy it to other areas where it may go against the angle in which you want your lighting.

It's a small issue that in return helps us sell its proper shape, as opposed to having both sides equally flat in terms of lighting. There is also a dark gradient at the top of the beam, imitating shadow from the roof above as well as weathering.

Almost everything in this texture sheet has been covered already, so I won't repeat myself. However, one part that particularly stands out in this is the shield texture, which is a good example of how I go about painting metal.

High Resolution Example Next Page

Misc Texture Sheet Example

The Shield

Due to texture space I decided to mirror this shield. First off we'll get a simple base colour in and basic shadows to define the rounded shape:

Next we can paint in our specular hotspot. Our main spot being the brightest, from above, where the main source of light would come from, and a slightly duller lit area underneath will be our reflection that will help the surface appear to be metallic.

Next, by painting over it with an Overlay blending mode and a darker than average blue, we can push the darker areas in contrast to the specular hotspot whilst tinting them and leaving the brighter areas intact and retaining their orange/yellow hue. After this we can kill some of the contrast if needed in preparation for adding more detail.

Now that we have our overall material defined, it's good to clean up any messy strokes and define the edges. The darker trim helps to hide the low polygon count due to its lack of contrast with the wall behind it.

I added some bolts to the shield to help to make it more believable. The simple top and bottom highlight makes them look reflective, even with little resolution.

Now we define our edges even further and give contrast to them along with the bolts by painting a darker value around them. Feel free to add some metal dents around the edges. It gives nice variation and makes the shield feel worn from battle.

Because metal is usually a smooth surface it's hard to add any convincing surface detail that translates well in this particular style. However we can paint in subtle wavy patterns as surface imperfections that could have been created when the metal was being forged. Try painting some very small bevels into these shapes to make them appear as dents.

Now we can add our paint. First create a new layer, choose a darker than average colour of your choice (in this case I chose a dark red) and then paint your shapes.

When done, set the layer blending mode to overlay, the result will keep your previous metal work intact and automatically give you a nice gradient and shift of hue in the light and dark areas. To add, we can create a mask for this layer, and mask out some areas so the paint appears worn and scuffed out. You can choose to paint them out directly, or create a selection using the layer we created for the wavy imperfections.

Now we can add our paint. First create a new layer, choose a darker than average colour of your choice (in this case I chose a dark red) and then paint your shapes.

When done, set the layer blending mode to overlay, the result will keep your previous metal work intact and automatically give you a nice gradient and shift of hue in the light and dark areas. To add, we can create a mask for this layer, and mask out some areas so the paint appears worn and scuffed out. You can choose to paint them out directly, or create a selection using the layer we created for the wavy imperfections. After all the textures were complete, I made a final pass over every one of them to adjust values, colour, and the general mood of the entire building. This included brightening a lot of the textures, tinting shadows and darker values as they had too much brown in them (especially the wood, which had little variation to the shadows). I also used Photoshop curves with a mask to adjust specific areas.

A good example of what I changed most was the brick texture. I felt it was creating too much noise over the entire mesh.

There were too many edges on what was already a fairly occupied mesh (lots of wooden beams, windows etc). To simplify it without making it incredibly bland, I made a layer of paint that covers it with a few exposed bricks from where the paint has been weathered, or perhaps 'missed spots'. I really liked the result as not only did it simplify the texture to work well as a base to the building, but it also gave me the chance to inject a bit more colour to the overall piece.

I also made a pass over the building model to exaggerate the shapes to something I was more comfortable with. While this is something that I could have anticipated before texturing, sometimes you just need to see things as they are and how well they work together at the time you are making them. I felt that the shapes were still a bit too thin and could have read better at a distance.

Taking your mesh and recklessly exaggerating it a bit here and there, or throwing a push modifier on it can often yield some interesting results. Because we're not screwing up any normal maps, there is only a benefit to it.

That's about all I have to go over really, I'm no super-great artist but I hope this walkthrough has shed some light on some of the techniques and workflows that I find helpful when it comes to creating hand painted textures.

I hope you enjoyed this as much as I did making it, Thanks for reading and happy texturing!

Misc Texture Sheet Examples

About Me

Hi, I'm Jon. I work as a Character artist at the London based studio 'Splash Damage' with some of the best artists I know (which can be pretty daunting at times!). I have been working here for almost 1 year now and it has also been my first job in the games industry, excluding bits of contract work on the side beforehand. I'm a big fan of stylized, painterly art in games, and do my best to work well in that field of game art. It is something I enjoy tremendously and have adopted as a personal style. Other than my job, I'm a pretty normal chap!

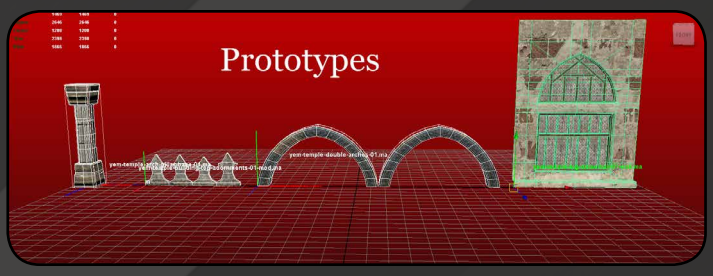
Jon Fletcher

Modeling

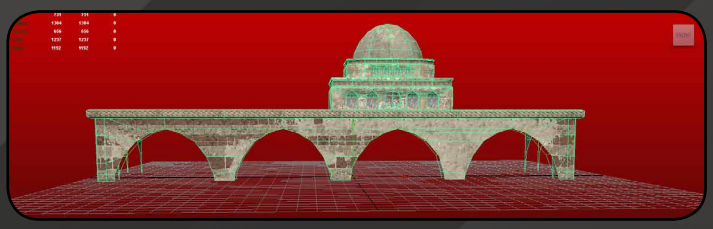
Environment Modeling Pipeline by: **David Ballard**

The process of creating environments at Naughty Dog is lengthy and detailed, but the real secret is sticking to the fundamentals; both the fundamentals of art as well as the fundamentals of video game pipelines. It's easy to get ahead of yourself when trying to create whole environments, but there are foundations of environment art that will keep you on track.

Here's an example of modular environment creation with prototypes. This building fat;ade is created with just 4 dif ferent prototypes and a minimal amount of non-proto typed mesh. We call this non-prototyped mesh Tfrag. Since Tfrag is only used once, it is a waste of memory whereas prototypes that are instanced multiple times but only load into memory once are much more cost efficient.



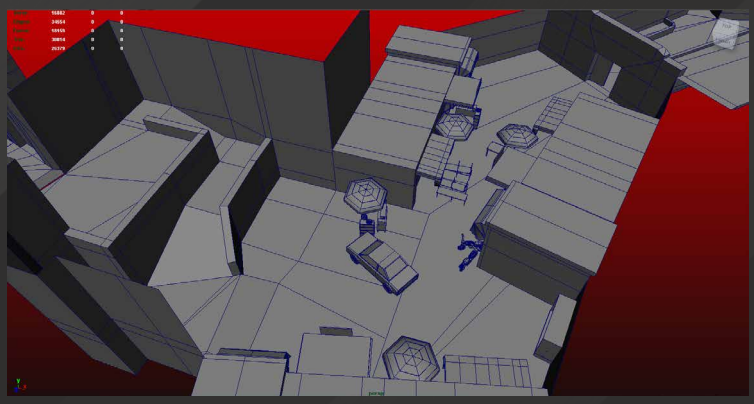
Obviously some Tfrag will be needed, but being as modu lar as possible will allow for numerous amounts of detail to be added to the level with a minimal hit to memory. Below are examples of both the Prototypes and Tfrag that were used to create the façade.

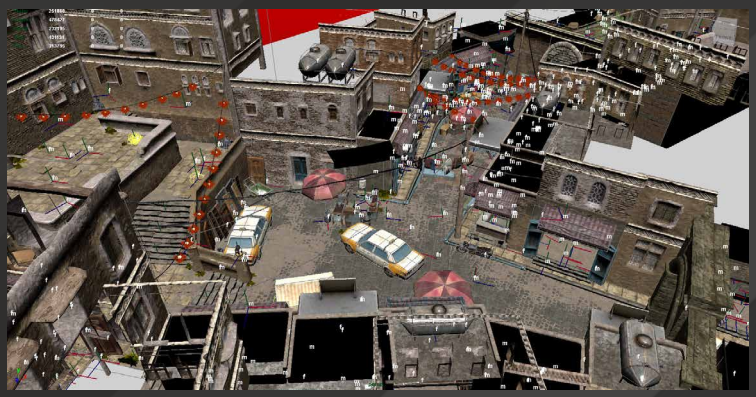


Working on a game like Uncharted requires a lot of planning and work. It takes a long time to finish an environment, especially with changes in story, design and artistic style. The best way to finish then, is to work iteratively. Taking areas of environments to full completion early on is risky as you're sure to have to change it sooner or later.

There is a process called look development where we will complete a small section of art as a proof of concept to show what each Environment Artist's vision of their level is, but very little of this is actually used in end results. From there we focus on macro art (the whole environment) and micro art (the detail within the environment). To help explain this, I'm going to use the market from Yemen in Uncharted 3 as an example.

After researching and look developing Yemen, the designer then gave me their initial level design in a form we call blockmesh. This is just a gray blocky mockup of the level in 3D. After deciding on the look and purpose of each area, I set to work on defining each set in a way that communicates to the player what that space is. In the market's case, I had to communicate that this was a lively part of the city that people gather to shop, meet and dine. On a macro level, this involved buildings, shops, food vendors, transportation, etc. And within such categories, the art is broken down on a micro level to give detail and life to the area.





A perfect example of this is the shops. After researching the different types of shops typically found in Yemen, I created various shop prototypes that were modular so building an entire marketplace would not only be quick, but also easily iterated on. I made around 9 of these shops that could connect and be interchanged to create the maximum amount of variation with the minimal amount of resources. Then I could work within each shop individually to give each one history and character. Below are examples a few modular shop pieces that were used to quickly and iteratively block out an entire market place. Working in this workflow mindset allows several different "looks" or environment styles within a level to be accomplished easier and faster.

With the basic setup of the market in place, then comes the fun part: detail. The creation of each environment is heavily dependent upon the game design. In the market's case, the gameplay consists of a foot chase which means the player will run past the art quickly and will need as much information as possible without being overwhelmed to quickly make decisions on what to do. The idea then is to give that information to the player quickly and easily to communicate where they are and where they are going. This is where detail is key. Some of the obstacles in the market are folding tables where the locals eat. To reinforce the design, the tables are adorned with plates, cups, pitchers, bowls and other items. There are food vendors cooking kabobs over charcoal pits with smoke filling the air around them. Next to the food vendors are shelves full of cookware and serving trays. And there are umbrellas and chairs to suggest people sit for extended periods of time here, possibly to dine and talk with friends.

While this detail is good in an art sense, it is also good for the design since we want to encourage the player to make the choice of either going around the tables or running over them and knocking all the items off for a more cinematic experience. It seems like a lot of work for only about 5 seconds of gameplay, but the job of the Environment Artist is to both capture the player within the world and support game design with hints of detail that serve as communication tools.

Another aspect of environment art is vistas or expansive art sets that a player sees from a distance. This could be anything from sprawling cityscapes to tall mountain ranges. At Naughty Dog, we refer to the parts of a level that comprise a vista as a "wide". Typically in video games, wides are just matte paintings that a player will never explore or be in. But it is easy to lose the parallax effect of 3d objects within a matte paining and also they appear flat on 3D monitors and the illusion of depth is lost. However, working on Uncharted 3, it was discovered that there is a certain distance at which point neither parallax nor 3D depth can be experienced and that's the best time to utilize a matte painting. When creating a 3d wide, the artist has to take into consideration how close the player will be able to get to the wide as well as how expensive the wide will be in conjunction with the level. Therefore, a wide is usually one of the last aspects of a level to be considered and early during production will not be represented except by maybe some simple blockmesh. Since most assets within a wide will be at a distance from the player, the art can usually be lower resolution than that found in the actual level, both in terms of poly count and texture memory. For example, in the Yemen city wide, (based on the real city of Sana'a), the further back the buildings go, the simpler the geometry and textures get. It's up to the imagination of the Environment Artist to create a setting and mood with the wide to enthrall the player with a minimalistic amount of detail, just as a painter can imply detail with just simple brush strokes.

An important part of the production pipeline that is crucial to talk about it outsourcing. Outsourcing is a huge part of production, and after much trial and error, Naughty Dog seems to have found the best way for us to implement it into our pipeline. Utilizing outsourcing for art helps to keep deadlines on track as well as give the environment artist more time to work on a larger amount of work. For Yemen, most of the outsourcing was done early on to help visualize the look and after a full library of assets was created, putting together whole levels required very little outsource. However towards the end of production when the levels were near completion, again outsourcing was used to create the large amount of shadow blockers so that almost no final art casts its own shadow, freeing up frame rate which ultimately allows more final art and detail on screen.

A big part of an Environment Artist's responsibilities is the invisible environment. That is, all the behind the scenes stuff going on that the artist is responsible for that isn't viewed by the player. These things include collision, shadow blockers, reflection geometry, and sound designation. While all of these are fundamentally basic to the experienced environment artist, a focus on these will enable the maximum amount of final art capable of being rendered in real time. As stated, shadow blockers were helped with by outsourcing, but early in production we decided to make all prototypes include shadow blockers so that through instancing we eliminate the amount of one off shadow blocker art that eats up time of the outsourcers.

Collision is created both in prototype and as one offs within a level to suit the needs of the needs of design and also to fix bugs. Reflection geometry is usually low res meshes whose textures are rendered from the higher poly final art that the player sees. Then both geometries are marked to either reflect or not reflect to save frame rate, allowing for real time reflections. Another job of the environment artist at Naughty Dog is to assign sound information to the collision to dictate what sounds are played when a player walks on or touches it.

Although this has been just the tip of the iceberg of the environment modeling workflow at Naughty Dog, it is easy to see that so much goes into creating an entire environment from conception to what is shipped in the final version of the game. And although this is the way that Naughty Dog does it, that doesn't mean it's the best or right way, but simply what works for us and we are constantly analyzing our methods and improving upon them. It is difficult and sometimes tedious work to fully realize a whole environment but also very rewarding. I often tell people that my job is actually to problem solve and that environment art is the fun thing I get to do for doing that job well.

Special thanks to Designer Eric Schatz, Texture Artists Jeremy Huxley and Adelle Bueno, Lighting Artist Eva Krzeminiski and the numerous other talented artists, designers and programmers at Naughty Dog.

About Me

David Ballard

I'm an Environment Artist with 5 years of experience in the game industry. Titles I have worked on include Section 8, Uncharted 2 and Uncharted 3. I worked on the train level, over a dozen vistas and a few multiplayer maps in Uncharted 2 and was responsible for the Yemen single player levels in Uncharted 3.

World Building

The Environment Art Pipeline by: **Anthony Vaccaro**

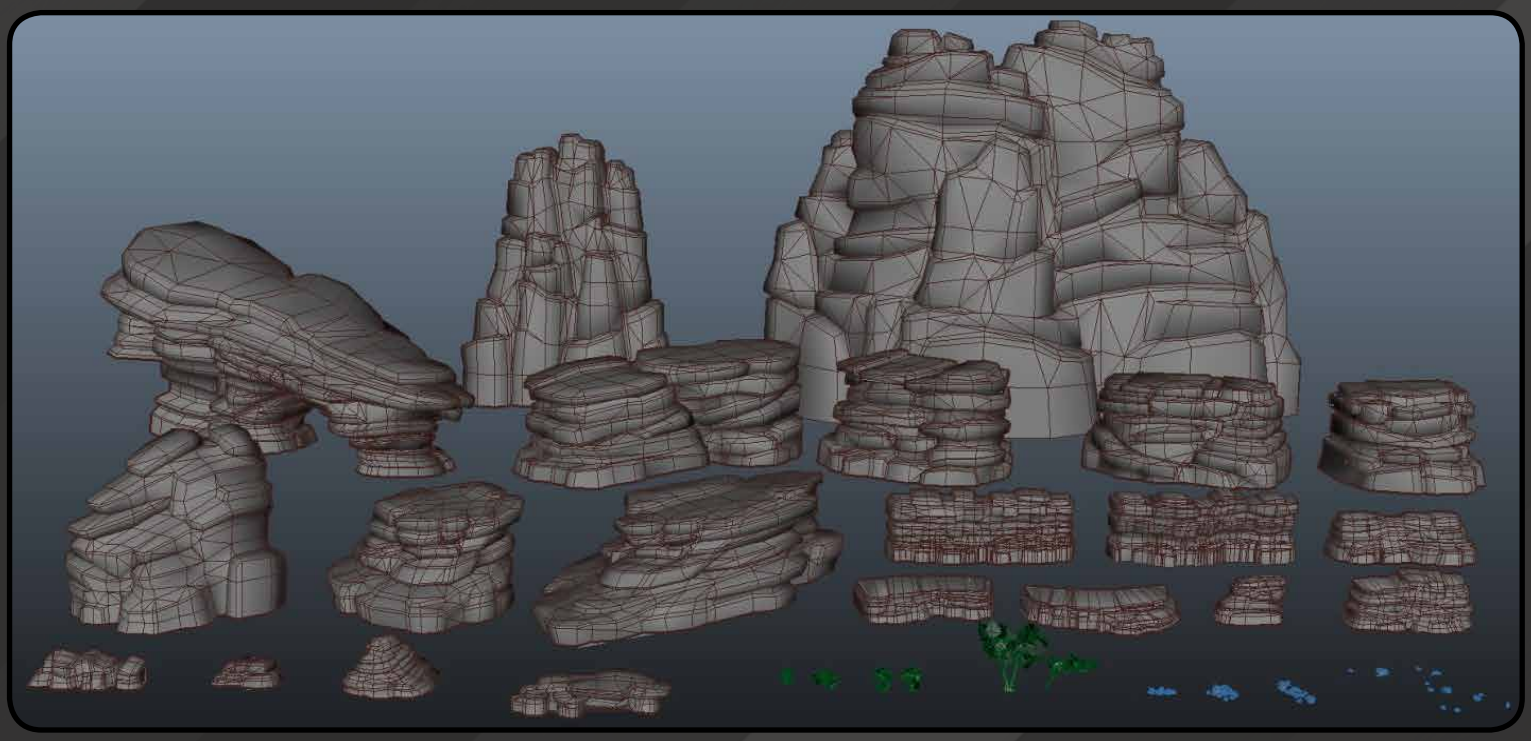
When creating the Caravan level in Uncharted 3 I knew its size would be the major issue that would cause the most problems. Creating the massive environment needed for a high speed horse chase through the cliff canyons and out in the desert while reducing the all too common problem of noticeable repetition would be the crux of this issue. This article focuses on aesthetic and technical decisions made to help alleviate this problem while going over a method I used to create a very vast environment within a production cycle.

Start Smart

When going about constructing an environment it is important you stay as far away from a modeling package as possible until you have a large library of reference images, this the key to creating believable words. Without a good foundation and understanding of the location you are striving to replicate in 3d, your environment will have that all too familiar 3d look instead of being a world viewers can truly escape to. This is where you can plan out the most important visual aspects of the environment and determine what is important to keep from your reference and what is not. You want to include what is visually striking, what will help set it apart while keeping within the set style of your project. You don't want to fall into the trap of trying to do everything possible and having everything suffer for it.

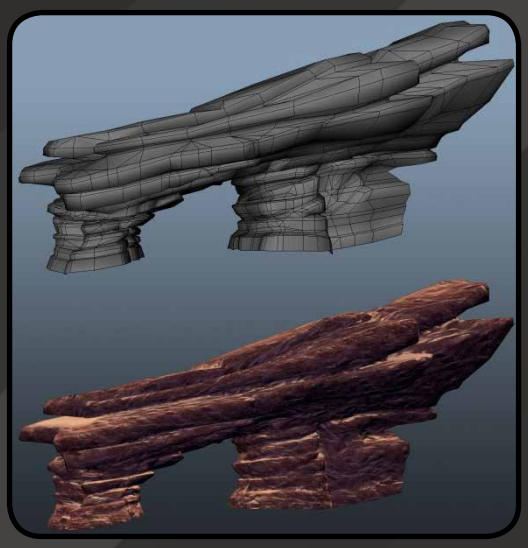
Rocks, Rocks and a few more Rocks

To help combat the problem of noticeable repetition from overusing a small handful of very unique models in such a large environment I went with the approach of creating a vast library of different models utilizing blending and tilting texture sets. There are many benefits to this approach of work with not to many downsides. Having a much larger library of rock assets to choose from helped create a much more organic look to the environment while minimizing the noticeable repetition. Changes to any model could be made without fear of destroying uniquely created maps at any stage of production giving me freedom to constantly improve and optimize the model as need be.



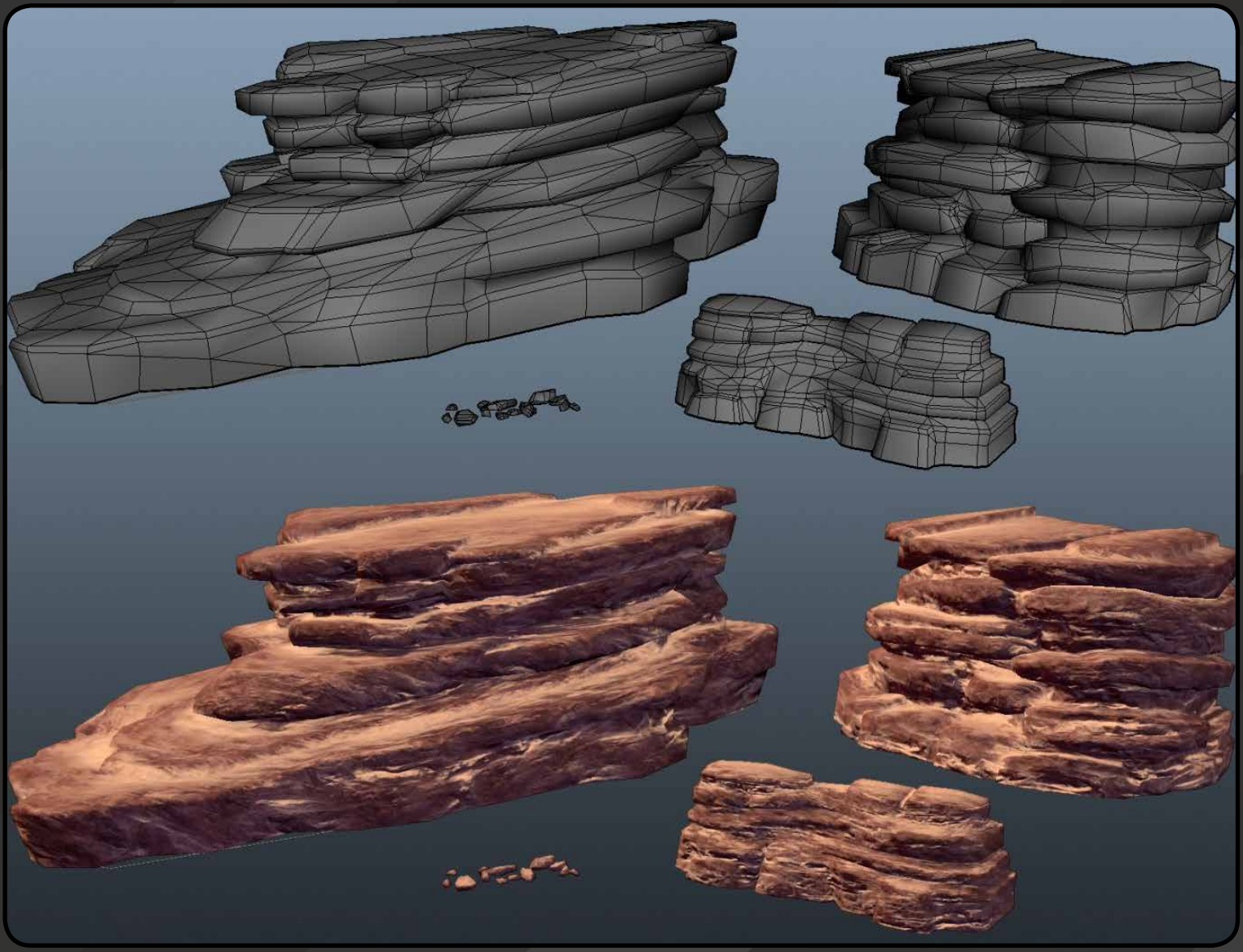
A small sample of the more than 60 unique rocks/cliff assets ranging from small to large. More than 20 different types of rocky rubble detail assets and 20 different foliage pieces used in creating the Caravan level.

Not only did I utilize a high model count for the environment but I also reduced how much each model differed from each other. Now this might seem like a counter productive thought process when the whole point of having a larger library of assets was to give you more variety, but the reason this was done was to give the level a better sense of cohesion. The issue with creating too many "unique" rock assets is that they will eventually stand out, and they become harder to blend with the other rocks and elements in your scene. It will look more like models are simply place next to each other instead of a solid flowing rock form that looks unique due to the diversity of models used while still maintaining the look that it is all the same cliff face.



Similar but Different

Now let's not get carried away and think each model should look exactly the same. This is untrue, we just want to minimize the amount of unique details that will stand out and betray the illusion we are trying to create with repetitious elements. Silhouette should be the main focus of the model while maintaining a consistent look through out each piece and limiting the amount of very exaggerated unique details. This of course does not limit you to only creating assets that look very similar. Much like your details you want to use the more standout assets sparingly and in places that you wish to draw attention whether it is the focal point of the scene or you are trying to use it to guide the player.



While the models themselves differ from Large, Medium to Small each carries through similar defining elements such as the chipped/layered look. These types of decisions on what style and types of elements you wish to carry through your models should be determined beforehand to keep a sense of cohesion throughout your level/assets.

But how do we make the world so large?

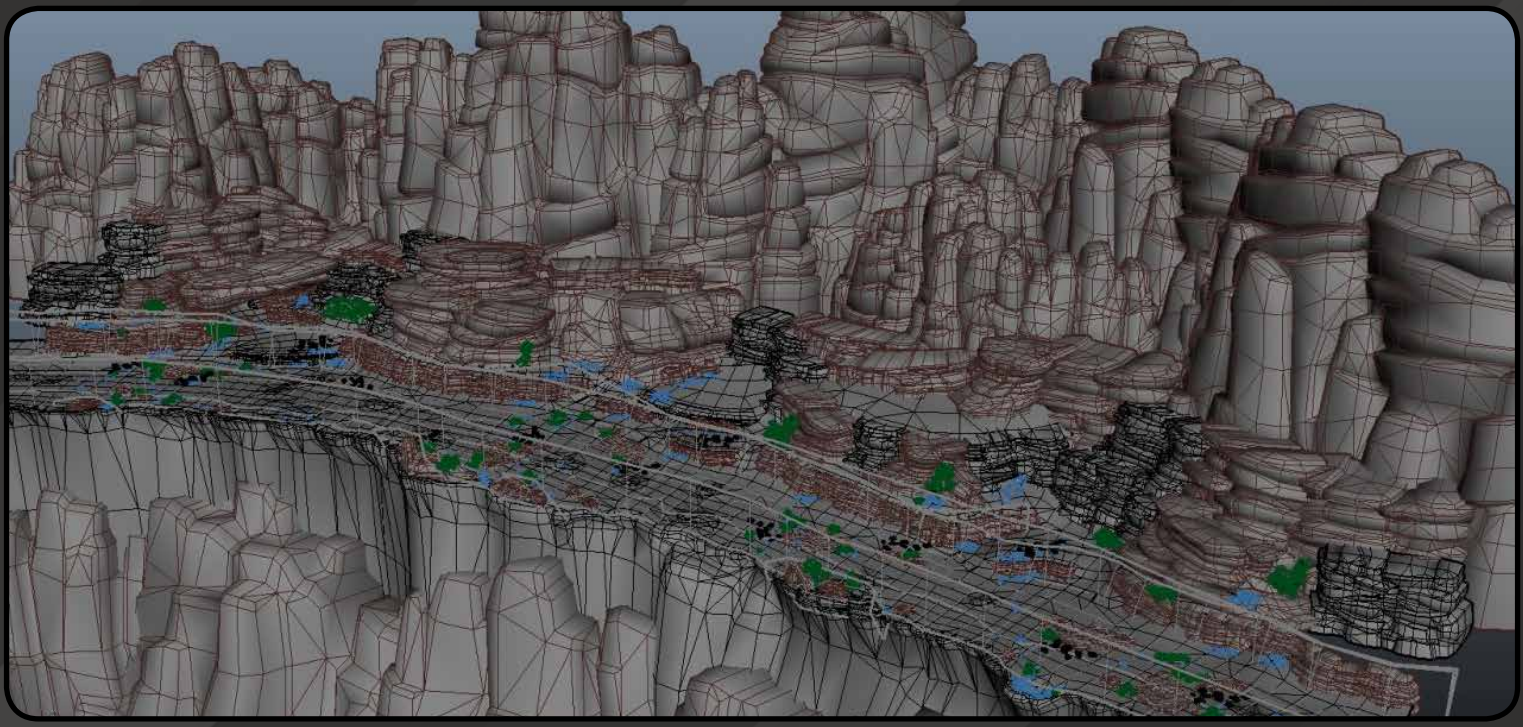
The last section of the Caravan level in Uncharted 3 is a daring battle on horseback high up on a cliff ledge overlooking a vast barren sea of sand. What most players (hopefully at least) don't realize is that they are actually in a never ending environment loop.

This gameplay section is not on rails, there is no end point and each player will complete the level at a different point. To achieve this result the level had to be constructed in a loop, a very wide one at that to minimize the fact that you are going in a circle and to compensate for players of varying skill level. Most players will never traverse through the entirety of the loop but it still has to all be there for those that will.

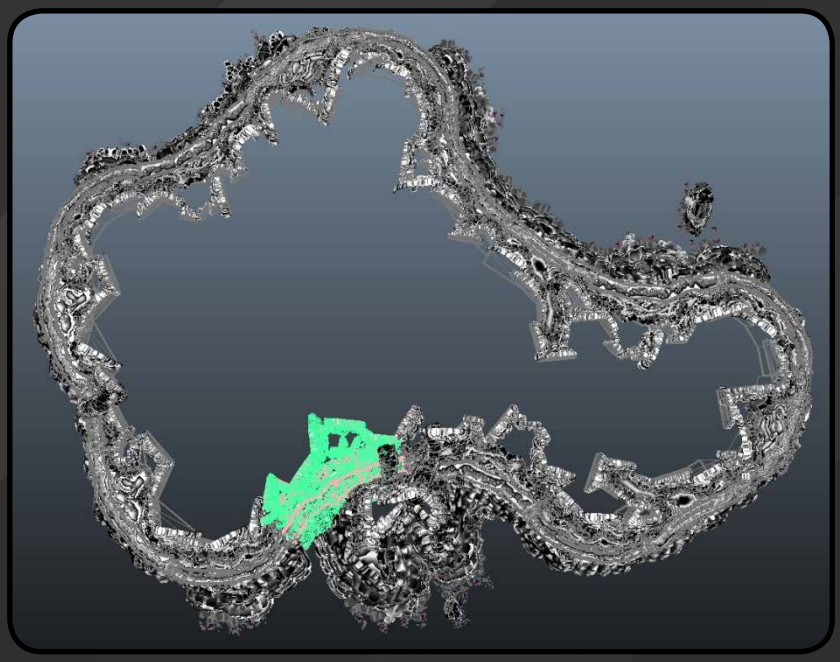
Utilizing the fact that we have a huge library of rocks at our disposal will help us create these large environments while keeping every area looking unique. How was this done then within the constraints of a normal game production cycle? Simply making things more modular!

Modularity within Modularity

At Naughty Dog I use what we refer to as "Nested Scenes" to create the miles and miles of track needed for this section of the level. These Nested Scenes are modular mini scenes within themselves. They are constructed much like any area of the level, they are built using many modular assets, unique terrain, specific game flags, and include things such a collision and shadow proxies. Everything about them is created exactly as a normal gameplay section would be except they are created with the intent that the start and end section will link up with another Nested Scenes much like a piece of train track. Using this method I created about 5 unique sections of terrain and assembled these modular sections in 1 master scene file.



Example of a Nested Scene. Created much like a regular level section that can be placed in a master scene like any normal instanced asset. To give a sense of scale the flat terrain section the player can move around in is about 5 truck widths wide.



This method lends its self well to the continual demands of design changes without requiring too much work. Changing things within each Nested Scene will then update all copies in the larger master scene, much like any individual modular asset being updated in its base scene, the changes will be reflected in all subsequent scenes it's being used in.

A top down view of the main scene file for the Cliff Loop. With the Nested Scene above selected you can see how large the loop actually is and attempting to create this any other way would be an extreme waste of time.

Breaking up the Boring

When creating large Nested Scenes like this, much like with individual assets, you want to keep the extreme uniqueness of these scenes to a minimum to reduce the chance players will begin to notice that they are traveling past the same chunk again and again. To break up the boringness of this and add spice to our level we will then want to go into the master scene where all our large track pieces are laid out and then add in extra details on top. These extra assets added into the master scene will help make each section of your level look unique and disguises the fact that you are repeatedly going over the same track section again and again.

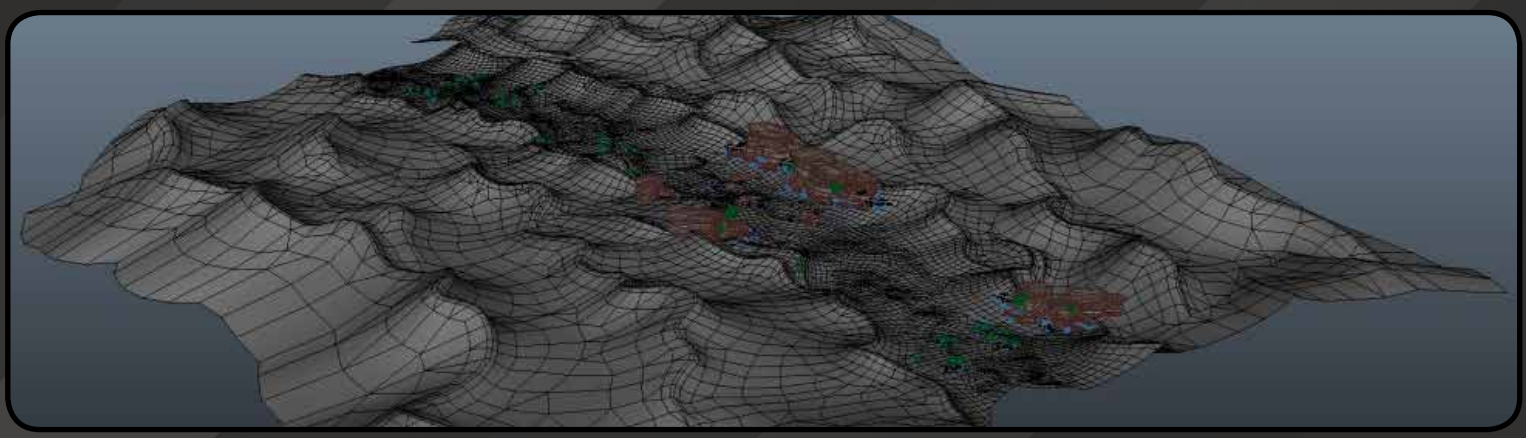
The same track section as above only with extra detailing assets placed in the master scene to break up the look of the area giving off a completely different feel while reducing the amount of unique work needing to be done.

Utilize your reference images here to help you determined what would be appropriate for the location and aesthetics of the level. Breaking up the look of the loop is important but you don't want to stray from the core look of the level just to make things look different.

Reference Images

Hey that's Game Development

Within game development an artist will always have to adjust their levels based on changes in story and gameplay. Having things extremely modular and easy to edit will alleviate a lot of the issues you will eventually face. One of the worst things an artist must deal with is when sections of a level must be cut due to changes in design or time. This happens on all projects and multiple times within my level during the creation of Uncharted 3. Utilizing the modularity of Nested Scenes, not as much time was wasted changing or removing large sections of gameplay as opposed to if I had made every section from scratch.



This technique was also used to create the endless sea of sand dunes earlier in the level. These were a bit more difficult as they required the edges to be completely seamless not only the model but also with the textures.

Closing Thoughts

Remember the points I brought up in this article are by no means the correct way to go about constructing your environment. There are many factors that come into account such as art direction, design, style of gameplay, and technology used at your studio. These are a collection of thoughts and tips I used for creating the Caravan level in Uncharted 3. The biggest advice I can give is really to think for yourself, do not rely on tutorials and articles written by others. There is no right and wrong way to create environments. Experiment and decide what works best for you on any given project. Most of all have fun doing what you love.

About Me

Anthony Vaccaro

I graduated from the Art Institute of San Diego California and got my first job working up at Bungie on Halo Reach as an Environment Artist. After Reach I joined all the talented folks over at Naughty Dog and worked on the Caravan level for Uncharted 3.

Jeremy Huxley

www.jeremyhuxley.blogspot.com

NAUGHTY DOG®

Texture Planning

Environment Texture Planning and Implementation by: **Jeremy Huxley**

One of the great perks of working at Naughty Dog is that a lot of trust and responsibility is placed in the artists. Aside from a few rules, we were free to pretty much make Sandlantis whatever we wanted. When we started, Adam Littledale (the modeler) and I gathered a lot of reference. The initial concepts and color keys for the city were done, but the initial ideas were that the city would be in ruins. After a lot of internal discussion and debate among the directors and leads, we were instructed to go with a more fantastical look. This lost city was to be inspired more literally by the tales, thus making it relatively pristine, having working fountains and plant life with sprawling vistas. Considering that Ubar would have been thousands of years old and is virtually nonexistent we wanted to embrace the tale and the mysticism surrounding the city as it makes for more interesting story telling and exploration for the player. Creating this level was a huge challenge technically and artistically.

Over a few months we settled on key points concerning look and feel based on the initial sketches done by our concept artists, which is to say that it was inspired by pre-islamic architecture, our final revision was even more elaborate and in working condition. With these principles defined we set out to create the city and I am going to talk a little about how we as a team approached each problem and how I approached my own from a texturing perspective.

Many ancient inventions came from this part of the world and we saw that as a great opportunity to compound styles while simultaneously adding interest and movement to the city. Having working parts after thousands of years tells the player that there is something strange about this place. The domes of the pavilions are crusted with jewels and jacinths, and are evocative of the tales and stories crossed with a subtle industrial style, in the end they look something like elaborate birdcages. There are pillars of marble and alabaster for the heavy blocks which are described along with gold, silver and elaborate tile.

Because we knew that Uncharted 3 would primarily be a desert game, we were very concerned about the colors we were choosing, some of the palette had already been planned, but it had evolved a bit throughout the production based on what was working harmoniously in the final levels. We were given the direction that we couldn't use red or a lot of warmer colors, because we had already had so many warmer toned environments.

We didn't want the player to feel fatigued, so naturally we felt that it might be a good idea to move towards blue, warm white tones, gold and a few cool reds to make the textures more dynamic. In regards to art, Uncharted games are very concerned with creative use of color for visual impact and also conveying the mood that best supports the story telling. Even though it might seem primarily cosmetic we always take great care to choose color that evokes the desired emotional impact.

Once we were happy with the look for the exterior of the buildings, we shifted our focus on creating interesting interior spaces. We knew that Drake would be exploring interiors and eventually going into the subterranean areas of the city. Given the importance of water in this game, we decided on ancient palaces and bath houses.

Some of the most inspiring reference that we gathered included a lot of Orientalist paintings by artists such as Jean Gerome, Alma Tadema, William Allan, Eugene Delacroix, Gustav Bauernfeind and Jean-Jules Antoine. Orientalism naturally worked with the style we were going for, it definitely added dramatic flair and the idealization worked well for Uncharted's hyper- realistic style.

These idealized paintings also mirrored the tales closely and were good tools when creating plausible textures when it came down to each marble slab, inlay, paver and jacinth.

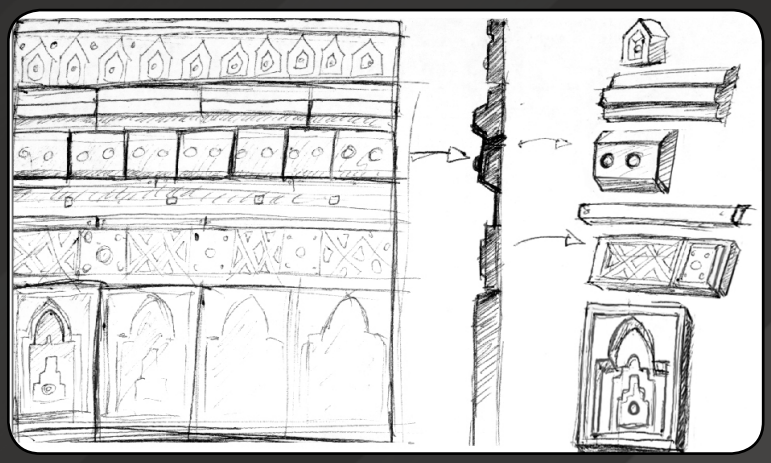
Initially my textures for the temples looked a little too noisy so one of the texture artists, Behrooz Roozbeh, pointed me in the direction of an artist Alma Tadema. Paying close attention to the austerity of some of Alma Tadema's Marble palaces helped me balance the noise and the empty space better.

Eventually, white alabaster and marble blocks worked the best as a base, and white is hard to get right in games, so it offered a fun challenge. Noise and empty space became a huge basis for making this style work.

Even though we had a precedent for not having any colors from the "warm" side of the color wheel in the level we ended up having a lot of colors that came rather close and the overall feel was rather warm. If it were all just analogous it felt too boring or too cold in terms of color, the player still needed to feel like they were deep in the Rub' al Khali desert in this fantastic city, but we also wanted the look to be somewhat unexpected.

In the end The warmth of the rocks, the gold, the marbles the tapestries and banners ended up giving us that third "accent" color that gave the level the kick that it needed.

Textures in Uncharted 3 were all built from scratch in Z-brush, which is the primary method that we generate our textures at Naughty dog. Before I do anything, I like to start by doing a lot of rough sketches to better plan for my texture needs in a specific level. Here is an example shown below.

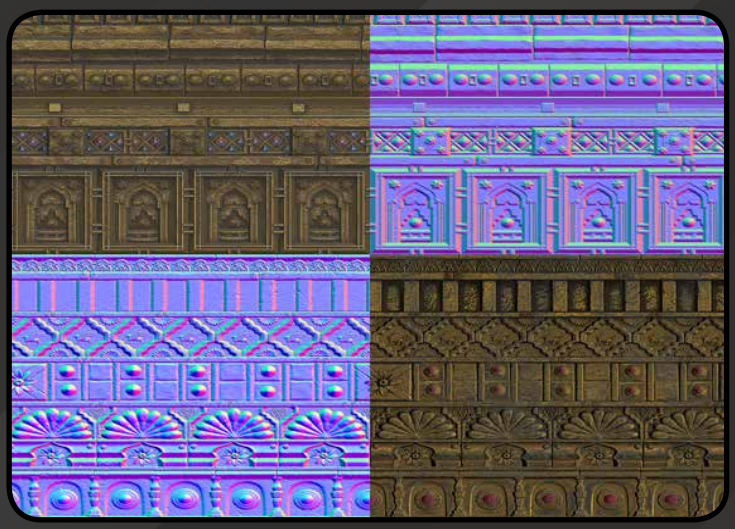


It is easy to create a 1 to 1 texture that is self contained and have it look great, however due to the fact that we had sprawling vistas in over half of Sandlantis above and below ground, we had to create vast libraries almost all consisting of tiling textures that could be used all over and to get the levels completed within a reasonable time-frame running at our desired frame rate. When planning a trim like the one shown above, I commonly used initial concepts by our artists and would try to pick out bits and pieces here and there that inspired me. I also used a lot of reference in books and online.

I searched for architecture, paintings and even sometimes jewelry or ornaments from that area and used small elements from each for ideas and color reference in my shaders. Quick sketches helped me work through how I could best replicate or embellish on sections of my texture without spending too much time on something that might not work in the end. The drawings on the right side above are some examples of an early texture concept I had done and then how I broke it down into its basic reusable elements. Once I had the larger details separated into easily manageable pieces I would then model these pieces in Maya. I didn't worry too much about getting every detail modelled in, only the overall shape and size, all broad strokes.

Next I import these pieces into Zbrush, tesselate and then sculpt basic edges and warp the planes a little, creating and saving off different variants for the tools, similar to how Brad describes in his texturing tutorial. Once I had a few versions of these tools I could then start laying them out on the canvas, offsetting to be sure that each strip tiles. I repeat this process until I have multiple layers, each separate strips on their own. I will usually export the diffuse and normal out to test the early texture sculpts in game to check the resolution. If the normals are reading well I proceed with the texture, if not I will adjust strips that are not working and try something else. To finalize the work in Zbrush I add scuffs, gashes, scrapes, along with broken bits here and there etc. I then export all of my textures including cavity and height maps. The final art usually ends up entailing a lot of layering and texture wrangling in Photoshop.

Both of the trim sets shown above were used in Sandlantis, the upper one is the final version of the sketch from before. Above is also an example of two large props we created that were able to maintain detail and a lot of variety using only these two shaders. I have found that almost everything I wanted to accomplish artistically in Sandlantis could be done with tile-able texture sheets as opposed to unique textures used only for one object. Planning your textures out takes a little more time at the beginning, but in the end helps save valuable production time and speed up the performance of the game, allowing for even more layers of detail. Working in games is difficult, you need to be able to make decisions on what to pay attention to and what to ignore and how to follow through with Maya, Z-brush and Photoshop to create the most effective textures and shaders possible.



Creating tiling textures helped me to unify our look. Having fewer variables to adjust makes the whole process easier in the long run, especially towards the end. In closing I would like to give a huge thanks and recognition to the entire environment team at Naughty Dog, without whom we would never have gotten this level done. It is important to remember that making games is a team effort and by the end of Uncharted 3, a lot of other artists rolled over to help us complete our level to the quality that we have.

These environment screengrabs are from the level Sand-Lantis, which I textured. I would say I did most of the textures onscreen aside from characters and some props. P.S. The wonderful modelling was done by Adam Littledale.

About Me

I have worked as an environment artist in Germany, the Netherlands and the USA for 7-8 years. A few games I have worked on include Hellgate London, Torchlight and Uncharted 3. I also do a lot of personal and indie projects in my free time.

Jeremy Huxley

Texture Tips for Production

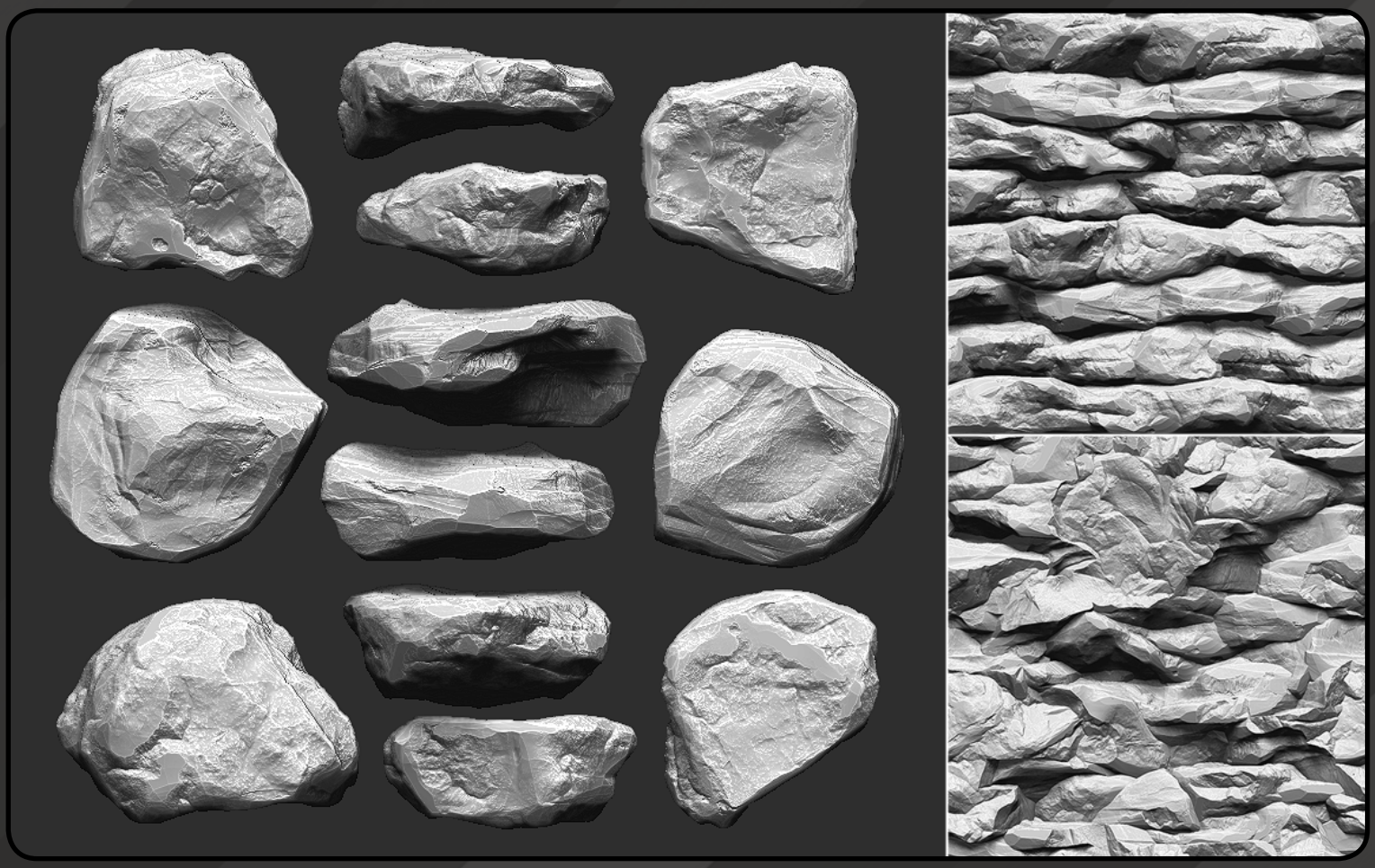
Creating Tiling Organic Textures with ZBrush & Photoshop by: **Bradford Smith**

My goal with this article is to walk you through a bit of my process for creating tiling organic textures with ZBrush and Photoshop, as it evolved throughout the production of the Caravan Level of Uncharted 3: Drakes Deception. I'll be demonstrating my process through the creation of a rock surface using source material I created, but these techniques can been applied to a variety of other surfaces. The goal here isn't to sculpt a highly detailed unique rock model; instead we will be looking at creating a library of useful tool and alpha assets and how to use them to quickly assemble a variety of rock textures. While quality is of utmost importance, being able to work fast is critical in order to be able to respond to the changing needs of production. Very late in the development stages of the Caravan level, I decided to re-apply everything I learned during production and completely re-did many of my rock textures, materials and blending in order to get much better visual results. It was a calculated risk that paid off, but I couldn't have done it without a solid workflow that allowed me to move fast and get predictable results.

Reference: It goes without saying, but good reference is critical. Know which reference to use as well as which reference not to use in order to stay true to the characteristics of the subject. Stay organized and use photo viewers with databases for tagging and rating. When examining a subject or surface, try to simplify it. Similar to the construction of a drawing, break it down into silhouette and broad gestural forms, then into the smaller defining planes and finally the finishing surface details. Try to plan your work based on those assessments, they will help inform the creation of the tools you'll need and right amount of details that will need to be on them. Usually the models will contain the silhouette and gesture, so the textures will need to compliment them nicely with the appropriate level of detail. Always be aware of scale and distance from viewer as they will play heavy roles in those assessments as well.

Tools: I found that my best results came from arranging carefully constructed tools that I could use over and over again to carefully add and subtract as desired. If each tool is sculpted to have distinct looks from at least 4 different views then you can go far with just a few tools. Spend time creating these building blocks and save them to a library. It's also helpful to poly-paint these tools before creating textures with them in order to get more variation in hue and value into the final product. If you need to just see light and value, you can keep your poly-painting intact by modifying the MatCap to ignore diffuse color by setting ***Modifier* > *OverwriteColor* to *1*.**

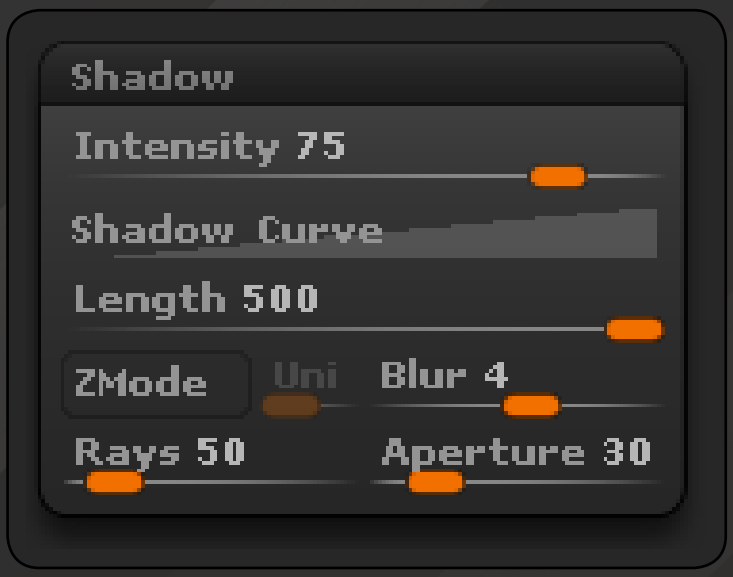
- **The following tools were used to create these two tiling height maps inside of the 2.D canvas.**



Modeling & Rendering Form

Now that I'm working in Zbrush for most of the texture creation process, my best normal maps came from careful attention to form and value. So being setup in a consistent, predictable manner helps me to achieve consistent results. I personally place much more emphasis on the sculpting of textures, than I do the color. If the form and cast shadow patterns aren't both interesting and plausible, then it won't make an interesting normal map and I won't even start the diffuse color painting process.

Light: The default light in ZBrush is pretty good for general vertical plane textures as is. However, I find it helpful to preview my work with more defined cast shadows than the default lighting offers; even if my final render is going to have softer shadows for texture construction. It helps me to judge z-depth and a tool's placement relative to neighboring tools when dropping them to the 2D canvas. Regularly taking a Grabdoc of the alpha is another good way to evaluate and ensure consistent z-depth across the canvas. Attention to z-depth is also an important factor in blending should you use your height map for that.



- **For more defined shadows, start by moving the light just slightly up and reducing the *Light* > *Shadow* > *Aperture* setting in the light palette.**

Materials: When I'm modeling in ZBrush I prefer the WhiteCap White as a neutral sculpting shader. With its slightly edgy look, I actually find that it keeps me from making normal maps that are too aggressive and helps me balance simple, clean forms with smaller superficial surface details that I can adjust the presence of later. I also found it to be a useful direct light render pass for texture construction, so I modified a basic shader to give me the same visual result yet work with the light palette.

Cavity Detection & Classical Value Structure: While the cavity feature is very useful for many things, I prefer a more classical approach to rendering form in my direct pass. I like surface details to be saved for the light-side and shadow details to appear soft. I prefer to set up ZBrush's cavity controls to lend a bit more detail to the light-side while keeping shadows softer. You can do that by giving your **Cavity Radius** a negative value, and raising your **Cavity Diffuse** just a bit. It gives a bit of light edging to the edge intersections of planes that add a nice touch to final diffuse textures. If I need one, I'll render out hollow cavity passes later and blend these layers together to control light and shadow detail independently in Photoshop.

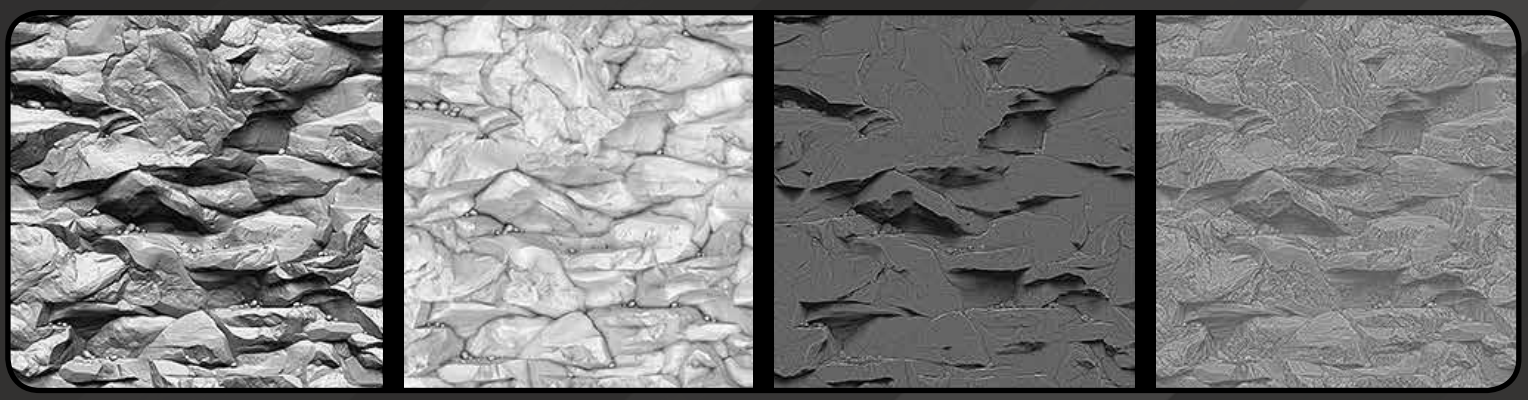
- **Compare a lighter edge focused cavity setting (left), with a darker hollow focused cavity setting (right)**

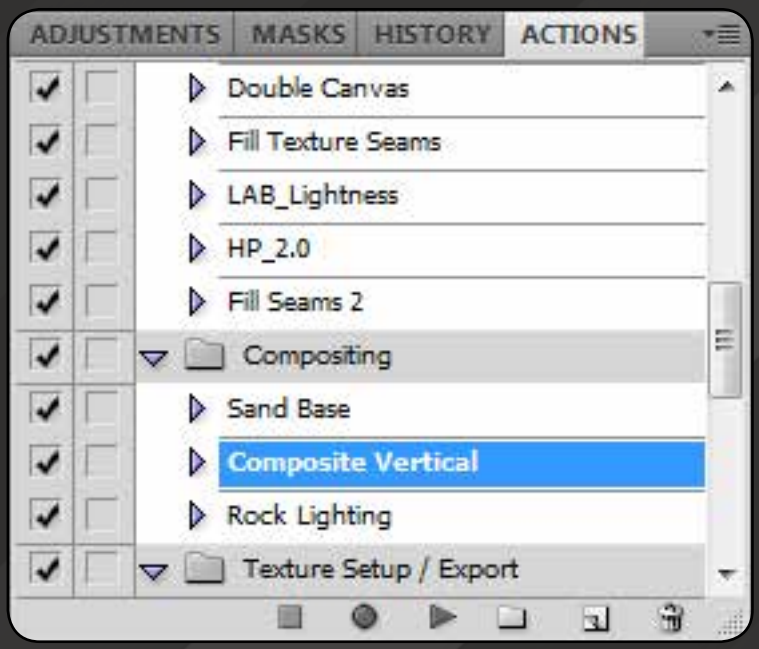
Texture Construction

Combined Lighting: Before I start working on my diffuse color map I always get my lighting setup inside of the PSD. I do this so that I can continually check my color map with my texture baked lighting to make sure they don't fight each other. I generally like to use a few different renders from ZBrush to get my combined lighting in photoshop. I always have an AO render, and I usually choose supplementary renders based on these two goals:

1. Something to control detail in the shadow-side.
2. Something to control detail in the light-side.

- **My solution most of the time ends up being one of the Framer materials and a Gummy material; if not a custom material.**

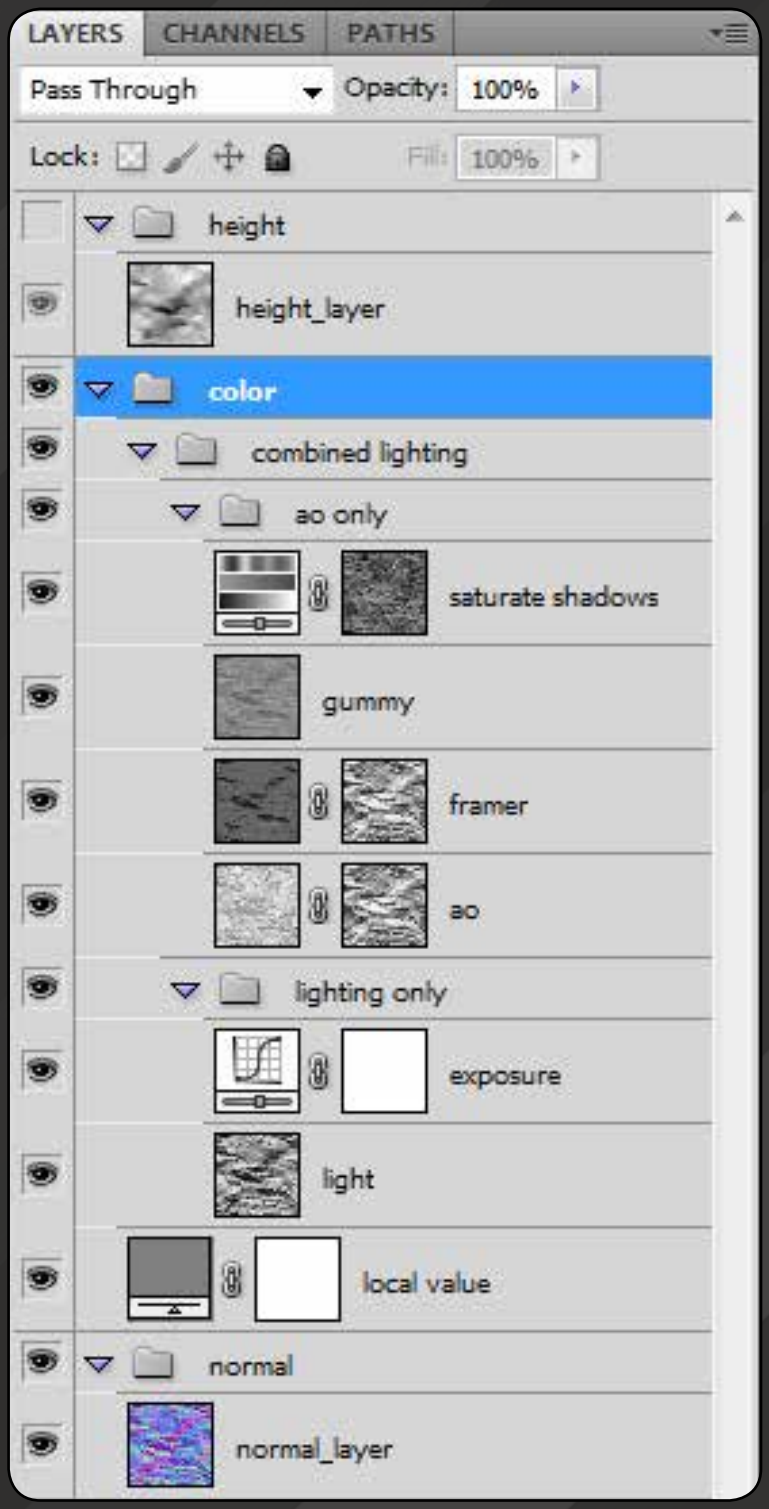




Automation: To keep some predictability and consistency to my work, as well as to save time, I set up actions that composite all my layers just the way I want them as determined by a bit of testing. From here I can adjust as needed. It's definitely worth investigating good automated practices in areas of your workflow through actions and batching. Freeing up tedious tasks will allow you more time to make creative decisions. In the layer stack below, all of the layer organization, grouping, blend modes, opacity, masks and settings were all done by an action. All I have to do is make sure the above 4 render passes are present and named properly. After it sets me up I can tweak my default settings as needed.

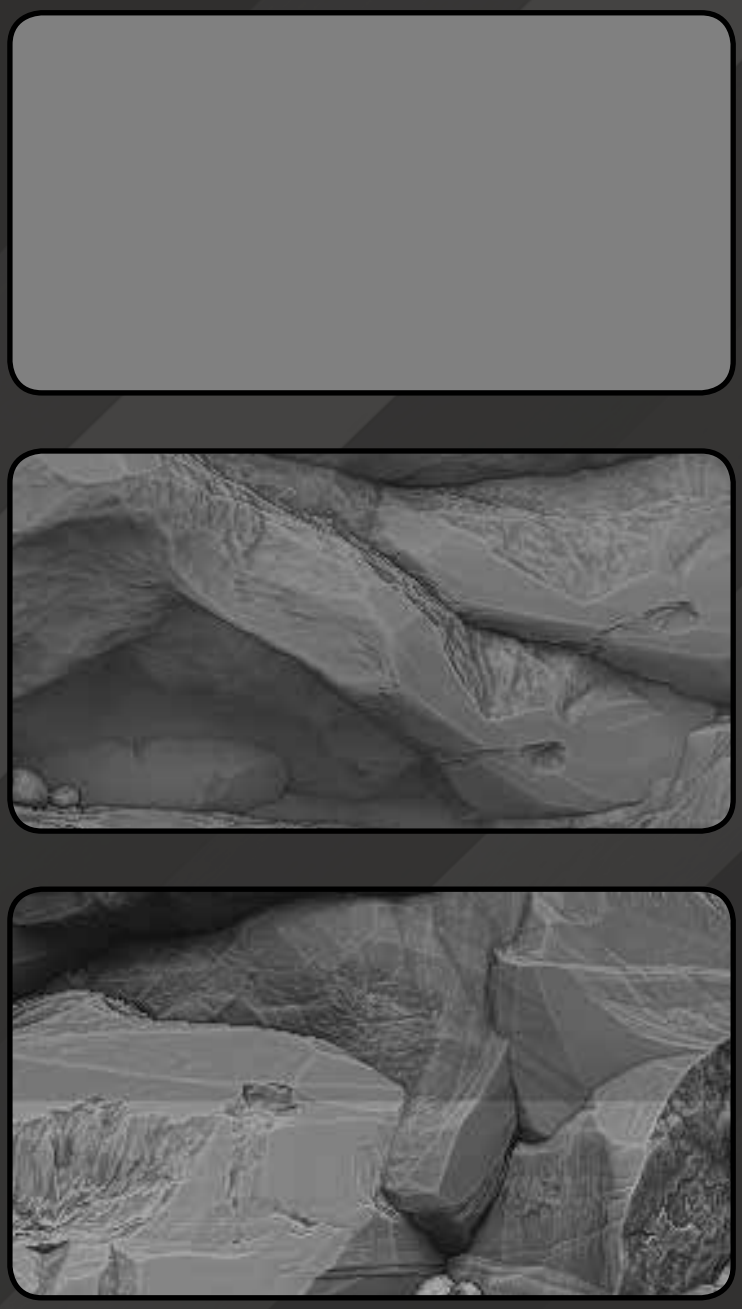
Lighting Notes: Looking at my layer stack on page 101, there are a few things worth pointing out about this process and setup:

Set Black Point: Determining the blend mode and percentage of each layer was actually pretty easy with a few basics in mind. Lighting passes like the direct and AO I prefer to multiply. When I'm determining the appropriate contribution from each layer I'm paying attention to 3 things: my black level, dark-light relationship and sharpness of detail (in and out of shadow). But probably the most important and first thing I want in place is black level, or my darkest shadow values. I want them dark, but I want padding in the shadow side of the histogram as well. The detail renders are usually blended as soft light and weighted by the direct pass to control light and shadow detail.



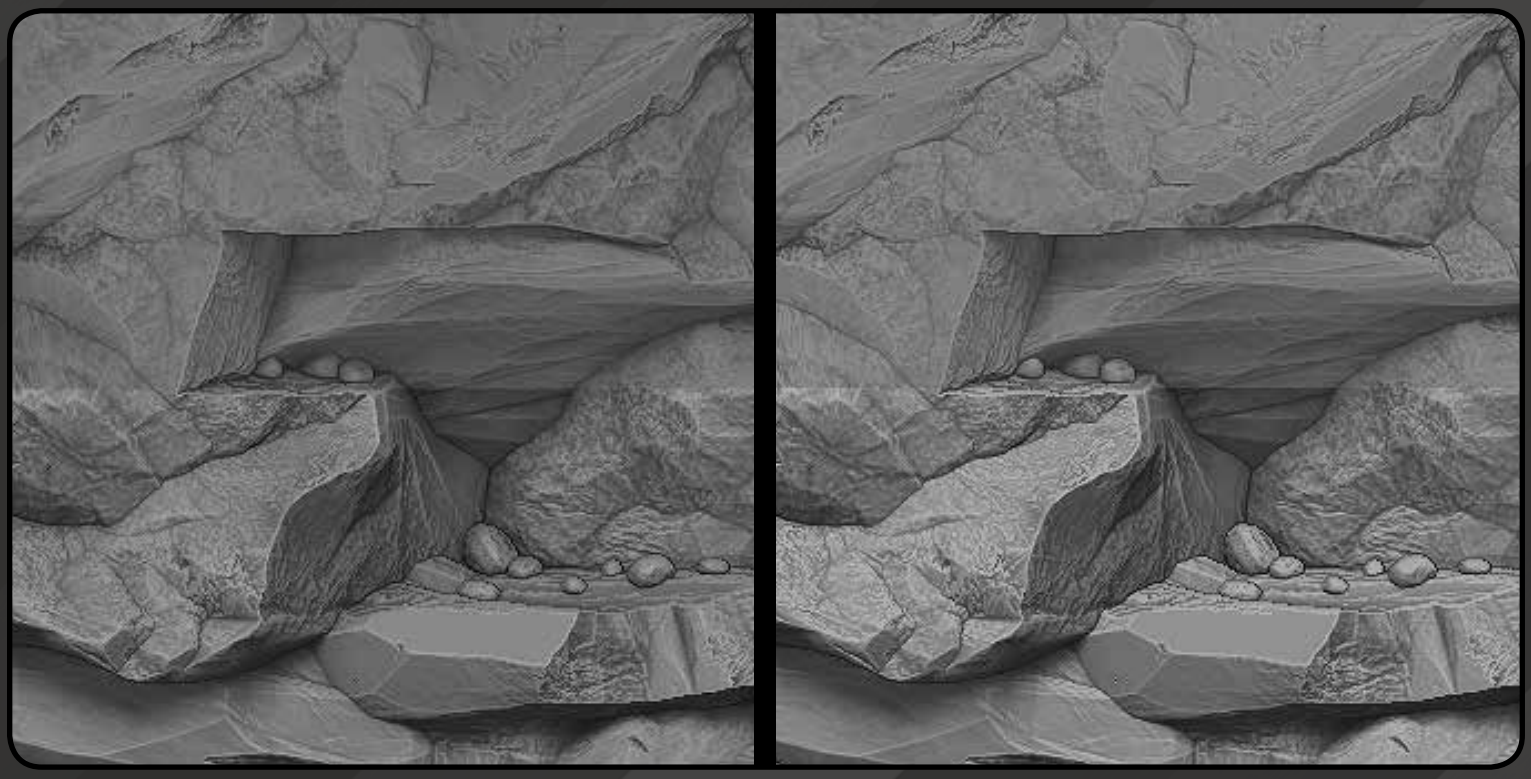
Placing Local Value: I placed a neutral grey of 128, 128, 128 at the bottom of my stack to act as local value in order to make this step simpler. After setting up my passes things have got pretty dark, so I'll "expose" up a bit by using a curves adjustment layer and dragging the middle of the slider up. My only goal here is to place that local value somewhere in the half-light region of my light-side. Use the *Info window* in Photoshop to help pinpoint that value. If I do this properly, then my diffuse color only, AO, and lit versions of my textures should in more harmony with each other, anchored by local value placement. It's good practice to keep a close eye on the *Histogram window*; when comparing the lit and AO versions, the graphed values of the lit should look like they are relaxing and expanding around the range set by the AO with a trend toward the local value. The graph should not even out and feel like it dove to the left. Doing this will help keep your textures in harmony should they be used in the same or similar lighting environments.

- **Compare Local Value (top) with AO Version (middle) with Lit w/o Local Value Placed (bottom top) and w/ Local Value Placed (bottom lower)**



Weighted AO (and other layers): You can always spot an image that has had its AO pass multiplied over the combined lighting. It's important to remember that the AO is part of the ambient lighting and should be treated as such. A simple example of a typical composite with combined lighting would be: ((Ambient*AO)+Direct)*Diffuse Color. The addition of the direct light greatly reduces the visibility of the ambient occlusion. So, for vertical plane textures I generally like to assume some kind of soft top-down hemispherical light source, and give a bit more light (and detail) to my Y facing texture planes. It keeps things still feeling natural, but makes things pop a bit more as you get more play between light and shadow forms. A simple technique used here is to just weight your AO multiplication by the inverse of your direct.

- **Compare non-weighted AO (left) and weighted AO (right); both with and without shadow pass.**



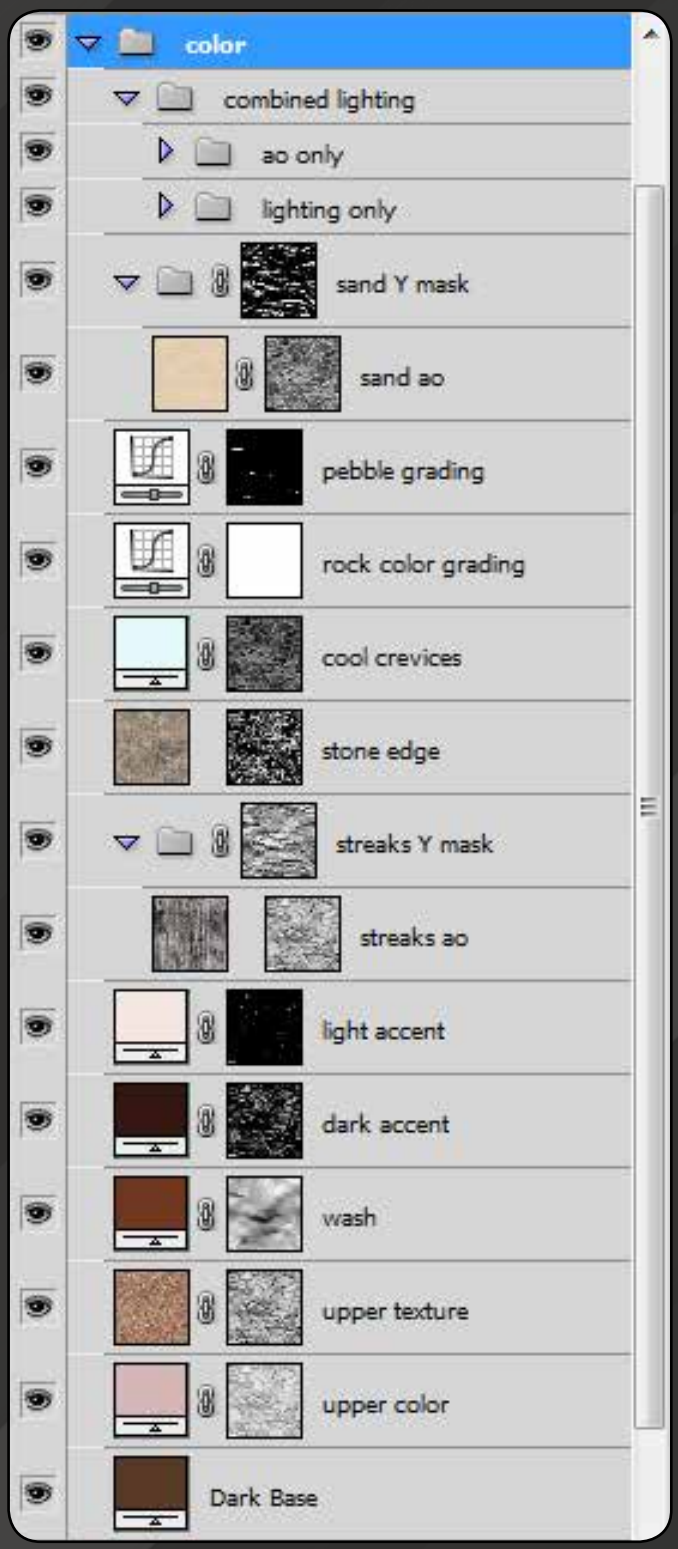
Quick Diffuse Color Tips: Because I'm usually focused on creating interesting forms for normal maps, I don't spend a lot of time working on a color map until I've checked out the normals in game and am happy with the sculpt. So in order to drop something in game fast I have a few go to techniques for quickly getting diffuse color and specular maps done for normal map evaluation.

Depth & Crevice Color Layers: If I haven't poly-painted the texture in ZBrush, I'll usually quickly build up layers of solid color mixed with layers of pre-made tiling texture. I usually have sampled colors picked from reference that I'll quickly build up through height map and AO masks. It allows me to work fast and iterate on the local color and texture detail.

Detail Masks: A lot of times I'll use whatever I already have handy like my AO render or the green channel of my normal map to mask detail. These can be used alone or combined in order to mask texture layers for grunge or sand buildup. A variation on ZBrush's Outline material is good mask for quickly overlaying some edge detail.

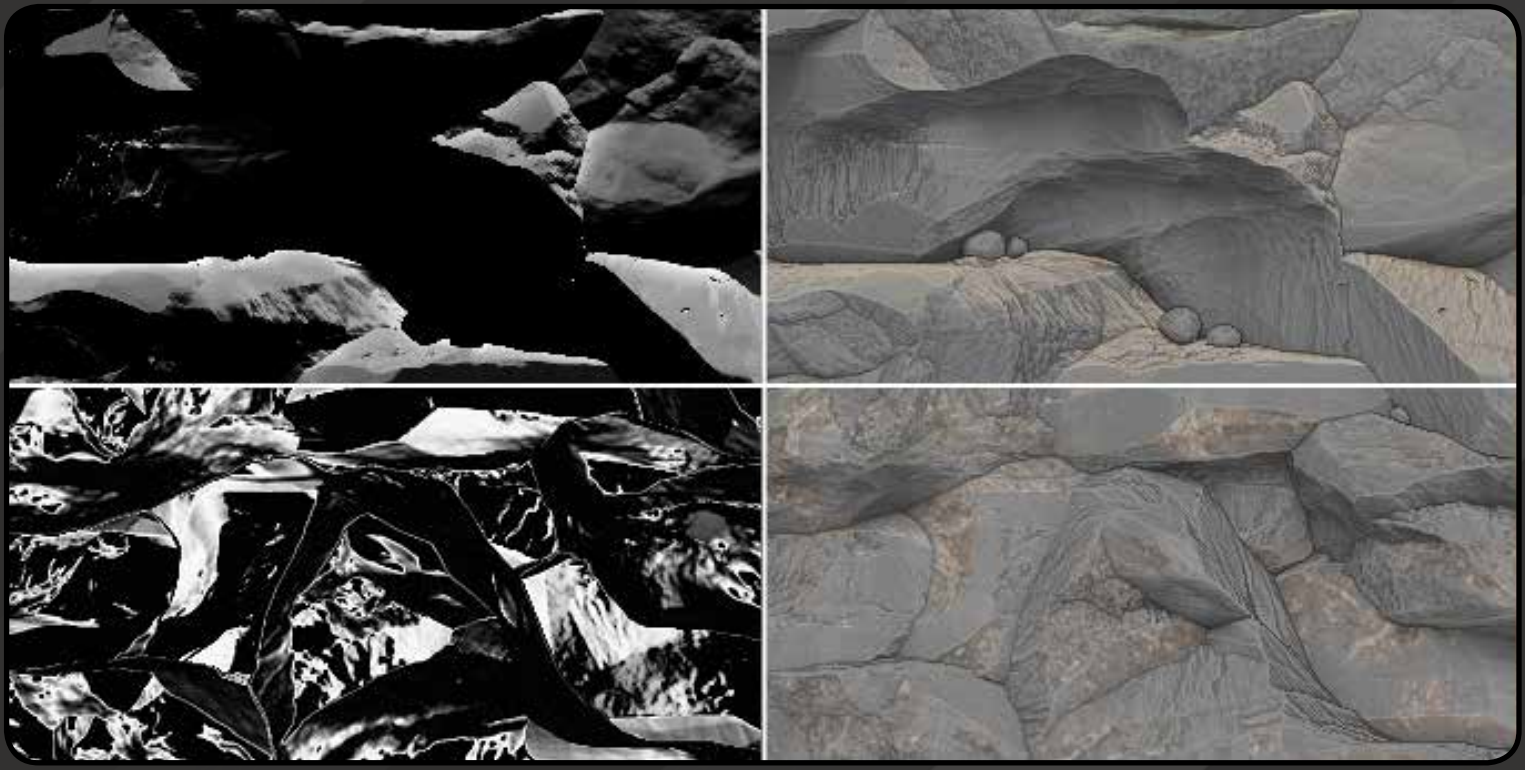
Using Materials to Capture Color Information: Getting color layers from custom materials can save a lot of painting time, and quickly achieve things that would be hard to paint. For example, a modified GradientMap material can be used to get horizontal striations across the forms of the rock face. The Fiber material is also great for moss and grass. For larger grasses, the material can be modified through ZBrush's shader layers to render custom normal maps and mattes as well.

Color Correction: I often don't get the color and value contrast set just right in these stacks to start, so I'll always put some color correction toward the top of the layer stack. I prefer a single curves adjustment layer and like to adjust per channel to get subtle color shifts throughout the luminance range. It's a lot faster than re-tweaking individual layers again. Even better, if I have a set of PSDs that are just variations on the same surface type, I can quickly update them all by simply updating my color correction if I need to; which I can also batch!

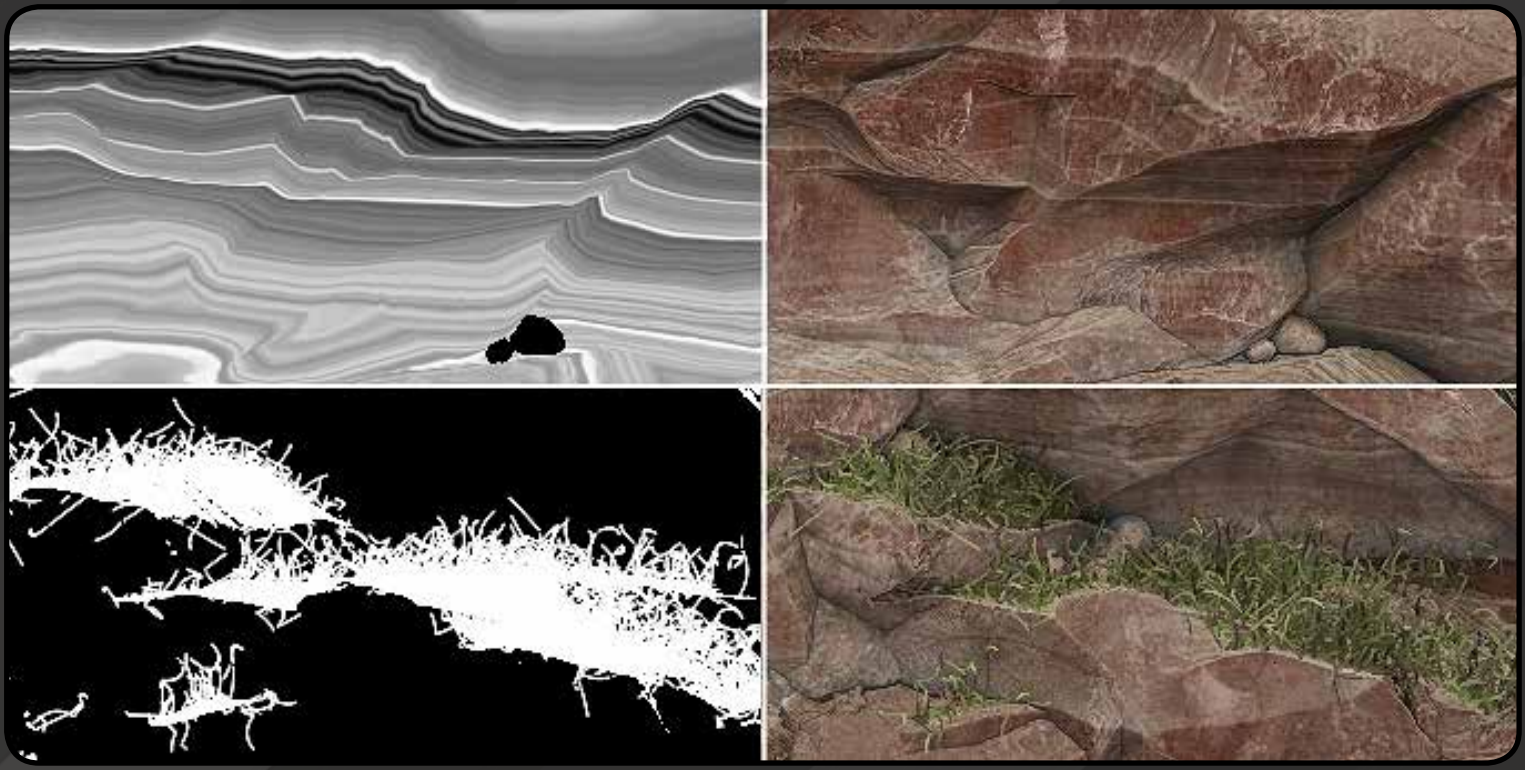


● **Building up solid color and texture**

- The combined AO and green channel mask for sand and result (top); The custom ZBrush Outline mask and detail overlay result (bottom)

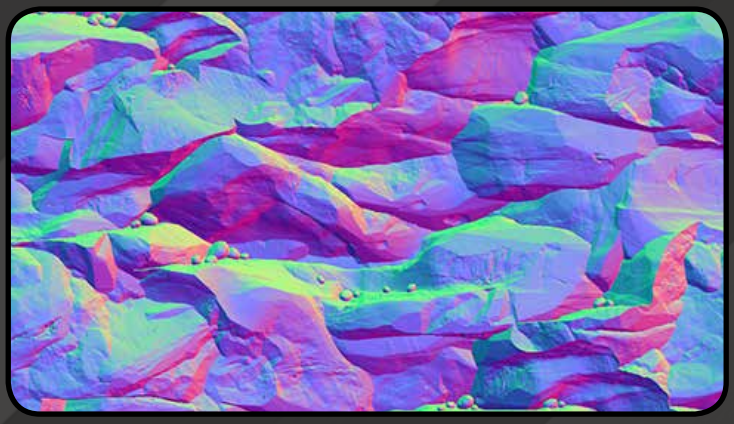


- A modified version of the GradientMap material and a custom texture were used to create a mask for horizontal striations that follow the forms of the rock face. Custom Fiber materials were used to render passes for grassy top planes.



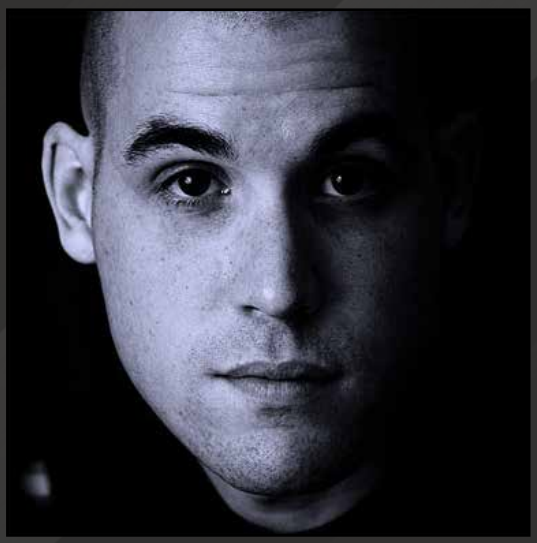
- The uncorrected colors (left) and corrected colors using curves (right)

Quick Specular Tip: A simple thing to do in order to get a fast specular map is to use the Channel Mixer Adjust Layer. Set it to gray and move the sliders to get the best balance of even lighting and detail contrast. The best part is that it's non-destructive and keeps doing its thing; so if I have it inside of a group above my color group, then every time I update my diffuse map to check it in game, I can quickly re-export an up to date, matching specular mask. For textures with a wider color gamut that need finer tuning, another useful tool is the **Black & White Adjust Layer**. These two adjustment layers can easily get you 75% of the way there.

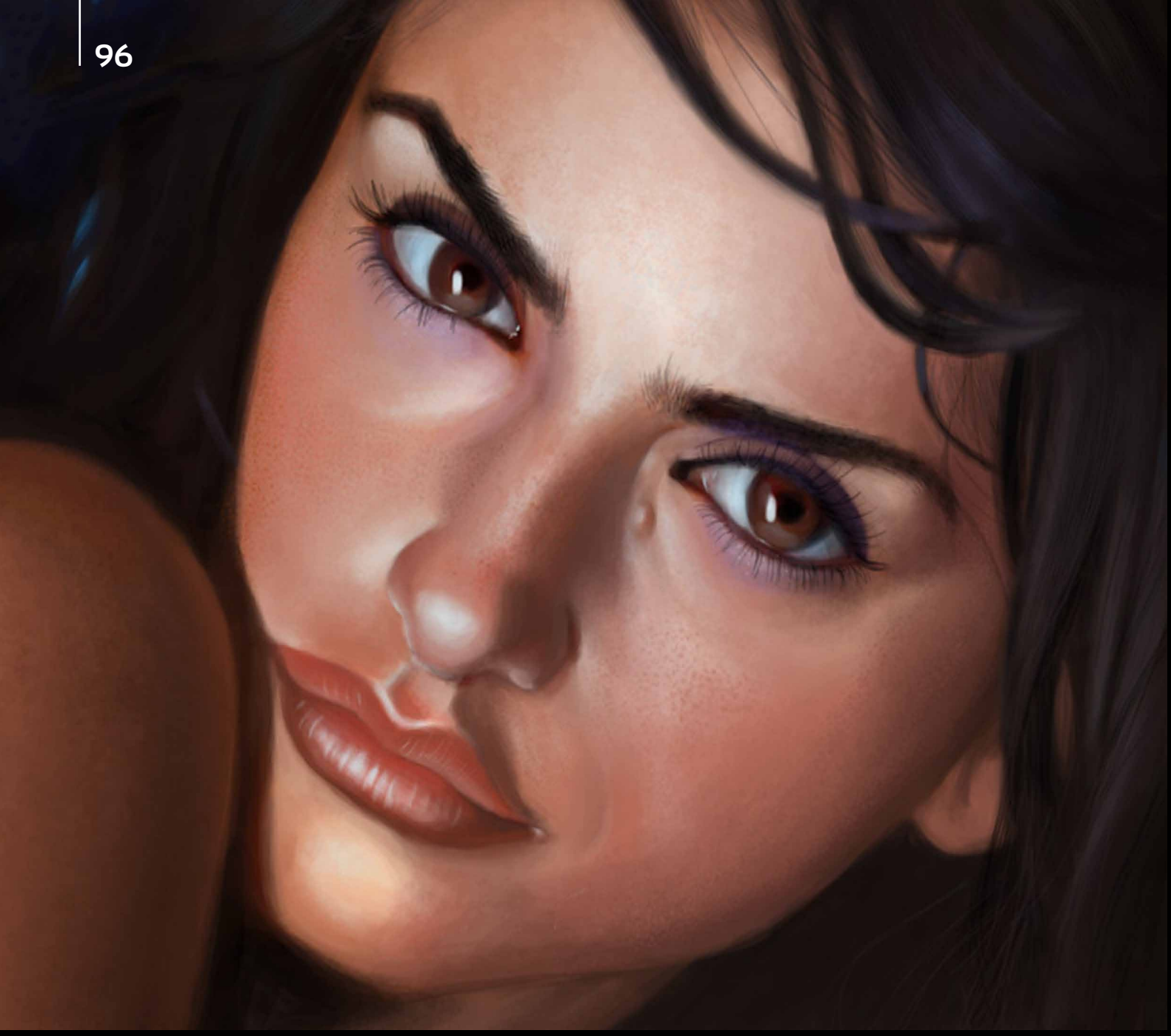


About Me

After graduating with a BFA in Computer Animation from Ringling College of Art & Design, I was hired at Electronic Arts Tiburon where I worked for six and half years and became the Senior Lead Environment Artist. I joined the talented team at Naughty Dog as a Texture Artist in the middle of Uncharted 3 development, where I focused on the development and production of the Caravan level.

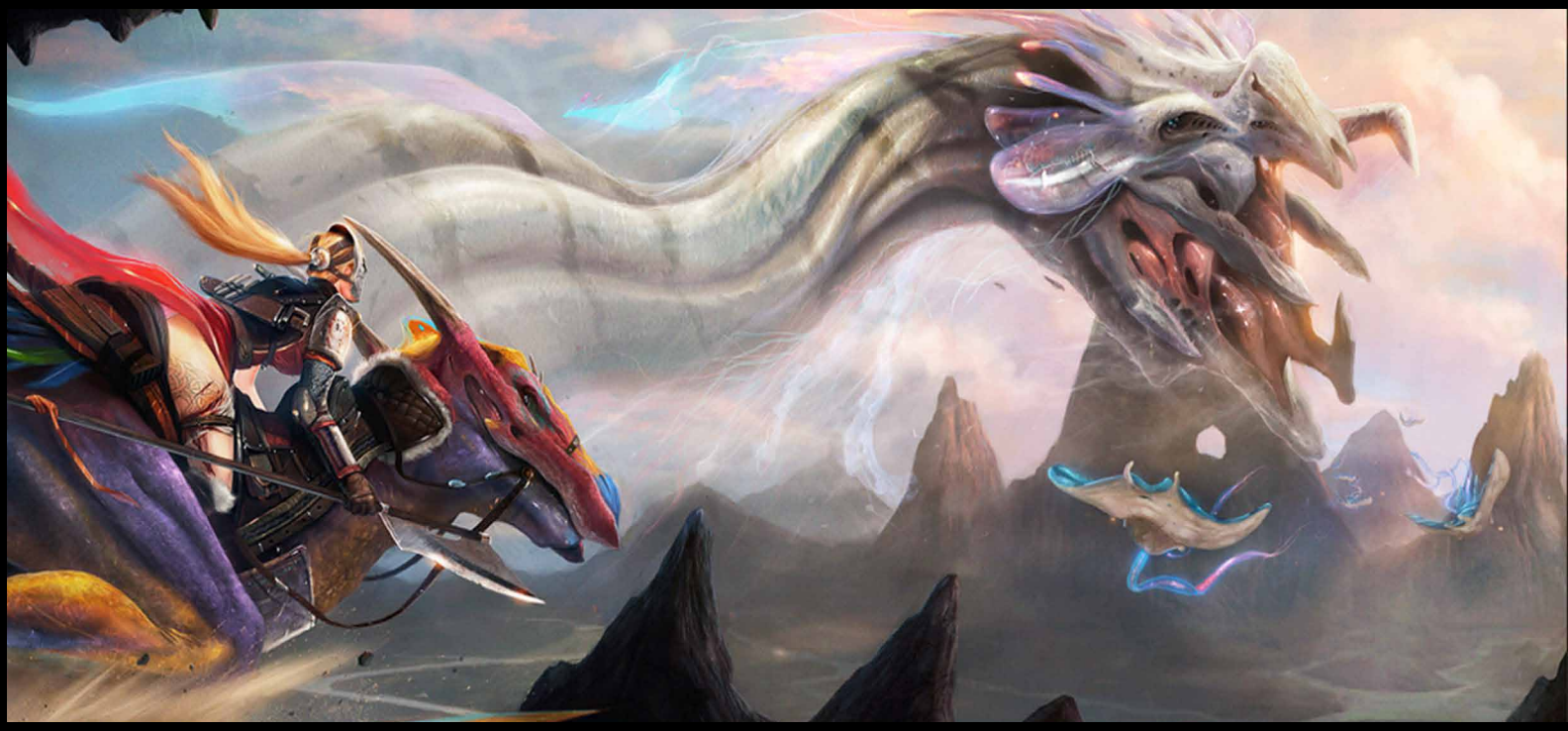


Bradford Smith



Amauri Ploteixa

www.jramauri.blogspot.com



Dan Luvisi

www.danluvisiart.com

Mecha

Mech Design by: **John Park**

Starting out, I knew nothing of mechanics, and till this day, I still have a rudimentary understanding of mechanics. But, I started to look around and began paying attention to the small elements of mechanical design.

Everything started out with understanding why we need "machines". From my understanding its purely an aid based man-made machine. There is a specific reason why we create computerized robots, factory robotics, and even automated machines.

Before starting any design, one of the key essential elements is research. We have to slow our thought process and ask ourselves "Why, when, where, and how?" A series of small questions can help solidify your design by ten folds.

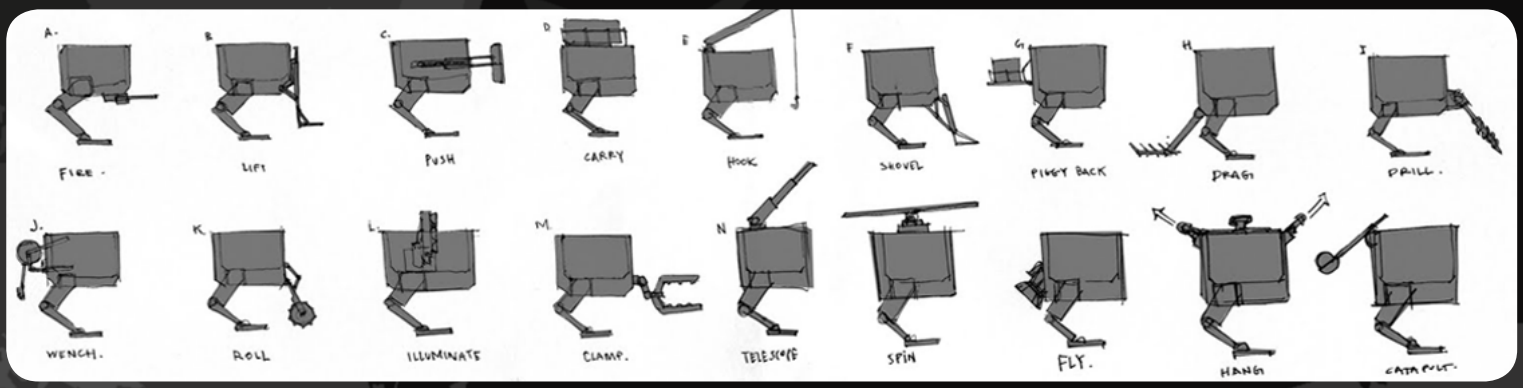
These are some additional questions we have to start asking ourselves:

Why - is this design needed? What is the primary function? Secondary function?

When - was this design built? Time year, era? fiction?

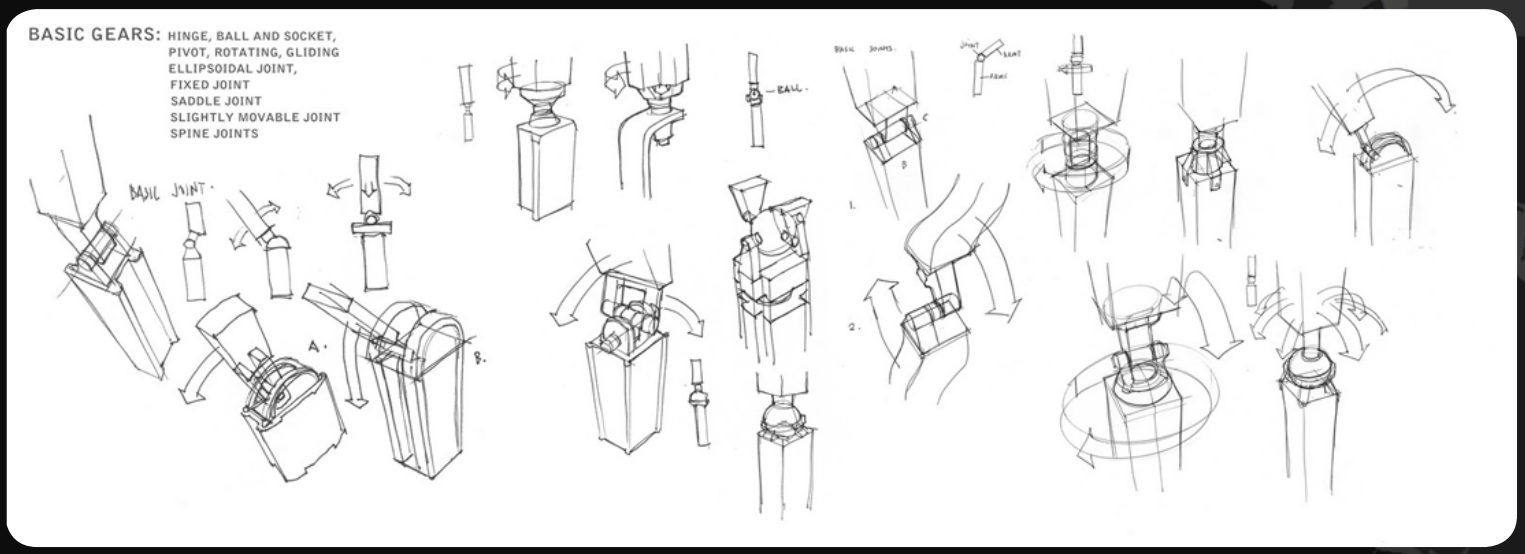
Where - would we utilize this type of design? In what type of space and setting?

How - can a we operate a design such as mechanical bots? Man piloted or remote?



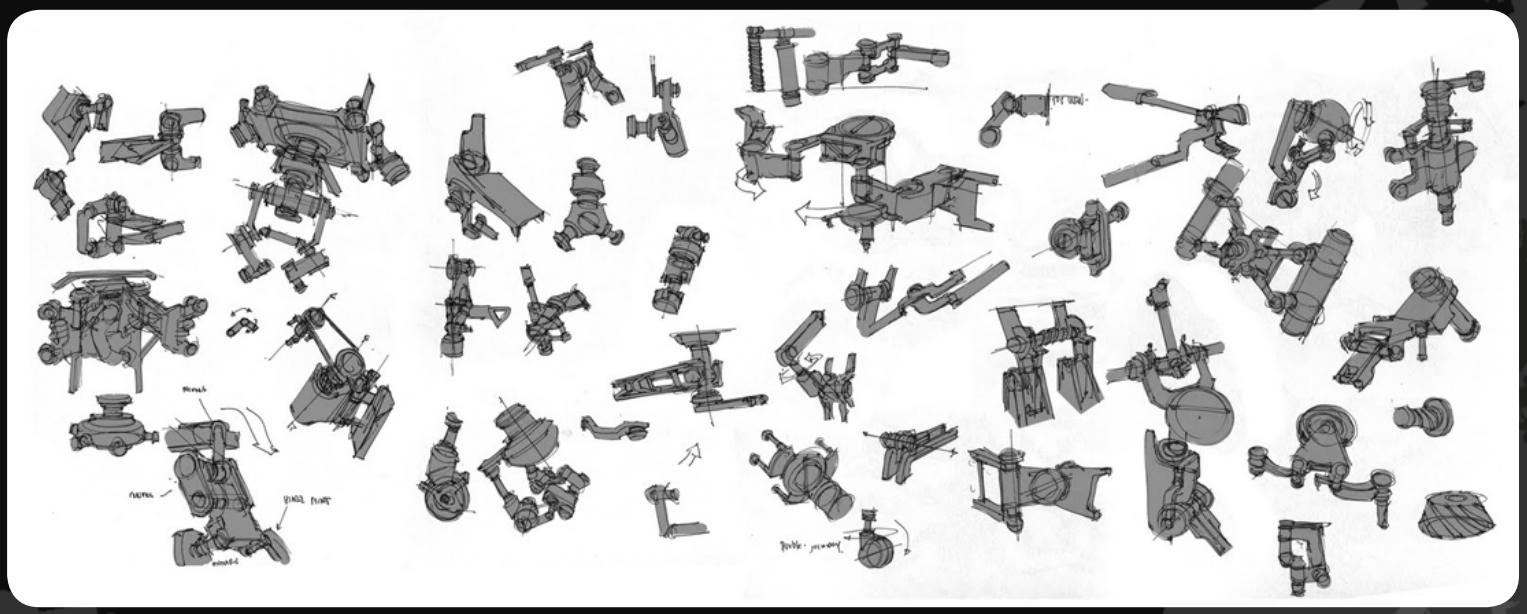
Here is a simple scenario sketch I've done on the side to explore job tasks or "purpose". These job tasks are simplified for our basic understanding of how to create a small scenario for mechs. (harvester, luggage carrier, tug and pull, etc)

After investigating the reasons for your design, we start to get into gears. Gears are some of the most basic to complex aspects of mechanical design. I relate this to figure drawing or anatomy of the human body. We start to breakdown forms and functions, asking ourselves why certain things move the way they do.



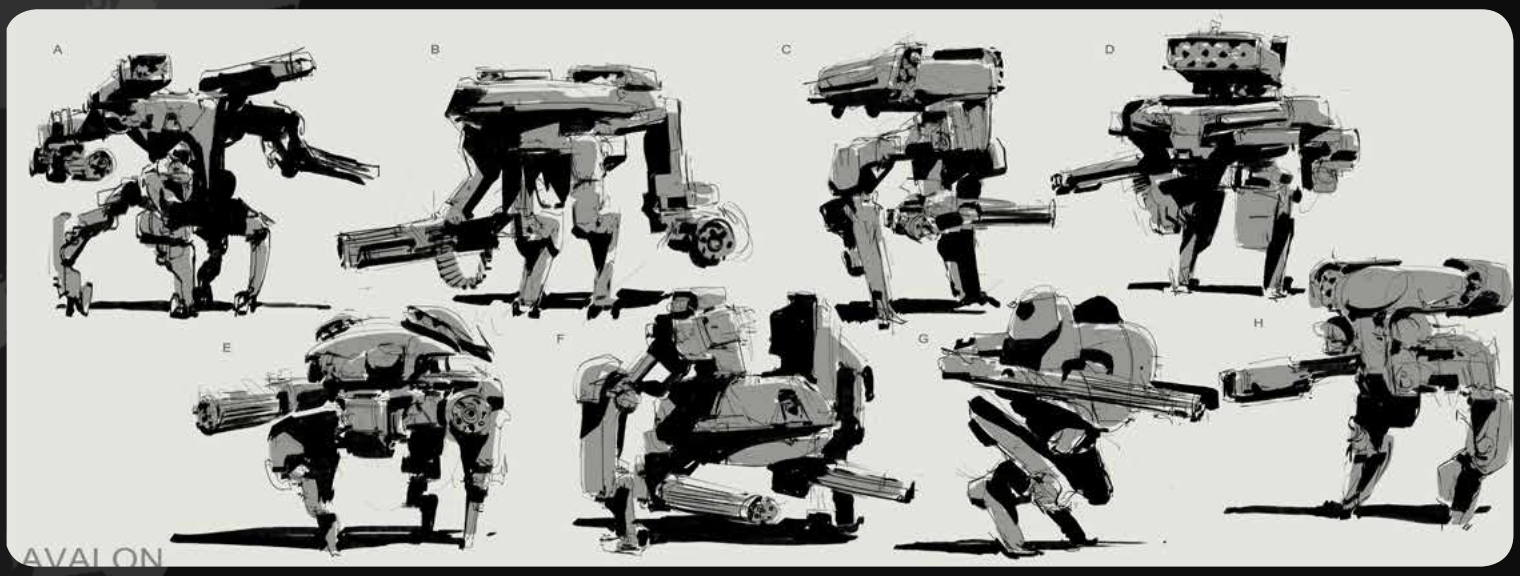
To get started, I began doing very basic studies to get a quick understanding of gears. I started to draw out simple gears that exist on your very own desk at home, a lamp. Looking carefully at the different pivoting points of a desk lamp allowed me to gauge its movements or "locomotion".

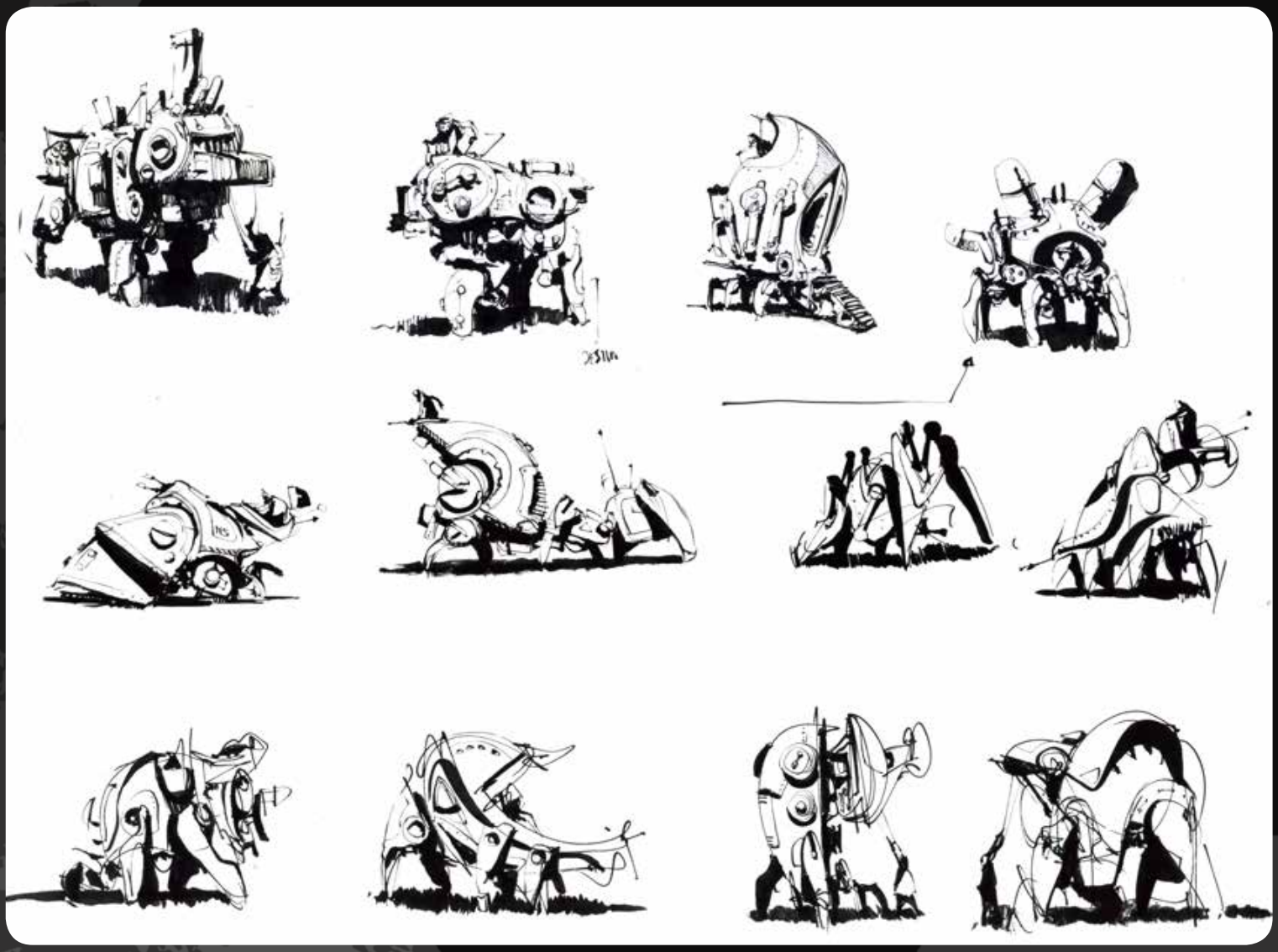
So with that in mind, I started drawing what I was witnessing. Hinge joints, ball joints, rotating joints, there were so many basic joints that allow me to understand its movements. After doing a series of these studies I started to combine the simple gears and joints to develop some complex joints. This allowed me to slowly build my understanding of how to compose a more complex gear setting.



After the comprehensive research, the questions to the studies, now we start to explore designs. One of the main things about generating good design is a first, second and third read.

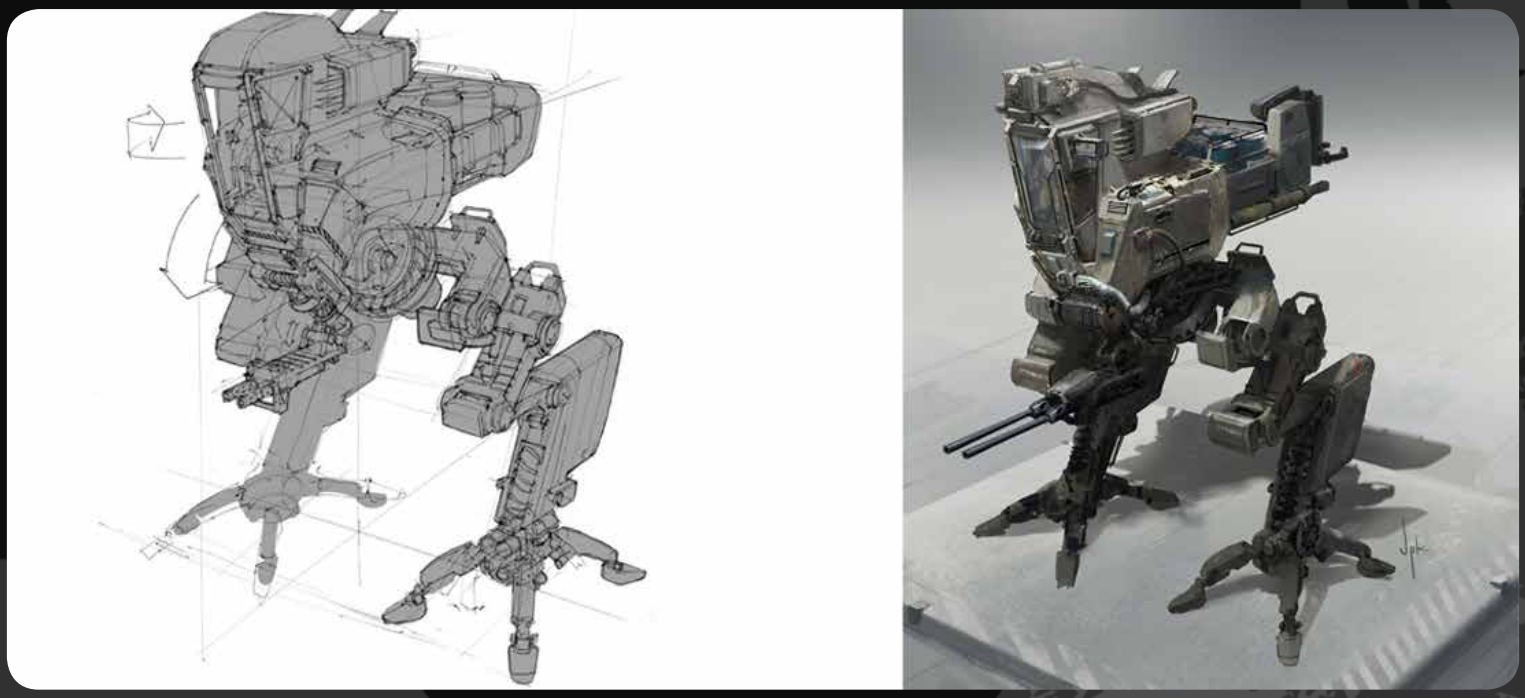
First read - a very appealing silhouette
Second read - good break up of shapes, ranging from small, medium, and large.
Third read - all of the smaller details.

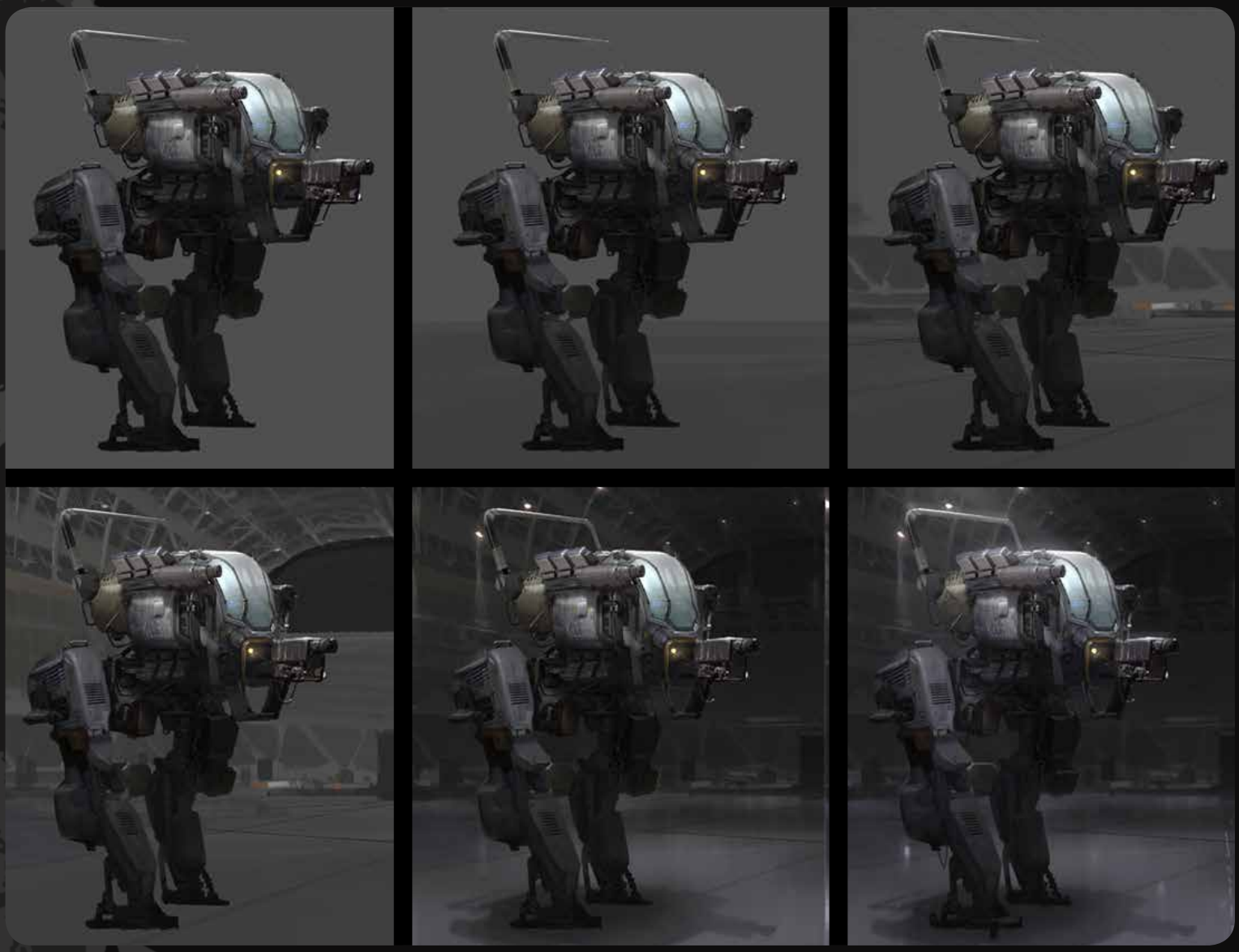


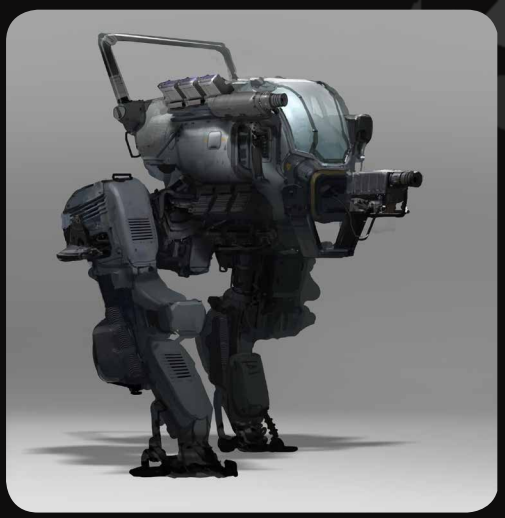


I usually try to do a quick range of designs, based on what my design goal is. After generating the a spread of designs, I would pick one or two to fully develop into a rendering.

Here are some examples I've done from sketch to render:







About Me

At a young age, John Park's dream was to become an artist just like his father and older brother. The countless nights of staying up late and drawing underneath his desk surrounded by his favorite comic books and toys became the result of what John is doing today.

John Park majored in Product Design and shortly after, he began pursuing his dreams and goals into Entertainment Design.

John Park started his career as a concept artist at Design Studio Press, working with Scott Robertson, who has featured as an artist in Alien Race. Ever since his experience at DSP, he kept pursuing his goals and has been involved with major studios for various projects and games.

Companies Worked With

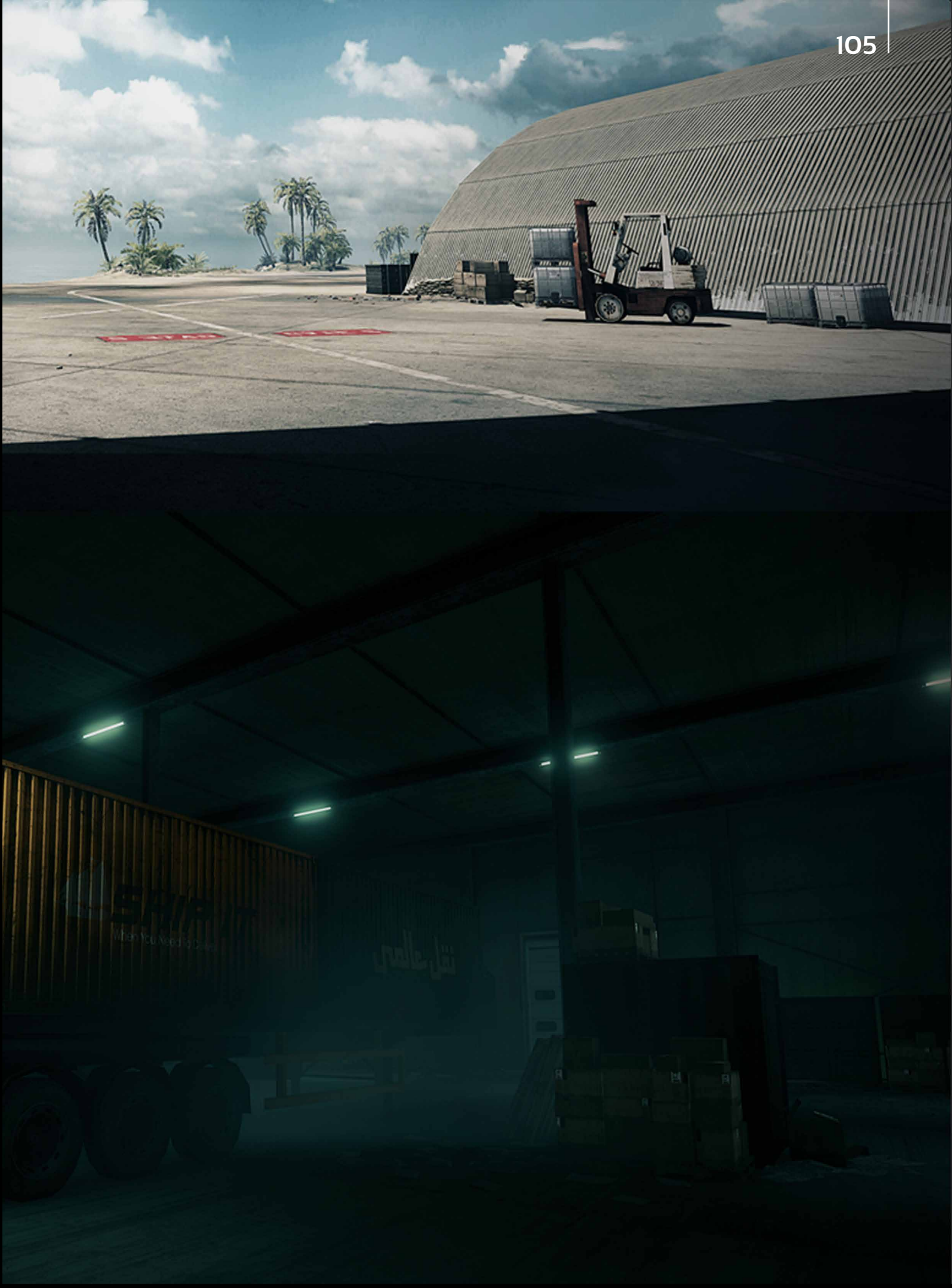
•Pasadena Art Center College of Design •Design Studio Press •SpinMasters •NBC •Blur •OUTSO •Disney •Ghosthouse •Hasbro •Suckerpunch •Spark •Universal Blink Wink Productions •Mattel •Sony

John Park

www.jparked.blogspot.com

Marcus Pettersson

www.kotter.se



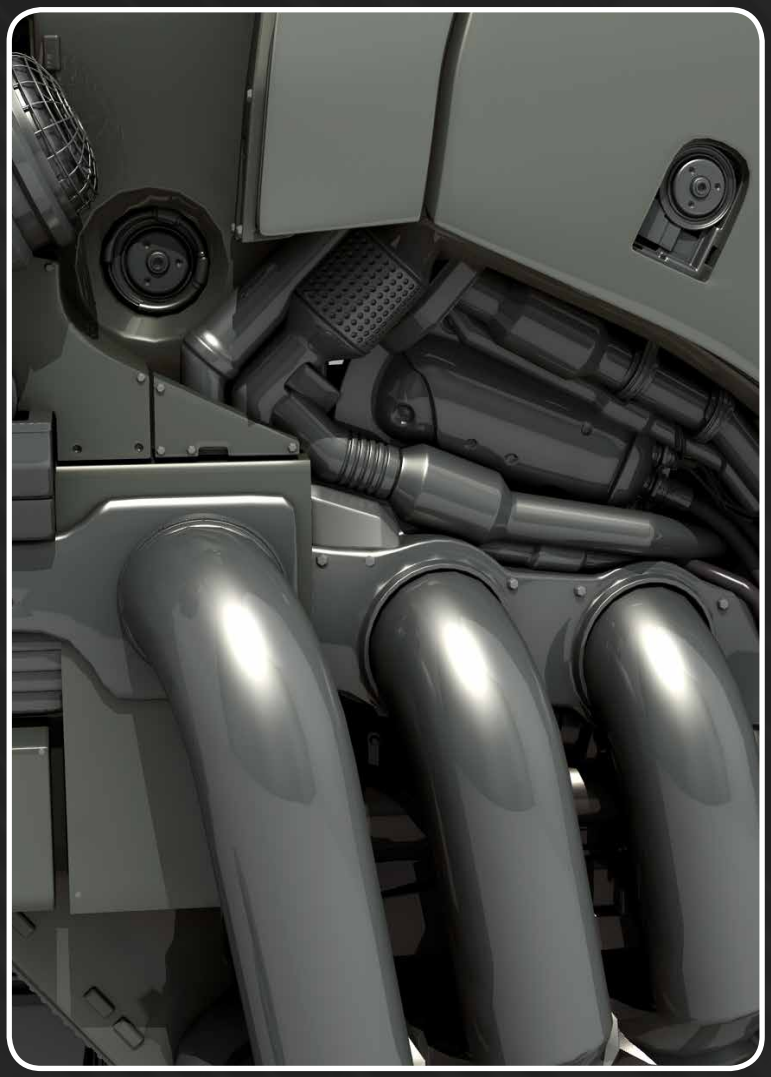
MACHINE

Hard Surface Modeling & Workflow by: **Tor Frick**

This is a brief overview of my general workflow when building larger, more complex hard-surface models. I wont go into detail how I model every shape etc, since there are already plenty of tutorials for stuff like that, but more give an overview of how I approach modelling, baking and texturing in general.

I wont go into application-specific workflow, and I am assuming that to understand what I am talking about in the article you need a decent understanding of the current gen workflow, with highpoly, lowpoly, baking and shaders. I built this mech based on a concept from Khang Le.

I picked it first of all because it's a really sweet concept and awesome mech design, but also because it got a good balance of details and larger, cleaner shapes, which would work well to demonstrate how I separate different materials. It's also a pretty detailed concept but leaves a lot of room for interpretation and improvising details.



The Scope

"Identifying Scope and Purpose"

First thing I do is to figure out the target specs and the purpose of the model. Knowing the target specs from the beginning allows me to plan the model better, according to what purpose it's going to be used for. For example, is it a cinematic model only? Is it mostly seen from 3rd person, 1rst person? Do you ever see it up close or standing still? Will there be more than one of it on the screen at the same time? What parts should be able to animate? How much unique UV space can you have and still hit the target texel density within the texture-limits? Questions like these are good to have answered before you even start modelling. This way you don't waste your time modelling things that wont be seen, or reusing things to speed up the modelling.

For this model I wanted to practice my modelling and surfacing/texturing, and try to step up the detail level from my previous work. I didn't go with any fancy technical or clever solutions really, just went with mirrored UVs over the body, except for the parts that were not symmetrical like the eye-section. The legs are all the same as well. It's a robot so I'm fine with a symmetrical design, as it will let me push the texel density higher and saves me time not having to texture the same thing twice.

For the specs I just went with really high-end specs, with 4*2048 textures +1k texture (authored at the double resolution) and 50,000 triangles. Sure, it's a bit high, but not impossibly so, and I wanted to take this opportunity to test my workflow against something more high end. My computer is pretty crap so I didn't want to go with one 4k texture! (hence the 4 2k-textures)

The Blockout

"Blocking out and planning the model"

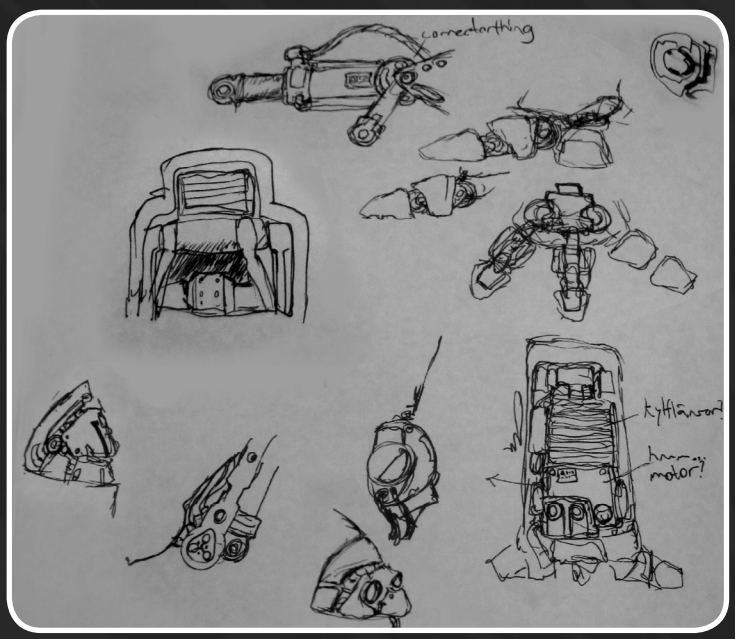
Then I usually make a decent blockout of the model to make sure the basic shapes work in 3d, and check if the parts work with animation as intended (in this case it's a robot so it's pretty easy to test.) I am pretty lazy when blocking out, and I tend to make the blockout a bit too simple, so I always try to push myself to get more shapes in there than I originally planned.

After making sure the shapes were working ok and the parts can animate, I do a rough plan of what will be in which texture and how many textures I will use. I find that planning things ahead as much as possible helps me to work around problems that I know I will have later on. For example hiding UV seams in easy ways, making sure the cuts between materials are easy to hide, etc.

There are lots of clever ways to hide seams in the textures, but I find that it's easier to just consider it from the start so that I can hide them with minimal effort. For example just adding an extra, deep seam between plates hides most UV seams perfectly.

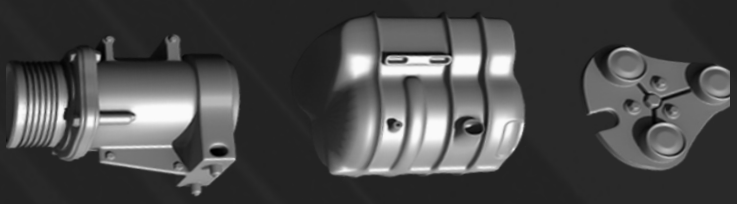
The High

After building all the base shapes (or as much of it as I stomach to do before I start making details... :D) I pick one part of the model, and start detailing it properly. I do this to find a good style for the detailing and it helps me to build a library of details that I can reuse over the entire model. I usually concept details as I go. Half my details are pulled straight from stuff like: google images: engine, the rest are improvised or based on my awesome concept art:



As you can see they are not exactly the most beautiful concepts ever made, but I often do these kind of quick sketches when I feel that I'm stuck or don't have a clear vision of how to build something. Sometimes the sketches are even simpler than this and inspiration kicks in after just drawing a couple of lines. Occasionally I make a more detailed concept.

I also have a pretty solid library of random machinery pieces that I have built up over time, which helps to speed up things a great deal. Sometimes I just start by adding some of these pieces where I know I will be doing a lot of detailing, and then build the custom detail around that. Sometimes it's the other way around, I build whatever details I wanted then I fill it out with some copypasta! Here are some examples of high-poly pieces that I copied out across the mech, rotated around and used to cover up areas:



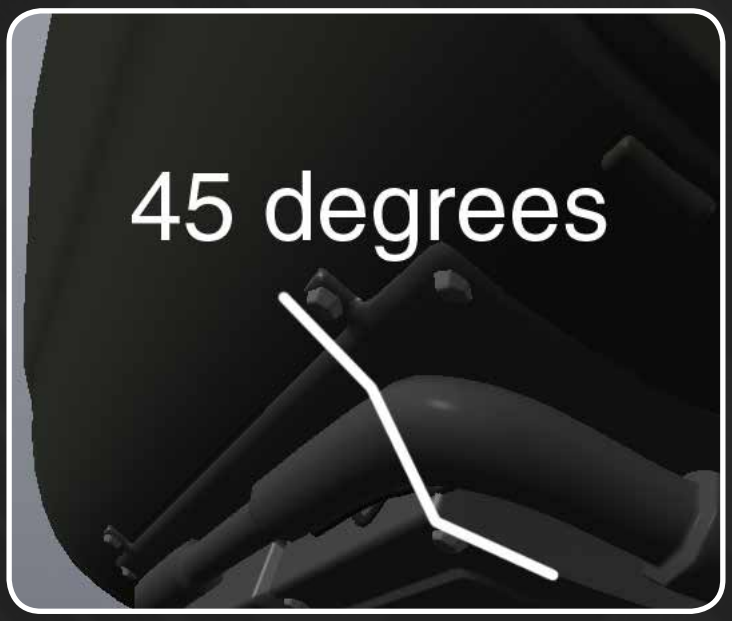
I also start assigning materials for the pieces before I start copying them around, so I don't have to go through the highpoly and assign materials after I have copy-pasted stuff all over. If you are going to copy-paste something across an entire model you might as well assign a material for the first one you place. It saves a lot of time to think ahead. For most stuff I build I only have a few materials that I bake out. In this case: rivets, a couple of base materials, hoses, and cords. So I build the highpoly until I'm more or less happy with it, but I don't take the detailing to ridiculous levels all over the place just yet.

Then it's lowpoly time! Nothing complicated here, I just try to match the highpoly as closely as possible, standard stuff, but if I find annoying parts. (See Examples Page 109)

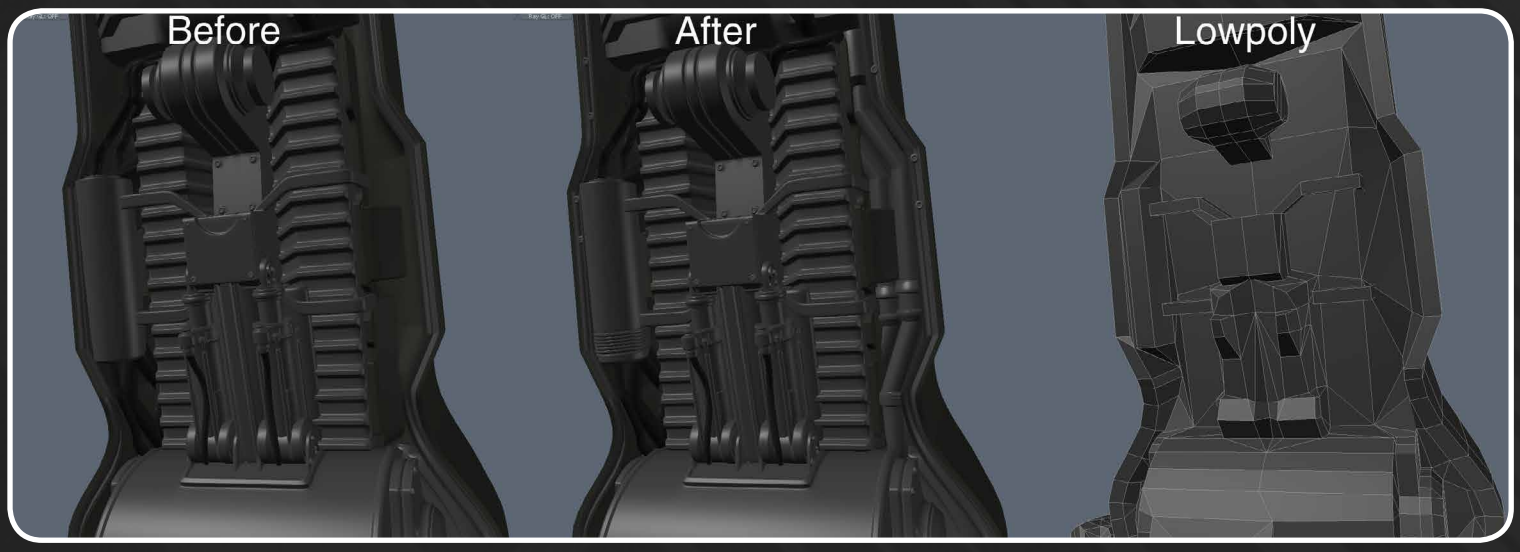
I just skip them for now, since they would be such a pain to build in the lowpoly and get a good bake.

Now this is the phase where I do another pass on the highpoly and basically plug all the annoying parts I identified earlier on the lowpoly with additional highpoly detail and shapes for a cheaper lowpoly and a simpler bake. Or like I call this step "oh god I'm so tired of this damn lowpoly I just want to bake my maps and be done with it now please" I usually just grab some pipes or something I already have built and copy-paste them randomly in an at least remotely sensible way.

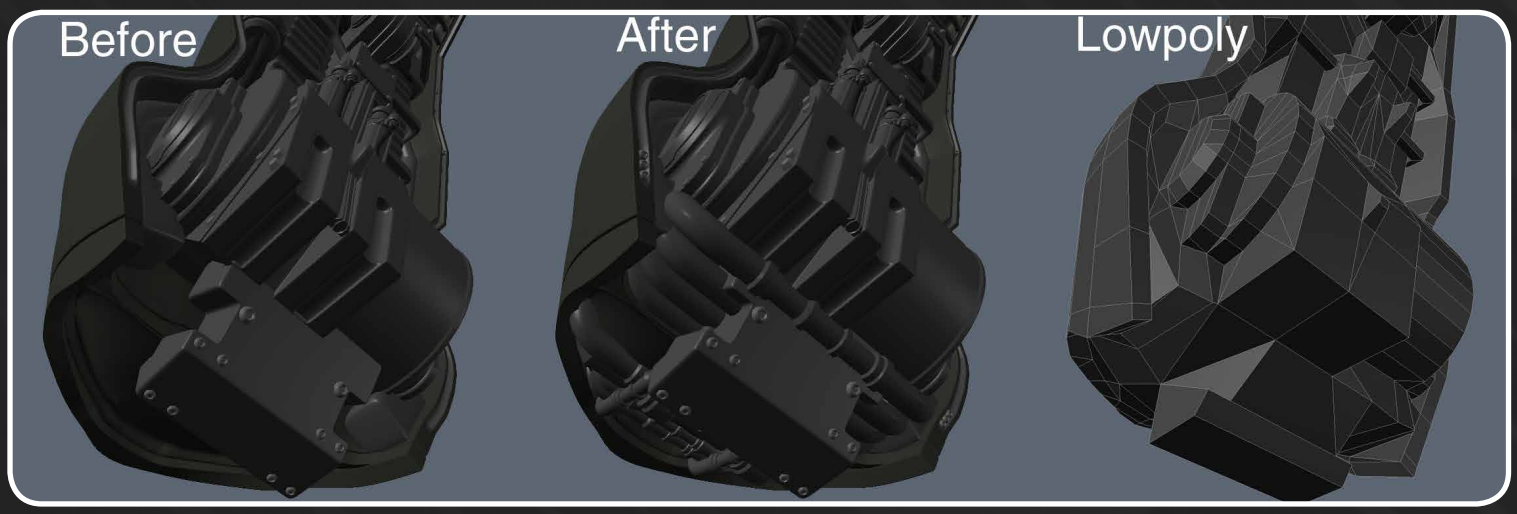
This doesn't mean that I cover all holes of the lowpoly with stuff for simplicity's sake, but rather cleaning up areas to preserve the illusion of depth without sacrificing too many polygons to get a decent bake. Keeping the big shapes in the lowpoly but getting rid of the annoying parts, basically. One classic favourite is those annoying small 90-degree corners, where you can just add some pipes and suddenly it's a 45-degree corner and gives a much easier bake and less polygons!



I like to spend a few extra polygons in the lowpoly just to have this sense of depth in the model, but by simplifying and covering up things in the highpoly I have an easier time baking it down. After that I finish up the lowpoly and unwrap it. I start doing some test bakes to see what kind of resolution I'm getting out of my maps. Yes, it will be ugly and smoothing will be totally messed up etc., but then I know how far I can push the details and how much will transfer to the normal map.



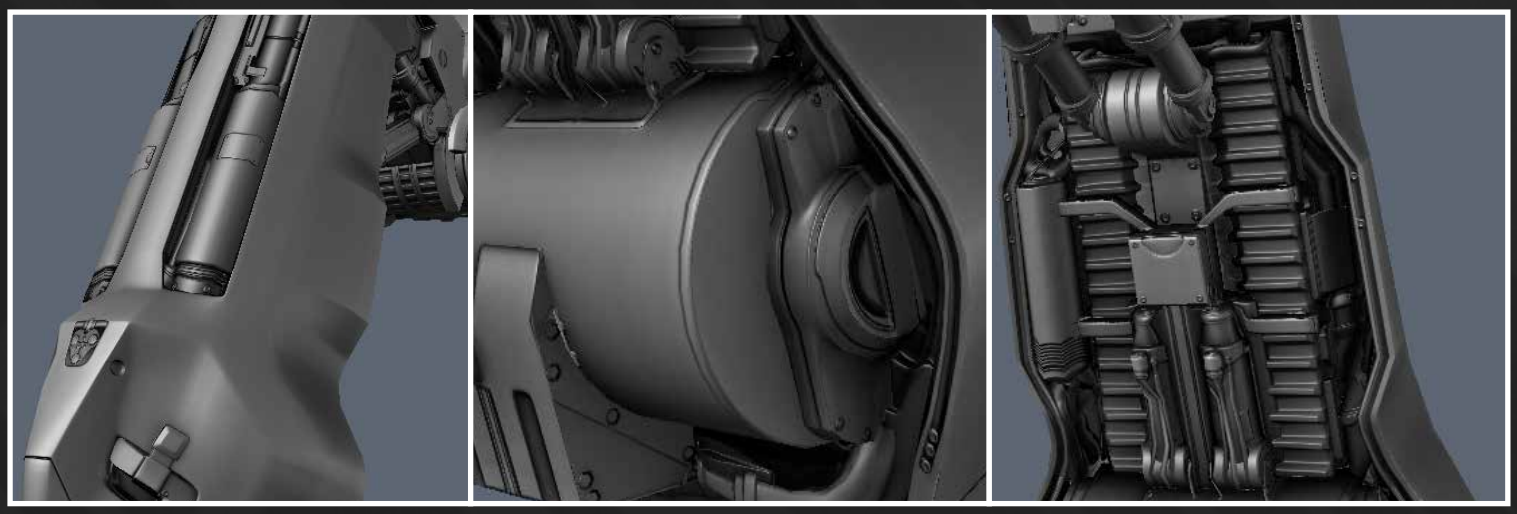
I never go crazy with detail that won't transfer to my bakes, so I tend to model the detail I know will show, and after testing the bakes a bit, I do one final pass on the highpoly where I add more details where I feel it's needed. I prefer to have a clean normal map with readable details than an over detailed bake that will just look like mush when in the right resolution.

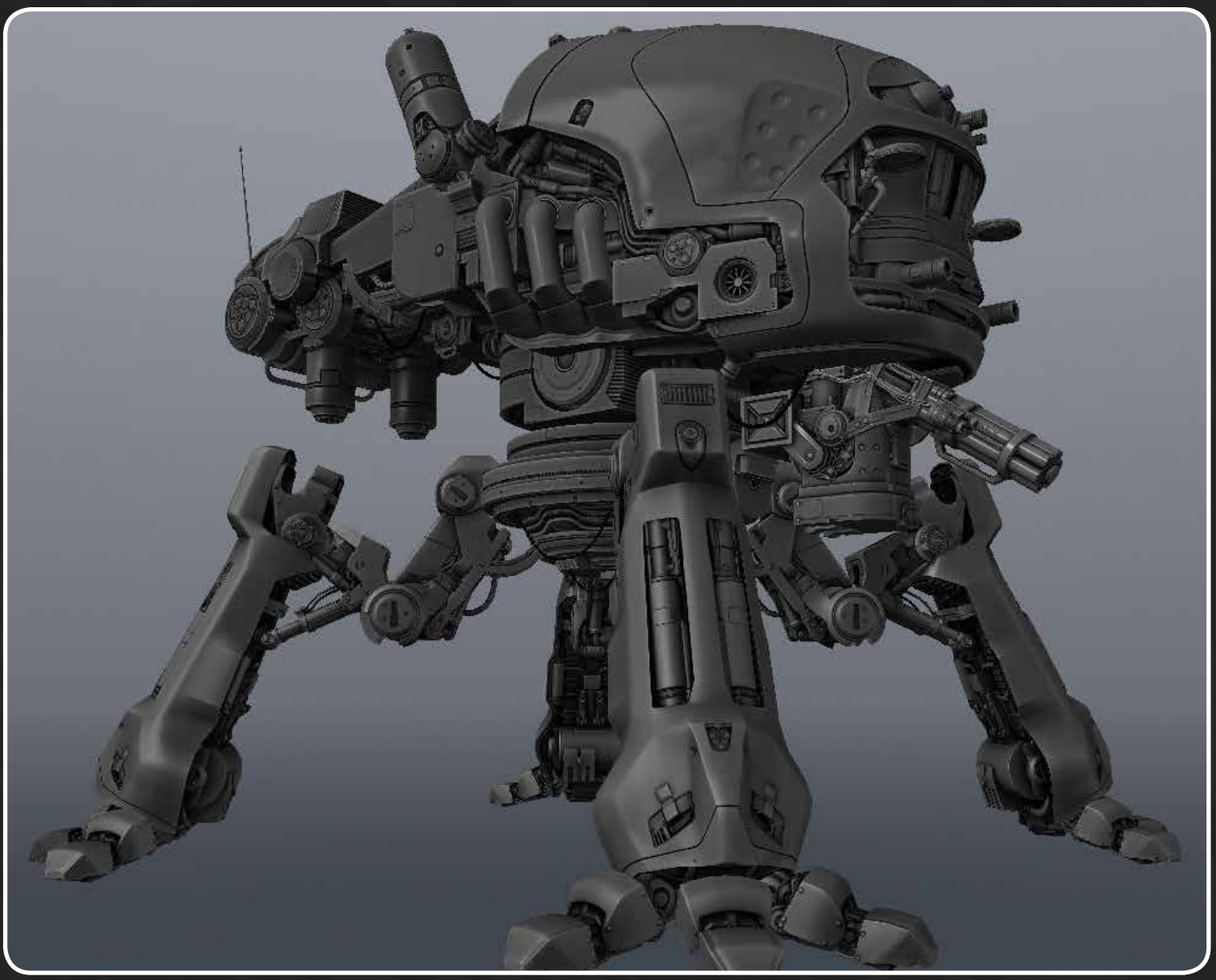


This also allows me to really get the most out of the normal map, when you find places with high detail intensity that you can push even farther due to higher resolution than expected. After this last detail pass I set up smoothing groups and fix potential smoothing errors. Of course, this way of working does not translate as well to sculpting, but I find that it helps to make a last pass on the highpoly when working on hard surface models to get that last bit of detail.

Baking Time

I usually bake at least AO, normal map, a mask with the different materials, and a curvature map. Sometimes I bake a bit of light, or use a skybox and bake that lighting down, depending on what kind of asset it's going to be and how it's going to be used. For example if you have a prop that is going to sit on the ground, outside, you might as well bake some sweet color bounce from the sky into it. I think cheating works great, as long as you don't have a super realistic totally dynamic renderer.





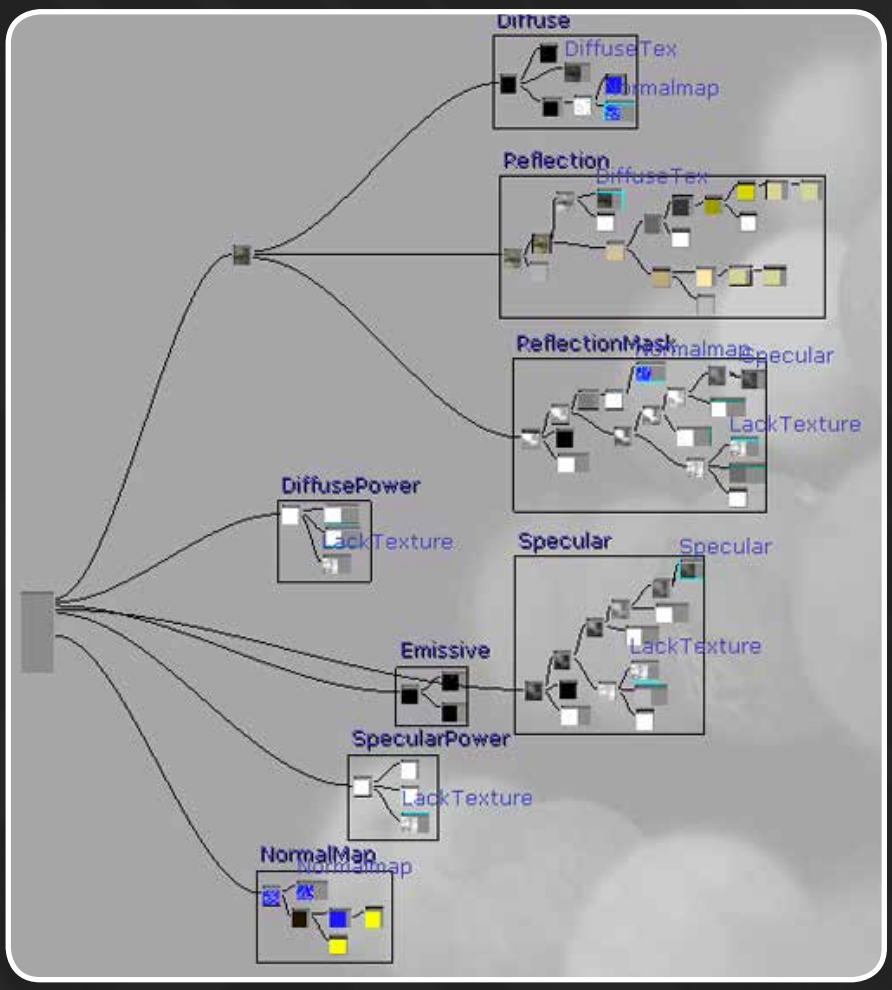
I set up a base for the texture, since this model will have several textures and they all have to match, I set up a template which is easy to use. I use a lot of adjustment layers in Photoshop. For example an adjustment layer for the curvature map that I use as an overlay, that way I wont have to do the same precise level-operation with all the textures, just replace the curvature map instead.

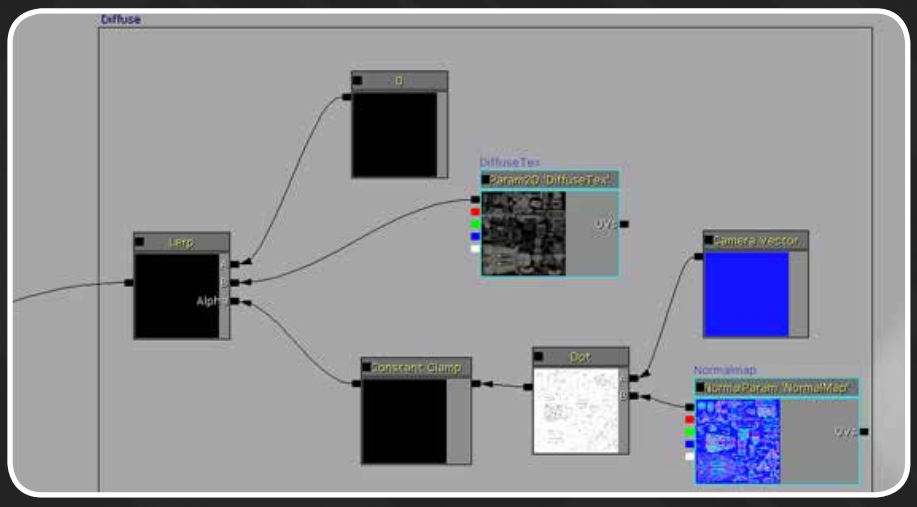
Same thing for some subtle highlighted edges, just a curvature map with adjustment levels on it. I create some groups for the different materials, using the baked color mask as alphas. I also add some basic rust and torn paint with the help of the curvature map and some quick levels to help out the blending. Needs editing of course, but it gives me a quick base to work with. For larger scenes with similar surfaces (like the Scifi Slum I made) I sometimes create an actionscript to create the base texture for me. This saves a lot of time spent copy-pasting bakes and layers. This is what the leg looked like with just base pass textures on it:

The Shaders

After baking out all the maps and setting up a basic texture with a rough approximation of the surfaces, I bring it all into the engine to set up my shader. In this case, it's UDK. I do this because depending on the surface you are trying to achieve, the shader and the texture have to work together. Changing how the shader works often means you have to change the values of the texture, and since this is a pretty complex model with several textures, I don't want to iterate on the textures since that would take far too long. On this model I only had two materials to really separate between, the metal of the shell and the metal of the bare mechanical parts. Since this is a cinematic model with really high polycount and texture size, I didn't really hold back on the shader either, but I did nothing really crazy. The shader landed on 137 instructions, which is pretty high but it could easily have been optimised if needed.

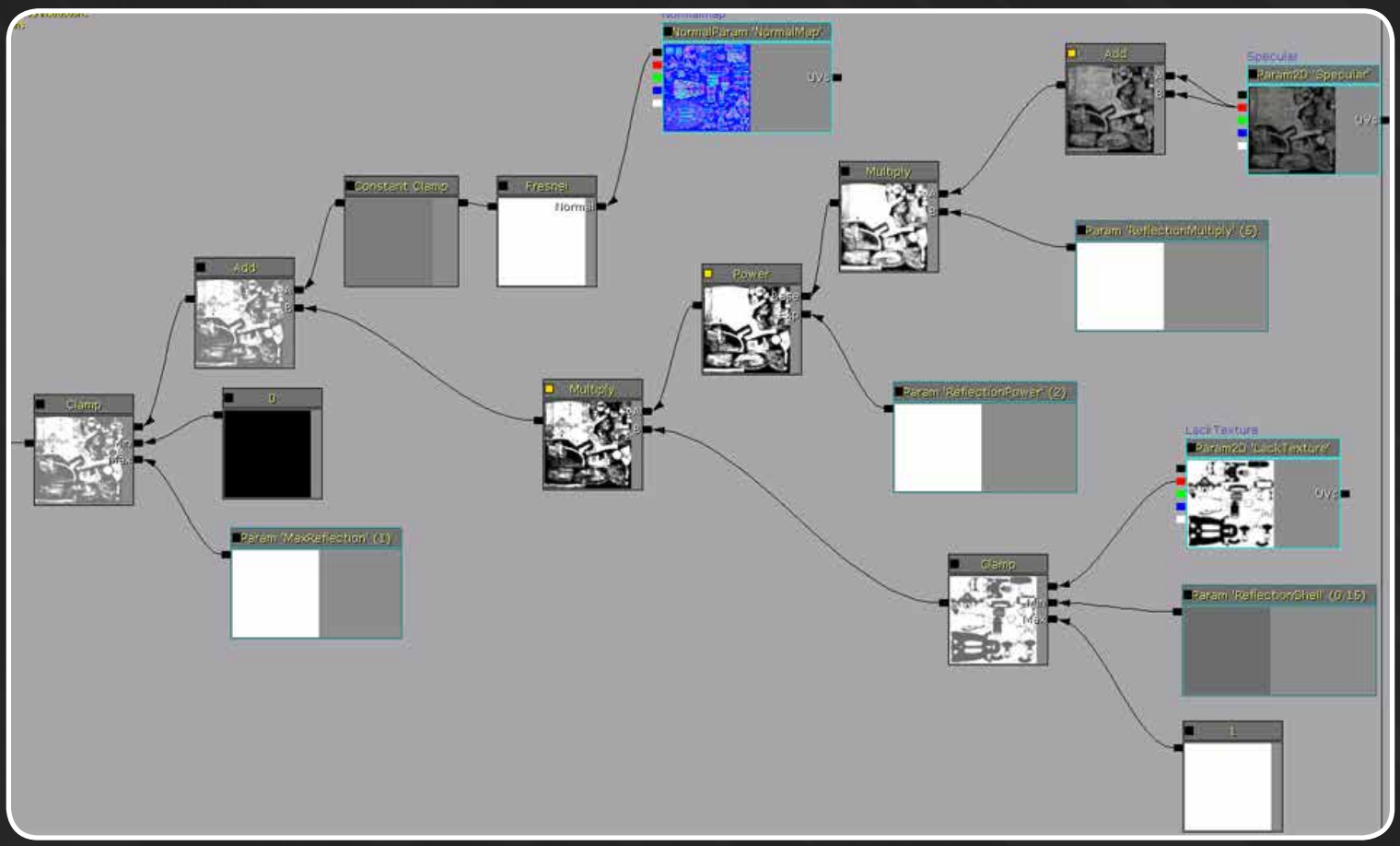
In the diffuse channel I used a lerp with the dotproduct of the normal map and the cameravector, to darken the falloff a bit. There is a normal map, and a detail normal map. Nothing really spectacular going on there, pretty sloppy detail normal, but I liked the crisp normal map detail so I kept it. The reflection is also pretty straightforward.



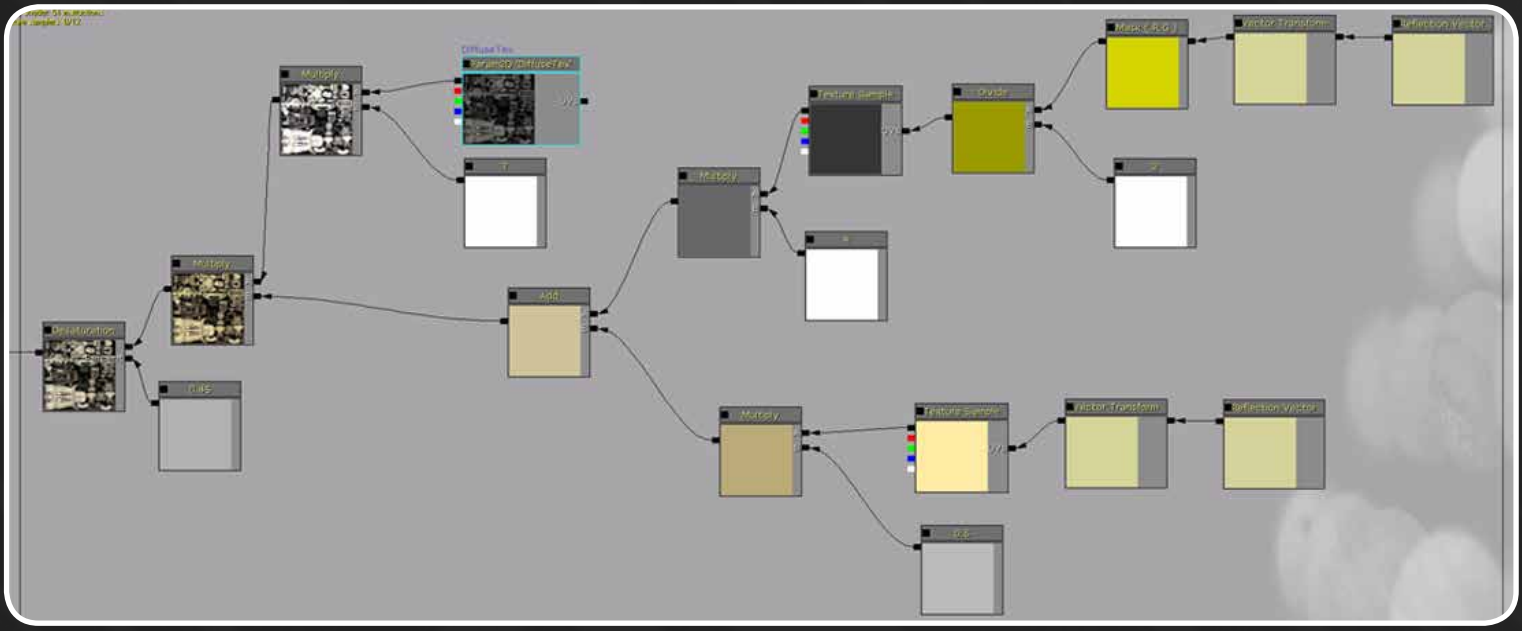


There is one section which works as a mask for the reflection, with a number of parameters and masks so I can tweak the reflection in the viewport. Same thing with the specular channel. For the reflection itself it's a cubemap of the environment, and another texture added on top for some fake highlights. I made a mask for the two surfaces, bare metal and the hull, which I use as a mask in most of the channels to help tweak and separate values between the two different surfaces. I also used different diffuse powers, the harder falloff on the bare metal helped the feeling of more oily metal, I think.

I used a lot of parameters to be able to control the shader in the viewport for fast iteration times. As a rule, this probably should have been done more properly in the textures, but I find that this works faster for me.



I created a master shader for the mech, then I made one instance of that shader, and then instances of that instance for all the materials on the mech (uh, sounds silly, but yeah.) This way I can adjust the values for the first instance and all the materials will update in real time in the viewport and makes tweaking a bit easier. If it's just for a specific render it's even better because then you can just set up a scene and tweak values until you are satisfied. Super cheaty but don't tell anyone! After setting up the shader it was just to finish up the textures, but I wont go too much into detail there as the texturing was pretty basic. I used the base I had from before, hand painted the rust a bit better, added some minor dirt and decals, and that was pretty much it actually.



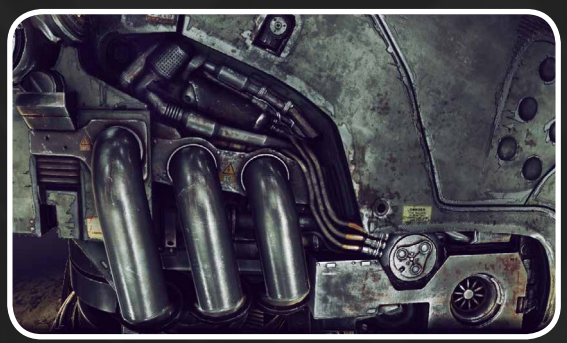
The Postmortem

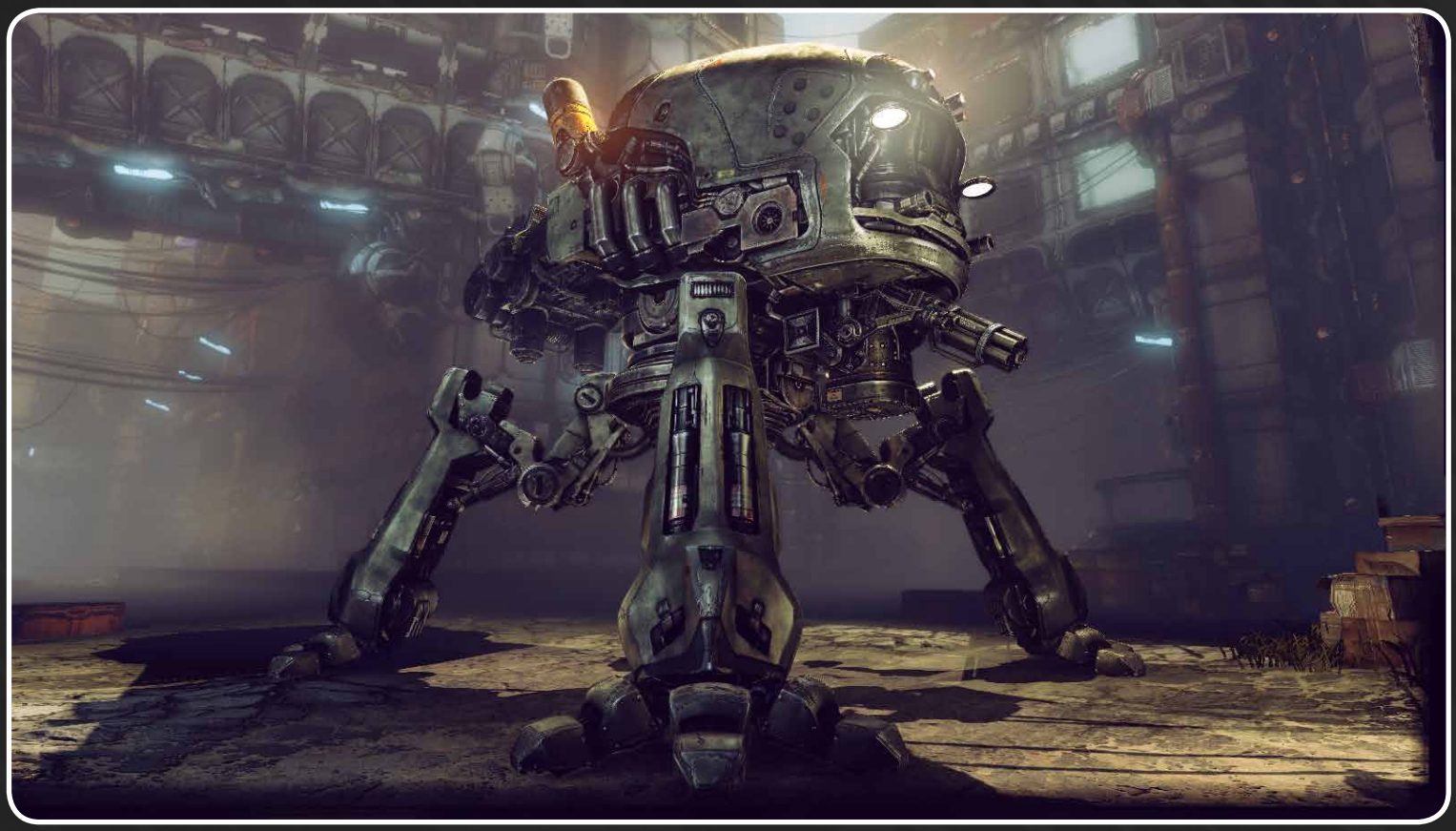
So, by the time that I actually finished this model, and this little article, I of course already have a bunch of things that I regret/wish that I had done differently. I thought I might as well share that too. First of all, I spent way too much time on the highpoly, but in an inefficient way. I should have built more modules to create the highpoly from, to speed up the detailing process. More clever modules for the engine parts etc. By the time I was finished with the highpoly I was already a bit tired of the model, which is never a good thing. I also (as I always do) did not block it out enough. I should have worked more with the shapes before I started detailing, but you can only keep me from the bevel button for so long! I also made the textures too big, by working in 4k resolution. This was not a mistake per se, but my computer was so crappy that in the end it was a pain to work with.

(note to self: buy new computer)

I almost regret the polycount, but that is mostly because I'm used to building things a lot lower poly, and the whole purpose of this mech was to practise more complex modelling. Building things really lowpoly is a challenge, but stepping up the poly-count is also hard, because you reach a point where it's hard to tell where to put all those extra polys you are not used to have.

All in all, I'm pretty satisfied. It was a good exercise and I learned a lot doing it. I hope that this little article can be of some use, and that there are some useful tidbits in it.





About Me

I have always loved games, and loved modding games, but it wasn't until university that I realised that you could actually LEARN this stuff and have it as a profession. I studied game art at university. I was lucky and landed a job at Massive Entertainment pretty fast where I spent a few years before heading to People Can Fly to work on Bulletstorm.

Tor Frick
www.torfrick.com

I'm currently working at MachineGames as a 3D-artist. I have never specialised in anything particular, and I try to keep it that way by always looking to work on my weaknesses as a artist. When I'm not working, I'm most likely in the gym or neglecting my friends and doing more 3d, or watching funny GIFs of cats!

A B C
S 16 20 24
F UIC

Jack Monahan

www.gausswerks.com

Avian Defender

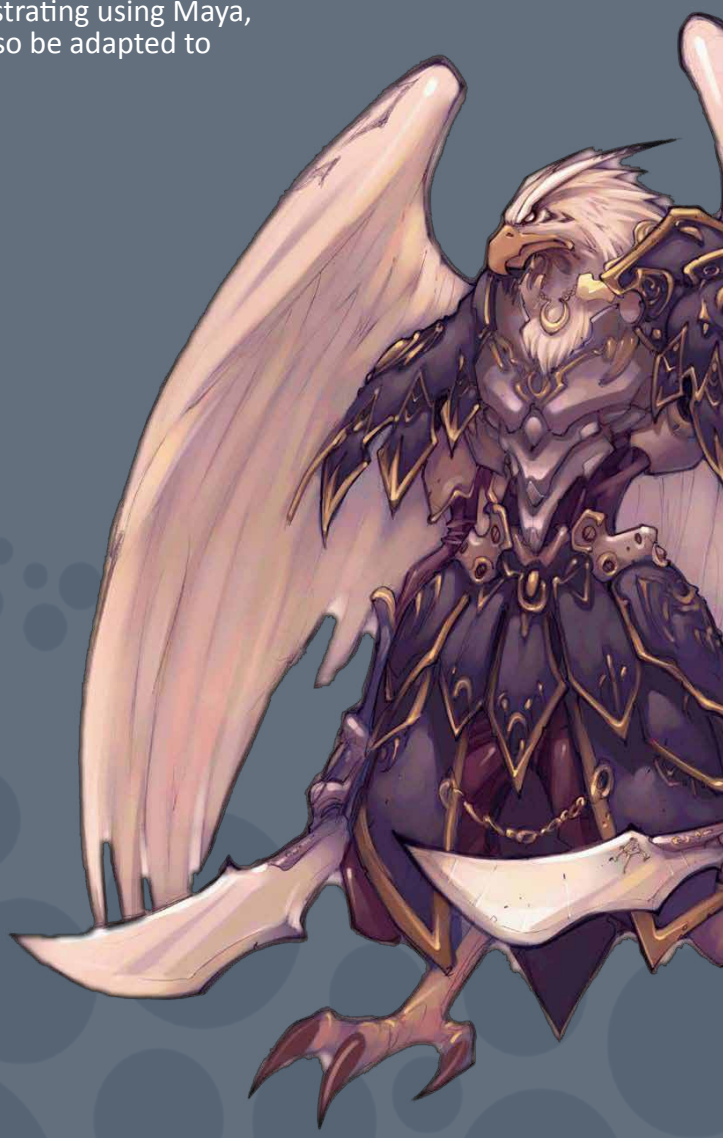
Diffuse Only Model Workflow Analysis By: **Hai Phan**

This is an overview of how I approach hand painted diffuse only game models using my Avian Defender model as an example. I'll talk about my workflow and preferences followed by an analysis on where I feel the model could have been improved. This was written with the intermediate artist in mind and presumes prior knowledge of modeling, texturing, and general art terminology. I'll be demonstrating using Maya, Bodypaint, and Photoshop, but the ideas presented here can also be adapted to other software as well.

First, what are diffuse painted models and why are they still relevant today? Diffuse only painting is a method for texturing low poly game models in which most, if not all, of the visual information must be communicated through the diffuse texture map. It was essentially born from technical limitations (low polygon counts, primitive shaders/lighting/rendering), but has developed into a stylistic choice that has defined the art style in some games (Blizzard titles, for example).

When everything is hand painted, the artist is called upon to make important decisions on how the model will look because of how little is relied on in the game engine renderer. It is akin to painting an illustration on a 3d model that must look good from all angles. Obviously there are differences in how you would author a diffuse map for a normal mapped model with fancy shaders, but I believe having diffuse painting experience can be helpful going forward. The fact that you must learn to paint almost everything on a diffuse only model will give you an appreciation for finding ways to create more pleasing and readable "next gen" textures.

The beauty of diffuse painting is that it can be easily edited at almost any point. Even after you've finished the model it's easy to edit the mesh, tweak the UVs, and reproject your texture on to a new model or swap pieces and move your texture around. Because most of the details are painted you can also make quick variants of the same model that look very different. In short, diffuse only models are a very efficient and adaptable way to produce game assets.



Concept By: Joe Madureira

Joe Madureira was asked what he thought about the model and he said.

"I jazzed in my pants"

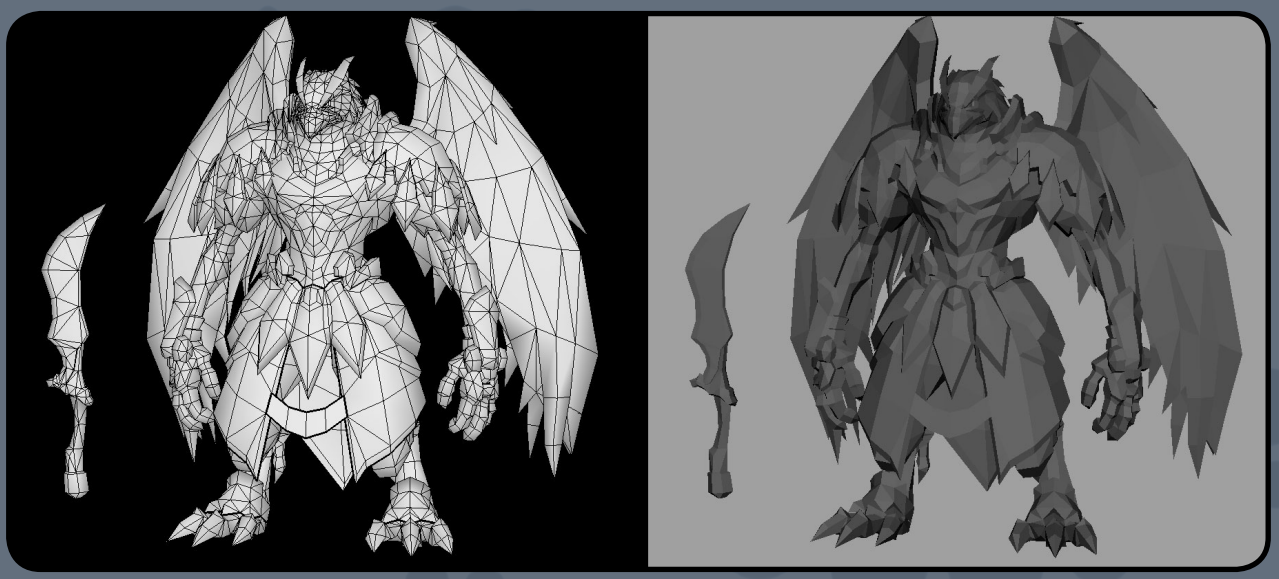
MAD!

Modeling and UV's

Push the silhouettes where possible and make the most of the polygons. Exaggerate, taper, curve, flare. Straight edges can be cool in some cases, but breaking things up can impart an organic feel that is often appealing

I won't go deep into modeling because it's beyond the scope of this guide, but there are a few things I'd like to mention:

- **My model is around 6 thousand triangles which is a rather generous number by the standards of most diffuse only games. The higher the polygon count is the less you may find yourself needing to paint. If you go too high then you start to lose a lot of the flexibility afforded by the diffuse only painting approach, and it would become purely an aesthetic choice.**
- **I see a lot of people getting hung up over triangles versus quads, but it's really not that big of a deal in most games. It basically comes down to deformation. As long as you have edges that accommodate bends then it becomes more a matter of quads being easier to deal with for some polygon edits and triangles being a good way to optimize shapes. There are a ton of arguments out there regarding this, but there's a time and place for both and you'll get a better sense for this with experience. There are definitely some "standard" ways of creating edge flows in various parts of the body, but trying to boil things down to "triangles are bad" is just ridiculous.**
- **When making any kind of model it's important to consider how it will be seen most of the time in the game. Typically this means the model should read well from a distance, and some exaggeration of the silhouette can help a great deal even on realistic models. Because of the stylized nature of the concept, I decided to model and bulk out as much as I could such as the feathers and armor bits.**
- **When working with low poly models, I personally like to start by keeping all the edge normals hard. I find that this faceted view of the model makes it easier to see how the form is coming along.**
- **I don't worry about finalizing which normals become soft or hard ("smoothing groups," if you will) until the very end because it doesn't really factor into how I paint textures.**



Final wireframe. Faceted view to more easily see the forms while modeling.

UV'S & Details

- I couldn't justify asymmetry on this model so I kept everything mirrored. You should always build with a plan in mind on how you're going to most effectively handle the UVs.

- You can see that my unwrap is all over the place with UV shells rotated every which way. Because I knew I would be doing most of my work in a 3d painting program, I was less concerned with keeping things upright and laid out for easier painting in 2d. However, rotating your UV shells can be burdensome for some people so plan ahead, and it's a good idea to place and group your UV shells somewhat logically.

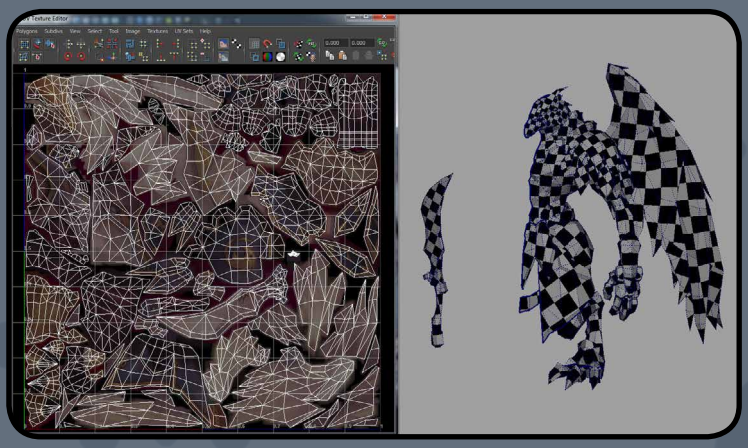
- I try to avoid flipping or inverting the UV shells. It's less of a problem in diffuse only models than with normal mapped ones, but keeping things oriented consistently can save you some confusion later on.

- Have as few UV shells as you can get away with. Fewer seams means fewer headaches, even in a 3d painting program. I'm okay with splitting off awkward pieces to fit things into the UV space better, but too many pieces becomes more difficult to manage and is less optimal for performance.

- It's good to pack UVs in as well as you can, but leave some breathing room between UV shells. This will allow you to pad your texture to prevent mip mapping problems and can give projection painting space to do its magic when painting across seams.

- Some minor distortion is a fact of life in UV unwraps so embrace it and use it to your advantage. Got an awkward part of the UV shell that is actually not very visible on the model? Don't be afraid to adjust those UVs to make room for more important things. Another good example of a place where some distortion might be okay is when unwrapping a face and keeping it so that the face isn't completely relaxed and difficult to interpret. Sometimes a little purposeful distortion makes it easier, and if a little "cheating" here and there helps you achieve better results then go for it.

- Another great thing about diffuse only models is how easy it is to stack UVs and reuse textures painted for one purpose for another. I didn't do a whole lot of that on this particular model, but there are areas where I definitely could have such as some of the armor panels.



Texture & UVW

- I know some people are pretty adamant about maintaining even texel density throughout a model, but I personally have no problems with adjusting the size of UV shells. If you look at almost any great painting you'll see that artists spend more time detailing focal points and leave unimportant areas more suggested. Allotting your UV space with this in mind can allow you to approach your model in a similar fashion. Of course it's possible to go overboard, and a realistic art direction may call for more even distribution, but it's something to consider.

Model Break Out

At the end of the day the point I'd like to make is to be flexible. Accept that your models will have problems until you gain more experience. Don't let not knowing the "right way" to do things paralyze you from moving forward. Your first priority is to make a good looking model and the way that looks best is probably going to be okay as long as you learn from your mistakes for next time.

The Setup

At this point I bring the model into my 3d painting package of choice, Bodypaint, for scene set up. Here's a list of some things I like to do:

- **Split the model up into parts to make things more convenient to paint (selectively hide meshes). I'll even duplicate mesh pieces and edit them such as opening mouths, removing faces that conceal tight areas, etc., and place them off to the side.**

  All these parts will end up using the same material and diffuse map so I can quickly jump to other meshes to work on difficult areas knowing that it will update on the original model.

- **Apply a material to my meshes and hook up a PSD file with the UVs on a layer for reference. Bodypaint has its own UV view, but I tend to jump back and forth into Photoshop as well.**

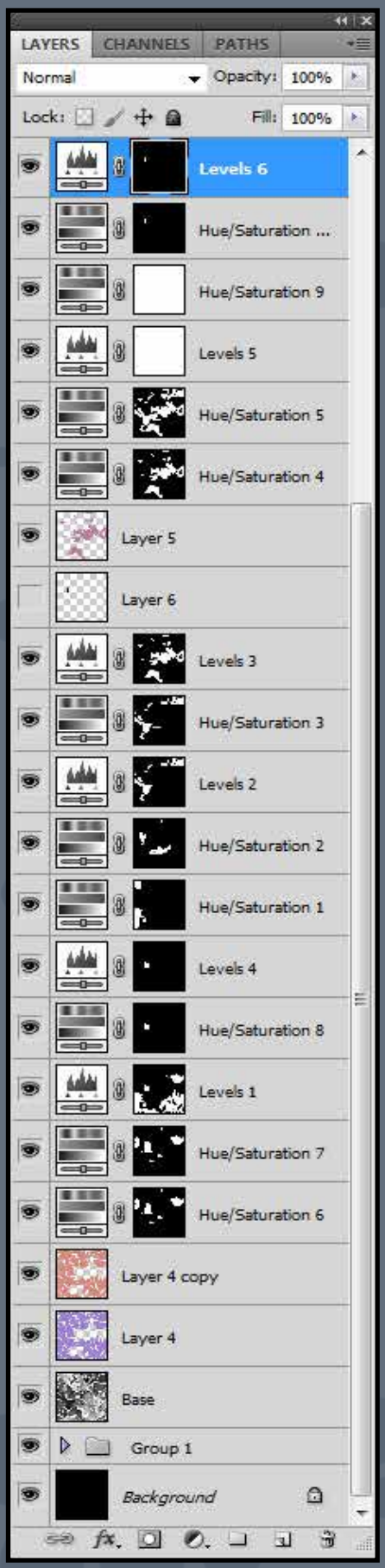
- **Set the object axes on the meshes so that the camera will pivot around the meshes' centers, and adjust the focal length if necessary (I prefer more telephoto).**

- **Set the viewport options to disable painting on backfaces and switch to Constant Shading mode, which is essentially a full bright or self illuminated view of the model (I also preview the model in Maya this way with Use no lights in the viewport's lighting options, or adjusting the incandescence of a lambert shader, or use a surface shader and adjust the hardware texturing options, etc.).**

  This kind of view is essential for diffuse only models because if you can make your model look "finished" in this view then you can have more confidence that the model will look great in most game situations.

Once the model is prepared I'll start painting anything on the model as soon as I can to test out if there are going to be any problems with the way I unwrapped the UVs or if there's something about my set up that is going to annoy or hinder me later.

As I said before, it's easy to fix these kinds of issues with diffuse only models, but it can still be frustrating to have to do so in the middle of painting.



Painting Notes

Your results may vary, but I would spend most of my allotted time on the painting stage. Let's say I have to finish a model in 5 working days. I would spend no more than 1-2 days on the modeling and unwrap and devote 3-4 days on the texture (of course, the geometry and UVs can still be tweaked whenever you like). The texture is king so it makes sense to plan for it to achieve the best results. It's hard to say how much time I really spent on this particular Avian Defender model, but I think I completed the modeling part in a weekend and then spent 3 sporadic weekends/nights painting.

I painted my texture at 2048x2048 with a target of 1024x1024 for the final. There are good arguments for painting your textures at the targeted resolution, but I tend to think that approach was more beneficial in the days of lower resolution textures. I'm fine with painting at double size and scaling down with some modest sharpening. It's comforting to have a higher resolution texture that you can potentially manipulate and work with more freely in the future.

I prefer working with as few painting layers as possible. It's essential for me to collapse layers and move on constantly otherwise the restrictions of maintaining a layer hierarchy can make me reluctant to make big sweeping edits and push the work artistically. I don't want something that's supposed to be painterly and organic to feel like it was composited and manufactured.

It can be a scary thing, but you should ask yourself, how bad would it really be if you didn't have those layers? Especially on a painterly diffuse model so much can be communicated with just a few strokes. If you're obsessing over details at the pixel level and preserving layers then everything you do is going to take longer and be more stressful with little to show for it.

No textures or lighting -> AO baked on facete

Of course this isn't to say that a single layer is what I would deliver in the final, especially in a team environment. I create and save masks of areas that need them so they can be worked on in isolation if necessary. Also, more realistic art direction may dictate that you keep noise and overlays on easily editable layers.

A word on brushes and settings: I typically don't use fancy brushes. That's not to say that I have a problem with them- in fact, I should explore them a lot more, but for general painting I often use a simple hard edged brush with opacity pressure. I don't use brush size pressure unless I'm drawing lines, and I never have brush size AND opacity pressure on at the same time.

I use soft edged brushes sparingly, usually only when making large, soft fades on the model where subtle gradients are desirable. Be careful with soft brushes for blending colors because the result can be too smooth and lack natural texture. Soft brushes also inevitably lead to a blurry and indistinct look to your work which is usually bad. Remember that an artist should appear confident and determined with each stroke because that can affect how the viewer perceives the final product.

In Bodypaint I change the default brush shape from circle to rectangle because I like the hard edge and I find that, with opacity pressure, I can get an interesting structure to my blends. I like that Bodypaint also allows me to soften the rectangle shape which lets me blend without being too smooth.

And so it Begins

On this particular model I baked an ambient occlusion map as a base to start painting from (sometimes I don't do this at all and instead start painting soft shadows to flesh out the form myself). There are a variety of ways to generate an AO pass, but the gist of it is that I use the same mesh for the source and target with a floor plane under the model to create a directional effect to the "lighting." I probably used Xnormal to generate this AO, but Maya's Transfer Maps could do the trick as well.

I baked the AO with a faceted version of my model (no soft normals) because it's more informative regarding the surface planes. Because there is no true high resolution source mesh the AO would have been very soft and indistinct if I had averaged the normals. The AO pass is optional of course- by the time I finish painting the texture there will be little evidence of it left, but it's nice to have a reminder of where the forms are and the shading can give me hints on where I might want to go even if I end up changing it. Plus, it's a convenient way to just throw something on the model and lessen any intimidation of starting from a blank canvas. There isn't anything sacred about the generated AO and you can, and SHOULD, adjust things to create the best diffuse map.

ed mesh -> Initial value pass

There was a time when I'd jump right in with colors and details, but these days I'm more methodical. I try to establish the values first, and I only do rough block ins of shapes and details. I normally don't fully flesh out details in greyscale, but I try to get to a point where I feel like I've got a plan on how to proceed. It may be tempting to gloss over this part, but I try to really think about how the texture reads. The baked AO was way too strong in places for my tastes so I had to find a compromise that still gave the model dimension without making it look too awkward in extreme poses.

I painted the texture almost as if the light is coming from the front (and back), leaving the sides somewhat shadowed. You might think that this would make things look weird when viewing the model from side view, but I think if done carefully this approach can really add dimension to your diffuse only models. You can see this in action pretty clearly when comparing early character art in World of Warcraft with their more recent stuff.

Color & Gradients

After I've established the values I add color to the model. There are various ways to do this, but the way I tend to go with is to put my value layer on top and set the blending mode to multiply and paint the local colors on a layer below that. At this point I will have a layer that consists of flat colors that I can use as a starting point for masks to isolate areas later on if necessary.

I then colorize the value layer to something a little lighter and more saturated to get rid of the dullness that a straight multiply gives. I typically strive for some kind of hue transition from light to dark (gradient map adjustment layers also work well for this). Try to avoid simply darkening and lightening the same hue.

This is just a starting point, and I will definitely be changing things from this automated method of introducing color. Depending on the material, how the colors change from dark to light, or simply from one end of the shape to another, very interesting things can happen in the transitions. Push the hue around and experiment.

Very soon after this I flatten my painting layers and start to fix areas where my initial process didn't do a good job with. As you can see, the initial colorizing process screwed up my values. It also introduced a red cast to the model that I tend to find appealing, but it will cause me problems later.

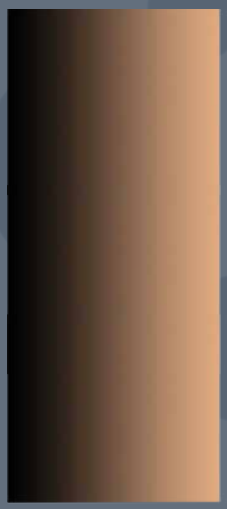
Here I was a little more careful and brought back the darker values and blocked in some details all around the model. I spend some more time on the head/face in order to set a bar for the rest of the model. It's not final, but it's far enough along to set the attitude for the piece.

I try to bring the whole model to a certain level of finish in passes. It's easy to get tunnel vision and detail out areas that no one will pay attention to so keep an overall view on how your model is progressing as a whole and do work where it's needed most (this is where painting in 3d is very useful).

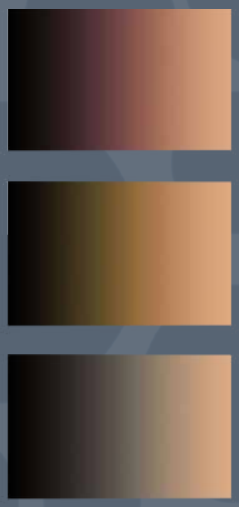
You'll be able to block things out with better accuracy and can maintain consistency more easily than if you were to bring each piece of the model to a finished state one at a time. It also gives other people a chance to evaluate your progress and will make early edits much less painful.

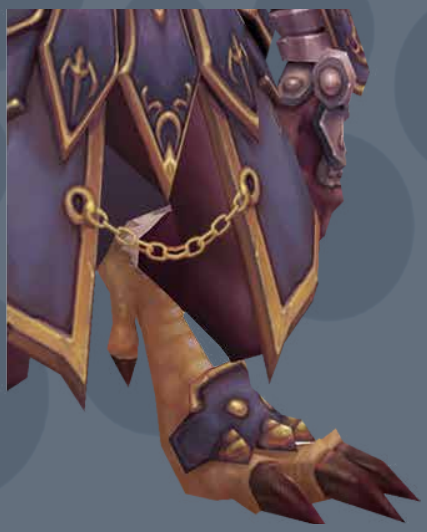
Because your model will be relying heavily on the diffuse you will need to give it dimension by painting in lighting and shadows to bring out details. A lot of people underestimate just how much you really need to paint. If it doesn't look awesome full bright/self lit then it's not done yet!

You can't get away with just filling in solid colors with some simple overlays. Look at your reference and paint until it conveys that feeling. If you don't have much painting experience then this is going to be a painful process at first, but once you get a better handle on it then it will help you immensely as a 3d artist.



Flat Transitions





Color Transitions

Contrast and Details

It's still too washed out so I add more contrast to bring out certain areas and help details read more clearly. I had put myself in a position where I was gradually feeling out for the boundaries on the contrast which is exactly what I was trying to avoid by doing the values first!

I start to detail out the rest of the armor and pump the saturation back up in certain areas. I'm referencing the colored concept heavily at this point. I work on trying to make sure the different layers of armor are readable and not too busy or cluttered. Adding too much visual noise is an easy trap to fall into so it's important to zoom out and examine the model from a distance. Try to evaluate what kind of edits you need to make it better as a 2d image and then try to work that into the texture.

The entire character is your composition, and as with any composition you want to attract attention to some areas more than others. I sometimes make the head/bust area slightly brighter not only because it draws the eye, but also it gives the model dimension and scale. If the model were evenly lit then it creates an impression that the model is small (if you put a light on a real person there would be more fall off than if you put the same light on a toy figure). As with anything though, a little subtlety goes a long way, and you don't want to do stuff that ends up being distracting. Contrast attracts attention, and remember that contrast isn't just about values. Differences in hue, texture, amount and shapes of detail, etc., are all things that need to be balanced carefully.

Contrast

Color DIfferentiation

Blockout Details

Large Details

I revisit the contrast and try to push the forms created by shadows and light. Eventually I find that sticking too closely to the concept was making the temperature of my texture too warm overall. I adjust this balance and start finishing the smaller details.

I completed the wings and weapon last partly because I wasn't sure how I wanted to handle them, but I got some ideas after finishing the other parts. The wings were kept somewhat simple because I didn't want them to overpower the rest of the model. Notice the differences in hue and value from the top of the wings to the bottom, and how the weapon is just a little brighter towards the blade tip.

Closing Thoughts

One of the toughest things is to know when to stop painting. Rather than rendering things out perfectly to conceal the artist's hand, some master painters would use fewer, but more purposeful, brush strokes that would create an effect that would engage viewers. I'm far from that level of painting, but it's something to strive for with hand painted diffuse models.

Study paintings and illustrations in detail. Note how color is used because on close examination what you find may surprise you. There is often way more color than you might expect, and there may be colors in there that you might have never thought would work. Hand painting textures gives you the freedom to make these artistic choices that viewers can appreciate even if they don't realize what they're seeing.

A common mistake I see in textures is to treat each part of the model with the same ranges of contrast. It's too simplistic to think of it as "raised/lit = bright, and recessed/shadowed = dark." Look at the darkest parts on my model and you'll see that it's NOT on the wings. The wings are basically white feathers and light colors will reflect on themselves keeping their shadows lighter overall.

Of course it's possible to create dark shadows in extreme conditions like very harsh lighting, but that's not the case here. It works the other way as well with very dark objects not getting very bright unless there's some specular hot spot or reflectivity. Shiny metals will probably have more contrast because of how much of the environment it reflects, and duller materials like cloth may have a smaller range of contrast.

This leads to another problem I see which is losing the overall forms because of contrast from details. This happens a lot when artists aren't using references to remind them of how things behave in reality. You could paint your details beautifully, but if they aren't sitting on the form convincingly then it's wasted. The details need to be lit as part of the whole object, and not treated separately. Break your forms down into simple shapes, and don't let details take over the general shading.

Diffuse only painting is very adaptable and you should never feel like you've painted yourself into a corner, so to speak. In this day and age there are ways to get around almost every problem and the willingness to do so by taking risks and suffering the consequences can make the difference between an average model and a great one.

Post Mortem

This Avian Defender model is probably still the thing I'm best known for, but it's far from perfect. Let's take a look at some of the things I think could have been improved:

Contrast: Even after all that talk about contrast, I could have used more in some areas. Contrast is something I've historically had issues with, but I probably could have avoided some headaches on this model if I had stuck with my initial values more closely.

Model complexity: Although I always have the rigging process in mind when modeling, I admit that I favored the model in this case. Especially considering this is a diffuse only model, I probably could have gotten away with streamlining things more.

Following the concept: I think I did a pretty good job sticking with the concept, but I added some of my own ideas like thickening the feet and tweaking the colors. I think the thinner feet looked odd in 3d, but I hate using that as an excuse and should have explored that direction more. I also thought adjusting the colors would make things easier to read, but it does change the overall feeling of the model. I left off the rune designs on the wings, but I think that's just because I forgot all about them or I subconsciously didn't want to make up a design because it's not completely visible in the concept. I made up the design on the back of the armor, and it's not quite as successful the chest design in front.

Color temperature: The "white balance," to put it in photographic terms, is still a bit on the warm and pastel side. It's definitely my personal preference affecting my judgments. It would probably have been a better idea to keep the texture a little more neutral and rely on game lighting to establish mood. Even though it's a stylized model, varying the color temperature could have also helped the believability of the textures.

Use of alpha: The bit of chain on the skirt presented an annoying problem because it's tough to say if something like that justifies the use of alpha. If the answer is yes, then the question becomes why I didn't make use of alpha in other areas as well such as the feathers. I think my reasoning in this matter wasn't consistent throughout the model.

Shading: I wonder if I could have pushed the lighting and shadows even further on the textures. Because there are a fair number of details, I think putting a greater emphasis on the lighting could have unified the model and made it more readable.

Presentation: I didn't do much more than take screenshots from different angles. I should have spent time rigging and posing the model myself with actual lighting instead of relying solely on full bright viewport screenshots. There's a lot that could have been done to better sell the character as a character.

About Me

Hai Phan
www.haikai.net

I always wanted to get involved in games ever since the old NES days. Back in the days before the internet the path towards that goal was a mystery and it seemed like one of those cool jobs that "other people" did. I decided to go to the Savannah Collage of Art & Design. I learned a lot and met some great people.

A classmate referred me for a 3d modeling job close to home working on military simulation stuff. I stuck with it for over 2 years but it wasn't really for me so I took another chance and quit, spending a few months making a new portfolio.

As luck would have it, I was able to get some interest from ArenaNet for a Character Artist position. I spent a few sleepless nights working on the art test because it was one of the very few diffuse only models I had worked on up until that point, but it was good enough. I worked there for almost 5 years.

Eventually the rain in the Seattle area was getting to me, and I needed a change. By this point I had already established myself on the internet somewhat, and one of my contacts encouraged me to apply at Trion Worlds where I have been a Lead Character Artist since early 2012.

Tuomas Korpi

www.tuomaskorpi.com

nDo2

nDo2 Workflow Walkthrough By: **Teddy Bergsman**

What is nDo?

nDo2 lets you create normal maps straight in Photoshop. This means you get to create normals with all the tools you already know, while keeping your pipeline clean. nDo2 brings multiple normal mapping disciplines together, and presents a rapid workflow skipping the 3D detour. It can substitute modeling pipelines, or act as a fast and powerful complement to basic high-poly baking.

Luckily, nDo2 does more than just normal maps. Powerful AO, displacement, diffuse, specular and cavity generators are at your disposal, tweakable in real-time and with 16-bit precision. Thanks to what can only be witch craft, rich 3D can be derived from super simple cavity doodles. To top it off, nDo2 extends PS with a 3D previewer, allowing you to preview tweaks without ever leaving Photoshop.

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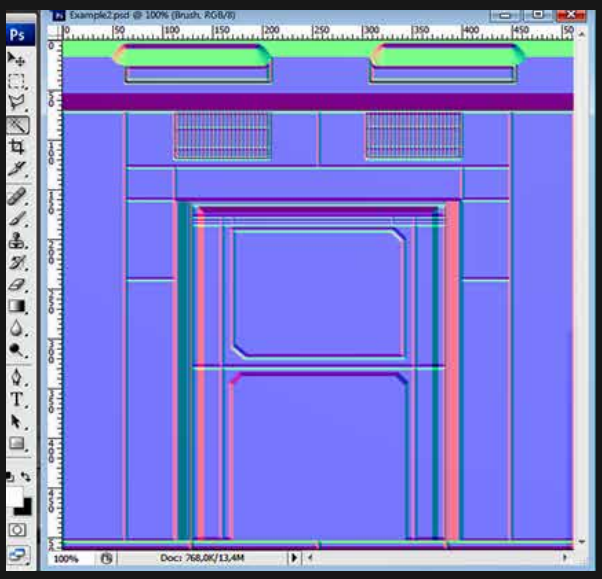
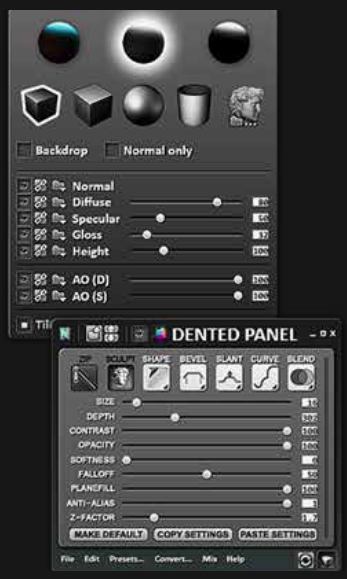
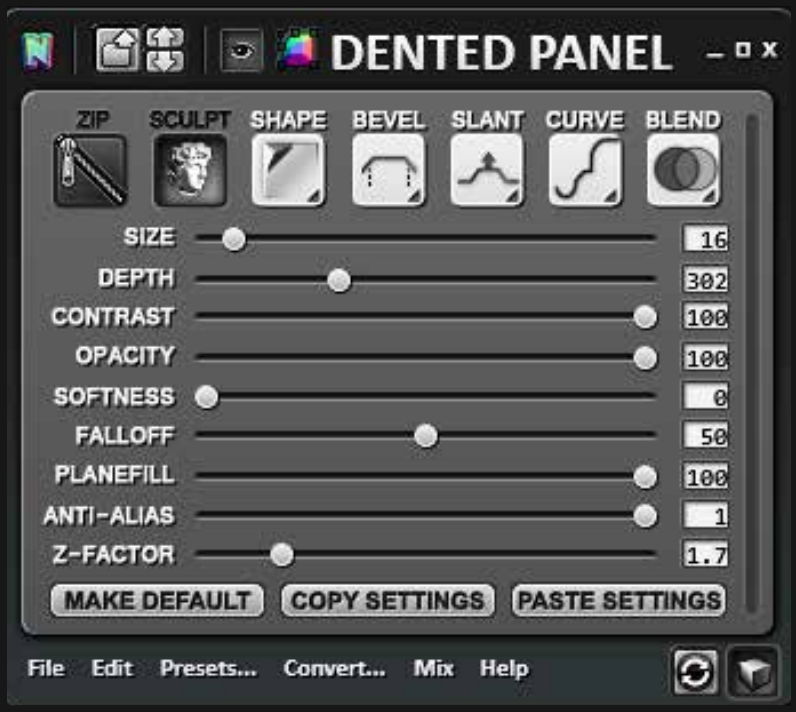
All content created using nDo2
Courtesy of Wiktor Öhman





The UI



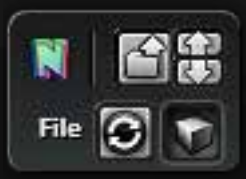
nDo2 consists of two main components – a small, flexible UI, and a floating 3D previewer. It reacts and transforms according to everything you do inside of Photoshop; it's all about letting you create as much as possible with as few UI interruptions as possible. The previewer is designed to boost turnaround, never forcing you to leave Photoshop when studying your results in 3D. It's as simple as can be. Your mesh, fully interactive, smack on the screen.

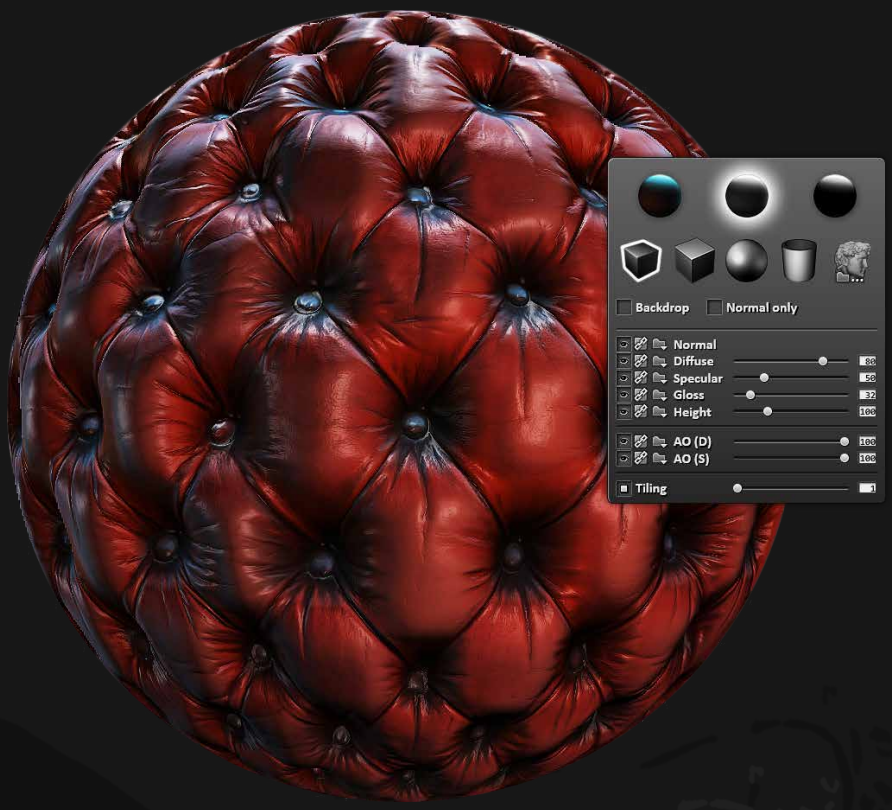
nDo2 morphs its UI according to what you do in Photoshop. For instance, when you make a selection, the UI will present you with options to convert it to normal. Select a group of normals, and a quick-tweaking interface will appear instead.

No one likes digging through menus, so nDo2 provides you with what you need, when you need it. It enables simple tweaking of many layers at once, and advanced tweaking of one layer at a time.

Tip 1: All sliders in nDo2 are snappable -- press Ctrl for regular snapping and hold Shift for double the snap threshold, or Alt for half.

Tip 2: The nDo2 UI is completely compressible. To compress, double-click the top-left N icon, and nDo2 will instantly turn into a small rectangular blob, hiding the previewer in the same instant. The same effect can be achieved by dragging either of the window's corners to size it down. To restore the UI, double click the N again.





The Previewer

The 3D previewer is basically a fully interactive switchable mesh, which hovers in Photoshop. Just like the main UI, it adapts to what you are doing in Photoshop.

When you tweak your maps, it instantly updates, and when switching between normal maps it automatically loads the current project. Also, with its relief mapper, you can always preview your normals in full 3D.

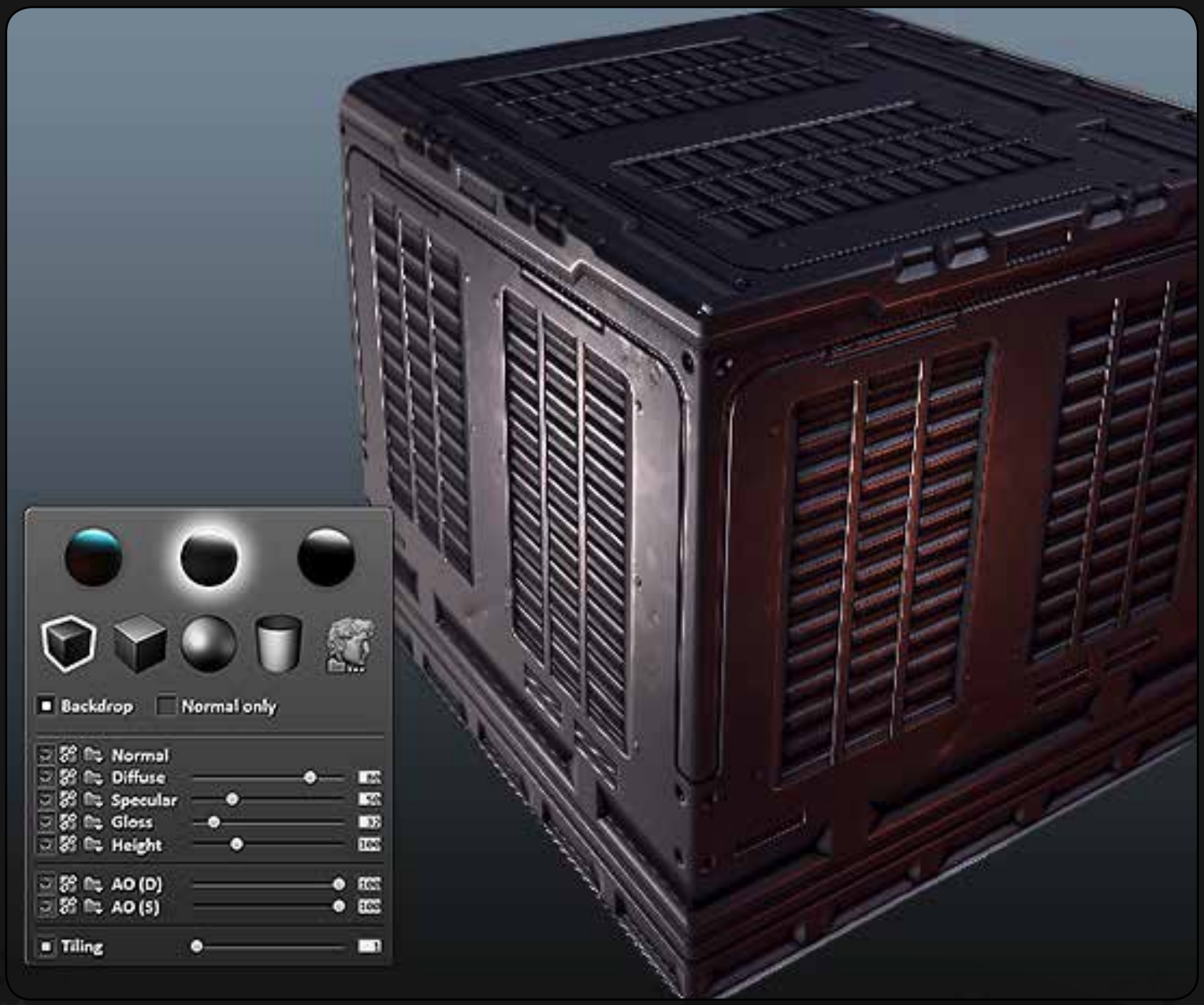
The previewer is full of options – simply right click it to open its context menu. The previewer context menu lets you tweak material rendering settings, hook up maps, toggle the backdrop, and select which meshes and light presets to display.

Tip 1: Texture maps can be toggled in three ways: hidden, killed, and solo. Hiding the map will temporarily disable the texture, whereas killing it will completely toggle off all reflectivity. The solo mode lets you preview pure, unlit texture information.

Tip 2: Map hooking enables maps to be auto-reloaded in the previewer when saved. To hook up a map, first select the desired Photoshop document, then press the desired link button. Now, whenever you save the document, the changes will appear in the previewer. Note that if the document has not yet been saved to disk, it won't auto-reload.

As you tweak any maps that have been generated with nDo2, the previewer will automatically render those updates. As you tweak your height map you will see the previewer reflecting your changes. nDo2 uses a Relief mapping shader to render 3D from height, similar to what is found in many real-time technologies such as CryEngine3. Just like all other map type values, you can tweak and toggle the height value through the previewer context menu.

Tip 3: To switch the preview mesh, click on any of the mesh icons to make it the active one, or press keys 1-4. To load a custom mesh, click the right-most mesh icon. Note that nDo2 will auto-triangulate any non-triangulated meshes.
Tip 4: To change the general tiling factor, simply drag the bottom-most tiling slider. Note that all text box values can be overridden, extending the default range.



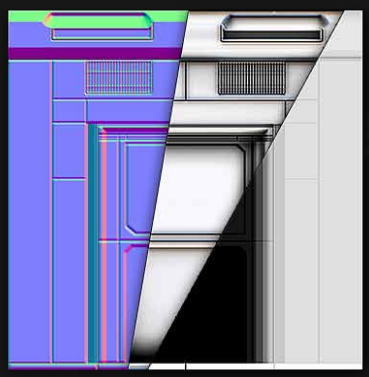
Tip 5: Sometimes it's nice to preview the mesh and nothing else. This is what the backdrop is for. Enabling it dims the screen and shows nothing but the mesh.

Hard Surface nDo2

How to create Hard Surface Normals By: **Wiktor Ohman**

All normals in this example scene have been done with nDo2. It contains tiling hard-surface normals, and basic high-poly normals combined with details made using nDo2. In most cases, modeling can be skipped entirely, speeding up the workflow immensely. In this simple example we'll look into how to create normals in the vein of this scene.

So, let's break down how to create a tiling hard-surface normal. We'll use a variety of creation techniques to create a few basic shapes, and then convert those shapes into normal layers. Then, we'll learn a few tweaking tricks for pumping out volume. Lastly, we'll learn about sculpting and zipping, and top it all off with height, AO, diffuse and specular maps.

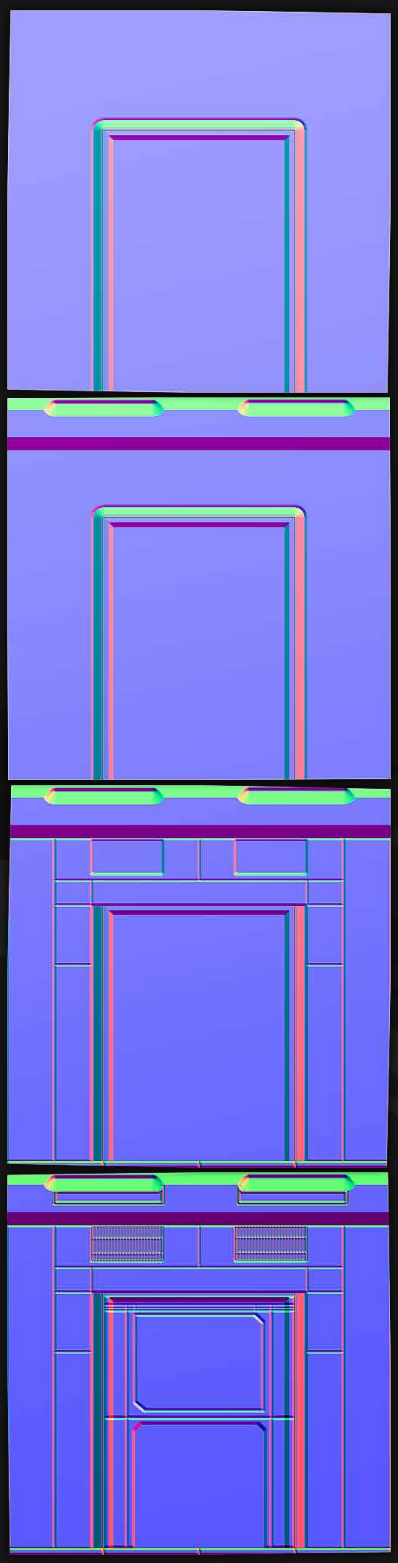


The above normal may look complex, but it's actually just 6 nDo2 layers. The 3D is calculated automatically from the hard-surface normal.

All in all the normal was created in about 5 minutes, and most materials were generated from the normal.

Step 1: Let's begin by creating a new 512x512 normal document. Just press the NEW NORMAL button (shows up if no docs are open), and you're good to go. You can also press File > New normal map or Ctrl+N. Note that a normal document is also automatically created whenever something is converted to normal for the first time.

Tip 1: You can customize the normal channel configuration by going to File > Preferences > Flip normal channels. For instance, checking Flip Y will make your normals compatible with UDK.



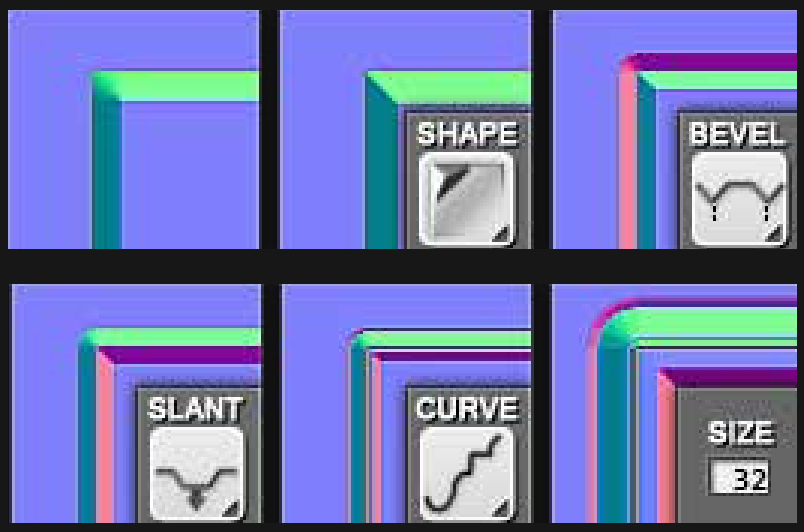
Step 2: nDo2 lets you use virtually any tool in Photoshop to create your normal, from selections and vectors, to photographs and hand-painted details. And once a normal has been generated, it's always possible to re-sculpt its original source, whether it be a vector shape, text or art layer. Whenever a conversion input is detected, nDo2 will display a big CONVERT button.

I'll create the first normal using a simple selection. This is most likely the quickest way you can create a hard-surface normal. Simply design your selection using any of the lasso, polygonal or marquee tools, click the big CONVERT button and you've got a normal.

Drag the selection so that it goes all the way down to the bottom of the canvas. Notice how a NO EDGE BEVEL option appears – toggle this, and the normal will not get any bevels near the canvas edges.

Step 3: nDo2 comes with more than 50 unique sliders and normal tweaking options, letting you experiment with your normals in endless ways. The moment a new normal has been created a tweaking interface will show up. Let's play around with it!

The top row of drop-downs lets you combine and choose between a range of normal Shapes, Bevels and more. The style I'm going for with this normal is a door frame kind of bevel.
I want it to be hard and crisp, so I set its shape to Chiseled Shallow. I want a furrowed look, so I set the bevel to Groove.

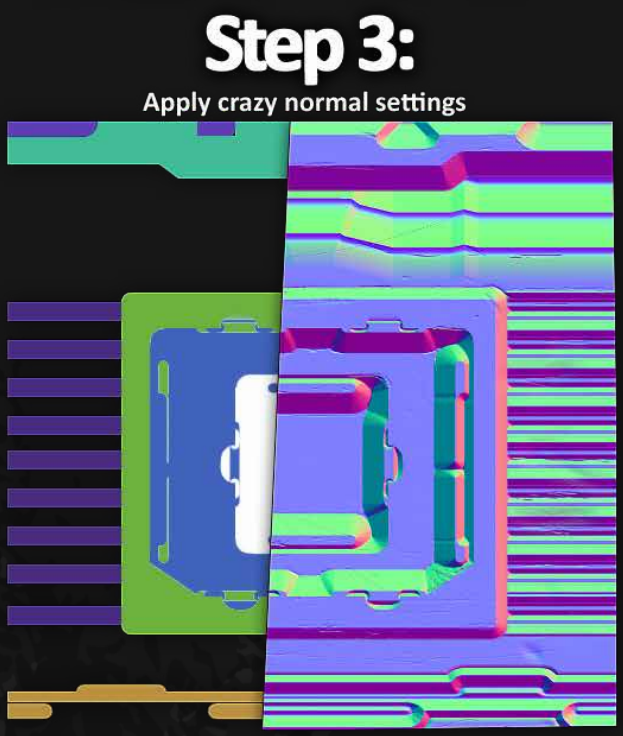


I'll also change the Slant to Down, making the normal point inwards. To finally get the multi-beveled look of a door frame, I'll go ahead and set the Curve to something funky like Terraced.

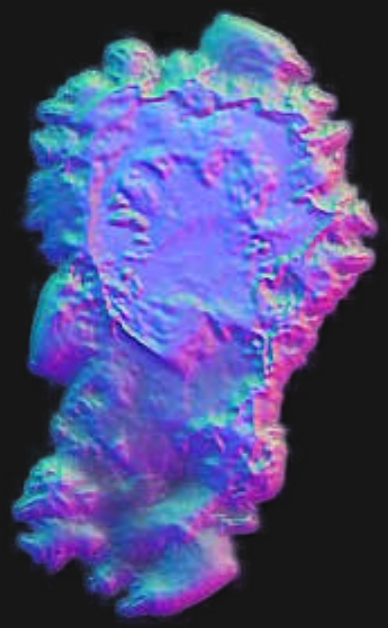
The sliders enable fine-tuning of more general settings, such as Size, Softness and Opacity. For this normal, I've set the size to 32 pixels, and left the rest of the sliders untweaked.

Depth and Contrast are similar to each other -- low values produce low intensity, but the difference is the depth slider also relaxes the normal bevel at low values. The Falloff controls the tightness of the normal bevel -- low values result in a sharper curve, high values yield a smoother, more relaxed curve. Planefill controls the opacity of the part of the normal which has zero angle (i.e. anything blue).

Tip 1: Curves offer a great simple way to add to the complexity of your normal, by transforming the slope of the bevel. They also reduce the need for combining multiple normals to produce multi-faceted bevels. You can achieve some pretty crazy results with curves, like in this simple but extreme example:



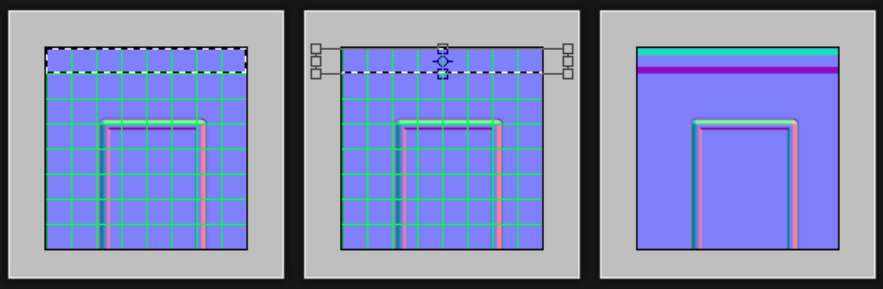
Look past the horrifically nonsensical dev-art, this example simply aims to show that crazy volume can be easily achieved from just 6 very basic layer masks. It is NOT art!



Step 4: The sculpt mode lets you use the full capacity of Photoshop to paint your normal in real-time using any PS brushes, and lets you edit the source of a normal at any time (such as the vector that was used to create it).

Sculpting lets you preview and tweak your normal properties as your normal is being painted. It's just as easy to sculpt organic details as it is sculpting hard-surface stuff. The normal settings of a layer can be tweaked at any time, even after the normal has been painted.

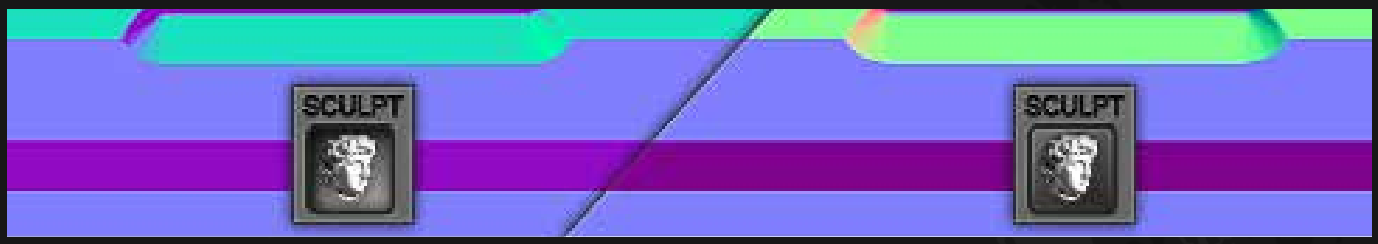
For our next normal, I want to create a new sculpt layer from scratch. It should be a bulky and tileable top trim, with a bit of carved hard-surface detail.



Creating an empty sculpt layer from scratch can be done by either pressing Ctrl+Shift+N, or selecting Edit > New Sculpt Layer. Regular sculpt layers will produce bevels near document borders. To create a sculpt layer with no border bevels, instead select Edit > New Edgeless Sculpt Layer. This is important when painting tileable details, so let's create one of these!

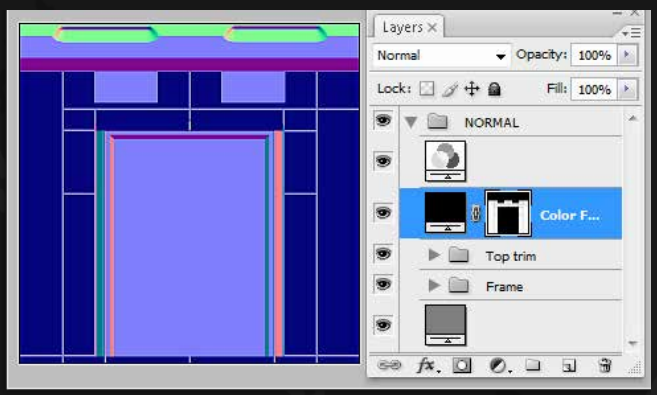
To create the trim base, I make a selection which I transform to extend the canvas borders. I then fill the selection with a random color, and set the normal Size to 16 pixels.

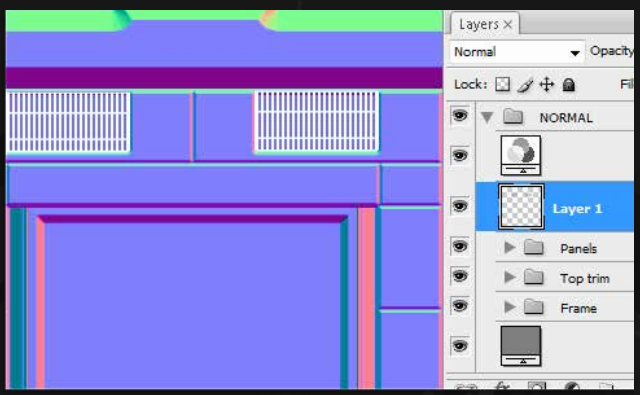
I'll also set the shape to Chiseled Shallow and Anti-Alias to 1. Next I want to sculpt some big carved details, so I select the eraser tool (add a layer mask instead if you want the original pixels intact). With the eraser brush radius set to 1px, I erase two straight lines near the top of the normal, to carve the bevel. I use the eraser, and not a black brush because when sculpting, brush color does not matter. To view the latest sculpt layer edits in the previewer, simply click the refresh icon.



To exit the sculpt mode, click the SCULPT button. This is necessary to ensure that the normal gets the correct colors. To convert any normal element to a sculpt layer again, simply toggle the SCULPT button, and you're ready to start painting. Untoggling turns the sculpt layer back into a normal.

Step 5: REPEAT UNTIL DONE





Panels: I've created the next normal from a masked solid color layer. I've used a Chiseled Shallow shape, an Emboss bevel, and set the size to 2 pixels.

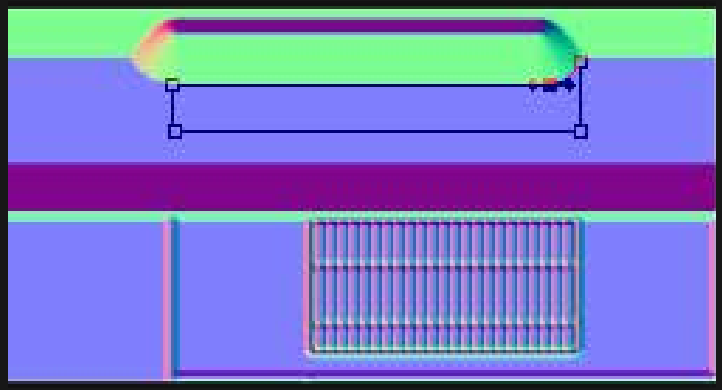
Gratings: Now that all basic shapes are in place, it's time for some detail work. Next I'll add some gratings, which I've created using a standard art layer. Simply create a new layer, paint, and generate. Bright colors will produce an opaque, upward-pointing normal, while dark colors and transparency will both point inwards.

Again, I've set the shape to Chiseled Shallow (optimal for sharp shapes), the size to 1 pixel, and the Blend to Hard light. With nDo2, you can blend normals together with any blend mode Photoshop has to offer.

By setting the blend to Hard light instead of Overlay, the normal will really pop against the underlying normals.

Lights: Next I want to add some detail to the top trim, this time using vectors. nDo2 supports any kind of Photoshop vector, including shapes, closed paths, open paths and text vectors.

Vectors can always be re-tweaked by entering the sculpt mode, and can be sculpted further using an additional layer mask.



I'll create a simple path vector. I'll make sure to close the path by connecting its first and last anchor points. If I leave the vector open, nDo2 will create a normal along the path using the currently selected brush. This is perfect for creating organic details, such as cables and welding seems. When I've converted to normal, I set the shape to Chiseled Shallow, the bevel to Emboss, the slant to Down, the curve to Ring, the blend to Overlay, and finally the size to 4 pixels.

Final details: For the final normal, I'll create a regular sculpt layer. I choose an Emboss bevel, set the size to 2 pixels, and select an Overlay blend. I sculpt some simple door details and call it done!

Easily create both hard-surface and organic environments using nDo2.

Tip 1: Once a normal layer is finished, zip it! This is done by toggling the ZIP button. It is a completely non-destructive process, and greatly boosts performance. Also, file sizes drop significantly, speeding up both saving & loading. A normal can be unzipped at any time.

Tip 2: You can rotate and transform any of your generated normals, and the normal recalculates itself in real-time. Try it out!

Tip 3: To transfer the style of one normal to another, use the Copy & Paste buttons. You can also override the default normal style with the Make Default button.

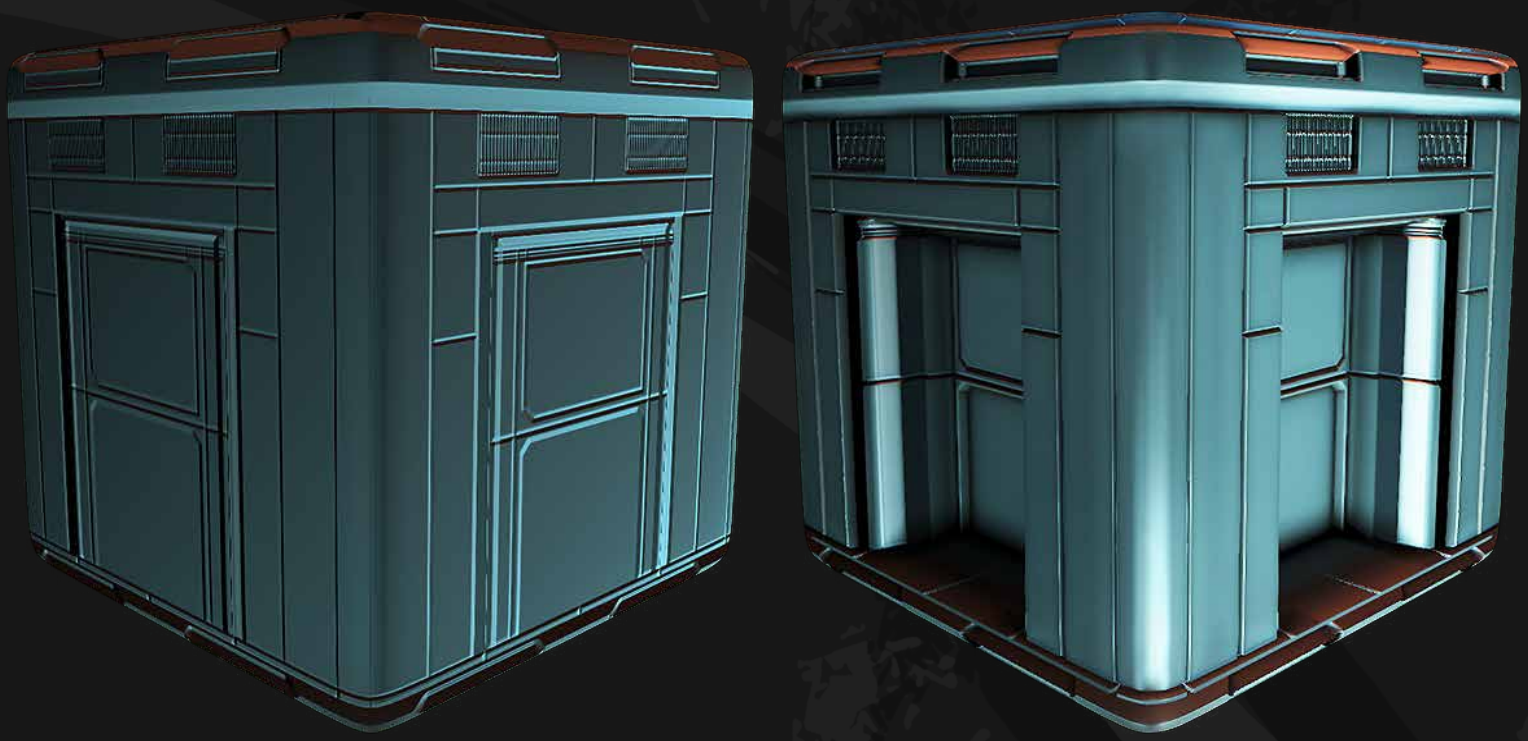
Tip 4: When sculpting, you have more control over your normal than through standard tweaking. For instance, you can apply Photoshop filters (such as blurs and distortions) or advanced transformations (warp transforms, liquify etc.).

Creating Materials

Quickly generating high-quality base maps is an important part of efficient material creation. Luckily, nDo2 comes with a set of powerful and flexible map converters. Normal maps can be converted to Ambient Occlusion, Displacement (organic and hard-surface), Diffuse, Specular and Cavity.

All maps can be generated with 16 bit precision and allow for real-time tweaking, no re-baking required. All converters can be accessed at any time by clicking the Convert... menu item.

You'll notice a few more maps than just normals can serve as input. The converter UI lets you choose between three input types, namely Normal, Height & Cavity. This offers a great deal of flexibility (16 conversion options in total), letting you do things like converting height to AO, or better yet, hand-painted cavity maps to normal.

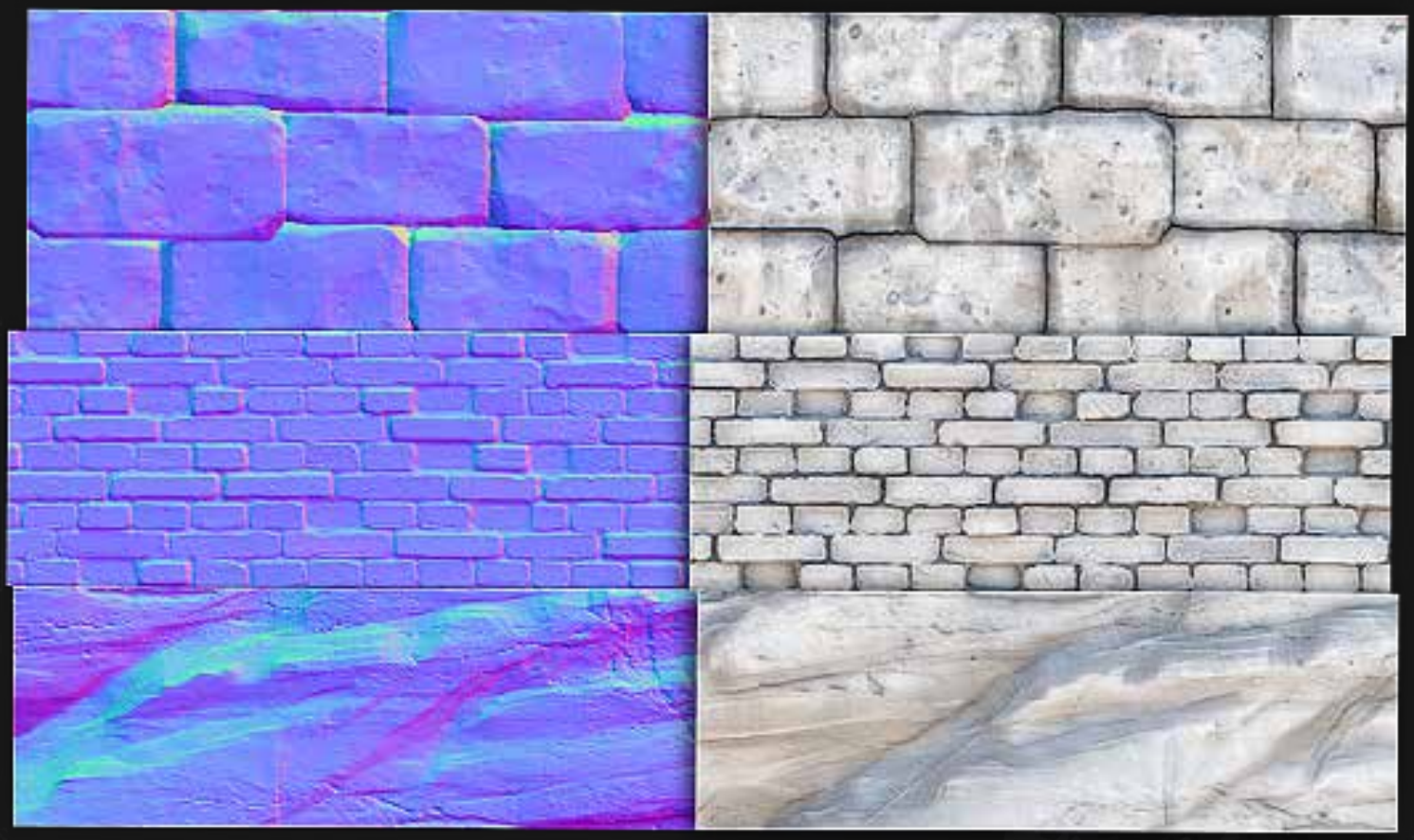


It is possible to generate any combination of maps at once (hold Ctrl to select multiple), and batching multiple inputs is supported. Here's the result of converting our new normal to tileable Ambient Occlusion, Displacement, Diffuse and Specular in one go:

Base materials like these are a necessity, and make texture creation a little less cumbersome. All maps generated by nDo2 can be tweaked in great control. Let's learn more about what can be done with each map type!

Ambient Occlusion

nDo2 offers a powerful Ambient Occlusion generator. It inputs any normal, and rapidly outputs robust AO. The look and feel can be tweaked and previewed in real-time without re-baking, allowing for advanced and efficient customization. Rendering AO from normal is extremely efficient, as all it cares about is pixels, and not hundreds of millions of polygons. Not having to sit through eternal baking times just because of a minor tweak can be quite a joyous experience! To generate the AO map, click the Convert... menu item. As the UI pops up, you'll see that the AO option is selected by default, so just press the Active Doc button, and your Ambient Occlusion will be ready in a few seconds.



When the conversion is done, you will now see your AO applied in the previewer . You can tweak its influence on both the diffuse and specular map via the previewer context menu.

You'll also see a small tweaking interface – go ahead and drag the sliders around! The sliders allow you to quickly balance the opacities of three different AO elements, namely the Fine, Medium and Large shadows.

Digging a little deeper, each AO element has a variety of tweaking options. The individually tweakable settings are Size, Softness, Opacity, Curve and Blend.

To access these settings, click one of the AO elements to dive into its advanced tweaking UI. Alternatively, right click the element, and the advanced tweaking UI will appear in the form of a pop-up.

Tip 1: The best results are generally achieved by setting the Softness to at least 1-2 times larger than the Size. A large size and weak softness tend to result in more unnatural-looking shadows.

Tip 2: It's possible to extend your AO with additional detail, for instance for adding a layer of larger shadows. To add more layers of detail to the AO map, simply select any AO element ("Fine Shadow", for instance), hover over the nDo2 UI and press CTRL+D. You'll now have an extra layer of AO, ready to tweak!

Displacement

Previewing your normal in full 3D while creating it in 2D is quite a satisfying experience, and gives you a more solid feel of the design you are creating.

nDo2 is equally as much a fully-fledged displacement map creator as it is a normal map creator. Due to the reliability of the nDo2 displacement creators, designing an advanced 3D material simply becomes a matter of designing a normal map. Displacement mapping has many powerful applications both in offline and real-time rendering. One real-time application is hardware tessellation, as demonstrated in this basic UDK example:

Normal maps are significantly easier to read than height maps, thus making them much easier to design. There is no need to think in the third dimension. Instead, this is automatically taken care of by the height converter.

nDo2 includes two displacement converters, All-round and Hard-Surface. Where the All-round displacement generator works for any type of normal map and is biased towards organic normals, the Hard-Surface generator yields non-biased, perfectly plane height (provided that the normal is in nDo2 format).

You'll therefore notice the hard-surface option is only enabled when working with nDo2 normals (i.e. multilayered normal maps created entirely in nDo2).

You'll therefore notice the Hard-surface option is only enabled when working with nDo2 normals – i.e. multilayered normal maps created entirely in nDo2.

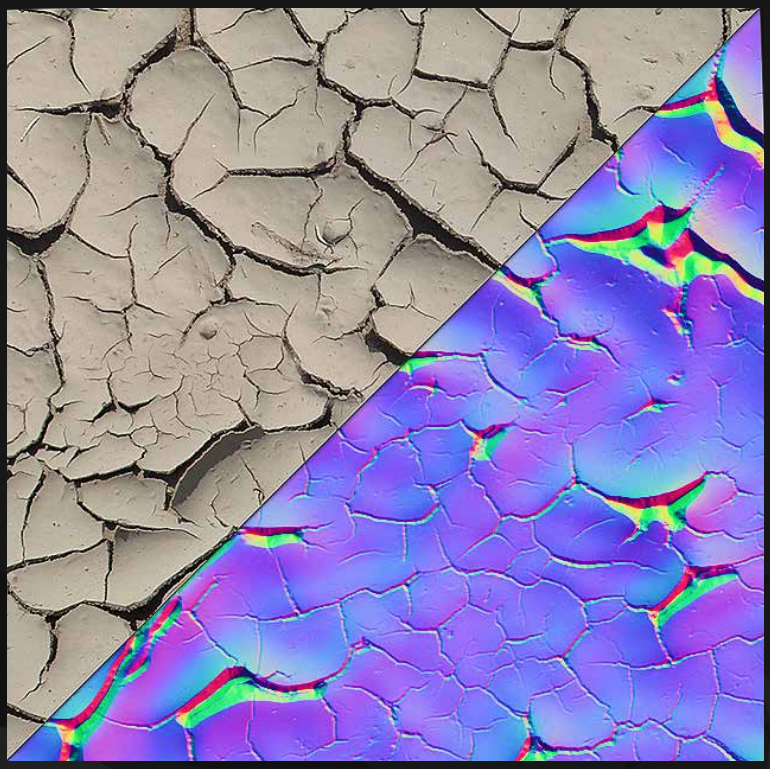
To generate a Hard-Surface height map, we first need to make sure our nDo2 normal map is selected. Then, open up the Convert... interface and select the Hard-Surface option. nDo2 will now quickly run through your entire PSD and individually convert each normal element to height. Note that you can manually bias the height of specific layers by modifying the normal elements' Z-factor sliders before converting to height.

To generate an All-round displacement map, open up the Convert... window and select All-round. As the map has been generated, you will be presented with a bunch of sliders for controlling of a range of height frequencies.

The topmost slider controls all frequencies at once, and distributes them according to the selected Distribution curve. The standard Slope curve provides an accurate blend of fine and large details, whereas the Gaussian curve lets you pump out more detail.

One of the most powerful applications of height maps in real-time rendering is hardware tessellation. nDo2 in combination with tools such as UDK makes tessellation easier than ever before.

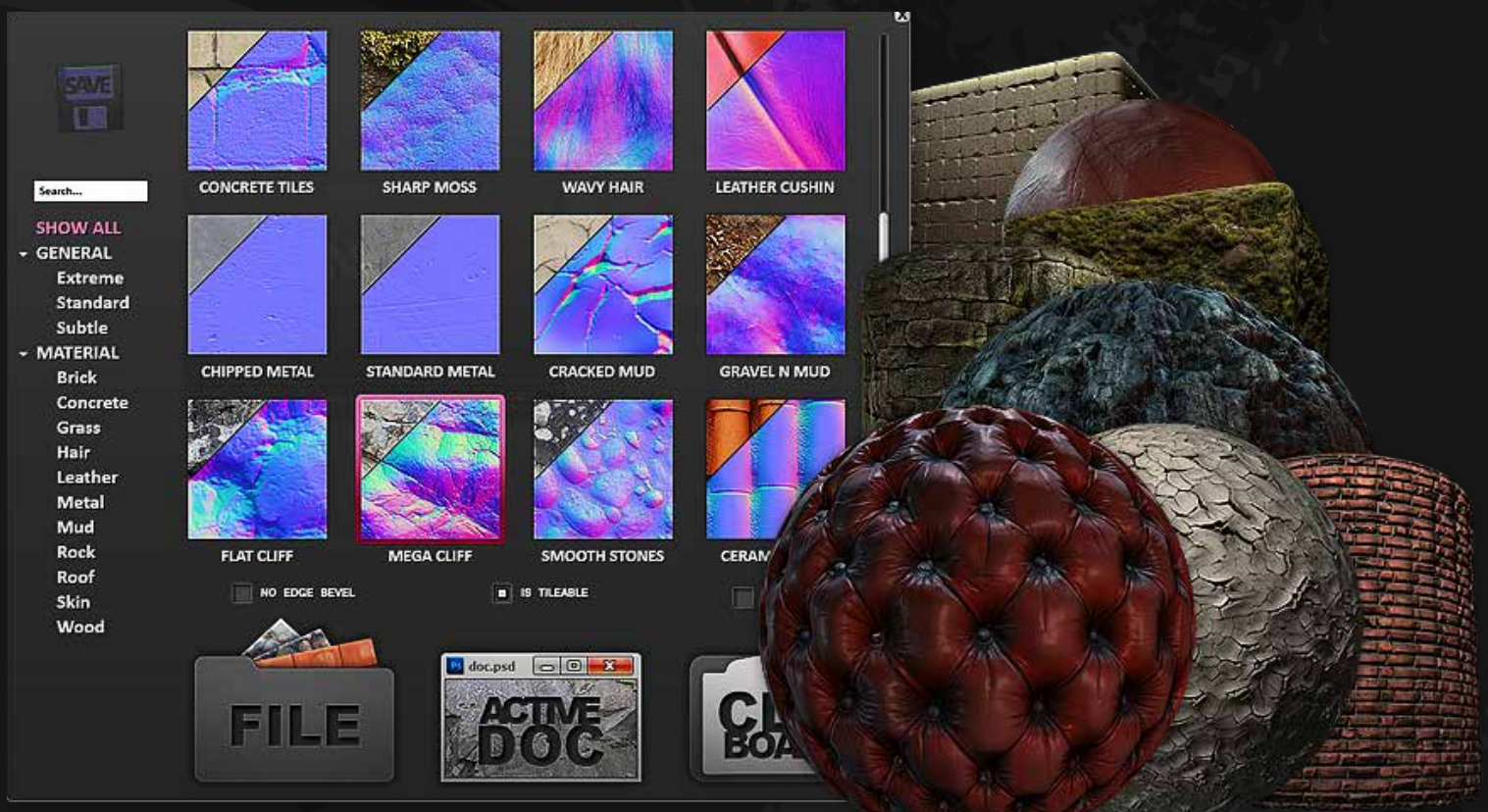
All normals and displacement maps in the UDK scene have been created with nDo2. Real-time tessellation is at work, really bringing the streets to life. Next, we'll learn how to create just such normals! You'll find creating organic stuff is easier than a breeze.



Those familiar with traditional photo-to-normal conversion tools will easily grasp nDo2's photo-normal creation process. When digging a little deeper, you'll soon learn it is fundamentally different in terms of creative control and output.

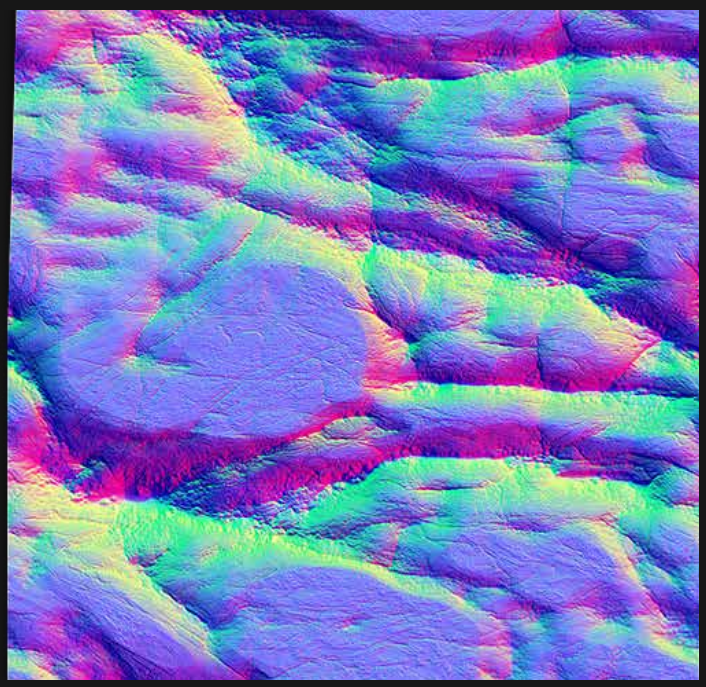
nDo2 comes with a number of material presets.

These presets are designed to reconstruct extremely rich, material specific normals from diffuse maps. The more advanced they are, the longer they will take to process. There is no limit to how much detail a preset can hold.



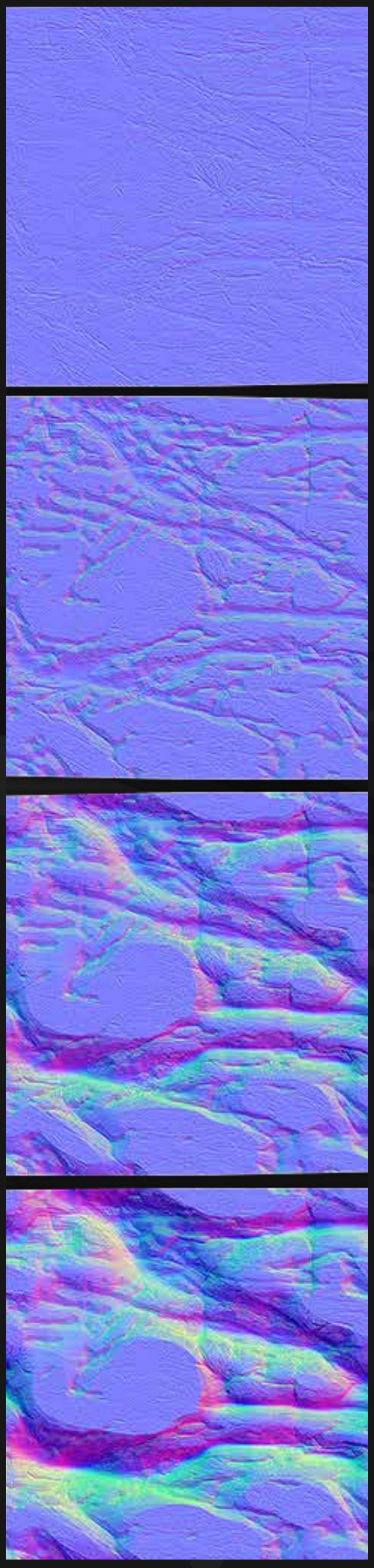
Converting a photo or hand-painted base to normal is super easy. Simply click on Presets... and the preset browser will appear. You'll find a tree view of the preset categories available. General presets aim to provide a vanilla blend of volume and detail, whereas Material presets aim to accurately recreate certain surface types.

As indicated by the three large buttons, you can generate normals from the clipboard, the active document in Photoshop, or from file (selecting multiple files result in batch conversion). If you already have your diffuse base opened and active in Photoshop, press the Active Doc button. I've selected the "Flat Cliff" preset for the example below.



When nDo2 has finished, you're presented with a simple tweaking interface for fine-tuning the characteristics of your normal.

Play around with the sliders until you are happy with the result. Fooling around with these sliders can have a dramatic effect on your normal map.



Custom Presets

It's easy to create your own preset from scratch. Start off by converting your diffuse to a single normal, and tweak its settings to bring out basic details. Then simply duplicate that normal (Ctrl+D), set it to overlay and tweak it to bring out new characteristics.

Keep duplicating and tweaking until you've reached the perfect blend of details and volumes tailored to your diffuse. There is really no limit to how complex your normal map can be. I

usually work my way up from small to large detail, but any order will do. Combining the vast amount of tweaking options lets you recreate pretty much any volume.

When you're done, simply group the normals, name the group, and hit Save in the Presets... UI. You now have a custom preset to reuse at any time!
Tip 1: When creating new presets, I always start off with a 200x200 crop of my diffuse, instead of the full-resolution original.

This is because I want tweaking to be as instant as possible when experimenting. I try to pick a part of the diffuse that contains a varied blend of details and volumes, representative of the diffuse in full.

When I'm done building the normal, I save the preset and try it out on my original diffuse. If I spot things to improve, I go back to tweaking the cropped normal and repeat until I'm satisfied.

Here's one of the more crazy bits of nDo2. In nDo2, displacement maps are computed by first converting a normal map to cavity, and then generating displacement from the cavity information. This means it's fully possible to generate height maps straight from cavity.

As we can easily convert height to normal, reasonably, we can create normal information straight from a cavity map. This actually means we can just as well paint our own cavity maps, and directly turn them into normal maps. Mother of god...

By looking at a cavity map, we almost instantly visualize how the original normal would look. Unlike normals, it is extremely simple to paint. Learning how to emulate cavity thus opens up powerful new normal creation possibilities.

To paint a custom cavity map, it helps to keep in mind how a real one works. Cavity maps hold convex and concave details, coloring any outward-bulging edges white, and any inward-hollowed edges black. Any constant slopes or flat surfaces turn into plain gray. Because of this I start off by creating a new document, filling it with a medium gray.

In the simplest of cases, I create two layers; one for black cavities, and one for white convexities. For simple stuff, I usually go with a 2-3px soft brush with 10-70% fill opacity, and only use 100% black and white colors.

I use low-to-medium intensities as cavity maps generally are not extreme in contrast. Note that painting with a too wide or intense brush will result in an unnatural cavity map, and thus probably a funky normal. I urge you to experiment though! Start off with a few simple tests to get acquainted with the basic cavity-to-normal logic, and go from there!

Image Created By: Philip Klevestav

Image Created By: Adam Fisher

As a final example, all normals in this scene are created with nDo2. Here the tool has been used extensively, as the scene holds tiling hard-surface normals, photo-generated normals, and basic high-poly normals combined with details made using nDo2.

About Me

My step-mom taught me Photoshop back in '98, and I've been an addict ever since. Back in the day I used to work on mods for Half-Life such as Sven Co-op and They Hunger, and about a billion more.

At age 19 I ended up doing 2D for Starbreeze Studios, and eventually shifted over to tools after having presented a few streamlining tools I'd been working on. Four years later two colleagues talked me into starting up a company, and so Quixel was born!

When I'm not working (HAHAH...) I love to play & learn new instruments, eat kilograms of chocolate, and explore all corners of the world!

All content created using

Teddy Bergsman
www.quixel.se

Image Created By: Wiktor Ohman

Kelvin Tan

www.urpo3d.com

Jonas Axelsson

www.jonascg.com

COLOR

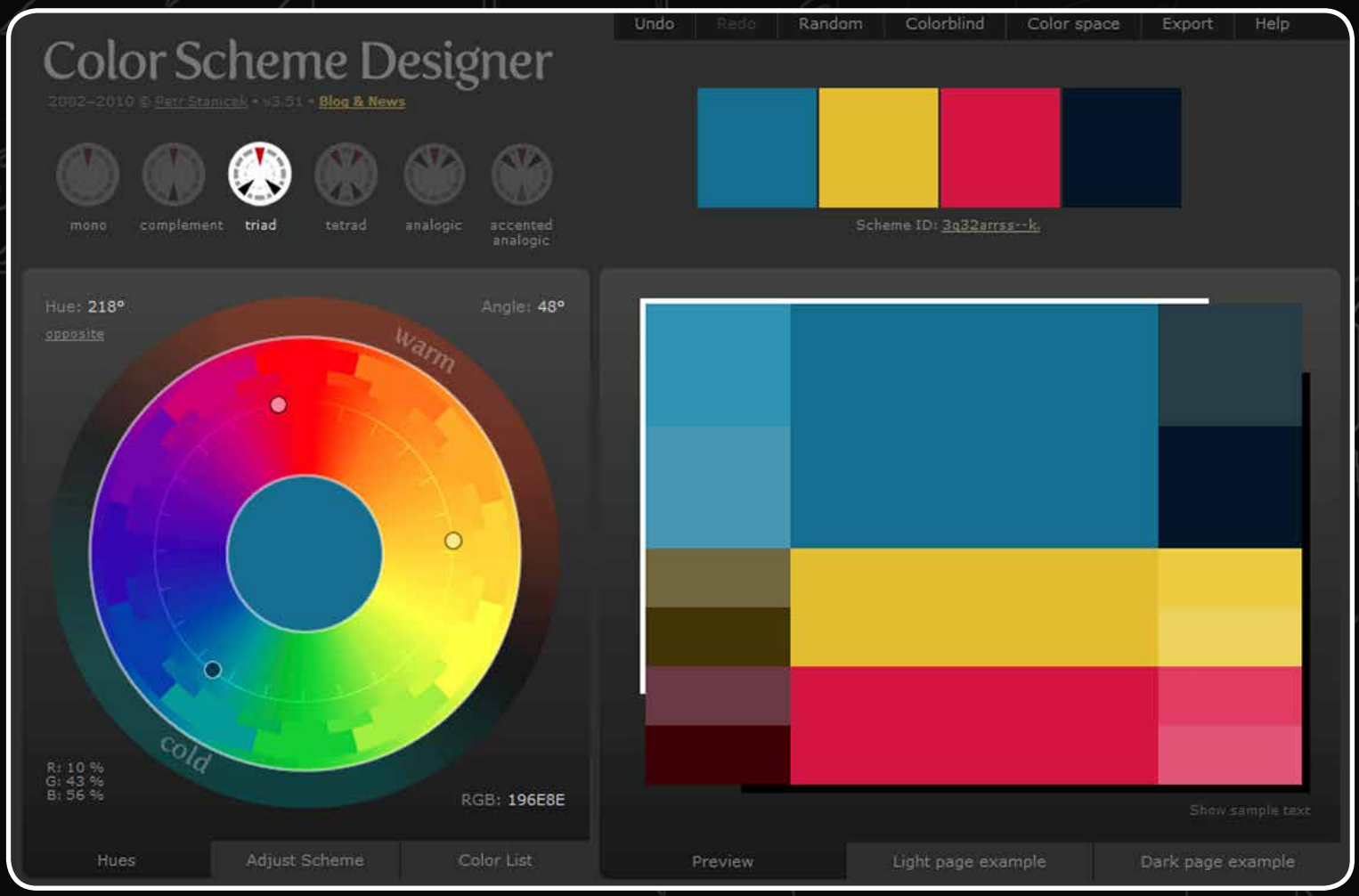
Color Theory By: **Ben Mathis**

Color Theory; scary topic for some. It can mean so many different things. For the purpose of this article, I'm reducing it to cover two main topics; the overall color scheme of your asset (what color are the various materials, i.e. is the leather brown or black or red, is the shirt green or orange, is the wall cream colored or dark grey) and the color interaction within those pools of color (are there any color changes within those solid chunks of material).

I will try to keep this generic so that it can apply to a diffuse only asset, or a multi-textured per-pixel asset using a diffuse+normal+specular+etc.

As a caveat, all of the topics I'm covering are highly subjective, and this is merely my opinion on the matter. If I come across as authoritative, it's just my writing style, feel free to take whatever you need, and leave what you don't.

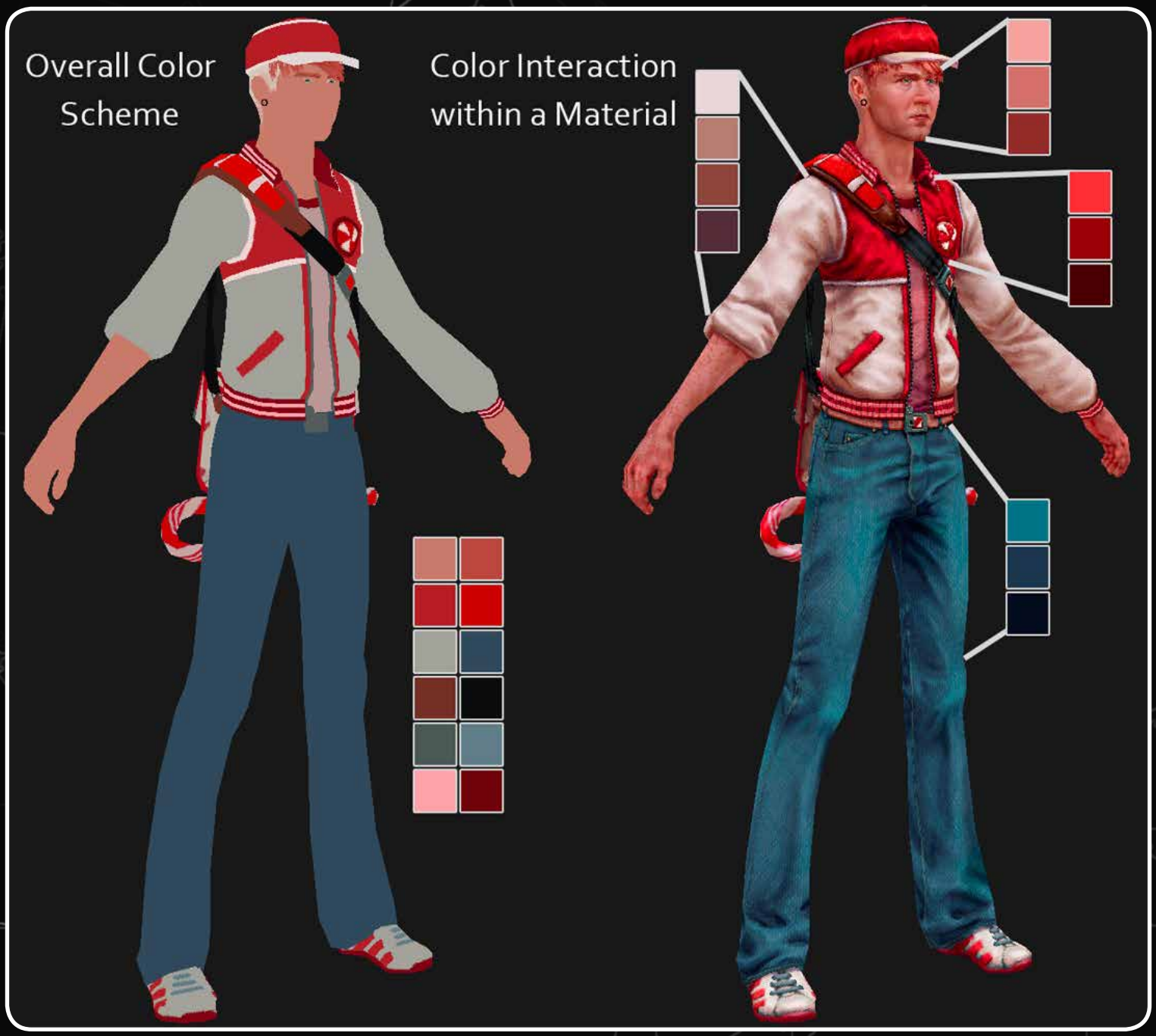
Also as a small apology, this paper is assuming the reader has perfect color vision, and I do not know enough about color-blindness to adjust it for those with this condition.



Painting in greyscale, and coloring after, has a very attractive allure. It allows you to make your tonal choices first, ensure forms read and work well with any shaders or effects you might be using, and leaves color out of the equation entirely. The problem with this method, is that unless you spend 2x as long, it robs you of the chance to make your color choices as you go.

It's harder to balance color and value at the same time, but if you train yourself to do so, I believe it will result in stronger colors at the end. Creating art is all about constant judgments.

Try something, look at how successful it was, and redo or continue further. Just as changing the value of horns on your theoretical character can change their visual importance and what material they appear to be, so too can the color you choose.



A color has three main components; Hue, Value, and Saturation. Depending on how much shading your shader and engine will be doing, value is the least important of these three, but even in a highly accurate off-line renderer, it still holds importance. Value is simply how bright an object is. Hue is the "color" as we traditionally understand it, and Saturation is how much of that color is present; low saturation looks faded, high saturation looks vibrant.

The best way to study color is a combination of studying real life (and photos of real life) and to look at aesthetically pleasing, representational paintings. Real life needs no introductions, and most people know how to Google image search, but for fine art, I personally love museums, or even digital copies of fine-art paintings.

(www.artrenewal.com is a good site for this)

These paintings were the height of color-theory understanding, and are collapsed into a two-dimensional plane. They are perfect for studying color theory. Two of my favorite artists for studying color theory from are William Bouguereau and John Singer Sargent.

The reason you want both reality and stylized depictions, is that real life is our reference point, but our goal as artists is to communicate, and knowing the best way to capture the feel of an item is a way to communicate what it is.

In the following example, notice how both images convey perfectly what the item is made out of, how we imagine it would feel to knock our knuckles against the surface, and how heavy it would be to pick up. Sargent has used very few colors and brush strokes to accomplish this, needing not render the entirety in excruciating detail. This is one reason I love him so much as an artist to study from.

Overall color scheme

The important thing about the overall scheme is that you pick one that helps you communicate, and by communicate, I mean the feel. We are in control as artists, or should be. One could take an asset for a dark and gritty game, such as Silent Hill, and changing only colors, make them seem bright and happy, belonging in a totally different game. This implies the colors the artist did choose were to help the asset fit within the world, and have the feel appropriate for the game.

The emotional impact of colors is outside of the scope of this article, and far too subjective to break down easily. For the sake of brevity, I will instead say that the color scheme should feel right to you, as the creator. This can be chosen however you want, with a logical examination, or just based on emotions, finding a scheme that speaks to you as good. I recommend two books to research color's emotional impact more: Color by Betty Edwards and The Elements of Color by Joseph Itten.

The way I go about deciding this initial overall color scheme, is to block it out early. Both in the concept, as well as in the texture right away. I like using layers and masks, but this step can be done on one flat layer. One reason I use masks, is that it makes it really easy to adjust these colors. I start with a "solid color" layer, and use a mask to constrain it to the right areas, and then I can double click any solid color layer to bring up the rgb picker to change colors. This allows me to play with values, hues, and saturation, before rasterizing the layer. If using a single layer, you end up having to paint again if you want to alter the colors.

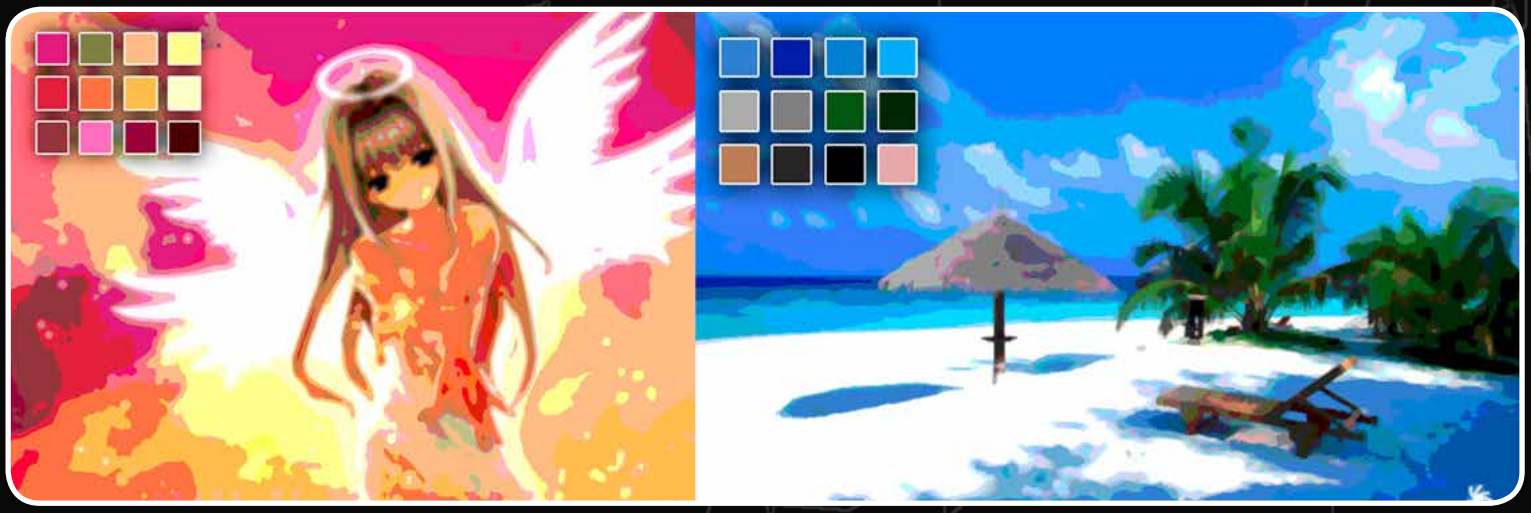
The very first part of texturing I approach is the diffuse (however if it is a “next-gen” asset, I have already baked the normal map off of the high poly, and have it affect the low poly model). I use “flat” or “no lights” mode extensively to help remove the medium scale shading and focus solely on the color I control. The below image shows the initial block out pass, and then the final texture.

Most of the time when starting an asset, we have at least some idea what the general colors will be. If it’s a wall texture of concrete, we know a variation of grey is the start.

If it’s a character, there might be a concept, your model might already depict the character’s racial skin color, and you might know they are wearing something of a known color like blue jeans or a team jacket or hat. If you are totally lacking for a color theme, there are various sites for choosing them.

http://colorschemedesigner.com/# is one such (the banner image is a screenshot from this website). You can also find a photograph of something with pleasing colors, and use Photoshop’s “posterize” feature to reduce it to a color scheme. You don’t even have to choose a similar asset.

A beach photo might provide the scheme for your character, or an anime drawing for your environment asset.



If you're having problems coming up with the colors for your asset, start with everything you have any clue on. Choose a basic skin color based on the race you've modeled.

If you know you want a bright red starter-jacket, fill in those colors, same with blue jeans, etc.

This ties into the principle of "anything is easier to start from than a blank page".

Next start with the items you aren't so sure about. Let's say you have your character's skin color chosen, but you don't know what color to make their pants because they are futuristic, or maybe their technical bits are giving you trouble.

I'll break down my process for deciding these choices.

To aid with this decision process I took a character I sculpted but never textured. I never even really thought about what color his clothing would be. I have colored the skin, and the belts, because I love lime green accessories (I even have a belt this color) but other than that I'm at a blank as to what color things should be.

Next, I know that his puffy vest is important. I want the visual focus to be on his upper body, so I want a strong saturated color for the vest, and the pants will most likely be faded and darker.

This will cause the eye to stay on his upper body. This goes back to what I said about communicating.

If this character in the game needs to have emphasis drawn to his mechanical parts, a brighter more saturated color for them, or even some kind of shader effect can draw the eye, but if it's just supposed to be banal that he has cyborg parts, more muted and faded colors would be appropriate.

I tried bright hunter orange first, but it was a bit too glaring, and didn't really say "cyber-punk" to me. Since it's just a solid color layer, I can easily change it to see how a few other examples would look.

I like the blue version, and now seeing the blue and lime green together, I think this character will look good using a cool color scheme, meaning mostly blues, greens, and a bit of purple.

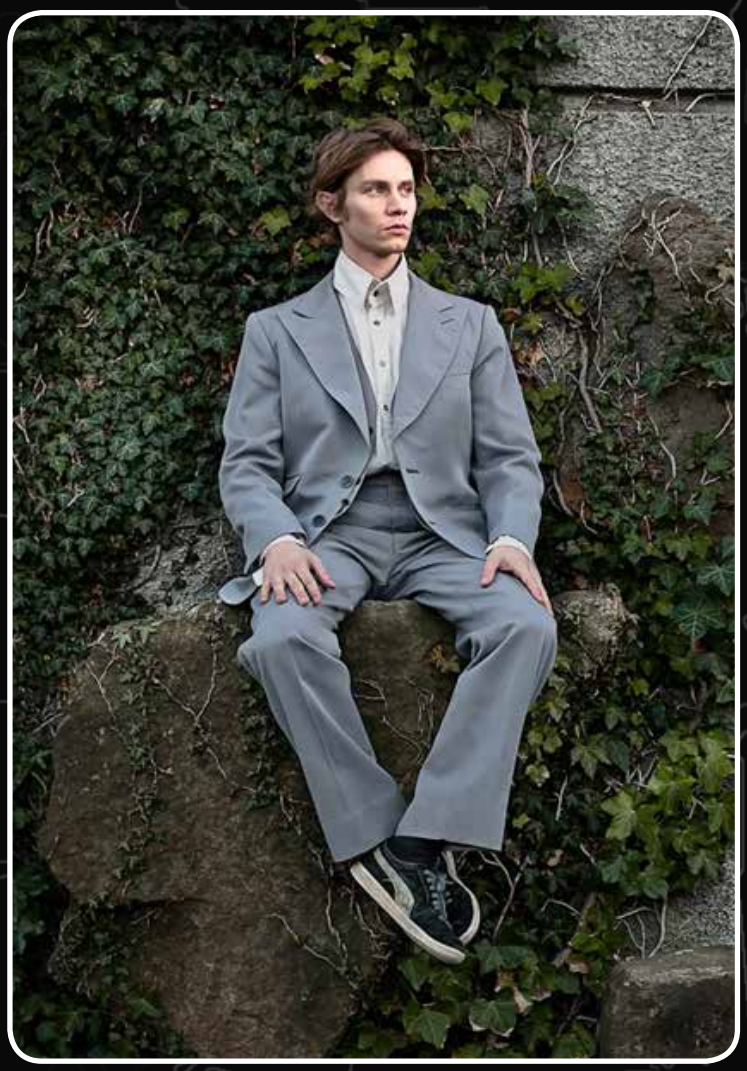
I'll keep repeating this process, moving from most important bits down to smallest bits. My next chunk would be the pants, then probably the main metal color for his technological bits, deciding if there should be two or more metal colors or if it's all the same type of metal.

All the same type of metal would imply a more planned construction of him as a cyborg, whereas the actual outfit seems very piecemeal, so multiple metal types would fit much better.

One problem is that after you've decided on the colors of all the main parts, you might be left with a lot of small items that you're unsure of what color they should be. Maybe they are leather straps, or small metal parts of goggles and other accessory items, both of which could come in almost any color of the rainbow.

I normally let the visual prominence of the design help me decide. Should they fade into the background of the character, or are they important bits that help add depth and would better be served with an attention drawing color?

As a simple example, this photograph I took, I have recolored his original red shoelaces to be a much less attention grabbing dull blue. This totally changes the color scheme of the image, despite how small they were in the picture. The red laces also helps play off the reddish skin tones as well, and probably wouldn't work quite as well with an Asian or African subject.



The shoelaces might have been too simplistic of an idea, but this thought process of "is this important or not" can help you decide. If you're still having problems coloring the smaller bits of your texture, try getting the tonal value working first.

Try pure white, then try pure black, and see which you think helps the texture read better for what you were going for. Once you've got a value that helps them work with the surrounding materials and asset as a whole, try first a monochromatic color, just a variation of the material the asset is sitting closest to.

Then try it's complement, then try one of the surrounding material's triadic colors. Use a fairly saturated setting for this, then once you find a color that works, fade the saturation till you get to a level that works.

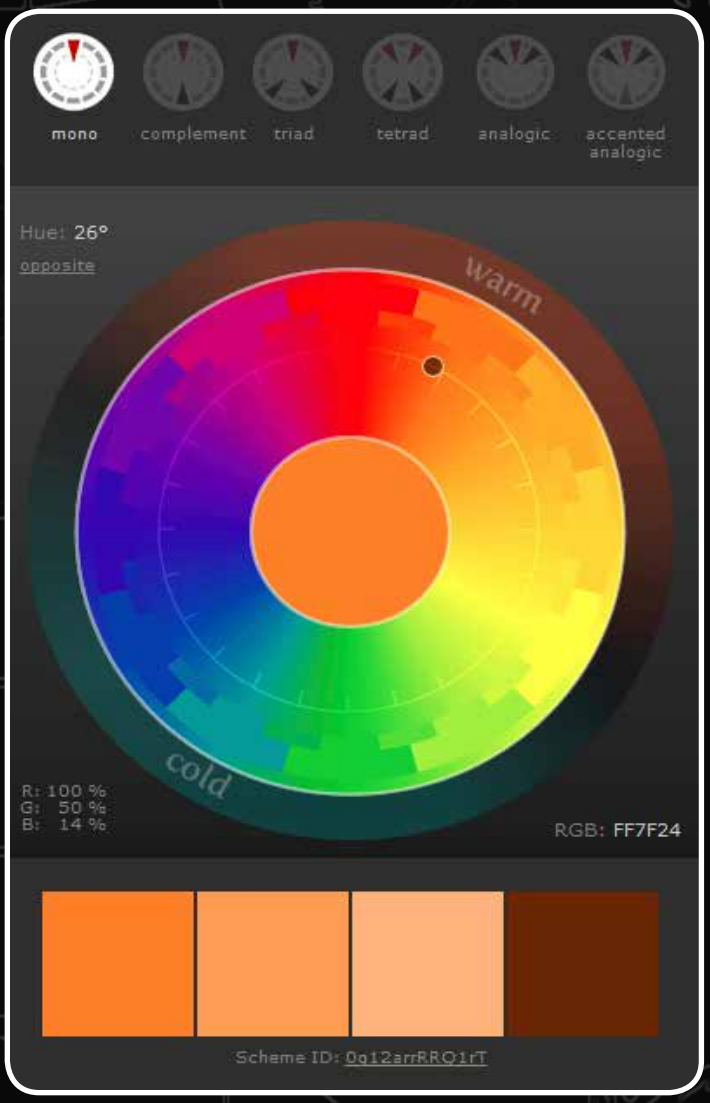
Monochrome, Complement, Triadic? what are all these terms!? Best to think of a color's Hue in terms of a wheel. A normal color wheel has the visually opposite hues opposite each other on the wheel. Red opposite from green, blue opposite from orange, purple opposite from yellow. There are ways to pick from this wheel that are visually harmonious, and they have terms for the ratio those choices are made.

Monochrome is the easiest, it's simply one hue and very similar ones, in this example, all hues we'd consider "orange". The black dot represents the primary color choice. The four swatches at the bottom show 4 colors that fit this scheme, in this example, all of them are monochromatic.

Next is Complementary. You can see directly opposite the dark grey dot (the primary choice) is a lighter grey dot, representing the chosen color's complement. In the four swatches at the bottom, we can see 3 shades of orange and a turquoise.

If we were making a simple creature like an orange caterpillar or a furry dessert creature that should remain mostly the same color, a great way to keep it from looking too monochromatic would be to give it turquoise claws or eyes, or maybe the inside of it's ear skin.

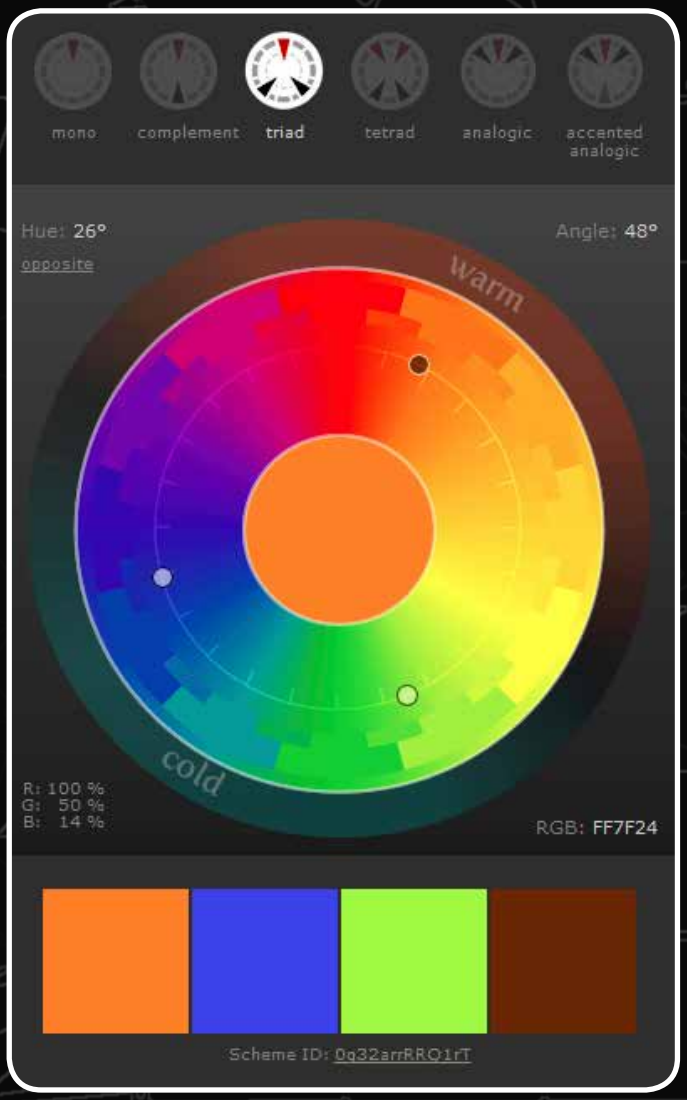
Randomly choosing a 2nd color without a good sense of color theory might create something visually jarring that does not harmonize to how our eyes work.



Next is Triadic. The dark grey dot is the primary choice, and then there are two light dots that are split evenly over on the opposite side.

This can also be called split complementary if the secondary choices are closer together on the wheel. Pure triadic has all three choices equal distances from each other on the wheel.

You can see from the color swatches that bright orange, blue, and green might seem jarring and hard to balance, but the key would be to choose one or two to keep saturated, and the others to fade.



A bright orange hat, with a strong blue shirt, might do well with a faded green bandana in the pocket. Or maybe you have a bright orange pants, with a leather jacket that is black but with hints of blue in it, and all the metal studs have a greenish metal tint to them.

This is a way to keep your normally uncolored items such as black leather or plain steel having a bit of color without it being jarring, and knowing what colors you can choose to use.

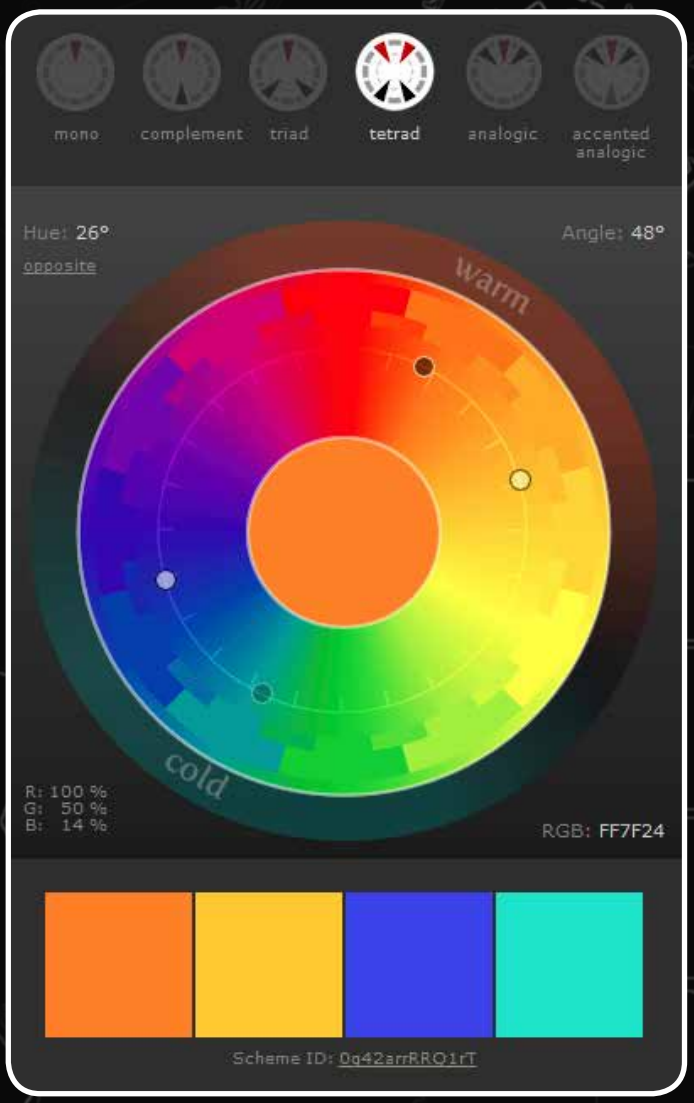
Tetrad is quite difficult to balance and rarely works with more than one color in a saturated presence, but I've tried it before and really enjoy the effect. It's basically two sets of complementary colors, spaces closely together.

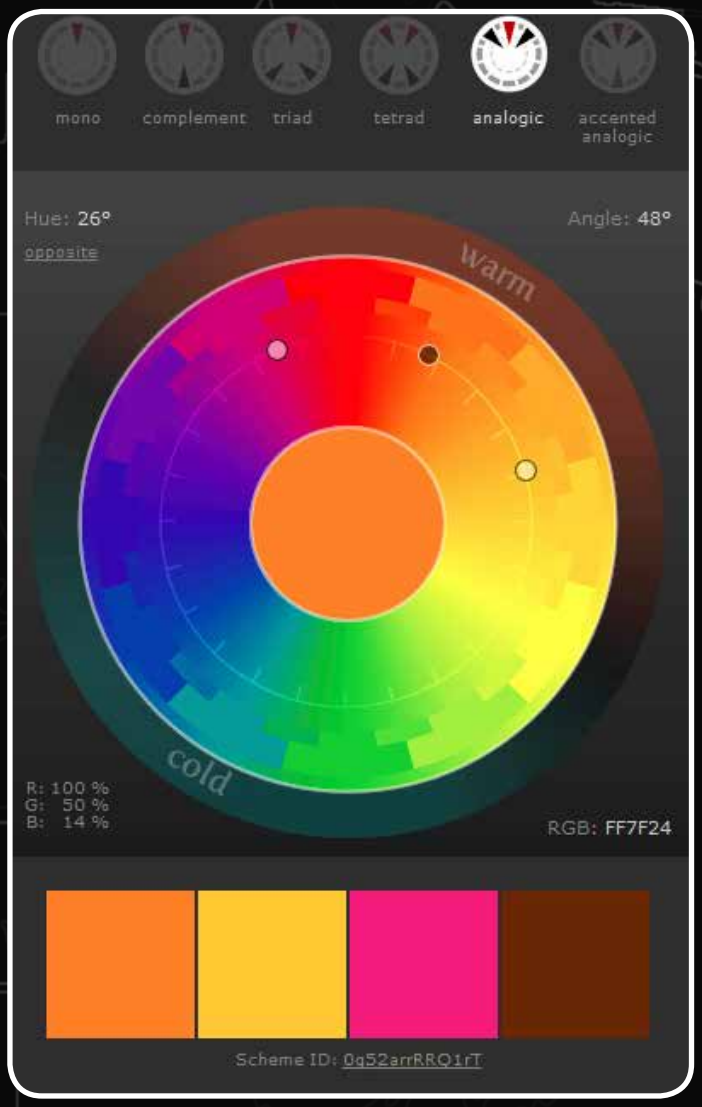
You can see in the four color swatches that orange, the primary color, has it's complement present, turquoise. Then the lighter orange secondary choice has it's complement present, a deep blue.

In the image to the right of the wheel, you can see a model by Brian Jones (AKA BoBo the seal) that I textured with a tetradic color scheme.

The bright green hair and red nails are complements of each other, and then the faded blue skin and faded orange leather are complements.

Analogic or analogous uses the colors just to either side of the primary choice. This works well because you're essentially getting a warmer and cooler version of the same color. It rarely works for an asset with multiple material types, but for something that is all the same material, it can be a good way to choose color variations, such as a canyon rock, or a rack of folded blue jeans, or a single colored snake, for examples.





Finally is accented analogic, which is a hybrid of complementary and analogic. It's just like analogic, only it introduces the primary colors complement. The crocodile in yellow jumpsuit uses this color scheme. Green being the primary color, the yellow of his jumpsuit, and the blue-ish dark leather are green's analogous partners, and then the strawberry pink stripes on his arms are green's complement.

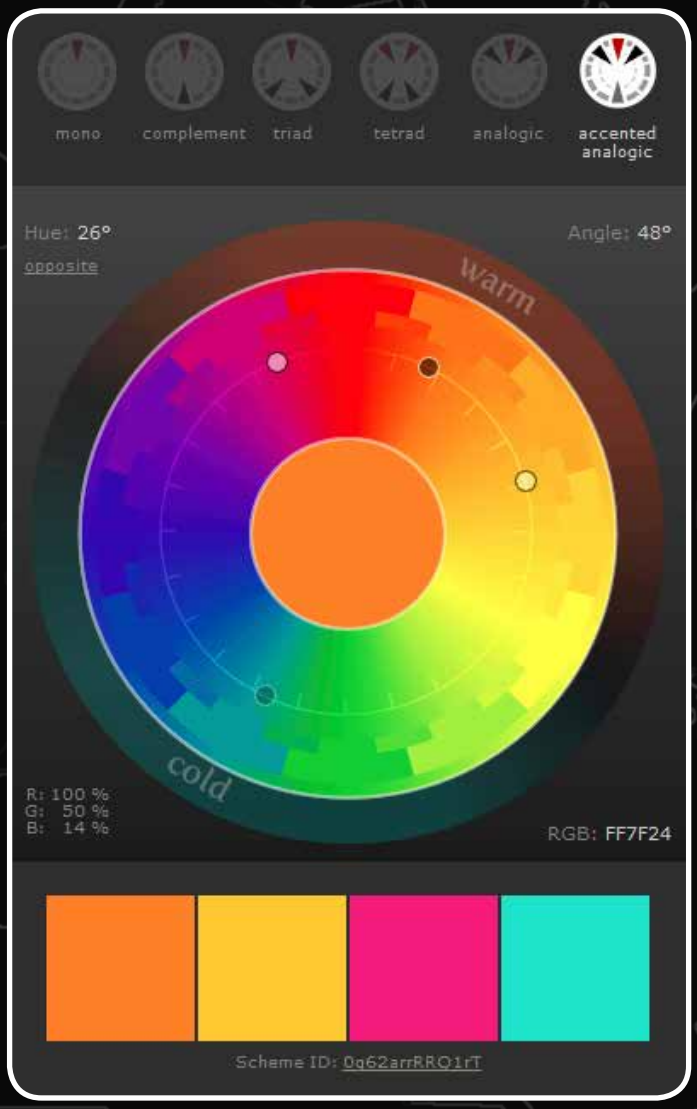
These color schemes and processes should help you come up with your overall color choices for your asset.

It's important to nail down these colors at the start, before you do the complicated work of detailing your textures.

Going back to change the colors after you've worked into the various areas will inevitably undo some of your choices you made along the way.

If the asset reads well with nice colors when there is no texture detail, it will still harmonize once you detail it out. Conversely if the colors don't harmonize, no amount of detail work will bring them together.

Learning to pick good color schemes of harmonious colors will keep you from having to leave everything desaturated. Artists who consistently use vibrant saturated colors that work within their asset know color theory well, either consciously or subconsciously.



Color interaction within a material

Assuming you have chosen your overall color scheme and have blocked out your colors, now it is time to work on the color variations within each pool of color.

The previous portion was easier to keep relevant to both diffuse only and advanced shader (I'll refer to them from now on as next-gen, assume at least a diffuse, normal, and specular map, with a per pixel lighting model) assets, but this portion is trickier.

The reason is that the majority of diffuse only assets have most of their lighting painted or baked into the diffuse, whereas next-gen assets rely on the engine's lighting model for most of their shading.

Diffuse maps for next-gen items still have a bit of color variation in them, and many engines offer ways of tinting shadows, or using a gradient ramp to light a material, so this is still relevant to next-gen diffuse maps.

Whereas you'll have to choose what color to paint your specular highlights in a diffuse only asset, in a next-gen asset you would separate that color choice out to your specular map if it's full RGB, or copy it to your specular color setting within the shader. For certain items, a colored specular really helps make the material type believable.

A real bronze kettle has incredibly intricate rules as to how it reacts to light, but if we also look at an artists depiction of a bronze kettle, we can see at least one way someone before us has communicated "bronze kettle" using only colors applied to a flat surface.

There is no kettle in a painting, but we see it as a kettle, that means the artist did something correctly, and we can learn from their choices, in combination with what we can learn ourselves from looking at life.

Look at the top row of three photographs of a bronze kettle, and then the bottom row of three paintings of similar kettles. None of the three paintings have anywhere near the detail or subtle shading or nuance that the photograph does, but purely through the color, value and saturation choices of the limited brush strokes the artist applied, our eyes see the same thing. This is why I suggest using both paintings and real photographs to help you figure out color variation.

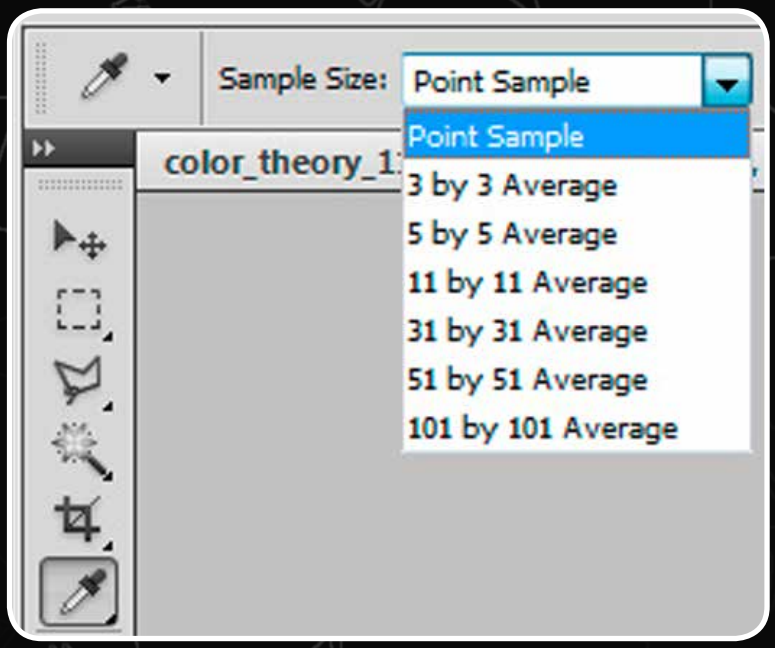
When looking at a photograph, one must keep in mind both metamerism and the possible light colors. Metamerism is similar to color balance, and is best explained as how the same color will look under different light sources. A picture will look one way under a tungsten bulb, and another under a fluorescent. You can even this out in a photograph by trying to properly white balance it.

The second is a bit harder, because if the object is reflective, and there are more than one light source, even if you balance to the primary source of illumination, the object might be reflecting the color of a second one. An example of this would be a reflective object photographed indoors, but reflecting a window and the sun outside.

Again using the bronze tea kettle (this can be applied to any material) I am going to try to figure out the "rules" of the material. My first step is to try to get the base color. This is what the object would look like in a perfectly white room where every surface was emitting a soft glow.

No shadows and no highlights, only the exact color of the surface. Rarely will this be one single color, unless it is a brand new, man-made object. This color variation is separate from shading color variation, and should be built in right away.

To help me sample from a photograph, I change the eye dropper from point sample mode to 5x5 average. This will ensure that you aren't getting digital camera noise, or a single odd pixel, but a much more accurate average of a color. I very rarely use colors exactly as is. I try to use a color picking session as a learning exercise, but then I "freshen up" or change the color before laying it down. Normally by saturating a little bit more.



I've put squares around the different areas I sampled from using a 5x5 average. The brightest one is really a reflection of the sun, so I would ignore it for a next-gen asset (other than to possibly use a cube map in the reflection that has a nice sunset in it), but maybe choose to paint in with it for a diffuse only, depending on the look I want going on, since it adds some nice color.

The next two down are more pure specularity. As an aside, in real life, there is no separation between reflection and specularity. Everything that shines is reflecting the light either in a blurry way like leather, or in a sharp way like a mirror.

We have to separate the two for ease of rendering in a real-time setting. So those second two swatches I would use to paint my highlights in a diffuse only map, and a combination of those two in a specular map for a next gen asset.

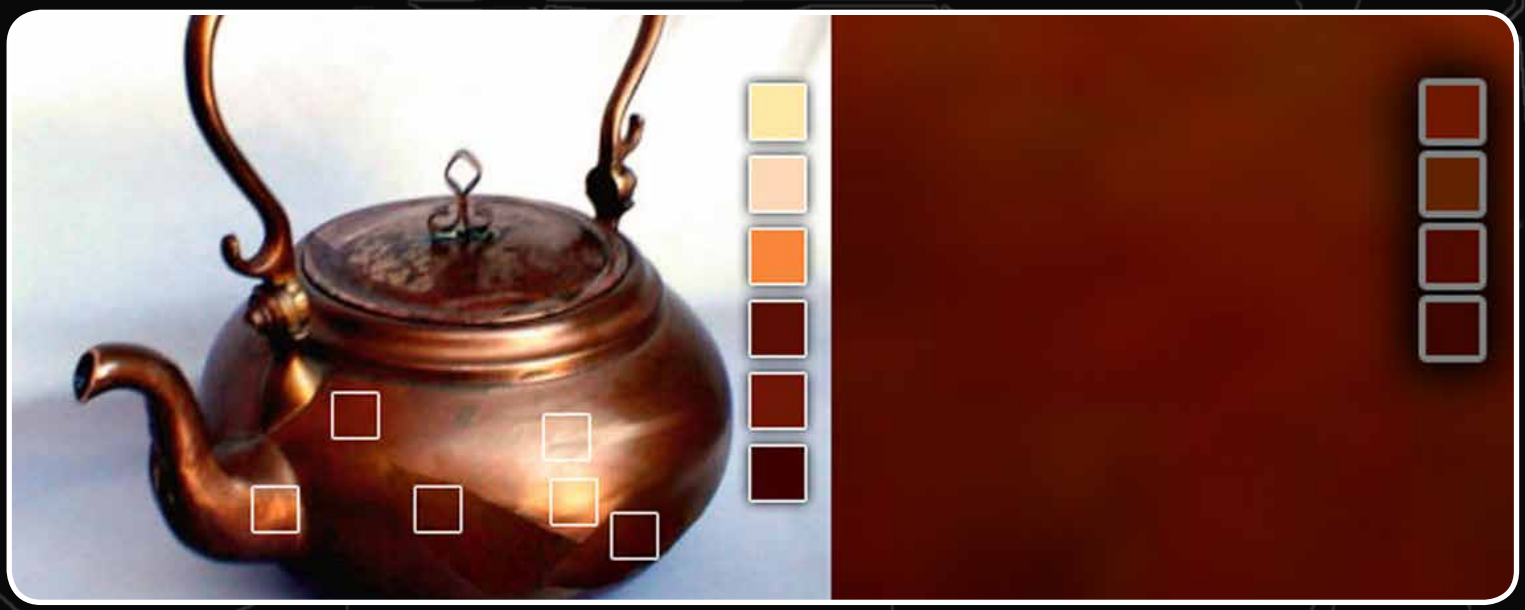
I would use more the second from top in the specular map, and probably paint in a little bit of the third one down to the diffuse map. The fourth one down is more the true color of the asset, and what I would lay in first.

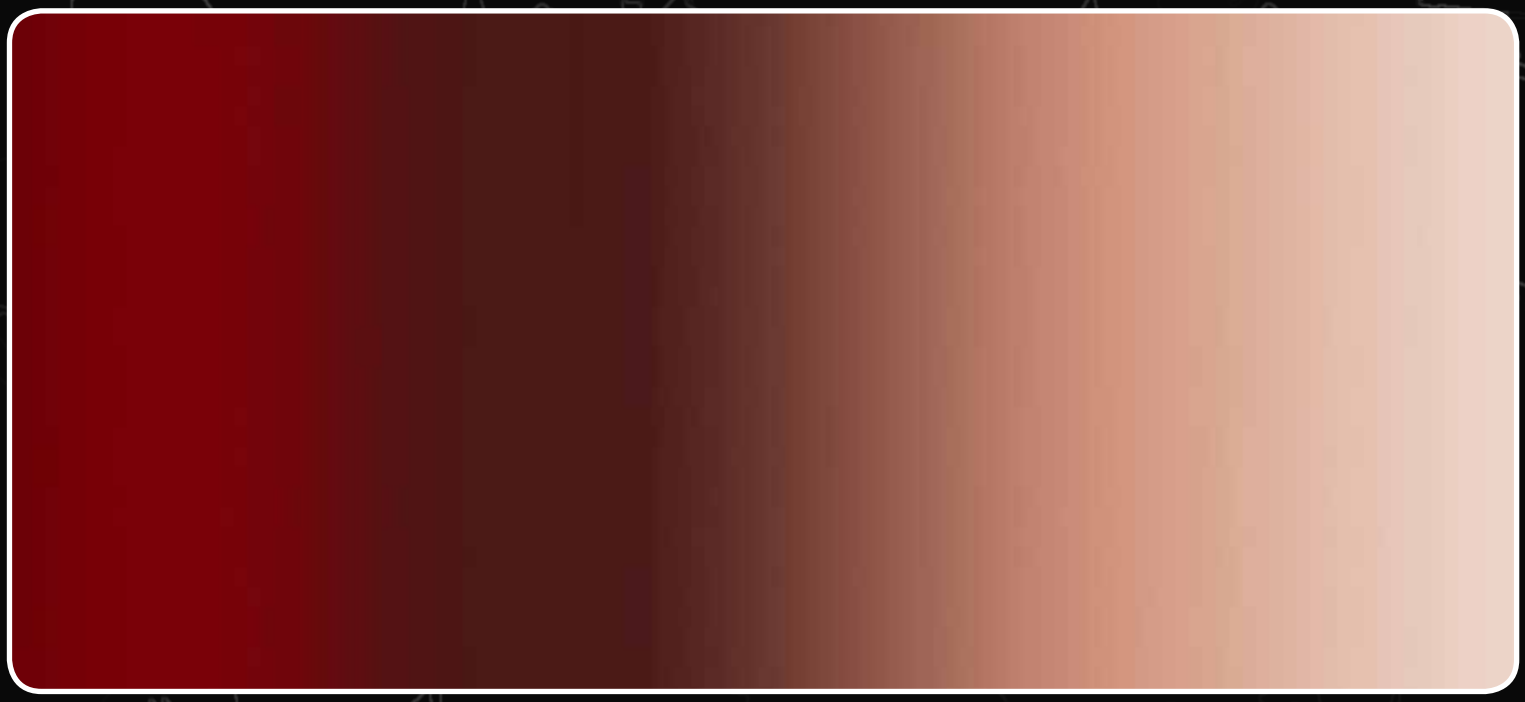
I've magnified just that selection square and upped the saturation on the right, and then sampled four swatches from it. This is the color variation that is good to get into your base layer before you start detailing.

You can get this through overlays, filters, or just grabbing some brushes and painting it on using scatter brushes or stamps. Because it needs to be subtle and layered, I normally try to identify the colors, so even though there is no green, the second swatch down on the right is greener to my eye than the other three.

I would pick a green brush with a scattered stamp effect and paint around my starting layer with that to help get color variation in. Back to the left image, the second from bottom is the core shadow color, and helps keep the item from shading directly from white to black.

This is where a shader with a gradient map for lighting helps (such as Xoliul's shader for 3dsmax), as you can saturate the core shadow area to get this effect.





A gradient using these color swatch choices, desaturated in all but the core shadow area.

If I were painting a diffuse only texture, I would more closely use these swatches as my actual color choices on the brush. However if you use only these same colors the entire painting session, you will tend to get too little color variation, so I tend to use photo reference to help me choose some slight variations to use.

As long as the average of your entire area is the right color, you can get away with a lot of color variation and still have it look “right”. This is an effect that Pointalism uses to great affect.

Some artists will purposefully choose cooler versions of the correct shadow color, and warmer versions of the correct highlight color for a great contrast effect.

For next gen assets, I would keep the diffuse very similar to the large magnified swatch on the right, and depending on the engine put in very little shading. If any, I would add only the two colors to either side of the middle swatch, and probably not at full value, since the shading will largely come from the engine, and will instead try to get the shader to implement those colors, by putting the brighter colors in the specular map, and using darker colors for a ramp texture, or even just influencing the ambient of the shader a little.

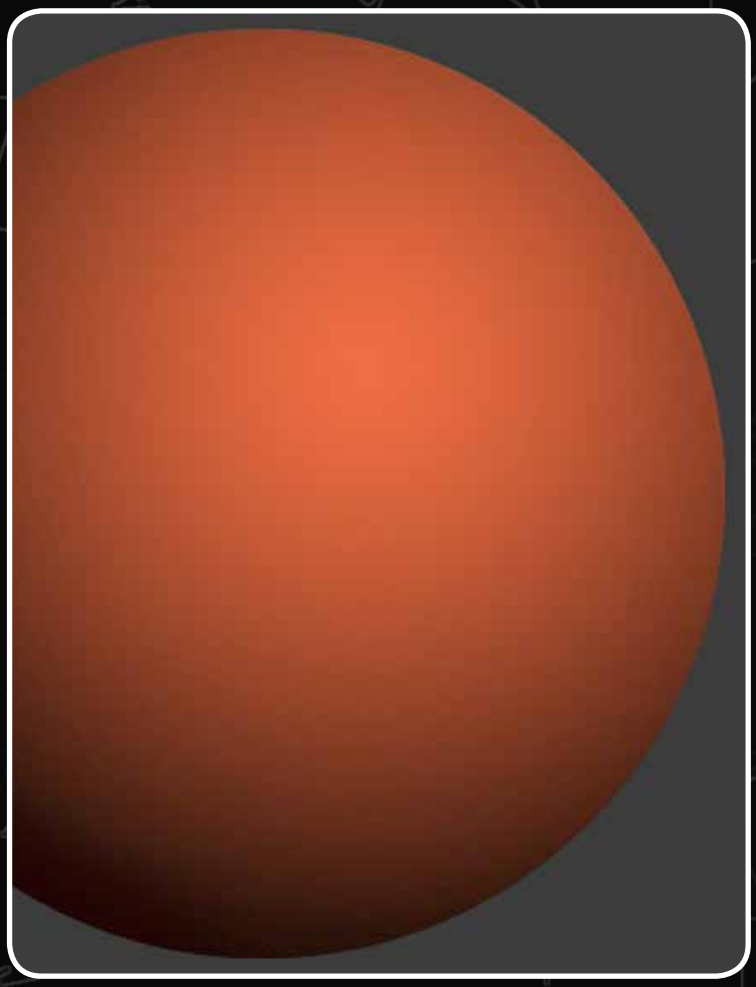
Whenever painting a diffuse only texture, I have lots of photographic reference, paintings of the same type of material, and possibly even textures by other artists to examine. I use what I learn from these three sources to help me figure out what colors to use when painting.

Whether you are hand painting a diffuse only texture, or creating a diffuse and full-color specular map for a next-gen asset, color variation is key! Flat colors are lifeless. You want both hue changes from light to dark, as well as hue changes within a certain value.

The amount is determined by the art style; heavily stylized games will tend to have much more color variation within a given tone, and realistic games will tend to have much less, but very few things in life have flawlessly even color within a given tone, and neither should your textures.

Both of these read as spheres, and both of them have an orange overall color, but the one on the left goes from dark to light with almost no hue changes.

The one on the right has much more color changes and is more visually interesting. If you are already done detailing your textures but they still lack color variation, make a new layer and set it to “color” blending mode. Choose some very strong vibrant colors, and paint with a 10% brush opacity, and slowly build up some color variations.



I've covered hue variation between shadow to highlight, but it is also important to have hue variation *within* similar tones. The number one problem most people have when learning to paint diffuse textures is using too little color variation within tones.

It is tempting to create a set of color swatches to sample from, two darks, two lights and a midtone, and paint all shading with these same colors.

This ensures a flat texture in regard to color, no matter how well the volume is created through tonal use or shader accuracy. In real life we get color variation from reflections of nearby objects, various light sources, fading of the original pigments, and numerous other phenomena.

Lacking these advanced light models in a game engine, even when using next-gen engines, we must fake some of this color variation to create an engaging and vibrant texture through the color use.

For a quick example I've created this painted wood texture. On the left, I used only five colors for all details. There is a good change of hue from shadow to highlight, so it's not monochromatic, but the overall texture lacks any variation, were it to be tiled over a surface, it would feel quite boring despite having good volume.

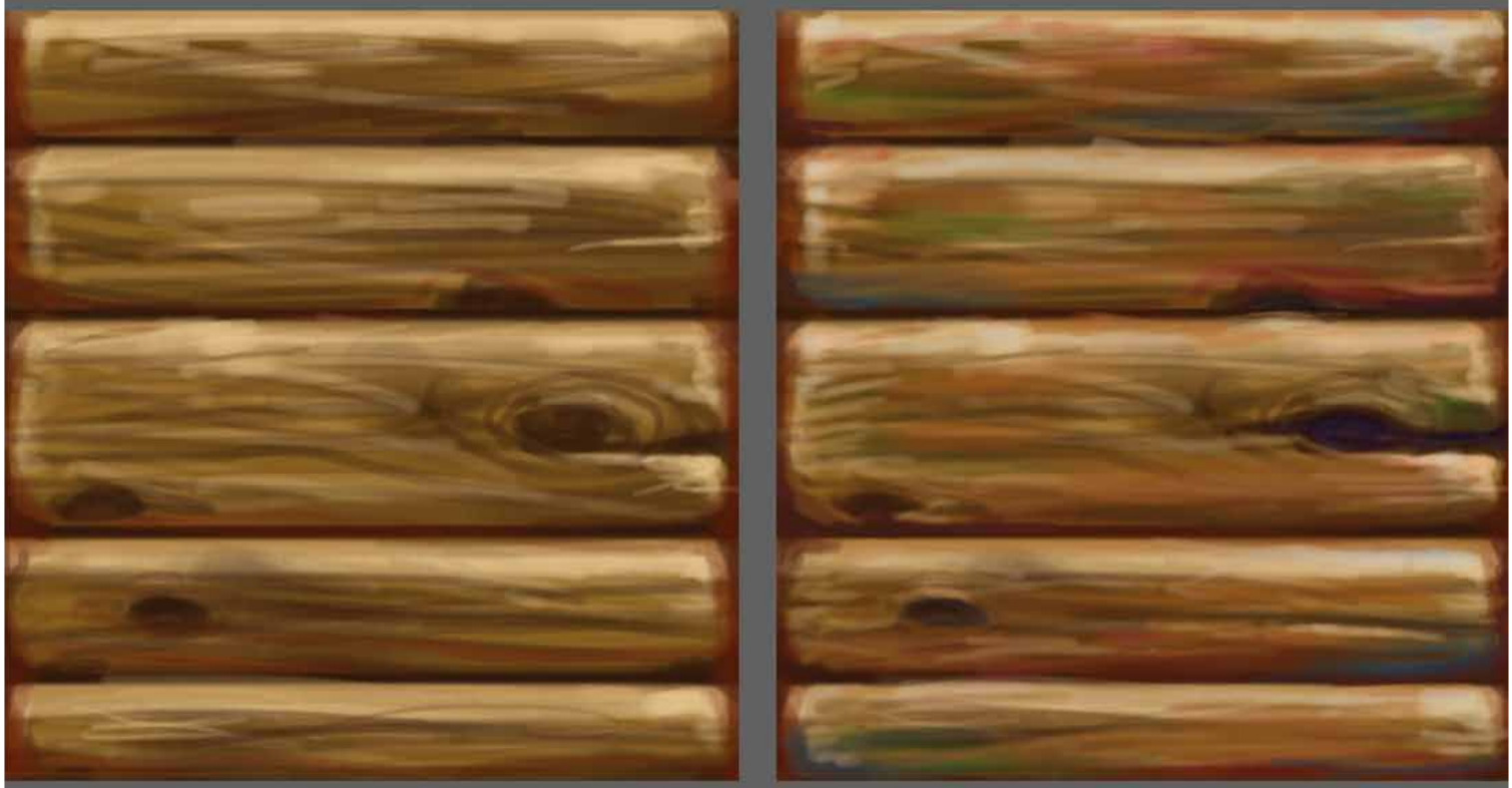
On the right, I went back and started using some variations of the extreme colors, mostly in the shadows in highlights. You can't play too much with the flatter areas without it looking like the material changed colors, but even there I've brought in some greens and reds and a bit of blue.

If you squint, both textures appear similar in terms of volume and what "color" you would describe the wood being in a single word. On the bottom row, I simply increased overall saturation while limiting the saturation of the yellows so that color variations from the overall yellow color would pop out more clearly.

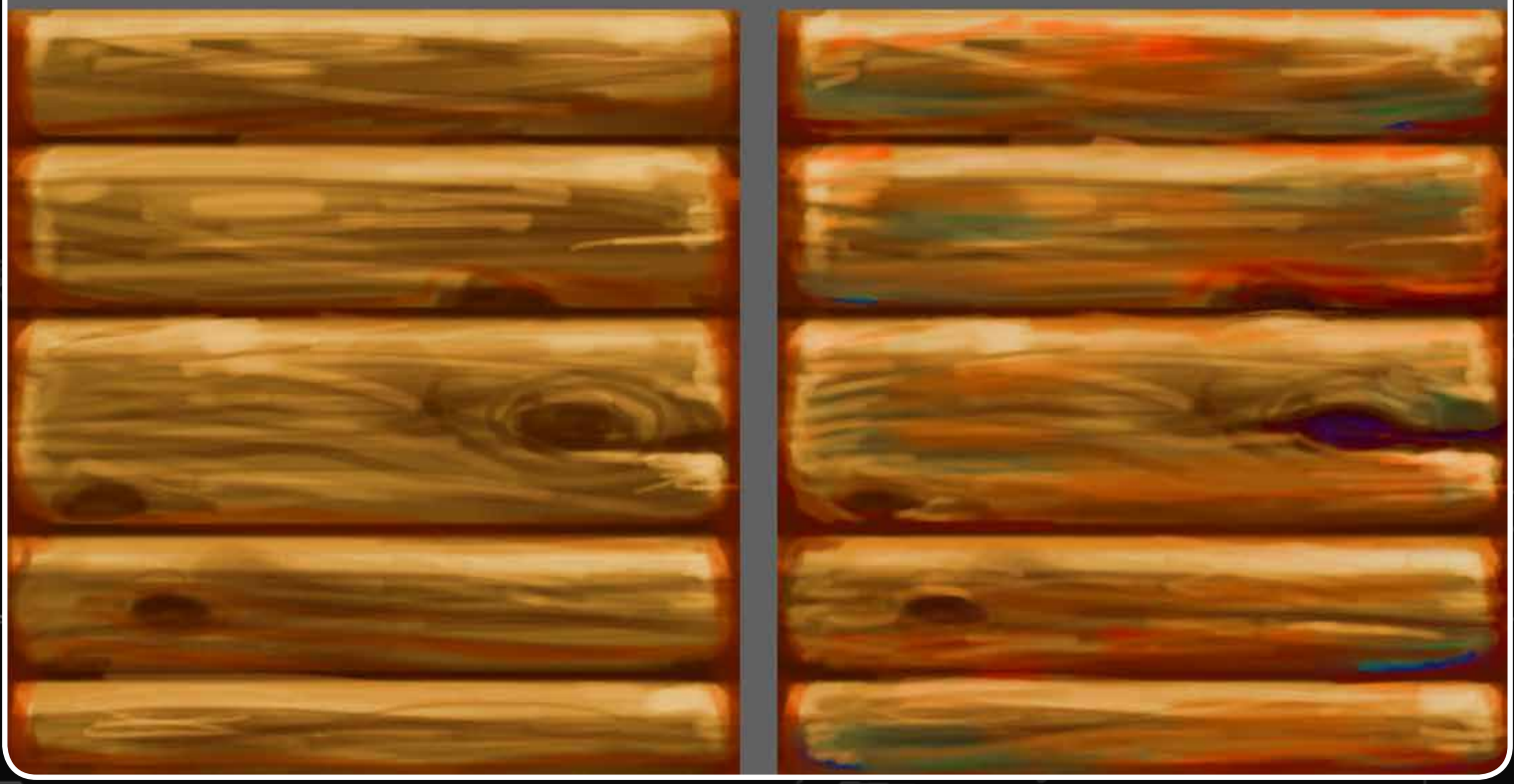
Squint and they look the same

Shadows and highlights all painted with the same colors

New colors picked each time to introduce color variation



Saturation increased to show color variations

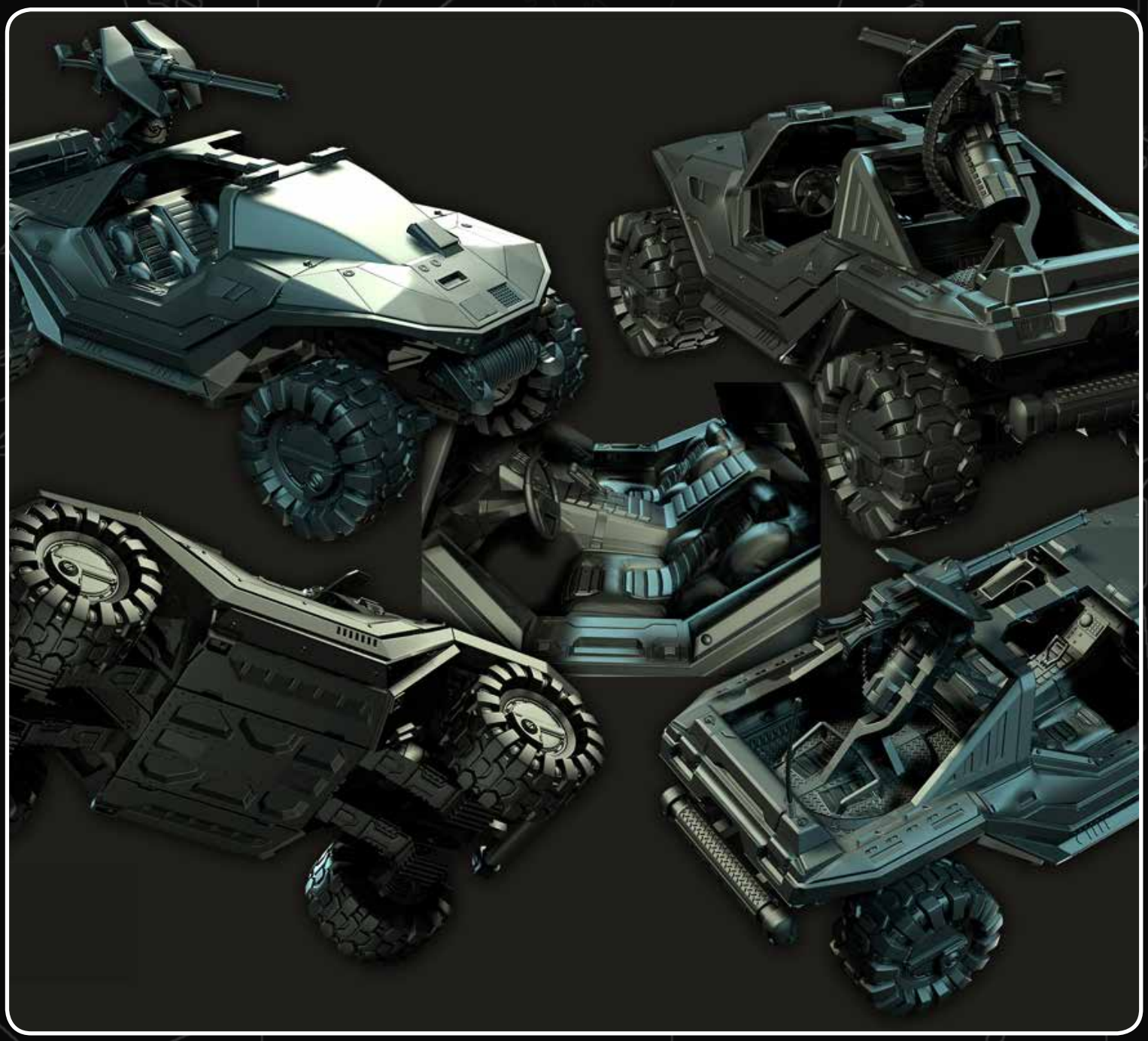


Conclusion

Keeping in mind color theory will help you not only pick a pleasing overall color scheme for your asset, but also help you to keep the color variations within each material type from looking flat and lifeless. Be in control of the color of your asset, make strong choices based on a solid understanding of color theory.

Figure out your overall color scheme first, look to the concept for clues, use photos or other images with pleasing schemes for ideas, and start with the largest most important chunks and work your way down in size and importance.

Next make sure the colors within each material have color variations, both from light to dark, as well as within each tone to avoid a boring feel. And finally, always make sure the color choices are subservient to the asset's purpose in the game.



Ben Mathis
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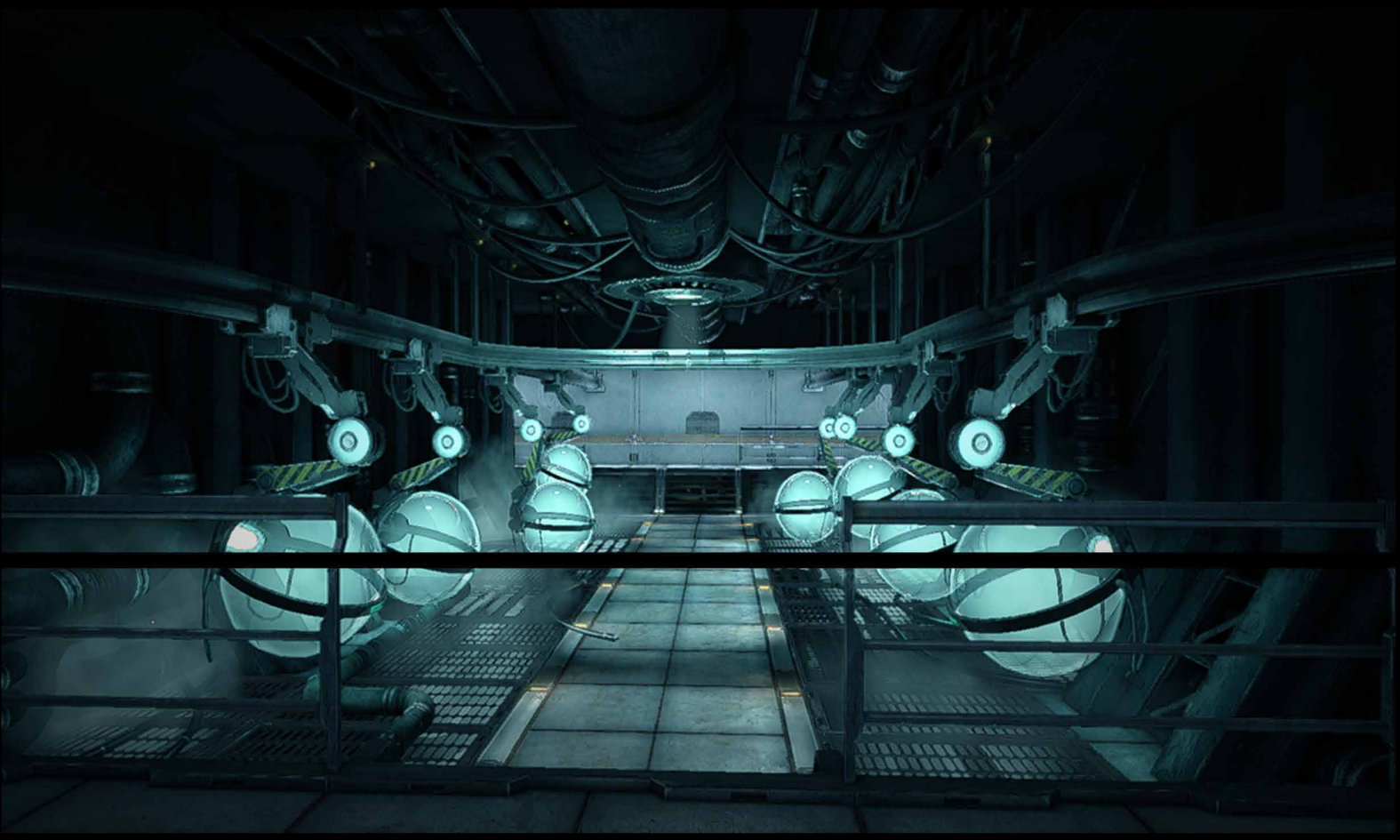
About Me

I hate biographies written in third person. I live in Iceland; the most beautiful and peaceful place on earth I've found so far, with my husband and dog. I like writing tutorials, making video games, photography, baking tasty things containing flour and/or butter, and working in my garden.

I've worked on a lot of games, one animated feature film, and also worked in the toy industry creating digital sculpts for McFarlane toys.



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JEANS

Creating Denim Textures By: **Del Walker**

This will be an insight into how I build textures, but concentrating on a somewhat complex surface that keeps arising in character art: Ass Jeans.

I'll begin by capturing forms from a relatively simple high poly sculpt and then use various baked maps to start creating our denim. The techniques I personally use could potentially be applied to lots of other materials but this is just a focus on jeans.

Why not just use a photo?

3 main reasons - Time, Control, and Crispness of Detail. With a photo it can be quite an exhausting/boring process to stitch together multiple images on your model to ensure it matches your sculpt.

Light information has to be painted out whilst trying to retain color pureness, which is a losing battle that can take ages.

Starting from scratch means you get complete control of lighting, so there will be no clashing shadows. It also means you are removing the possibility of blurring or distortion you might otherwise get from using warp/liquify tool when using photos.

If you are creating some pieces of a texture by using photos and others by hand then it's very difficult to maintain the art style, and can quickly become jarring. Cohesiveness adds believability. Plus it's just cool to say "Yeah bitch! I handpainted all that shit" to your spouse when you've finished (actually... don't do this. It never ends well).

Maybe there's a misconception among some students that hand painting textures means it must look stylized and toon like. How much realism you can get in hand painted textures is just a reflection on how far the subject has been taken artistically.

Anyways, with all that said and done, I hope you find this helpful! Feel free to completely reject any of my methods and try out alternatives. Art is about experimenting and preference, so adding your own spin to get results you like is only natural.

High Poly Model

When sculpting I put HUGE emphasis on the silhouette and major forms. 90% of the work is done on subdivision lvl 2 or 3, making sure that all lines and rhythms are appealing and correct. For these jeans I didn't take the detailing very far at all really.

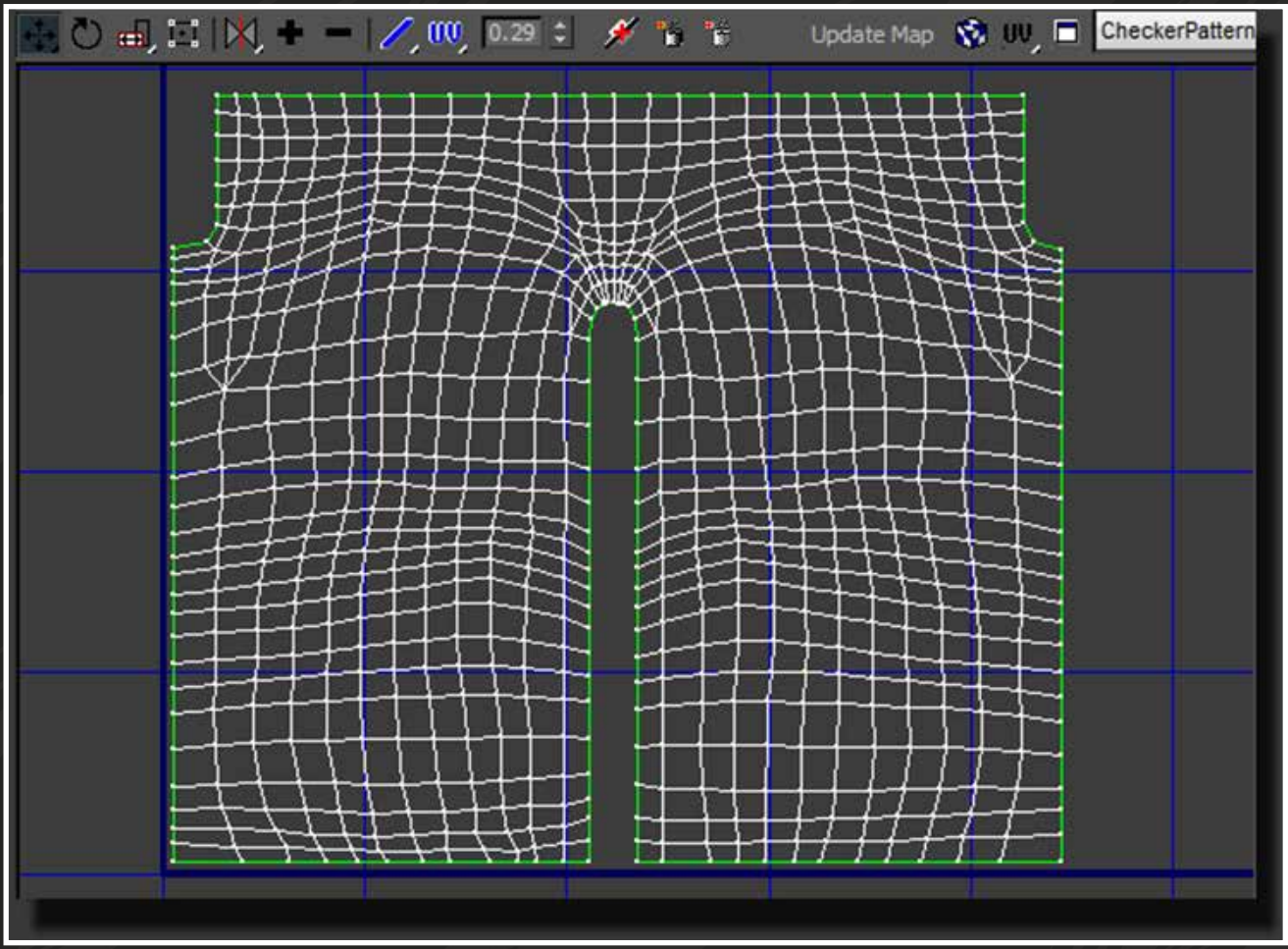
In fact it's relatively plain and holds no super-high res details (seam stitching, lots of baggy folds, canvas fibres etc.) The focus is putting the landmarks in the right places and using those as a basis for the texture. It's always important to think about the big picture and the sculpt as a whole. You want it to 'read' clearly from a distance before you begin zooming in and detailing everything.

That's not to say super detailing is bad, that's entirely up to you! But in this tutorial we'll be putting the stitching etc in the texture as I wanted this to be a texturing focused exercise. Another thing to note is that although I use photo reference to make the creases, I have to think ahead and ignore some areas. Most reference might show heavy creasing over the kneecap, but if I put this in the sculpt it would just look strange if the knee bent in-game and it still had creases on the knee. So yeah... mix reference with common sense.

Low Poly & Uv Unwrap

The quality of your deformation/bakes/shading and pretty much everything can be helped by keeping your mesh-flow nice and smooth. Never rush this part. Taking the time to ensure every flowline is smooth and purposeful will really improve both your silhouette and keep your normal maps showing super crisp. While it's very tempting to sculpt endlessly then 'crank out a retopo for the low poly', you're really just going to screw yourself up if you think like that. Get the most out of your model by being really strict with the smoothness of your topology. Also, be careful of putting triangles at deformation stress areas (knees, hips, etc).

Keeping things quaded makes things easier to control, but in general triangles are harmless until you put them in the wrong place. In the end the entire model gets triangulated when it is exported to a game engine anyway, so when people say “All triangles are bad” they are being just plain stupid. The problem with triangles arises when you put them in a place that needs to do a lot of bending.



The orientation of your UVs can be pretty important, so making sure it’s not tilted at an angle can help later on.

For example if your seam edges are straight and the UV island is unwrapped then you then you don’t have to worry about any curving or bending when using tiling overlays.

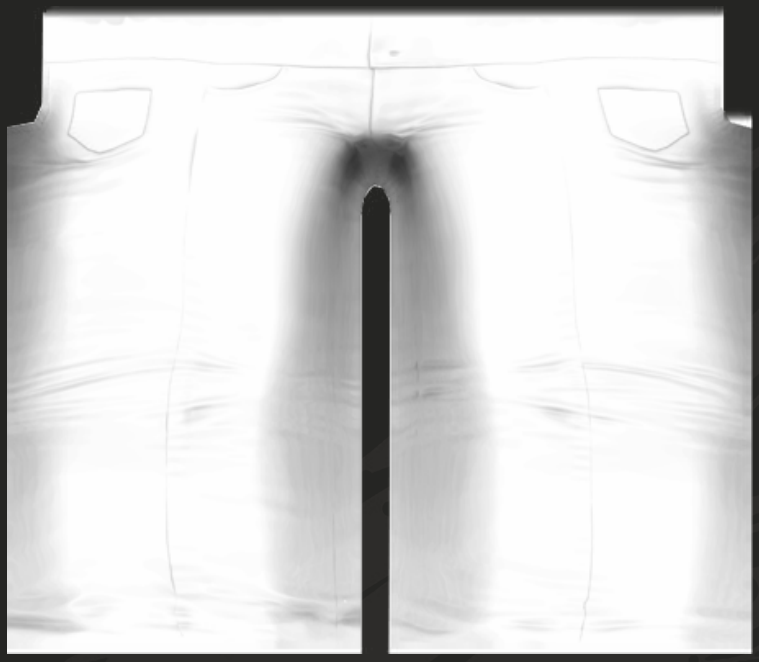
In my example I threw my major seam on the inside of the leg as it’s the part that will be seen the least clearly from most angles.

Having wavy or bendy UVs can quickly get out of control, especially if you’re not using a 3D painting program. If I were working on a flat-diffuse model that didn’t rely on any overlays then I wouldn’t be as concerned about keeping everything upright.

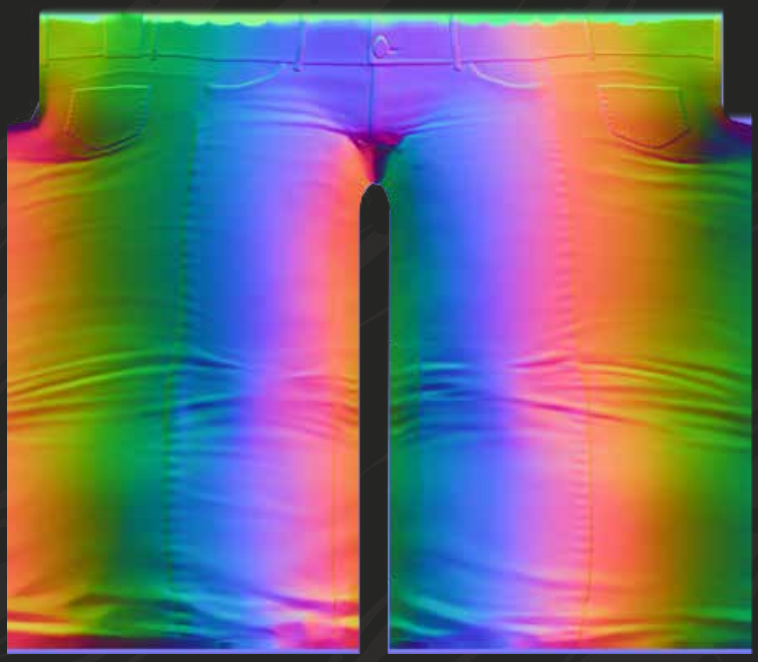
Baking

I personally use Maya or Max to bake maps, but for the purpose of this tutorial I'll use xNormal since everybody has access to this freeware software. The only tips I'd say for baking really is to remember to triangulate your low polygon meshes before making your maps. It's just extra information that help the bake get calculated better and come out slightly crisper.

I created a way of texturing that uses a virtually unused form of normal map to give me a headstart on forms. It's probably very unorthodox for most.

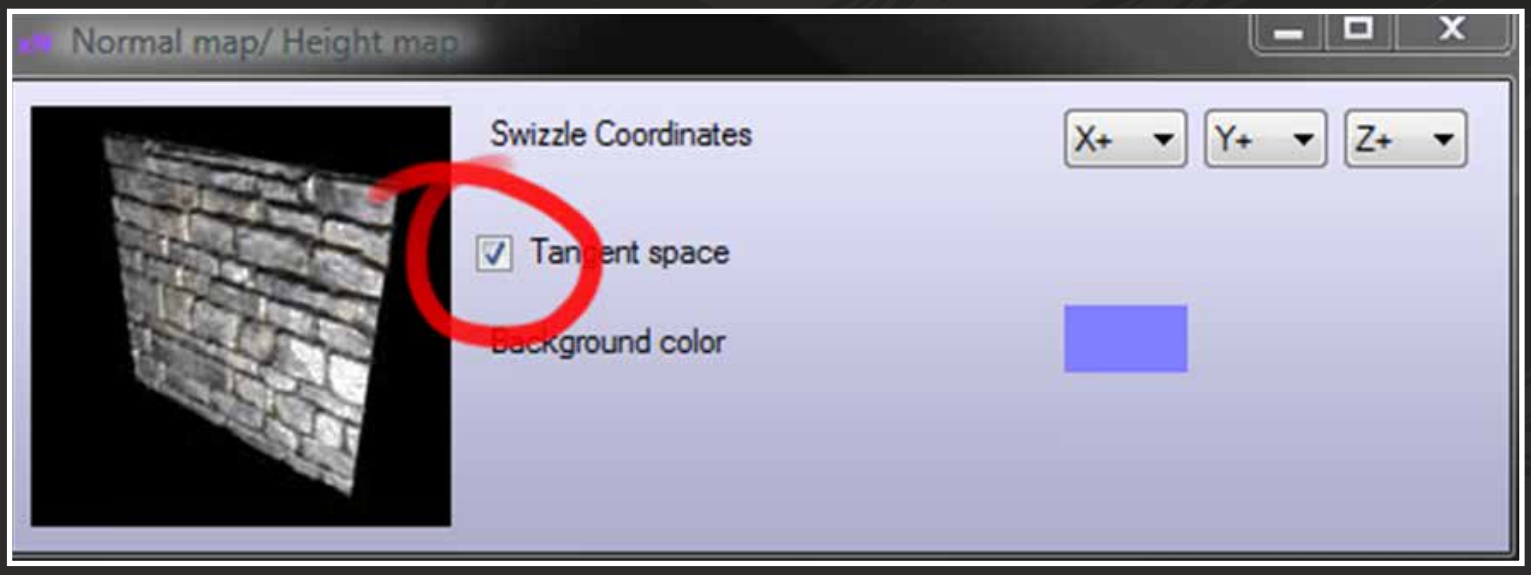


Ambient Occlusion



Object Space Normal Map

To make the object spaced normal map just go into the Normal map options in xNormal and switch off the "Tangent Space" checkbox.

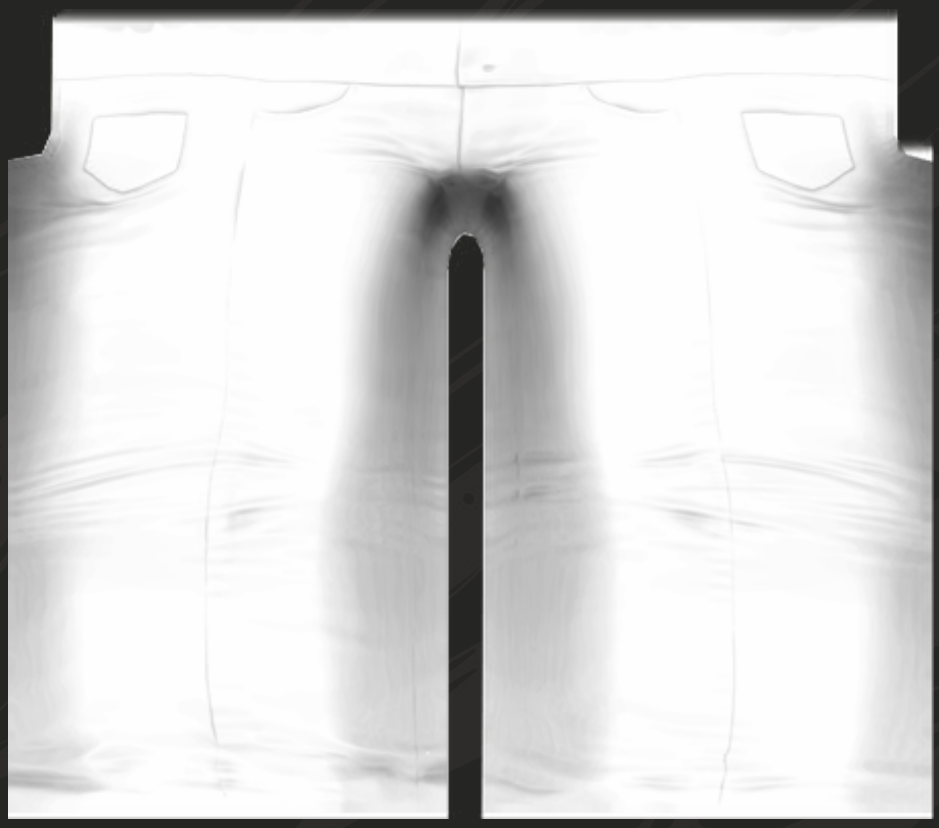


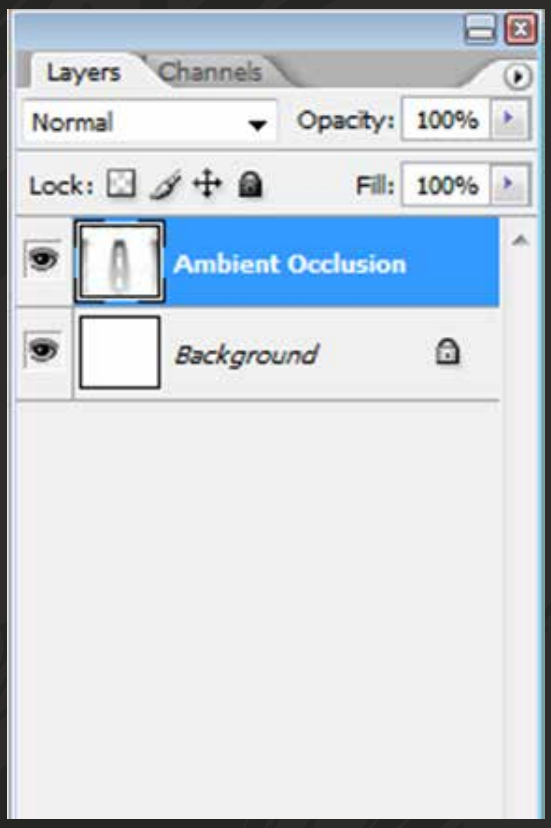
Next up, is the building the forms using the bakes we just made!

Building The Forms

(Before you start textures, make sure your model is displayed at 100% self illumination)Once you're ready, throw down the regular AO bake, but you don't want any Black in it. Black can never be colorized and will always remain black so to remove that just go to

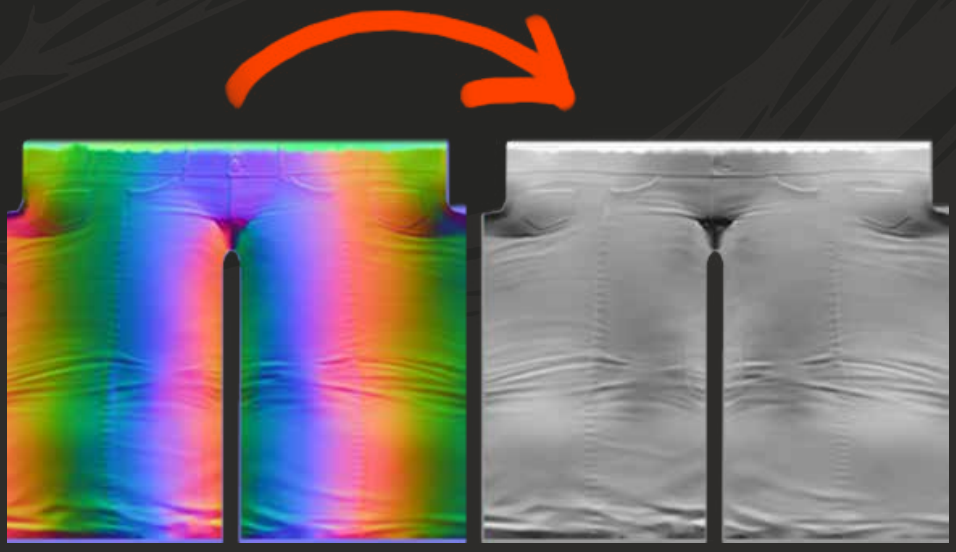
Image > Adjustments > Hue/Saturation and raise the Lightness by 15.





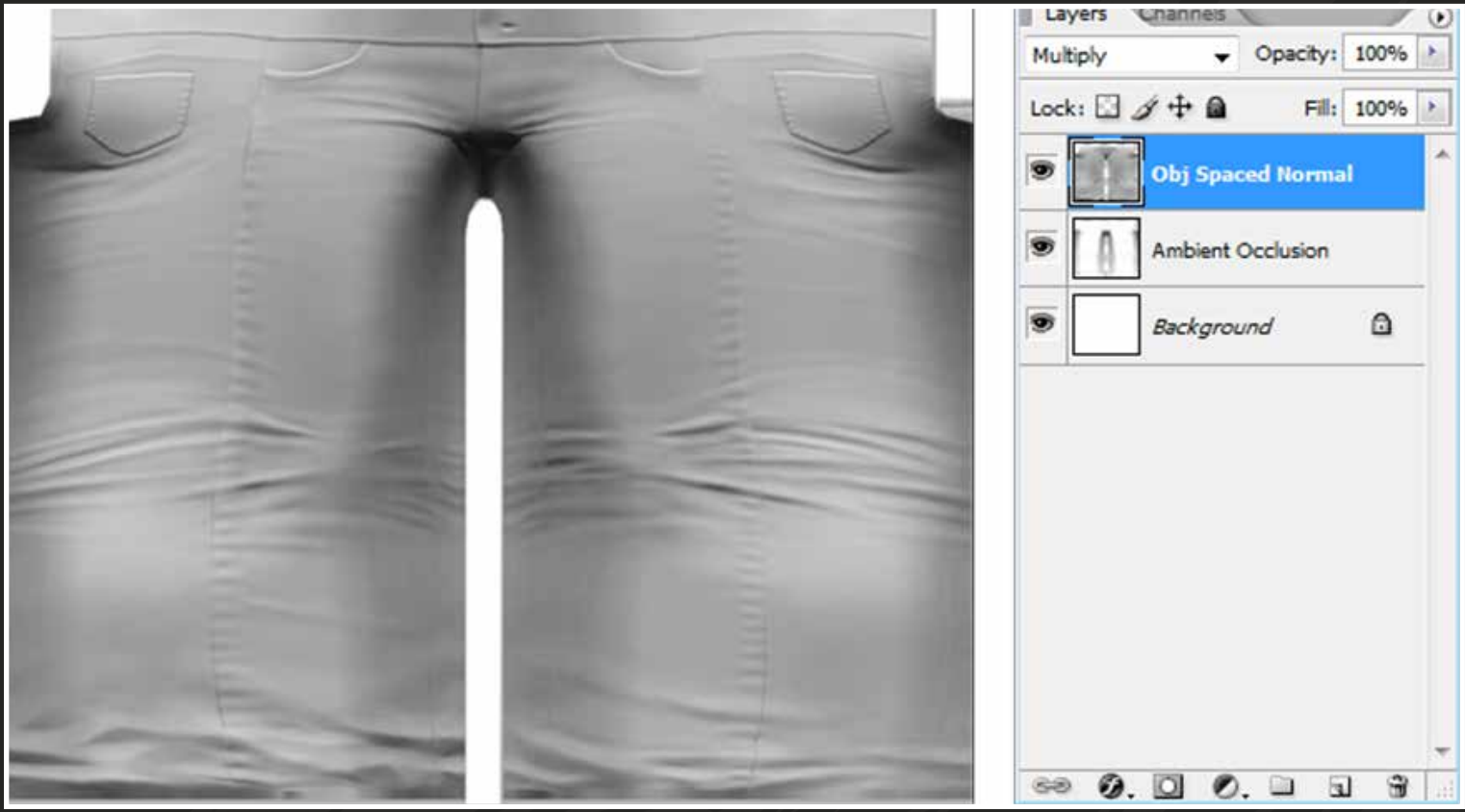
Next you're going to want to go to your rainbow colored Object Spaced Normal Map you made. Then grab the Green channel from it. If you can't find it just go to the top bar and hit Window > Channels.

Question: WTF is this green channel about? The Green channel represents the Y axis on an object spaced normal. So normal directions facing down are dark values, and upward normals are light/bright.



Object Space Normal Map Green Channel- Normal Map

Take that Green channel and paste it over your Ambient Occlusion map as a Multiply layer. We want to remove the Blacks from this too so remember to raise the Lightness by about 15 just like we did with AO layer.



Should see some forms begin to take shape, its just far too shadowy and murky right now.
One thing to consider is that our green channel layer is actually faking 'top-down' lighting which does add implied shading that has to be used sparingly.

If your game model is going to be viewed with mainly top-down lighting then it can help the shader tremendously by adding a little form, just don't depend on it. Too much implied lighting in your texture will make the normal map redundant!

Take the time to really tweak this map by adjusting the Levels as necessary, and removing the deep shadows. Keep this map bright and fresh! Too much shadow information won't work in-game, especially if there's a lot of dynamic lighting.

I use this subtly in the colour map to help bring shapes out, but mostly it will be a guide for building up the textures. Little tricks like using it as a mask layer to paint the highlights can really help to build forms and make sure everything is going to perfectly line up with the normal map.

I know many people have various ways of creating their Occlusion map, I just personally find using a regular AO with a plane SOMETIMES unhelpful in capturing the forms from the sculpt in an even distribution.

Occasionally when using a plane, I find that everything near the bottom looks a lot darker than the things near the top, and small details get lost. That's why I will use it on a case by case basis.

I think it's sometimes best to try a technique based on the subject and in this case I decided to use mainly the normal map to emulate the forms; especially because I saw on jeans reference how much if the weathering begins top-down because of they manually sand it in the factories (I strongly recommend you Youtube it, its very interesting!)..

Ultimately it's important to experiment with different methods of how to start your texturing process. Being flexible can save a lot of time, and can make getting to your goal a smoother journey instead of depending on one method for everything.

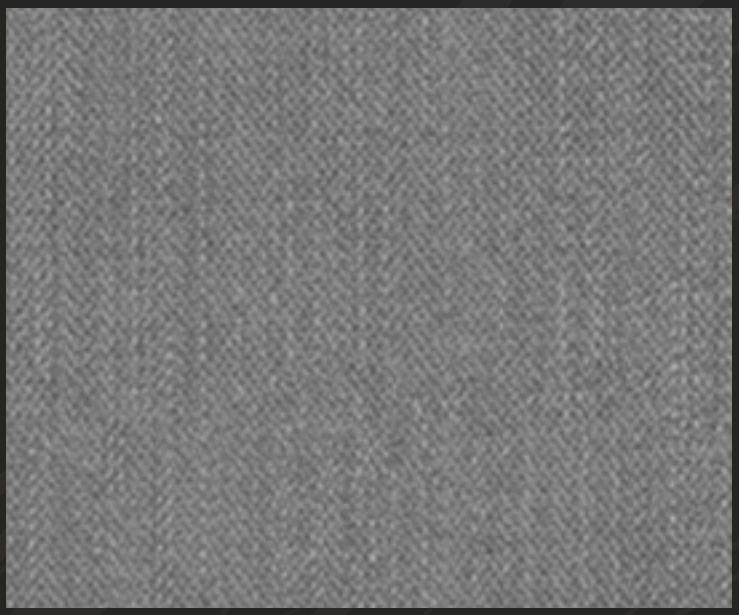
Learning to not DEPEND on 1 method isn't good. you really have to work hard at improving your texturing by practice to get the most out of your models. You can't cheat craft.

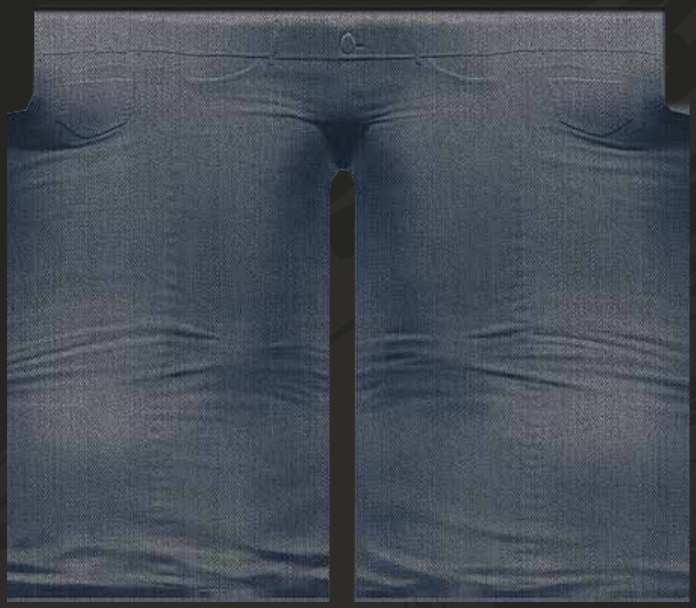
Texture Dat Ass

To get started we flatten the AO map we just made and colorize it to a denim color. From there we set it to Multiply and begin making textures on layers underneath it, using it as a guide. This will remain our top layer for a while.

The bottom layer should be a tiling denim overlay, which is at a mid grey. This is only non-handpainted part I use. Make one using photos of denim fabric close up. Or you could just be lazy and just grab one I made earlier.

www.drawingyourdreams.com/mydenim.bmp



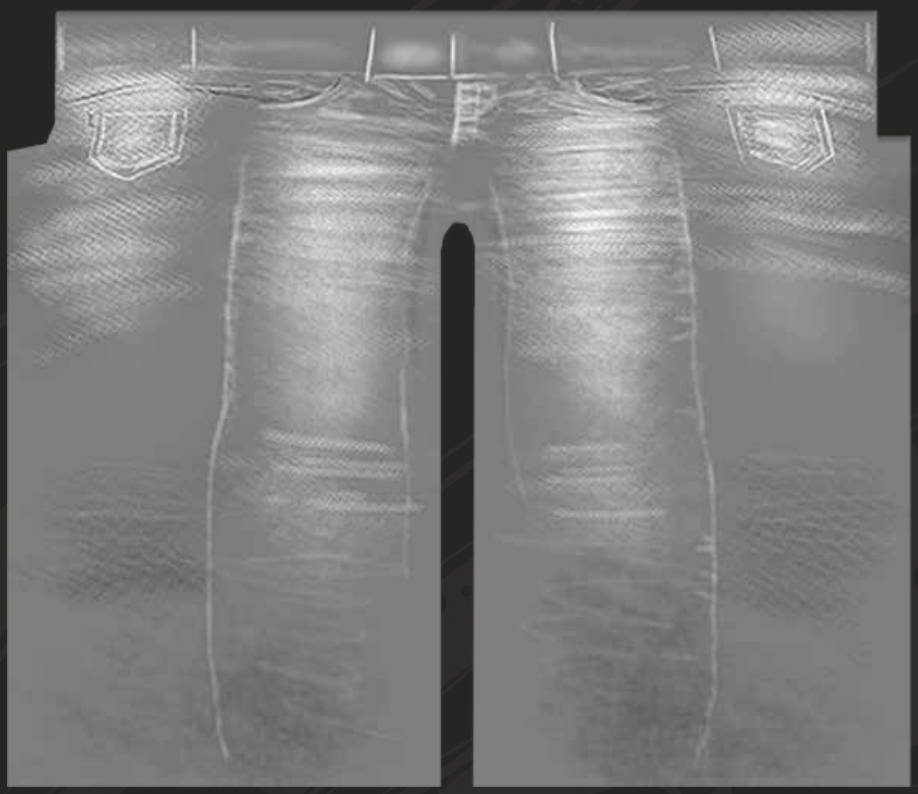


The base should be pretty dark to begin with. I will be painting directly on my fabric layer using the Dodge tool.

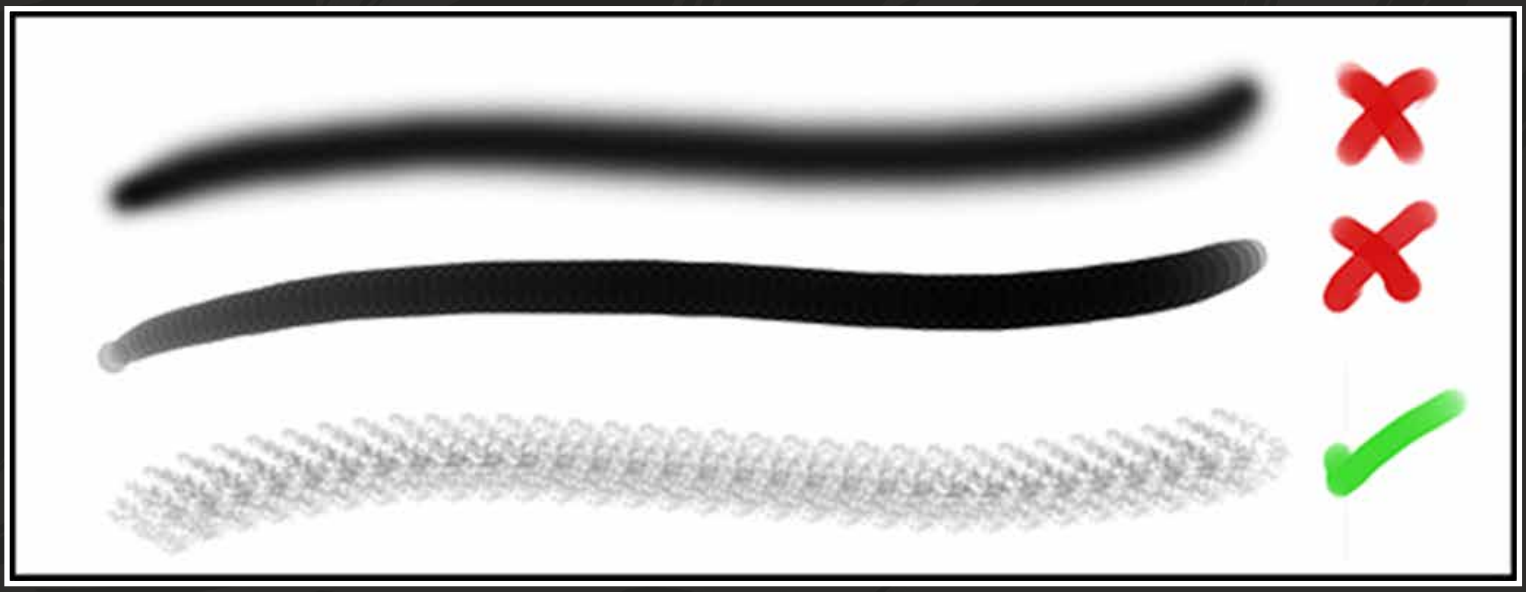
I like to build the highlights + dirt with Dodge & Burn, with a soft round brush. I keep a super low exposure using the AO to guide me.

Colorizing the fabric layer blue then using the paint brush on Hue mode to paint different yellowing areas adds variation.

At this point I create a layer on top of all my maps and fill it with 50% grey and set it to Overlay. Then it's simply a case of building up the worn + faded effect on the jeans using a rough brush with the Dodge brush. I'll use a copy of my AO as a layer mask to help me build shape.

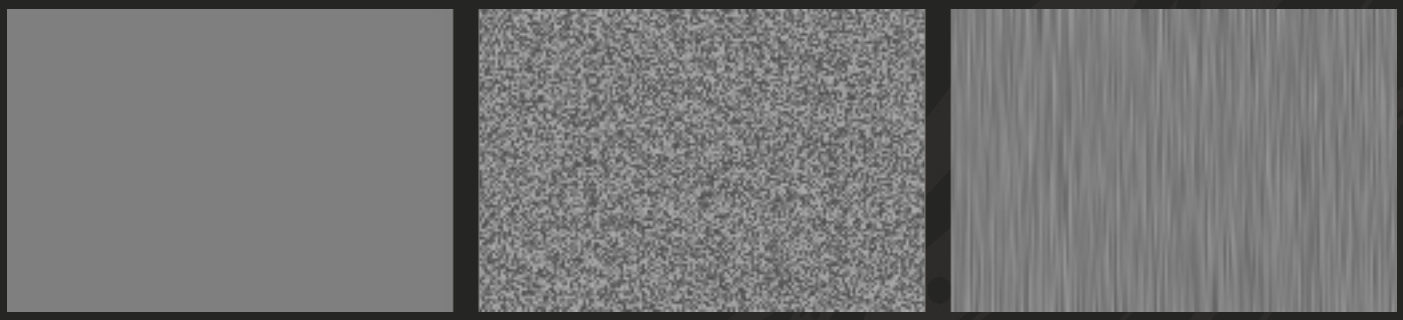


Doesn't need to look pretty! Just get scratching, and follow ref.



When building up the faded worn marks using Dodge, I want a very rough brush on a low Flow setting. The standard Photoshop chalk brush with the spacing pulled up a bit works great. If you use a round soft brush its going to make everything have a powdery look which isn't denim-like at all. A smooth brush will give it a painterly look, and that's also the opposite of what we're trying to achieve. (Powdery jeans are SO not 'in' this season)

Another variation I add is an overlay of a simple noise layer. I want to keep the feel of directional fibres so I add a Motion Blur to make it streak vertically. After that I'll hit Sharpen to force a tiny bit more contrast. Layers like this are the reason the UV unwrap was so important. If the UV was warped, or curved then I'd pretty much be screwed when making this Overlay.



From here I just continue to bleaching out areas and add dirt and grime near the cuff, knees and pockets. Areas that hands come into contact with the denim will show the most faded and stained, so the contrast of the fibre will bleach and show up stronger here. The size of the texture map is very important here. If you have a huge texture sheet then you're going to want to scale up this layer so that it reads clearly from a distance.

Final touches involve slowly turning the opacity down of my AO to about 35% while I Dodge more highlights on my top layer. I happened to make this AO in such a way that it has a lot of implied top-down lighting which I don't want too much of, or else it could clash with the normal map and lighting of a game engine.

Finally I add random spatters of discolouring, and yellowing. Adding the stitches and any labels goes on a separate layer so I can use those to generate normal map overlays later on if I need to. At this stage decisions are based purely artistic eye and looking at ref that will bring it to completion. To finish up just make a cavity map to bring out all the fine edges.

Pretty much all that's left to do is grab the tiling denim layer and the stitching layer and make normal maps out them by using a normal map filter and overlay that on my normal map

That's pretty much it! Obviously there are things to consider about the personality of the character too.

Things like rips, or more grime could be added to change the 'character' of the jeans! I don't pretend to be the master of texturing, I'm still learning too!

I do however want to underline (especially for people still learning) that it's good to put yourself out of your comfort zone and really take time to really push things as far as you can.

It could have been quite easy to stop with this texture about 4steps back and think "hey that looks good enough.

I think I'm done now". Making a lot of iterations and going the extra mile with polish is really the only way squeeze the most out of quality.

So I highly recommend not picking the 'short route' and going the extra mile. Hope this was helpful and brings something to your own art.

About Me

I'm a Character Artist in the UK, and I've been in the games industry for about 2years. I first snuck into the industry after studying Graphic Design for 2years then going on to study Game Art at De Montfort University.

Childhood for me wasn't filled with drawing, and I never did an art course until long after I finished high school so don't feel that it's impossible if you weren't an artist from age 2. It's still possible with a metric Fuckton of hard work. I try to devote an hour a day to pencil studies, life drawing, or 3D personal projects where possible.

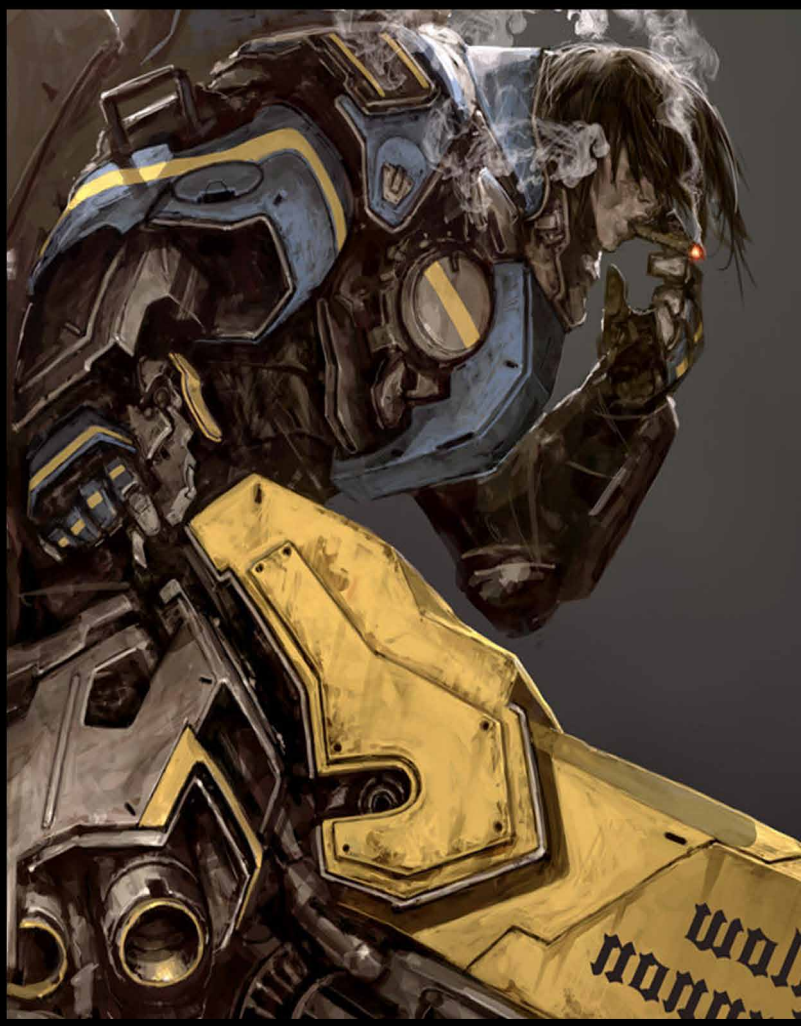
I still occasionally play SNES and & PS2 rpg's, but am genetically anti-FPS. Currently I'm working with some extremely talented people here at SEGA who are helping me on my path to world domination. My weapons of choice are an A5 Wacom tablet, and +3 Great Axe.

Del Walker

www.drawingyourdreams.com

Baolong Zhang www.baolongzhang.blogspot.co.uk

5 MINUTES REMAIN



ZBrush4R2

ZBrush Sculpting Tips & Tricks By: **Michael Vicente**

I've received a bunch of e-mails asking me "what's the secret to making crisp edges using ZBrush?", "what brushes should I use for making my rocks not to look like bubble gum?" and a bunch more, but unfortunately I can't cover them all. This article is a good opportunity for me to at least explain the main one "how can I approach rock modeling".

Rocks are something pretty strange. They look like a simple thing, but everybody will tell you the same, "it's maybe one the the hardest things to do right". I'm not saying this just because I actually did a bunch of them, but because it's what I see on most 3D forums. I think good rocks are something really lacking in most of games, and especially if they need to be stylized in some way.

A game I have in mind that inspired me a lot for my own motivation in improving myself to make stylized environments, and I think contributed a lot to make me chose what I want to do in my life as an environment artist, is Darksiders.

It has a great balance between stylization and the "next-gen" feel. I also played Rage, and the rocks also look amazing. They also have a really nice mix between realism and stylization. So yes, realistic or stylized, there are a few games that put some love into making really nice looking rocks.

Sometimes using completely different techniques, depending on the challenges they're facing, but it's still something pretty hard to achieve. Often times it's just because you don't have time to make it look good enough, or because of some tech issues.

I still have lots to learn and improve for sure, we learn things everyday and this is probably what I love the most in the game industry, learning from the others. So I'll try to explain what I've learned so far. All the ZBrush tips that help me make crisp edges and work faster.

I'll start this article by covering how to improve your user interface, as well as a few tips and tricks. Then I will go over a complete breakdown focused on producing a stylized rock, using one of ZBrush's newest features : Dynamesh.

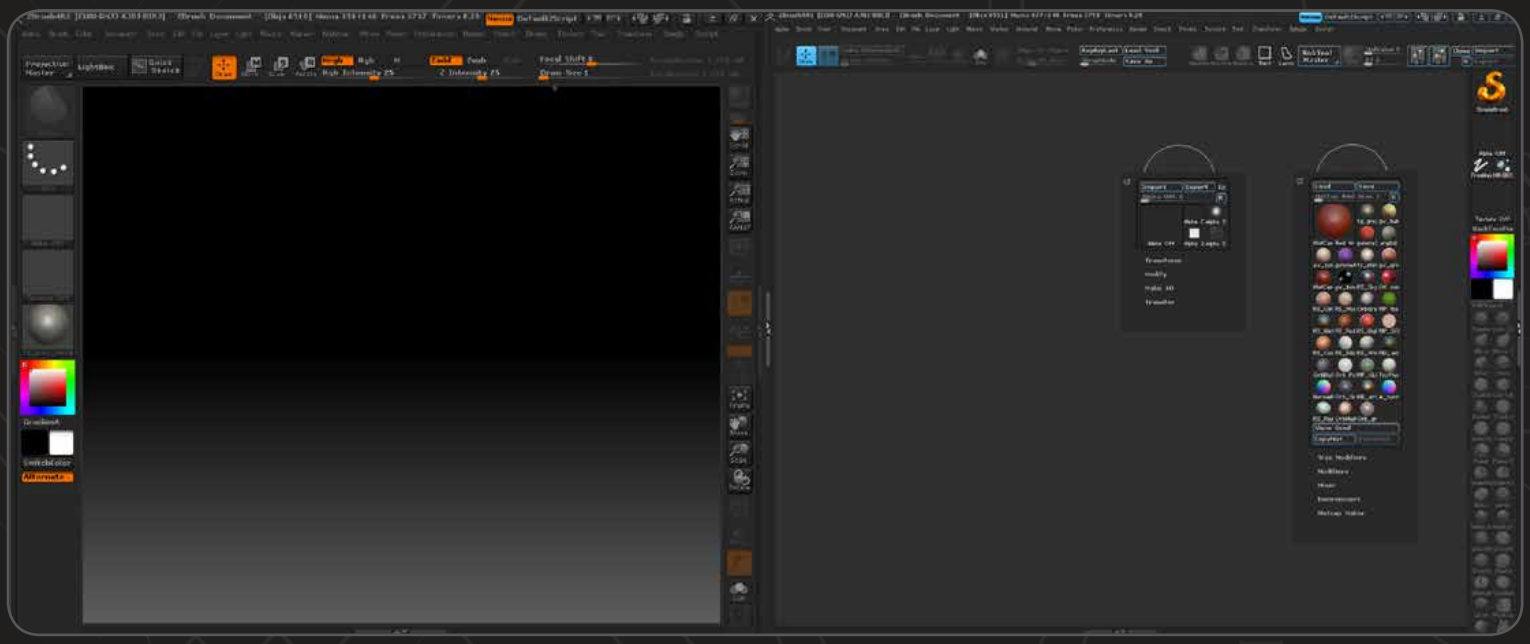
The Interface

First of all, these pages are mostly for advanced ZBrush users. You should already know at least how to navigate and how the general interface of ZBrush works, which is not the easiest thing to learn at first. Hopefully ZBrush is becoming more and more intuitive and accessible.

It's been a huge leap between ZBrush 2 and ZBrush 4R2B, which we can easily call ZBrush 5. It's now a must to know in the game industry, and that's great because this software is fun as hell. If you use ZBrush a lot, customizing your interface is really important.

It will save you a lot of time and you'll feel a lot more comfortable with your own settings and skin. This custom UI bellow is just an example of how it can change the aspect of the software, how it can turn ZBrush into something that suits your needs perfectly.

It's not meant to be the perfect UI for every ZBrush user in the world, it's just a UI that works the best for what I need to do. Of course you can download tons of custom UIs, but I definitely recommend you make your own for your specific needs.



Standard UI **Custom UI**

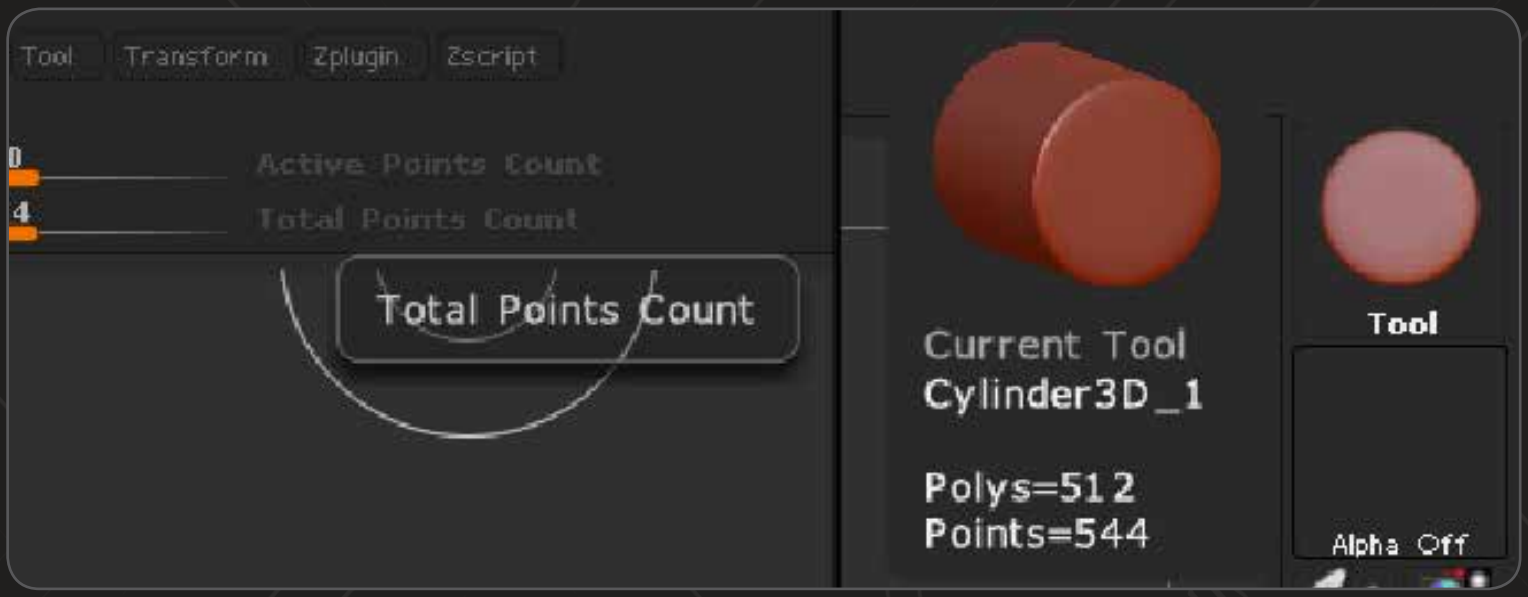
Interface Customization

Go to Menu > Preferences > Config > Enable Customize Move icon from different Menus using “Ctrl+Alt” and drag and drop it wherever you want.

(Drag them into the canvas to delete them)

Once you’re happy with your UI, turn “Enable Customize” off, and press “Store Config”, that way your UI is loaded each time ZBrush is opened. Don’t forget to save it, using the “Save UI” button.

If I have any advice on what to add or not, it will be trying to think of what you use all the time, even small things you don’t even notice. Also removing things from the base UI, all the things you almost never use. For example, I removed all the “projection master”, “Lightbox” (using the short-cut “,” instead) and “Zsketch” buttons, because I don’t use them that much. You can also remove all the document buttons on the right side (Scroll, Zoom, Actual and AAHalf), as well as the “Active and Total points Count” from the canvas, because you still have access to this information just by hovering the mouse over the tool icon (of course it depends on how you use ZBrush).



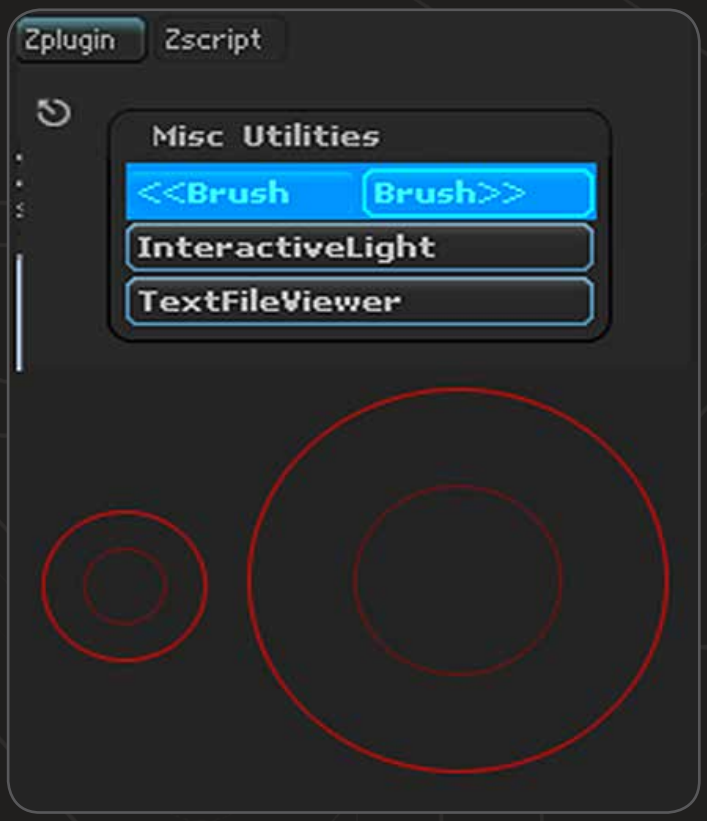
Now "what's the point removing buttons from Zbrush?" Simply because removing icons doesn't mean you can't use them anymore. You still have access to the using shortcuts. It allows you to add other icons you use a lot more with the gained space and have a clean UI that is not over-flooded by multiple panels.

An other thing, is placing it regarding if you are right handed or left handed. As you can see on my custom UI, I removed everything from the left panel because I'm right handed. So it's more natural for me to place it on my right and I don't need to travel my cursor ages from the left to the right of the screen.

Hotkeys

These are the key for a smooth and fast workflow. You can set a hotkey (with enable customize off) by pressing "ctrl+alt left click" on a button, or even an entire menu like the materials, alphas etc. Of course you can even make your own menu by going to "Preferences>custom UI>create New Menu".

Basically you can drop anything you want in this menu (like your custom brushes for example) and assign it a hotkey once it's done. I also highly recommend you to assign 2 hotkeys to control your Draw Size (I have it near my left hand since I sculpt with the right one.)
You can find it on Zplugin: "<<Brush" "Brush>>"



Preferences

Another favorite hotkey I have is one for the "Solo Mode" from the Transform palette. Basically it hides every other subtool you're not working on. This is really useful when you have tons of them.

By the way, you can also quickly switch from one subtool to an other just by clicking on Alt+left click on the Tool you want. It sounds basic, but some people don't know this really useful shortcut.

Endless Draw Size

Sometimes it's useful to be able to have a draw size that is as big as the canvas (if you want to smooth a really big surface for example.) You can tell ZBrush to go over the Maximum Draw size by going in "Preferences>Draw>Max Brush Size".

Small Icons And Big Previews

You can tell ZBrush to reduce the size of the icons to something smaller. It is really useful if you use a lot of brushes and want them all in your UI. This is configured in Preferences>Wide Buttons.
In addition to this, you can tell ZBrush to show a really big preview of your tools when you mouse over it, by going in Preferences>Quick Info>Preview Icon Size.

Hide 2D Tools

If you never use 2d Tools, ask ZBrush to hide it in "Preferences>Interface>Auto Hide 2D Tools". Since MRGBZGrabber is a very useful 2D tool for making custom alphas, you can add it to your custom UI and even with "auto Hide 2D Tools" enabled, it will stay visible.

Auto Collapse Palettes

When you open a lot of menus, it can start to get pretty messy. One thing that helps a lot to keep things clean is to set the palettes to auto-collapse. That way, when you switch from a palette to an other, the previous ones will collapse themselves and not disturb you. Go to Preferences>Interface>Auto Collapse.

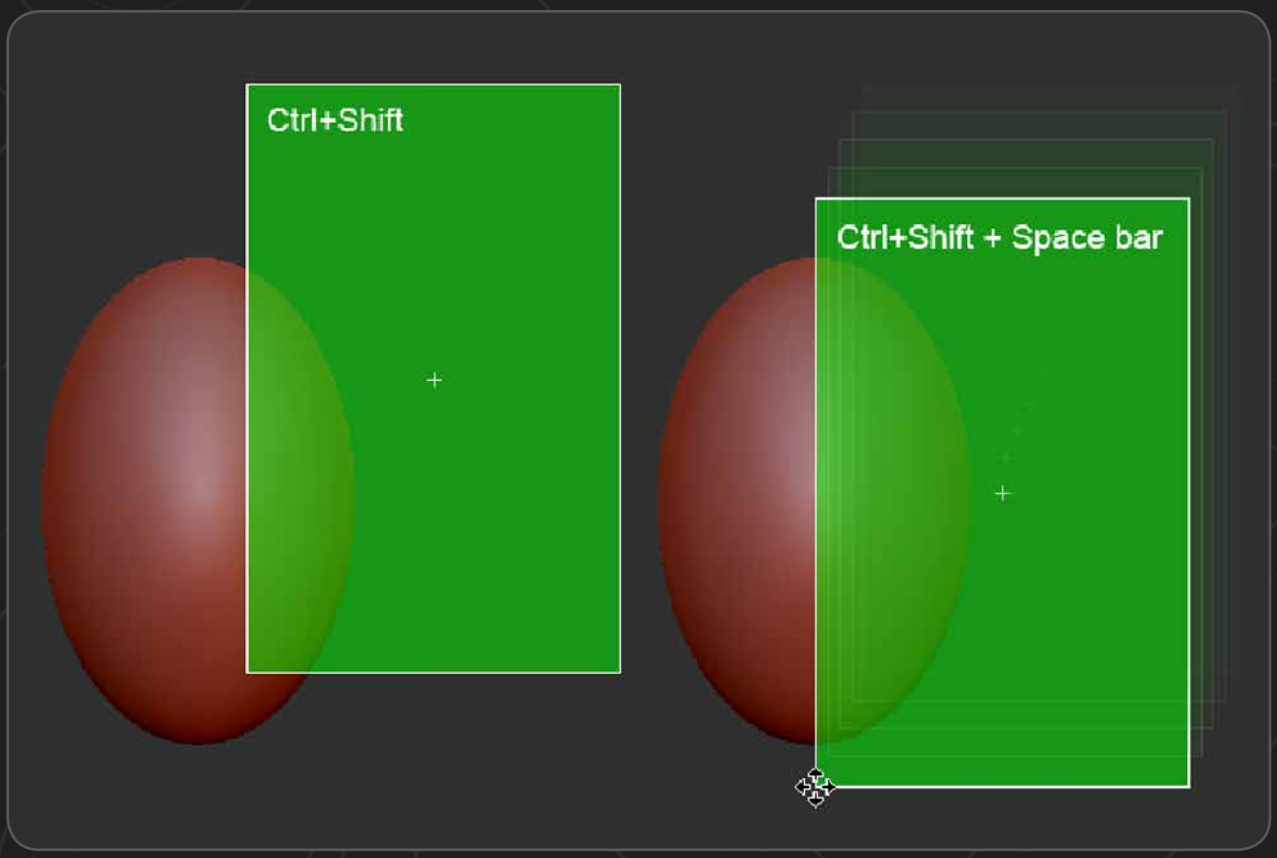
AutoBack in ZBrush

Sometimes ZBrush crashes and you lose your work. So just in case, turn on the autoback option in ZBrush (very well hidden though). Go to "Preferences>Performance>Auto File Recovery" that way ZBrush will save your tool to the recovery folder which is found in the root folder of ZBrush.

Selections

One good thing to add to your UI is shortcuts regarding if you want a “rectangular marquee Tool” or a “lasso tool”, because while sculpting we often switch between draw selection, rectangle selection and lasso selection. You can push it even further with a toggle between those selections using some scripts found on ZBrushCentral.

You can also move a selection by holding the space bar which is really handy.

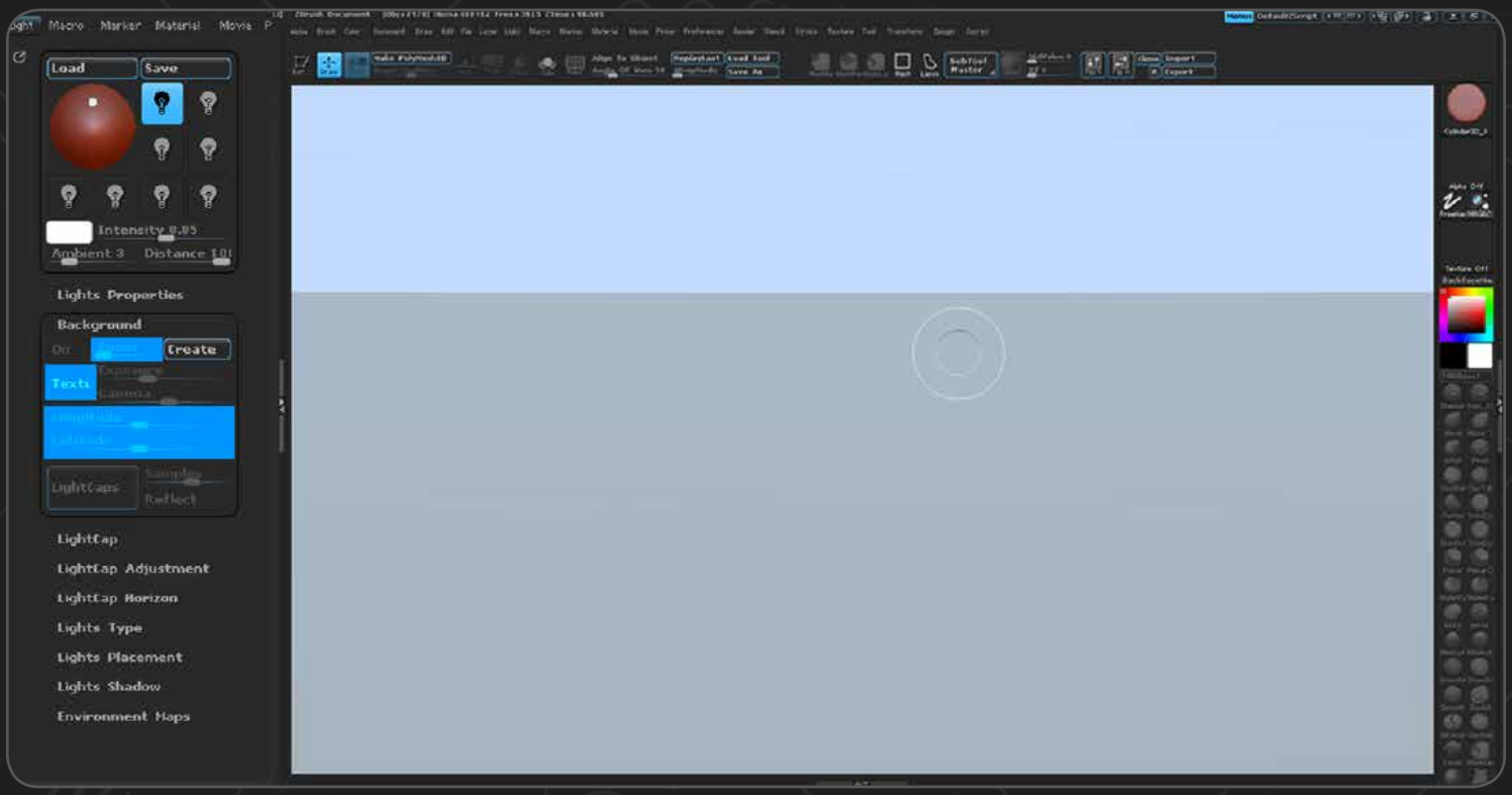


Removing The Gradient From The Canvas

Yes this gradient is annoying, and it sounds simple, but a bunch of people don’t know how to remove it. Hopefully you can remove it by going to “Document” and turning the “Range” slider to 0. You can even change it’s color in the same place going to “Back”.

To be honest you can even customize it yourself in case you want a custom gradient. It is possible. Go to: Light>Background>texture and load a texture that is very long vertically and almost flat horizontally (even 1 pixel).

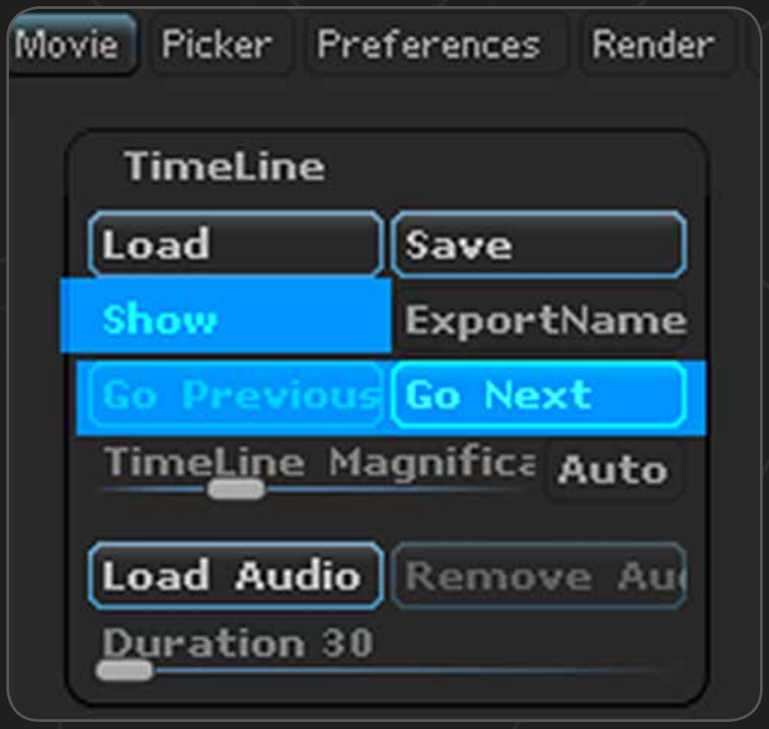
In the Background menu, set the zoom to its maximum to have something perfectly horizontal. This technique allows you to change the gradient and if you clear the canvas with ctrl+n it will stay since it's a lightcap trick and not a "2d tool". Don't Forget to save your canvas settings in "Save As Startup Doc" in the document palette.



Timeline

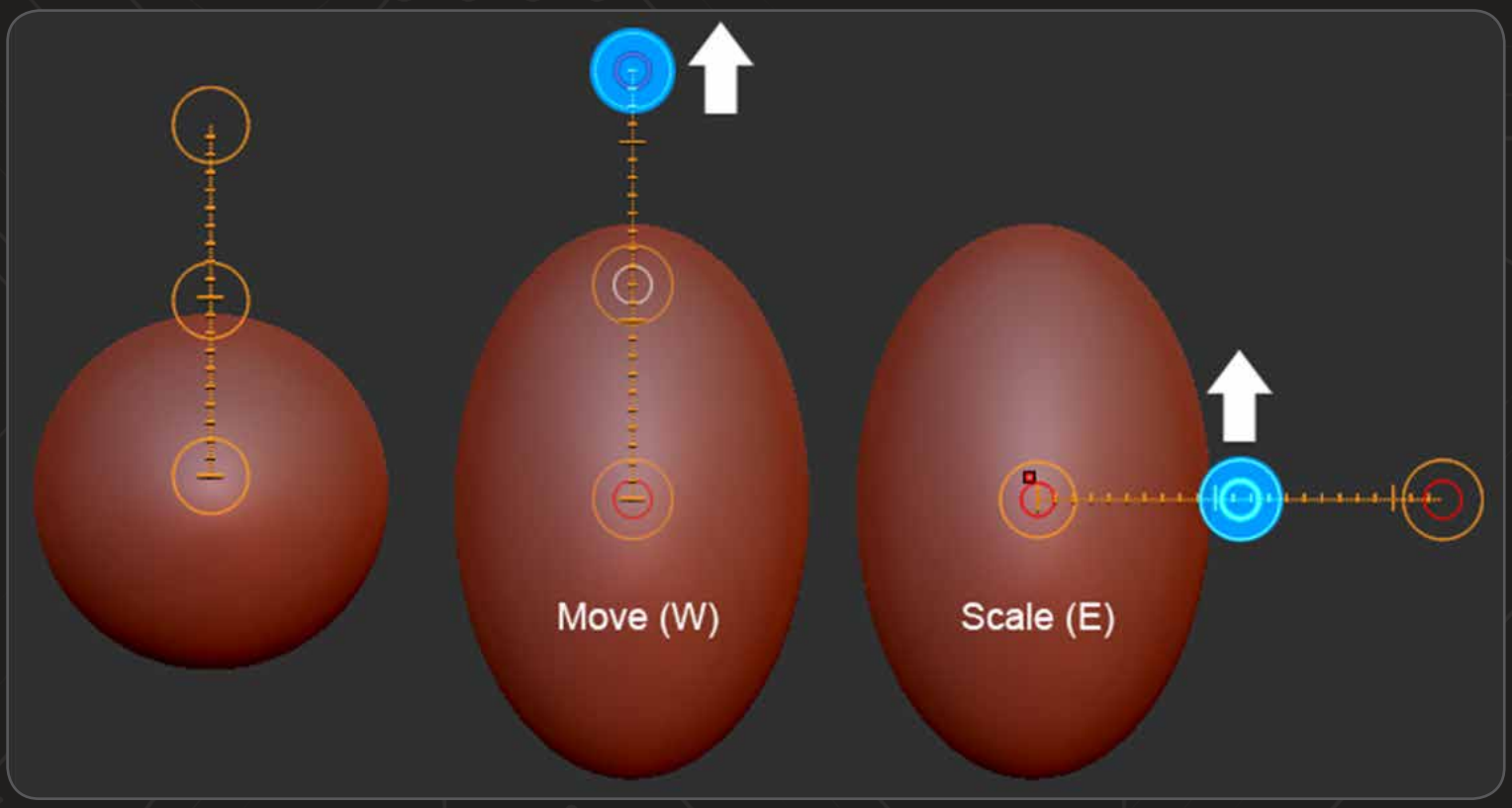
Ok so this is for people Saying "ZBrush annoys me because we can't have the Classic 3D applications Orthographic Views". Actually, you can, even if it's a weird trick to use and you can't have them all at once. "Go to Movie>TimeLine>show", and assign a Hotkey to The "show" Button. That way you can toggle the Timeline whenever you want.

Then Assign two Hotkeys on "Go previous" and "Go next" to something like the left and right arrows. Setup a view you like by simply clicking on the timeline to add a key, then next view >next key, simple as that. Then Hide your timeline with your Hotkey. You can now quickly Change your views with your arrows!



Transpose

As you know Transpose is used to move, rotate, and scale a part of a mesh or all of the mesh. I already saw a bunch of people having troubles transposing their meshes, because sometimes the transpose tool doesn't feel really intuitive. For example, I feel more comfortable using the actual move transpose, instead of the scale transpose, if I want to scale a mesh in a horizontal, vertical, or even diagonal constraint.



Another very useful trick when using Transpose, is once you draw your transpose line, keep holding your "left click mouse" and click on "ctrl". That way, you'll be able to instantly move, rotate, or scale your mesh without re-clicking!

Brushes

The brushes I use the most when I sculpt environments are Claytubes, Flatten, Move, Dam_Standard, Inflat, Pinch, TrimFront, Planar, PlanarCut, MalletFast, MalletFast2, Smooth, Slide and a bunch of custom brushes.

The problem is, a lot of useful brushes are missing in ZBrush 4R2 brush palette ("b" shortcut). It's not like they're gone forever, but they are now only available through Lightbox which is pretty annoying if we use them often. This is the case of the MalletFast2 Brush that I use a lot, or the Slash Brushes, the SmoothStronger and a lot more.

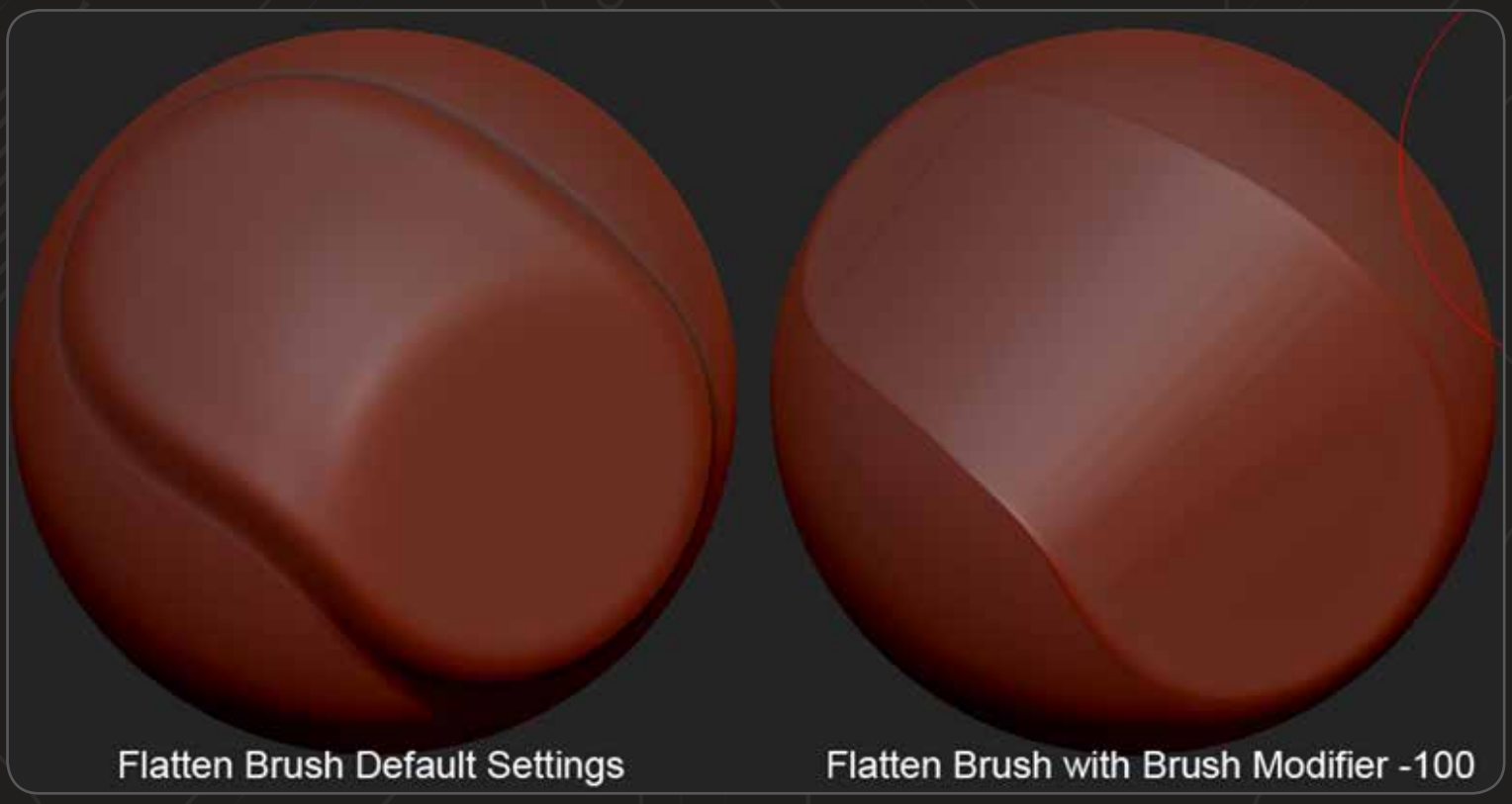
So if you want those brushes to be available in the Brush Palette (also as a UI icon), go to your ZBrush Folder>ZBrushes and copy the brushes you want to your Zdata>BrushPresets folder. So now when you hit "b" you'll have all those brushes available.

Flatten & Pinch Brush

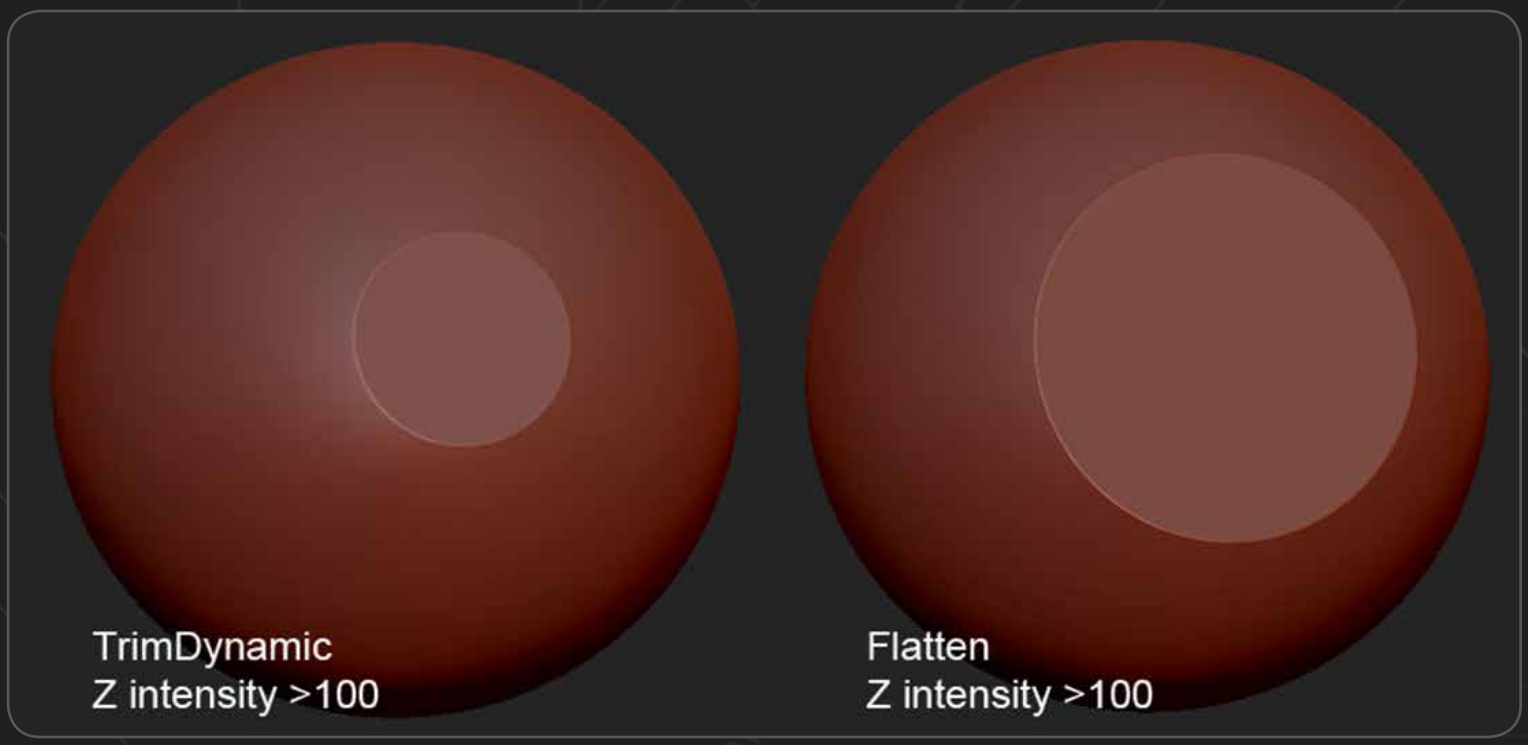
What's the secret of making sharp rocks on Zbrush? I'll say for me it's using the flatten brush. The flatten brush is really perfect to quickly build a crisp silhouette, but also to polish your mesh to something really clean. It's also perfect to fill cavities, holes and erase details when using it negatively (with alt). For me, this is the best brush so far when I'm making a stylized environment.

If you try to use the Flatten Brush you'll notice that by default this brush looks more like a LayerBrush. It makes some weird artifacts on the sides, instead of doing what it's meant to do, flatten. So to fix it, Go to "Brush>Modifiers>Brush Modifier" and set the slider to -100.

I like to use it at its maximum intensity since it's the result I expect from this brush. I saved it as my new Standard Flatten, using "Save As" in the "Brush" Palette and replacing it.

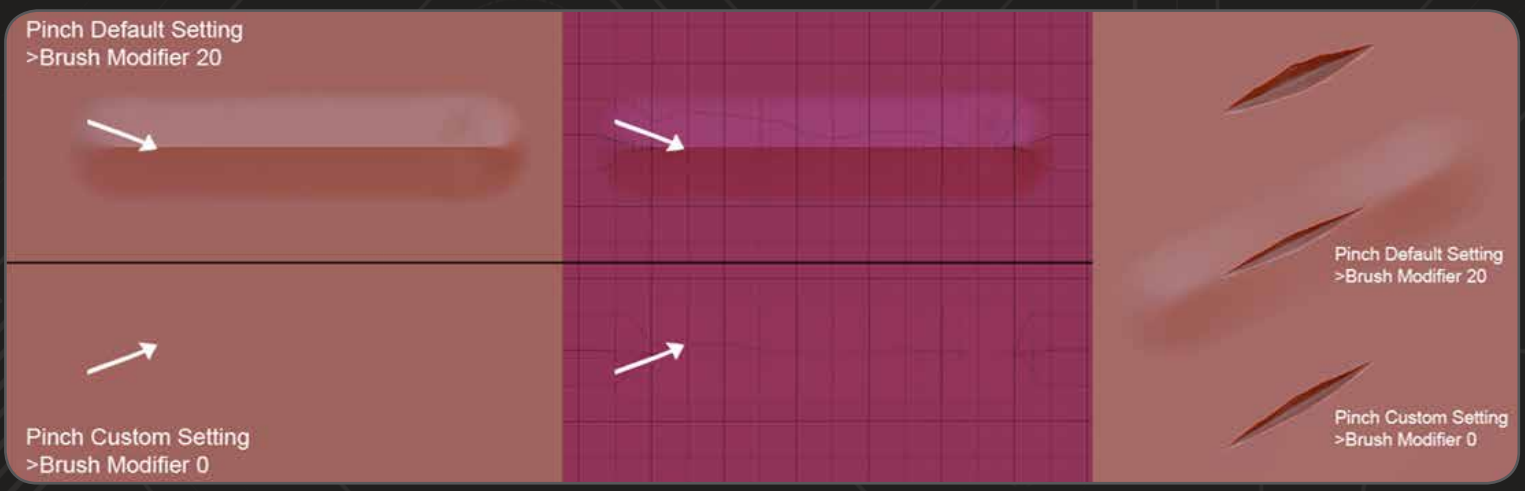


To be honest you can now use a new brush, the TrimDynamic Brush, which is very similar to the flatten brush. I don't use the TrimDynamic because I don't feel it is strong enough for what I need to do. It also has a strange Polish feeling on it, but it might be useful for small details.



Another brush I use a lot is the Pinch Brush. This is a really cool brush, especially when I make some cracks on my rocks. I can make better variations of scale with this brush. But again, the default Pinch Brush isn't working as it should work.

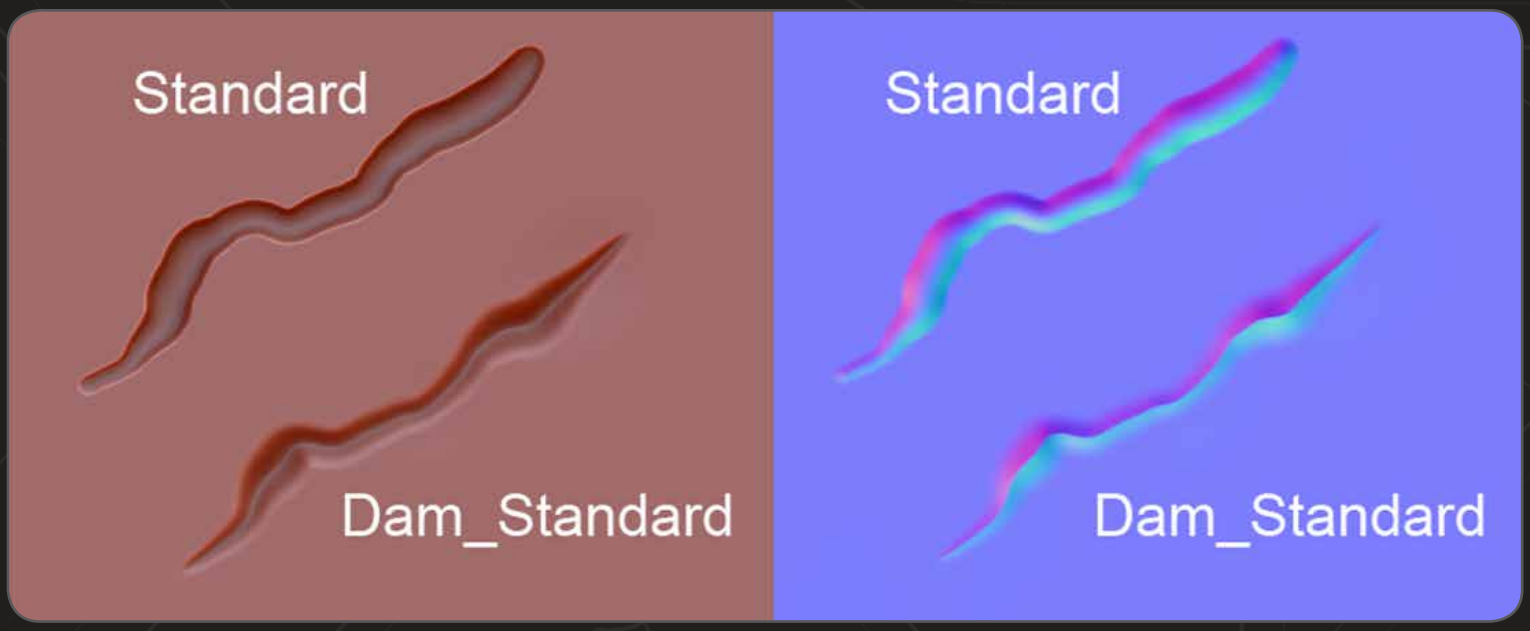
For some reason The Brush Modifier of the Pinch is set to 20. So by default, when you pinch something it also pushes the mesh up. This setting isn't that bad for pinching edges, but if you want to pinch something on a flat surface it is just not working fine. So again, I replaced the Brush Modifier to 0 and saved it as a my new Standard Pinch.



Beveling

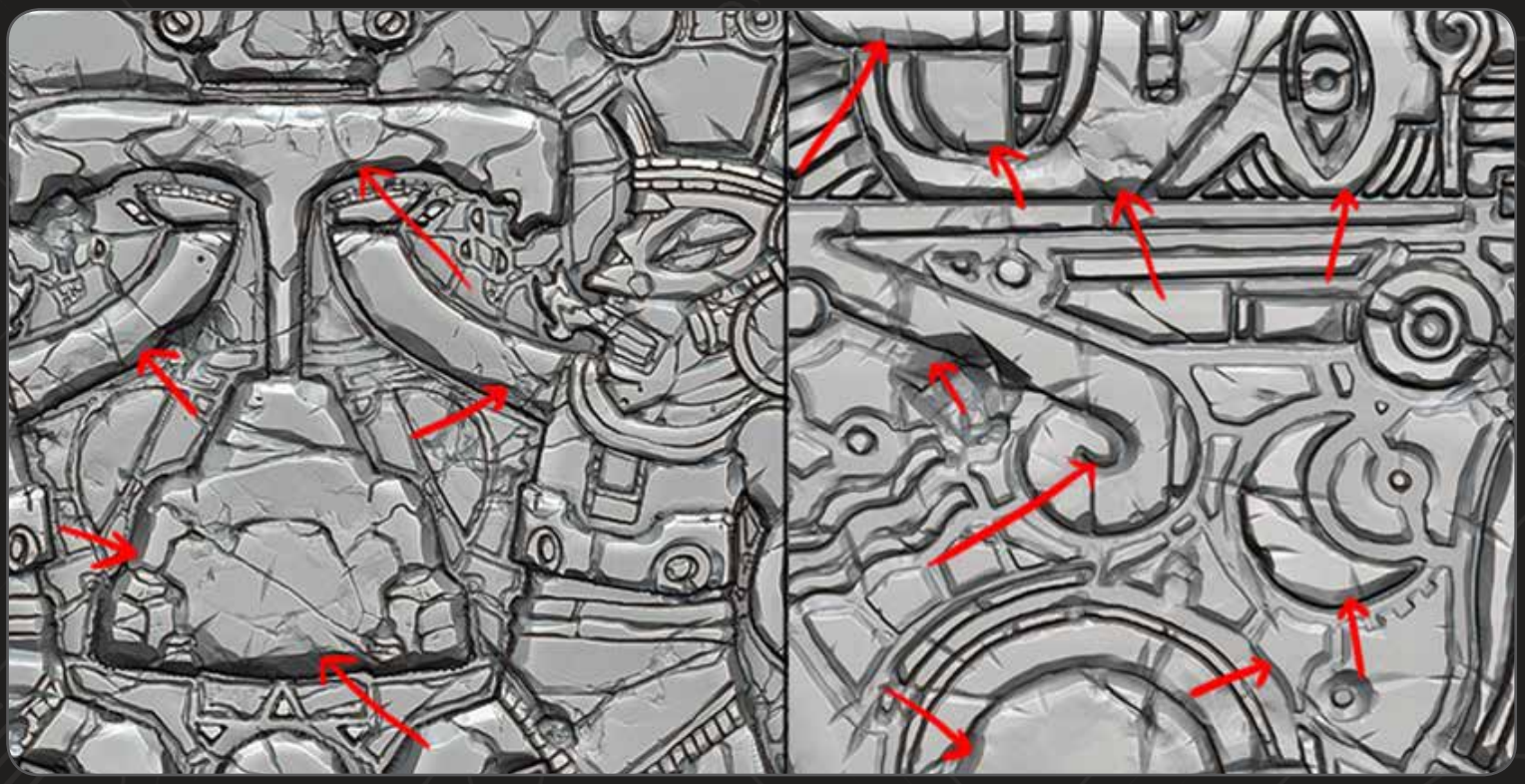
I think before stepping in the sculpting phase, the notion of “beveling” the edges is really important, especially if you need to bake your High Poly onto a Low Poly for games.

It makes it more sexy and stylized, but also more organic/natural. This is why a lot of people use the Dam_Brush instead of the Standard Brush, because of that pinch on it, which gives this perfect bevel for organic stuff (wrinkles, muscles, even cracks.)



It gives way more depth and volume once you bake it. Below, the first one has no bevel but more depth, the other one has Bevels and less depth. Once you bake it in some flat surface, the non beveled one looks almost flat while the beveled one looks way stronger.

Beveling the edges gives more style and allows you better control as to what you want to highlight in your sculpt.

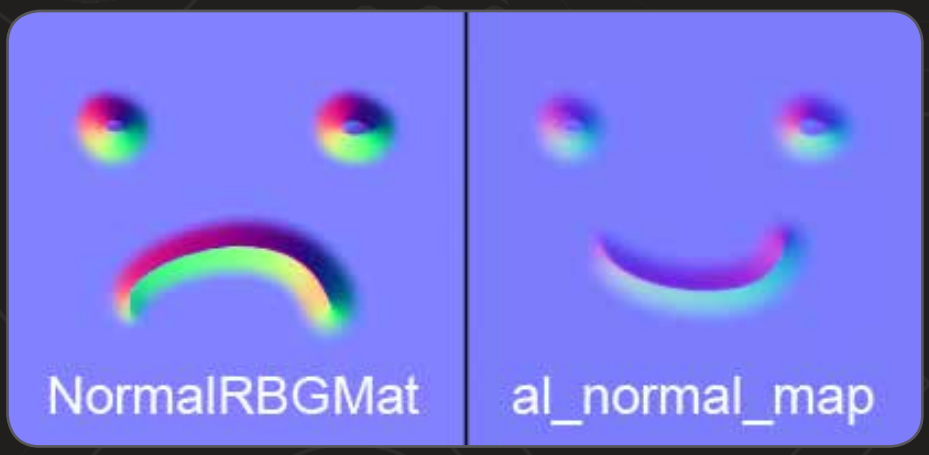


Also by default ZBrush uses a very strong normal map shader, which is a shame because the normal map matcap is a very efficient way to just quickly generate a normal map from a tool (like a tillable plane for example) without any baking. You can actually make really good tillable textures using a set of tools and dropping them directly in the 2d canvas and use the "²" key (or "ù" for Europe key-boards) to control your automatic 2d tilling.

So once your tillable 2d texture is done, you can paint matcaps on it to create different Layers. Maps such as normal map, shadows, spec, ao, anything that you can edit in Photoshop to make it look even better.

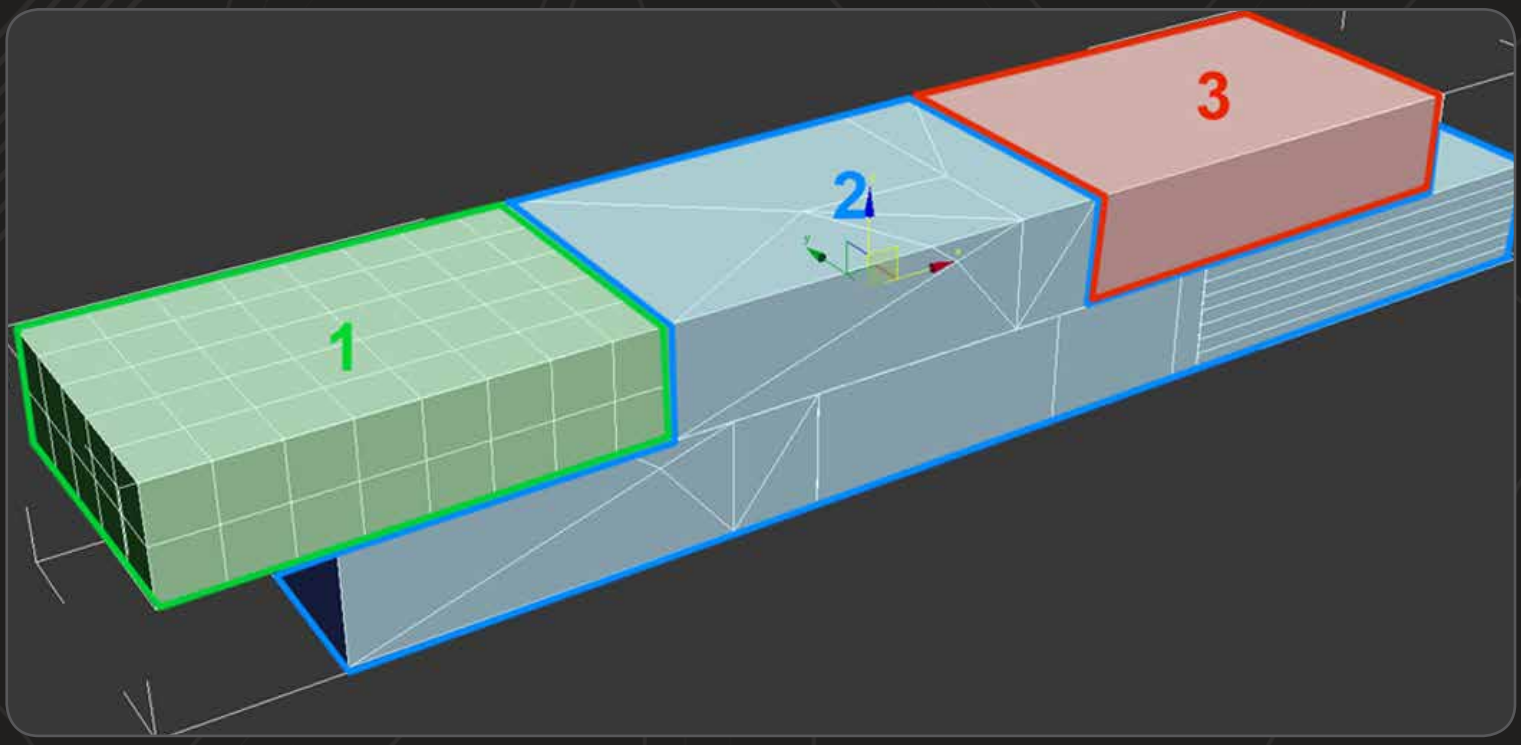
So If you want a standard Normal Map Matcap, and not the very strong one from ZBrush, you can download one from ZBrushBlog, in the Support>DownloadCenter>MatCap Library

(http://www.pixologic.com/ZBrush/downloadcenter/library/)

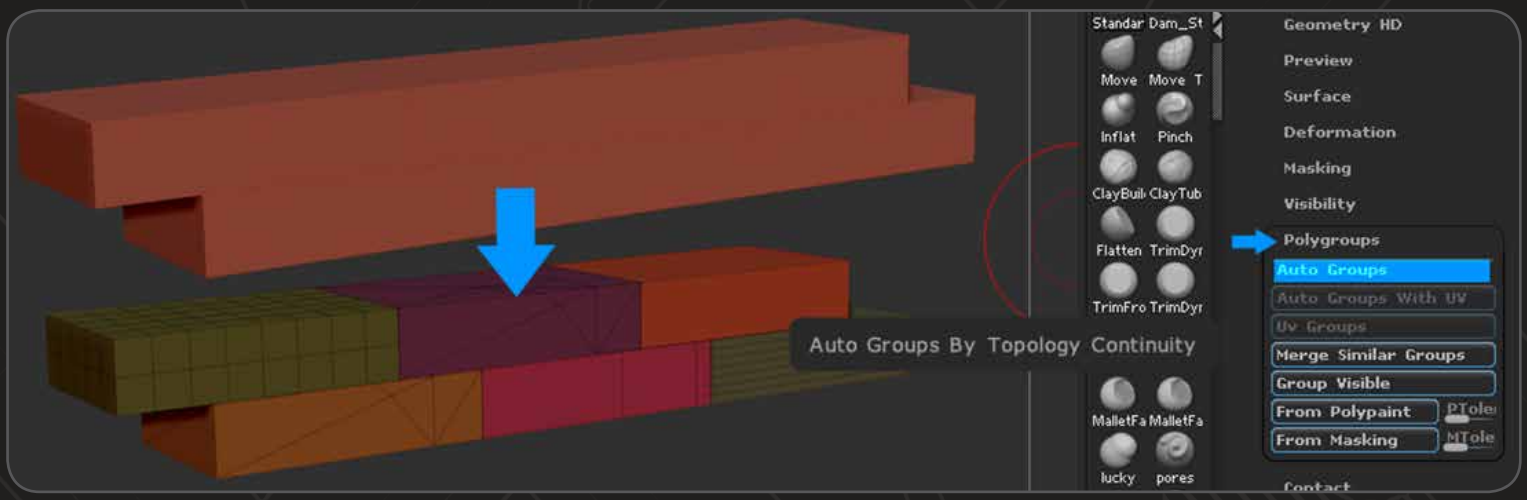


Prep Work

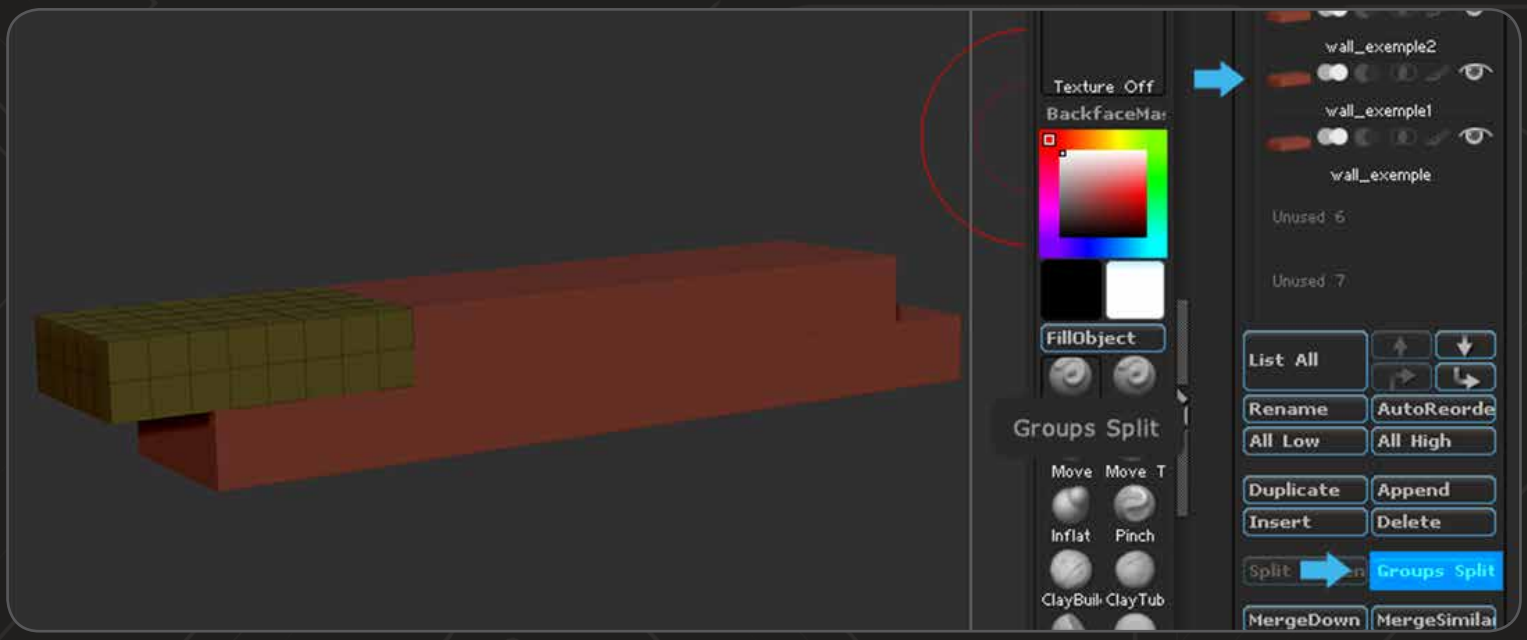
Remember how slow it was preparing a base mesh in another application before importing it into Zbrush? For a brick wall for example, you needed to tessellate every simple cube with a uniformly distributed topology (example 1). This is where dynamesh will help us to prepare our base mesh much faster. Now you can just use any topology you want. From a decimated mesh with the crappiest topology ever (example 2), or even just making your block-out with non tessellated cubes (example 3.)



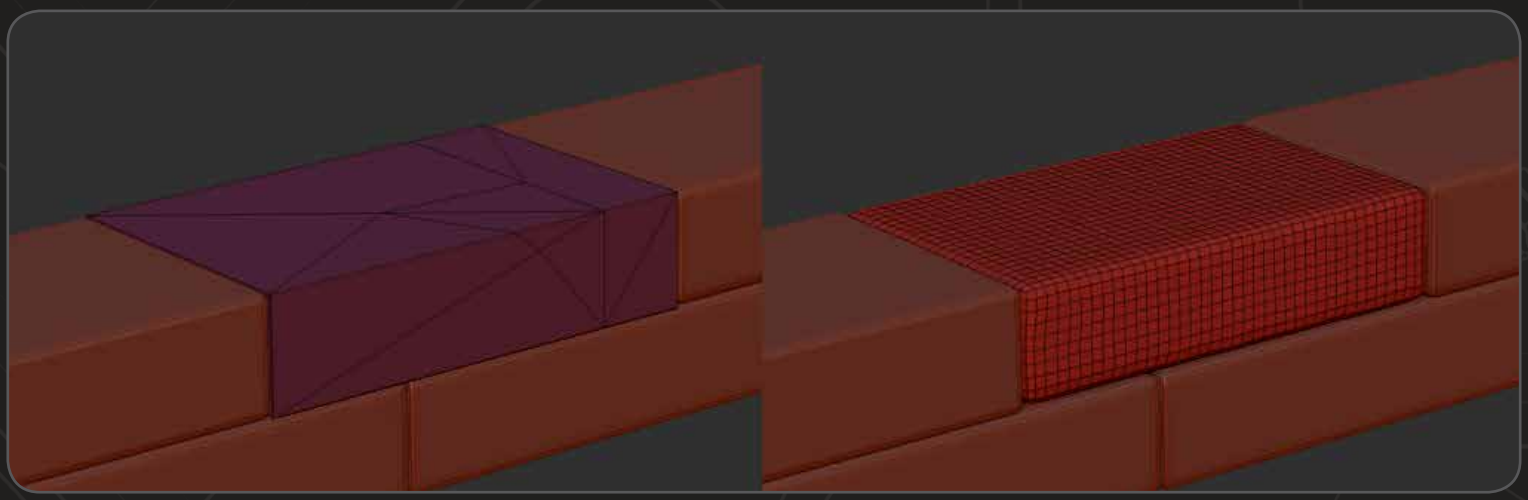
You Don't need to export each brick separately, just export all the meshes at once as one Obj. Then go to Polygroups>Auto Groups in the Tool palette. This will have an effect that automatically separates each brick as a different group, since each brick has it's own topology.

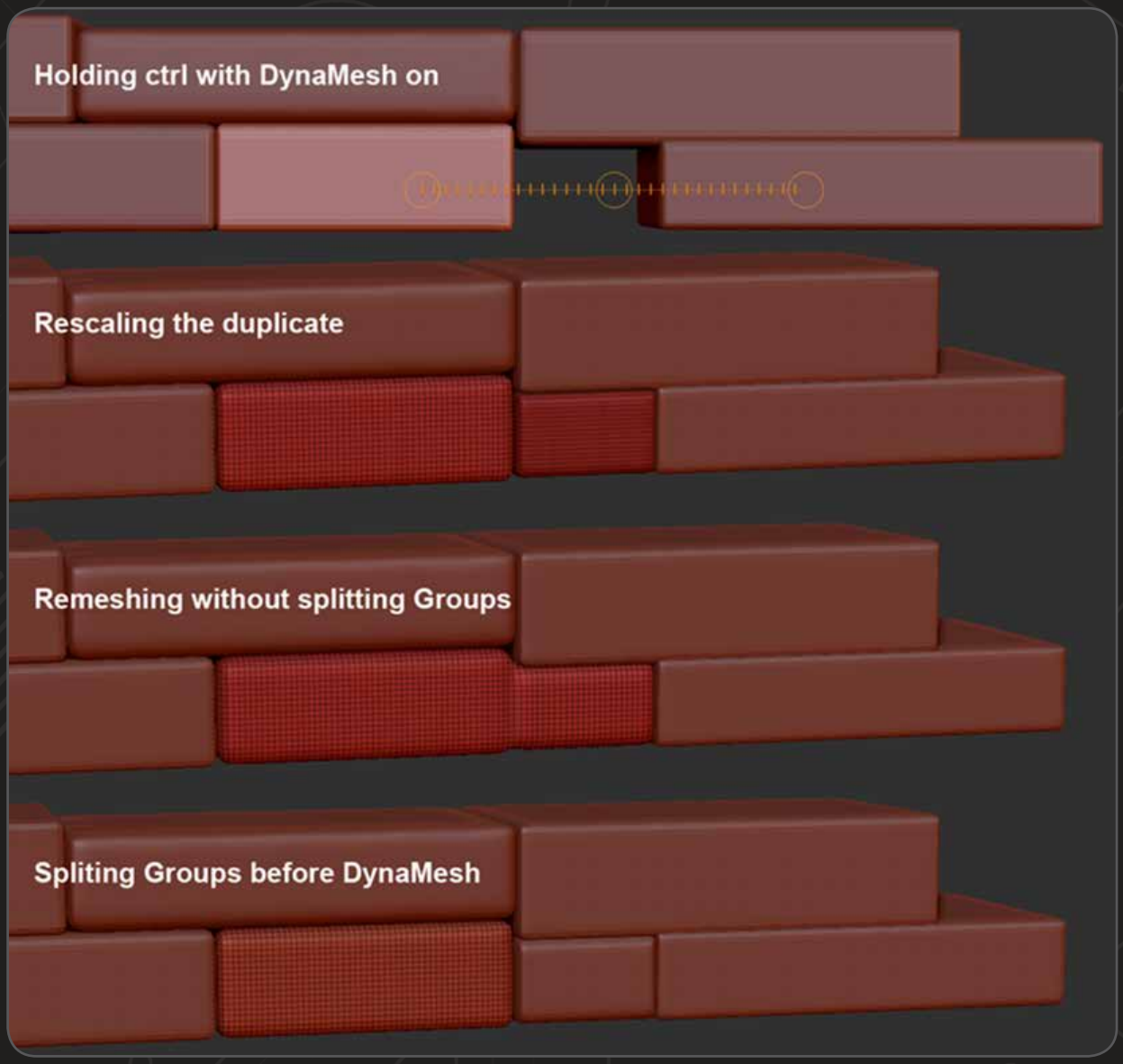


So now you still want to split each brick into a subtool for a better control. Since you have assigned a group to each brick, you can now use the "Groups Split" in the tool palette to make each brick its own subtool that is ready to sculpt.



In order to create good topology from you base mesh, you can apply dynamesh in each subtool and start sculpting! The more resolution you have, the crisper the edges will be.



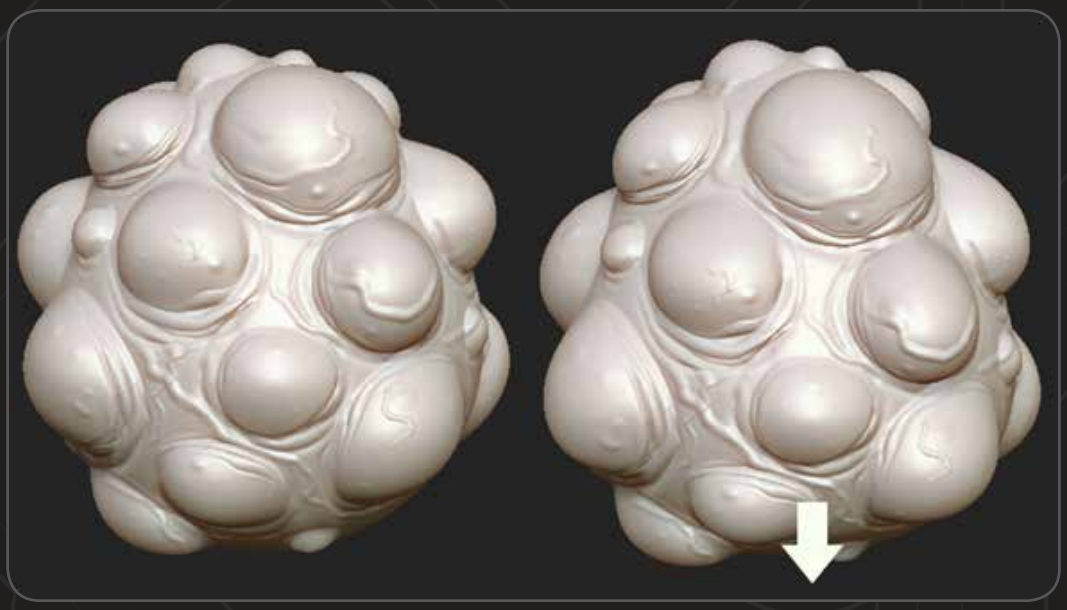


You can start to edit your subtools and make it more random (this is just a really quick example, by changing the scale of some bricks). Notice that you can duplicate a Dynamesh tool by holding ctrl (and shift if you want a directional constraint.) Before re-meshing it, don't forget to "Split Groups" or they will be merged together if they are too close to each other.

Make It Real

One of the mistakes people sometimes make (I did this as well when learning ZBrush) is trying to sculpt multiple parts of an asset (let's say stairs for example that are made from different separated slabs) using only one large surface. This technique doesn't really work that well because you don't get believable shadows in your tool (from the in-between of the slabs for example.) This example took me 5 min for both, but as you can see multiple subtools really makes the shadows stand out because this is real geometry instead of trying to replicate. It will just feel more believable when you will bake it to the low poly. Usung different subtools also allows you to make changes at any time and control each subtool separately.

Sometimes, adding a bit more believability is achieved in simple things, subtle enough to not disturb you. For example, adding just a bit of gravity deformation in this egg makes it more heavy. Of course it's not something we always need to do. I wouldn't apply gravity to that egg if I know it will be modulated in all directions, but for this quick example it's enough to feel it belongs to earth, and not space (even if it's a space egg.)

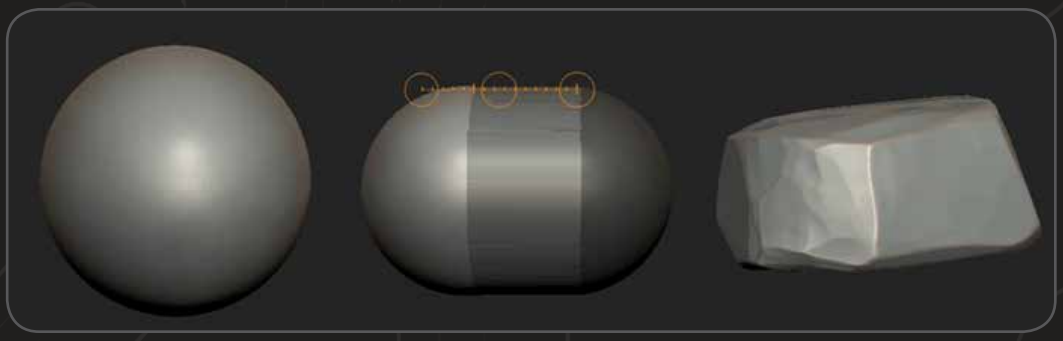


Dynamesh Rocks!

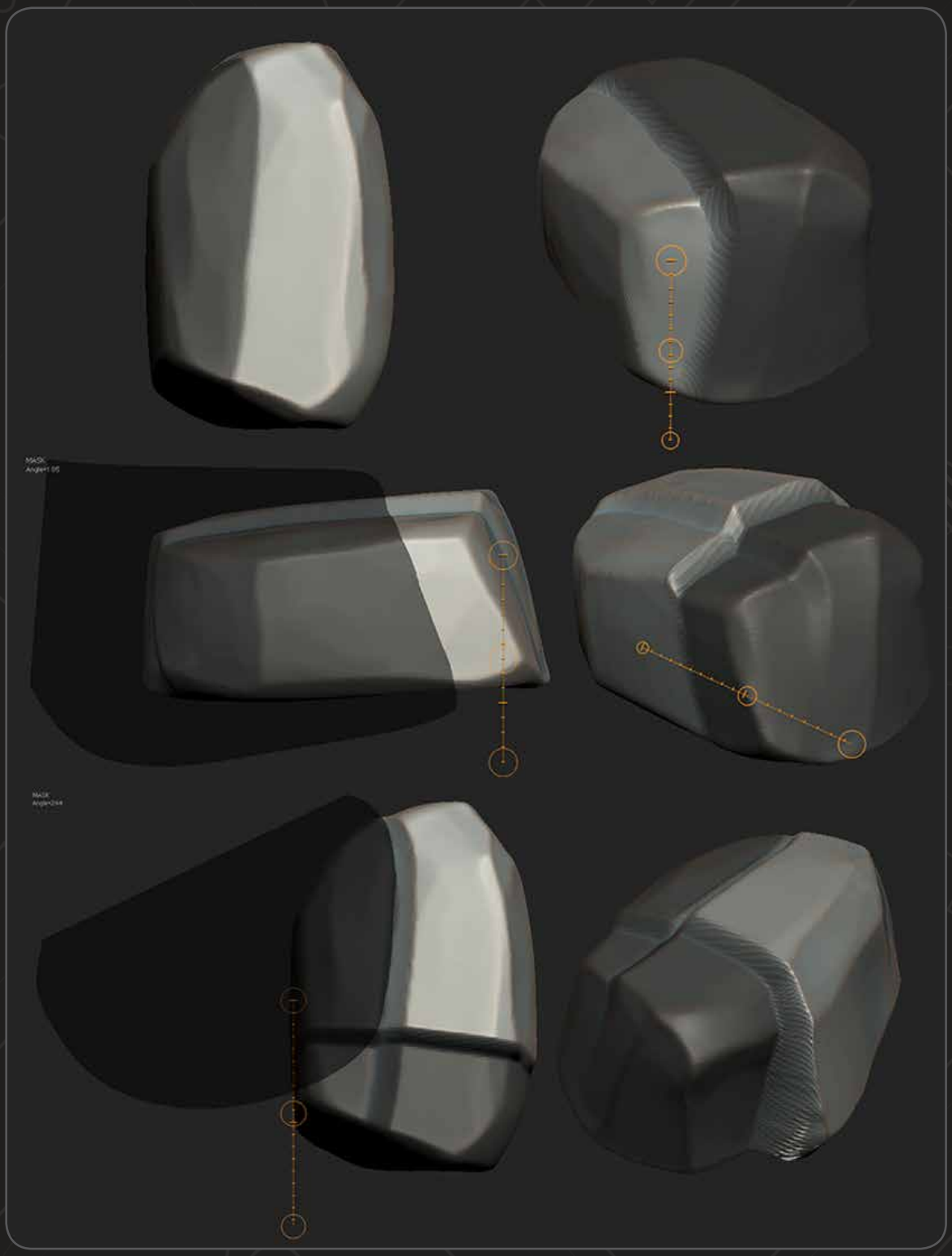
Creating rocks using Dynamesh By: **Michael Vicente**

So this is it, let's quickly see what tools we can use to make a stylized little rock using Dynamesh.

I started with a Dynamesh Sphere (I could start with a cube, it's just that Lightbox has a Dynamesh preset that is good enough to start with.) I first try to get a longer shape, by moving half of it with a mask. Pushing the mesh like this pretty much destroys the topology, so every time I push the mesh like this I'll use Dynamesh to remesh it. Then with the Flatten Brush I roughly brake the shape for something more angular.

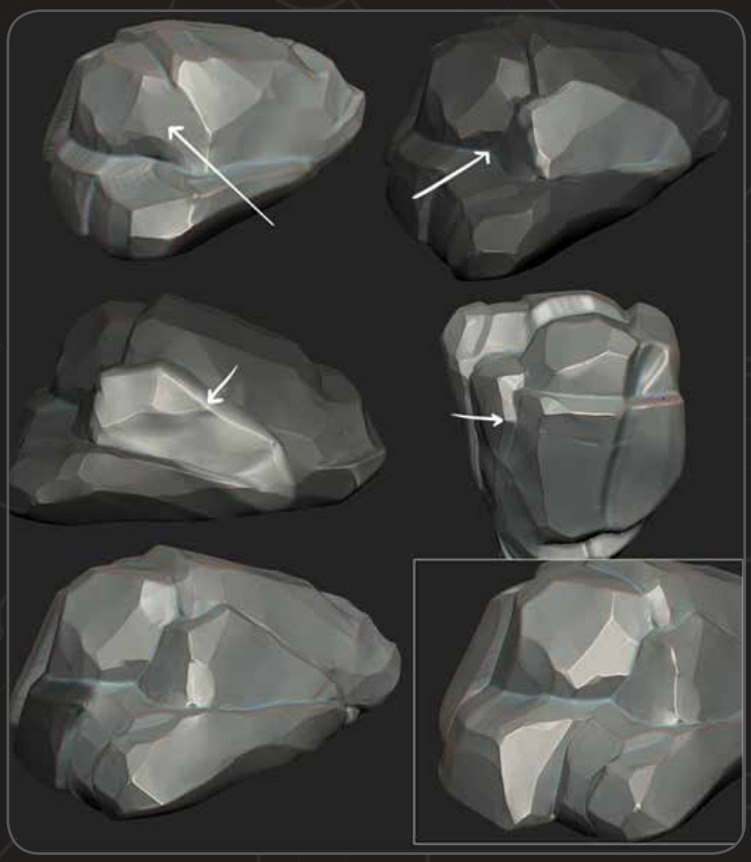


Masking a part of the mesh with the lasso selection is really useful to quickly build random shapes by transposing them.



Here I'm using the Inflat brush to create a new shape from a mask, and refining it with the Trim Front. As you know the inflat brush is also a really destructive topology brush, but since we use dynamesh to remesh it, we don't care about polygon stretch. This is where the magic of Dynamesh is: focusing only on sculpting.

I keep pushing shapes, and try to refine some angles with the Flatten Brush for something cleaner.



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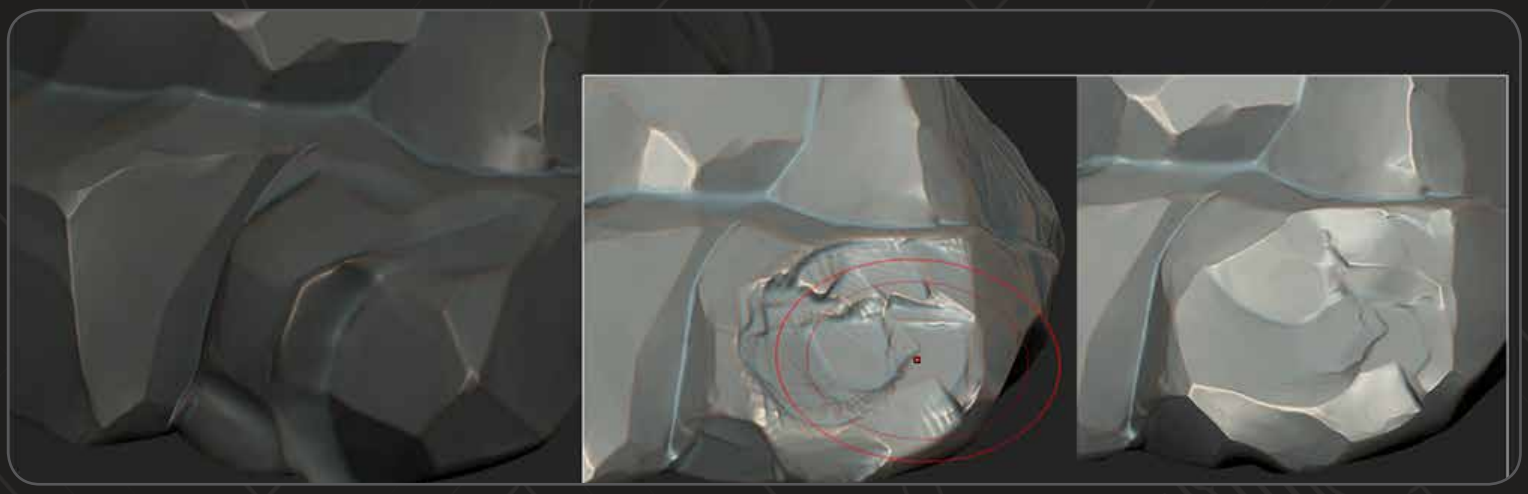
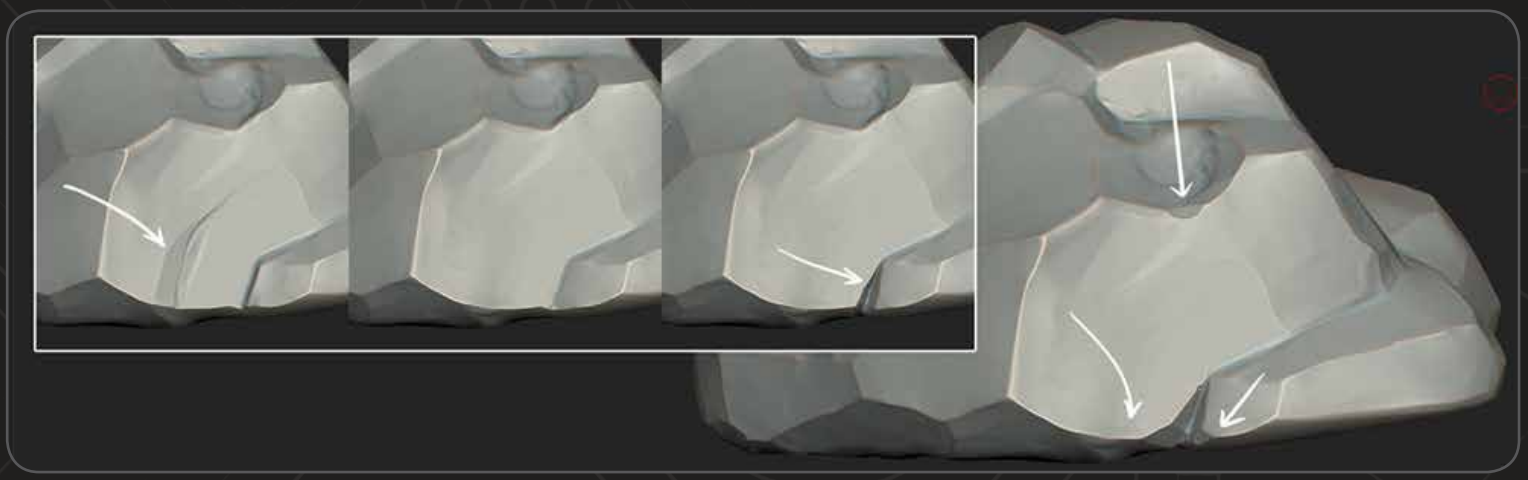
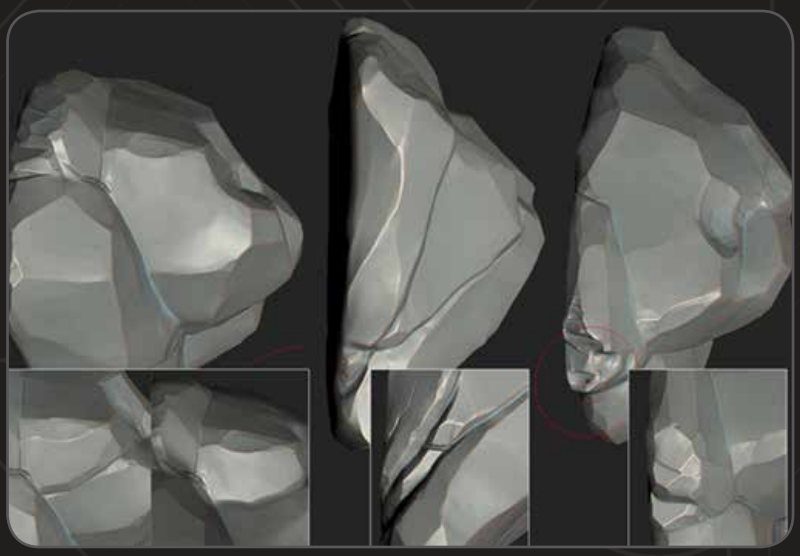


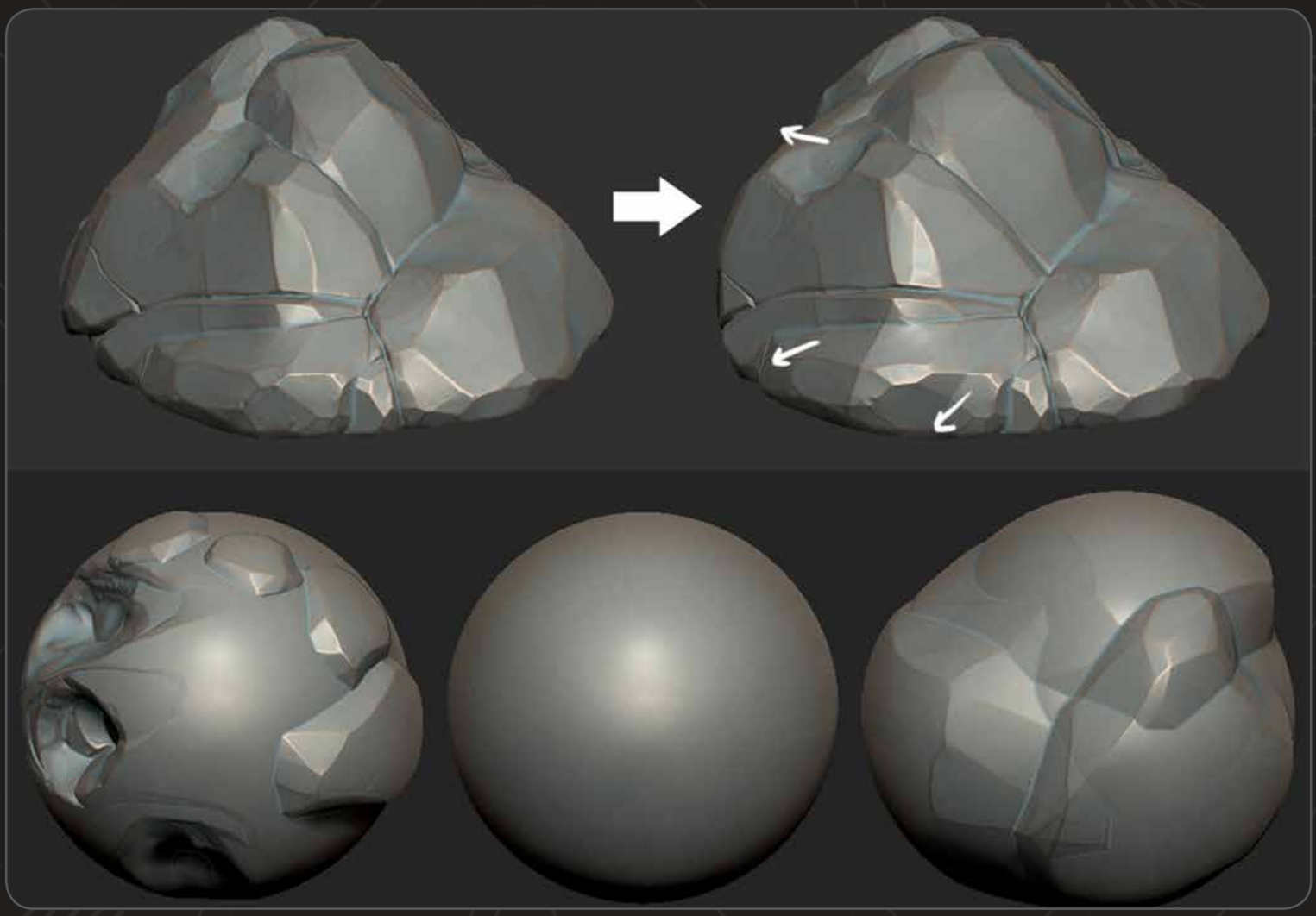
Using Flatten Brush with zsub to polish a flat surface, and then defining more the angles with a custom Slash Brush.



Using the three techniques, Flatten refinement, custom brushes and custom alphas for cracks and angles, and "mask'n move".

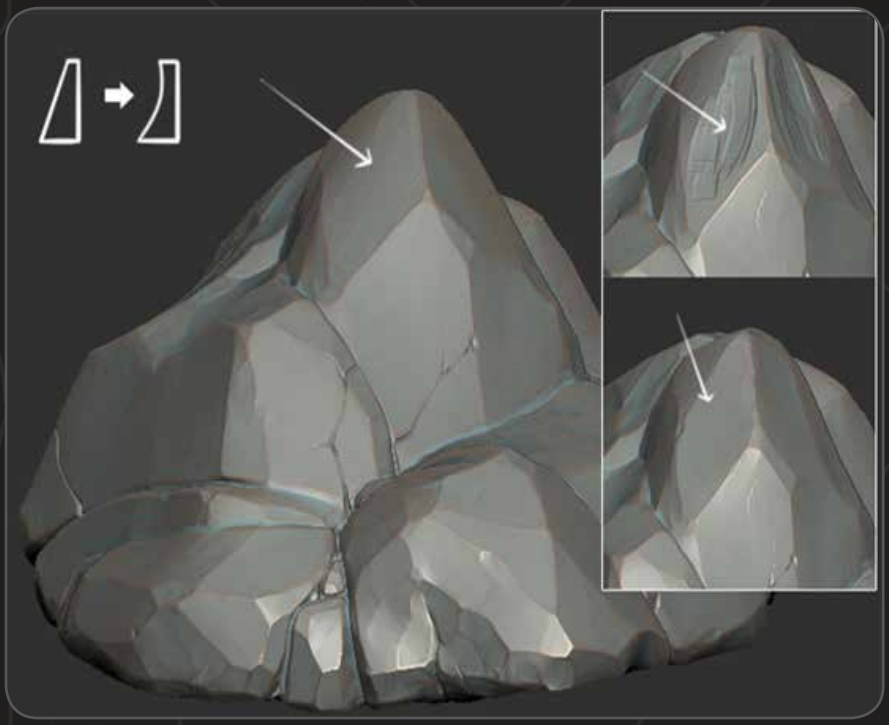


Another way I found to quickly extrude some shapes, is having a bunch of custom brushes with simple shapes. By the way, it is also useful for surface details like small impacts or asperities.

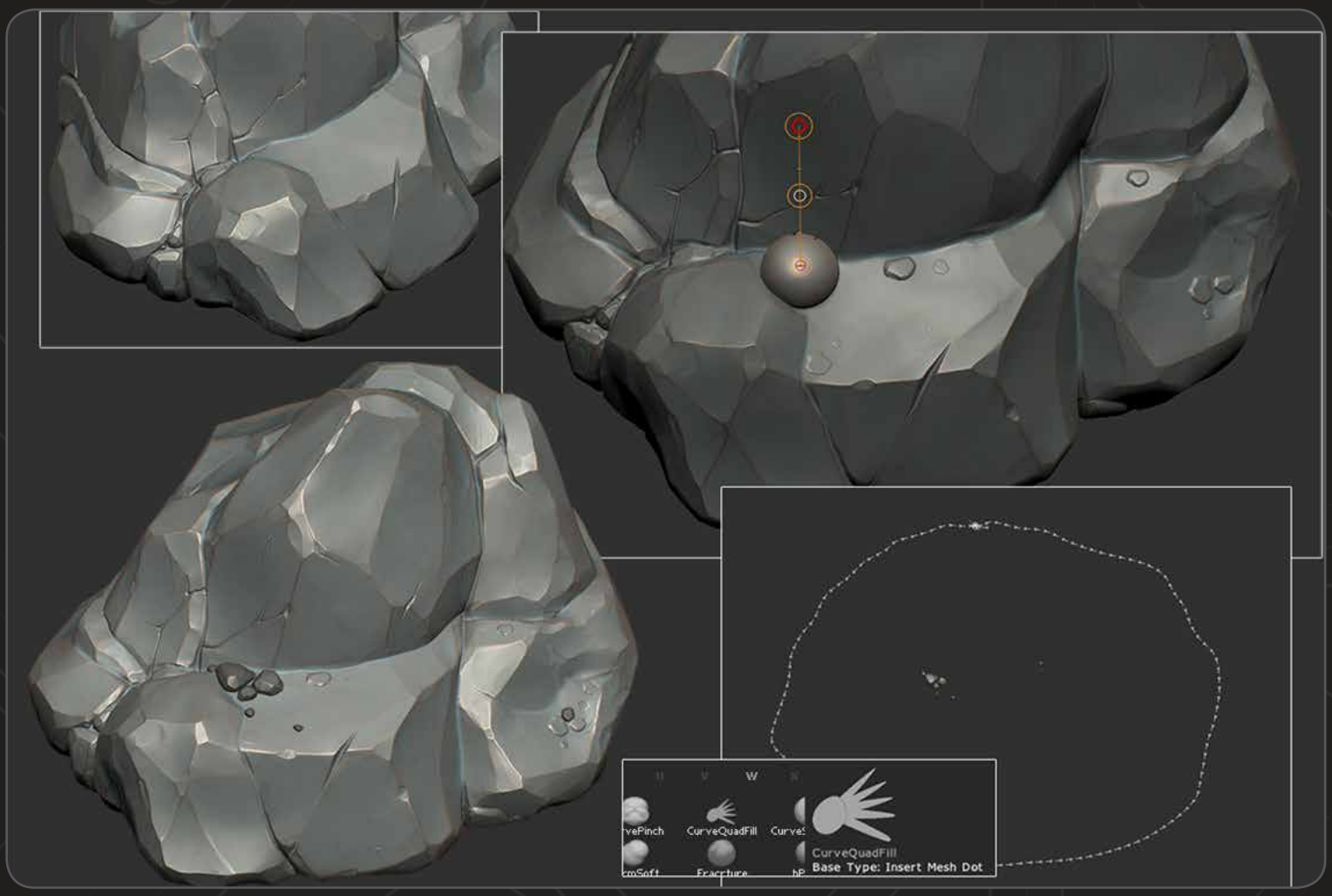


One thing I really like to add is curves. Even if it's not really realistic in some ways, I think it adds a lot to the style making it a bit more aggressive and dynamic.

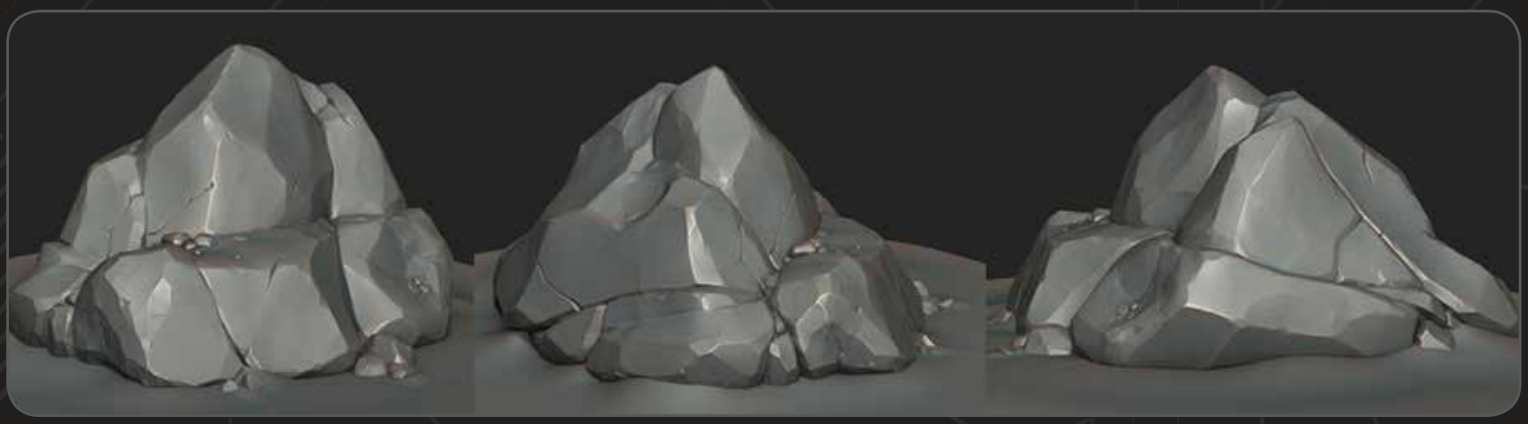
In this example I pushed a lot of shapes that I felt needed to be more dymanic, and curved it using the Move Topology Brush on side views. To curve some flatten shapes, I used Clay tubes, then Flatten with zadd and zsub to refine it.



Once I'm pretty happy with my mesh, I want to add some extra details, such as little rocks and little impacts. I also want to see it in a terrain to see how it blend to it. So here I'm using the CurveQuadFill brush, and all I need to do is draw the shape I want from the top view (don't forget to use Groups Split after your spline, since this Brush is a Dynamesh One, it's basically attached to your current tool.) Don't forget also that you can use the Solo Mode from the Transform palette to work on the current tool you want without being disturbed by the others.



I guess that's it! I could go deeper with the sculpt, but I tried to cover the main process of it. I really hope you guys found this article interesting. For any questions You can contact me at michael.vicente1987@gmail.Com! If you just started learning ZBrush Then I wish you the best with it. Have fun ZBrushing!



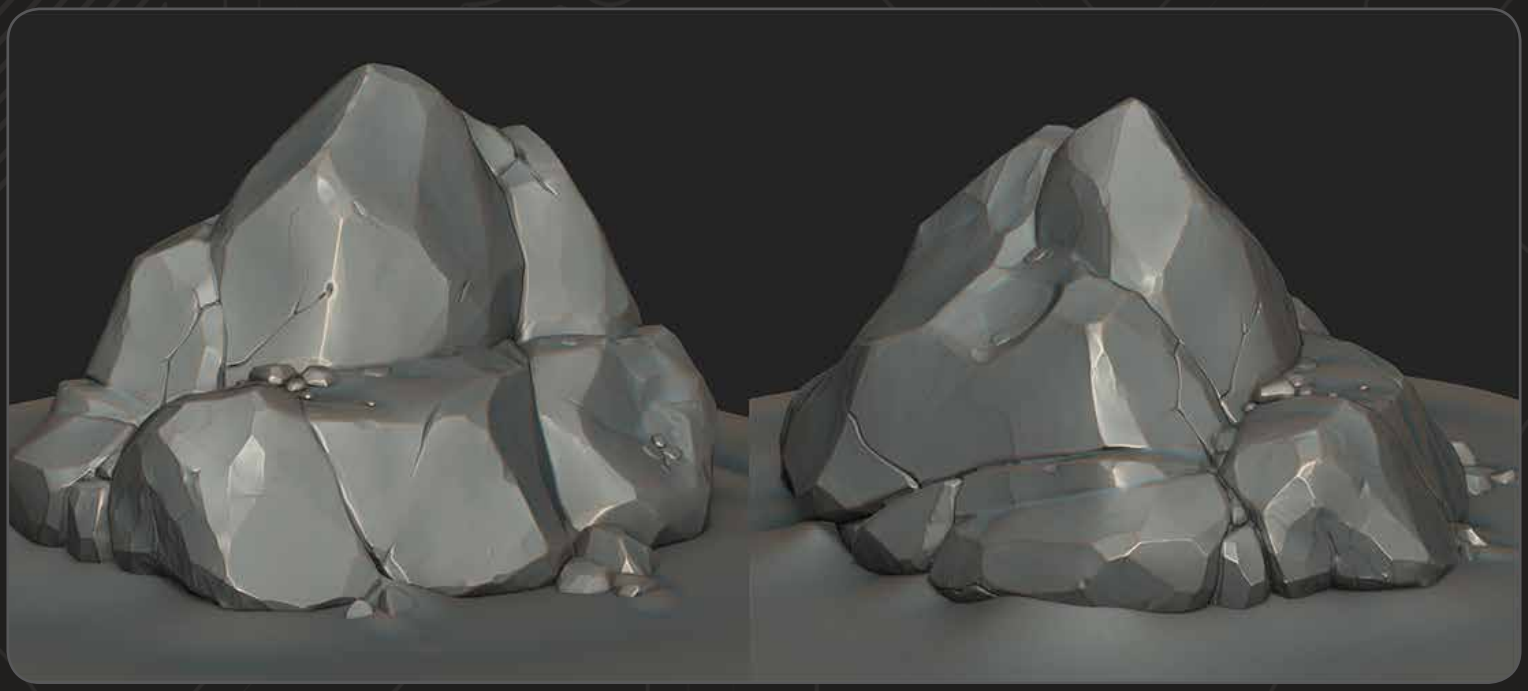
About Me

I fell in love with games when I was a young boy. I loved to draw already, I knew I wanted something artistic and fun, but I was more going for concept artist at first. Inspired by some amazing Samwise Concept arts from Warcraft3. I always loved to play but I decided to focus on video games in college when I understood I didn't need math and programming to learn 3D stuff.

My first game experience was a PSP game for atari. Then I worked at a few small french companies when I started to meet really good friends. We motivated ourselves and set out to learn the next gen process. I wasn't really specialized at first, I even made characters, but my true love is for environment art.

ZBrush was the first software I learned, even before starting to learn 3d in school. I think at some point, I focused on ZBrush because I knew I wanted to make organic models for environments. I'm currently working at Blizzard as an Environment Artist on the Next gen MMO.
My favorite games are Bioshock, Darksiders, Warcraft3, and Left 4 dead!

Michael Vicente
http://orbart.free.fr



Clinton Crumpler

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Denis Zunon

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SkinTones

Getting them Right By: **Jacque Choi**

There are all kinds of subtleties in human flesh. There are various regions of the face that can change colours depending on the expression or mood of a person.

From the flushed red cheeks of someone blushing, to the dark teal vein that grows out of the forehead when someone is blistering in anger.

There are even notable complexion changes such as liver spots and moles that indicate the age of a skin type, or even windburns and freckles to show how our skin will react to certain environmental conditions.

Tonal shifts in various regions of the face can indicate mood, convey emotion, or even accentuate an outlandish personality trait of an ostentatiously designed character.

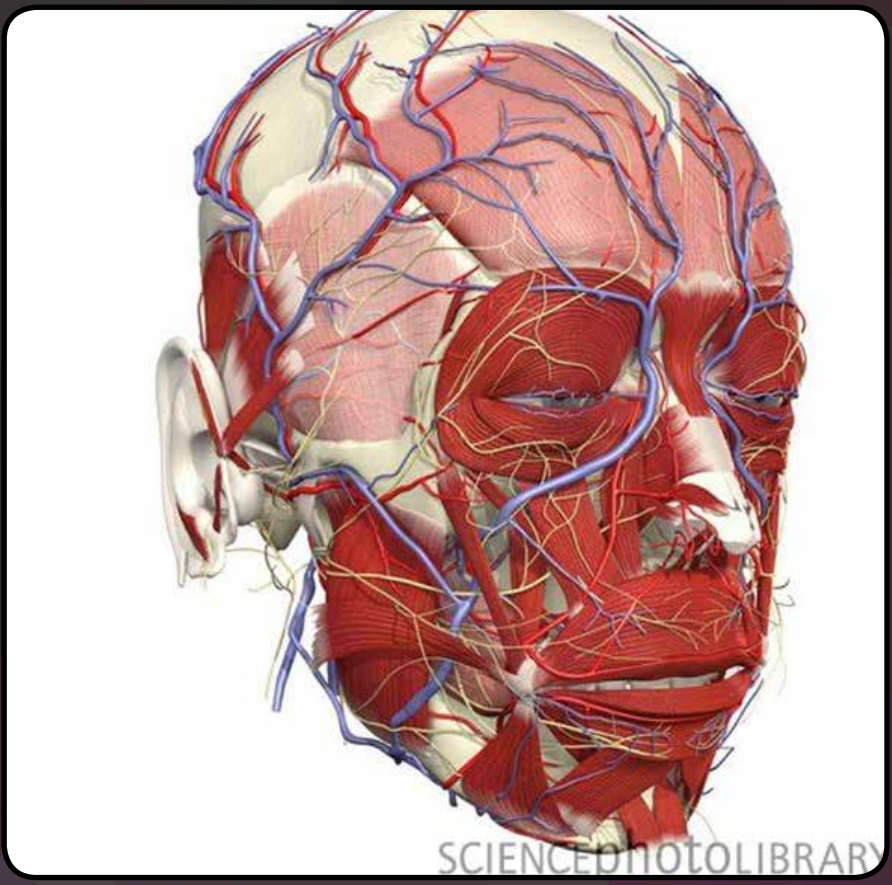
I don't pretend to be a scientific expert on this subject matter, but there's a startling amount of ambiguous ignorance on this subject when there seems to be a pretty drastic push towards higher levels of believability in real-time human characters.

In my 12+ years of game development, I'm shocked to see how many artists employ the method of using a simple color fill with a flat peach skin tone; multiply the Ambient Occlusion on top of that, then overlay a film grain on the entire thing before calling it a day.

The artistic impressions we derive from these tonal variances are conceived from both our understanding of anatomy, and its interaction with light.

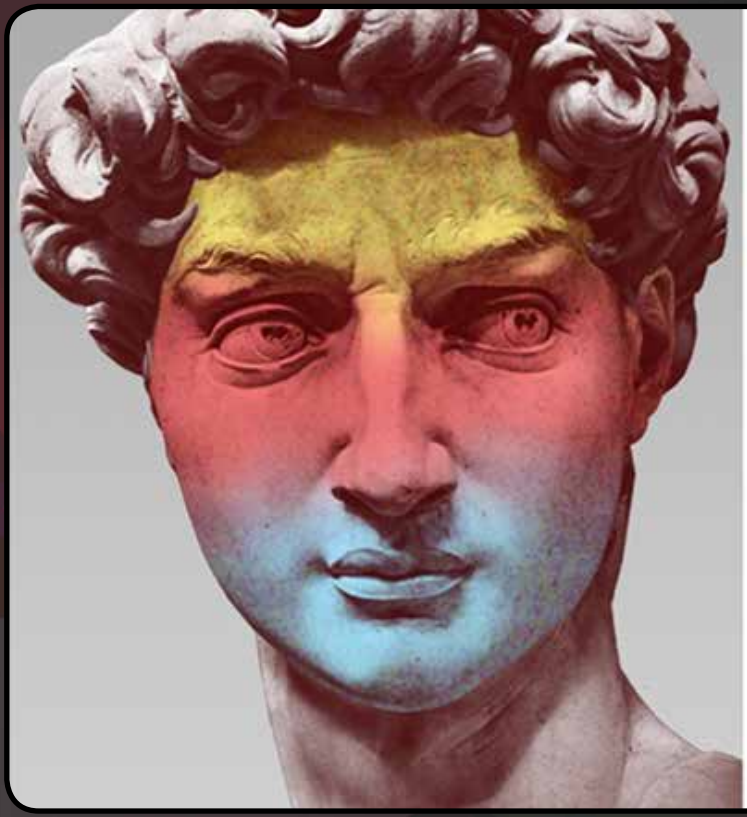
The biology of colour zones; (as we see in the Science Photo Library anatomical depiction of the Muscles, Nerves and Blood of the face) stems from the muscular neurovascular structure of what happens beneath the sub-dermal layer of the skin. The Forehead is relatively free of muscles (and therefore red blood cells), whereas the central zone of the face has more dilated blood vessels on the cheeks and nose. The areas around the mouth lips have more veins carrying blue deoxygenated blood.

Jeremy Engleman's 'Head of a Woman' shows an exaggerated gradient of a woman's flesh tones, as she becomes very flushed with red around her nose and lower face.



The biology of colour zones;

As an artist, that leaves us with a more simplified roundabout explanation of our basic understanding of overall facial colour zones.

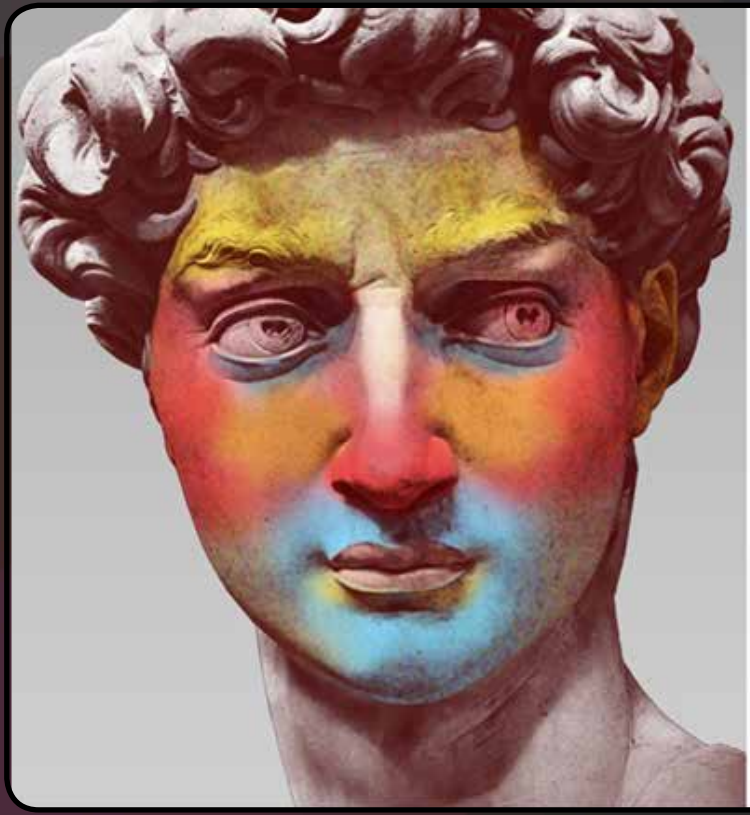


Yellow/White Brow

Red Cheeks and Nose

Teal/Grey 5 o' Clock Shadow.

But delving further into the details of these colour zones, we can start isolating various areas, tones and the degrees that some of these hue shifts become more apparent under various conditions.



Blue/Teal under the eyes

Desaturated Nose Bridge

Blush Cheeks

Pink Lips

Yellow Labii Inferioris

'Jumblatt' Sculpture by Jordu Schell

Around the eyes are Periorbital dark circles. Anatomically, these are blood vessels that can be seen through the skin, and are similar to large varicose veins. The Periorbital Skin (area beneath the eyes), is the thinnest skin the body, and is more visible depending on the translucency of the skin, or how deep-set the bone structure is.

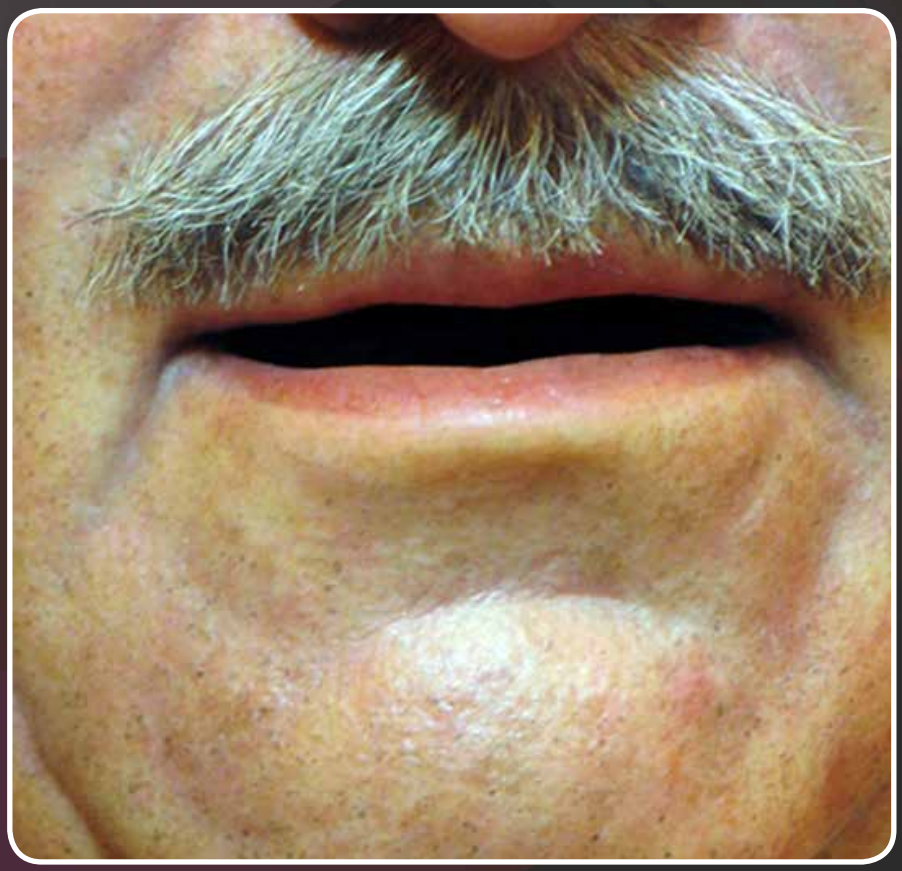
The tip of the nose is generally much more saturated than the aforementioned 'central zone' of the face, as it is derived from dilation of the blood vessels (very typical in Heavy Drinkers, or someone who recently came out from the cold). The older a person gets, the blood vessels begin to lose their elasticity and remain dilated.

Other causes of this include Vitamin B1 Deficiency, which is prevalent in those that have a less varied diet such as vegetarians, or people who do not receive enough sunlight.

The Geezer' image by Laurel Austin

The redness from the cheeks is derived from blushing or flushing. The facial skin has more capillary loops per unit and more vessels per unit volume than any other skin area. The blood vessels of the cheek are wider in diameter and closer to the surface, therefore these tonal shifts are much more visible to an artist's eye.

The redness from the ears is derived from Vasodilation, similar to blushing, anger, or any type of body-regulated autonomic system discharge.
The Pink/Red from the lips derives from the 'mucous membrane' that contains capillaries that come close to the surface of the skin. It's actually the blood in these capillaries that make them appear more red.

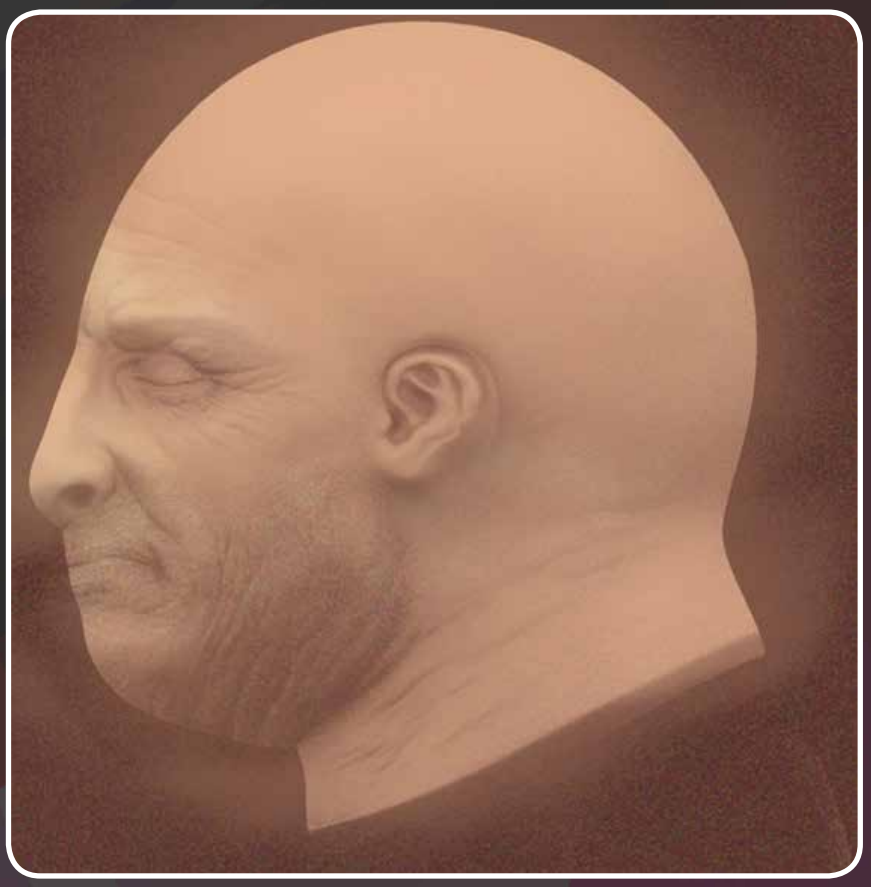


The area below the lips, 'Labii Inferioris' has subtle yellow tones, Shown in Jordu Schells 'Patient Zero'.

The Labii inferioris (the muscle beneath the mouth above the chin), have the fibers of the muscle intermingled with yellow fat. It's common to see this discolouration much more prevalently in older Caucasians (who generally have much more translucency to their skin).

'Study' by Volta'

Exploratory Texture Study



One effective way I start my skin tones, is to use a simple grain (enlarged 400%) as my base, and Linear Dodge it over my blood red pass. I feel this gives plenty of refractive colour differentiation at the subcutaneous tissue just below the actual skin. Translucent skin can potentially show higher levels of colour differentiations.

I apply a saturated dark red Ambient Occlusion, then proceed to paint in my Base skin tone, allowing for some of the red to show through (notably towards the lower part of the face). This will help to emulate the 'Red Zone' towards the middle of the face. (I intentionally covered up the nose, as the subdermal tonal variances are less visible.

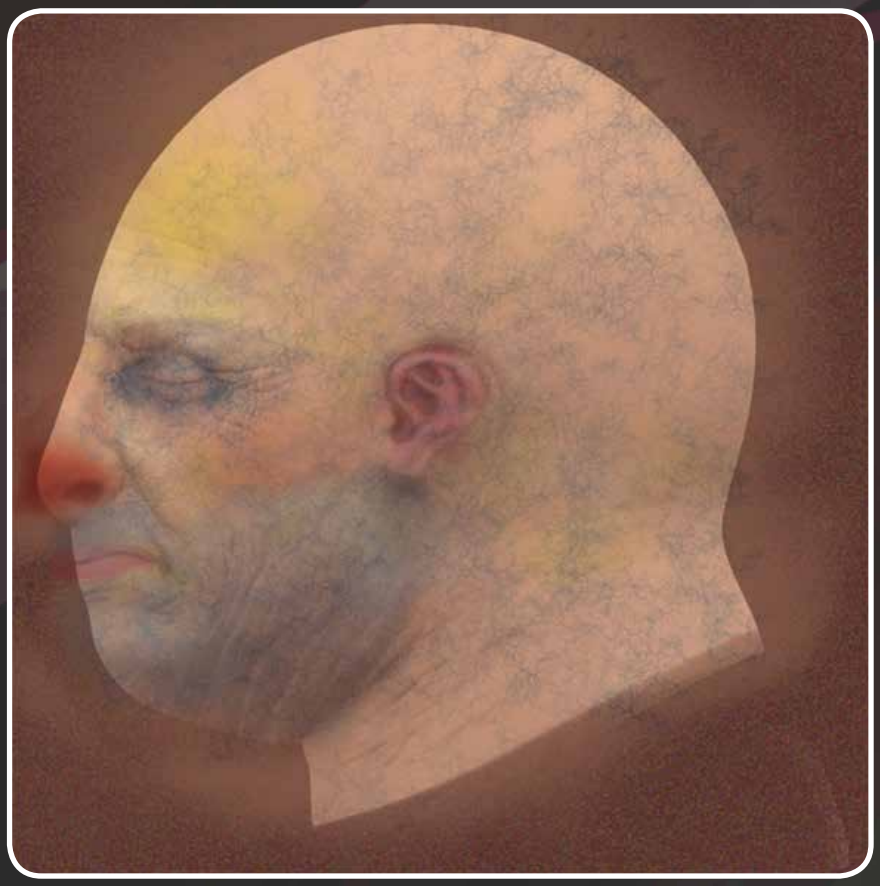
From here we can start with some detailed areas that add additional colour to the skin:

I begin by adding varicose veins, by using the free brushes supplied by Adobe Resource and liberally apply bluish-green veins over the entire face.

I then mask them with a cloud to give subtle translucency differences. This can be heavily exaggerated to show a mild case of Telangiectasia.

Stock Photo Courtesy of www.123rf.com

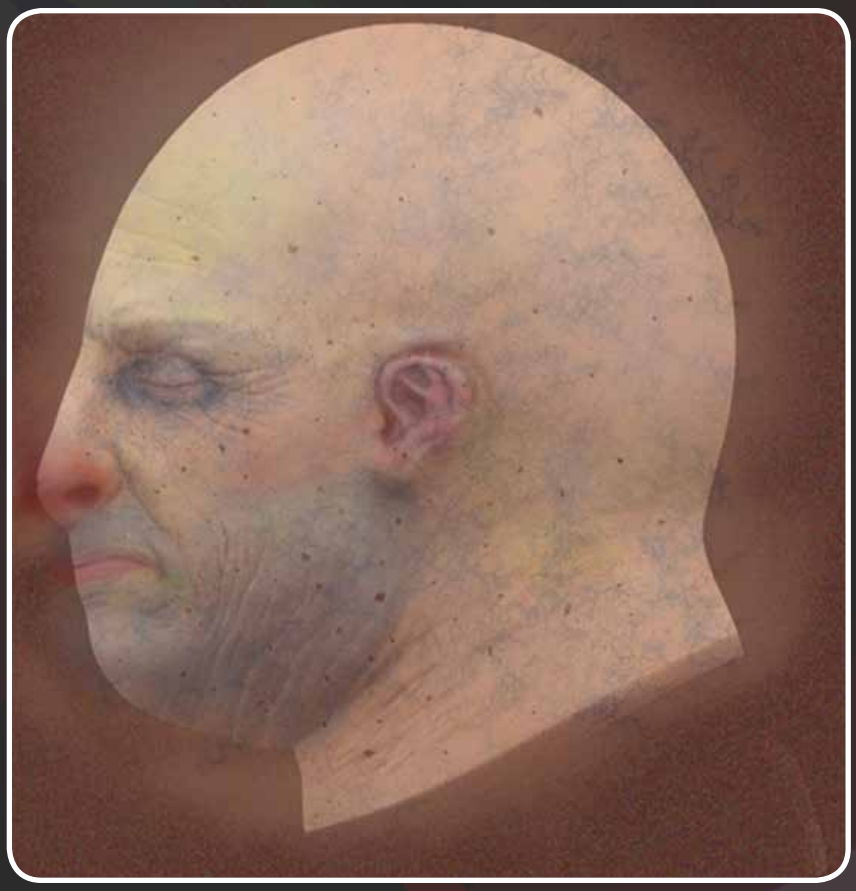
Photo courtesy of www.your-doctor.net



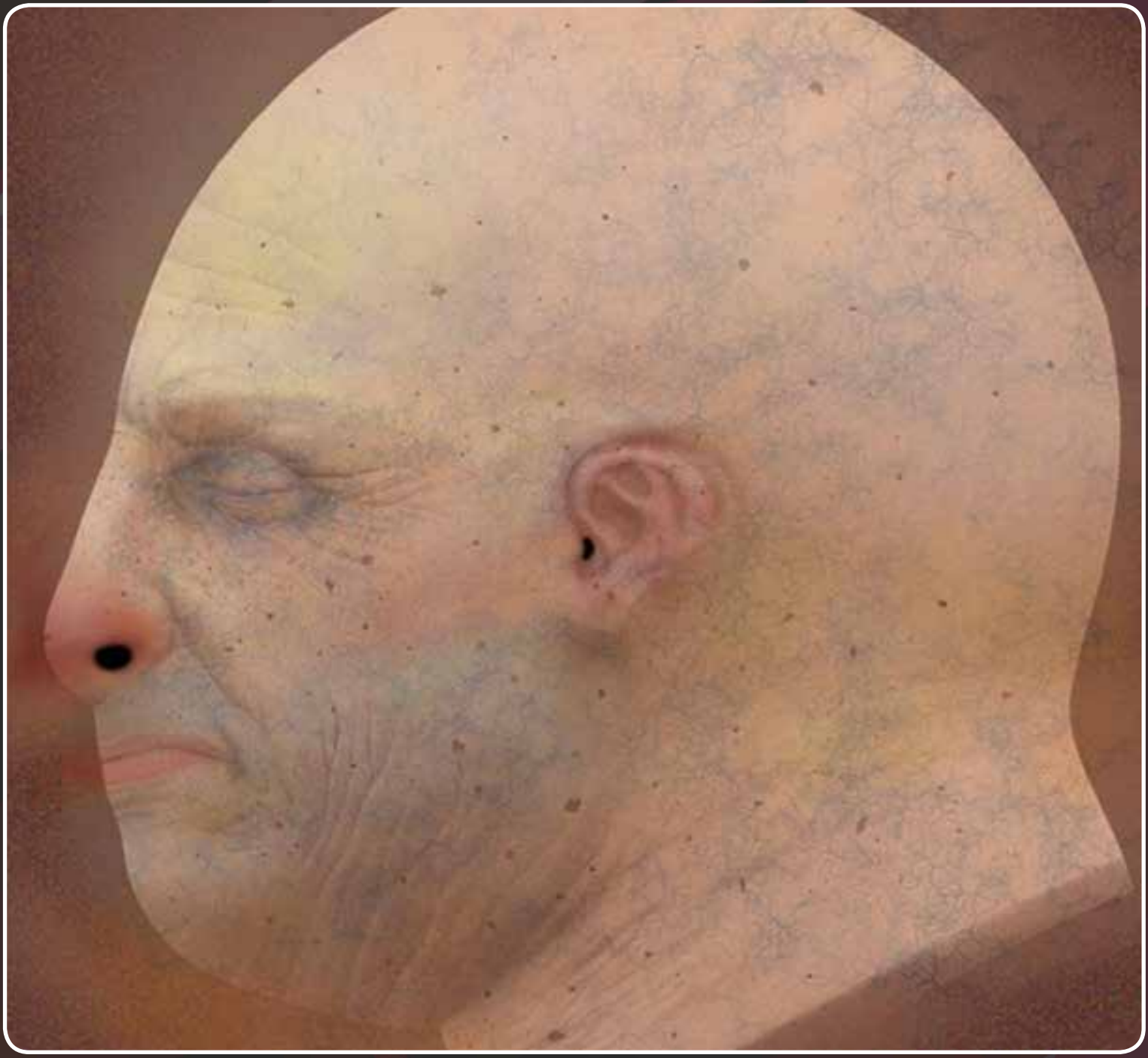
I then go ahead, and applying a blue-ish white tinted brush at a very low opacity with a skin brush, and begin liberally applying this to balance out many of the hues. This allows many of the colours to become a bit more muted, which wrestles with a lot of the previous tonal passes. This somewhat emulates the effect of the epidermal layer of the skin.

From here we can add further detailing such as freckles, acne, windburns, liver spots, scarring, hair, moles, roscea etc. The details can further tell a story about the character, such as diet, age, or sun exposure.
For this particular study, I simply added some freckles and liver spots, then masked it with a cloud:

Stock Photos courtesy of www.123RF.com



I finish the texture with an emulated 'Sub Surface Scattering' pass, by simply painting over all layers (including the Ambient Occlusion) a very light orange in various areas that would receive such scattering. This further balances out the skin tones, and gives back some of the colour taken away from the Epidermal Layer.



The culmination of all of these tonal details creates much richer and warmer flesh. I honestly feel the variety within the flesh is what gives so much of its life and believability.

Like many of these rules, there are plenty of exceptions, and room for artistic interpretation. There's so much more to discover, particularly when it comes to various ethnicities, age discrepancies, skin types, emotion, blood circulation, temperature, skin conditions/diseases, etc. I honestly feel like I've barely skimmed the surface with this explorative study.

With the advancements of real-time graphics (such as multi-layered Sub Surface Scattering), there will be a greater emphasis on pushing the boundaries of believability.

As 3D Artists, I really feel that it's our duty to delve deeper into the theoretical concepts of how things work, and develop methods on how we can utilize those theories into practice.

About Me

My name is Jacque Choi, and I hail from Edmonton Alberta (Go Oilers!). I am a graduate of the Fine Arts program at Emily Carr University in Vancouver BC.

I have been working in games for over 12 years, and have been fortunate to collaborate with some wonderful artists on such titles as Tony Hawk's Project 8, Gun, FarCry 2, and Rango.

I am currently employed at Funcom Montreal as the Principal Character Artist for their upcoming MMO; 'The Secret World. I am also the 3D Character Design Instructor for the Champlain College of Vermont's Montreal Campus.

I am always trying to learn something new each time I approach a personal project. I am continually trying to expand my skill-set, my theoretical understanding of art, while actively pushing my understanding of real-time pipelines, and processes.

Jacque Choi
www.jacquechoi.com

Bibliography:

Engleman, Jeremy. Head of a Woman. 2007. Bodypaint, Maya, Zbrush. January 6, 2012.

Science Photo Library. http://www.sciencephoto.com/image/114559/530wm/C0050351-Muscles,_nerves_and_blood_of_the_face-SPL.jpg. Science Photo Library Ltd, 2011. CG Image. January 6, 2012.

Michelangelo, di Lodovico Buonarroti Simoni. David, 1501-4.

Schell, Jordu; Basso, William; Watson, Lynn. Jumblatt. 2008. Schell Sculpture Studio. Sculpture. January 6, 2012.

Dartmouth College. http://www.dartmouth.edu/~thabif/weeklyclinic063003/thumbs/th_07rosacea0630.jpg. Trustees of Dartmouth College. Photograph. January 6, 2012.

Volta. Study. 2010. Volta. Digital Painting. January 6, 2012.

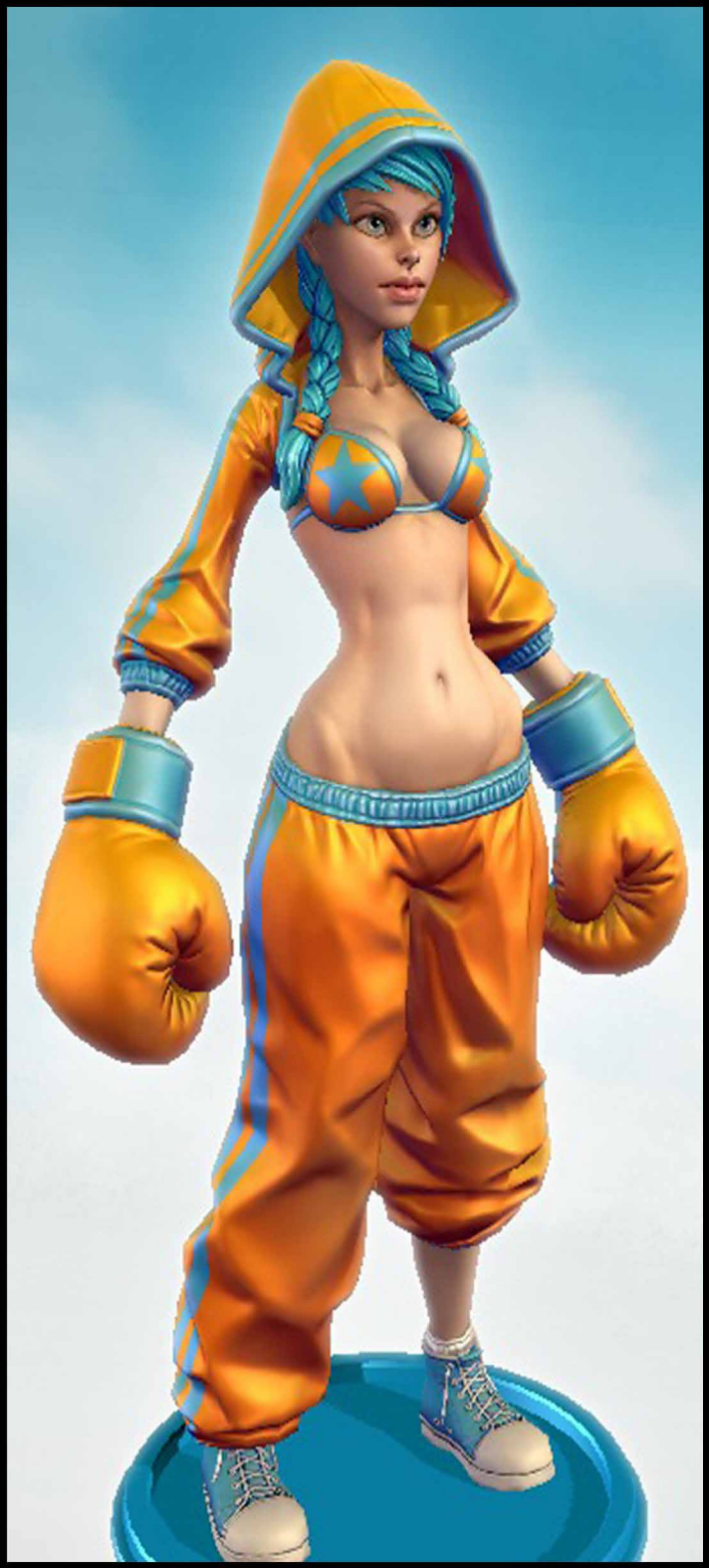
Austin, Laurel. The Geezer. 2010. Bethesda Softworks. Digital Painting. January 6, 2012.

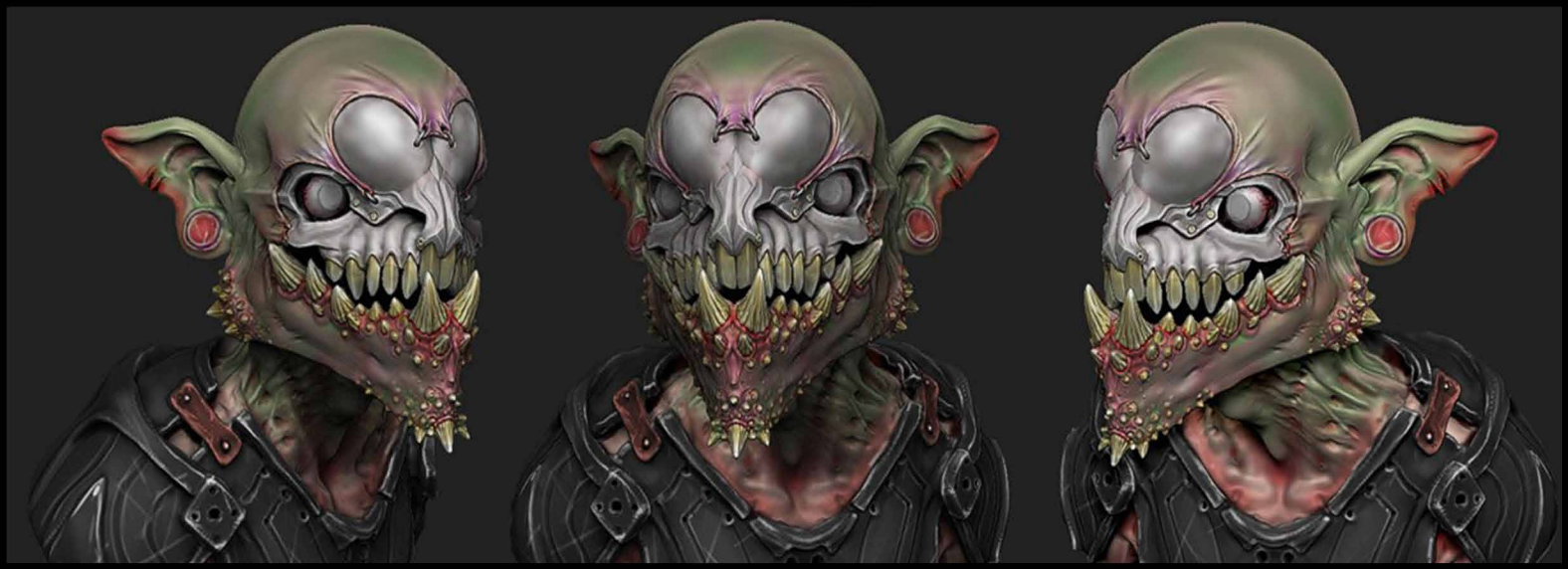
1234RF. Eyelid With Blood Vessels Veins On A White Male Teenager. 2011. 123RF Ltd. Photograph. January 6, 2012.

Your-Doctor. http://www.your-doctor.net/dermatology_atlas/rwx/rwx/Telangiectasia_nose.jpg. 2010-2012 Your Doctor - Dr.Khalil Al-Yousifi – Kuwait. Photograph. January 6, 2012.

1234RF. The Face Of A Beautiful Brunette Woman With Freckles On Her Skin, Blue Eyes And Pink Lips. 2011. 123RF Ltd. Photograph. January 6, 2012.

1234RF. Portrait Of A Young And An Old Woman Juxtaposition. 2011. 123RF Ltd. Photograph. January 6, 2012.





Ted Lockwood

www.monkeyknifefights.com

Vincent Mayeur

www.mayvin.be

CONCEPTING

Concept Art Thought Process By: **Ivo Nies**

When I do a personal piece, I hardly go trough the thumbnail phase. I either already have something in my head, or it just takes finding one nice part and building on that. But since this is getting published I wanted to take it a bit more systematically and serious and do some thumbnails to determine the direction I want to take this piece. It's good practice, no scratch that, it's VERY good practice! Sure your personal piece might feel like work, but in the end, you will get a better piece out of it.

That's because you can just doodle and put them all in one big canvas, you can just pick and choose and let yourself be the Art director. You won't understand what does and does not work until you put yourself in someone else's shoes.

In this thumbnail phase I stumbled upon a cool praying mantis silhouette which I surely wouldn't have found without this very important phase. I really liked it and so I started adding and adding to it, building a story around it. I don't know if other artists do this, but I do and I find this a very important part of the creative process. If I build a small background story around my pieces I find it easier to absolve myself in that reality and add to it, making a much more interesting piece.

Then it will simply evolve from a picture with a theme into something a lot stronger. So at this point I wanted to show a small scene. A soldier hiding from or hunting this larger alien. Actually I thought up a much more interesting back story to the alien than I showed in this small scene (it's hard to tell a complicated story in just one image). maybe I will get back to that some day, but for now this is what I wanted to show you.

I wanted to do something a bit more cinematic for this piece and play a bit with the lighting, so in this scene I wanted to separate the 2 figures,

The alien silhouetted in bright back light (helps pull the viewer to the 2 characters without distracting them with a background that is too interesting) and the guy hiding in the dark.

But to prevent the guy from visually disappearing in the background, I decided to have some light shine on him to silhouette him a bit more.

This way the contrast is still large enough that you look at the alien before you find the person hiding, but also low enough to pick out the guy that is hiding.

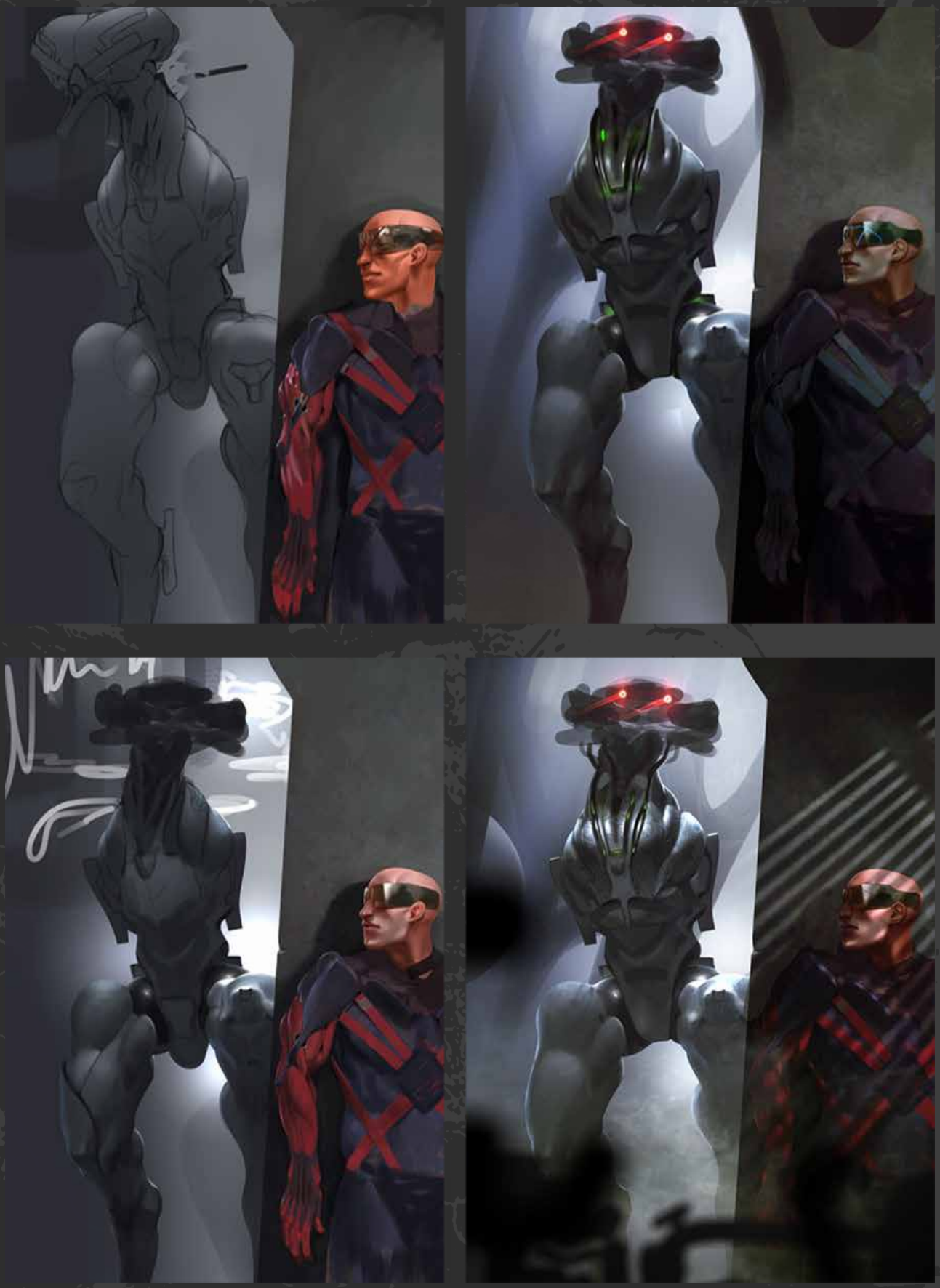
The alien based on the silhouette of a praying mantis, at first had no arms. But this was a bit off and unbalancing, it needed something more recognizable to fight with.

Giving him normal arms would break up the interesting silhouette, so I gave him arms that can be folded up. For this shot it needed something to hold, so I gave him a sort of energy weapon

By this time the scene contained everything it needed. From there I started polishing it, working the lighting and figures until I was satisfied.

Having a solid sketch is important, but most importantly during the process of creating something, leave, then come back for reflection

Or of course have someone else slaps you in the face with a very objective reflection, that always works and never be too shy or ashamed to ask someone for help.



Ivo Nies

www. EVILart.biz

About Me

My name is Ivo Nies, 28 years old and currently live in the Netherlands with my amazing wife and a lot of pets.

I always loved to draw and I have always been heavily influenced by books, video games, comics and movies. So once I figured out people with money pay artist to create these amazing worlds, I decided to start my journey and try to become a concept artist and to be a part in the creation of video-games.

Now I work as a concept artist at a small studio in the Netherlands, trying to improve myself for bigger and better things!

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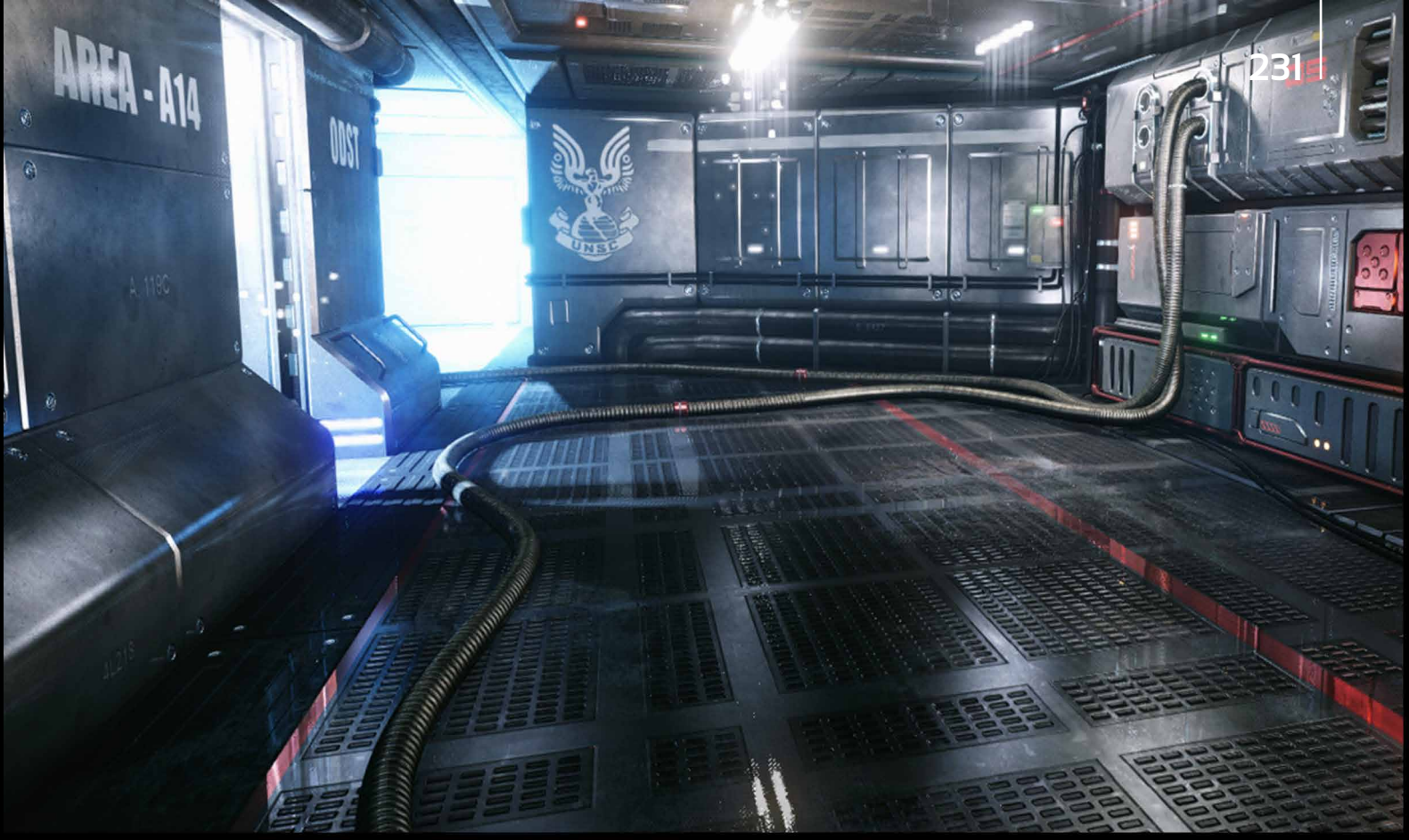
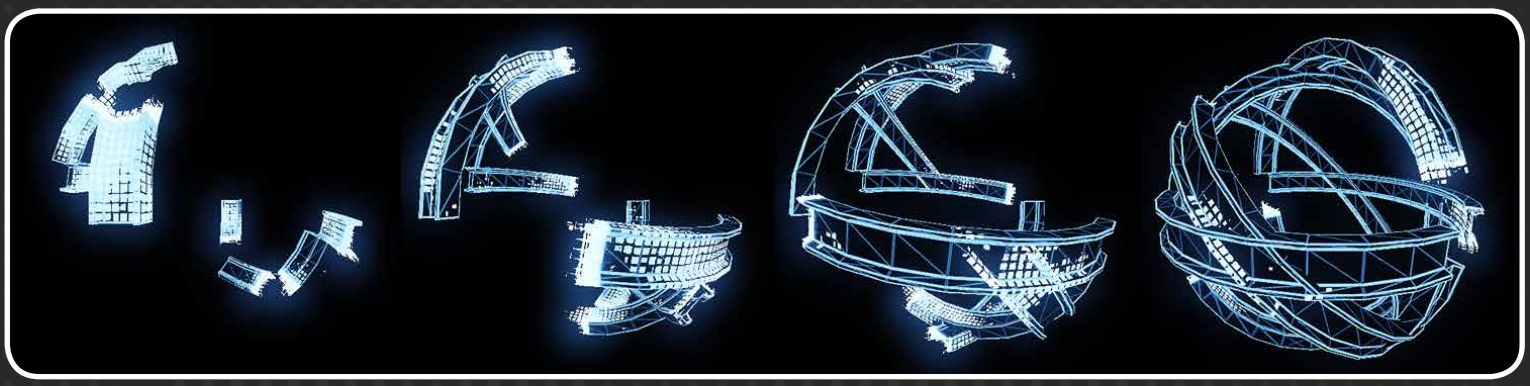


Rense de Boer

www.artbyrens.com

NANO Construction

Creating Stylized Transitions using Unreal Shaders By: **Jeremy Baldwin**



We will be looking at developing an exciting transition effect within the Unreal Engine 3. During this session I will show you how to create some very unique texture's utilizing the basic tools Photoshop has to offer. The method we will be using to generate our textures, will be procedural with unlimited seed variations. This will ensure every outcome has the potential to be original, and have its very own personalized artistic twist.

Then inside the Unreal Engine 3, we will take a look at the nodes that will be used in our shader, as well as a general overview of the node properties and functions. After setting up our shader, the textures will be implemented and modified to achieve the desired effect. We will then look at using vertex channels to drive a parameter (e.g. Constant One Vector), that a particle system module can modify over time. And what better way to wrap up a project like this, than to build a working demo inside cascade! But wait, it wouldn't be smart to have a simple idea and jump straight to the production phase without being prepared! Otherwise, the outcome might be lacking and/or disappointing. So lets first look at some general rules to help guide us!

Establishing the Desired Effect

There are 3 key steps I take when establishing a new element (Such as a Visual Effect)

Obtaining Reference
Creating a Base Construction
Creating Life

Reference: I cannot emphasize how important reference is. And not just for VFX elements, but all elements in art and design. An important thing to remember is that in most cases, your memory will fail you when trying to re-create elements that behave in very specific ways. Even for seasoned artists, this can be a tremendous problem. Plus, it gets your creative juices flowing and past the "Blank Canvas" stage with something tangible. So get out there and collect some reference!

Base Construction: Once I have an idea of the element, its general look, and the behaviors it exhibits, then I create the core element. For example: If you were to think of a camp fire as a special effect, you would need to create the Hot Flames in the Center, General Embers, Popping Embers, Smoke, and High Velocity Smoke Trails following pieces of wood that eject off of the fire pile. But the core of a Camp Fire effect would simply be the Hot Flames. By establishing this element and simply placing it on a wood pile, people would automatically assume it was a camp fire. Does it look awesome yet? Probably not, but it is recognizable, and therefor is a successful "Base Construction" of your effect.

Creating Life: Once the Base Construction step is complete, I begin to build in all of the supporting effects to bring the whole element to life. As stated in the "Camp Fire" example above, the core effect would be the Hot Flames, and the supporting effects would be the Embers, and smokes. Here is another example to help those who might still not understand the difference between a Core Effect and Supporting Effects.

Element	*Core Effect*	*Supporting Effects*
Tornado	Spinning Funnel of Wind	Debris, Small Wind Gusts
NANO Construction	A Mesh Transition	Energy Cubes, Lingering Cubes

The Shopping List

This step depends more on experience and is not as important as the other three, therefor it is not necessarily required for some things. But, I do recommend it heavily! Once we have an established effect in our minds or within a concept, we will create a list of items that need to be created for us to achieve a believable and aesthetic end result. Don't just go in and start creating at random because this can lead to time loss, inefficiency, and is generally a bad rule of thumb. There needs to be structure!

Ok, enough with the pleasantries, I think it's about time we get our hands dirty!

Nano Construction Transition

The Idea: The way I see it in my head, is an object is built from small, Nano like energy in a sweeping fashion. But, that is simply not good enough. We need to see similar, established effects that are already fully created to help get the creative juices really flowing! This could be your own prior work, or that of another. Time for Reference!

Nano Reference: The first thing that came to mind was the Deaths in the Tron universe. When someone is killed, their body or affected area releases an "energy" that travels in a grid like pattern spreading outwards from the epicenter. Following this surge of energy, the body or area disassembles into little cubes and shards. (Not technically speaking, but just from a visual standpoint).

This effect roughly resembles what I have in mind, just reversed. Seeing this reference might also reveal other elements to me that I might not of thought about, such as a distortion effect, or sparks that occur during impact.

Another source of reference for me was the game Singularity. When playing through the game, you sometimes stumble upon objects that are broken or disabled, such as a broken and shattered stair case. In order to get passed the broken object, you must reverse its state back to a point when it was still in functioning condition. When the player does this, we get a cool, orange glow that scrolls from the outside and pans to the center of the object symbolizing its transition. Once the object is set back to its original state, there are some dust like embers that blast out from the object and gently drift away, which visually tells us that the transition and object transformation is complete.

For now this is good enough, but feel free to grab as much reference as needed. The more you have, the more your brain explores possibilities.

Nano Shopping List:

To achieve this effect, we will be using Photoshop, 3D Studio Max, and the Unreal Engine 3 (UDK). The Textures we will be creating for this project are:

Square (Nano) Mask Texture
Square (Nano) Grid Mask Texture
Shifted Gradient Mask Texture
UV Render Texture

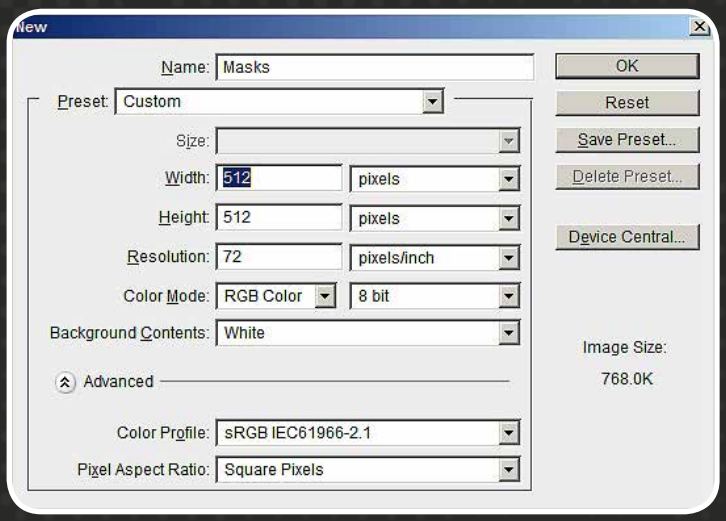
The Object we will be applying this to will be a Mesh that exists within the UDK Package: StaticMesh'HU_Deco_Statues.SM.Mesh.S_HU_Deco_Statues_SM_Statue03_01' However the object does not matter, when applied correctly, this effect is universal. The Shader we create will consist of:

Several Masks
If Operations
UV Coordinate Manipulation
Vertex Color (Alpha) Driven Values
Textures

Photoshop: Creating the Textures

Right, lets get to it! Upon opening Photoshop, we need to create a New Document to house all of our texture work. Select File > New and in the document settings Choose:

Name: Masks
Preset: Custom
Width: 512 Pixels
Height: 512 Pixels



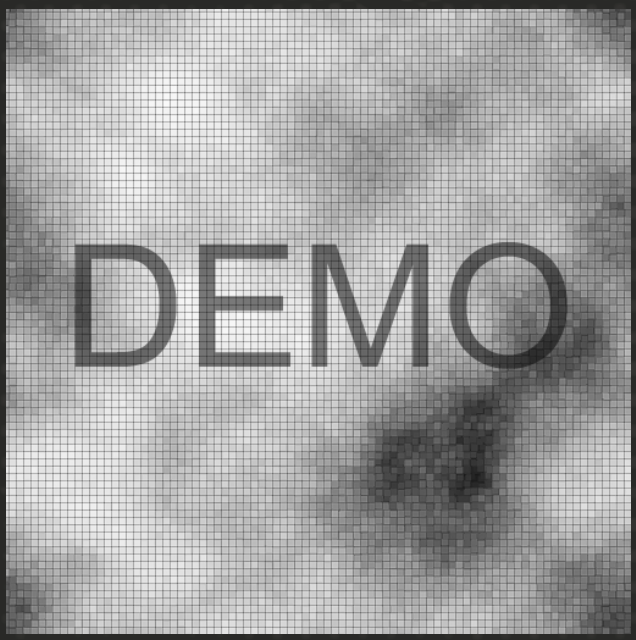
Leave the remaining settings to their default state.

Differentiating Square Texture:

What we need to create is a tiled square texture with different values in each square ranging from 0 – 1.
This way, when we create an “IF” operation in Unreal, we can specify how and which squares will be effected in what order.

Create a New Layer and Rename it Noise. Make sure your Foreground and Background colors are set to Black and White. This way, we get a value range of 0 – 1. Using the shortcut “ALT+Delete” you are able to fill the layer with your foreground color. On another note, the shortcut “CTR+Delete” will fill the layer with your background color. Once filled, select the layer and go to Filter > Render > Clouds. If you are not happy with the pattern generated, you may duplicate the process to generate a new variation. This can simply be done by using the shortcut “CTR+F”.

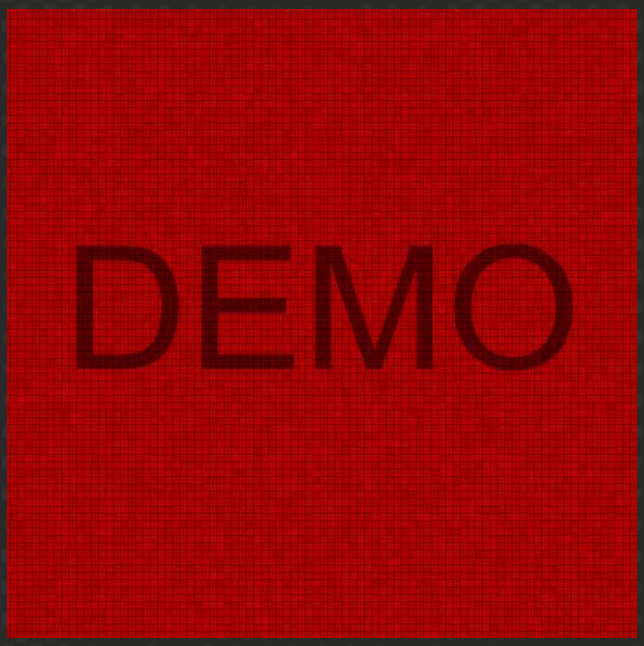
Next we need to create the grid pattern and isolate specific values within each square. Sounds tough right? Well we are in luck because Photoshop has a filter that does just that, and more! With the Noise Layer Selected, navigate to Filter > Filter Gallery. When the Filter Gallery opens, choose the file folder in the right menu that says (Texture), and choose Patchwork. Set the Square Size to 1, and the Relief to 0. Now that the parameters are set, click Ok to accept the changes.



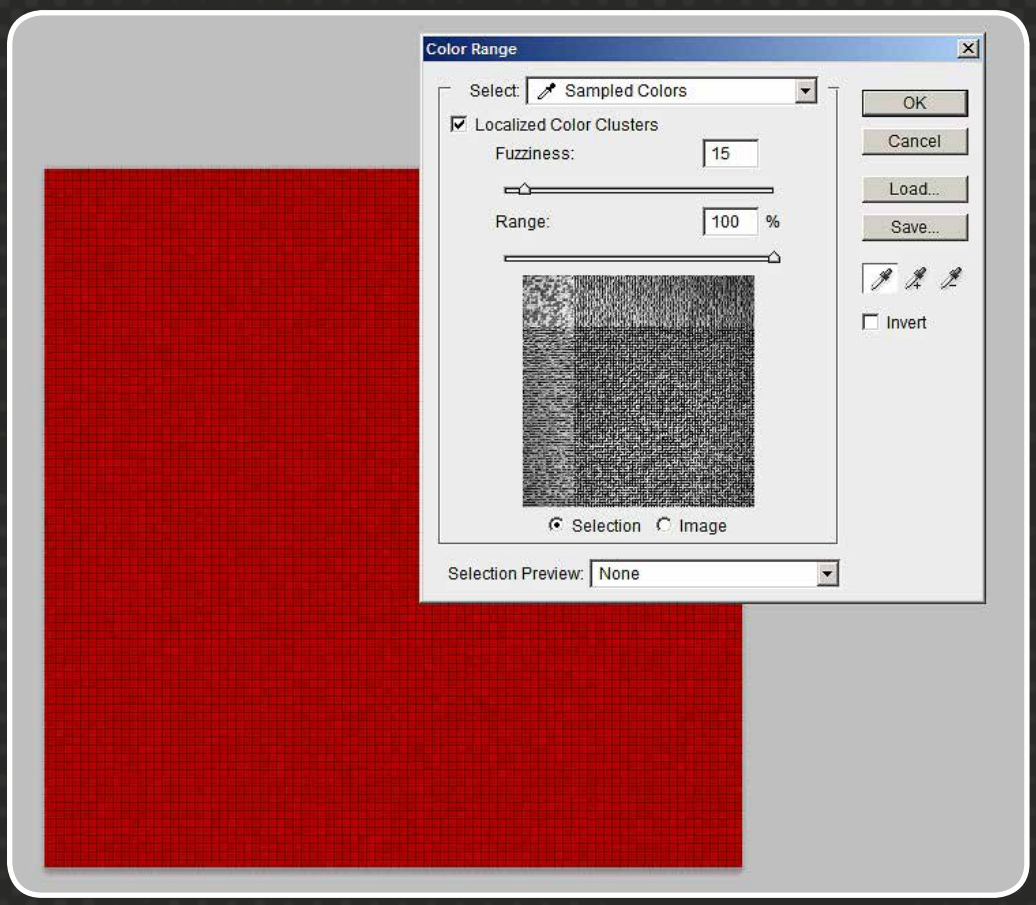
Great Job! We have finished with the first Texture.

Square Grid Texture:

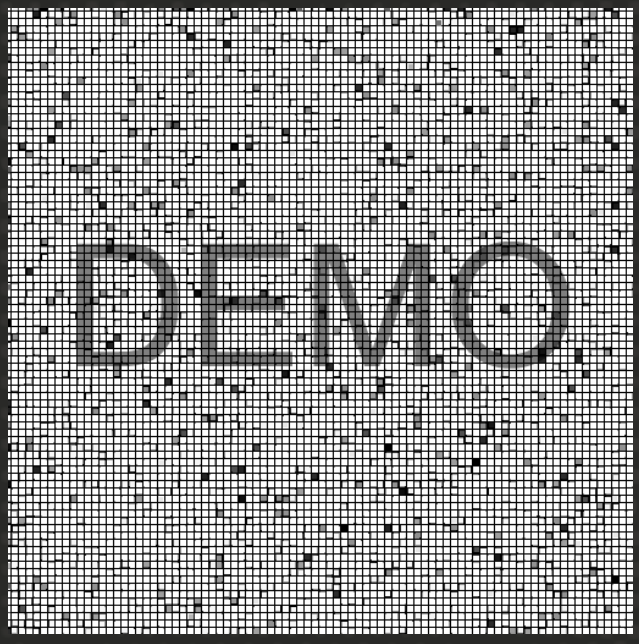
Here, we will be generating another grid pattern but instead of using Black and White, we will use Red and Black. This will ensure that we have a good contrasting color to select and manipulate. Name this layer Grid Mask.



Once we have generated our new texture, we want to create a new selection based off of the color variation. To do this, navigate to Select > Color Range. A window will open that has several options in it with a preview box. Make sure your "Select:" is set to Sampled Colors. I have personally set the Fuzziness to 15, but this is purely up to you. Your cursor will also turn into a dropper icon. While holding shift, left click some of the red values in the grid texture you generated.



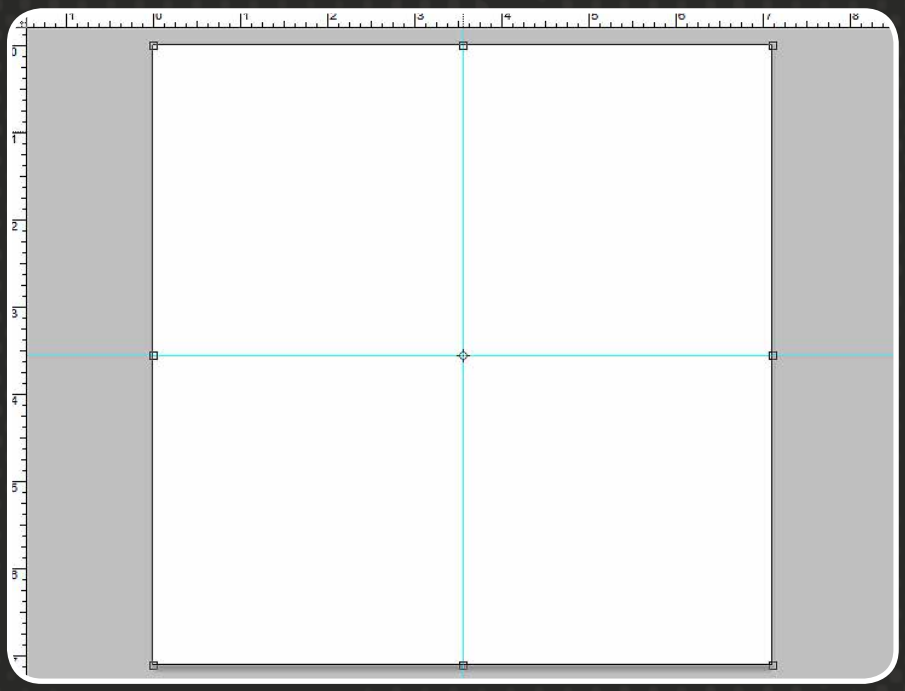
When you are satisfied with your selection result, click Ok to accept your changes. Do not deselect! Move over to your layers menu and create a New Layer by clicking on the icon, do not use the shortcut. Set your Foreground and Background colors back to White and Black. On the newly created layer and with your selection still active, fill the layer with White. Once filled, you may deselect by using the shortcut “CTR+D”. Create a new layer below this layer and fill it with Black. Select Both layers and Merge them using the shortcut “CTR+E”



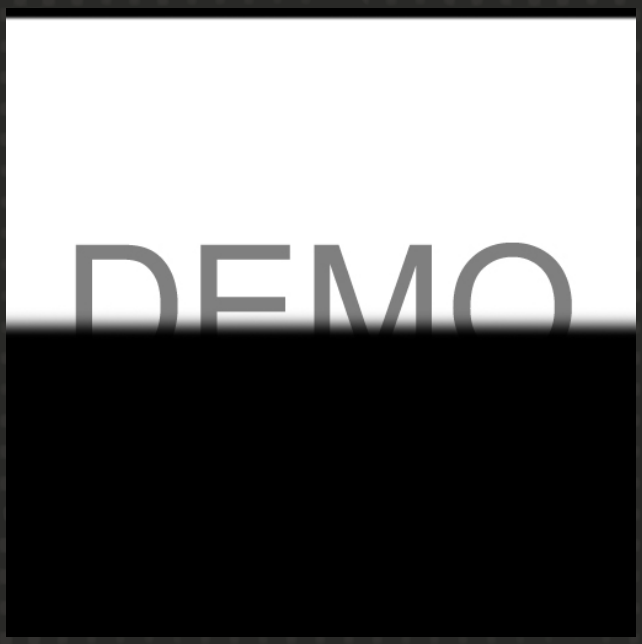
Congratulations! Yet another texture has been completed.

Shifted Gradient Texture:

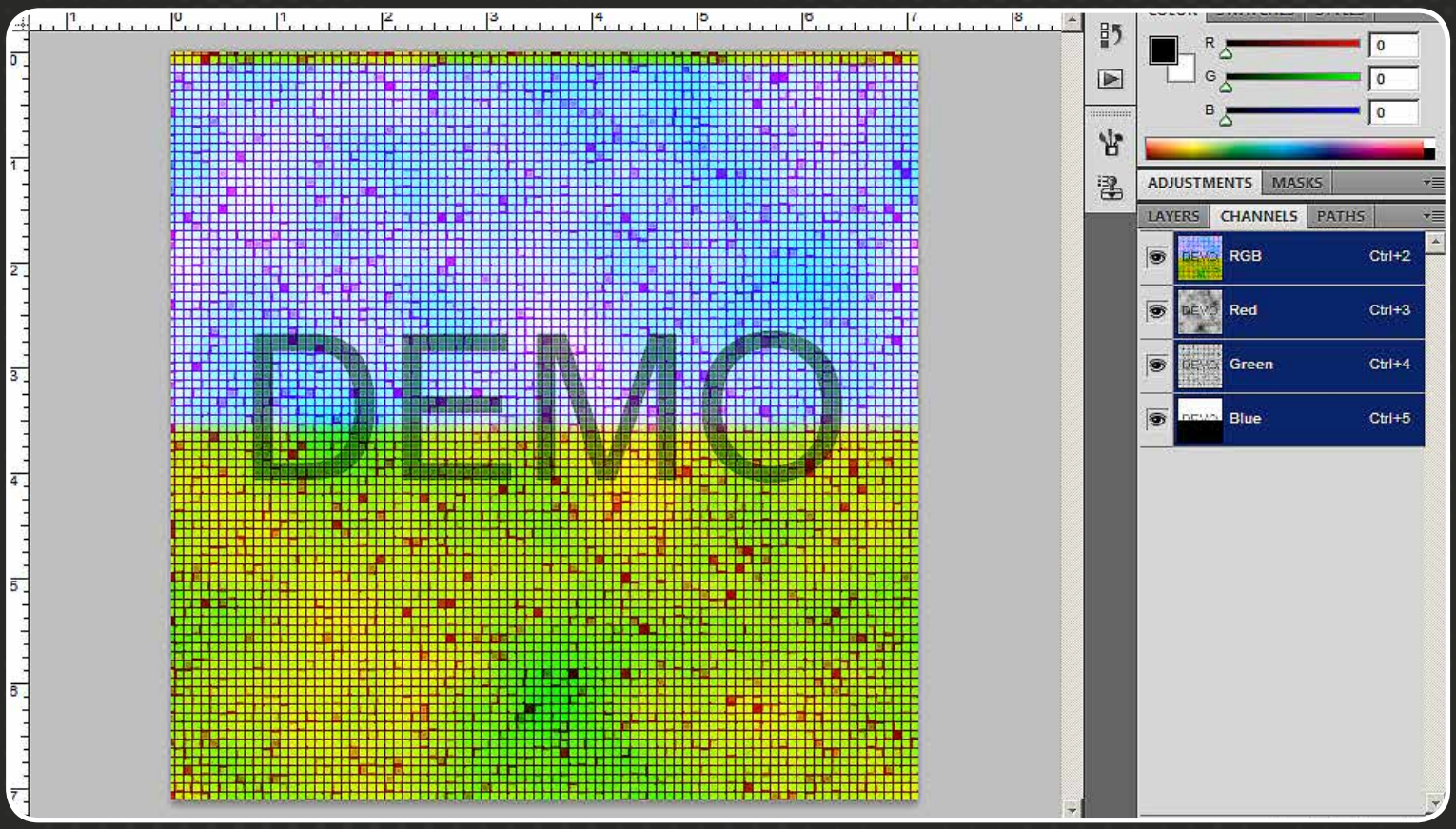
This one is pretty simple and straight forward. Create a new layer and name it Shifted Mask. Fill this new layer with White. Before we start jumping in and creating, we need to know exactly where the center point of the canvas is. To do this, select your new layer and use the shortcut “CTR+T”. Since your layer fills the canvas 100%, the center crosshair will be located at the exact middle point. We need to now expose our ruler which will show up along the work space’s border. To hide and unhide it, use the shortcut “CTR+R”. Once the ruler shows up, we will hold down CTR+Left Click and drag out from the ruler to create a Blue Line Marker. Drag this line both from the “Left Vertical” and “Top Horizontal” rulers to the center crosshair. Once done, you can simply click Enter to leave transform mode.



Next we will create a new layer and select our Square Marque Tool from the tools bar located on the left (Default Photoshop). Using the Square Marque Tool and the Ruler Lines created, select the lower half of your empty layer and fill it with black. Now select a 15 Pixel strip from the top of your layer and fill it with black as well. Once both black sections have been created, merge this layer down onto the white layer below. Navigate to Filter > Blur > Gaussian Blur and set the radius to 5. Click Ok to accept your changes.



Now that we have all three textures completed, we need to pack them into the RGB Channels of a new White Layer. The Noise texture will be packed into the R channel. The Grid Mask texture will be packed into the G channel. And the Shifted Mask texture will be packed into the B channel. Since there are tons of resources on how to do this, and at the risk of boring you, we will move on.

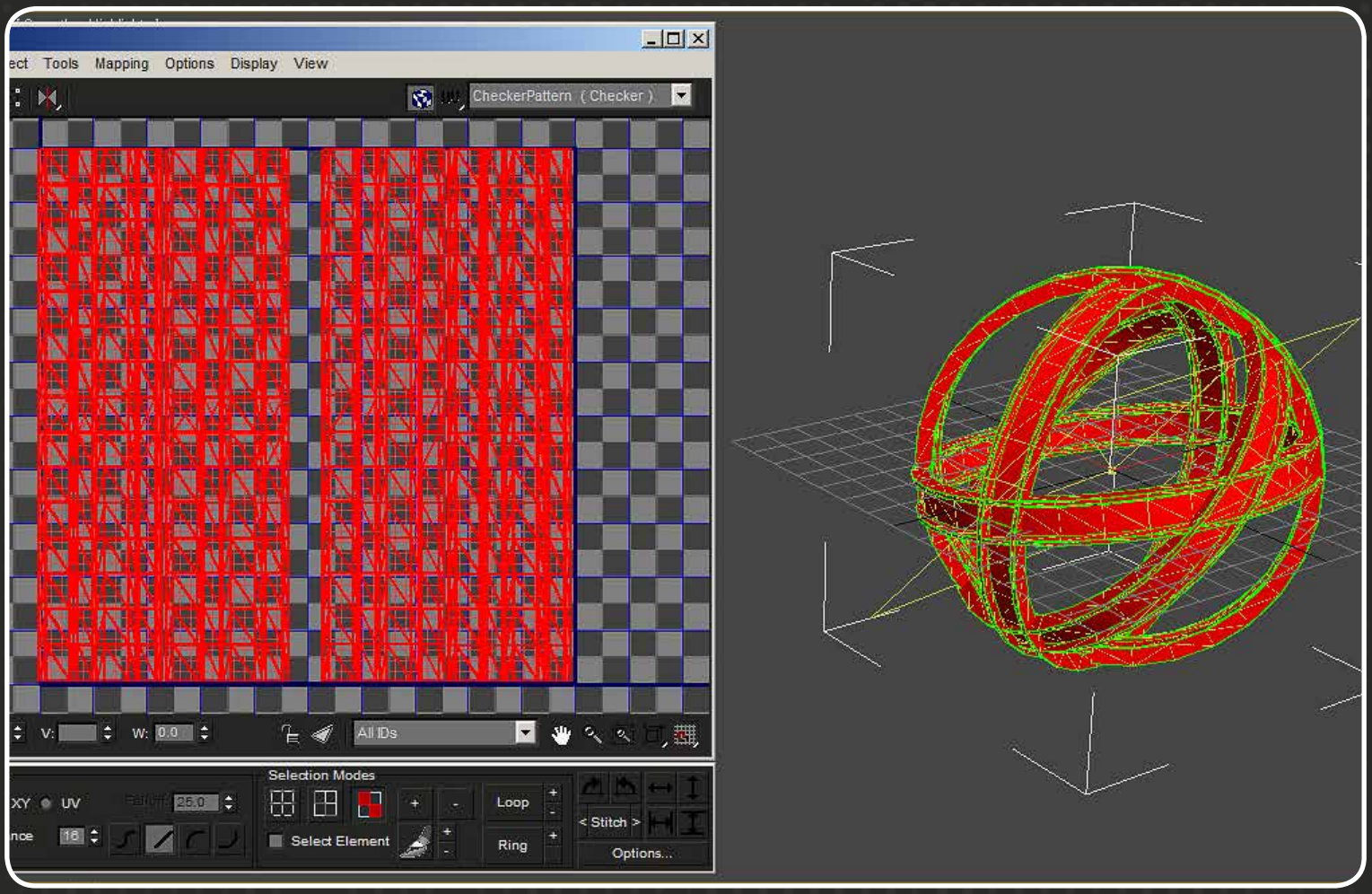


3D Studio Max: Setting Up a Test Mesh

Now that we have the textures created for the masking, we need to get the mesh setup with two specific things in mind. The first is a usable model with working uv's for the effect to look cool in the Unreal Engine, and the second is a uv set to render out for simple texture work in Photoshop. For this project we will use a mesh already provided in the UDK Package. So really quickly, we need to launch UDK (I am using the 05/11 release). Inside of UDK Navigate to your Content browser and find the Mesh:

StaticMesh'HU_Deco_Statues.SM.Mesh.S_HU_Deco_Statues_SM_Statue03_01'

Right click the mesh and choose the option "Export to File". Save this file out to a safe and structured location on your computer, and name it SSphere. Now that we have a mesh, load up 3D Studio Max and Import the mesh called "Ssphere_Internal.OBJ". This file should also be larger than the other two files that were created alongside this one on export. Once imported, convert the object to an Editable Poly object, and apply an Unrwap UVW modifier to it. Click the edit Button in the properties of the UVW Modifier within the command panel to view the UV Set. You will notice there are already existing uv's however, we are going to be creating a "Top – Bottom" effect, therefore we need to grab all of the uv's and rotate them 90 degrees Clockwise.

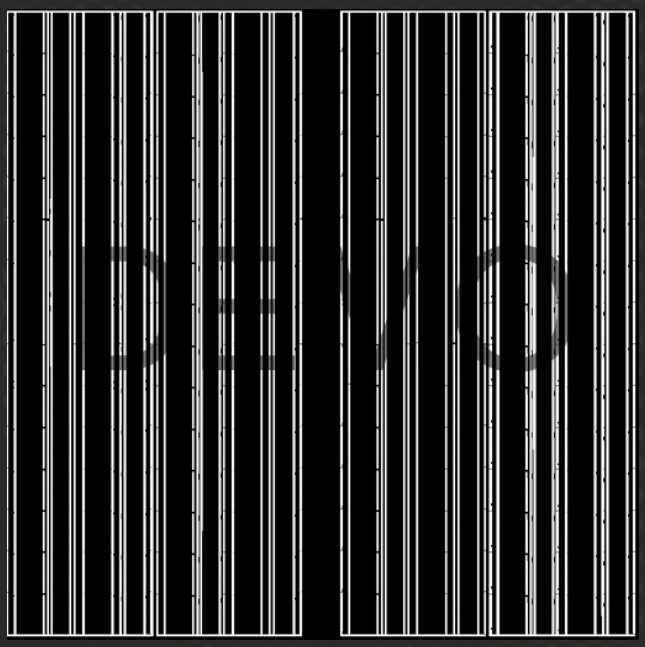


After we have flipped the uv's, we now need to render out our UV Template for texture use. Click on Tools > Render UV Template. Set the Resolution to 1024x1024. Make sure the options "Visible Edges" and "Seam Edges" are checked and that seem edges is a bright green color (Default). Once the render is complete, save it out for later use. Now that we have completed our editing tasks, convert the object once again into an editable poly object. Make sure you have the object selected and choose File > Export > Export Selected, and name it to PropSphere. Be sure to export it as .ASE.

Photoshop: A second Visit

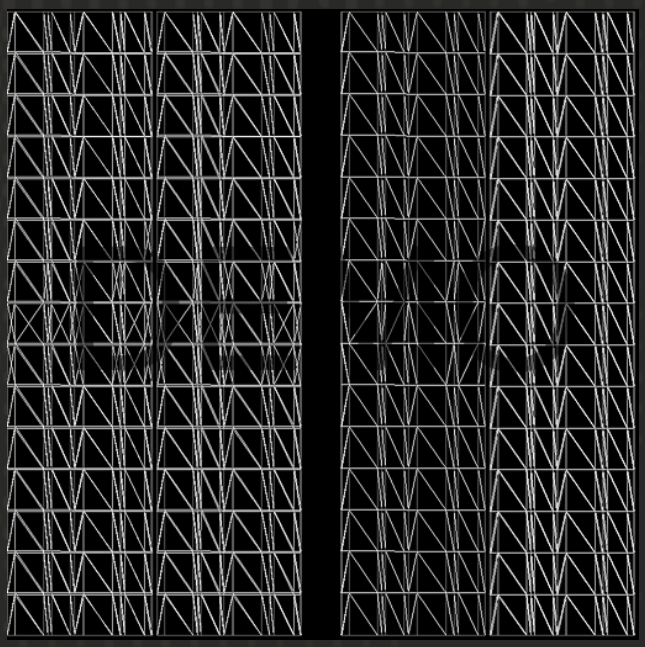
This will be a short one guys! As all we are doing is creating 2 basic textures off of the uv render. So lets knock this out of the way and get on to the Shader!

UV Outline Texture: Load your uv texture into Photoshop (File > Open), and unlock the layer. This can be done by simply double clicking the layer, and then selecting Ok when the "New Layer" dialog box opens. You should see your Seams in Green and the rest of your edges in white. We will utilize this color variation once again to create selections. Navigate to Select > Color Range, and choose Green. Once done, click Ok to accept your changes. But there is an issue, the selection is only a pixel or two wide which won't be good enough. With your selection active, navigate to Select > Modify > Expand. A dialog box will open, and you will need to input 2 for the "Expand By" value. Now create a new layer and name it Stroke Mask. With your selection still active, fill it with White. Now create a new layer below and fill it with Black. Once completed, merge both layers together using the shortcut "CTR+E".



Only one texture to go!

UV Texture: Simply select your original uv image that you exported out of 3D Studio Max, and duplicate the layer. Desaturate the image 100% by using the shortcut "CTR+SHFT+U" and name this layer to Wireframe Mask.

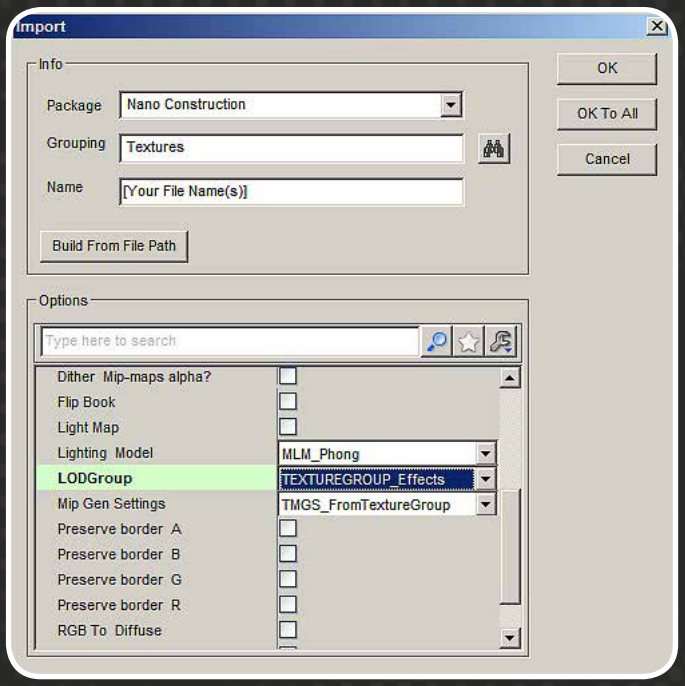


Now that both textures are created, like before, we will pack them into the RG Channels of a new White Layer. Pack the Stroke Mask into the R Channel, and pack the Wireframe Mask into the G Channel. Save it out and lets move on!

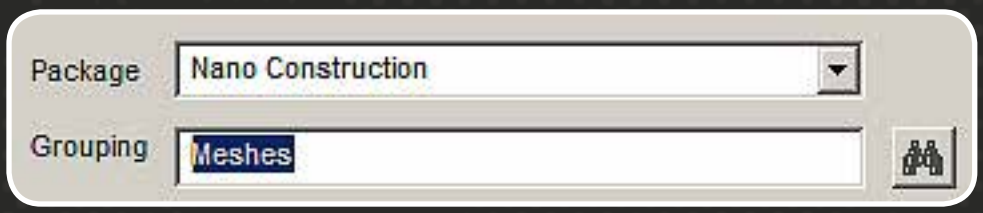
Unreal Engine 3 (UDK): Building the Nano Shader

Great job making it here and I hope you have already gained something useful from the prior text! Now comes one of my favorite parts in Shader creation... Yes you guessed it, building the Shader! Like you never saw that one coming. Anyways, back to business.

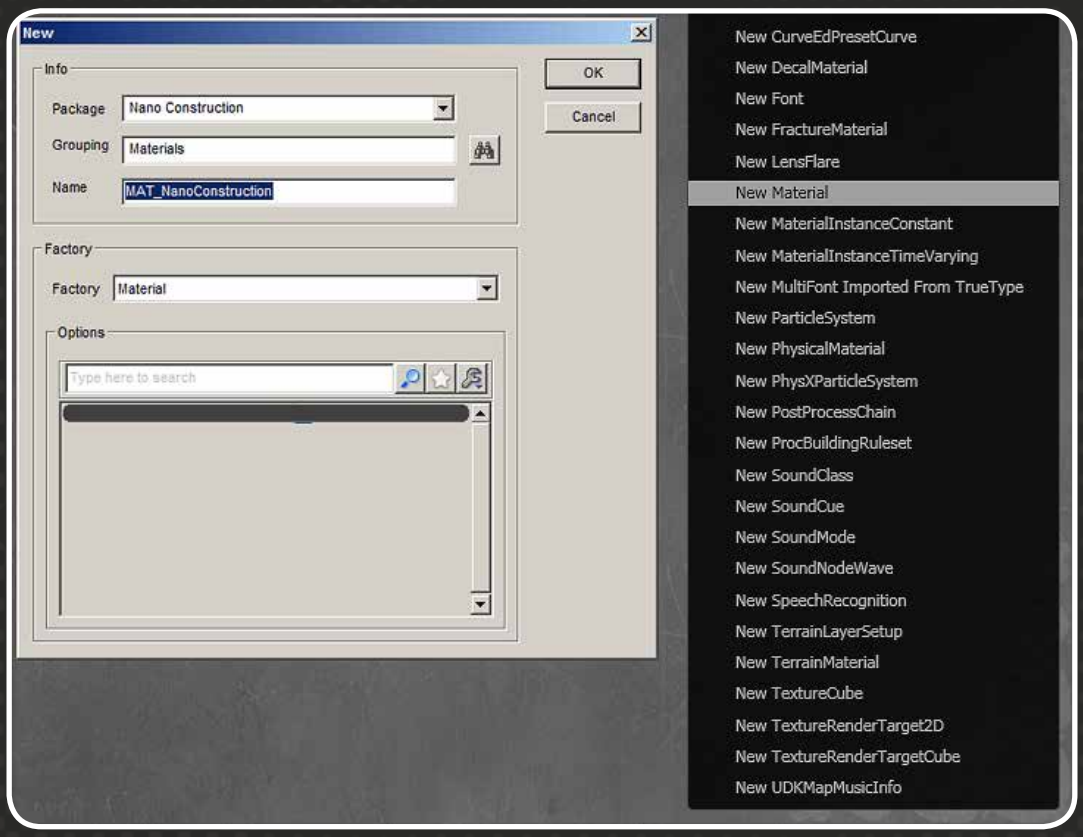
Folder Structure: It is important in any situation to create structure, and Unreal is no exception. Upon loading UDK, navigate to your Content Browser and find the "Import" button located at the bottom left of your window. Click import and navigate to your folder where you stored all of your textures you created. Select them all so we can do a batch import and simply click Open. A dialog box will appear with options for importing. Name the Package Nano Construction. Name the Group Textures. Leave the "Name" section alone. As this setting will change based on what you named each image. You may also manually overwrite it if you wish. Under the Options, we are simply going to scroll down the the "LOD Group" And change it from – TEXTUREGROUP_World to TEXTUREGROUP_Effects. Once you have set these options, click "OK to All".



Next we will import our mesh. Navigate to the Package you just created named "Nano Construction" and with the root folder selected, right click in the canvas area and choose "Import" from the right click menu. Navigate to your folder where you stored your mesh. Then select your mesh and click Open. The same dialog box will appear and for mesh we will make only one simple change. For the group name, type in Meshes and click OK.



Now that we have imported all of the necessary files, we still need to create a new Material. To do this, right click in the canvas area and select "New Material" from the right click menu. Once again, a similar menu will open. For this, we will change the Group to be Materials, and the name of the material will be MAT_NanoConstruction.



Helpful Resources for Nodes: Some of these nodes might be a bit confusing if you have never used them before. If you aren't familiar with some of these nodes, I recommend looking at:

IF - http://udn.epicgames.com/Three/MaterialsCompendium.html#If
VertC - http://udn.epicgames.com/Three/MaterialsCompendium.html#MeshEmitterVertexColor
TextCoord - http://udn.epicgames.com/Three/MaterialsCompendium.html#TextureCoordinate
Cmask - http://udn.epicgames.com/Three/MaterialsCompendium.html#ComponentMask
AppendV - http://udn.epicgames.com/Three/MaterialsCompendium.html#AppendVector
Divide - http://udn.epicgames.com/Three/MaterialsCompendium.html#Divide

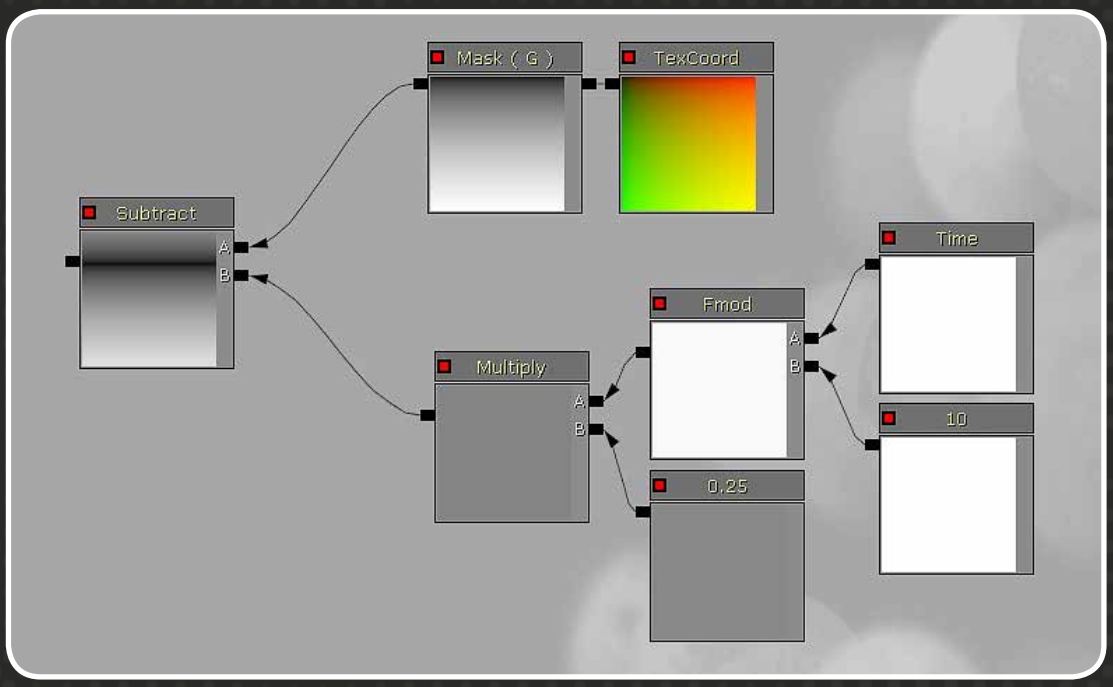
Looking through the Material Compendium in general is something I highly recommend. After this exorcise, stop in and study. There is a lot of helpful information on the UDN and elsewhere if you take the time to study it.

Building the Mask: Double click on the Material you created "MAT_NanoConstruction" and your material window will open. I am not going to tell you step by step how to add each specific node. If you do not know the shortcut key(s), then you may use the Material Expressions window to search for them. To access the Material Expressions window (Which is normally located on the right of you Material window), navigate to the word "Window" Located at the top left and choose "Material Expressions:" from the drop down.

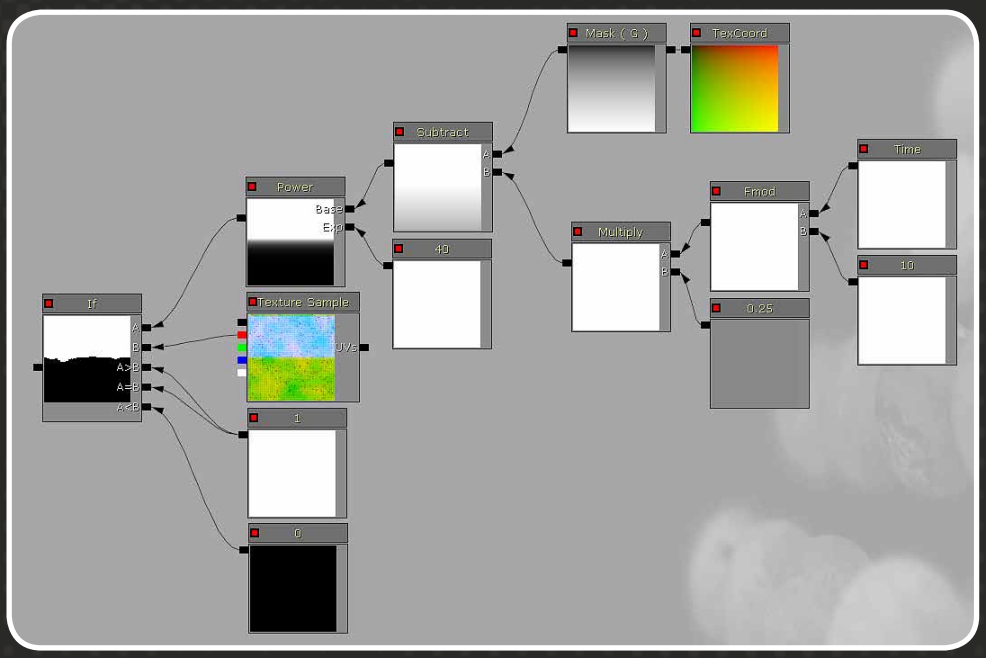
First thing we need to set up is the Material Type. Click in the Canvas of your Material and you will see the Material Properties located at the bottom of your window. Change the Blend Mode to BLEND_Masked. Change your Lighting Model to MLM_Unlit and check the box for Two Sided.

We will first create a TextureCoordinate node with a value of UTiling and VTiling set to 1.0 (Default Value). Next we will need to isolate the Green Channel. To do this, create a ComponentMask and in the properties un-check the R, B, and A Channels. Now check the box for G Channel. Plug the TextCoord into the ComponentMask node and you will see a horizontal gradient. We now want to move this gradient down over a given time. Later we will want to control this in Cascade, but for now we will create a simple Time Variant to do it for us so that we can see updates in real time. First we will need a Time node and Constant. In the Constant, set the R value to 10. Now create an FMOD node and plug the Time node into (A) and the Constant into (B). Now create a Multiply Node and another Constant. For this Constant, set the R value to 0.25. Plug the FMOD node into (A) and the Constant into (B) of the Multiply node. Now that we have our isolated Green channel of our TextCoord and a Time Variant, we need to use a subtraction.

Create a Subtract node and plug the Component Mask into (A) and the Multiply into (B). We have now successfully created a gradient sweep moving downward. (Note: If you are unable to see it animating, make sure all of your Real Time options are enabled within your material editor).



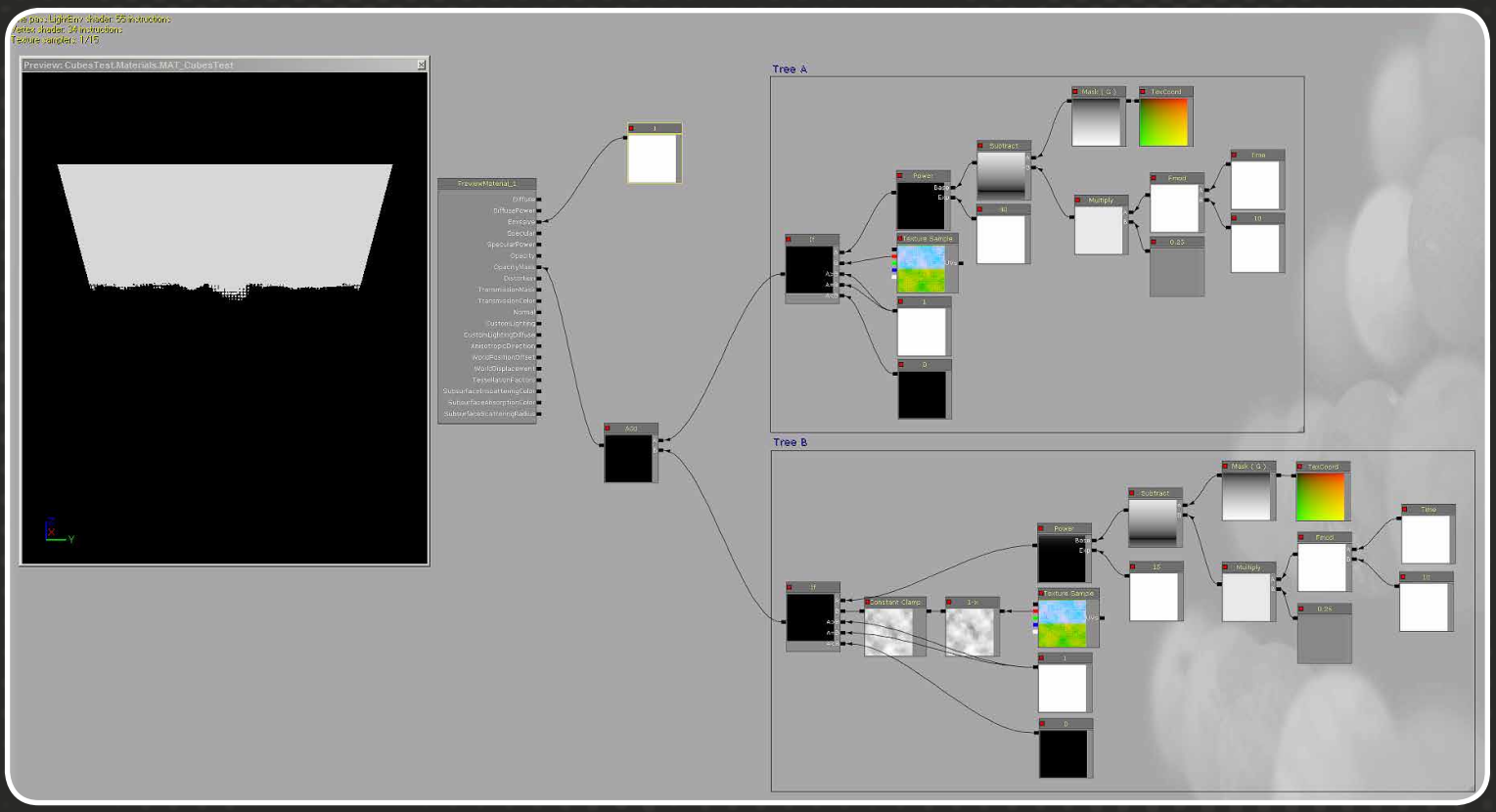
Next we need to modify this gradient and clamp the edges. We will create a Power Node and another Constant with the R value set to 40. Plug your Subtract node into the (Base) and the Constant into the (Exponent). By doing this, we have created a small falloff on the edge of the gradient that will help us drive the Square Selection Method of our Textures we created earlier as they are fed into an IF node. First we will create the IF node, bring in our Packed Nano Square Mask (First texture we created), and two more Constants. Set the first Constant R value to 1 and leave the other at 0. Plug the Power node into (A) the R channel of your texture into (B) the Constant with the R value set to 1 in both the (A>B, A=B) and the Constant with the R value set to 0 in the (A<B) of the IF node. You will now see that the falloff of the gradient is controlling the manner in which the squares are being selected as the TextCoord G channel Moves down (Thanks to our Time Variant).



We now duplicate our existing node setup and move it down. Here we will make some modifications to select the inverse of our mask and change the way it is controlled by altering our Power node. In the duplicated tree, locate the Constant that is plugged into the Power node. Change its value from 40 to 15. Next, locate the texture sample that has its R channel plugged into (B) of the IF node.

Disconnect it and move it back a bit. Next create a One Minus node and plug the R channel of your texture into it. Now create a Constant Clamp and plug your One minus into the Clamp. From there, plug the Constant Clamp node into the (B) input of your IF node. To finish this Mask off, we will create and Add node.

Plug your IF node from Tree A into (A) and the IF node from Tree B into (B) of your Add node. Now plug your Add node into the Opacity Mask of your Material. Switch the Viewing model to Plane.

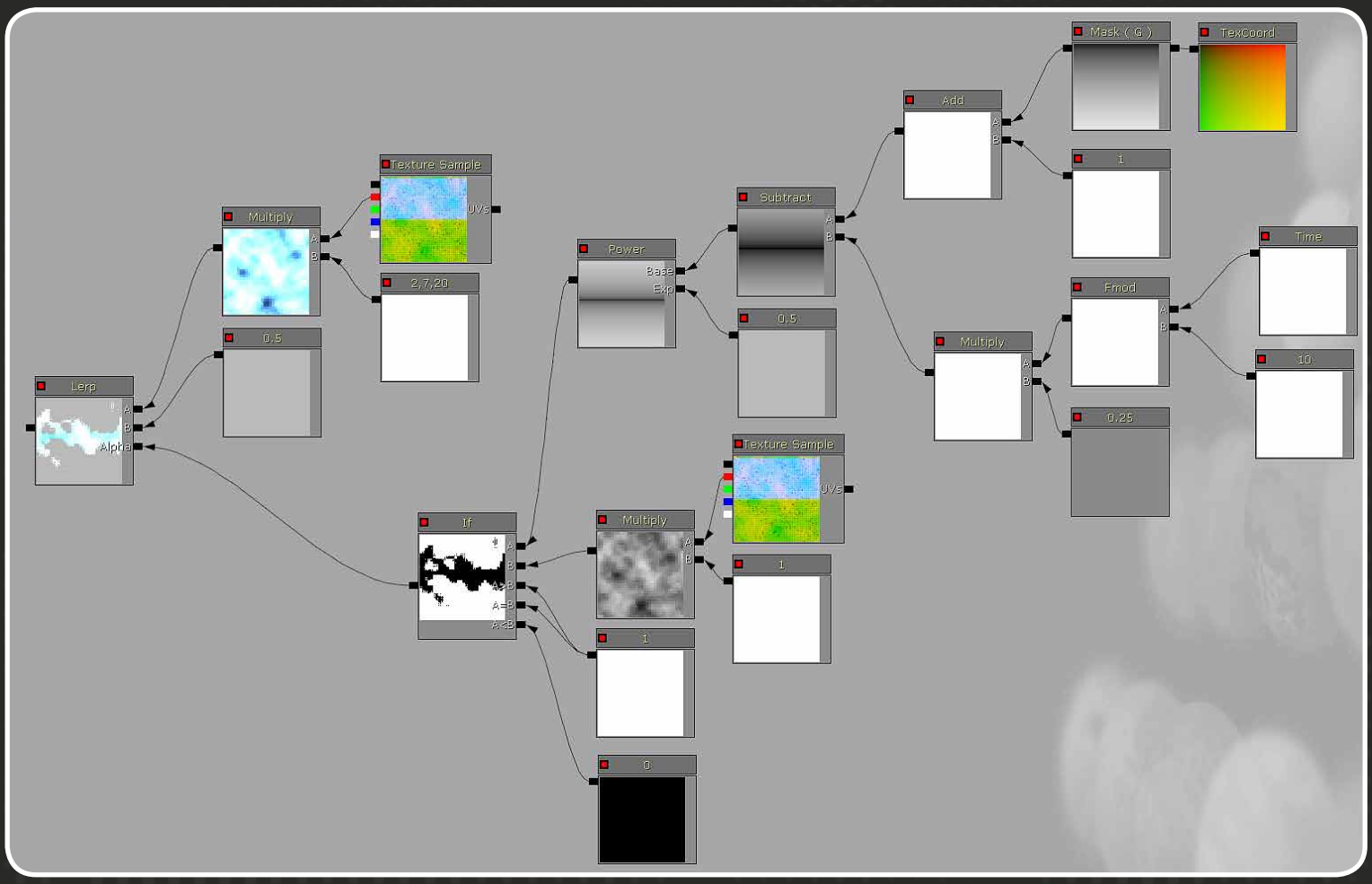


Building the Diffuse: To start this off, we will once again duplicate our Tree A of our Mask setup and drag it up to make some room. We will now modify it by first disconnecting our Component Mask from our Subtract node. We will then create a new Add node and a Constant with an R value of 1. Plug your Component Mask into the (A) and the Constant into (B). Now plug the Add node into your Subtract node.

Next, locate the Constant that is plugged into your Power node and change it from 40 to 0.5. Now create a new Multiply node and a Constant3Vector. In the Constant3Vector properties, set these values: R=2, G=7, and B=20. Navigate to your texture that the R channel is plugged into the multiply node and plug the R channel into the (A) of the new Multiply node.

Also, plug the new Constant3Vector into the (B) of the new Multiply node. To finish off the Diffuse, we will create a new Constant with an R value of 0.5 and a Lerp node. Plug the Multiply node into (A) the Constant with a value of 0.5 into (B) and the IF node of Tree C into the (Alpha) of the Lerp node.

Here we have effectively created a digital square dissolving effect that still roughly follows the mask speed and direction, but causes breakup and adds to the visual aesthetic.



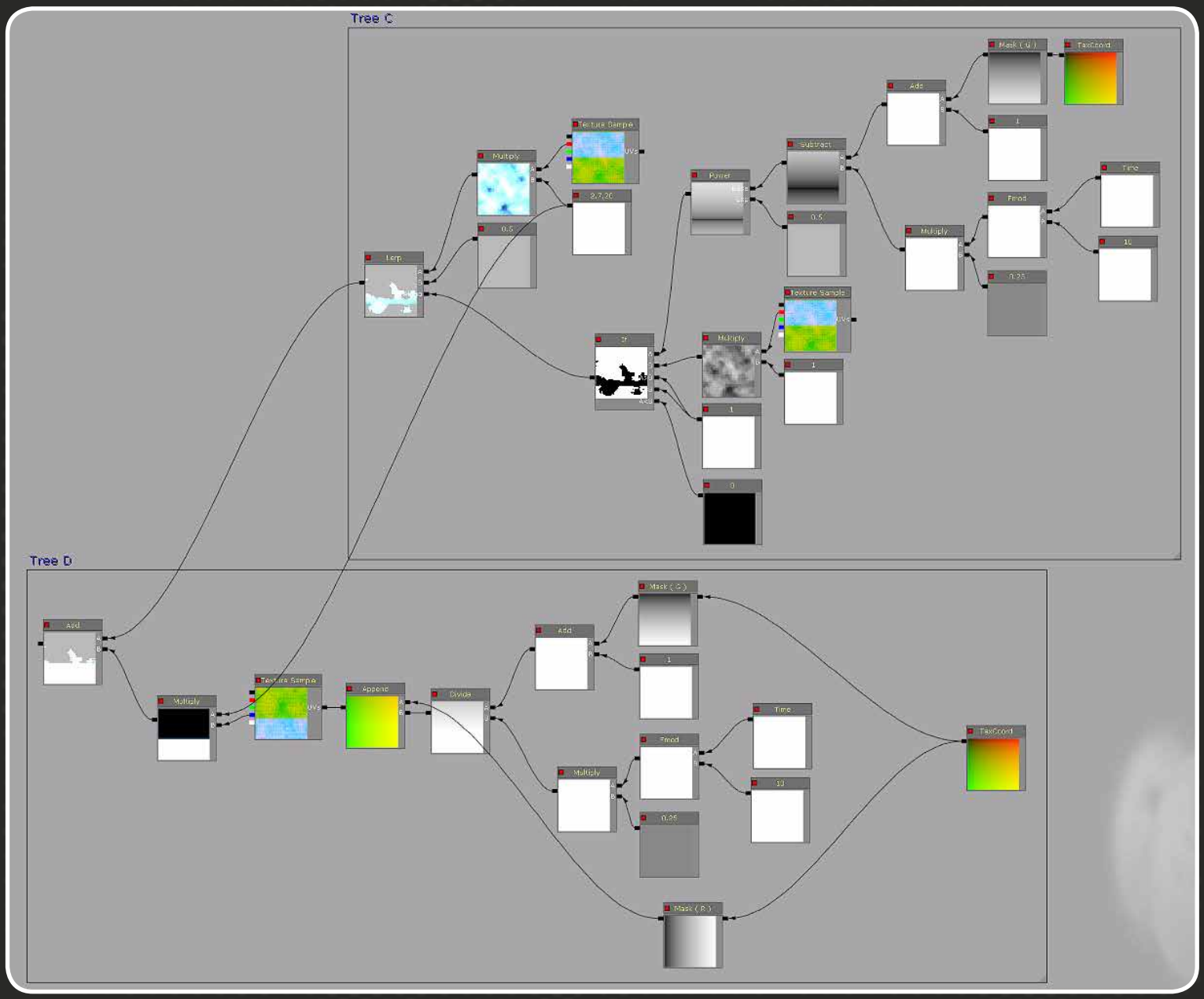
Building the Emissive: We will now be doing something a bit different. Using some of the methodology shown in isolating and manipulating TextCoord's in previous sections, we are going to modify a TextCoord and feed it back into a texture sample to manipulate the uv's! This can be extremely useful in many situations, so I recommend setting some time aside and learning as well as experimenting with all the possibilities.

Once again we are going to re-use nodes to save time. From Tree C, grab the TextCoord, the Component Mask Setup, and the Time Variant Setup, and copy/drag this down to create some room. Create a Divide node and plug the Add node into (A) and the Multiply node into (B). We now want to feed this back into a texture. But if you were to try, you would notice a very ugly result. This is because we are only feeding half of the information back into a texture. Remember how we stripped out the Green channel using a Component Mask? Well, we need to now do that for the Red Channel.

Create a new Component Mask and make sure only the box for R is check marked. Plug your TextCoord into the mask and you will now see a vertical gradient. Next we will need to combine the modified Green channel back with the Red Channel. Create a new Append Vector and plug the Divide node into (B) and the Component Mask with R isolated into (A).

Great job! We have successfully stripped a TextCoord, modified it, and re-built it to be used to drive a texture's uvs. So let's do just that!

Create a copy of your Texture and move it in front of your setup. Now plug the Append into the UVs of your texture. Create a new Multiply node and plug your texture's Blue channel into (B), then locate your Constant3Vector from Tree C and plug it into (A). Lastly, create an Add node and plug your Lerp from Tree C into (A) and your Multiply into (B). Then plug your Add node into the Emissive of your Material.



Congratulations! You have successfully built a self animating sweeping transition that represents a Nano like energy constructing a value! Now wait a minute? A value?

Yes, a value. Because currently we have a Constant plugged into the (B) of the Lerp node. However, we will be plugging in a texture in the next section which will sky rocket this shader to a whole new level of visual pleasure, and only in a few clicks! We will also be removing our Time Variant setup and be replacing it with a Vertex Color driven parameter so that we may set keyframes within Cascade and animate it over time. So come on, lets wrap this thing up and make it look awesome!

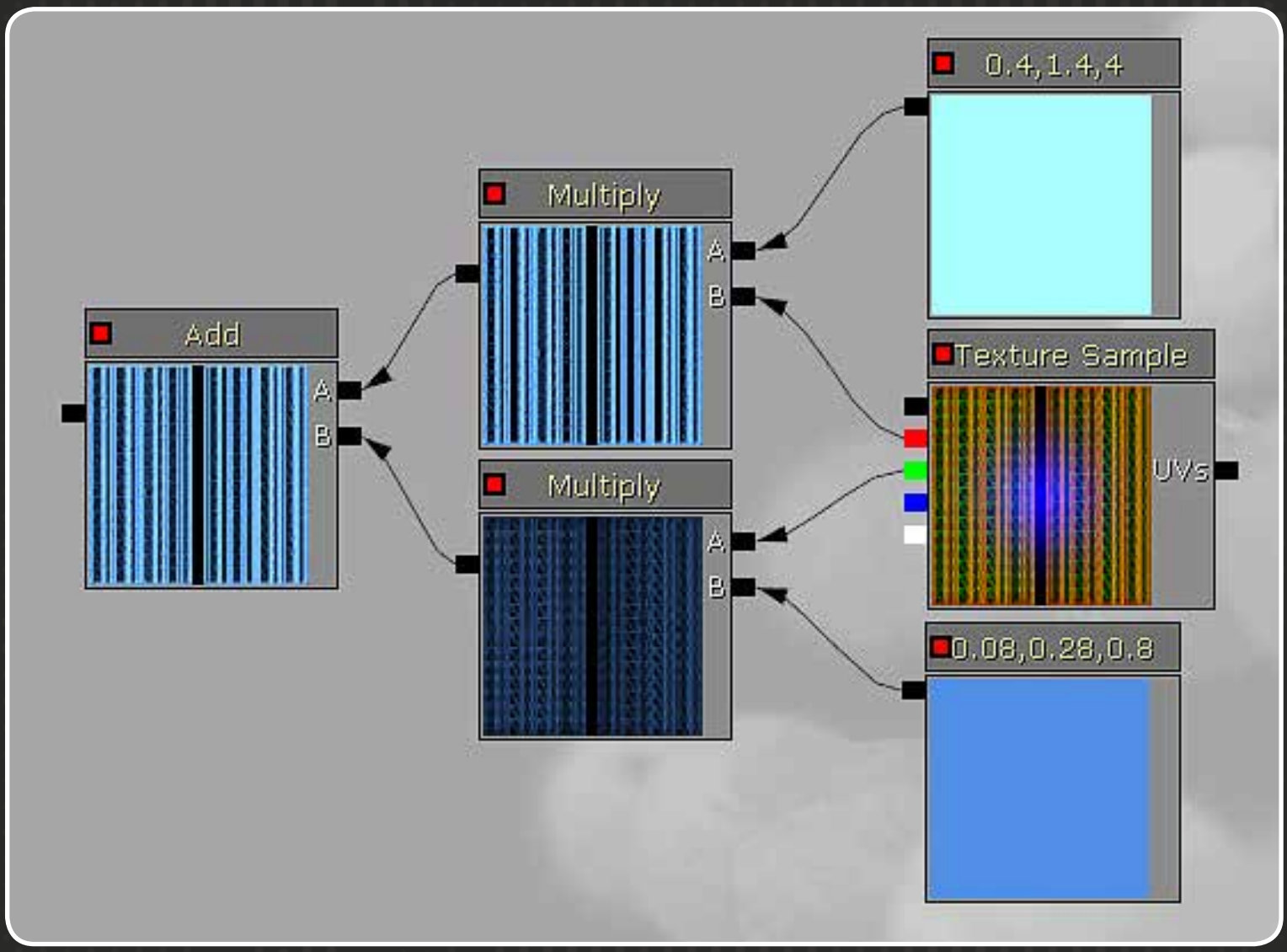
Shader Makup: We will start by changing our constant to a texture. This way, when we apply it to the mesh, we will get great feedback and add that much more to the visuals and believability.

Locate your Constant that is plugged into the (B) input of your Lerp node and delete it. Bring in your packed texture you created from the uv renders we did in 3D Studio Max. Now create an Add node, two Multiply nodes, and two Constant3Vector nodes. We will be creating a bright blue in the first Constant3Vector, and a dull blue in the second. For the bright blue, select one of the Constant3Vectors you created and set the values to: R=0.4, G=1.4, and B=4. In the other Constant3Vector “dull blue”, set the values to: R=0.08, G=0.28, and B=0.8.

Now plug your Red channel of your texture into one of the Multiply node's (B) and plug the bright blue Constant-3Vector into the same Multiply node's (A).

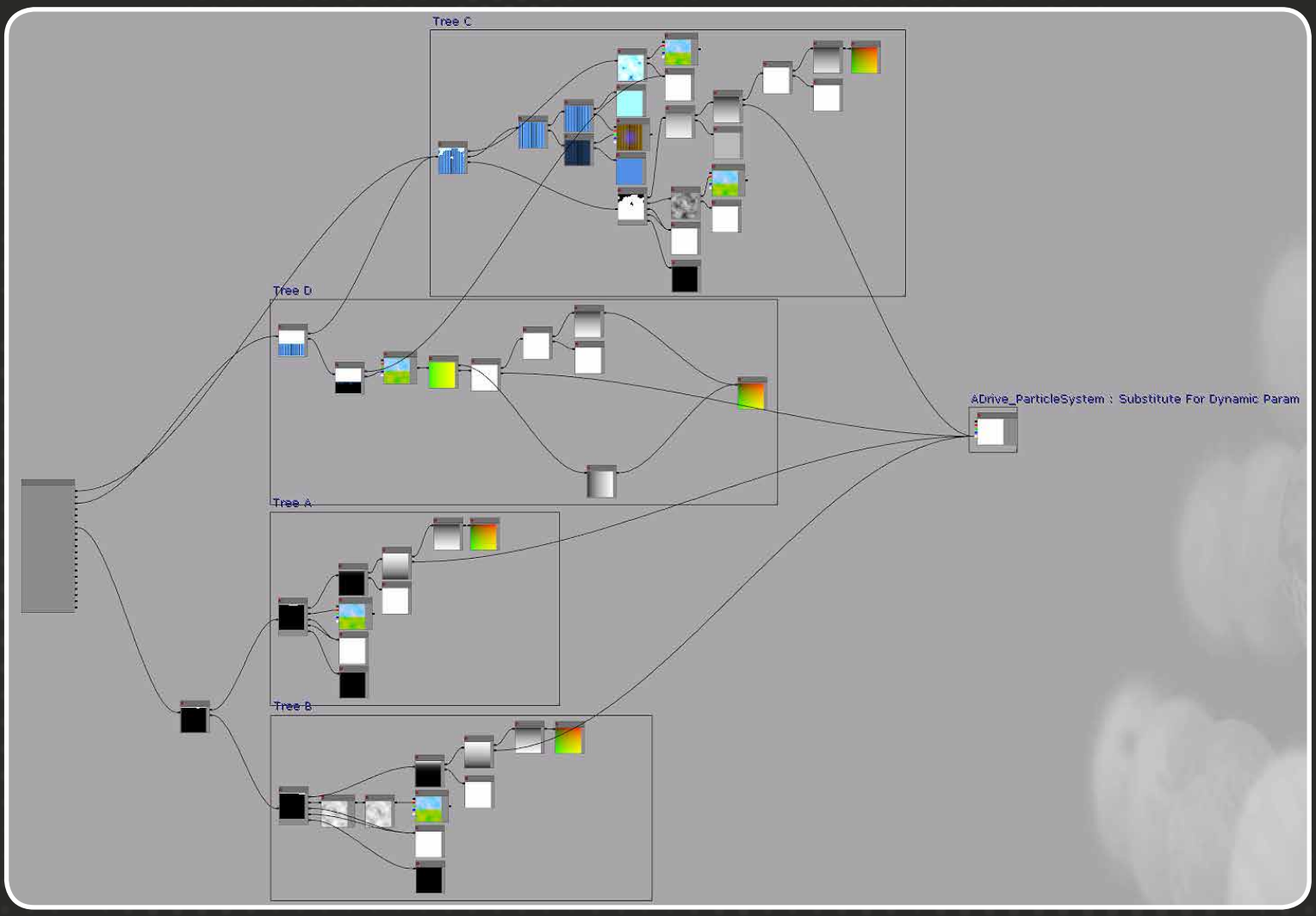
Now plug the Green channel of your texture sample into the other Multiply node's (A) and plug the dull blue Constant3Vector into the Multiply node's (B).

Then to wrap this up, create an Add node and plug the first Multiply into (A) and the second Multiply into (B). Now plug the Add node into the (B) input of the Lerp node. There we have it! The new revealing texture.



The last thing we need to do is replace our Time Variant Setup with something we can control. To do this, create a MeshEmitterVertexColor node. Drag this behind your whole shader setup. Plug the Alpha channel into all of the Divide (1) and Subtract (3) nodes to replace the FMOD Time Variant.

By doing this, we will be able to control the percentage of the masks progression through the value we feed into the "Color Over Life" module present in Cascade. Which in short means, this went from a set animated effect, to a fully customizable effect!

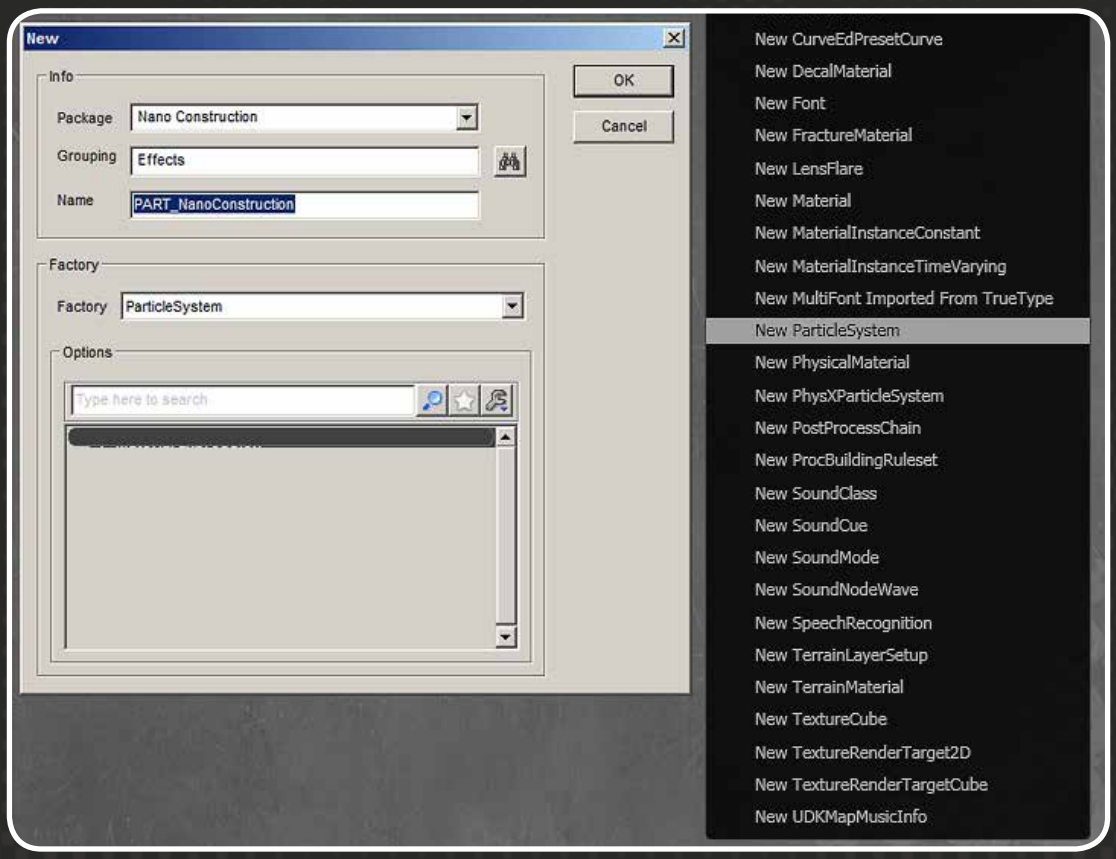


Cascade: Creating an End Composition

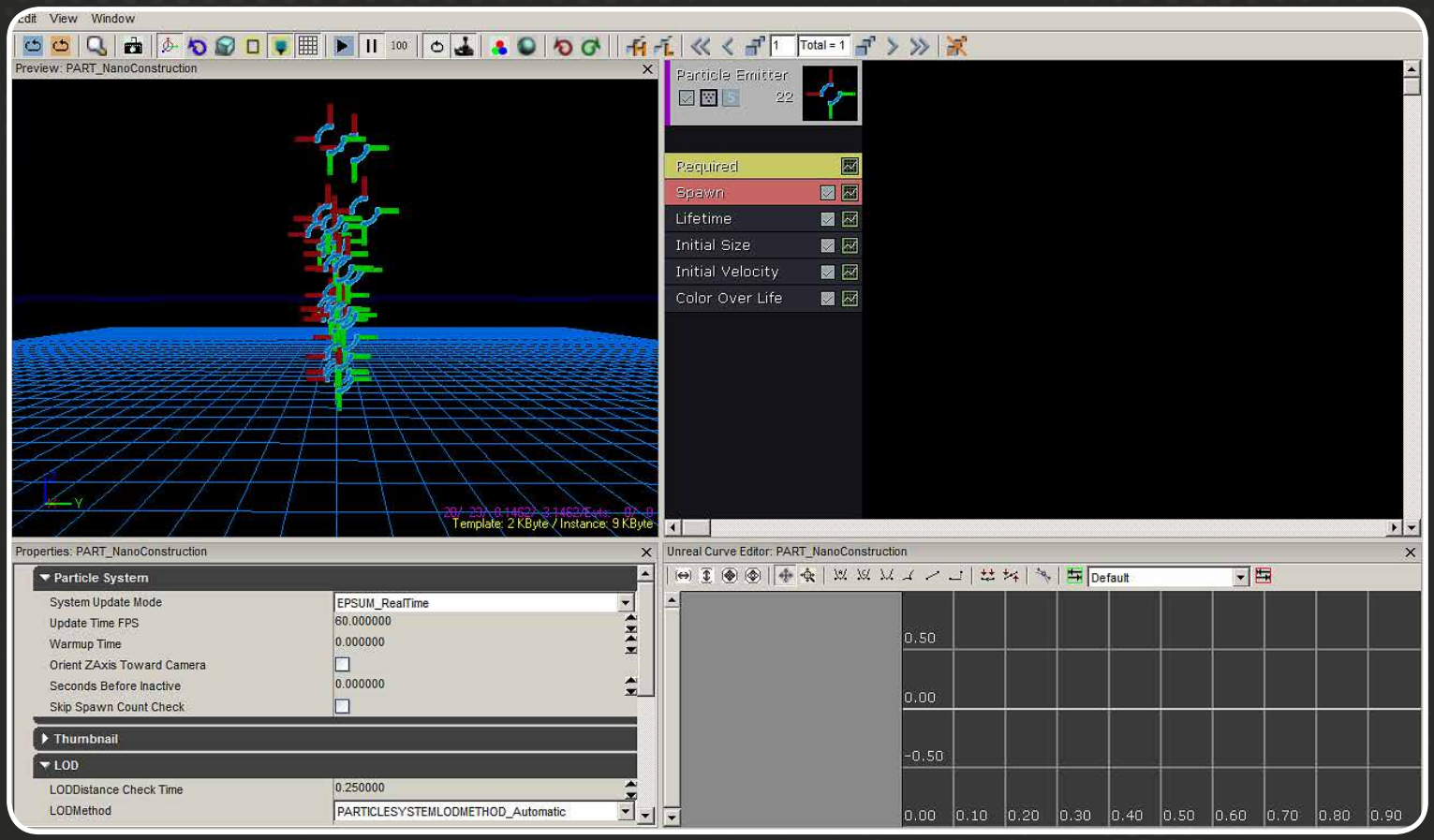
Helpful Resources for Cascade: If you are new to Cascade, I would recommend studying the UDN's recourse library and become familiar with how it works, as I will not be explaining the basics of UI, and Cascade Module Properties.

Cascade - http://udn.epicgames.com/Three/CascadeUserGuide.html
Modules - http://udn.epicgames.com/Three/ParticleSystemReference.html
Curve Editor - http://udn.epicgames.com/Three/CascadeUserGuide.html#Curve Editor

Creating a New Particle System: Now that we have everything imported, our shader built, and we are ready to apply it, lets create a new Particle System. With the main root folder of the package selected, right click in the Canvas and select New ParticleSystem from the right click menu. As before, name it properly and place it into a group called Effects.

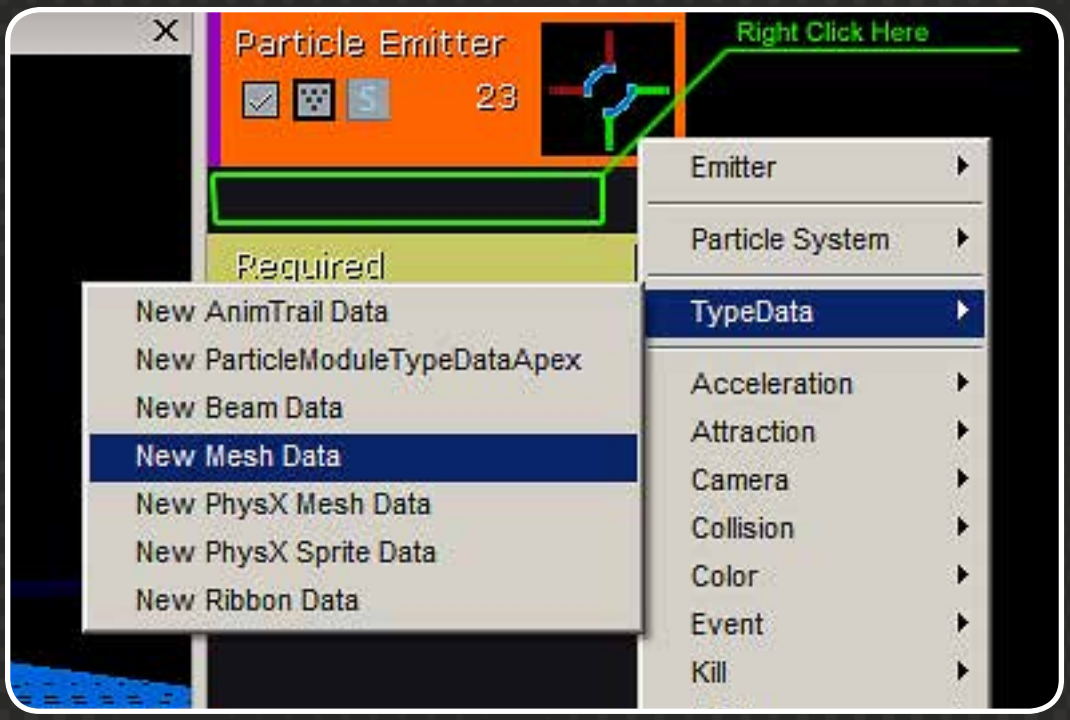


Setting Up The Particle System: Double click on the particle system you just created and the Cascade Editor will open. The first thing we will do is set up the existing emitter to fit our needs. Right now, it will be a basic setup, but feel free to experiment and modify it as much as you want.

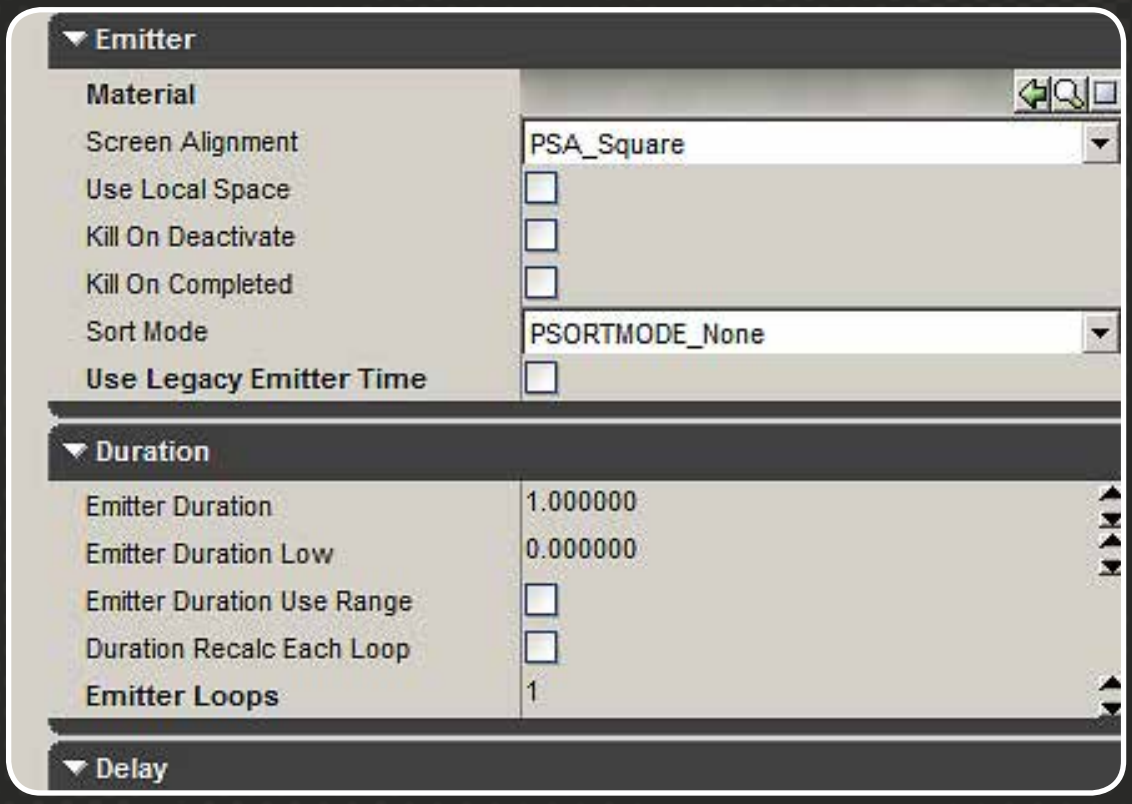


Setting Up The Particle System - Type Data : First thing we need to do is tell the Emitter to emit meshes. We can do this by right clicking the blank space above the Required Module. In the right click menu choose Type-Data > New Mesh Data. Now click on the newly created Mesh Data and in the properties window, use the little green arrow to select the modified mesh we imported (PropSphere).

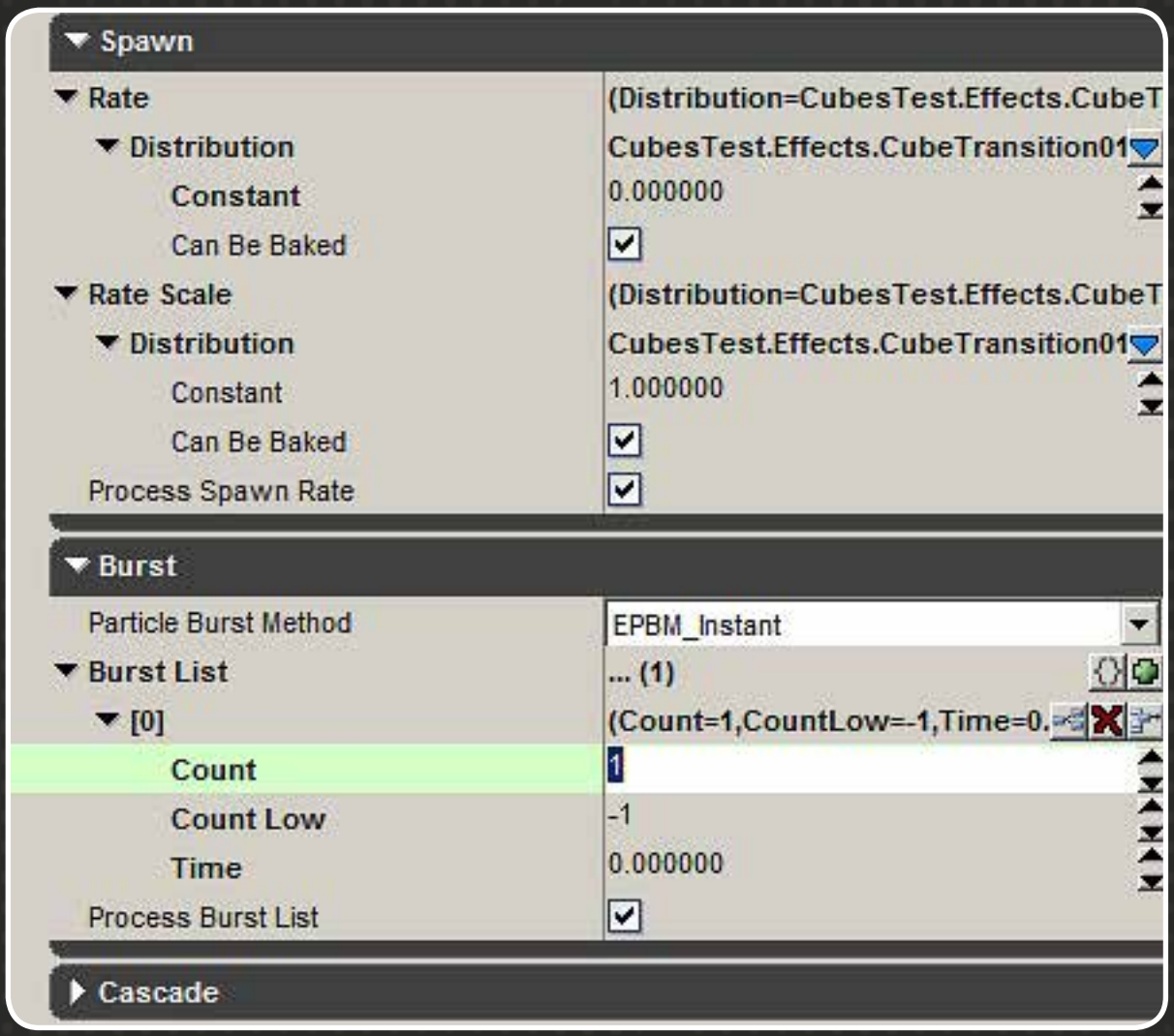
Next, check mark the box below that says Override Material. This means we can specify a material in the Required Module and it will override any material applied to the mesh by default.



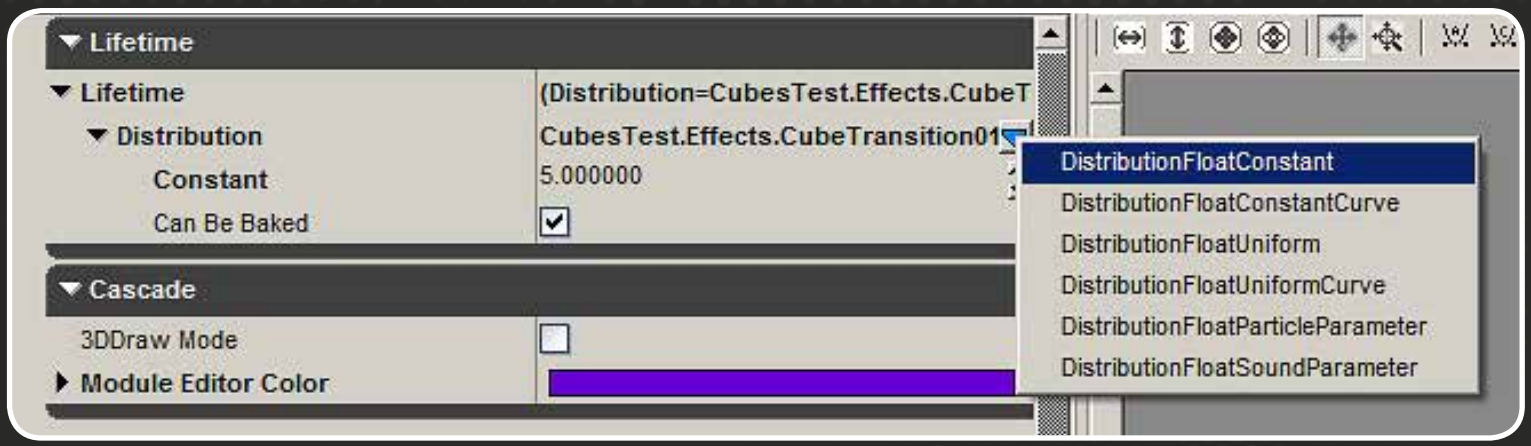
Setting Up The Particle System - Required Module: Click the Required Module and in the properties under the Emitter tab use the green arrow to select the material we created (MAT_NanoConstruction). Navigate down to the Duration tab and set the Emitter Loops to 1.



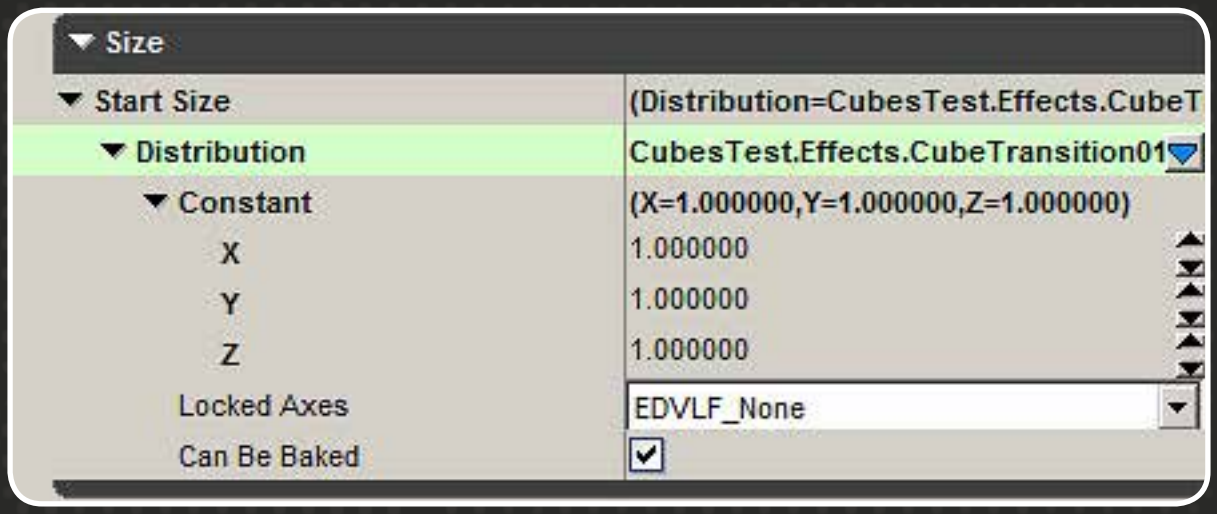
Setting Up The Particle System - Spawn: It is important to note, we don't want a constant number of meshes spawning, but we only want 1. Therefore we must change the spawning method altogether. Under the Spawn Module properties in the Spawn tab, change the Rate > Distribution > Constant value from 20.000000 to 0.000000. Next, locate the Burst tab and click the green + icon (add new item). When the new item is created, expand the (0) sub-tree and change the Count from 0 to 1.



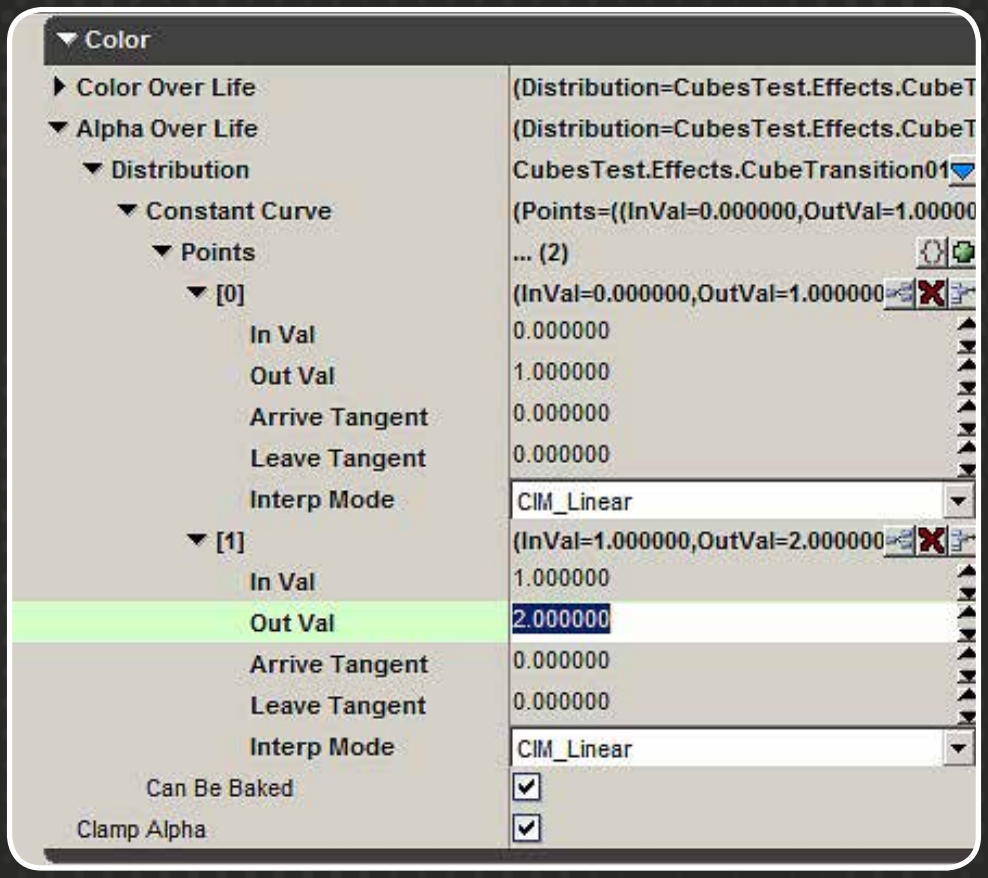
Setting Up The Particle System - Lifetime: Upon selecting our Lifetime Module, you will notice we have a maximum and minimum value (DistributionFloatUniform). We do not want this. So we need to change our distribution type by clicking on the little blue down arrow icon located at the right of the Distribution property line. From the drop down menu, select the top option (DistributionFloatConstant). Set the value from 0.000000 to 5.000000.



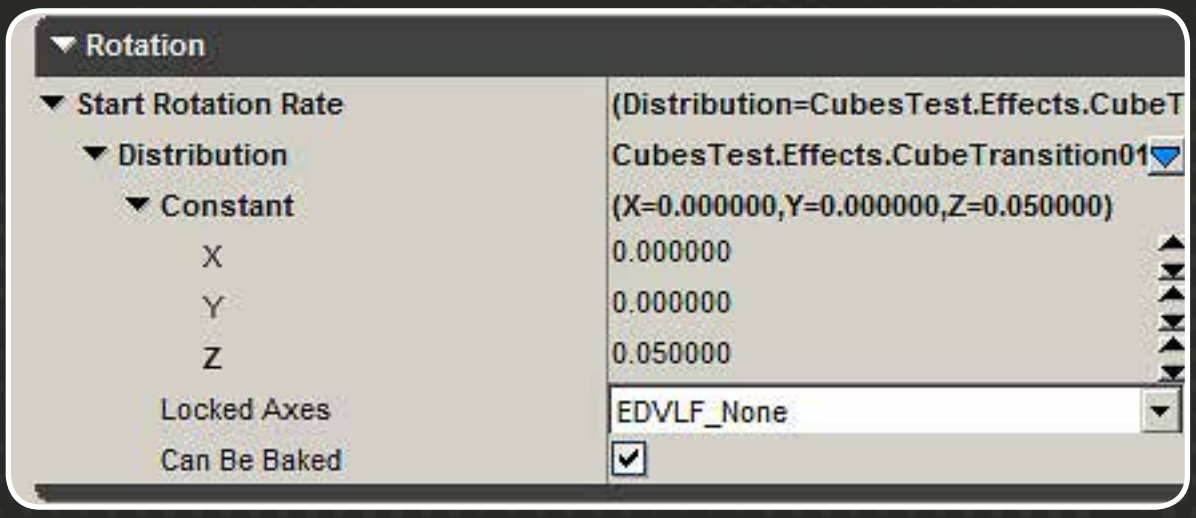
Setting Up The Particle System - Initial Size: Just like the Lifetime Module, the Initial Size Module has a default distribution type of DistributionFloatUniform. Change this to a DistributionFloatConstant and set the XYZ values to equal 1.000000.



Setting Up The Particle System - Color Over Life: This directly correlates to the MeshEmitterVertexColor node we added inside of our shader. Remember how we utilized the Alpha channel and plugged it in to the Divide and Subtract nodes? Well, its time to put it to work! Drop down into the Alpha tab of your Color Over Life Module and you will notice there are already 2 existing points: [0] and [1]. Under the point [0] Change the "In Value" to 0.000000 and the Out Value to 1.000000. Under the Point [1] Change the "In Value" to 1.000000 and the Out Value to 2.000000.



Setting Up The Particle System - Init Mesh RotRate: To top everything off, we will give the mesh a slow and gentle spin to add a dramatic finishing touch! In the Init Mesh RotRate Module, change the distribution type to DistributionFloatConstant and set X,Y to 0.000000 and Z to 0.050000.



Congratulations you have finished! And with a cool new effect I might add!

Closing

I really hope you have enjoyed this short read through and that you were able to walk away with some new found knowledge on some level. I urge you to explore, learn, and experiment with visual effects because it truly is a rewarding topic with unlimited possibilities. Its been a pleasure having this opportunity, and I look forward to possibly sharing a lot more with you in the future!

About Me

My name is Jeremy Baldwin. I am currently working as a VFX Artist at Timegate Studio on an unannounced title.

I was born and raised in Texas, and for the most part life was pretty normal accept for a few things here and there. Ever since I can remember, there has always been something about 3D and Visual Effects that has stimulated me. One of the big turning points that changed my interests from being just a fantasy into an actual pursuit was a scene I saw as a child from an old Star Trek where Geordi La Forge walked through a computer by shifting matter. Unfortunately I knew no one and nothing about creating movies and games. For the longest time, I stumbled around trying to find a good starting point, or a good source of information. Though this was frustrating, I didn't let it stop me from reaching my goals.

As the years went by I learned as much as possible by developing and honing my skills in 3D Environment Design, and slowly working on other skill sets such as VFX and Compositing. I began joining forums to network and hopped on board several indie teams to help hone my skill sets in different working conditions. At the age 22 I was able to land my first industry job at TimeGate Studios on a little project called Aliens: Colonial Marines. I have had such a blast so far, and with all of the possibilities opening up I know the future is going to be one crazy ride.

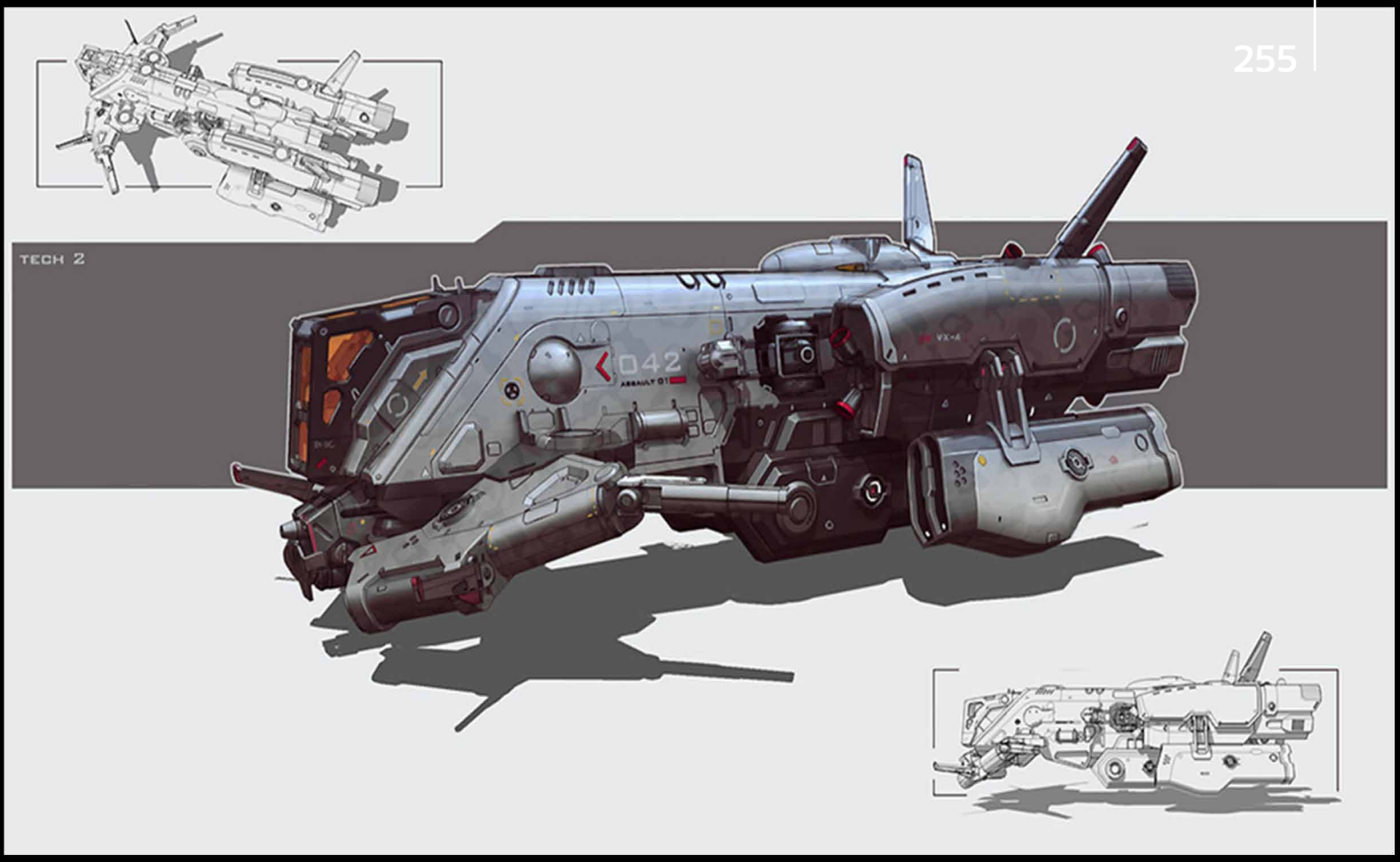
What I enjoy more than anything about this line of work, whether it be environment art, visual effects, or compositing, is that no day is ever the same. Every new day is a new story with new challenges, keeping the mind alert, awake, and ready to create.

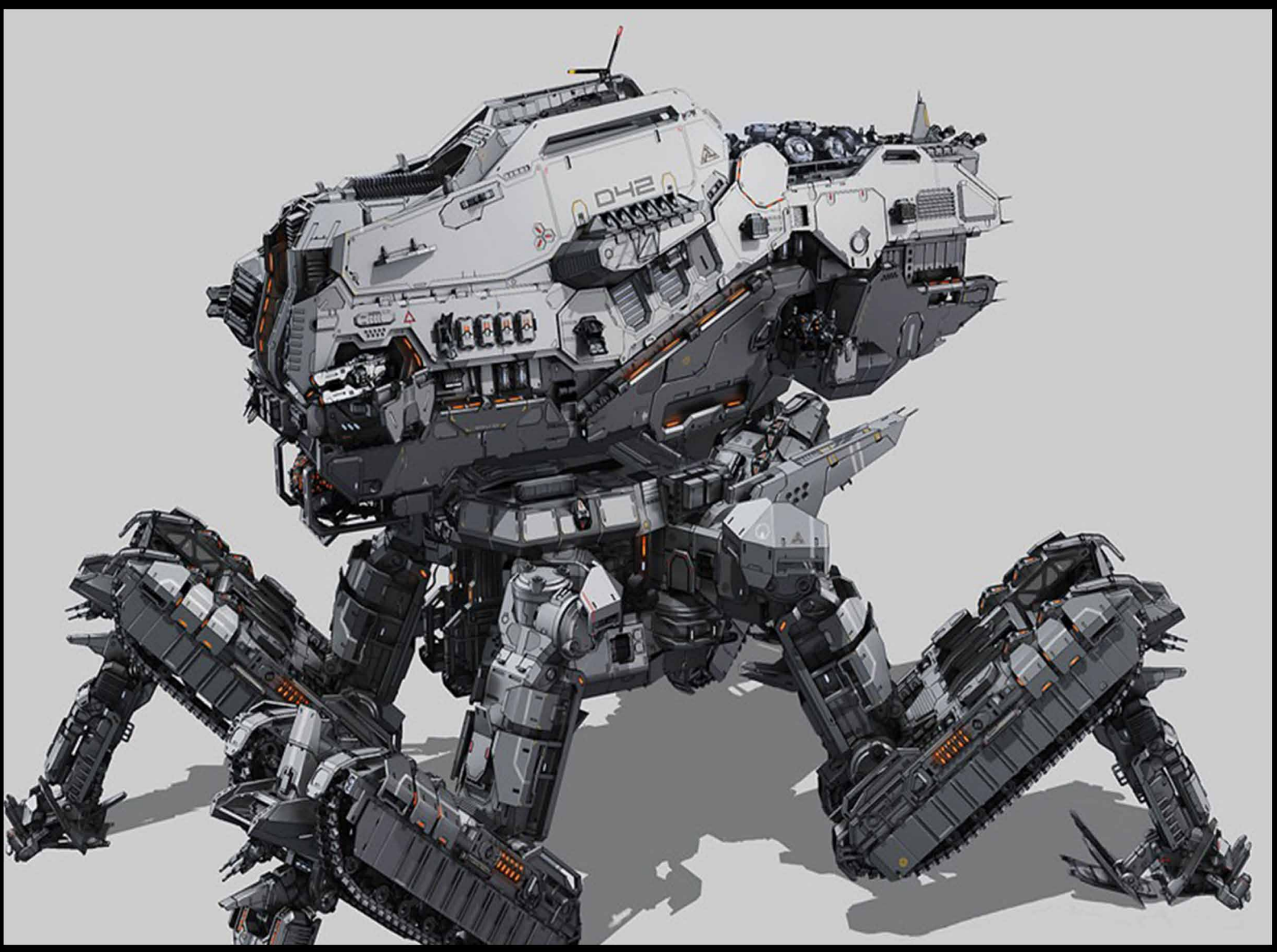
Jeremy Baldwin

www.jeremybaldwin3d.com

Justin Sanders

www.sandersart.net





Alexey Pyatov

www.karanak.cghub.com

OLDSCHOOL

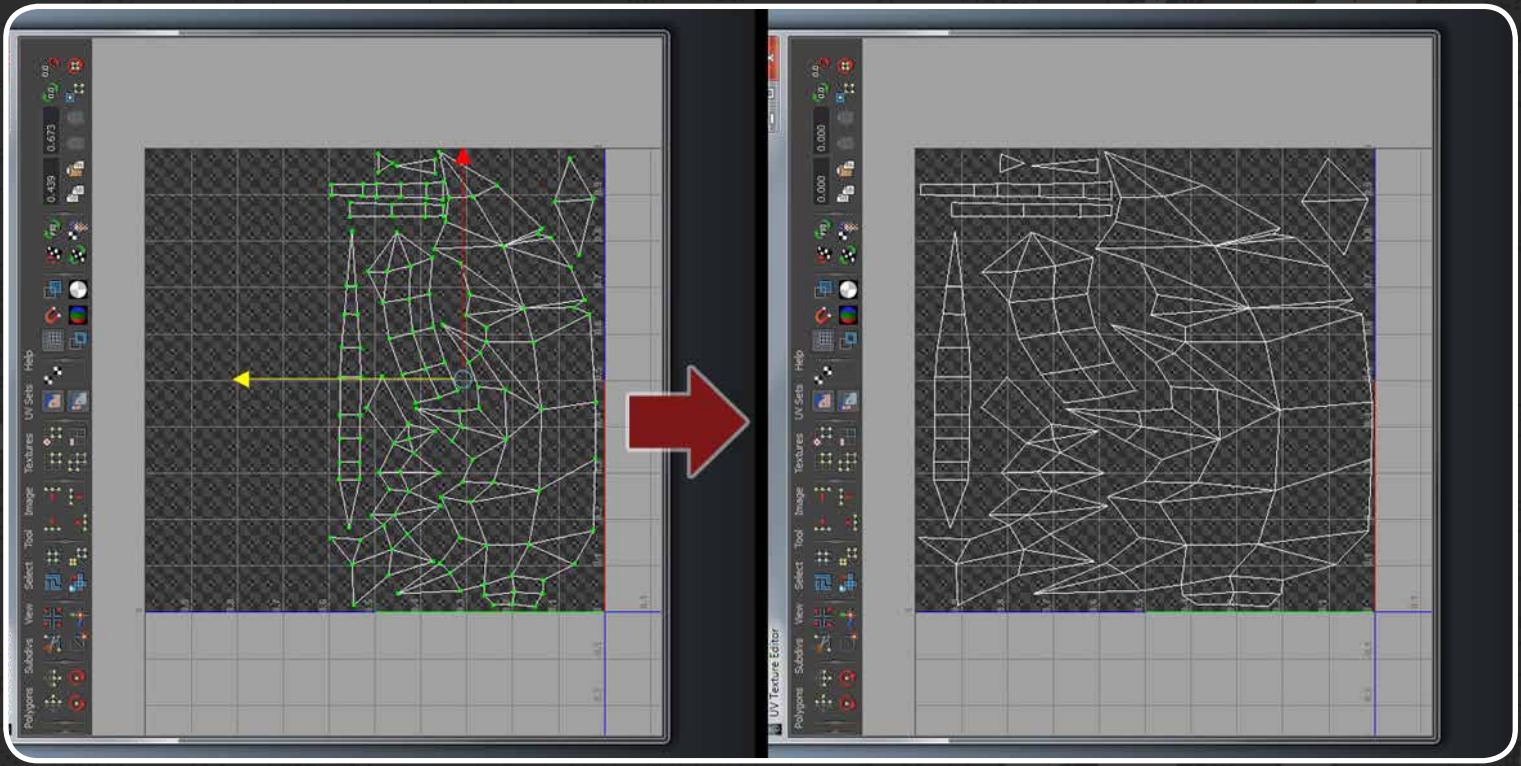
Hand Painted Textures By: **Tamara Bakhlycheva**

Today I want to share with you a short tutorial about creating a hand-painted texture for a low-poly weapon. I'm going to tell you how to paint realistic looking stylized textures without using any photo reference. Here are the original weapon concepts that I sketched up a few months ago, I choose the left sword for creating a 3d mesh from.

I won't tell you here how to make the simple mesh, I just want to show you a small tip that you can use for making this thing easy.

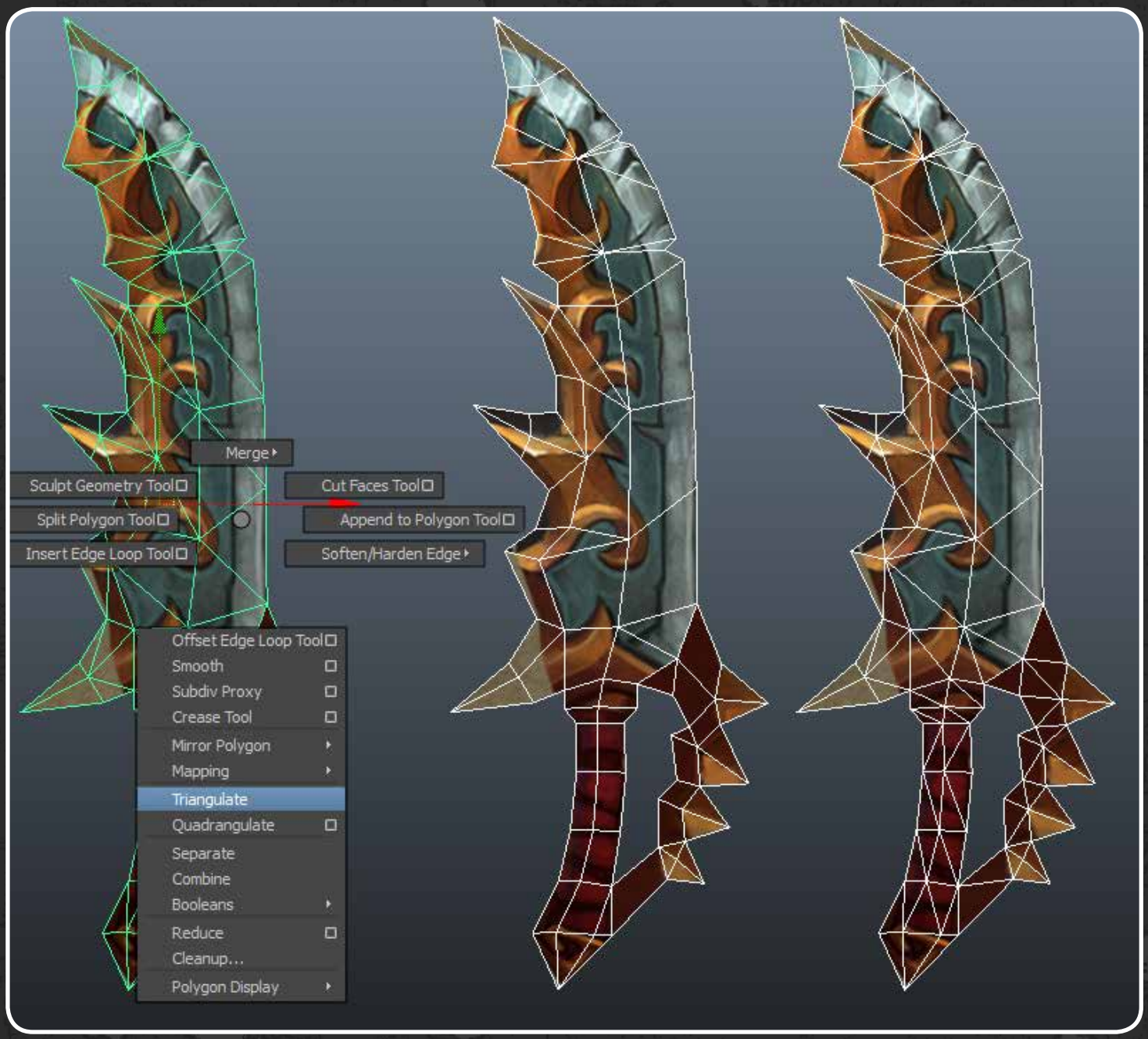
I took my concept and made this simple black and white picture based on it (Polygonal Lasso tool), this will help a lot to work with mesh, you can just put it on background and move the vertexes on your plane according to the silhouette and then extrude it at the final. This is just a small trick but it saves you time later.

There is nothing special about UV mapping for such a simple object either, except when mapping first use set it to half then scale it to fill the 0-1 work space, then save it as a 512*256.



Before starting with texture painting we have to first triangulate our mesh, for example if we use Deep Paint, which has a different algorithm approach with triangulation than 3DS Max or Maya.

That means the texture painted on a non-triangulated model will show up incorrect afterwards. I flip the mesh on it's side then export for DeepPaint. Of course it might vary from program to program.



I also use the Marmoset Toolbag for previewing my texture while working and for the final renders, so I export my sword and import it into Marmoset . I then create and assign a new material with the texture's psd file. Then I switch the default Channel model from PhongEnvironment to FlatEnvironment as well.

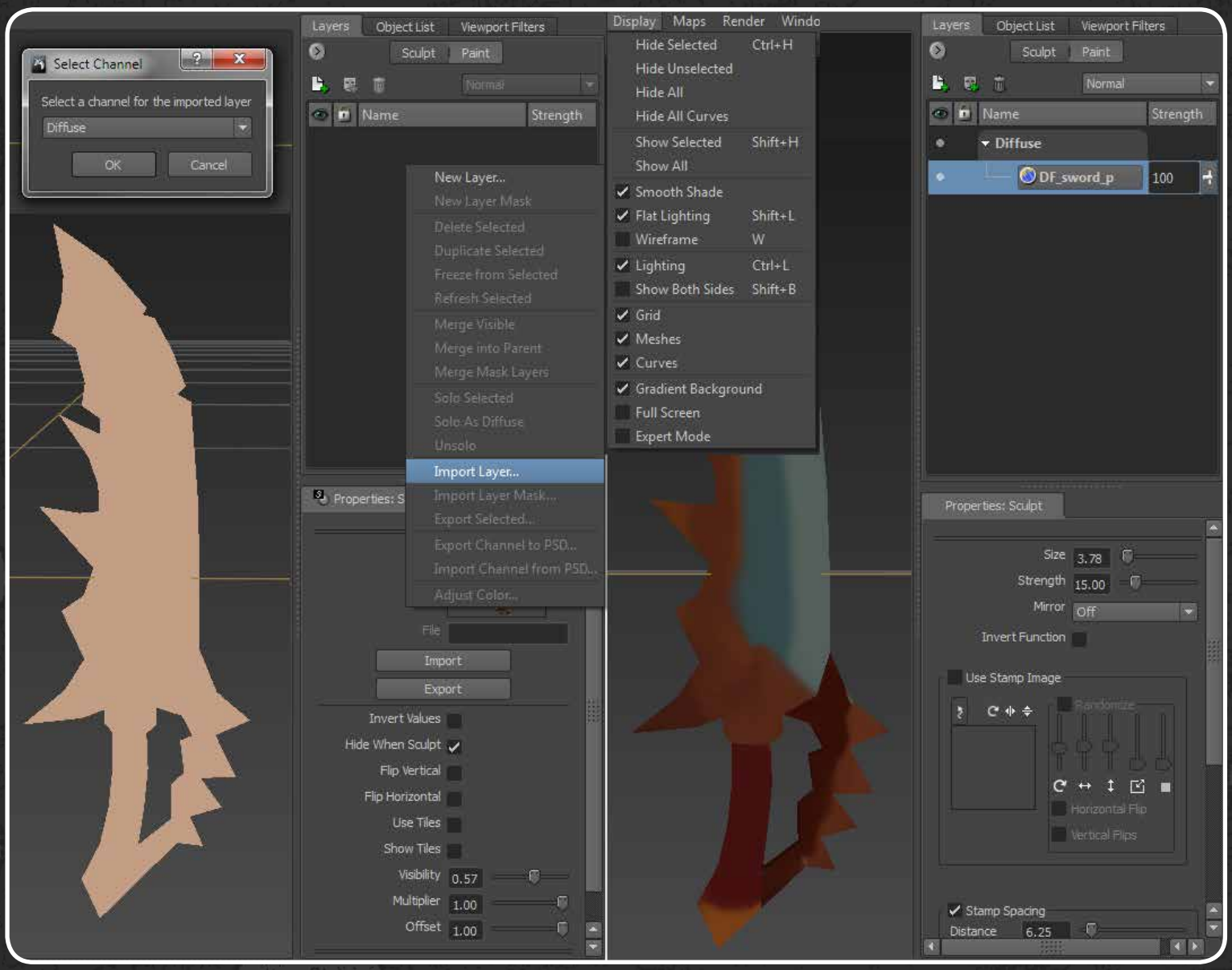
You can see a rough color base on the right mesh, it's pretty much dark, but not too dark, we need to leave the range for the darkest and brightest colors later. If you try to paint a metal spec very bright and wide at the start it won't be a shiny metal as you might have imagined, but it may look more along the lines of something that looks like a plastic.

In the beginning my texture looks pretty much this way each time. For more complex models I use Faogen for baking directional AO. This program is really simple to use and can bake soft and hard edges. I highly recommend using it to create a volume base for your future texture and I usually put the AO layer between the UV and color layers on Overlay or Multiply. This is something you can always play with.

I prefer to work with programs that allow me to use projections for painting . I also work with Photoshop and programs such as Deep Paint, Z-Brush, Mudbox. Photoshop has a few 3d features itself. I used to work with Deep Paint for long time, but that program hasn't been updated and was shut down by it's developers for a few years now.

It seems that it's not going to get new version anytime soon. So that's why I decided to show you some simple projection texture painting using Mudbox 2012. It's kind of a new thing for me to do myelf , but for my tastes it works pretty much the same way as Deep Paint, but with more opportunities and more flexibility than other software. Import your mesh to Mudbox, switch from Sculpt on Paint. Right click on space under the Paint tab, in the floating menu click on Import Layer and choose your texture file. Mudbox supports formats such as jpg, psd, tga etc. I prefer psd, but there is one condition when using it due to size contraints and load times. One layer in the file only. Select a channel for the imported layer set it to Diffuse.

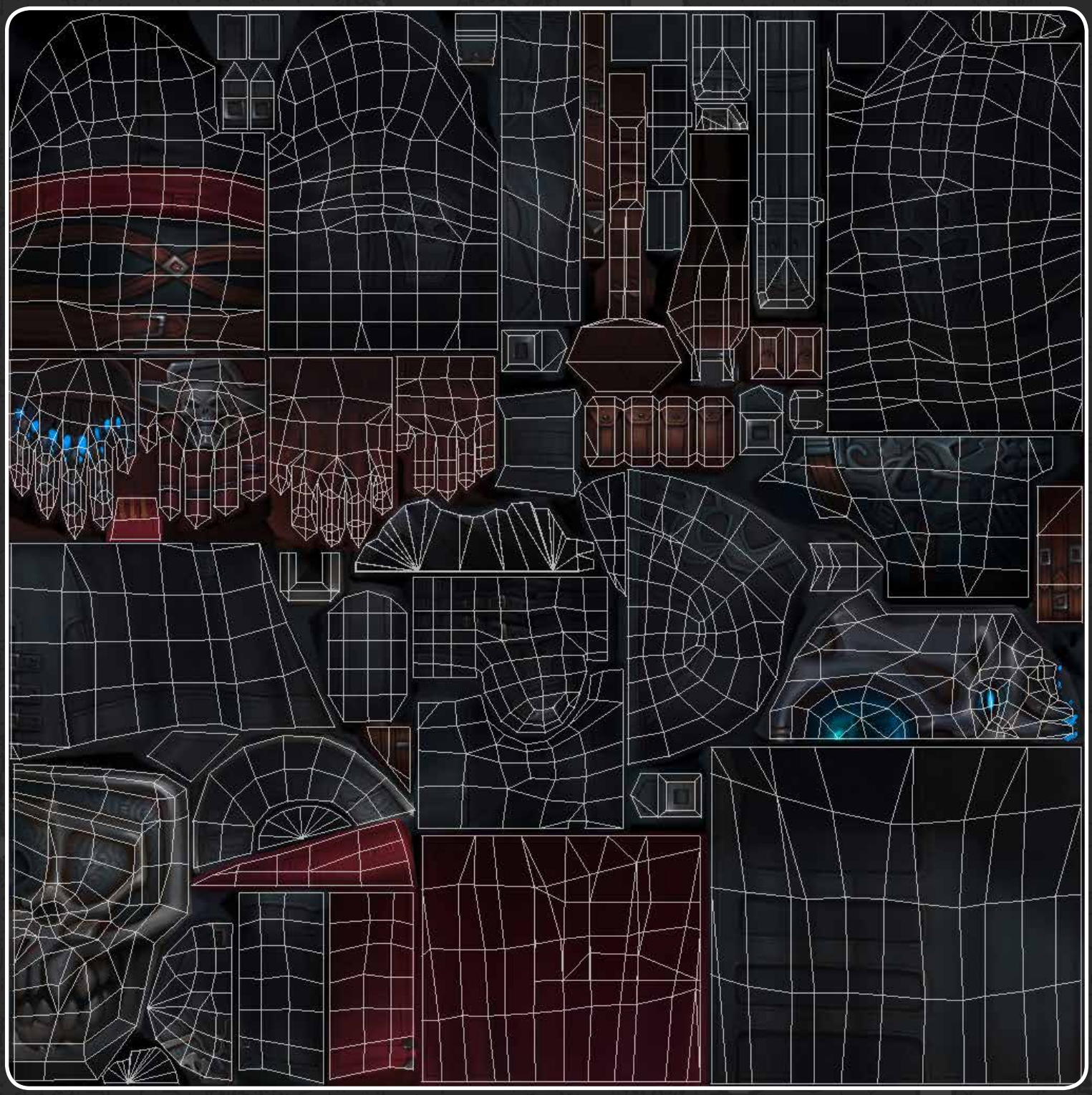
Don't forget to to check on Flat lighting in the Display Menu. For hand painted textures we need to keep the mesh clean without shaders, because our main goal is to paint all of the shadow and light values ourselves.



Let's talk about projections. It is a very cool tool for hand painting textures, fixing seams and also for painting on optimized UVs. For more complex models and models for video games you're going to need to create very optimized UV's, keeping it in tight blocks for saving space. That can cause a lot of stretching while UV mapping and can make it impossible to paint a neat texture right on your original texture sheet.

But the projection mapping method will help you out here. Here is the example of what I'm talking about. Most of the pieces were transformed and a lot of UV shells were straighted up for optimization's sake. If we were to apply a checker material to this mesh we would see how the UVs are messed up in some areas.

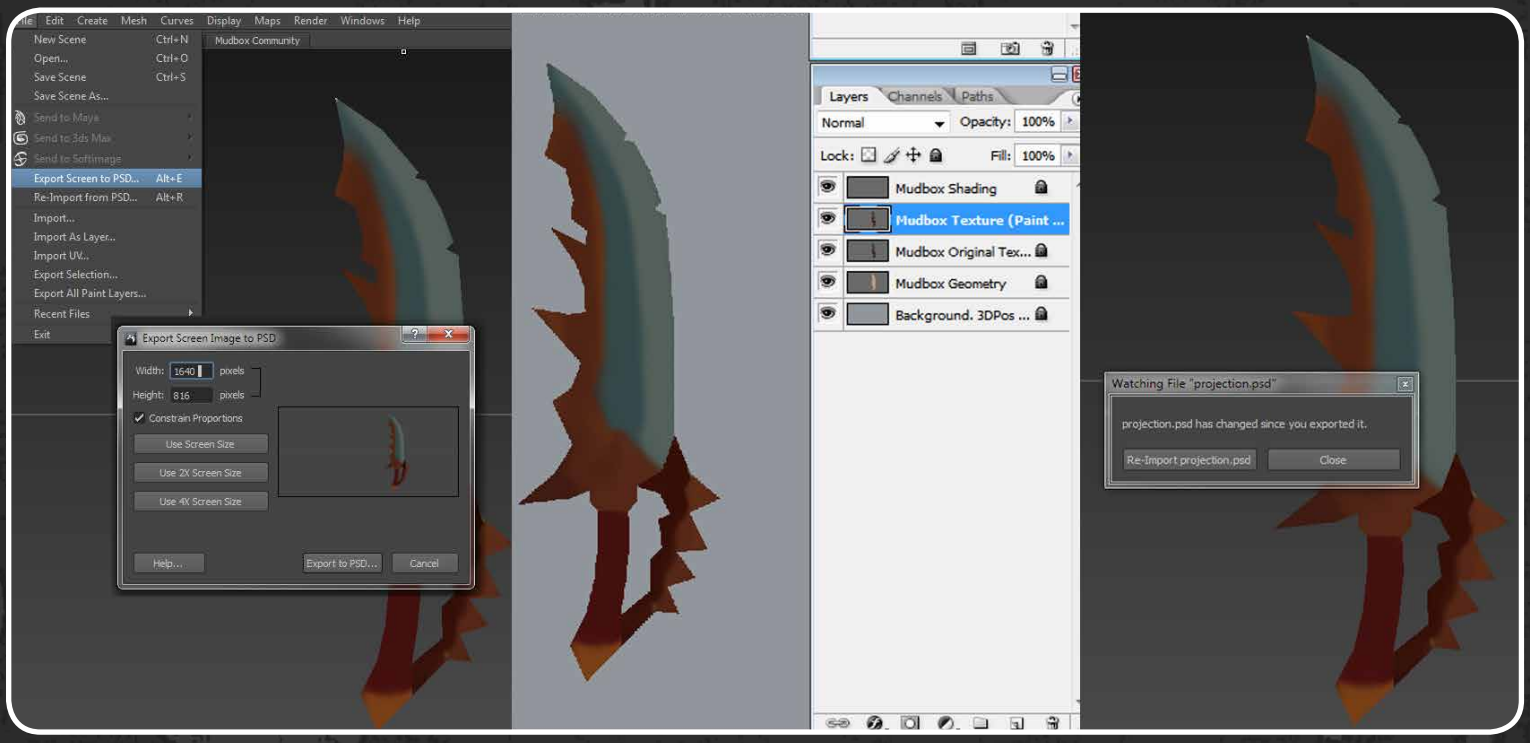
But that does not matter because we are projection mapping. Actually this sword is very simple with no hardcore UV optimizing needed and can be painted right on texture sheet in Photoshop, but that's just another way to paint the texture. Most models are more complicated and projection mapping in these cases will help a lot more in the end.



Most of the programs with a projection mapping feature might have a common issue with using symmetry on meshes. There is a simple way to fix this. You simply delete half of the mesh, or you can try to only paint on one side of the mesh. If you notice bugs on the center of your mesh then there is a symmetry error going on, or there are some skipped polygons. This is a common sign of that issue, just keep this in mind when you are working with projection mapping.

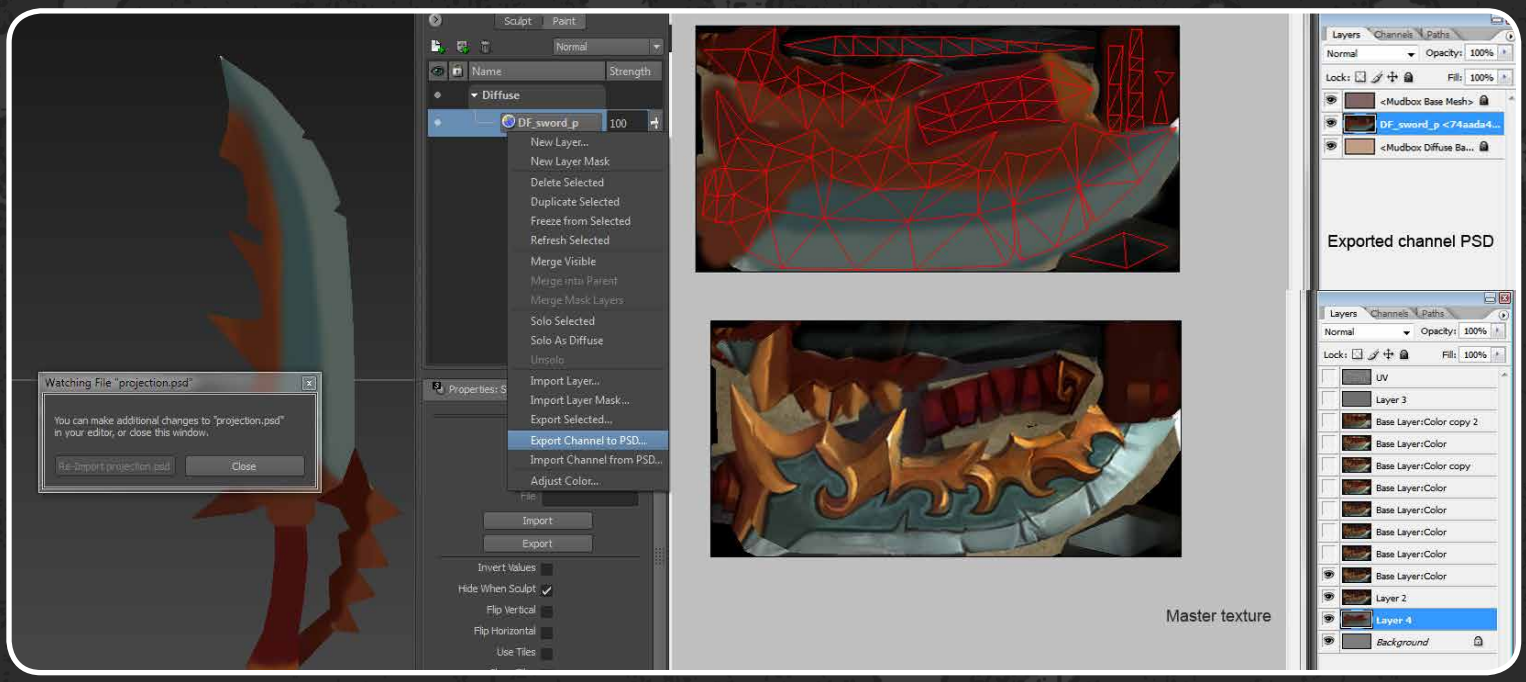
To start using projection mode I generally do these steps. File,Export Screen to PSD (Alt-E) and Export to PSD button. It'll suggest that you save the projection file and then it will open in Photoshop automatically. As you can see the projection file has a 5 layers and all of them except for the Mudbox Texture (Paint Here) locked.

Obviously, that is our work layer. We can also create new layers above this one and paint on them, but make sure to merge them all to one Mudbox Texture (Paint Here) later. It's important to keep all of the files and name and layer groups in the same order you started with when exporting the projection. When you are done save the file, switch back to Mudbox and apply your projection map on the mesh by pushing Re-Import for the projection.psd.

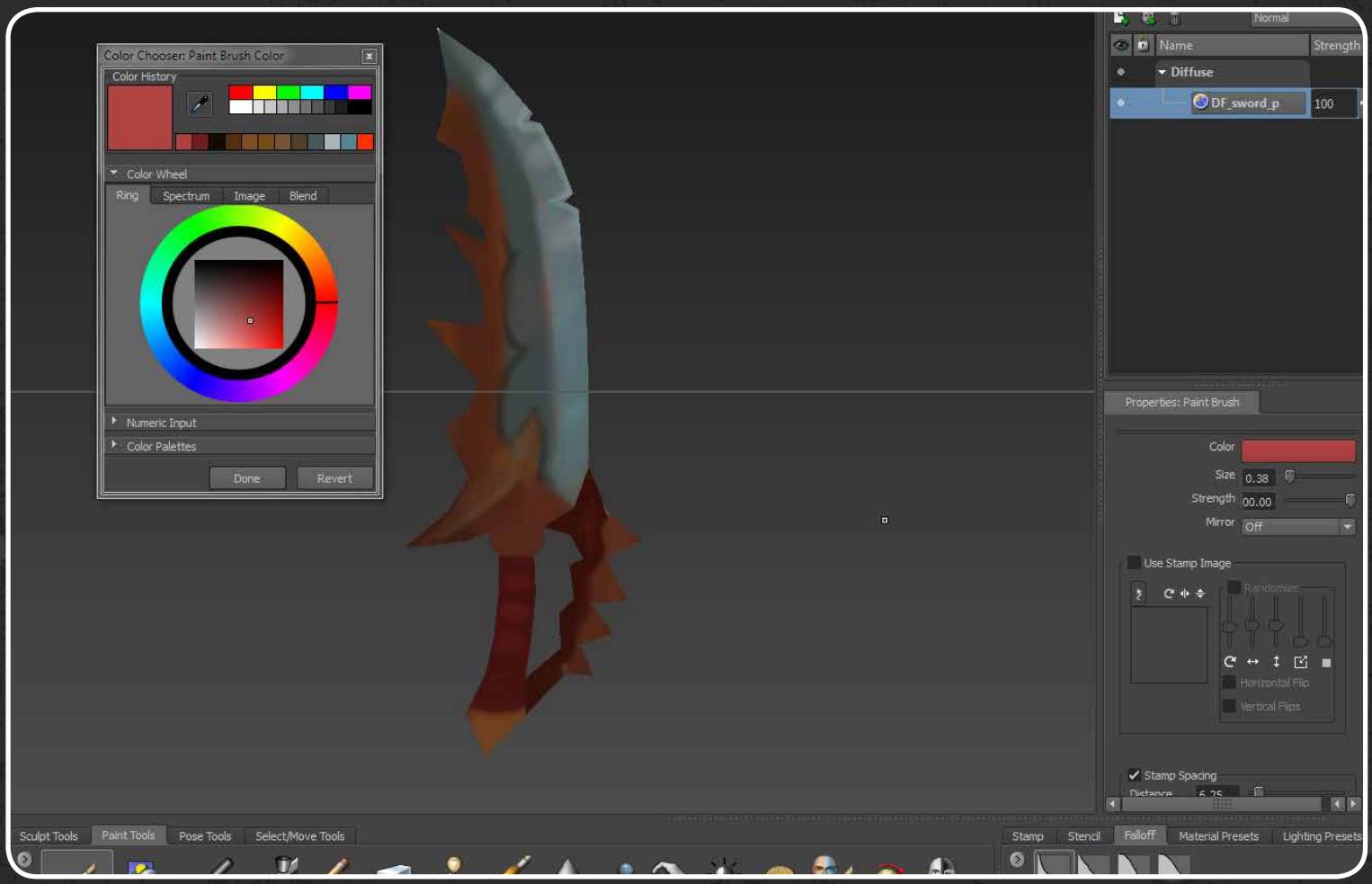


To get your changes made by projection into the main original texture sheet, Right click on the layer in Mudbox and Export Channel to the PSD Save. That will open the PSD automatically after saving. As you can see this file will have 3 different layers and we only need one DF_sword_p <blablabla> , just move it onto the master texture.

I prefer to keep all the layers just in case I want to reference them later, but it's up to you if you want to collapse them all. The cool thing here you can paint on this exported file on DF_sword_p <blablabla> layer as well, along with creating more layers to paint on. Just to be safe, be sure that you keep the layers in the same order, quantity, and names, before you save and re-import (Alt-R) this file back to Mudbox.



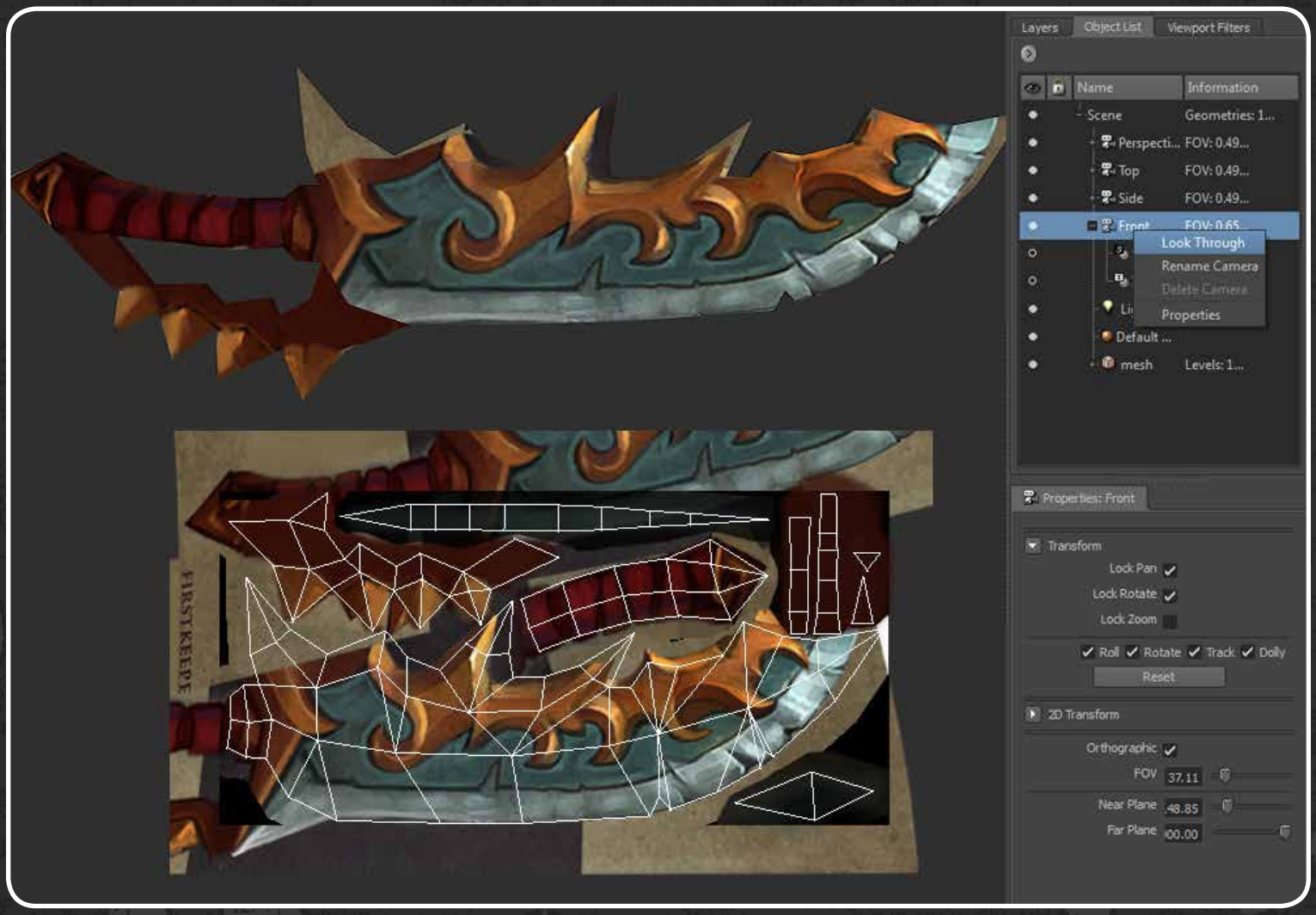
You can also paint right in Mudbox itself . In my opinion, it is really cool to use this option on the early steps, while you build up a base of shapes and volumes in your painting. You can create a new layer or you can just use the original one. Size regulator's hotkey is B, Strength M, Falloff for changing of brush properties, Mirror is a useful thing too. There are also a lot of common tools for painting which might be useful as well in Mudbox.



Usually I start my texture painting with a color base, as you can see on previous picture, but this time I cheated. Since I have a hand painted concept close to the style and color scheme in which I need to achieve. I just put the concept piece using warp transformation in Photoshop onto the mesh.

This requires using a simple front view projection. To switch on the Front select Object list, you will need to find the front camera, right click and look through the list . It gave me a great color base and some nice details at the same time, but it still needs to be repainted in some places for full equallity between mesh and texture sheet. Anyway this trick is used to help create a fast base for your future texture, but that's only an early step in the process .

We still have a lot of work to do. At the same time it's a good thing to use the concept one more time, because you already have spent some time on creating this nice picture to use for the hand paint texture so it only makes sense to use it to help you texture.



For painting I use a simple round brush with 100% Opacity and 100% flow on a normal layer. You can use Overlay or Multiply for shadows and Screen or Color Dodge for the highlights. Step by step from the rough base I add more detail and try to make the illusion of volume.

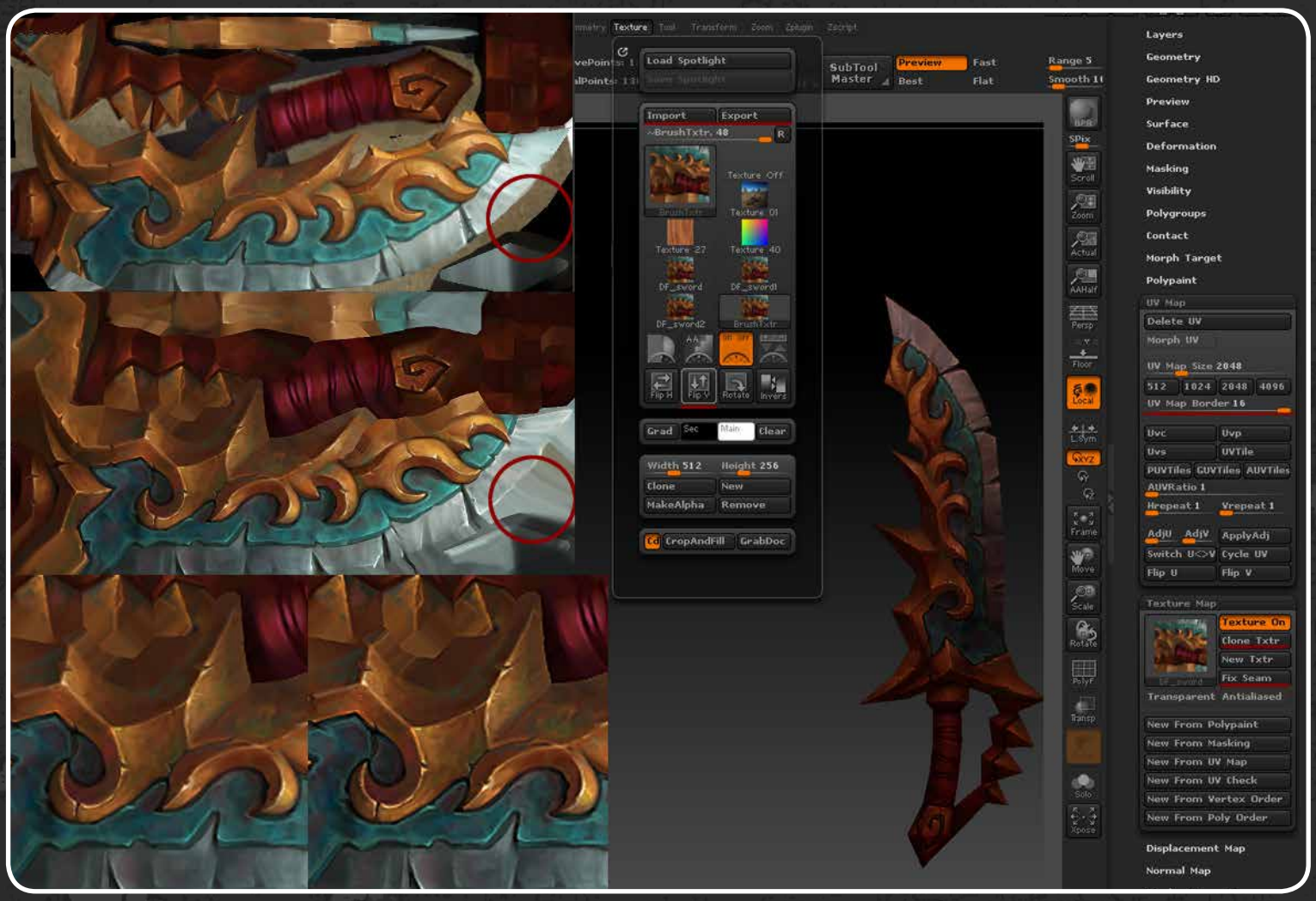
It is also a stylized texture, so try and keep colors clean and bright enough. Feel free to add more warm and cool color tints for a more convincing illusion of materials and shading. I suggest you check photo and video references if you are not sure how they will behave in real life. For example the blue-greenish color was taken from a random ancient copper chalice.

At the same time it's important to keep in mind where your main light is coming from. For this sword it's coming some where from the top. Based on this knowledge we can start to build all the light and shadows in the correct place. Be careful of colors that are too dark or too light, most dark and light points should be very small otherwise all volume will be flat and boring and the illusion will be broken. You can see on the left sword that the texture is too bright, it is flat and boring.

It doesn't look like a metal material at all because there are no highlights. Highlights are what makes metal look like metal. Here are a couple pieces that are showing the importance of contrast between lightest and darkest points.

The last thing that we need to do is fix the seams and clean up our texture. For that I'm going to use ZBrush. I Import the mesh and texture then I flip the texture vertically. I then apply it on the mesh.

In the UV Map menu I change the UV Map Border to 16. Then I use the Clone Texture and Fix Seam buttons that are in the Texture map menu. Next flip your texture back and then export it back to Photoshop. The last operation is a Smart Sharpen for your final texture. Now you should be done texturing your mesh.



Tamara B.

http://firstkeeper.deviantart.com

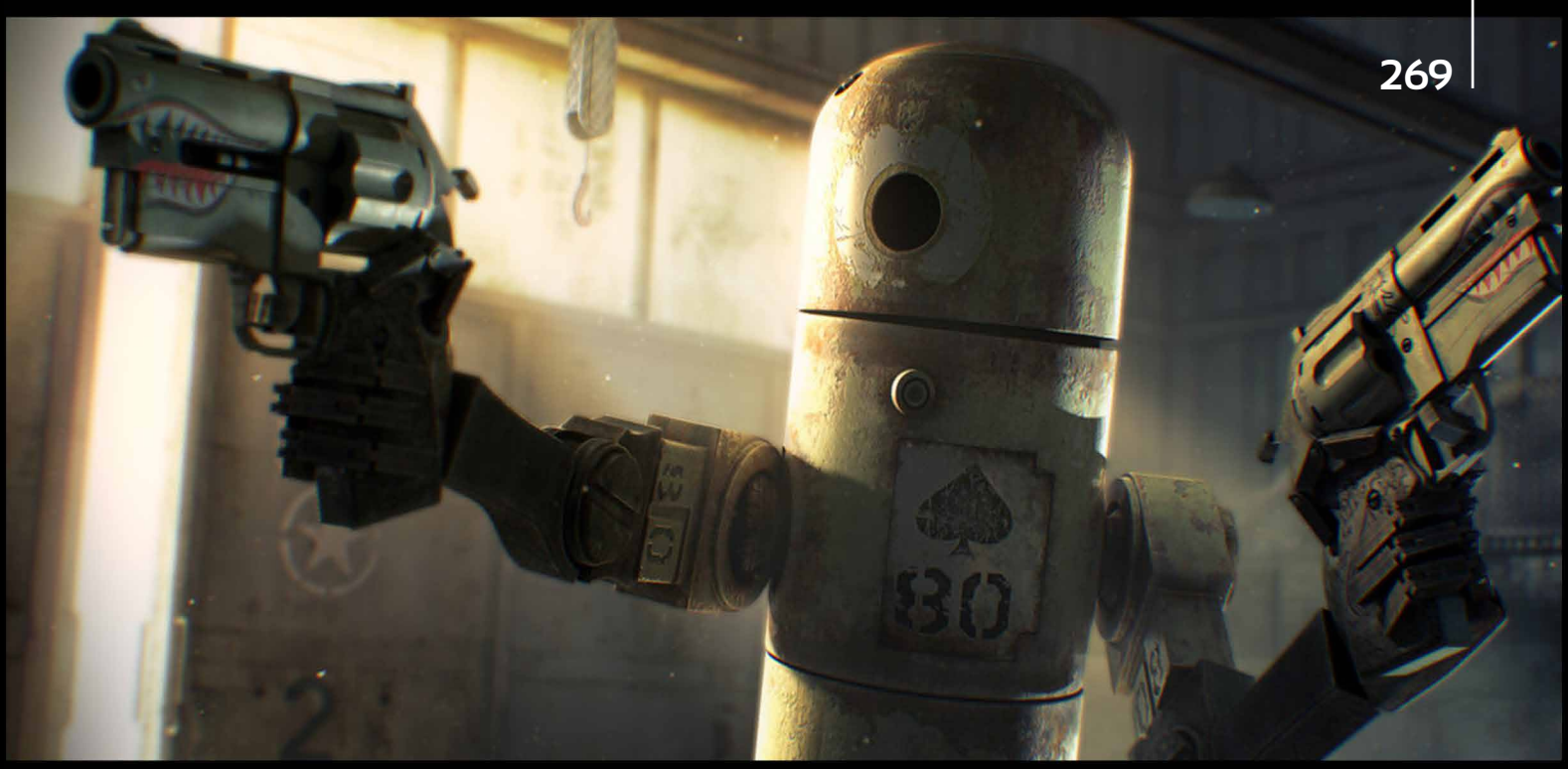
About Me

I'm a 3d-character artist, I was born in Russia, but the last couple years I have been living in California. I have studied arts and have played video games since I was 6 years old. Creating characters for video games is my passion, especially if the characters are made using the old-school style of hand painted textures.

I have worked for a few companies full-time and as freelance artist since 2005, my favorite pieces of my work are from the project Allods online a russian mmorpg.

Anthony Scarlata

www.anthony3d.com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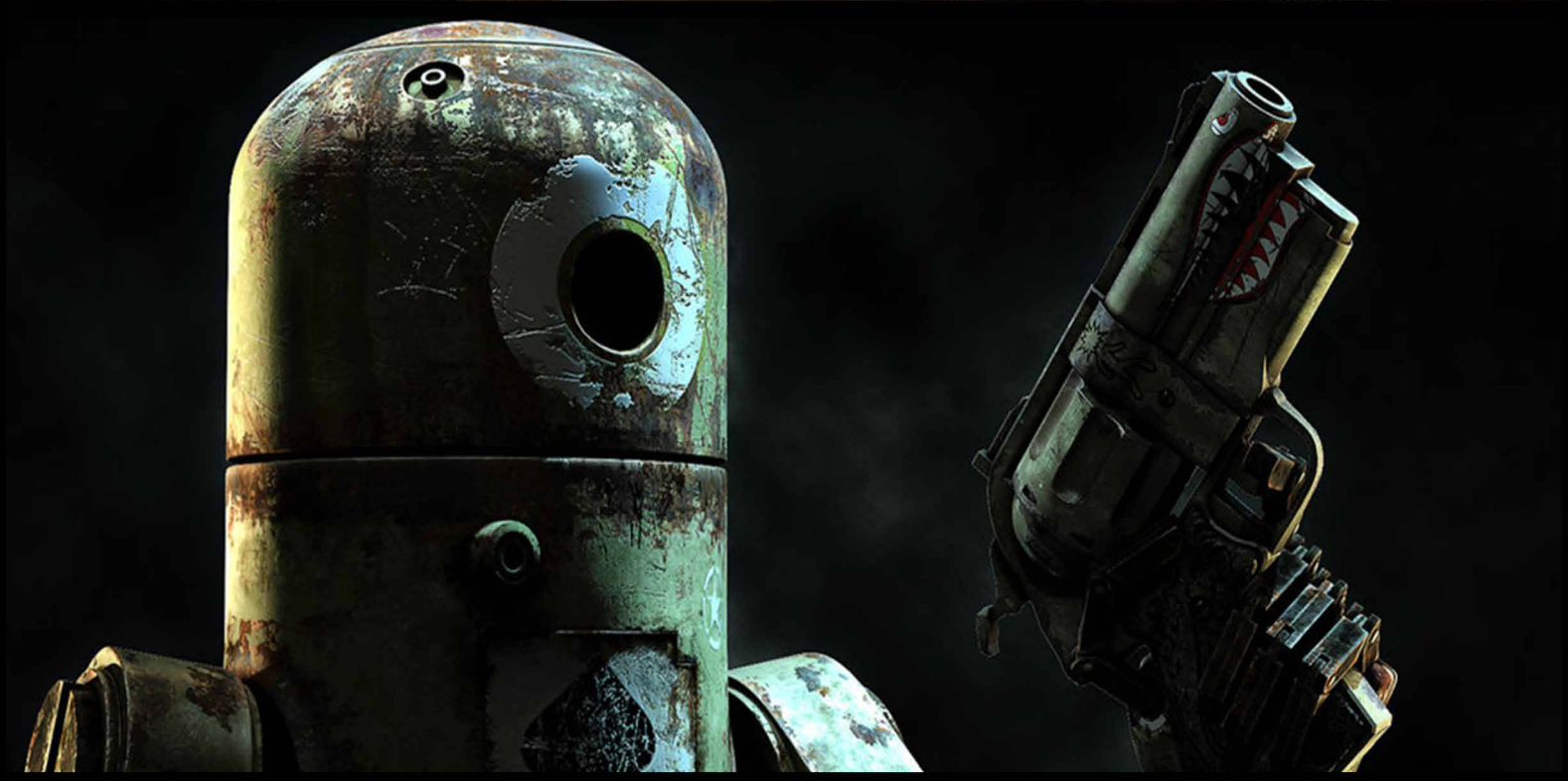
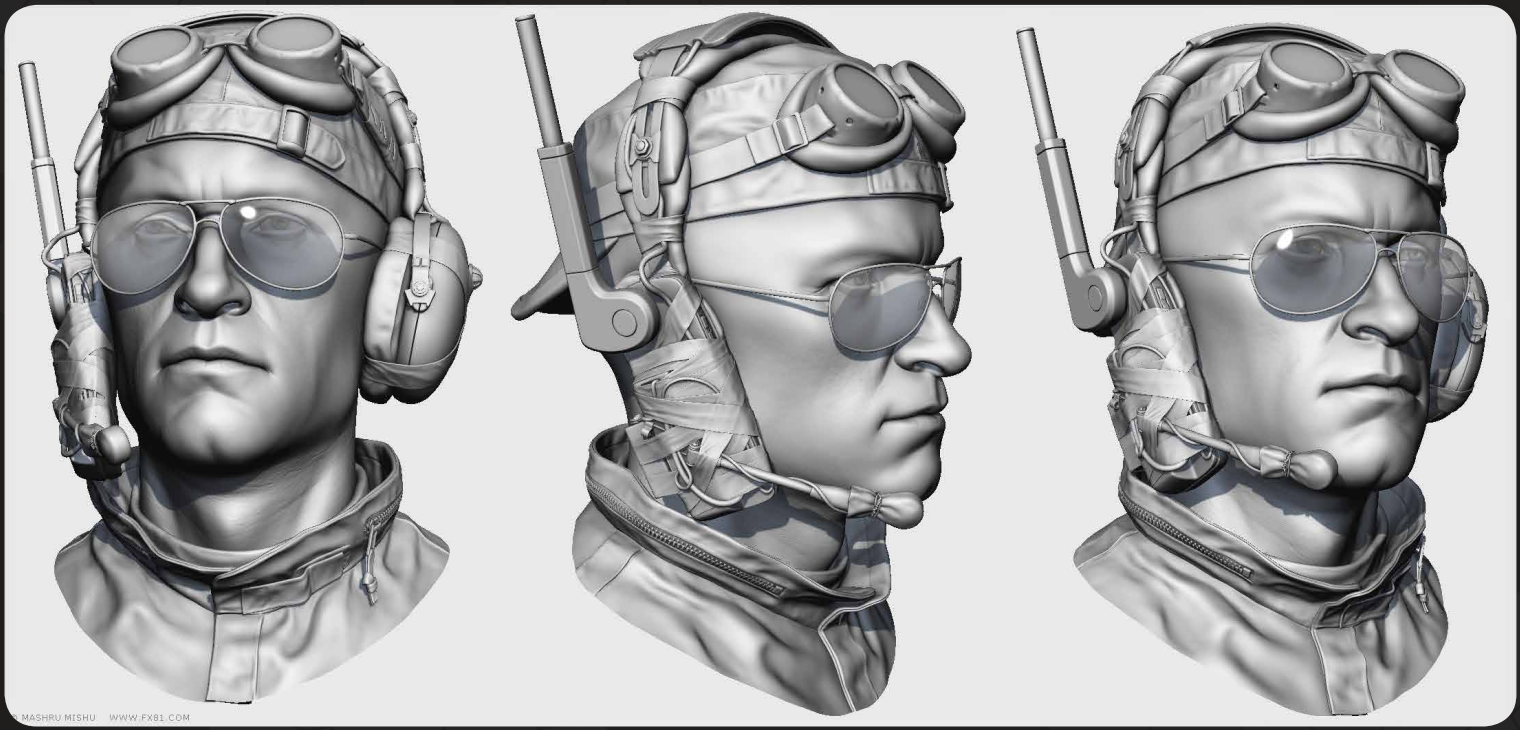


AAA Texturing

Hand Painted Textures By: **Mashru Mishu**

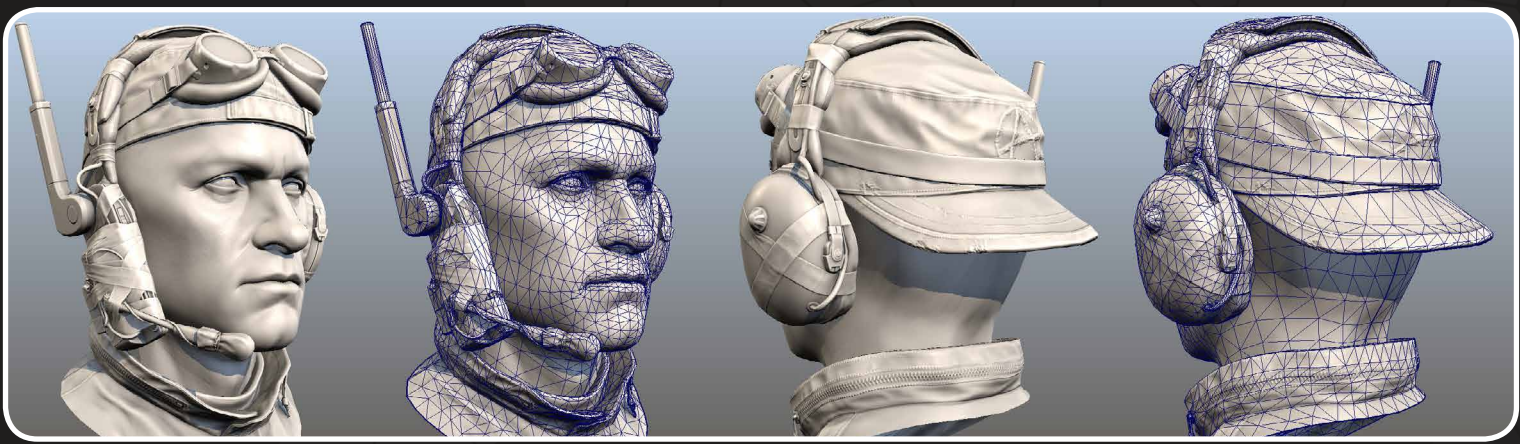


Introduction:

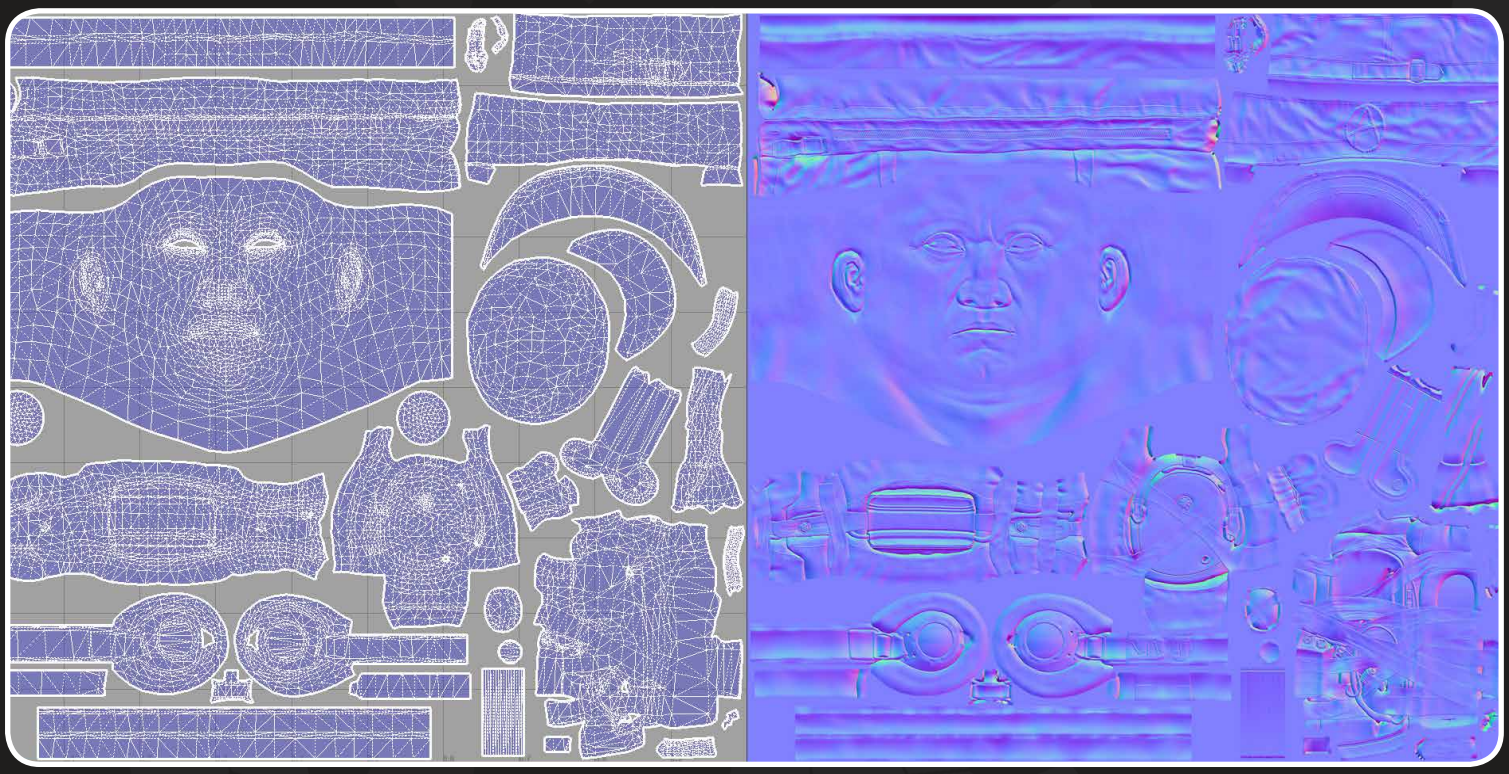
The following article will demonstrate how I usually create textures for a realistic game asset. For the purpose of this article I decided to make a realistic head bust with a wide variety of surface types such as skin, fabric, metal, rubber and plastic.

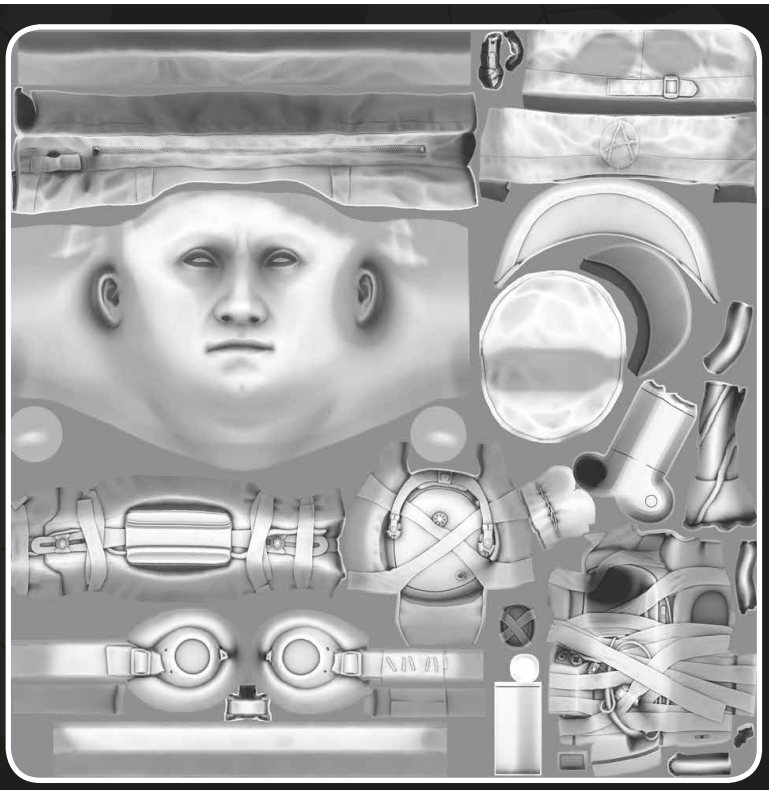
The highpoly model was mainly modeled in Maya and the sculpting was done in Mudbox. The lowpoly model was created mostly in Topogun and final adjustments to the lowpoly along with the UV layout was done in Maya. Everything on the model is in one 2048x2048 texture sheet.

Normal map, ambient occlusion map, material ID map and curvature map were baked in xNormal. Some additional AO was rendered in Faogen. Final model is rendered in UDK. Here are some images of the highpoly, lowpoly and UVs.



Lowpoly with final normal map and AO map applied

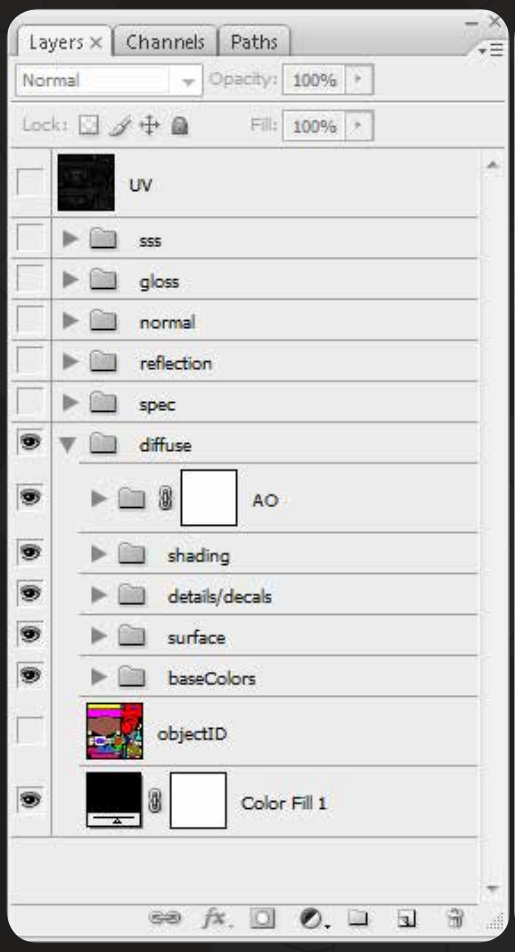


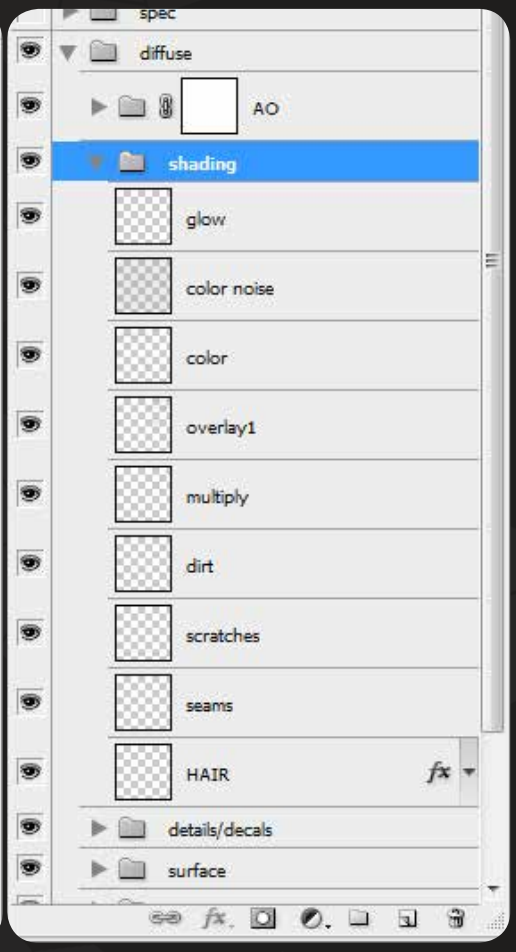


Photoshop PSD Management

For most of my game texture projects that involve diffuse, normal and specular textures I use an existing PSD template file to start with. This PSD file is actually very simple and nothing but a bunch of folders and hierarchy setup that just helps me to keep the layers organized.

As you can see I have several sub-folders inside the “diffuse” folder. I have broken down my work load into the following segments – base colors, surface textures, details/decals, shading and AO. Also shown here are the painting/shading layers that I like to use for most of the texture works. Some of these layers should be pretty self explanatory like the color, overlay and multiply layer – they are basically layers with those blending modes.





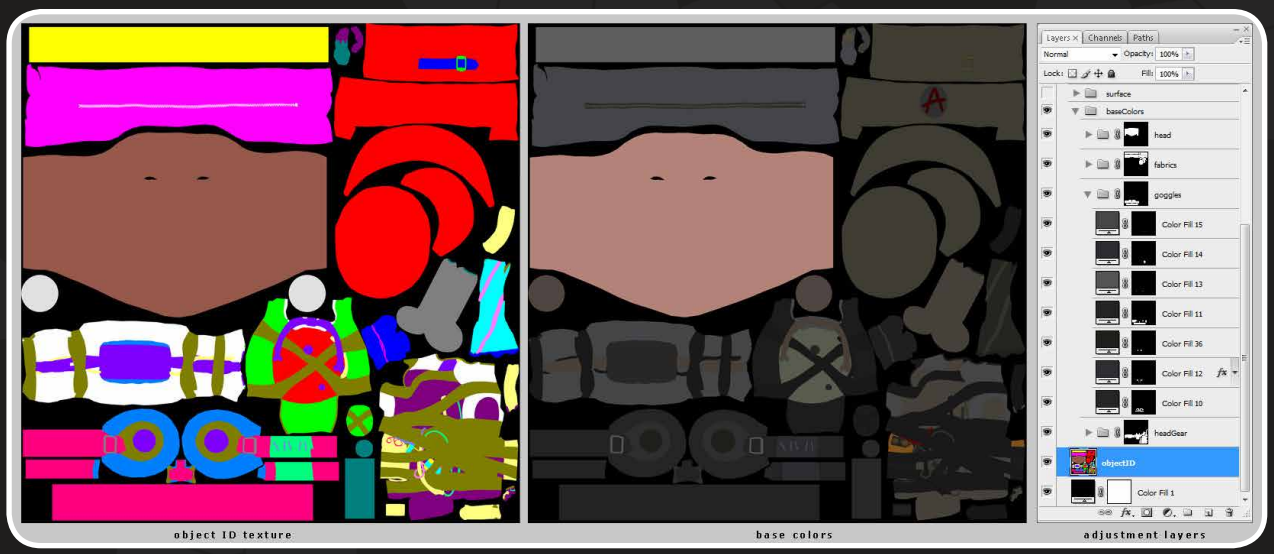
Color is used to paint in any hue changes I want, overlay is used to paint any light and shadow and multiply is just for darkening areas. Glow, dirt, scratches and seams are all normal blended layers. Hair layer is just normal blended layer with a subtle drop shadow with ~2 pixel shadow width. Color noise is a color blended layer. I create this color noise by filling an empty layer with 10% grey and then apply a noise filter with 400% amount.

Then I apply Gaussian blur at ~9 pixel radius. Finally I adjust the opacity of the layer as required by the specific project. This color noise is important to add subtle color variations on all areas of the texture. Of course I have to make selective opacity adjustments on areas like skins and flat color surfaces so that the noise is not too apparent.

Base Texture Colors

To begin the texture process I start with an object ID color baked out of xNormal. To create this texture the highpoly mesh needs to be exported in separate .obj files so that different colors can be assigned to different obj meshes in xNormal. Under the options for “Bake base texture” in xNormal there is an option “Write objectID if no texture” which must be checked to create the base texture.

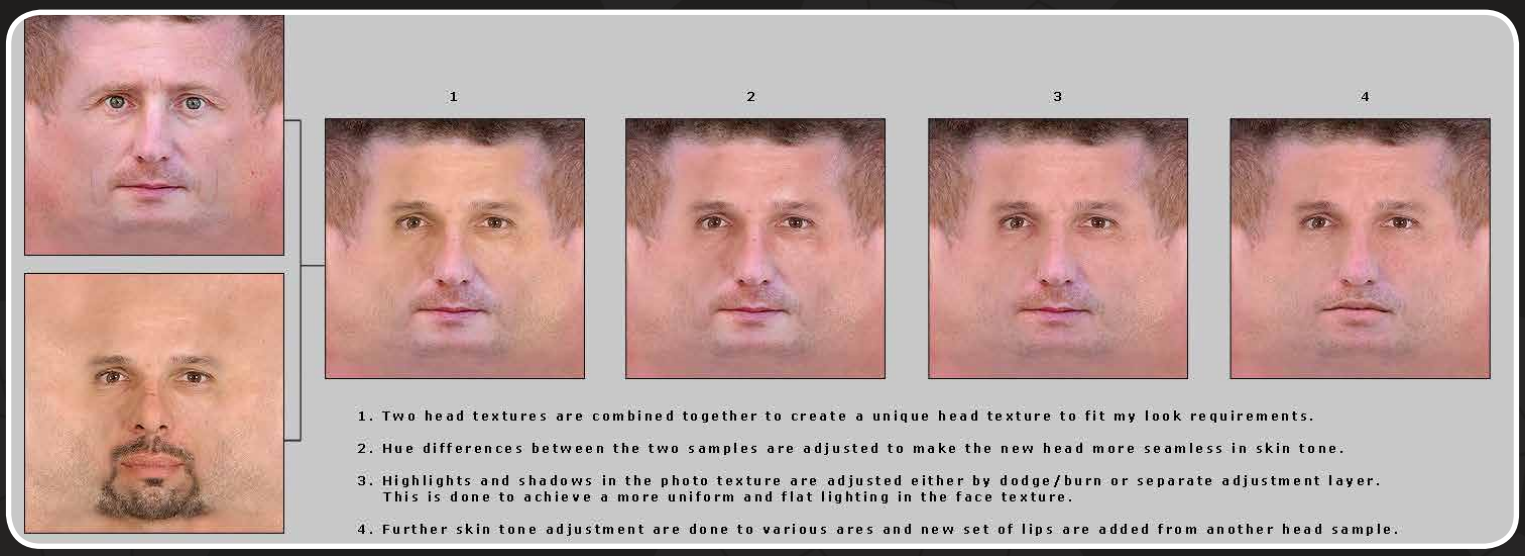
I usually bake this texture at twice the resolution of the texture size I plan to finally work with. Since I planned to use a 2K texture for this project, I baked the object ID texture at 4k. I do this to have a sharper and higher quality mask in the base colors. So once I have the object ID texture baked and cleaned up I proceed with selecting different color elements and creating new “solid color” adjustment layers based on the selections.



Since I am just starting the texture process the selected colors are sometimes guess work and will need further adjustment as I proceed to other stages of the process. I also tend to group the solid colors in different folders if there are too many of them just so that I can work on certain sub-groups selectively. This way the PSD structure stays more organized and it stays easier for me to navigate through the layers. Once I am done creating all the solid color layers I will move on to creating the surface textures.

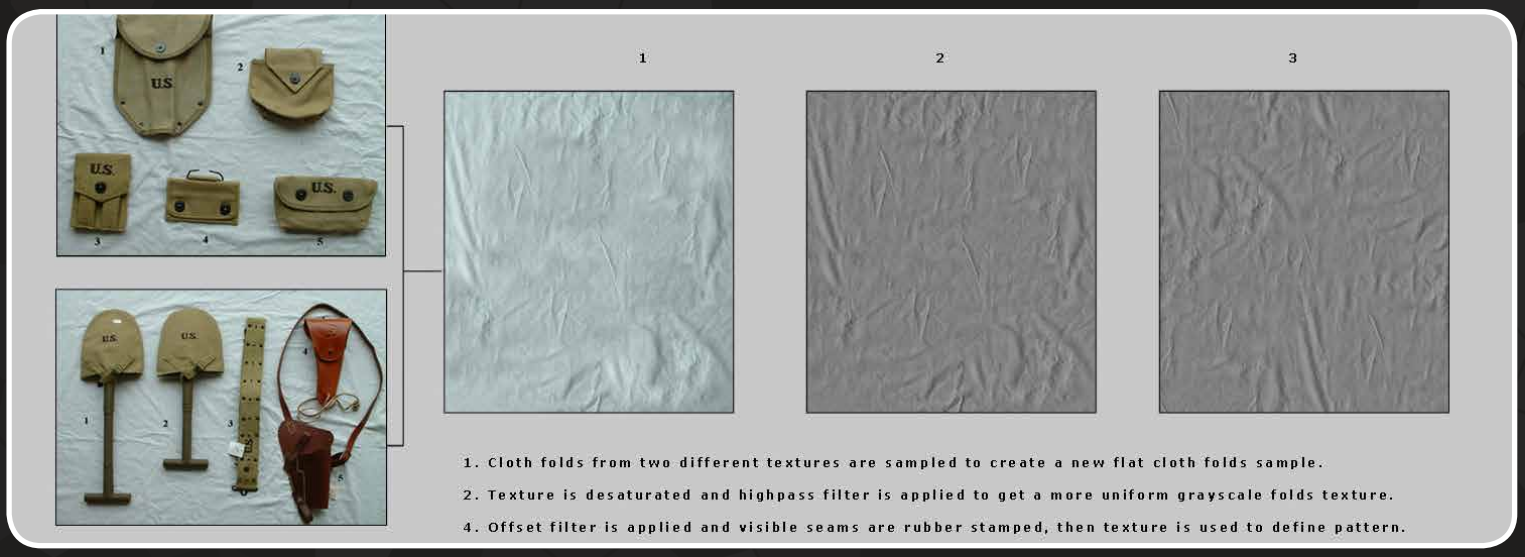
Surface Textures

Surface textures can be photo textures, patterns and/or any painted surface details that identifies that specific area as skin, metal, plastic, fabric etc. For the skin details I will search for a head photo that matches my model requirements and the specific look I am going for. I am using 3d.sk textures for the faces. Here I am taking two different head photos and combining them by masking out the eyes from one head. After that I make sure I make the skin tones from the two heads look exactly same. I do this by either making a masked hue adjustment layer or painting in on a color blended layer. Third step is to make the skin lighting as flat and uniform as possible. Since this asset is fully normal mapped and will get all the lighting from the realtime shader, it is important to remove any lighting artifacts now. Later on in the texture process I can manually paint in more light/shade on a separate adjustment layer if needed. In the last step I brought in a new set of lips to match my model better. After all that is done I use liquify filter to conform the photo of the face to the normal map/UV.



1. Two head textures are combined together to create a unique head texture to fit my look requirements.
2. Hue differences between the two samples are adjusted to make the new head more seamless in skin tone.
3. Highlights and shadows in the photo texture are adjusted either by dodge/burn or separate adjustment layer. This is done to achieve a more uniform and flat lighting in the face texture.
4. Further skin tone adjustment are done to various ares and new set of lips are added from another head sample.

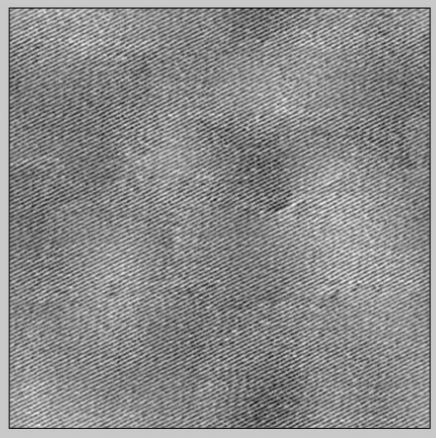
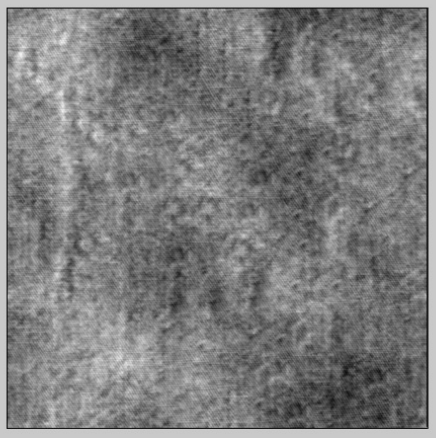
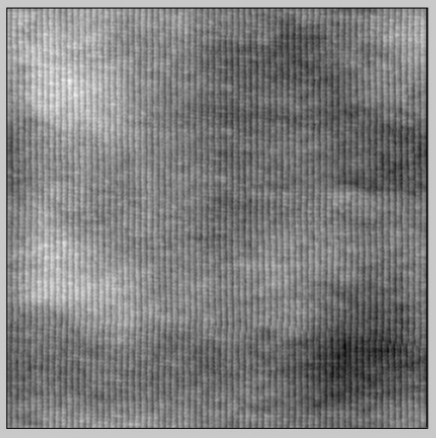
For the lot of the fabric areas I use photo texture as well. Some of these photos are from Surface Mimic's website and some are just images from google. I usually take the photos, run a highpass filter on them to even out the high level lighting variations and then run an offset filter on it. Then I use rubber stamp tool to make the tile seamless and generate a pattern from them. I usually try to make the levels fairly neutral and grayscale so that I can apply them on any color as an overlay.



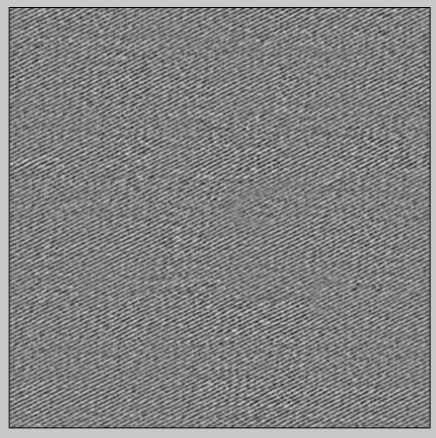
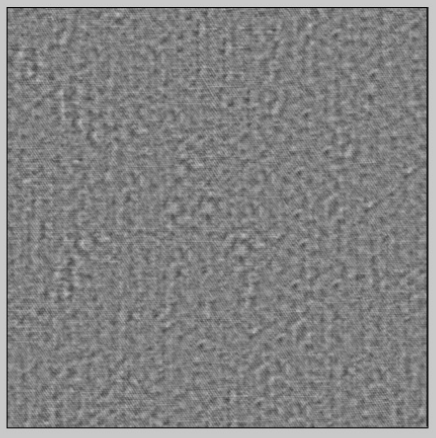
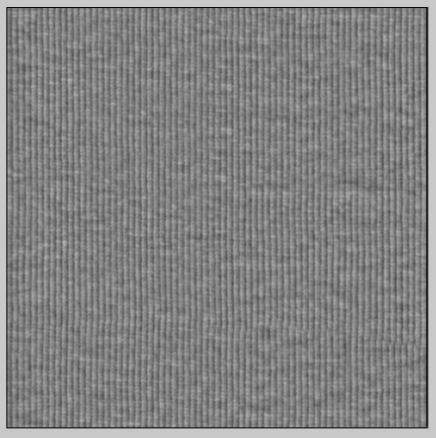
1. Cloth folds from two different textures are sampled to create a new flat cloth folds sample.
2. Texture is desaturated and highpass filter is applied to get a more uniform grayscale folds texture.
4. Offset filter is applied and visible seams are rubber stamped, then texture is used to define pattern.

Images from google to tillable fabric fold pattern:

Photo scans from Surface Mimic

Tilable textures after highpass.

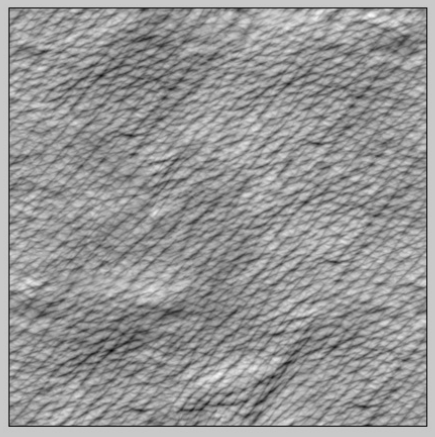
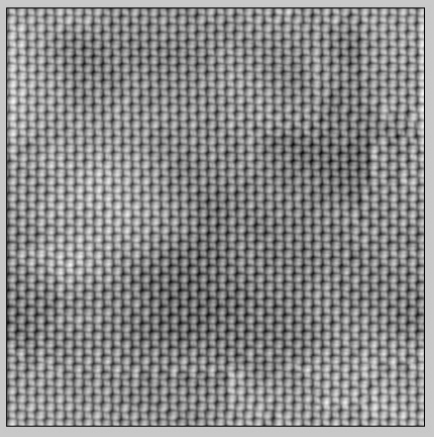
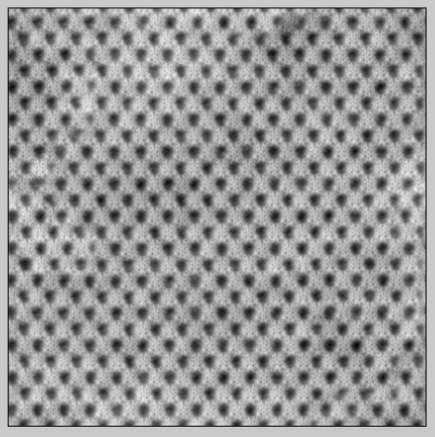




Images from google to tillable fabric fold pattern:

Photo scans from Surface Mimic

The photos from Surface Mimic are depth maps so in some cases I used a lighting effect filter in photoshop to turn these scans into more readable patterns.

Photo scans from Surface Mimic

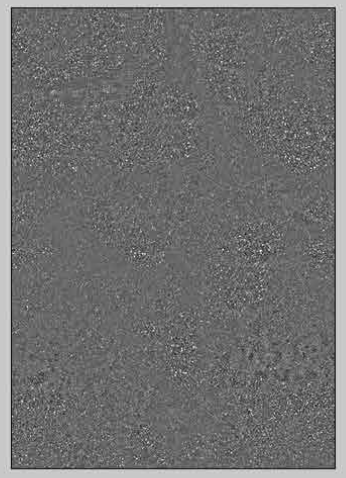




Here are few examples of that:

1. Photo source of foam.

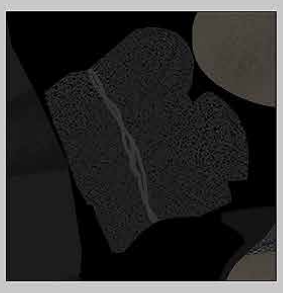
2. Rubber stamped texture

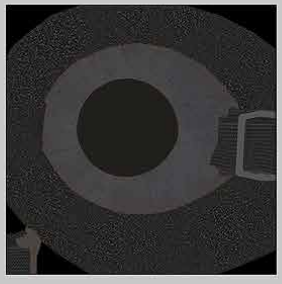
3. Offset applied and seamless.



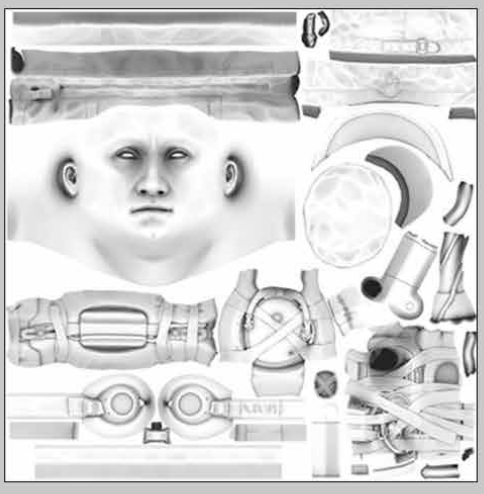
4. Highpass and levels adjusted.

All of the above textures can be defined as patterns in photoshop and applied as an adjustment layer with overlay mode. In some areas the photo textures need to be flattened and distorted to conform better to the UV layout. Same as the face texture I would also use liquify where ever I need to distort and conform the photo texture to the model/UV.

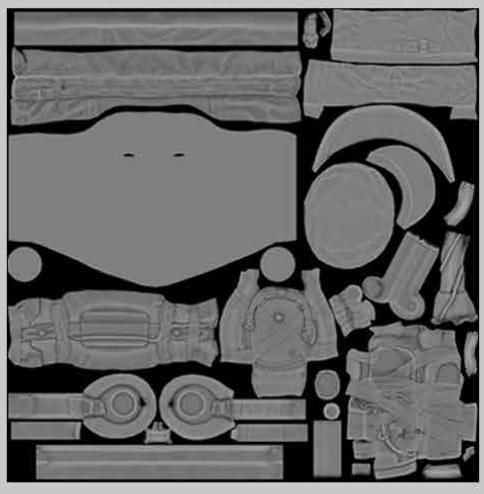




Next step in the process is to apply ambient occlusion. For this asset I am using a combination of three different AO map bakes to get the final result. First is a uniform AO from xNormal, second is curvature map from xNormal and third is lowpoly AO from Faogen(Rusted Dreams). Faogen is quite simple tool to use and you can find out more about it @ www.rusteddreams.net.



Uniform Ambient Occlusion (xNormal)



Curvature map (xNormal)

Lowpoly Ambient Occlusion (Faogen)

I usually apply the AO maps via solid color adjustment layers with overlay blend mode. I copy the AO maps to a new alpha channel and invert it, then I load selection from that channel. This creates a selection based on the darkness of the AO map and with this selection I create solid color layers.

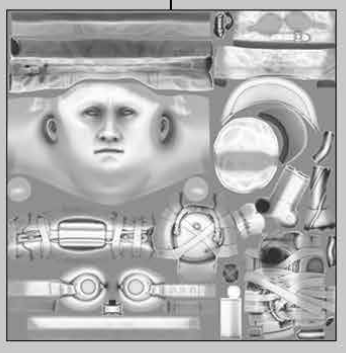
For the contrast AO layer, I load selection of the AO map once then I hold ctrl+shift+alt and load selection again from the same AO alpha. This creates an intersection selection of AO alpha, easier way to think of it is that the selection is getting multiplied by itself to create a more contrasted, sharper AO map selection. This new selection is used to create a contrast AO solid color adjustment layer.

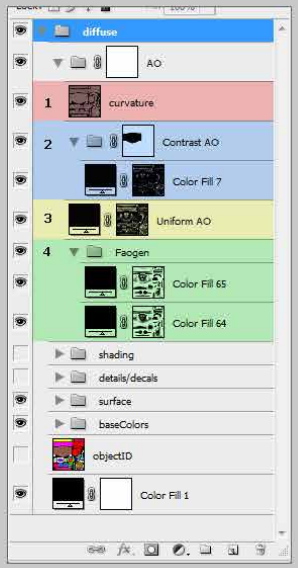
One thing to note is that I usually never use AO maps as just multiply. The following image should illustrate better how I setup my AO layers.

On top there is the curvature map, next is the contrast AO (face area is masked out), then there is the regular AO and finally there is the Faogen AO maps.

Adding Details

Following images shows some of the details added in this stage:





1. Curvature map is applied as overlay @ 70% opacity (adjust opacity as needed).
2. Contrasted AO solid black color with overlay blend mode @ 30% (adjust opacity as needed).
3. Uniform AO solid black color with overlay blend mode @ 30% (adjust opacity as needed).
4. Faogen AO solid color layers (duplicate layer added with altered masking for face) with overlay blend mode @ 30%.

I usually apply the AO maps via solid color adjustment layers with overlay blend mode. I copy the AO maps to a new alpha channel and invert it, then I load selection from that channel. This creates a selection based on the darkness of the AO map and with this selection I create solid color layers.

Stitches and torn fabric threads

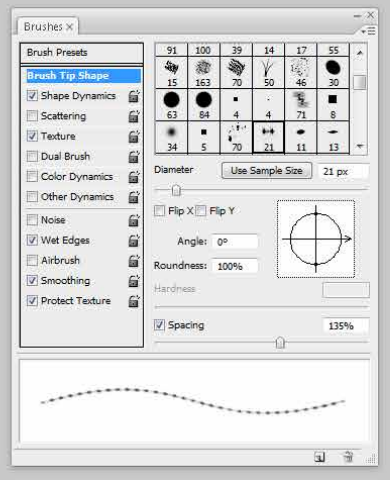
Sticker decals

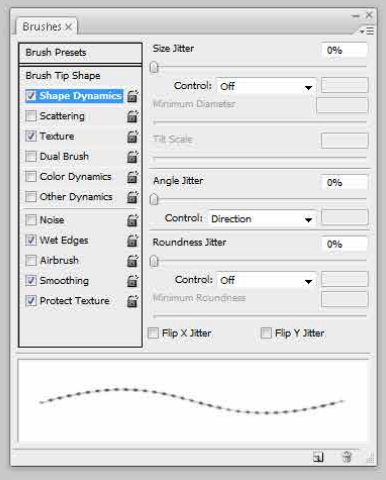
Text details

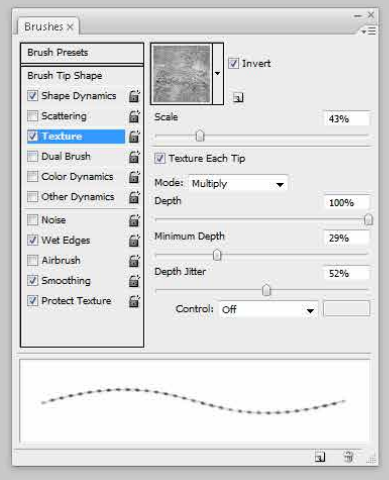
Logo details

Creating a stitch brush:

Stitche brush sample
128 x 128 canvas size



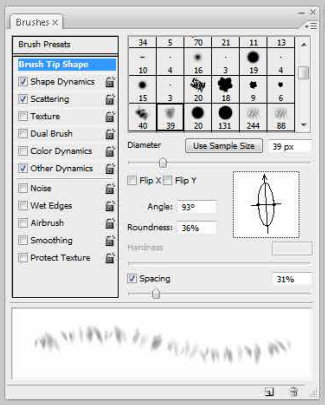


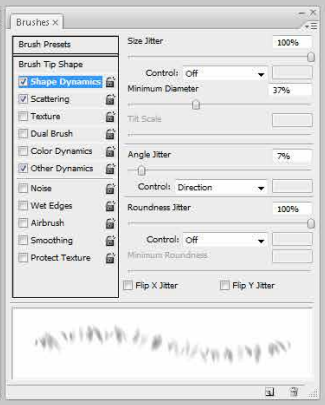


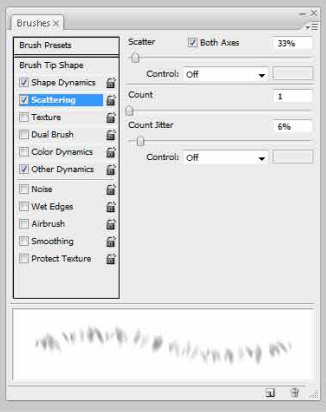
Creating custom brushes in Photoshop is very simple. First make the alpha sample that you want to repeat and then define it as a brush. This will create a new brush based on the sample from the selected canvas. Now you can edit all the settings accordingly to create a new brush that you like. To add the stitches to the texture I usually apply a subtle drop shadow for the stitches and paint in the stitch as needed.

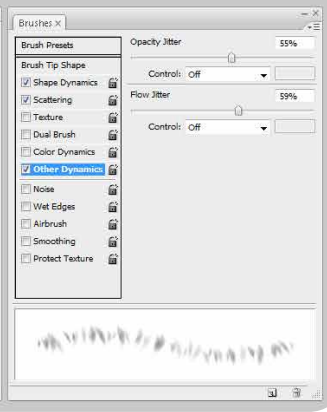
Creating a fabric seam brush:

Seam brush sample
128 x 128 canvas size



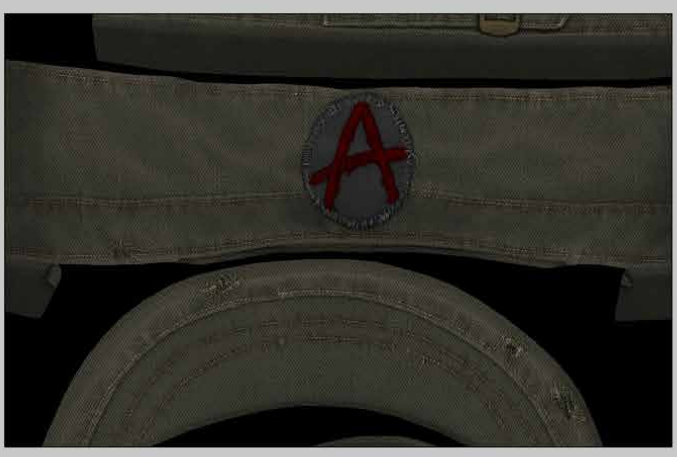






Seam brush can be very helpful in adding that extra little bit of details to fabric seams and especially in areas where there are stitching going on. I usually paint these details on an overlay mode layer with black and white colors. Here is a comparison with added seam details:

No seam details painted



Seam details painted

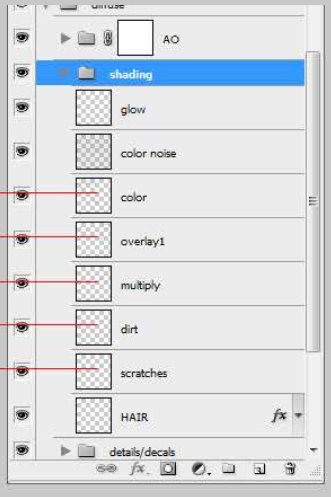
Shading, Lighting & Final Details

So far I have built base colors, added surface details, added small details, decals, etc and now I will add final lighting/ shading and any dirt or color variation to define the texture better.

Here is a comparison of before and after adding final shading and details along with the layer setup that was explained in the beginning of this article.

Texture before final shading

Final shading and details added

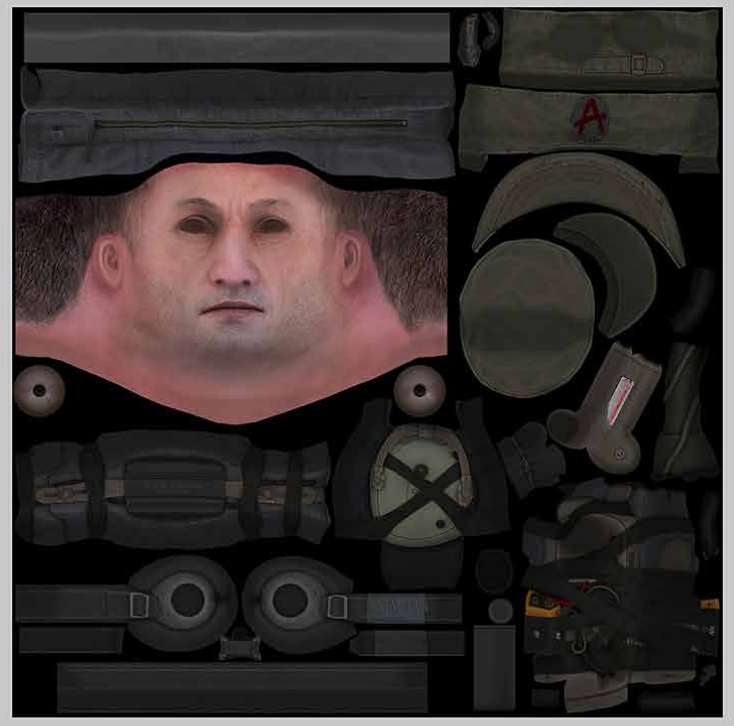


Using the same technique as the seam brush I also created a scratch brush and a dirt brush. In the image above you can see that I added scratch marks around the edges and dirt over the metal surfaces.

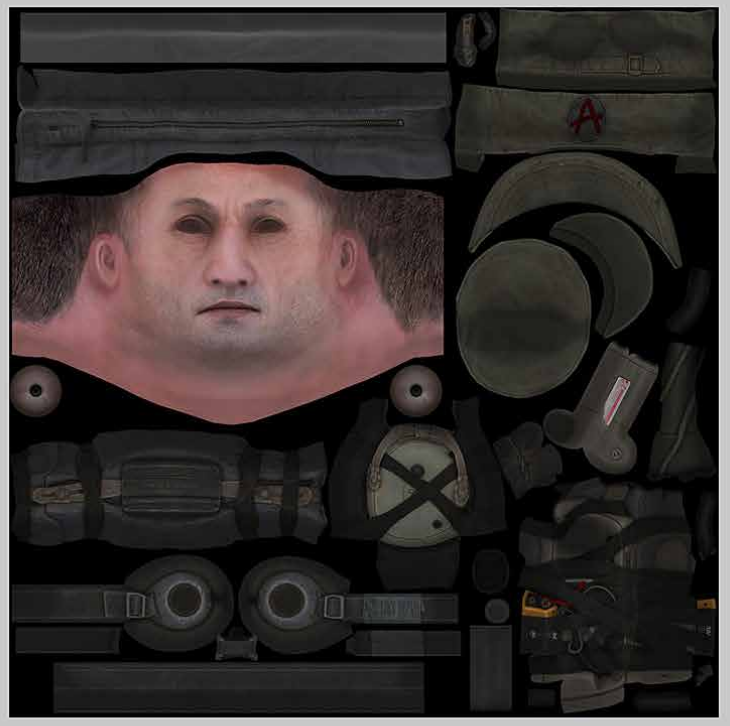
Maintaining a level of realism during this stage is all about the individual artists subjective taste and ability to perceive believable aesthetics.When painting light and shadows I make sure to keep it subtle since the majority of the lighting will be achieved by the realtime shader in the final render.

For the skin areas I would add a bit more saturation around crevices and this adds a subtle impression of a subsurface scattering effect.

When painting light and shadows I make sure to keep it subtle since the majority of the lighting would be achieved by the realtime shader in the final render. For the skin areas I would add a bit more saturation around crevices and this adds a subtle impression of subsurface scattering effect.



Texture before final shading



Final shading and details added

Propagating Details to Normal Map

There are several details added in the diffuse map that needs to be propagated to the normal map. For example, the decals and stitches need to have a slight bump up in the normal map. In addition to those there are also surface details that can be propagated.

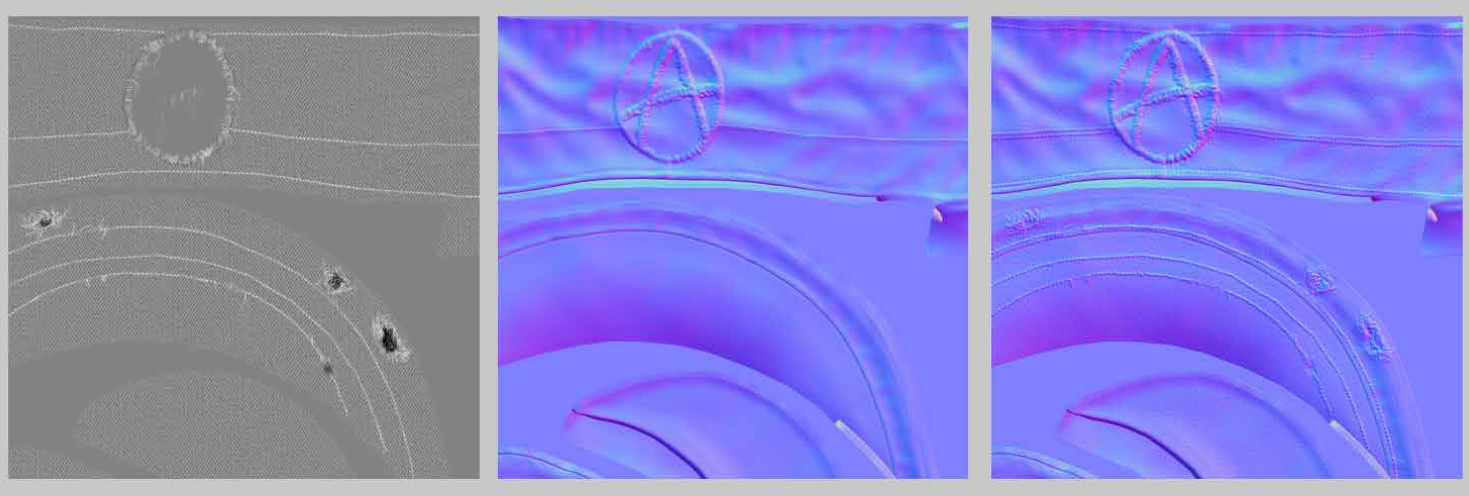
I usually am very selective about what details to add to the normal map in this stage. Anything that is too noisy is ignored. Details like subtle dirt patches don't need to be added into the normal map.

I start off by copying any layers which contain the details that I want to add. I will create a solid color layer with 128.128.128 color and on top I would put the layers with white color containing the details. Basically I am creating a height map.

I can also add details with darker black shades to add a negative bump to the normal. Once I have the height map ready I can use either xNormal plugin or nVidia plugin to generate normal map based on the height map.

Once I have the detail normal map ready, I will level the blue channel of this map from 255 to 128. This makes sure that the detail normal map does not destroy the blue channel of the baked normal map.

Keep in mind that blue channel of a normal map is as important as the red or green channel. Blue channel provides the depth information facing the camera. Once I leveled the blue channel, I can change the surface normal map layer to overlay mode and it will blend nicely with the baked normal map.



Height Map | Baked Normal Map | Final Normal Map

Here you can see the progress:

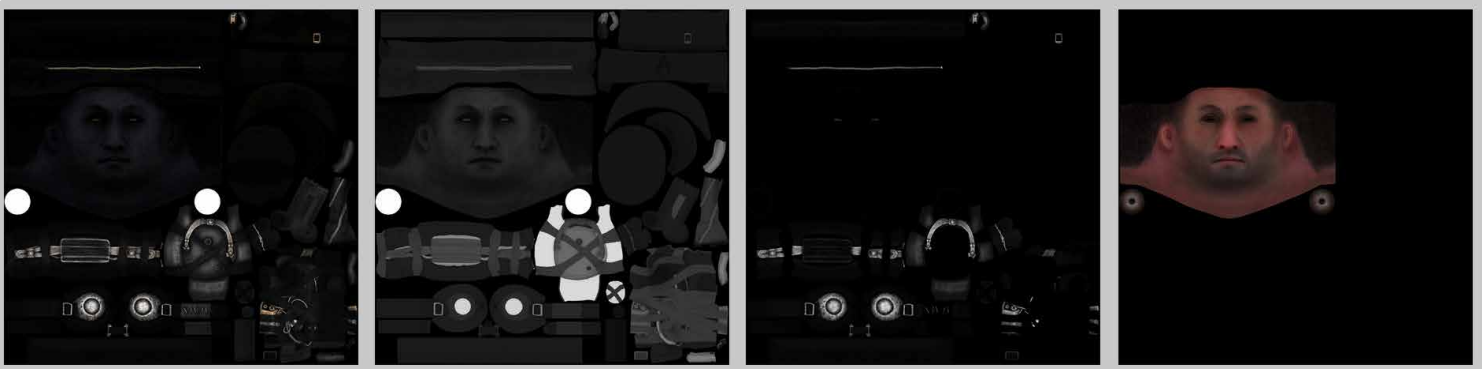
Specular, Gloss, Reflection & SSS

Creating the specular map is straight forward. I start by adding new adjustment layers for hue adjustment and level adjustments. I will create additional adjustment layers, some for higher specularity level and some for lower specularity level.Gloss map defines the size of the specular highlight.

In UDK it is called specular power. Higher the white level smaller the highlight size, so highly polished surfaces would receive a smaller highlight size. As you can see in the map below, the fabric surfaces are the least glossy therefore the darkest in the texture. Plastic, glass and some of the rubber surfaces are higher in glossiness and therefore brighter in the texture.

Metal surfaces look best with medium level gloss since they are not really the smoothest surface even though they are more reflective than other surfaces. So it is important to keep in mind that surface specularity is not directly proportional to glossyness as sometimes it if mistaken by some artists.

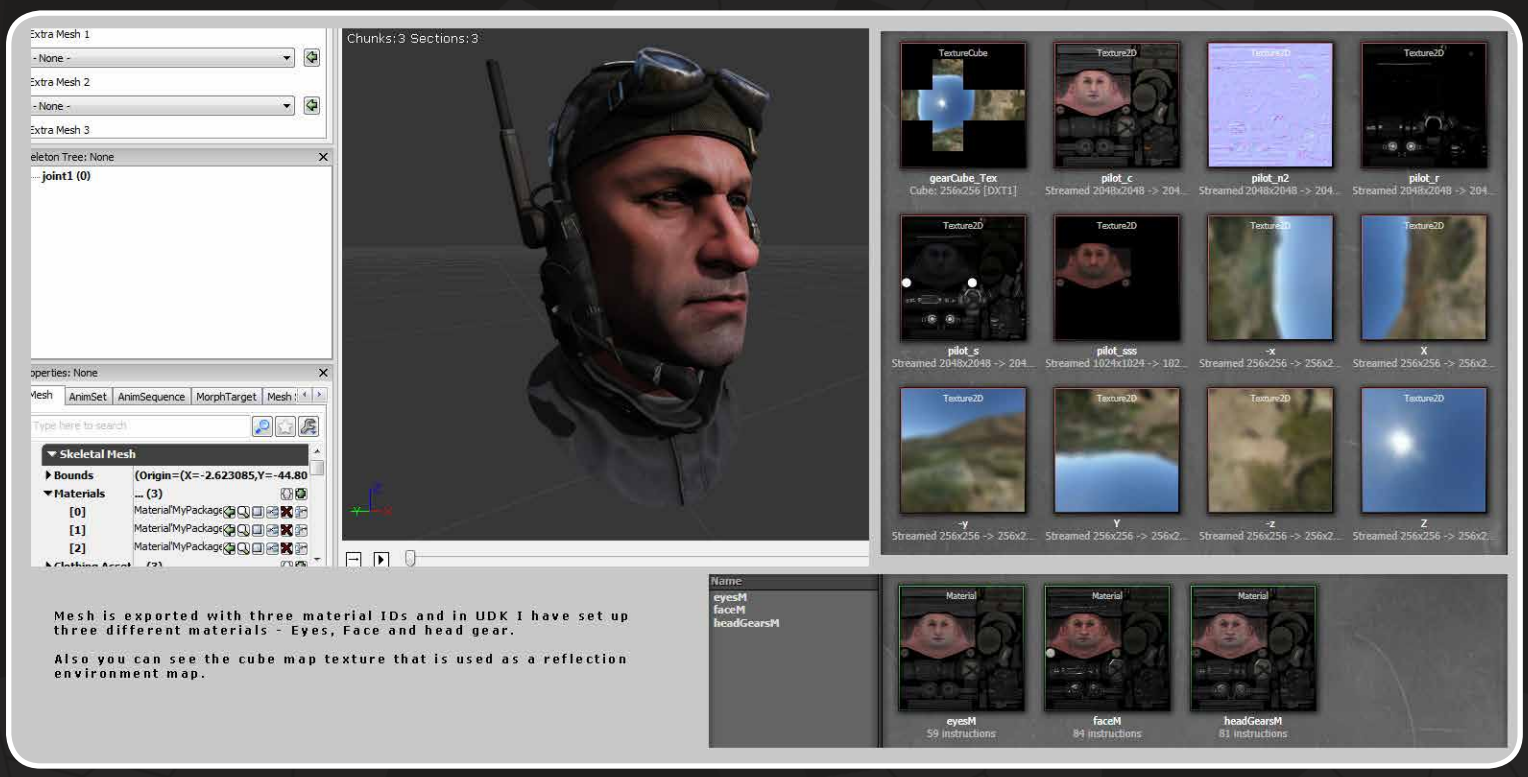
The reflection map is similar to the specular map however not all the highly specular surfaces are highly reflective. Only the metal and glass surfaces are the most reflective in this case. To keep the tutorial simple i have kept the sss map creation easy, essentially it is a saturated version of the diffuse texture but with darker values in areas where I expect to see less scattering like the eye brow area or the hair areas.



Specular | Gloss | Reflection | Subsurface Scatter map

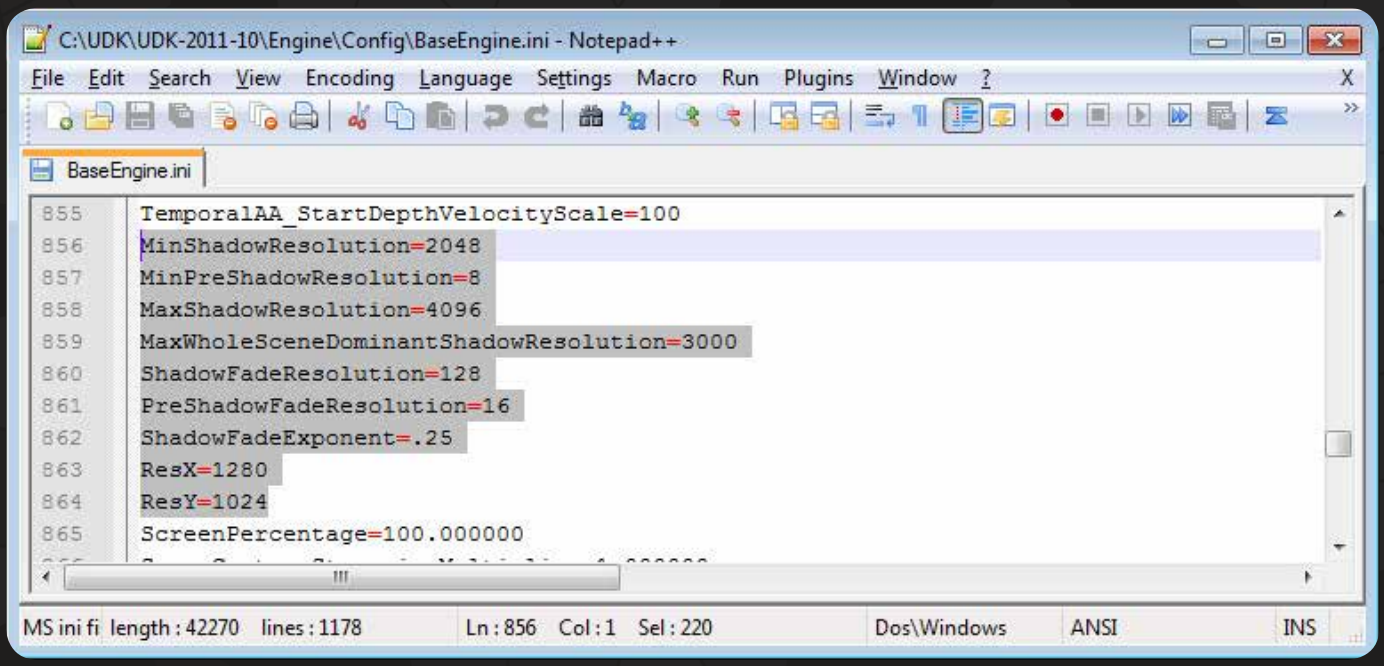
Final model in UDK

After all the textures are done I export the mesh for UDK. Before I exported the mesh I had three materials applied to the mesh; one for the eyes, one for the face and one for all the headgear. This allows me to assign three separate materials in UDK. Here is a screenshot of the mesh in UDK and the materials associated with it.



I also created a custom cubemap for the reflection environment. Cubemap tutorials are abundant and UDK website has several documentations about it so I will move on to discussing the shader settings instead and show how the final renders are setup.

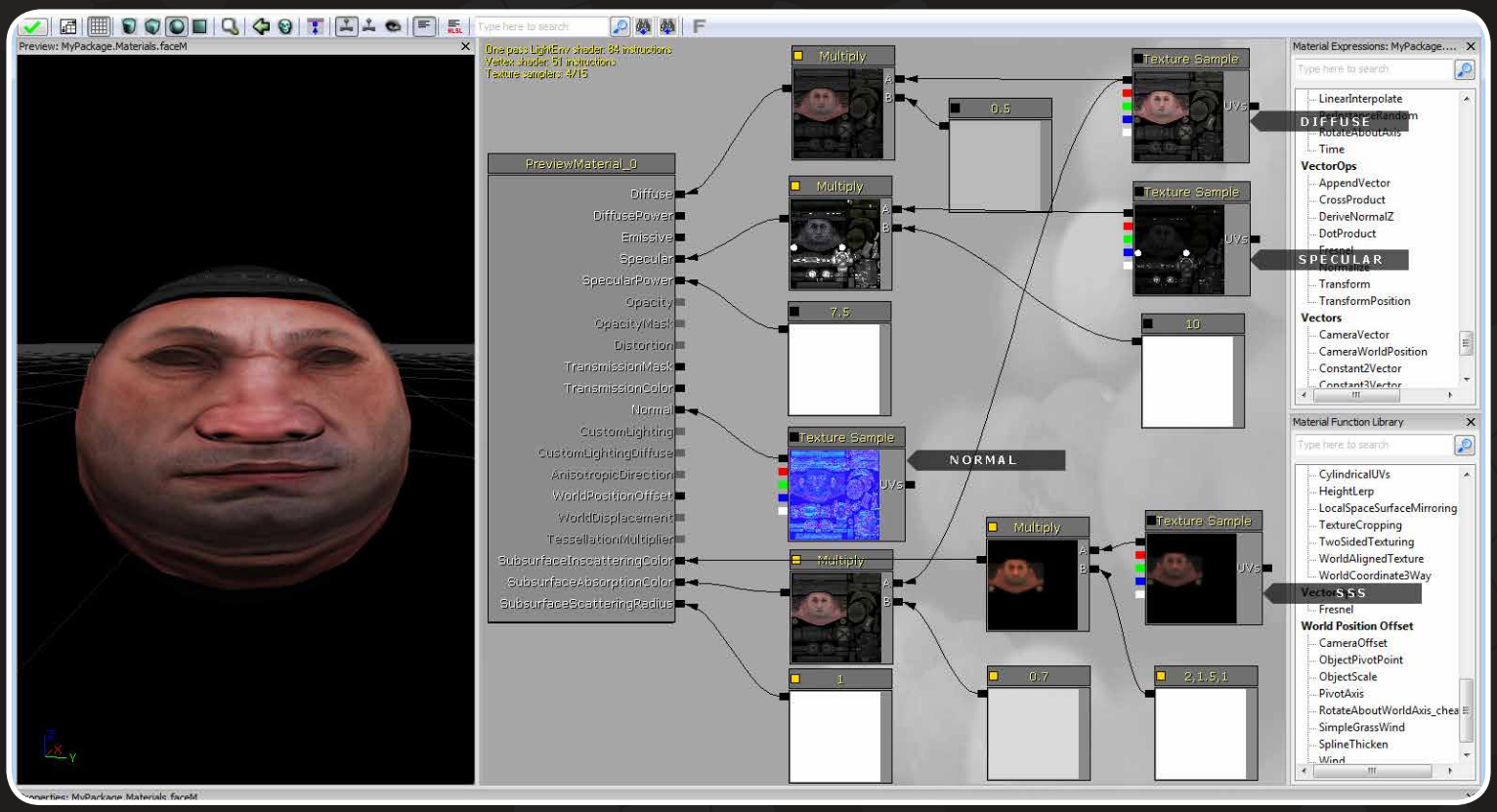
The final render is done using the "Midday Lighting" map template. I basically make the dominant directional light color completely white and increased the shadow resolution by editing the baseEngine.ini file. Here are the highlighted areas I modified:



For the face, I have a material with SSS enabled and the Editor has to run in directx11 mode. Since I am using sss I have added a multiply(0.5) node to darken the diffuse a bit. The specular is multiplied and this is something that depends on the specific specular map so you will have to adjust it as needed.

For the specular power I am using a flat constant since the gloss map is unnecessary addition of another texture sample. Plugging in the normal map is a straight forward connection. For the SSS effect the "SubsurfaceInScattering-Color" is the epidermal color. I have a custom SSS texture created for this connection and it is plugged into to that input via a multiply node to further adjust the color intensity of the InScatter. "SubsurfaceAbsorptionColor" connection is the reflective color of the skin after the light has hit the surface. So basically I can just use the diffuse map or have a multiply to adjust it as required.

One thing to note is that this color should be slightly desaturated than the default skin color to counter balance the inscatter color. Finally there is the "SubsurfaceScatteringRadius" connection. I have just plugged in a constant with value of 1. Higher values will make the skin look more waxy because this input defines the light scatter distance.

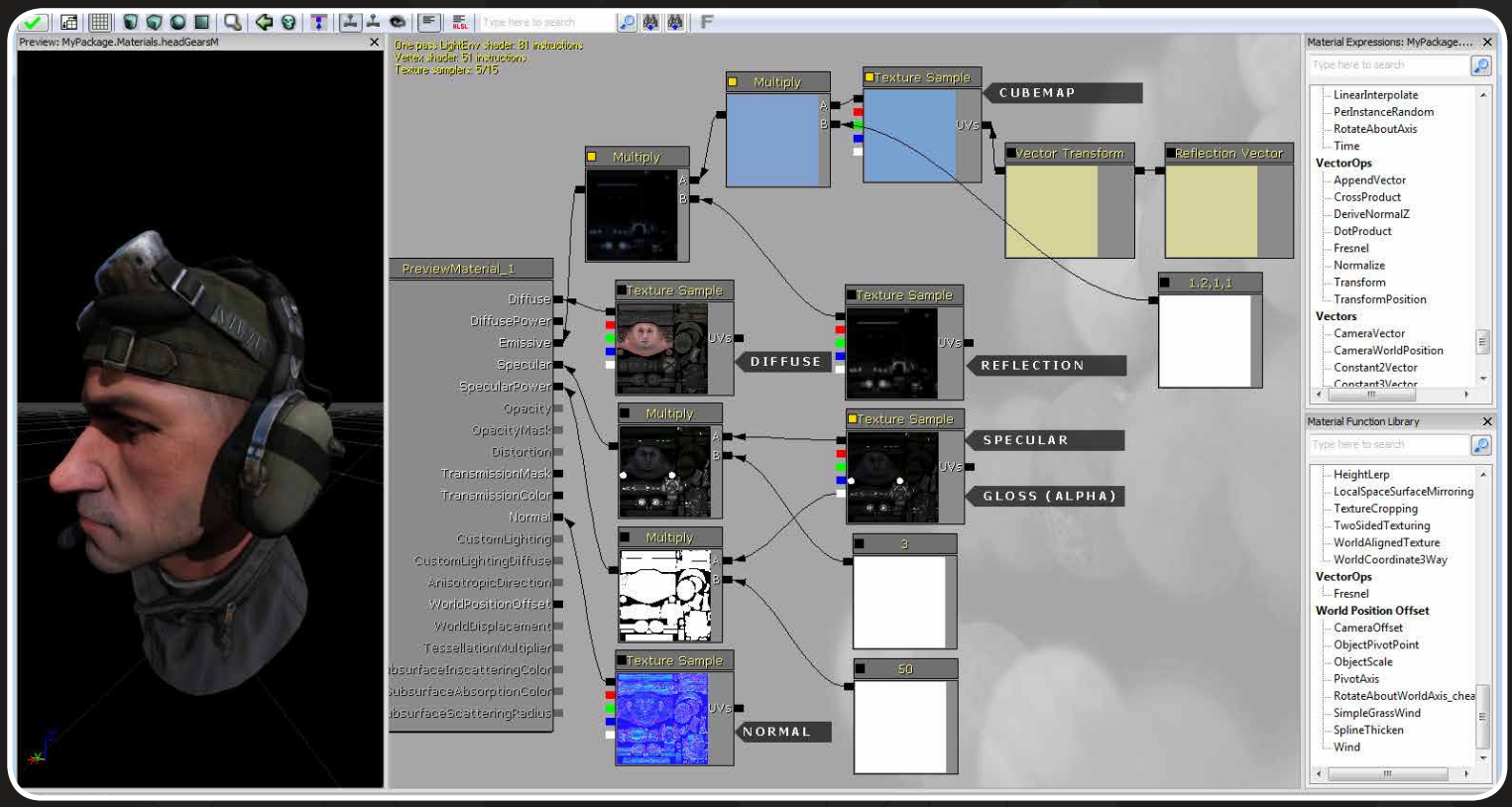


Here is the skin shader setup:

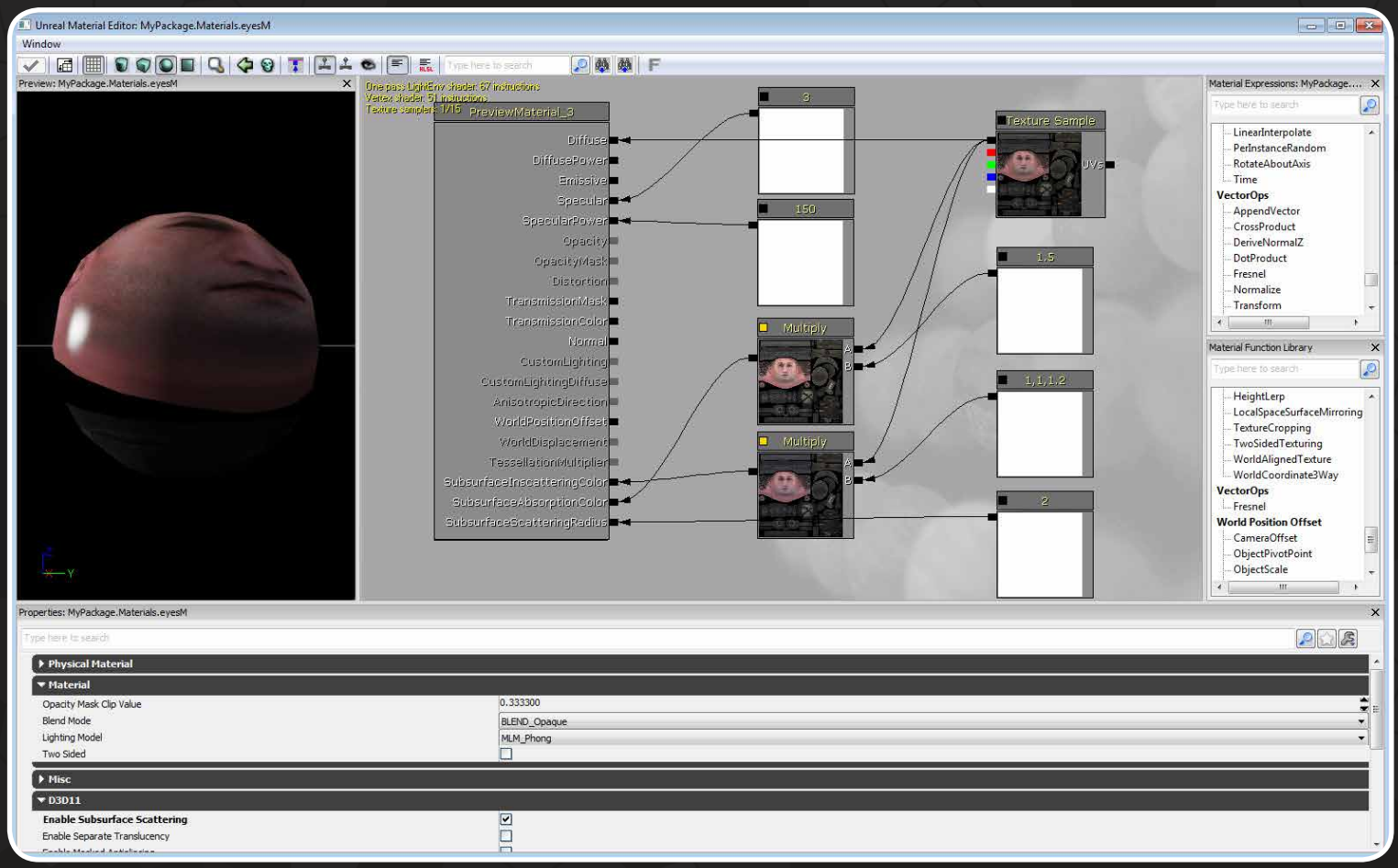
The headgear is another separate material with a reflection map for the metal parts. I created a simple cubemap for the purpose of the reflection. There are several online tutorials on how to create a cubemap in UDK so I won't discuss that.

After I have a cubemap texture ready I will plug it into the emissive input. However, the cubemap is connected via a multiply node and the reflection mask texture is connected to the other end of the multiply node so that the cubemap is only reflected in the areas where I want the reflection. You can further adjust the color of the reflection by adding another multiply node and a constant3vector as shown in the image below. Diffuse map is a straight forward connection.

Specular map is connected via a multiply node to further adjust the intensity of the specular highlight and the alpha channel of the specular map has the gloss map which is plugged into the specular power input via another multiply node. Here I have to multiply the gloss map by 50 to get the results I needed. This is something you may have to play around with depending on your specific gloss map. Last connection is the normal map which is just a straight plug in.



The eye shader is also a separate shader for this asset since I wanted to have some SSS as well as high specular power with the least amount of texture samples involved. As you can see I have only one texture sample in the entire shader and rest is taken care of by constant nodes.



And here is the final render in UDK. As mentioned before, I am using UDK's "midday lighting" template for this render and I adjusted light color to be completely white to get a clear color definition of the separate materials.

The shaders can be tweaked further to get even more realistic results but for the purpose of this tutorial my intention is to show how to achieve the best result I can with the least complicated shader. I hope the entire workflow demonstration has been clear and informative.

About Me

Mashru Mishu is a freelance artist working in the game industry for around six years. He is originally from Bangladesh and is currently residing in New York.

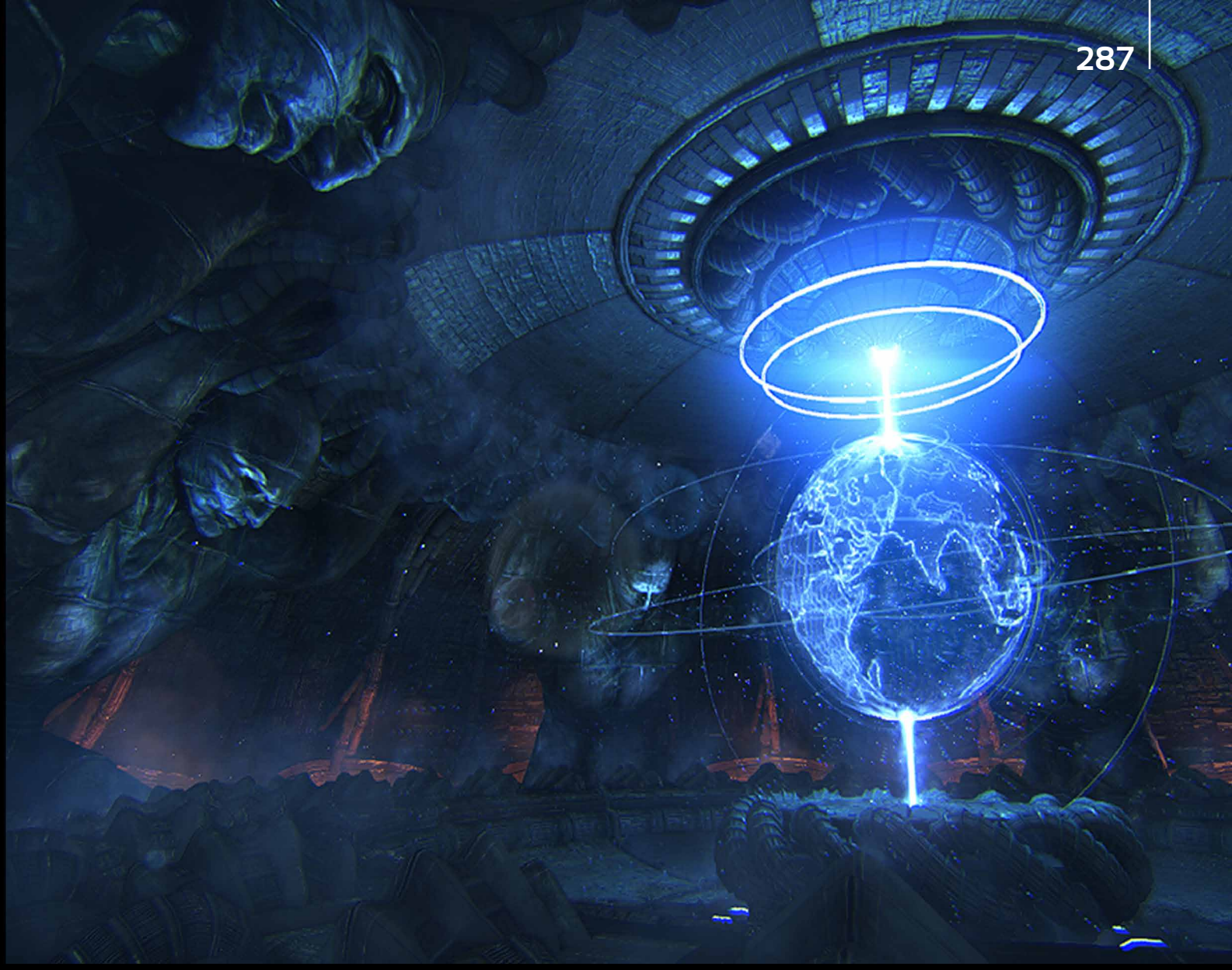
He graduated from the School of Visual Arts and worked at THQ (Kaos Studios) for 4 years before he started freelancing fulltime.

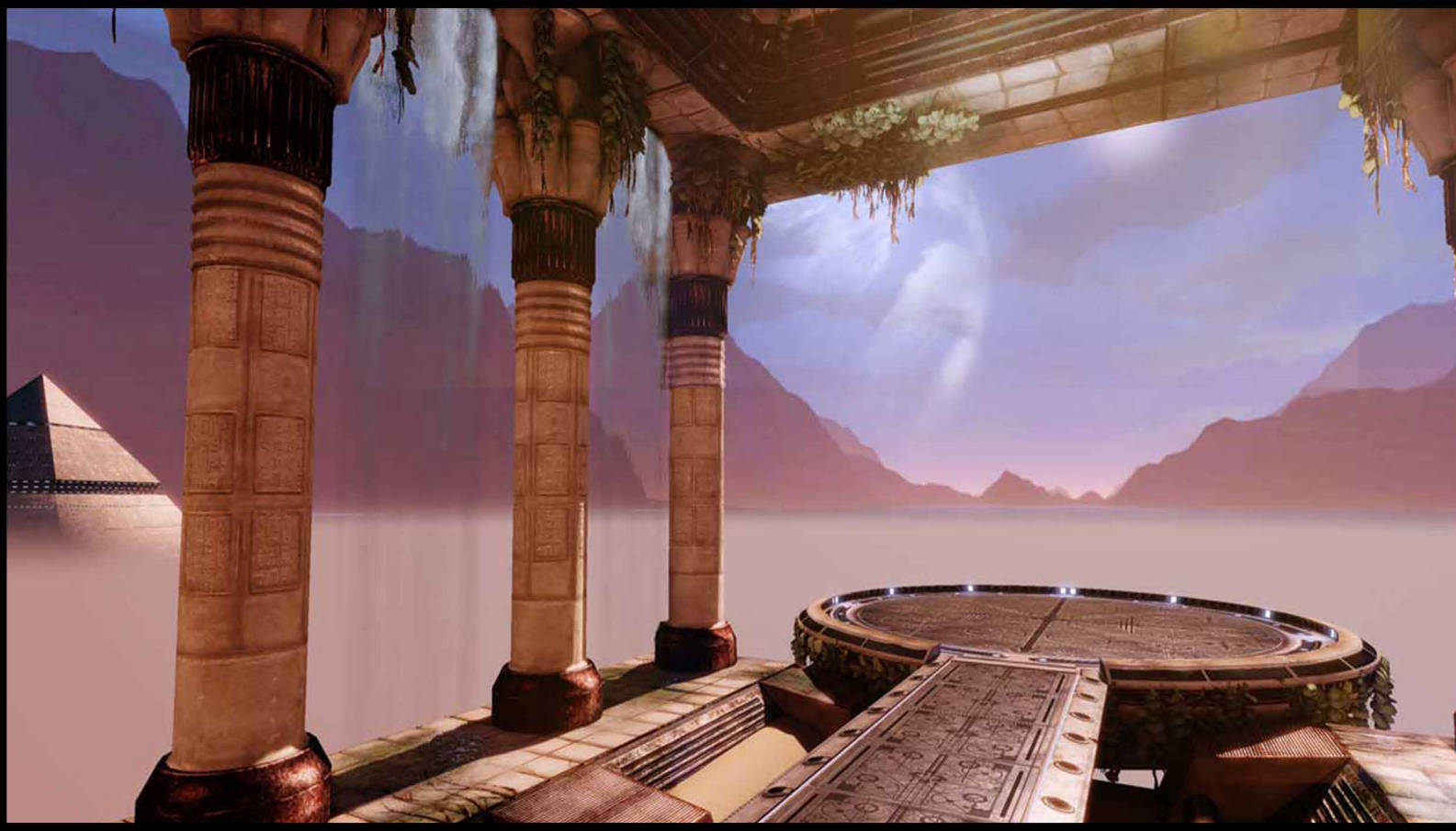
Work experience:

Hawken (Adhesive Games)
Ben 10: (ArtBullyProduction / Vicious Cycle)
Counter-Strike: Global Offensive (ArtBullyProduction / Valve)
Dishonored (Arkane Studios)
Doom 4 (id software)
Trials Evolution (Redlynx)
Firefall (Liquid Development / Red5 Studios)
Gangstar 3 (Gameloft)
Infamous 2 (Valkyrie)
Alli Skate (4MM Games)
Fear3 (Exis/ Day1Studios)
Natural Selection 2 (ArtBullyProduction / Unknown Worlds)
The Darkness 2 (ArtBullyProduction / Digital Extremes)
Frontlines: Fuel of War (Kaos/THQ)
Homefront (Kaos/THQ)
Deep Black (Biart)
Nexuiz (ArtBullyProduction / Illfonic)

Mashru Mishu

www.fx81.com





SPARTH

Questions & Awnsers with: **SPARTH**

Could you tell us a bit about where you are now and what you have been working on?

Stating that I've been very busy will probably be an understatement. After having worked three years on Rage at IDsoftware in Dallas, I decided to leave for Seattle at the end of 2008, this was despite the fact the games production was still not finished.

I created quite a lot on the design side of Rage with Kenneth Scott and a group of extremely talented colleagues.

We spent a great amount of time creating these assets and the time spent creating those assets we found was for the better, as the game proved to be effective and successful.

But it was time for me to move on, so when Kenneth Scott left the company in 2008, I followed him 6 months later, and started at Microsoft 343 Industries on the next Halo game as soon as i arrived.

It's been a bit more than three years now, and once again, the schedule has been pretty much always full thanks to Halo 4. 343 Industries has been growing at a fast rate, the project has been growing in the same way, and i've been enjoying every minute of it.

A lot of your professional and personal work is Sci-Fi. That said, were you excited to start working within bthe Sci-Fi universe of Halo?

It's a fact that Science fiction has always been a genre of great predilection for me, as it gathers a lot of visual and storytelling possibilities, combined to the constant excitement of imagining and predicting the future.

I was of course extremely excited to work on the Halo franchise, not only because of its legacy but also because the Halo universe is immense and diverse, and offers endless design options and visual expansions. True, you still need to respect some characteristics of the franchise, and the storyline has always been carefully depicted and explained, but it leaves a lot of room for concept artists to add their own touch, and for now we never felt blocked by any types of limits.

What are some of the Pros and Cons about stepping in and working on an IP as established as the Halo Universe?

Well, I'll be honest to say that for now my experience has only been positive when it comes to the IP as a whole, and constraints have only been minimal.

You have to remember that the 343 franchise studio has been created specifically to imagine the future of Halo, and a lot of creative minds like Kenneth Scott or myself had been called on the project in order to give a fresh look to the Halo world, in other words, we were asked to create a real upgrade compared to the Bungie Era, and this is what we have been focusing on since 2008.

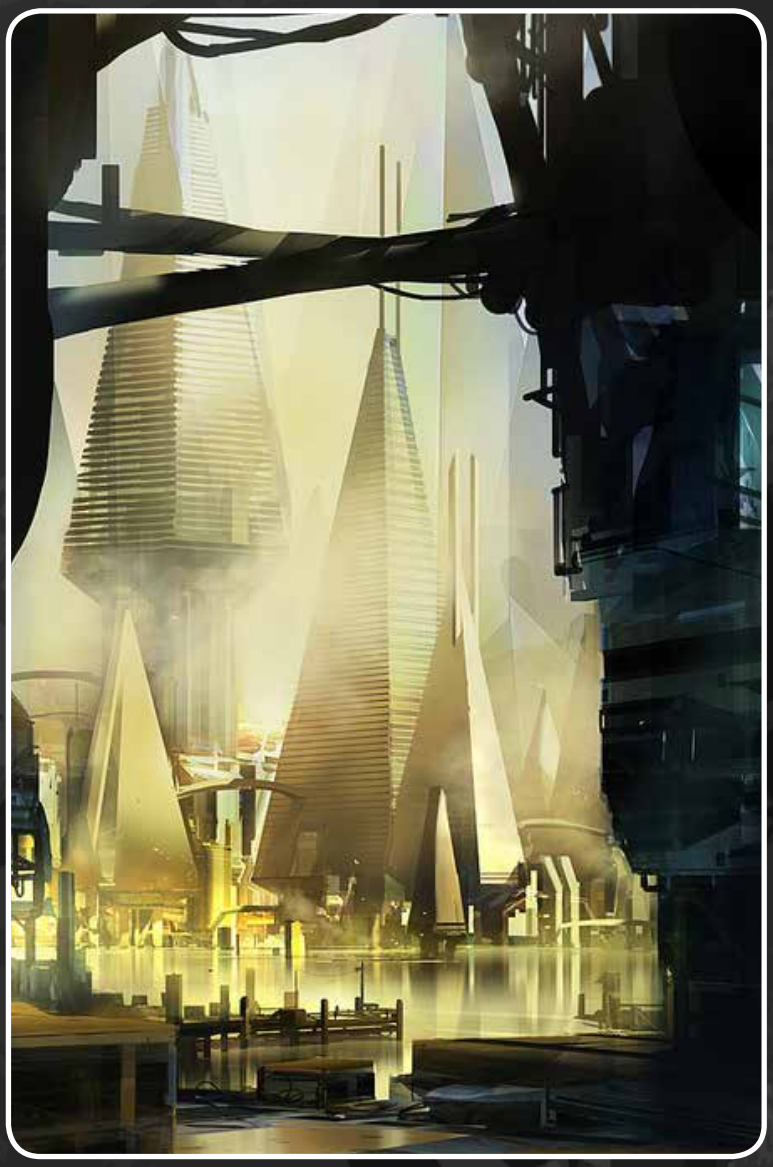
There were obviously a lot of constraints, especially when it comes to characters, outfits, enemies, weapons, as well as bringing everything to a next level of aesthetics.

But i would rather call these "exciting constraints" as it was mostly like having to break a puzzle down and create a bigger one out of an improved set of existing pieces.

In a lot of cases, creating concepts is like playing a game, you must have fun. if frustration gets into the workflow, you can instantly feel and see the difference in the art.

But it's something we have learned to spot fast and effectively, even within our own art. we always have a lot of way to get the excitement back, and besides, this has really been a non problem on this project.
inspiration has always been flowing like crazy!

In a previous interview you mentioned that you saw concept artists utilizing more 3D tools in their workflow in the future and likewise more 2D tools working their way into 3D artist's workflows. Have any of these tools and techniques made their way into your workflow?



I had a long conversation with my friend David Levy (Tron, prometheus, Enders'game) a few weeks ago about the matter, and it appears that when it comes to concept art applied to the movie industry, a lot of 3d tools are becoming growingly important in concept artist's workflow.

Movie directors are often requesting very finished scenes, in the way they would appear in the movie. This means concept artists have to focus more and more on hyper-realistic renderings, as well as implementing new matte painting techniques to their images.

Obviously, that's where 3d tools pop in, especially to help concept artists better prepare their scenes in advance: 3d materials can be used in a lot of ways, not only as a base for 2d paintings, but also to obtain multiple angles out of specific scenes.

It's always a big advantage over 2d for this matter. With a video game industry getting increasingly cinematic, I wouldn't be surprised to see it follow the same path. digital techniques have always been very similar between both worlds anyway, so it would make a lot of sense.

What are some of your favorite video games if you have time to play any?

I admit I'm not having a lot of time to play nowadays, but I have always been a gamer nonetheless. for now, I only play super fast games like chess, dice, or small Ipad games that do not require too much time for a playing session.

But I have been a fierce FPS gamer in the past, imagining a lot of quake 3 arena maps under the name of Nunuk, between 1999 and 2003.

I started playing Ultima III on an IBM pc in 1983, so the passion has definitely been lasting for a while. When it comes to the "modern" era of videogames, I would instantly put ICO as a huge reference for me, not only because of the visuals, but mostly because of the degree of achievement the creators have been able to push through such an adventure.

It's close to being perfect, and this fact alone is quite rare when it comes to the gaming world.

How do you decide what color scheme to use to help the overall composition of your scene?

It all depends of how strict the task is from the very start. If a specific color scheme is requested, we will focus on it and do our best within the constraints. However, we often have our hands free when it comes to the environment side, especially during the pre-production phase of a game. In that case, I often experiment a lot, and this until the last minutes, just before finishing an image. I often operate drastic changes in a very impulsive way, and my color schemes can de facto change very fast. I always keep my color choices minimal into my images, and this in order to avoid what I call the "rainbow syndrome", or the use of multiple color tones in the way of a rainbow. It is a mistake that novice artist often do, trying to impress a lot on the color side, and totally forgetting about the smart usage of complementary tones. My philosophy is that the more you introduce parameters into a scene, the more you divide the impact, and this can be applied not only to color themes, but also to composition, subjects, as well as storytelling elements within a scene.

What are some of your pet peeves regarding art?

I used to be terrorized by the "blank page syndrome" if that ever applies to painting, and if I analyze the way I have been pushing my creative process during this last decade, I think it was mostly aimed at never finding myself in a situation where I would have to start a concept from scratch.

For this very reason, I always have a lot of materials on my hard drive, previous paintings that I use as overlays, custom shapes that help me obtain extremely fast results, templates and image extracts that i can cut and paste in a canvas and transform to my liking. Another frustration I often encounter is linked to the fact I rarely fully render my images.

I consider myself being more of a starter rather than a finisher, putting a lot of impulse at the beginning of each new image. the fact of adding details and fully render an environment piece for example, can contradicts my sense of design, to the point of altering the initial intent.

I am still capable of pushing images a lot of course, and I often get a lot of excitement at doing so, but I still have a preference for the very first creative phase of a concept, the moment where you put things into place, where the big structures and the strong storytelling elements are being organized.

What movies would you call your favorites?

This is a simple one! I don't think my top 5 has ever changed during these last twenty years. I have that incommensurate passion for the Blade Runner Movie by Ridley Scott, to the point of collecting multiple DVD versions as well as numerous different scores by Vangelis for the movie.

Alien 1 is following, really not far behind. 2001 Space Odyssey by Stanley Kubrik is coming third.

The last, two spaghetti westerns by Sergio Leone, "The Good the Bad and the Ugly", as well as "Once upon the time in the West".

These two movies redefined a lot of standards to the point of creating a new genre, still inspiring a lot of actual film directors.

These movies are so good they are out of time, at least to me. Of course if you extend my favorite movies to a top 10, you would also find the Star Wars trilogy, "The Thing" by John Carpenter, as well as "The Fearless Vampire Killers" by Roman Polanski.

What are you currently bored of seeing in current games or other entertainment industries style art wise?

There would be a lot to talk about when it comes to thinkers and followers, and I admit there's been too much of the latter in the video game and movie industry, especially when it comes to style and design mimetism. But I suppose it has always been that way, and not only specifically in video game. Besides, the will to create and evolve creatively in the best way is something strictly driven by passion and hard work. some lack the passion, some lack the hard work. some lack on both, unfortunately. My modo will probably never change when it comes to a creative process: always think outside the box. as to working in a company, I think it all comes down to three main ingredients: Talent, diplomacy, and becoming irreplaceable.

I'll also be honest to say that my gaming habits have changed a lot these last years. I rarely have a full three hours evening in my schedule, and playing a game is getting kind of rare. I don't find the excitement any more, like when we all used to jump into a Quake 3 Arena map, but this is a very personal statement. For this particular matter, I have been very excited to observe the rise of independent developers these last years, mostly thanks to portable systems like the Ipad. You now have a great number of small games available, but they're extremely creative and graphically different and achieved. A real breath of fresh air compared to the larger "mainstream" companies.

About Me

Sparth (Nicolas Bouvier) has been an active artistic director and concept designer in the gaming industry since 1996. Born in France, he now lives in Seattle, Washington, working for Microsoft.Having had the privilege of travelling extensively at an early age to such places as far afield as the USA, Singapore, China, France and Europe, he was influenced greatly by the various cultures, and he enjoyed observing people and making notes of all these tiny details of life that he was witnessing.

The varied influences are largely responsible for his multiple creative passions, which range from space, to buildings, to robotics and beyond.

There are no limits to his creativity when it comes to translating forms and concepts. One of his greatest passion remains contemporary architecture, of which he applies principles in his own art, with an experimental and original approach.

He also harbours a fascination for modern skyscrapers, although he admits that he wouldn't be able to live too high above the ground himself.

Sparth has contributed to the development of several released games since 1997. Alone in the dark 4 (2001), Cold Fear (2005), Prince of Persia - Warrior Within (2004), and Rage, a project still in developement at IDsoftware, and has participated with Darkworks-Studio, to a lot of game projects in collaboration with large companies like Capcom and Namco.

In 2003, he decided to leave Paris for Montreal in order to join Ubisoft on their ongoing projects, Prince of Persia Warrior Within, as well as Assassin's Creed. he left Montreal for Texas in october 2005, where he spent more than three years working for IDsoftware in Dallas. finally, in january 2009, he joined Microsoft to participate to the future HALO adventures.

Nicolas "Sparth" Bouvier

www.sparth.com

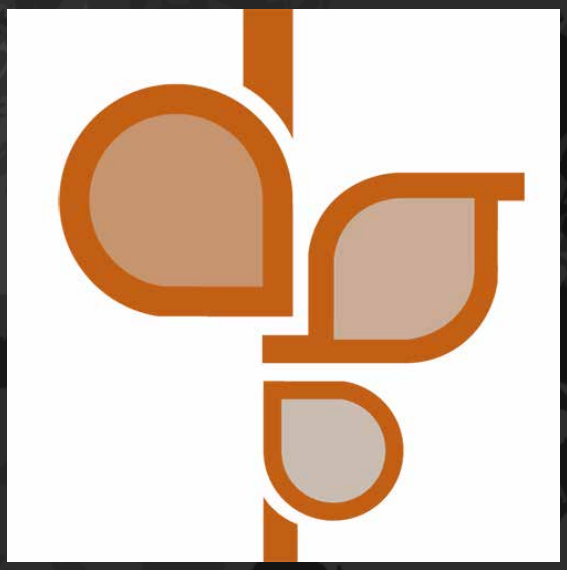
Check Out

Structura 2, my second book will hit the shelves at the end of January of this new year. I have been putting a lot of dedication and time to this second opus during 2011, and we finally managed to get it done. A huge thank you for Scott Robertson, Tinti Dey, Jenny Sue, and DesignStudioPress for their dedication and patience.

Big Thanks to all who have participated to the project, with awesome words from my friends David Levy, Kenneth Scott and Stephan Martiniere. releasing a book is always an adventure. When the road is smooth, and bumps minimal, it's always a plus. Structura2 is available via DesignStudioPress or Amazon.

STRUCTURA 2

http://www.designstudiopress.com/new_site/book_pages/pics_Structura2/book_structura2.html



Be swept away into the imaginative and gorgeous world of Sparth's imagination and then pick up a few Photoshop tips to assist you in improving your digital artistic knowledge and visual communication skills!

In addition to the amazing images that you will want to devour over and over, Sparth shares his expertise with several step by step tutorials focusing on specific Photoshop techniques using custom brushes, custom shapes, clone stamping and the smudge tool, to name only a few.

Page Count:
160 pages

Paperback
9 x 9 inches
isbn-13: 978-1-933492-65-0

Price:
$29.95 usd

Hardcover
9 x 9 inches
isbn-13: 978-1-933492-66-7

Price:
$44.95 usd

Parka Blogs

Book Review: Structura 2

http://parkablogs.com/content/book-review-structura-2

This is a nice sequel to the first Structura art book, and it's slightly thicker too with more content. This book focuses on more concept art for sci-fi and environment. There are spaceships flying off from the many sleek locations conceived by Sparth. The environment paintings are mainly of desolate but exotic landscapes. I noticed he likes to use a lot of dark colours and black to make his other colours standout. Even for the cover, it's mostly black with blue tint as colour.

There are some illustrations created in different but refreshing style. Those are some experimental sketches done using Alchemy drawing software which look very much like manga style because of the outlines. Those look great. There are also some beautiful paintings created using just squares and rectangles.

INTRODUCTION

What if all the world's famous historical figures, alive or dead, were to compete in arenas located throughout the many monuments or landmarks around the globe to battle for Good vs Evil. Well now they will in the very first contest by Papercut.

CHARACTER ART BRIEF

Pick any historical figure from history (living or deceased). You are discouraged from selecting actors/actresses, musicians and/or entertainers, unless they have made a significant impact on history such as John Lennon, Beethoven, etc.

You must choose a faction between Good or Evil that your historical figure is going to fight for. Feel free to pick a faction that would contradict their original character (ie. Good Hitler, Evil Gandhi). There will be a top 3 for each faction (top 3 Good entries, top 3 Evil entries).

You must give your character a special ability of some kind. It can be related to the character themselves, such as Benjamin Franklin having a lightning bolt ability or Neil Armstrong having a meteorite attack. You have to be able to visually represent this ability in some way in your final submission.

ENVIRONMENT ART BRIEF

You will have to set the stage for the SHOWDOWN by selecting from any monument, landmark, historical location, on Earth (ie. Pyramids, Mount Rushmore, Alcatraz, etc).

Your place of choice can be set it in any time period and/or alternate universe. Meaning you can go back to the construction of Big Ben in London, or give Time Square in New York City a steampunk setting. It doesn't have to be an exact replication of your chosen setting, so be as creative as you like, however it must be recognisable in the end.

You can do multiple angles of your scene, but the main render must be done in a side-on fighter game style (Street Fighter, Mortal Kombat, King of Fighters, Marvel vs Capcom, etc). So pick your composition and setting wisely.

RULES

All work must be your own and created specifically for this competition.

Teams are allowed for Environment Art entries. Up to TWO artists maximum.

All entries must create their own Work In Progress thread on the forum in either the Character Art or Environment Art sections and must post updates regularly or risk disqualification.

Thread naming convention:

Character Art Thread: [SHOWDOWN] – Good/Evil – Name of your character – Your name
ie – [SHOWDOWN] – Evil – George Washington – Emil Mujanovic

Environment Art Thread: [SHOWDOWN] – Name of location – Your name(s)
ie – [SHOWDOWN] – Mount Rushmore – Emil Mujanovic & Ryan Hawkins

Only one entry per category is allowed. Meaning you can submit both a Character Art entry and an Environment Art entry, but you cannot submit two or more Character Art entries and/or two or more Environment Art entries.

Entries must be submitted before the deadline November 30th, 2012.

FOR THE FULL CONTEST BRIEF

Visit our site www.artbypapercut.com! Thanks for showing interest and good luck and we hope you enjoy the competition. If you have any feedback please leave the feedback with us on our forums and we will try to review it and incorperate it next time.

SPONSORED BY:

UIXEL

It has been a long and winding road since I first started working on VERTEX. It actually all began well over a year ago with me bouncing around ideas with (in some cases harassing) other artists and it soon became apparent that there was a demand for high quality, industry relevant tutorials, articles and resources for student, hobbyist and professional game artists.

With that, I approached several artists within the games industry with the idea of creating a dedicated game-art magazine, for game artists, by game artists, with the intention to release one issue every few months. However, I was amazed with how many positive responses I received and how many big name artists were willing to contribute that the original magazine idea grew so large that the only way that this could be achieved was to compile all the articles in one giant book.

It is also important to know that all the content created by the artists was done entirely in their own spare time set aside from their jobs and social lives to contribute VERTEX. On top of that, none of artists and contributors asked for any financial compensation for their time and effort spent putting this together and were willing to donate this content to better the game-art community as a whole.

I apologise in advance if you find any errors within the book, whether they are grammatical errors or formatting errors. But bear in mind that some of the content was written by non-native English speaking artists and in some cases the articles themselves weren't originally written in English and required translations as well.

I really hope you enjoy all the content that in the book and we have done the best that we can in such a limited time and with limited resources. However, if you do spot something, please share it with us in the suggestions threads on our forum: http://www.artbypapercut.com/forum/

Finally, I would like to thank the following contributors, supporters, artists, friends and family for making this book possible.

To my wife and kids for being there to support me throughout all of the late nights. Thanks I love you guys!

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Team Bam Bu
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Chris George
Jesse Moody
Marcus Pettersson
Adam Bromell
Taehoon Oh
Ivo Nies
Ben Regimbal
Del Walker
Jonathan Fletcher
Kekai Kotaki
Curt Binder
Sean VanGorder
Chris Holden
Dylan Brady
Brian Poche
Maddy Taylor
Jon Troy Nickel
Cody Bunt
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Without you, VERTEX would have only been a dream and not a reality. I am sorry if I have missed anyone who has helped me along the way who might not be on that list.

If you are interested in being a contributor for future books and/or projects, don't hesitate to contact us as we are always looking to collaborate with talented people.

Ryan Hawkins
Editor
ryan@artbypapercut.com