



Art Directing VFX for Stylized Games

Jeremy Mitchell - Double Fine
Shen-Ming Spurgeon - Motiga
Bill Kladis - Epic
Bryanna Lindsey - Volition



Microtalks!

- Real world examples from 4 projects covering a broad range of visual styles, each with their own techniques and subjects.
- 4 Speakers
- 11 minutes each
- Time at the end for questions.





Motivations

- VFX teams can be short staffed with an enormous scope of content to build.
- VFX often left to self-direct. Detailed concept art is rare.
- Games with a more realistic visual style have their own unique challenges, but the artistic path to success is often clear.





Introductions

Jeremy Mitchell - Double Fine

Shen-Ming Spurgeon - Motiga

Bill Kladis - Epic

Bryanna Lindsey - Volition



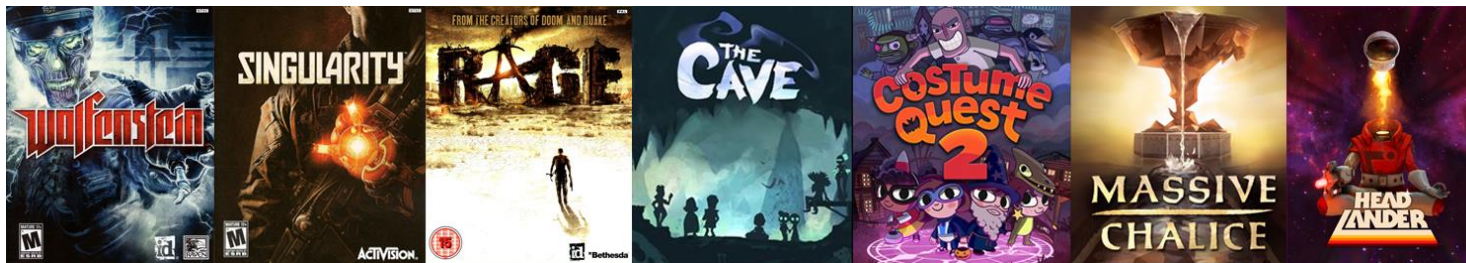


Jeremy Mitchell - Double Fine

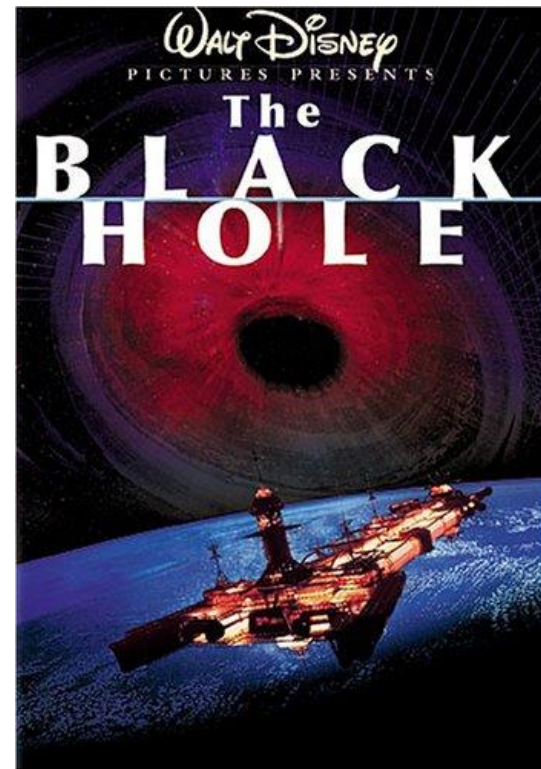
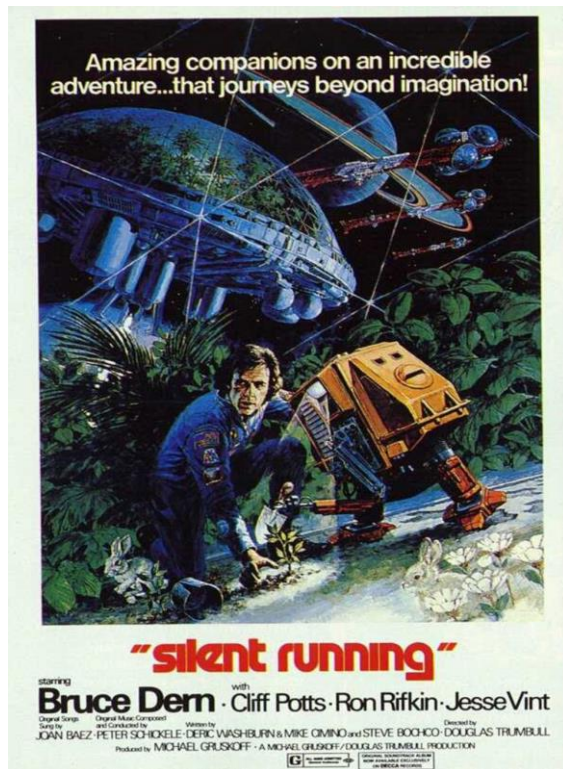


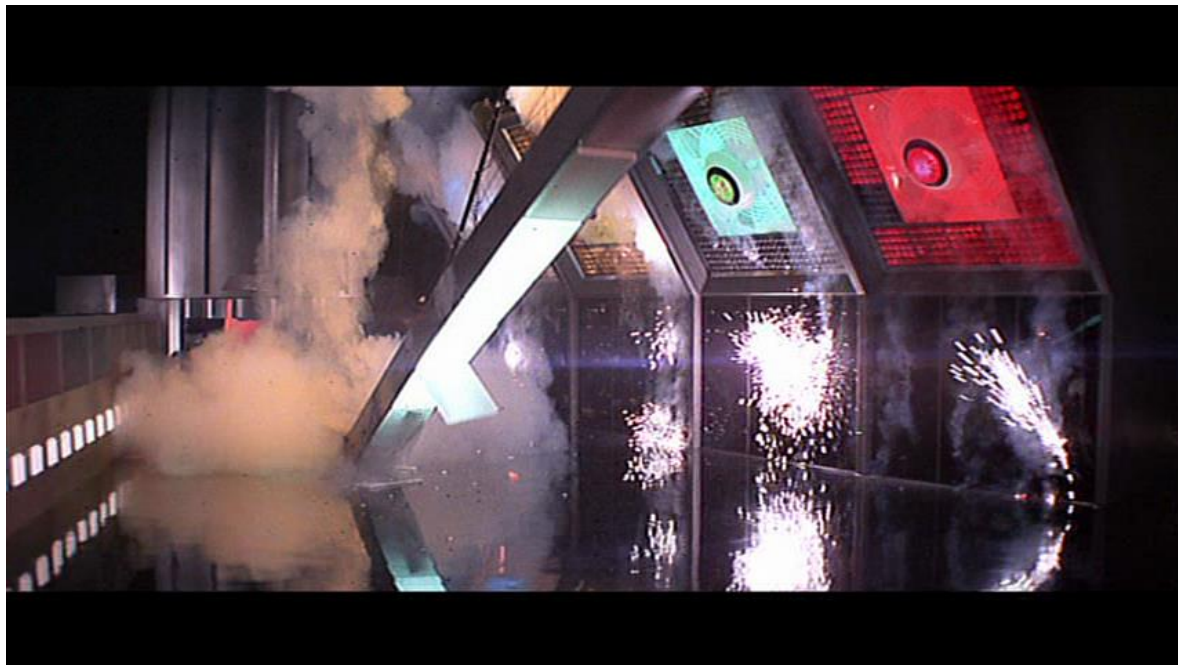
Jeremy Mitchell Senior VFX Artist Double Fine Productions

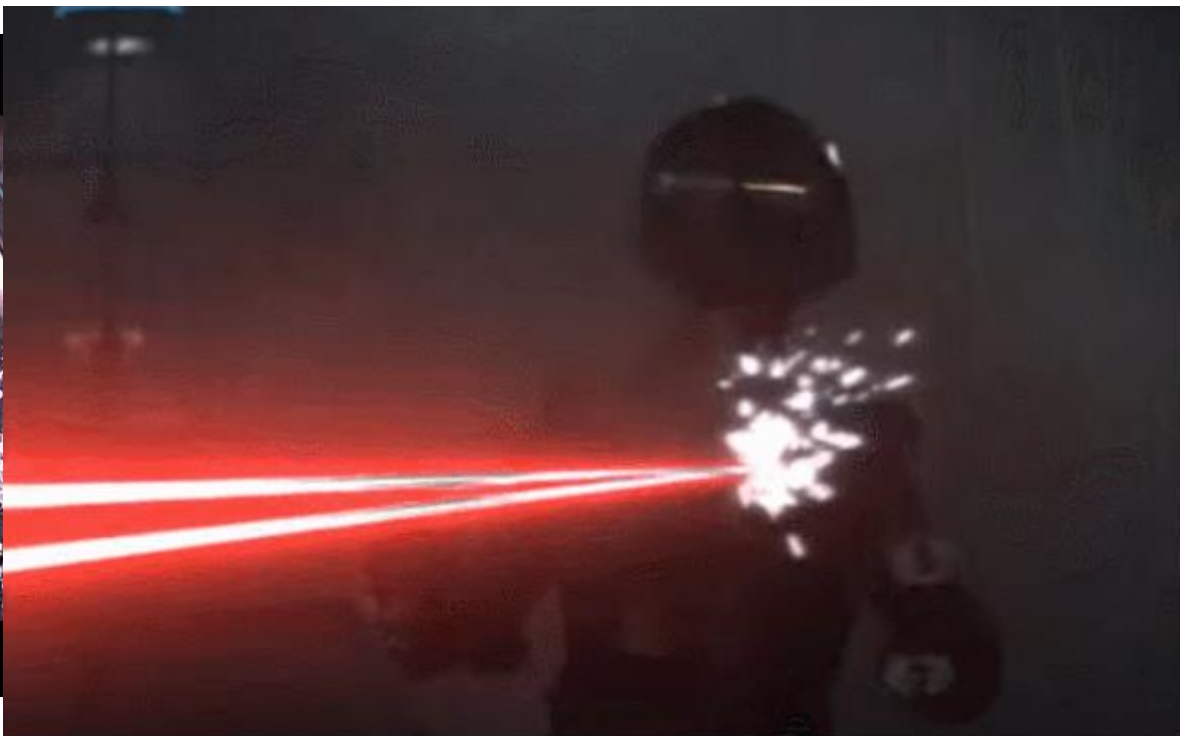
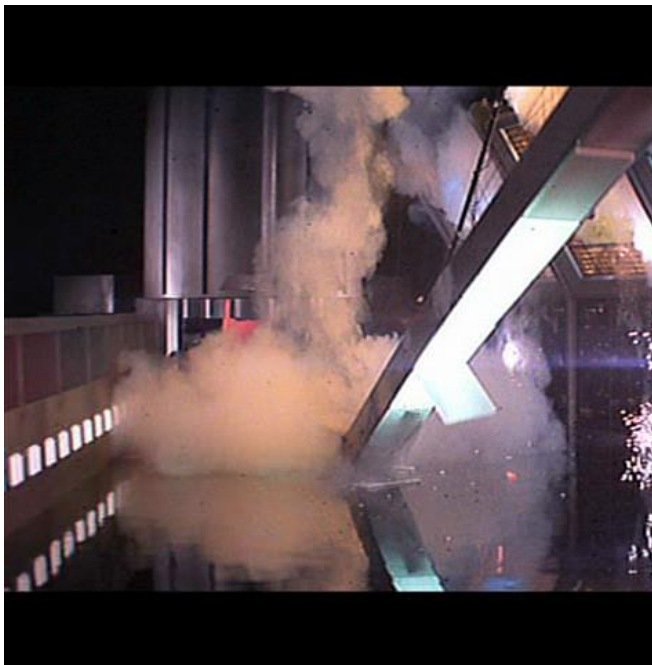
- Making VFX for games for 10 years
- Double Fine, id, Raven





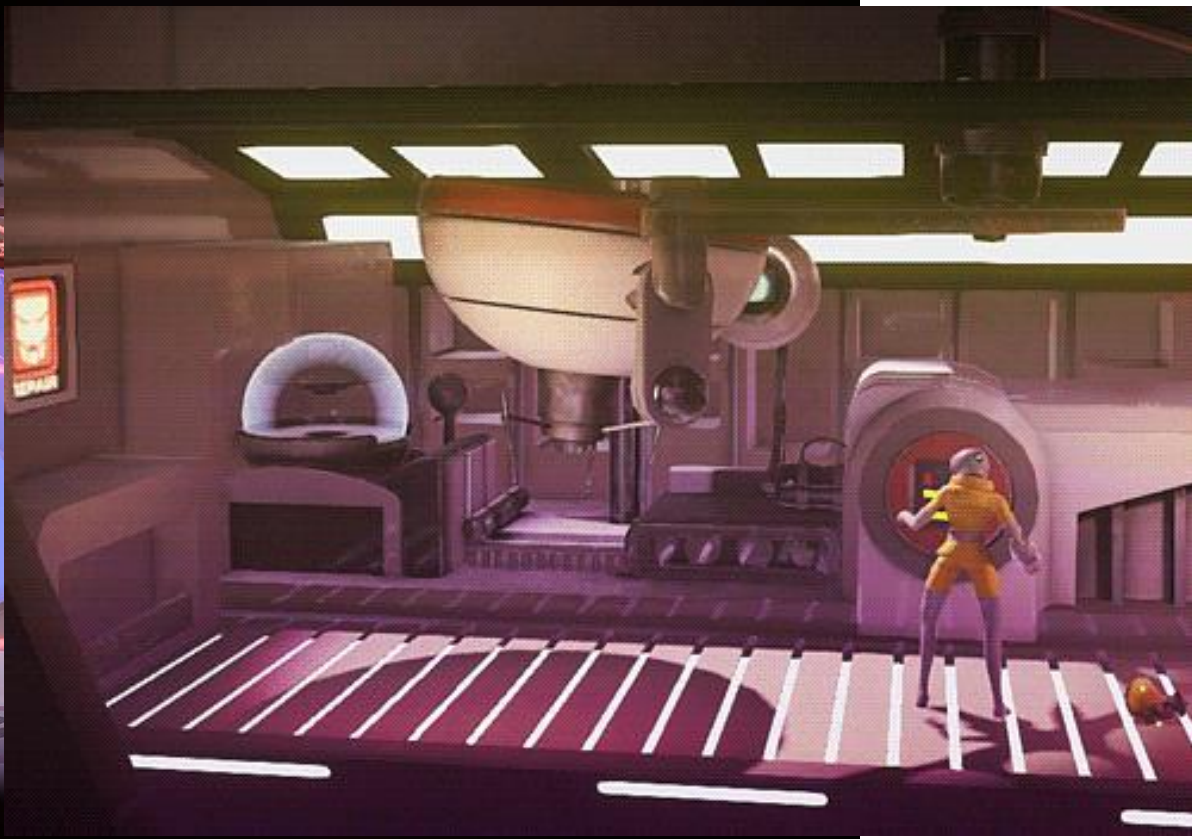


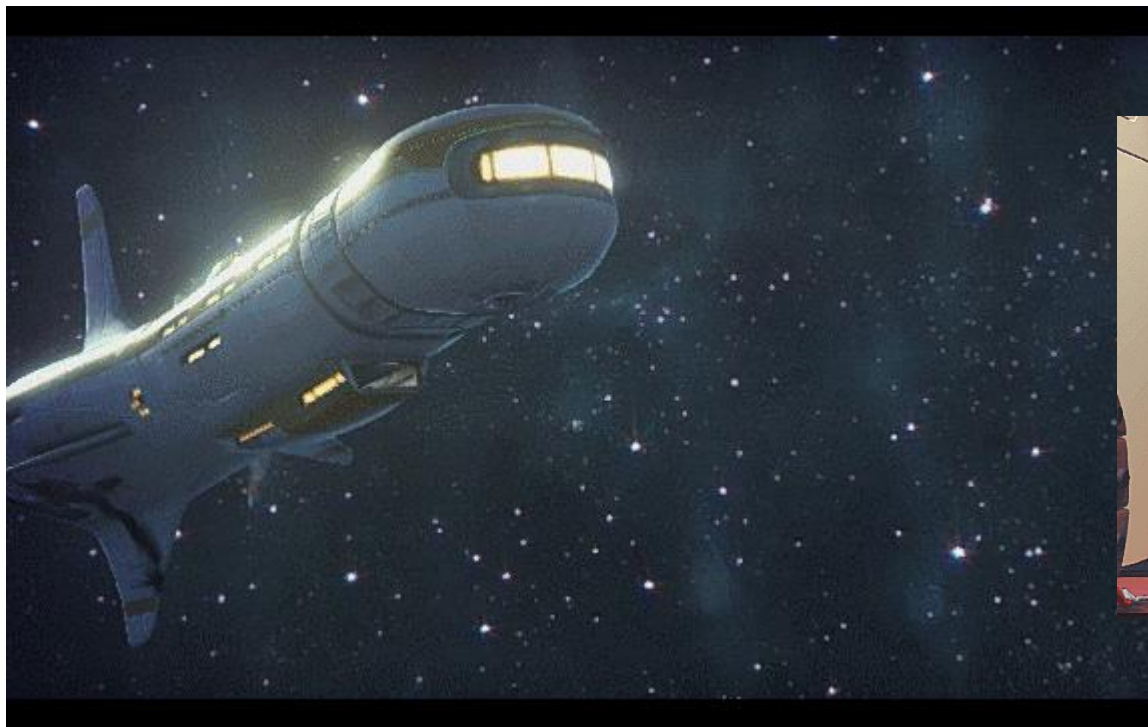












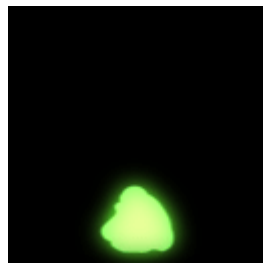
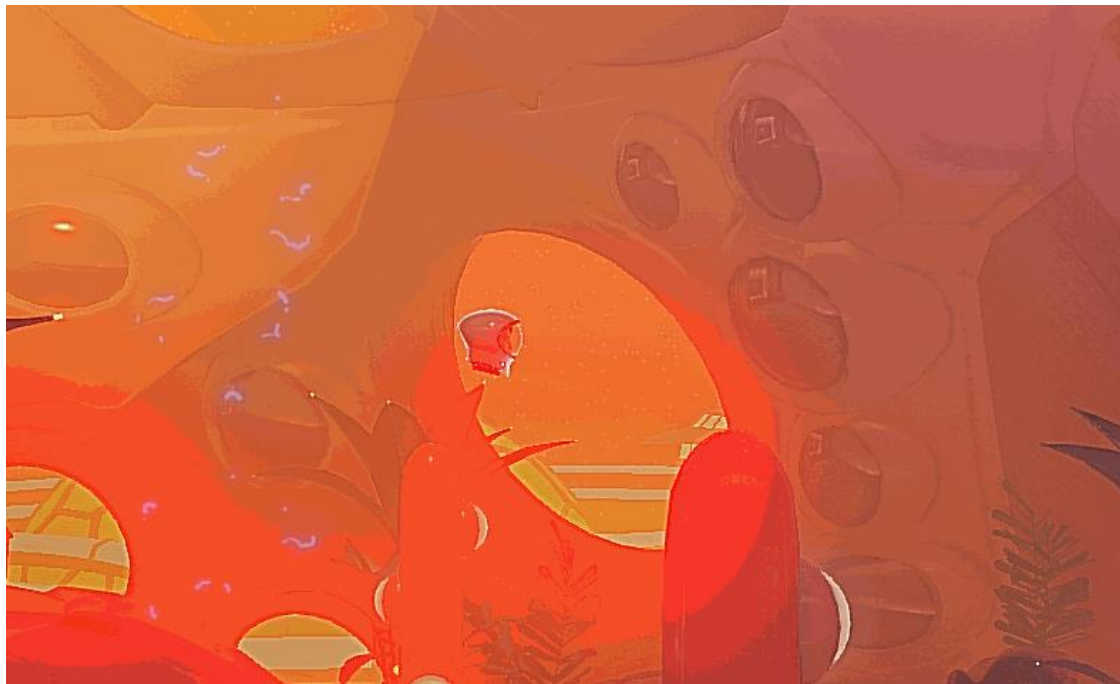
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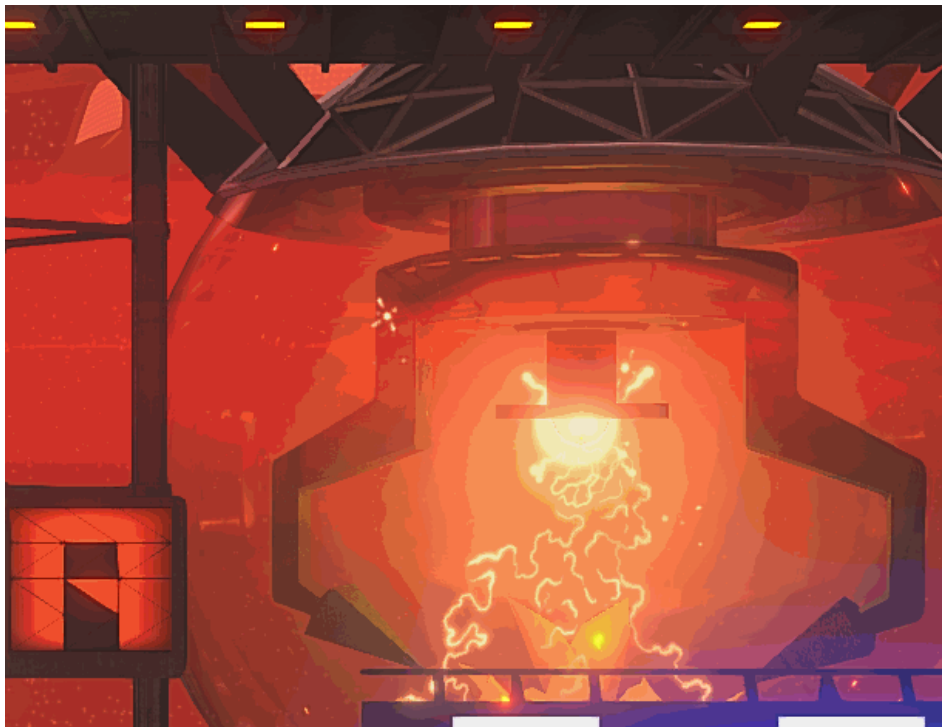


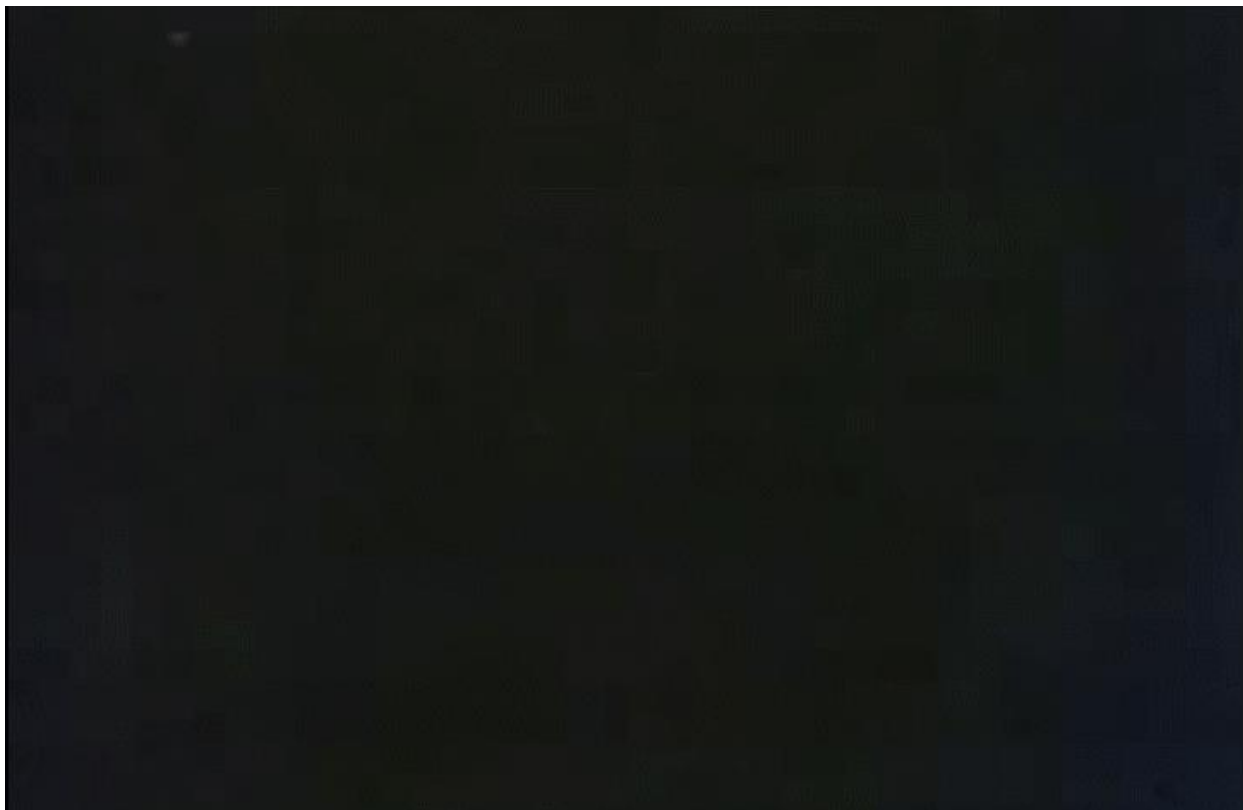


BAD ANIMATION

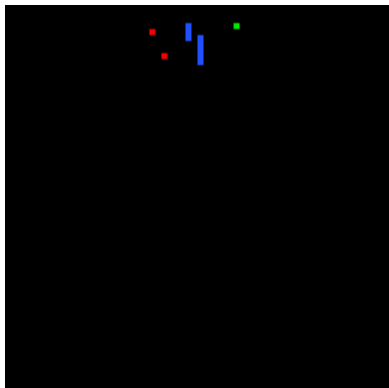








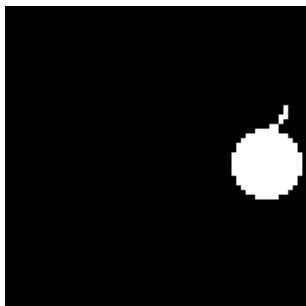
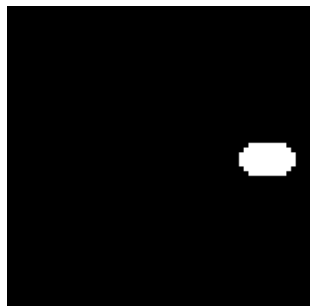






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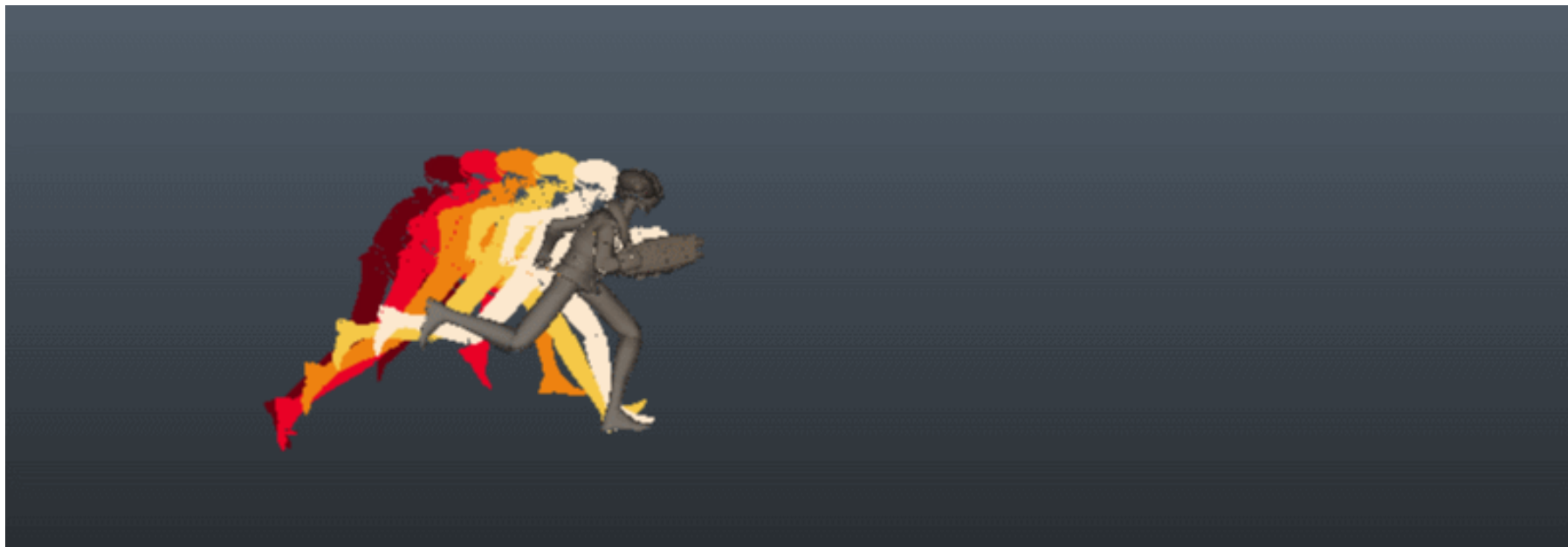




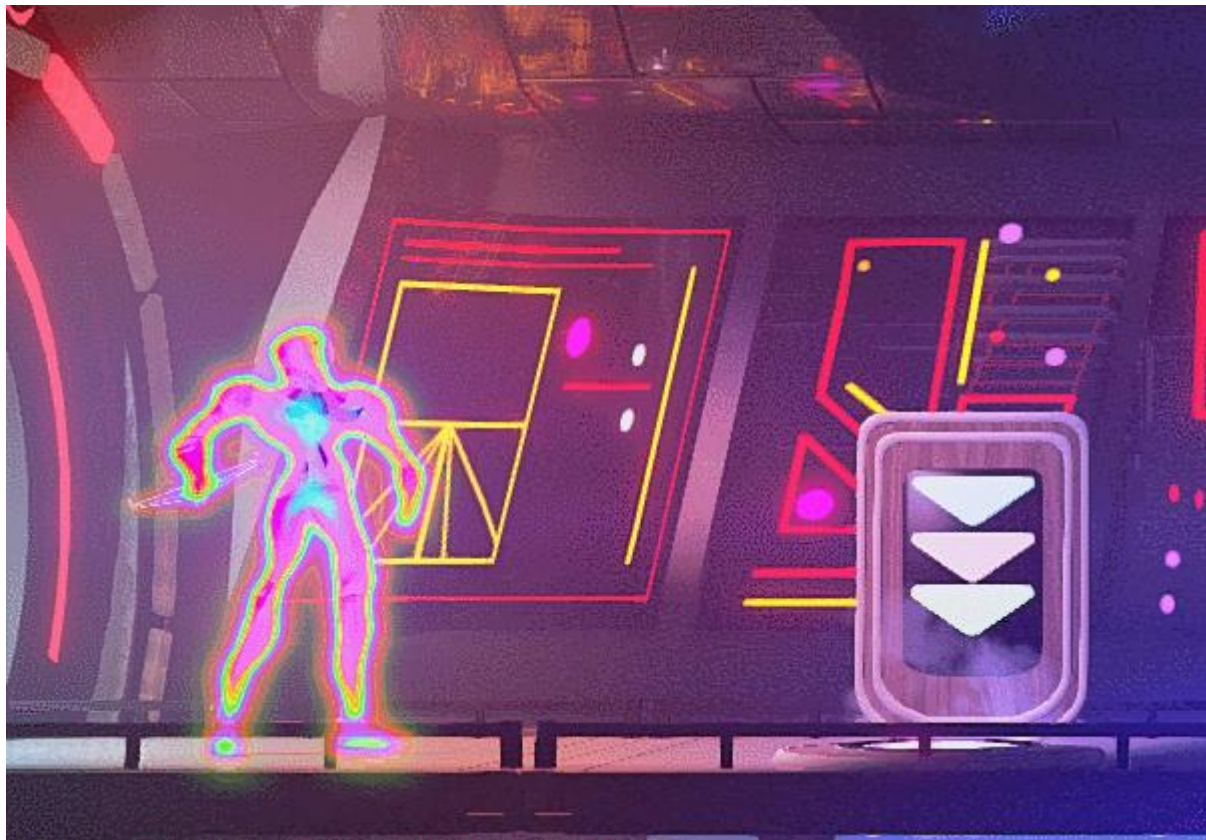
Screen Space Effects

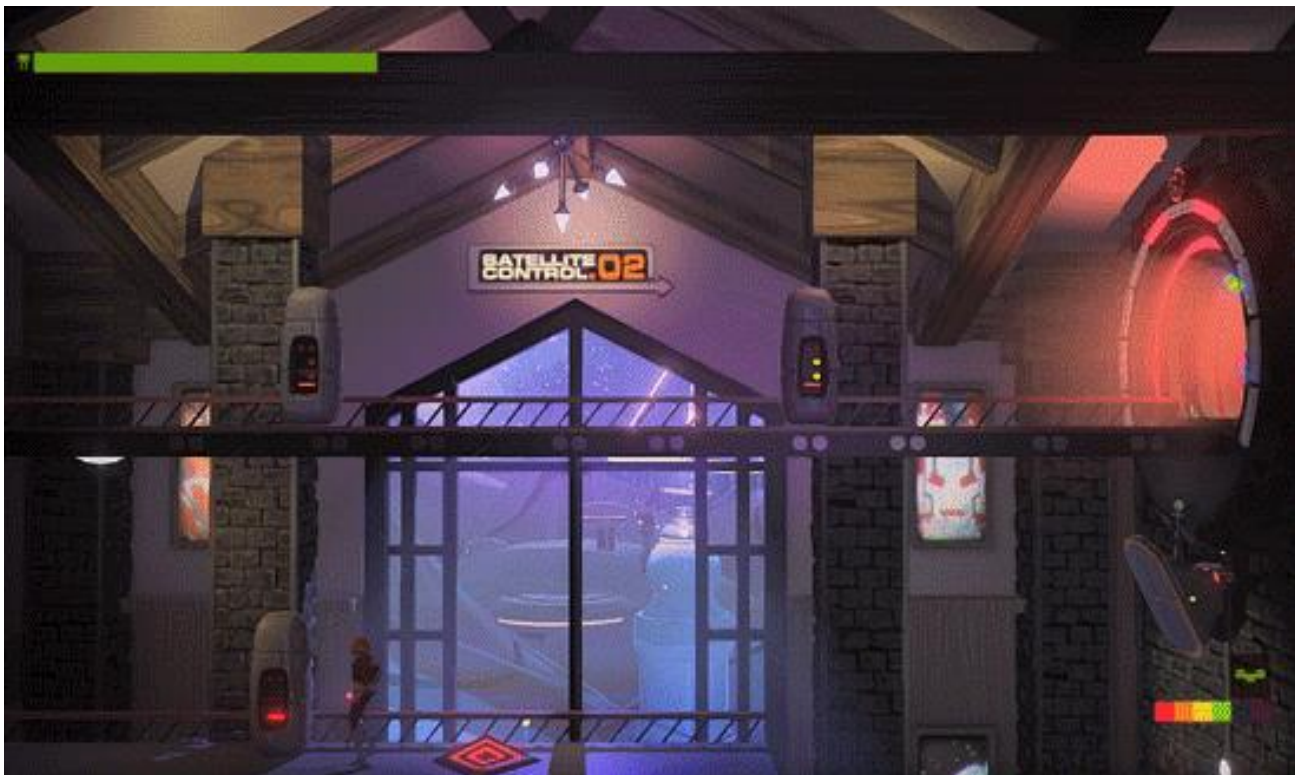


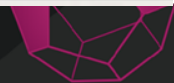
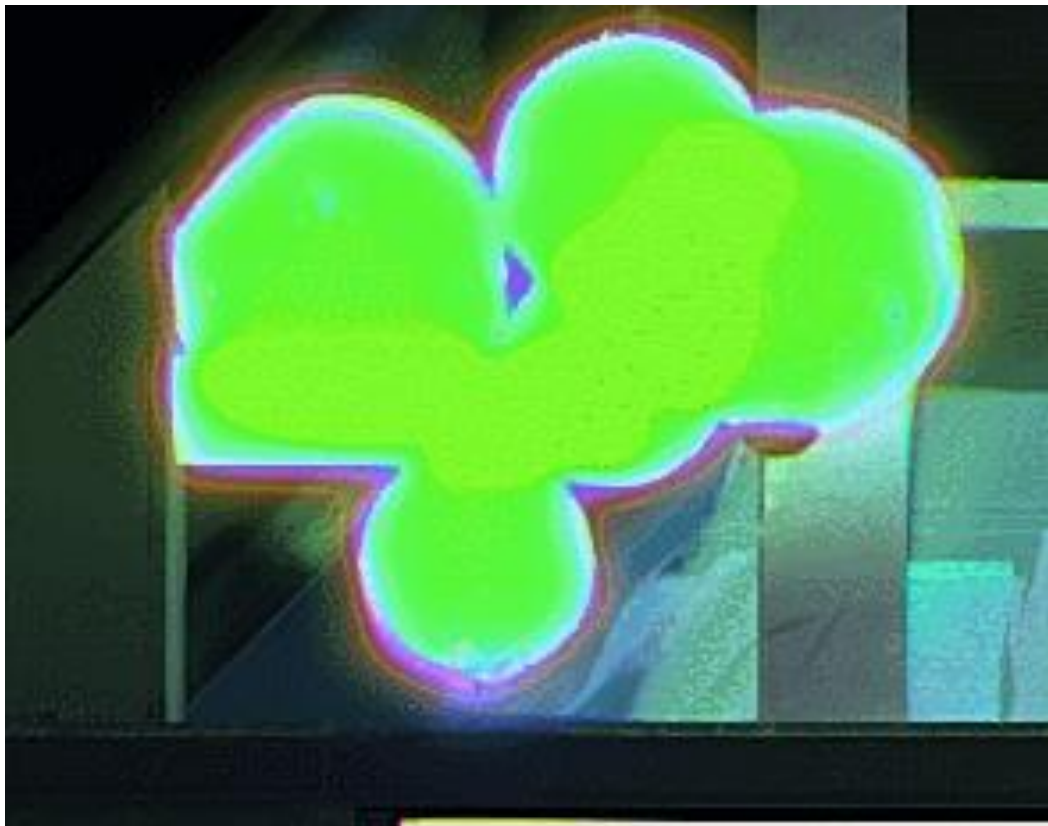


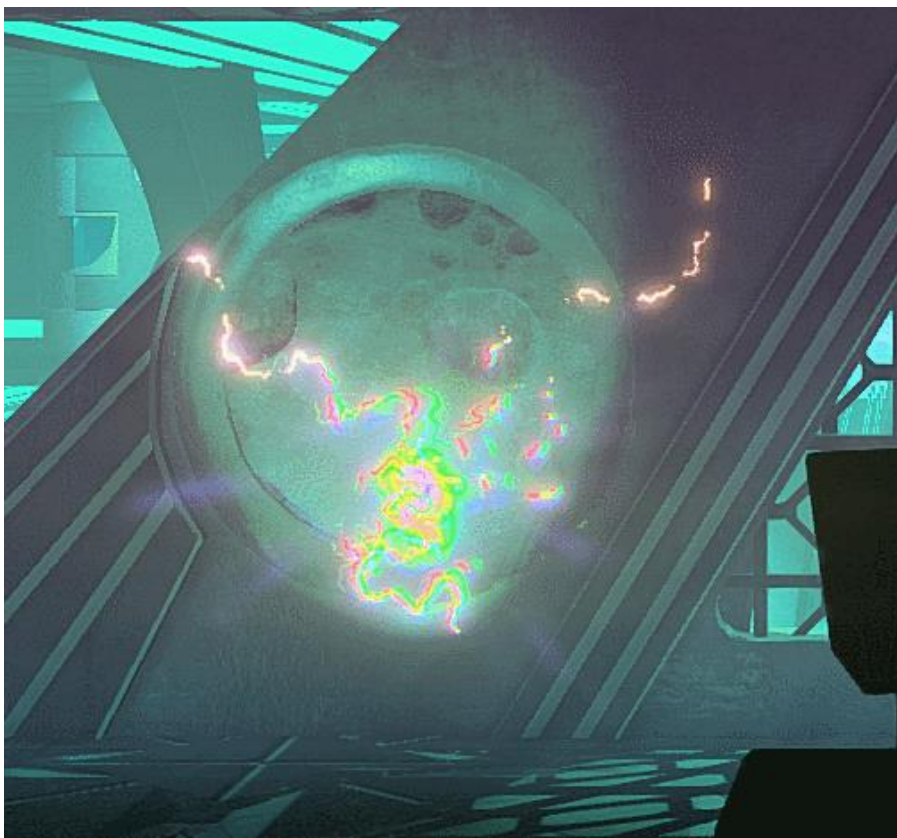


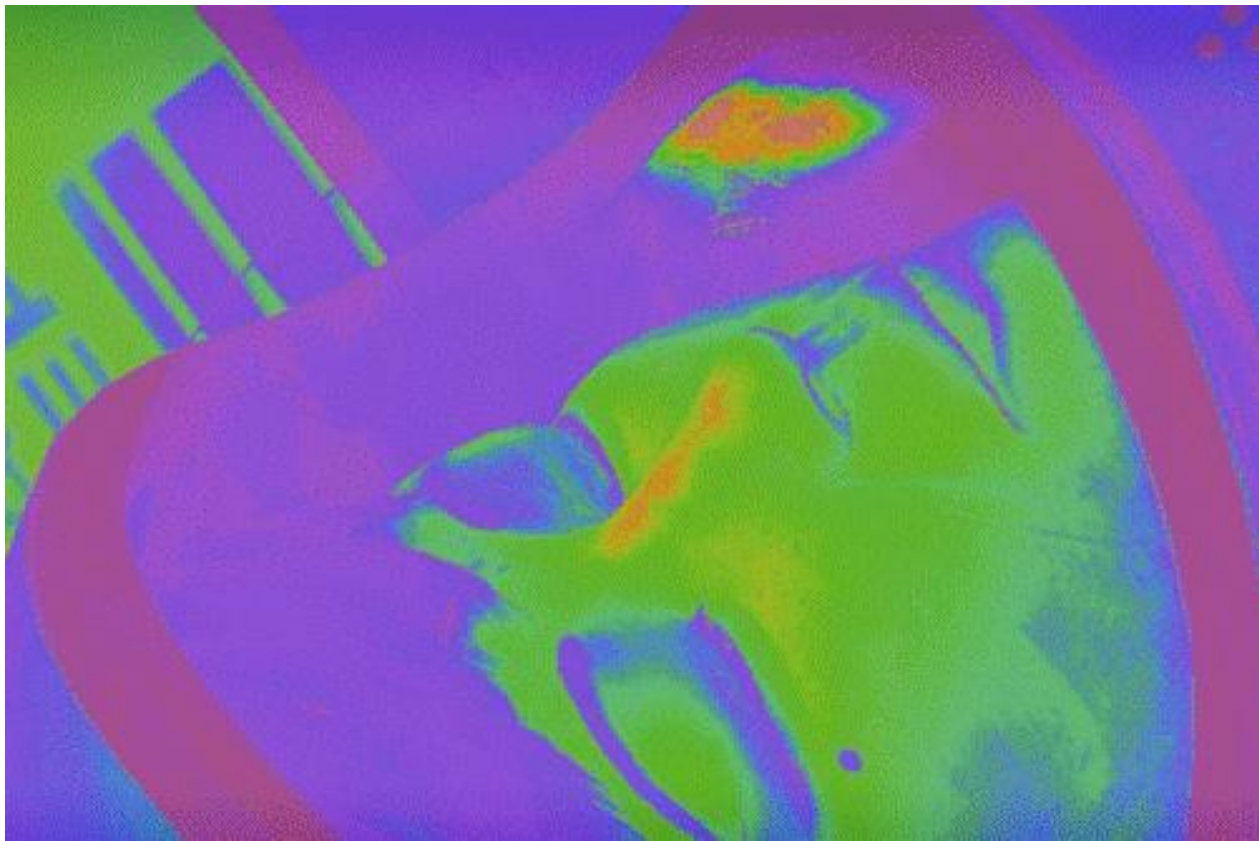














Final thoughts





Art Directing VFX for Stylized Games

Shen-Ming Spurgeon
Senior FX Artist, Motiga, Inc.



GIGANTIC™

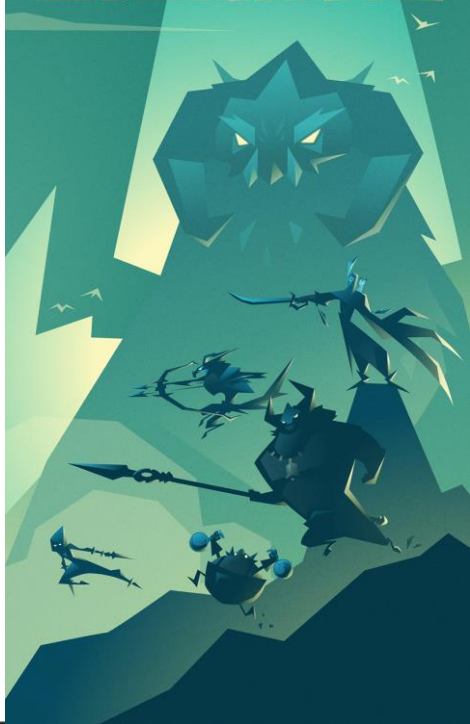


What is Gigantic?

A MOBA and third-person shooter with 5-on-5
PvP action

- CHOOSE from a huge roster of unique heroes with fantastical weapons and abilities
- FIGHT against enemy teams, summoning incredible creatures to combat the foe
- POWER UP your Guardian before your enemy does
- GO GIGANTIC with your fully powered Guardian to ensure victory

GIGANTIC™



PERSONALITY

REALISM



GiGANTIC

HK-206



1) Shapes

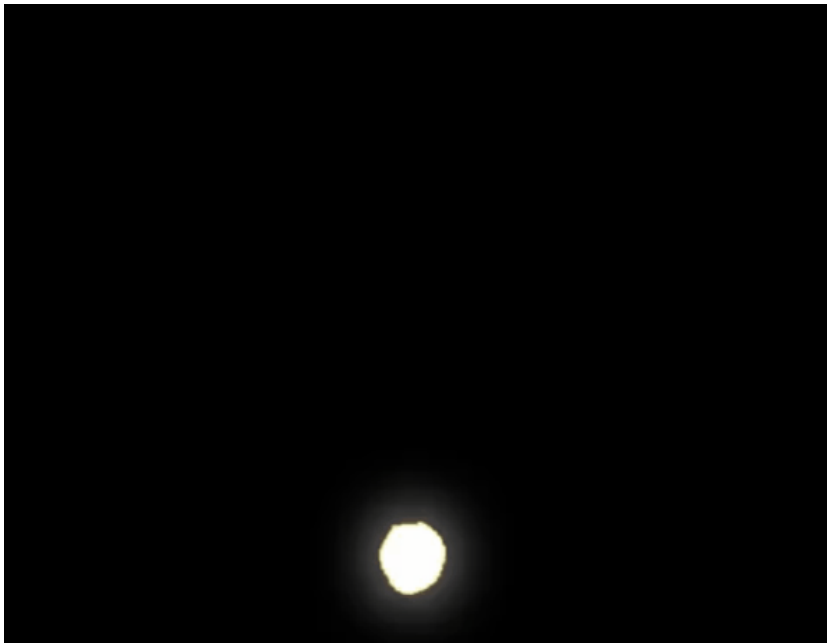
2) Anatomy



GiGANTic

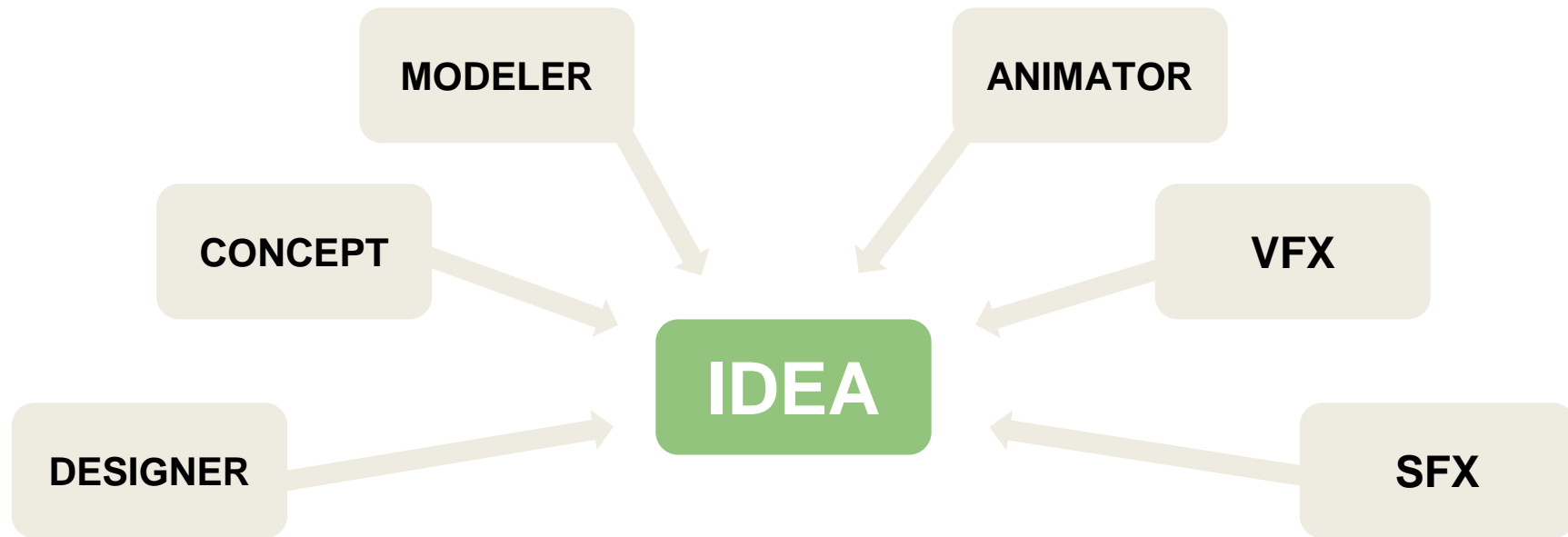
Uncle Sven







Art Loop



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PROCESS



Beckett

- Professional Adventurer
- Former test pilot
- Makes her own equipment

Armed with...

- Machine Pistols
- Cannon
- Grenade
- Jetpack





Explorataion

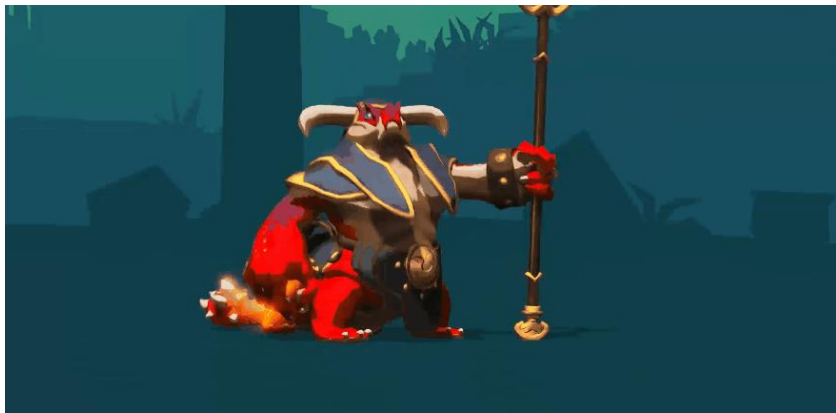
- Personality?
- Attitude?
- Plays well with others?





Exploratory Goals (vs. Designers)

What kind of weapons do they have?





HK-206



Beckett





Exploration

- Who is this character?
- What does the weapon do?
- What is the unique visual language for them?



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GOALS & RESTRICTIONS



Gigantic FX Tools



AUTODESK®
3DS MAX®

RayFire





FX Goals

- Create a hybrid stylized visual effect
- Needs to be observed from 360°
- Ensure that the visuals fit the character
- Visuals should not take away from gameplay





FX Goals

A personal goal: Creating an effect that I want to see over and over again





Restrictions

- Should not be solely sprites
- Can work on uneven terrain
- Performance
 - Potential for two Becketts in a game
 - Meshes are expensive



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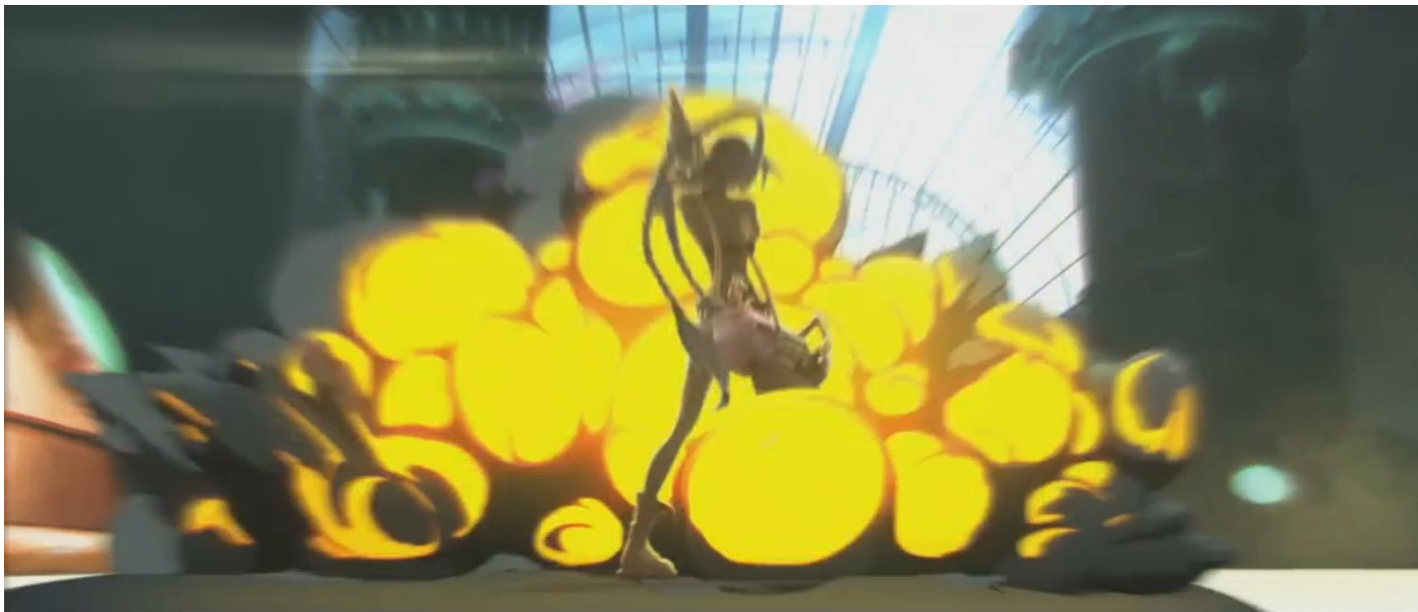
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PROTOTYPE

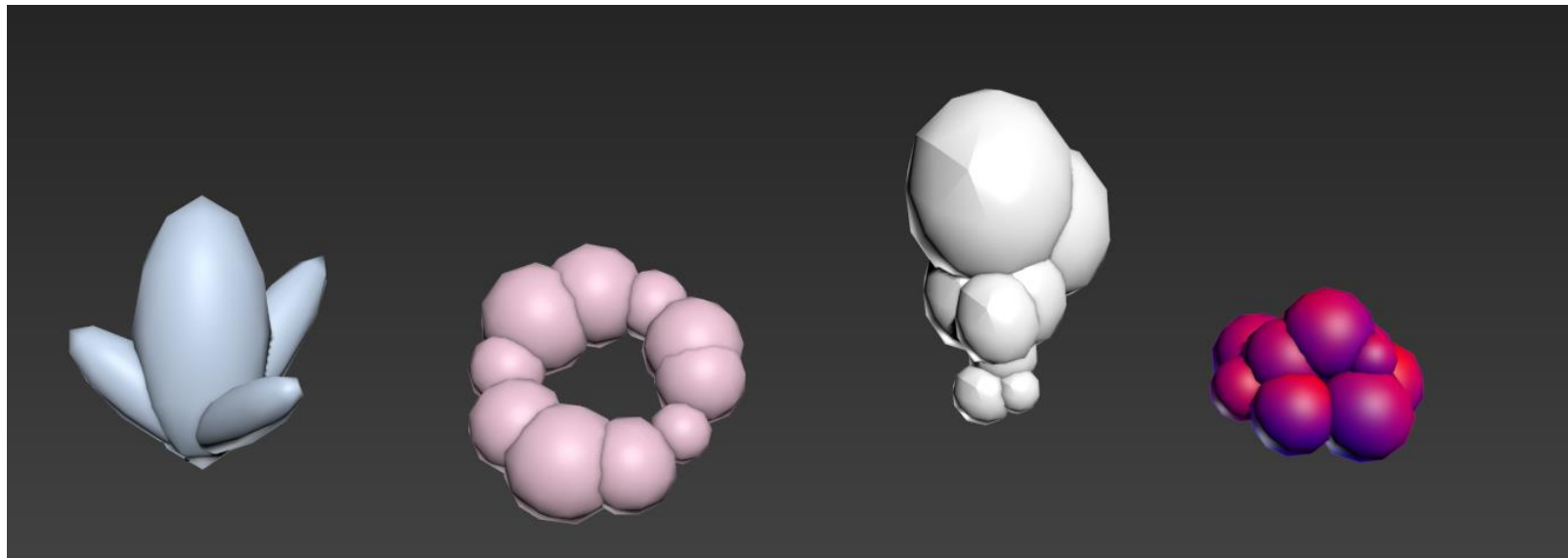


How am I going to turn this into 3D??



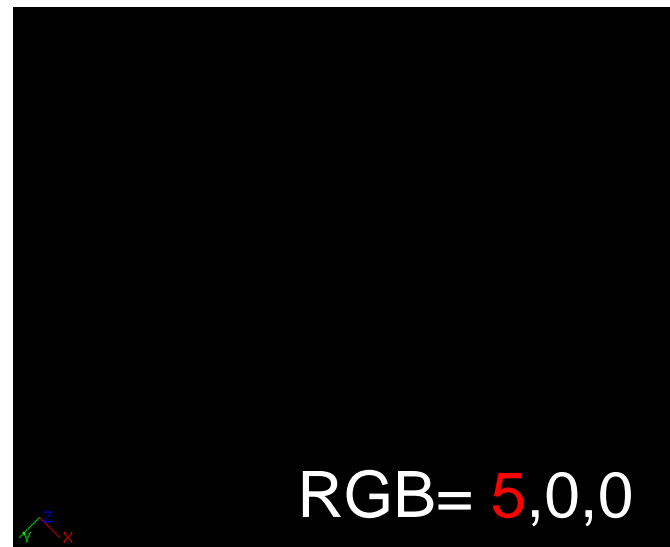
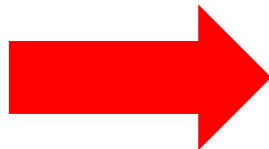
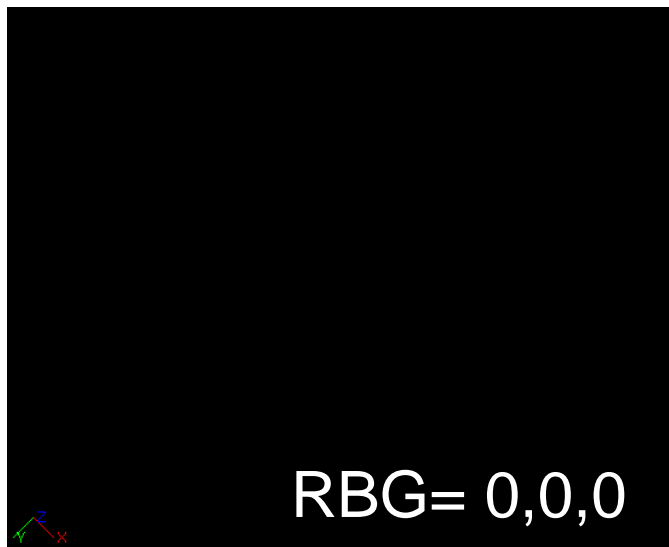


Prototype (Meshes)



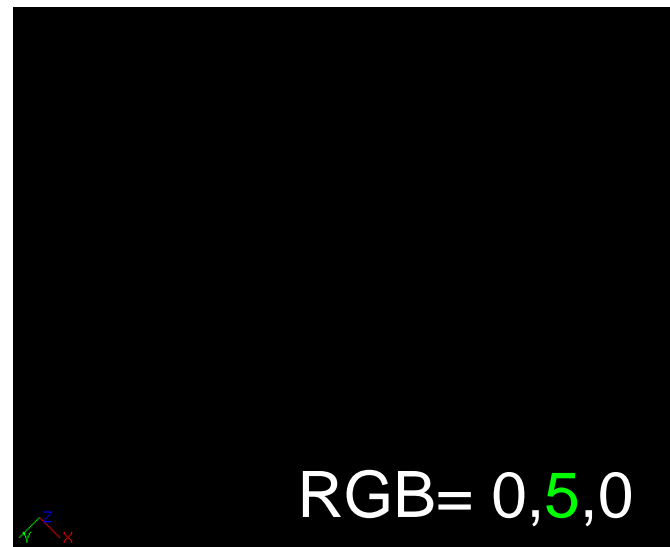
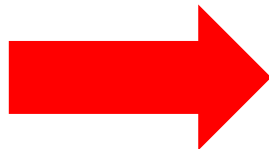
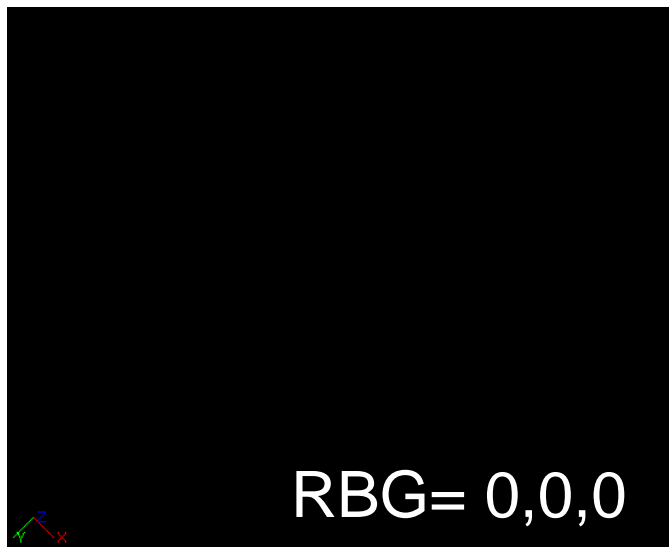


Mesh + Material



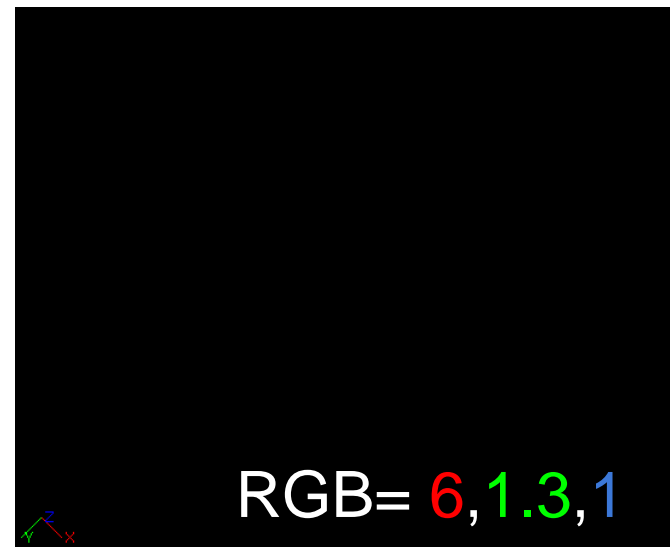
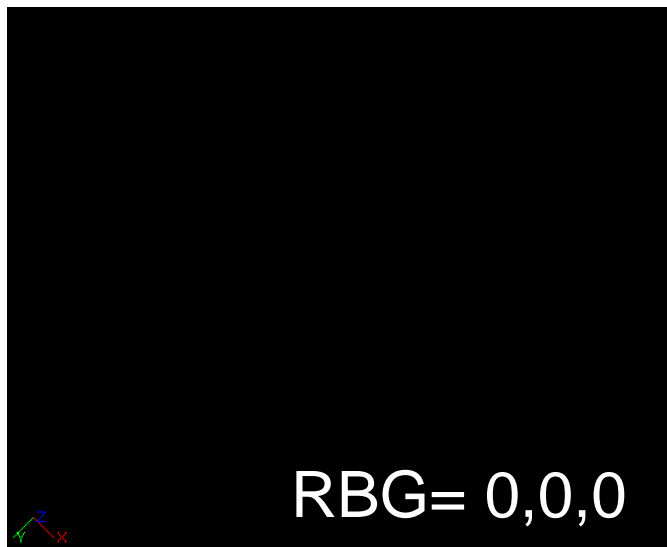


Mesh + Material



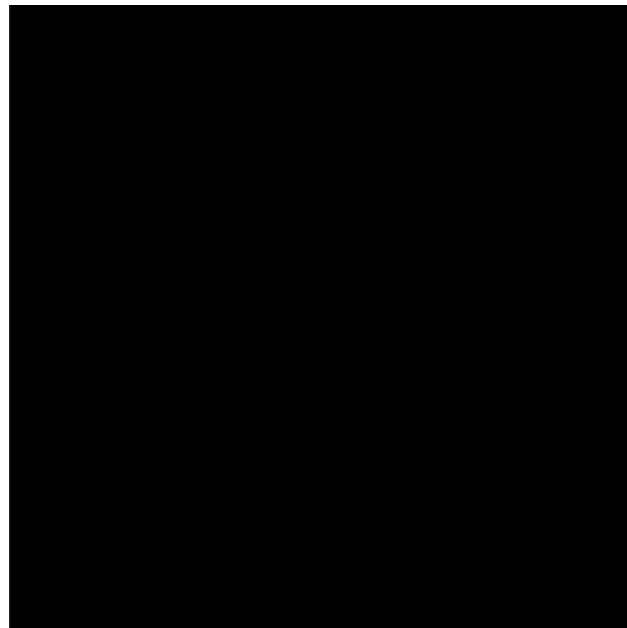
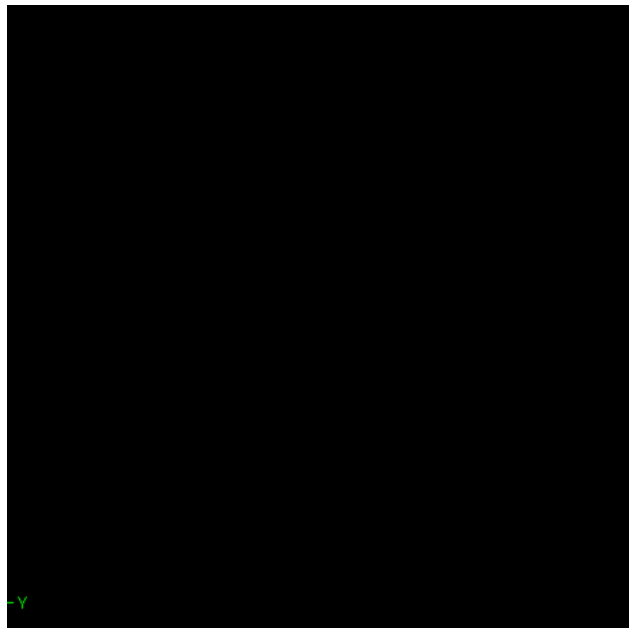


Mesh + Material





Mesh + Material





FINISHED EXAMPLES



Final Asset (Grenade Explosion)









Conclusion

- Establish rules for your stylized VFX
- Break the effect down into simple shapes
- Immerse yourself in as much stylized imagery as possible
- Always get feedback
- Get weird





Art Directing VFX for Stylized Games

Bill Kladis

Senior FX Artist, Epic Games



What is Fortnite?

Team up with other players to build massive forts and defend against hordes of monsters, all while crafting and looting in giant worlds.

EXPLORE – Completely dynamic apocalyptic world.

BUILD – Your fortress with traps and walls to protect.

DEFEND – Against the monsters of the storm.

RESCUE – Save the survivors of the storm.





VFX Art Direction

FORTNITE



Anime



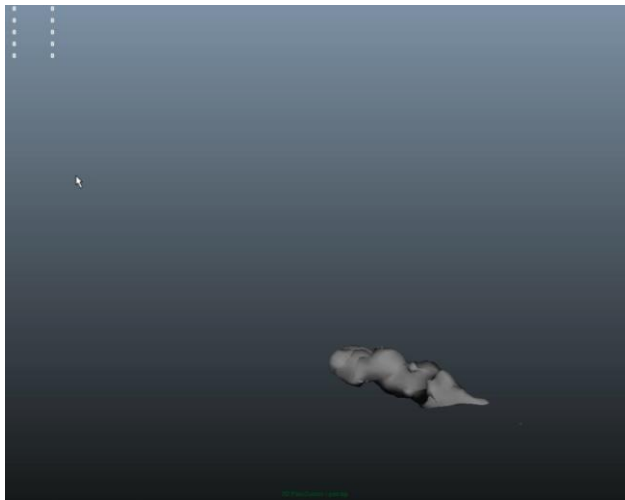
Pixar



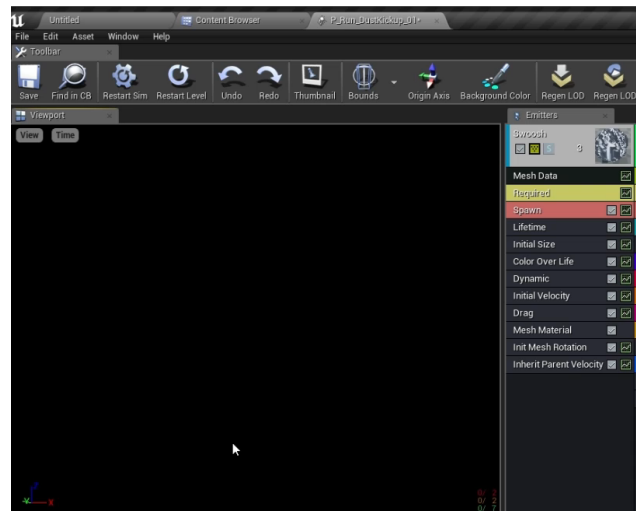




Vertex Animation Tool



Final animated rig in Maya

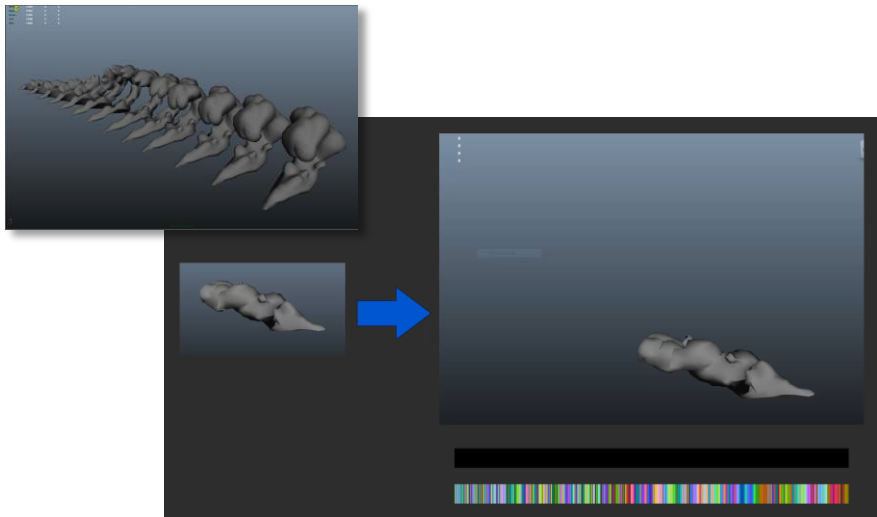


Final effect in engine
Static Mesh used inside of Cascade
Not a skeletal mesh!

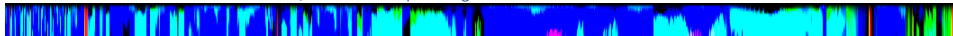




Vertex Animation Tool – Is it Magic?



X axis is # of vertices in the meshes (1,030 in this example image) – Vertex Positions



Y axis is # of frames in the animation (13 in this example image) – Vertex Normals

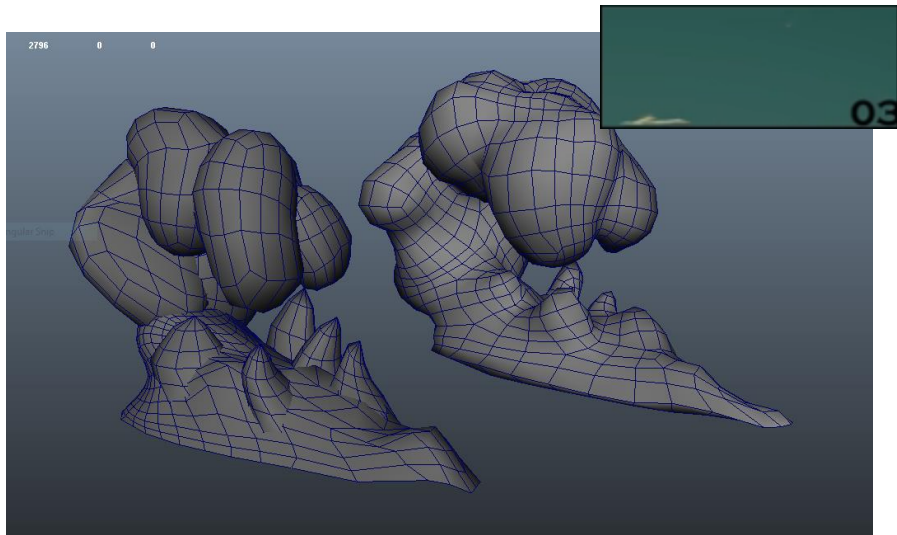


- Created by Jon Lindquist, can be used in 2 methods
- **Method #1** – Texture based (most commonly used in Fortnite)
 - Bakes down vertex positions and vertex normals to 2 uncompressed textures.
 - Uses World Position Offset to move vertices frame by frame.
 - Uses a material function to allow explicit control of time / current frame.
 - + Provides smooth interpolation between frames, so time dilation has a lot of wiggle-room
 - - Limited to 8k texture
 - - Requires 2 texture lookups, memory
 - - Single mesh, topology must remain the same





Vertex Animation Tool - Modeling



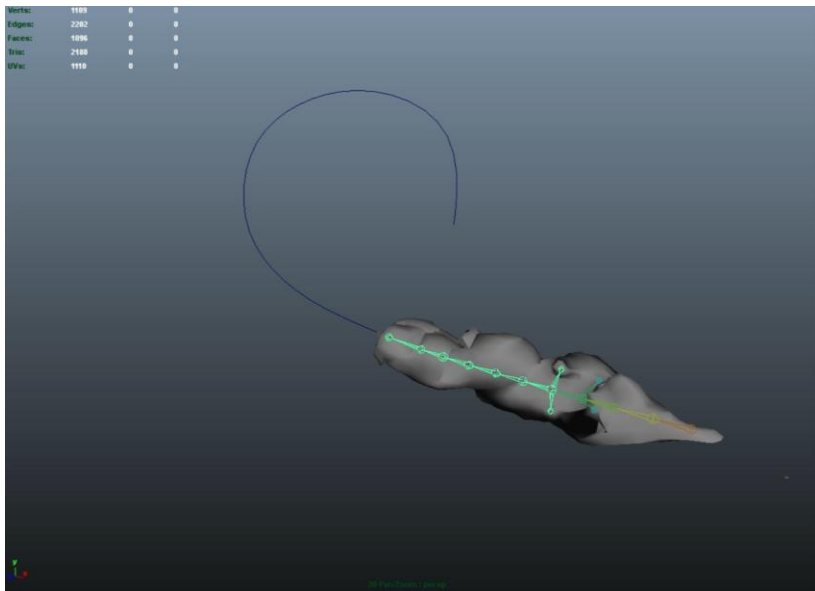
Spheres stretched and warped vs. Zbrush's ZRemesher Output

- Where to start? Working backwards tends to work best
 - Start with the final shape in the animation as your model.
 - Work smart – In this example, I took spheres and deformed them in a hysterically simple way to achieve a rough shape.
 - Then using ZBrush's Dynamesh & ZRemesher, it automatically creates a single manifold mesh with clean topology that's ready to be rigged and animated.
- Final topology on the right is 1,030 vertices.





Vertex Animation Tool – Rig Like It's 2D



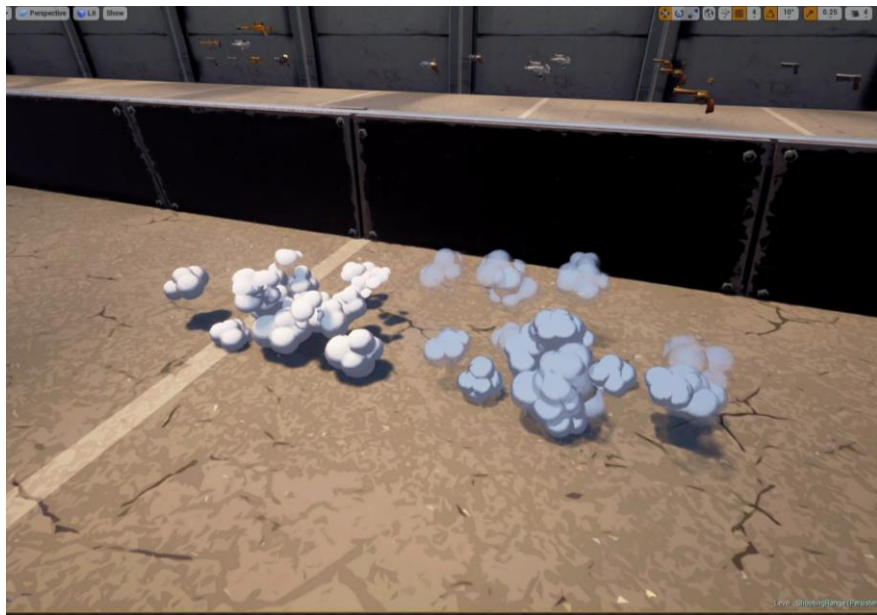
Rigged and animated inside of Maya

- Make rigs that support the intended motion and final shape
 - The end result has a very precise level of movement that would be difficult to attain with a fluid sim.
 - Using joints attached to a spline allowed me to quickly animate along a specific trajectory.
 - Utilize ALL of your tools for movement and motion – Translate, rotate, scale, roll, and twist





Stylized Materials – Masked Blend Mode

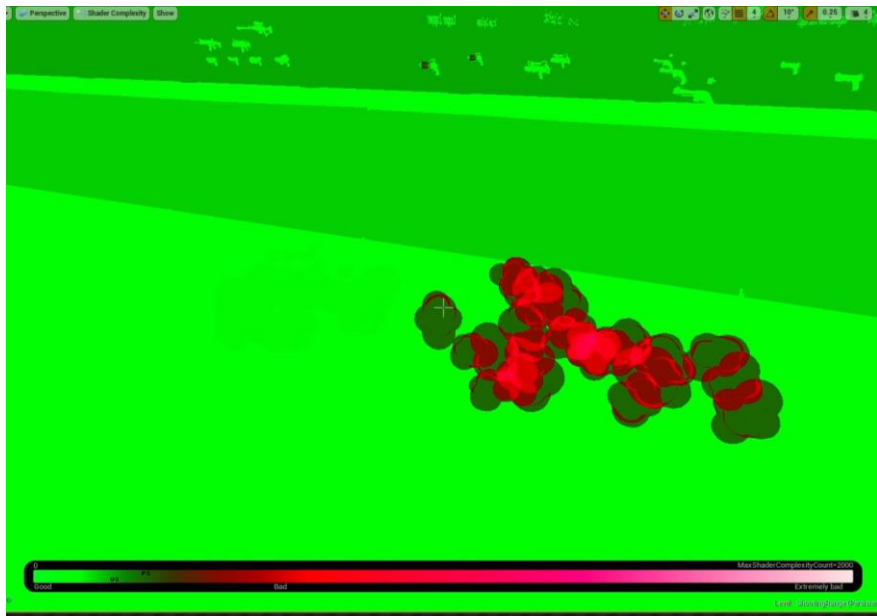


- What material techniques can be used to sell style AND preserve perf?
 - Since we are aiming at stylized smoke (simple shading, 3-colored stepped cell highlights, hard erosion edge), masked materials are an excellent choice
 - Masked material is on the left, lit translucent on the right.





Stylized Materials – Masked Blend Mode



- Deferred Rendering is our friend!
 - Since UE4 is a deferred rendered, overdraw is almost completely eliminated (still must do a 1-bit depth test).
 - The diffuse pass doesn't require to render past the first geometry rendered in a single pixel, so overdraw is (nearly) eliminated.





Stylized Materials – Cell Shading ToD



3-step cell shading highlights influenced by the sun/moon directional vector

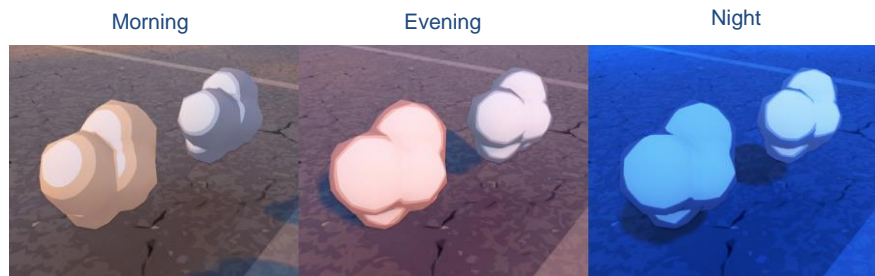
- Light Vector
 - The time of day manager writes key data to a material parameter collection (Time of day, light vector).
 - Now just dot between the vertex normal and this light vector, and the shading follows the sun/moon.
 - LERP between this and a standard fresnel (0.55), and you get a softer mix that tends to face the camera (mostly), but still accounts for the light vector . . . to an extent.



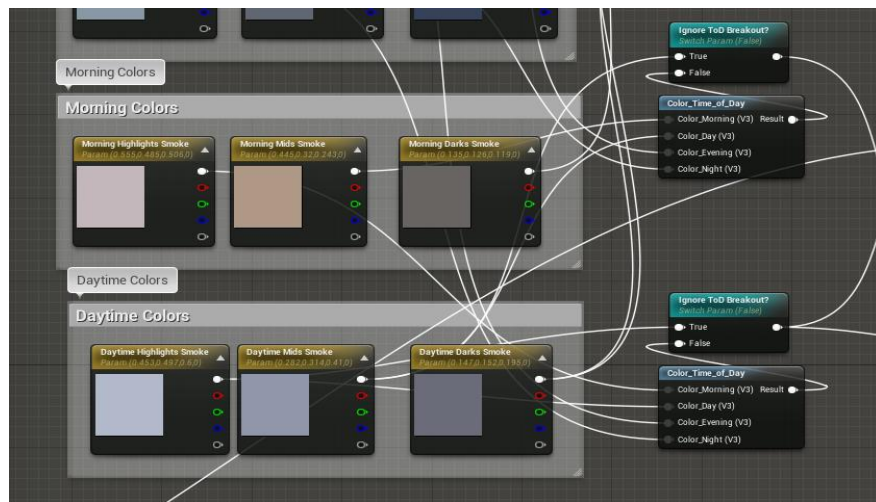


Stylized Materials – Cell Shading ToD

- Current Time
 - Now takes this day-phase RGBA value, and multiplies it against the input for each major part of the day.



3-step cell shading highlights - Colors are explicitly defined by artists (left) vs. colors that stay constant throughout day/night cycle (right)





Stylized Materials – Fresnel Erosion



- How do we get a masked material to disappear neatly?
 - Remember masked materials have 1-bit opacity
 - Since we're stylized, let's capitalize on it.
 - Use standard fresnel ($\text{vertex normal} \cdot \text{camera vector}$) and bias against this into our opacity mask.
 - Just animate from 1 to -1 to erode away.







Stylized Materials – Explosions

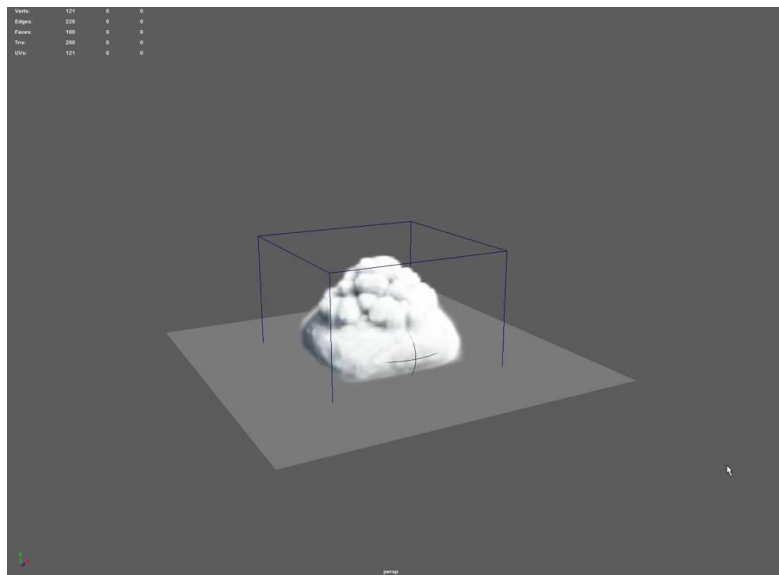


- How can we get even MORE use out of our material and meshes?
- **EXPLOSIONS!**
 - The master smoke material in Fortnite has a static switch to enable heat for explosions.
 - Enables a transition from heat to density with a dynamic parameter.
 - The same techniques can be applied for secondary transitions (ie heat to density)
 - Take our Fresnel, invert, then round to achieve a hard edged transition.
 - Same 3 color cell shading going directly into emissive (artist derived “light vector”).





Stylized Materials – Explosions & Sim

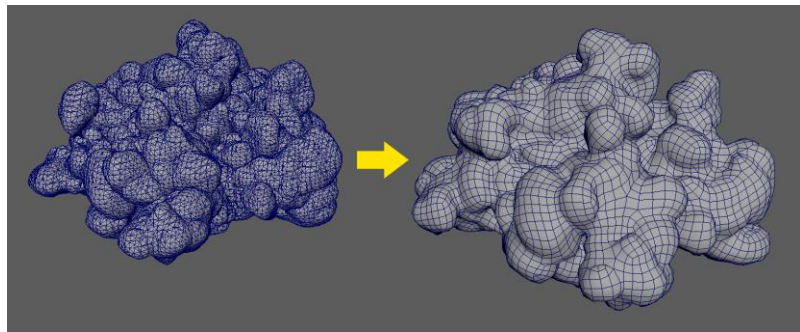


- Explosions in real life are complex, have lots of movement, undulation, eddies, etc.
- We can go past hand-animated assets and dive into more realistic motion and movement using fluid sims and the vertex animation tool.
- We can capitalize on our existing smoke and explosion style that has been established in this presentation thus far (continuous volumes, fresnel erosion, retopologizing)



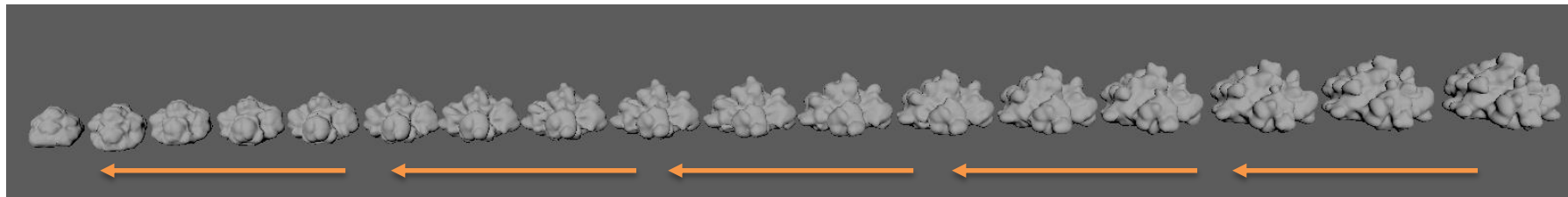


Stylized Explosion – Cleanup Time



Baked Mesh vs. Retopologized Mesh
31k verts vs 7.1k verts

- Convert fluid sim to mesh
- Take the final frame from the fluid sim as our starting point
- Retopologize in zBrush
 - - Detail loss (accidental +, smoothed out surface works well with stylized FX / cel shaded material)
- Now working backwards from the last frame, shrink wrap to the previous frame
 - - Cannot be completely automated, requires cleanup by hand



20 Frames used from original sim of ~50



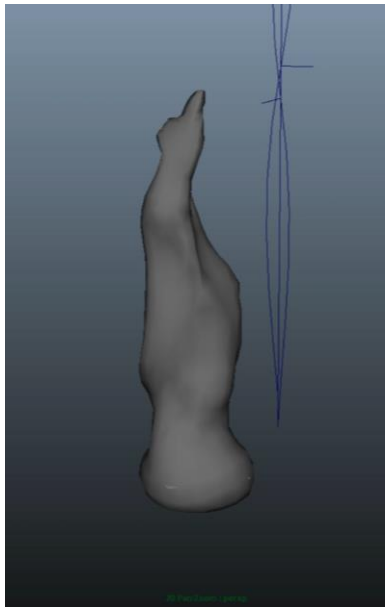


Explosion – End Results





Vertex Animation Tool



- **Method #2** – Model-sequence

- Takes a series of models and “flips” through them, frame by frame via UVs:
 - + Doesn't require matching topology between frames, good for complex shapes.
 - + No textures, less complex material function.
 - - Large mesh asset size.
 - - No interpolation between frames, bad for time dilation.
 - - Difficult to UV.







Thank You

Fortnite

Matt Hancy
Maury Mountain
Pete Ellis
Jonathan Lindquist
Bob Tellez
John Abercrombie
Vitaliy Naymushin
Jonathan Hau-Yoon
Fred Kimberly
Phil Cole
David Hunt
Kendal Tucker
Brian Campell
Kevin Vasse
Zak Phelps

• Epic Games

- Simon Tovey
- Ryan Brucks
- Olaf Piesche
- Tim Elek
- James Kincaid
- Canon Pence
- Tim Sweeney





Agents of Mayhem

Bryanna Lindsey

Senior FX Artist, DS Volition



volition



Bryanna Lindsey
Senior VFX artist
DS Volition





What is “Agents of Mayhem”?

- 80s cartoon nostalgia!
- Problem: how do we make “2D effects” for a 3D world?

AGENTS OF MAYHEM







Simplified





Vibrant,





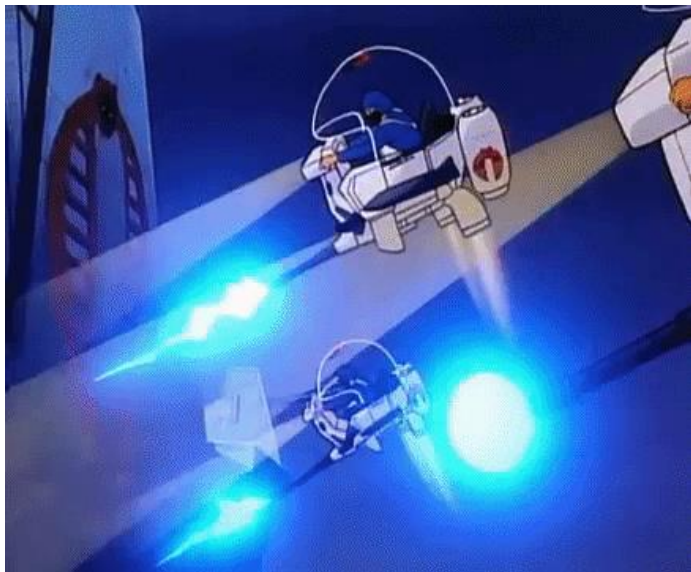
Theatrical!







What do "80s cartoons" look like?



"GI Joe"





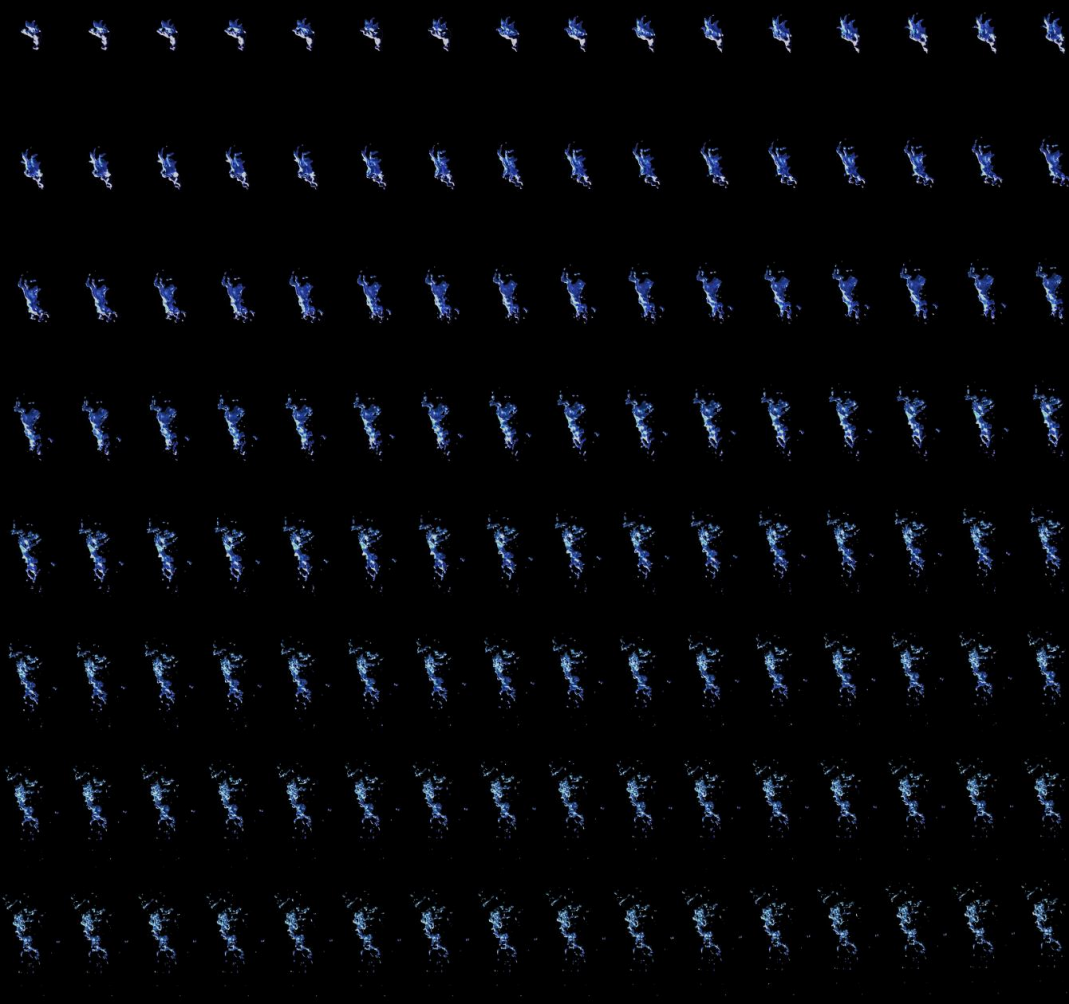
Simplified

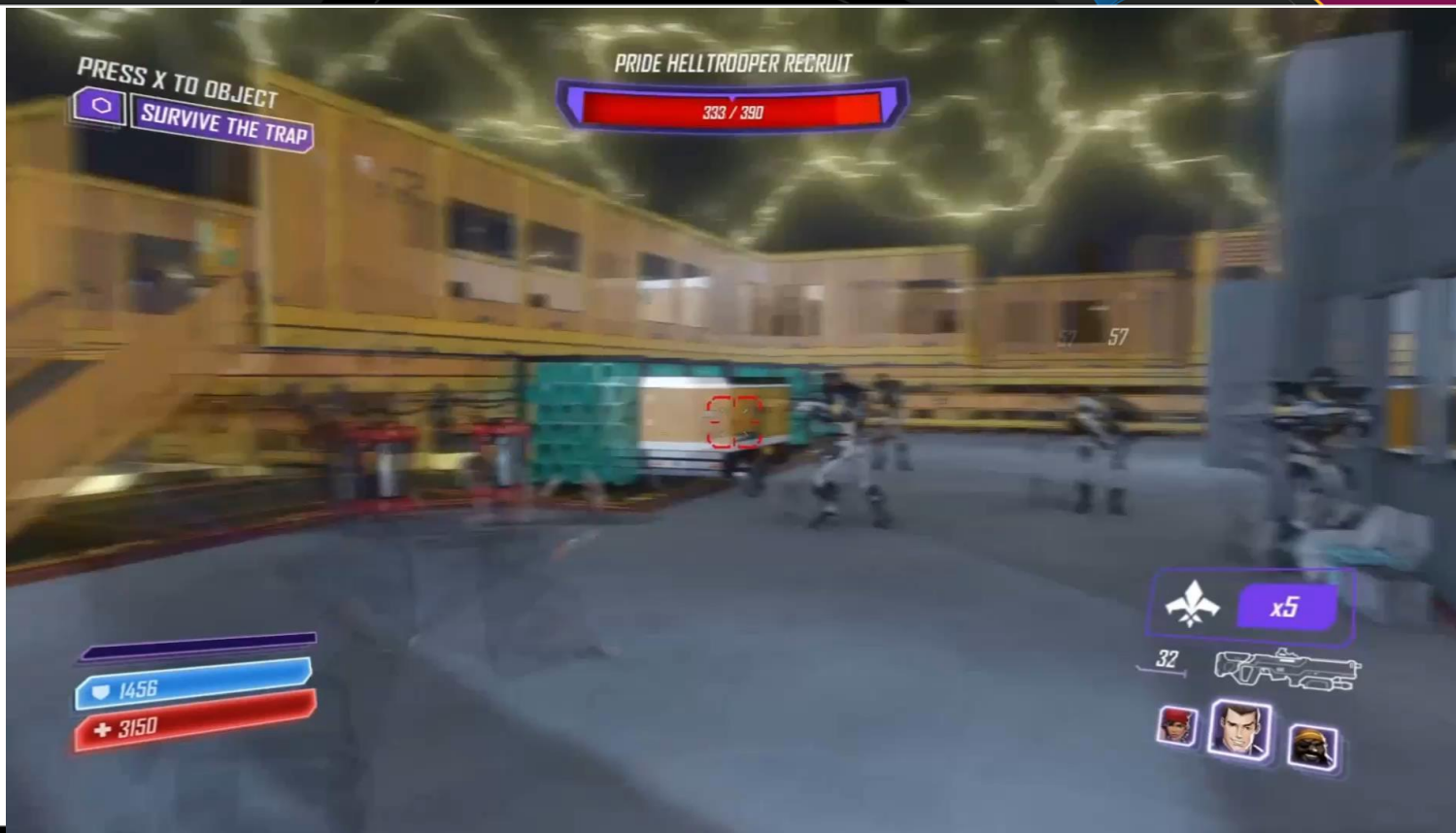
- Blood.
- Problem: How do you simplify blood and make it fit into your stylized, “80s cartoon” universe, when blood is usually absent from 80s cartoons?



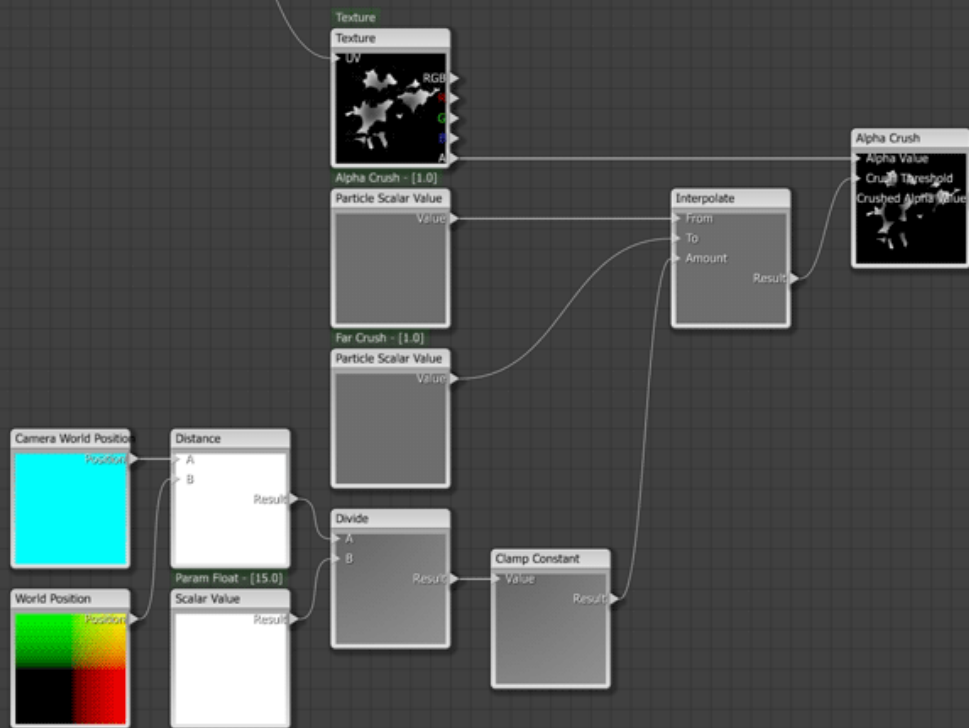


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Vibrant in classic 80s cartoons



"Silverhawk"



"Galaxy Rangers"

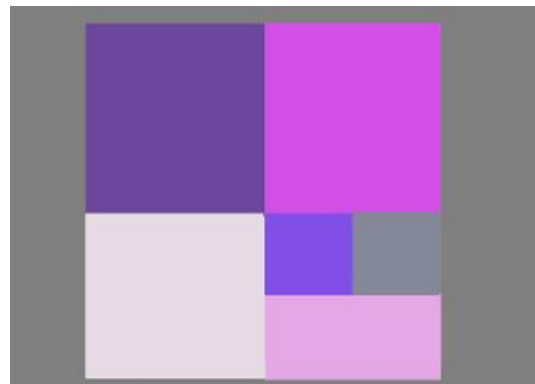


"Jem and the Holograms"





Vibrant - Color





Vibrant – Layering





Vibrant – Layering





Vibrant - Timing





Theatrical: What is it?



"Thundercats"

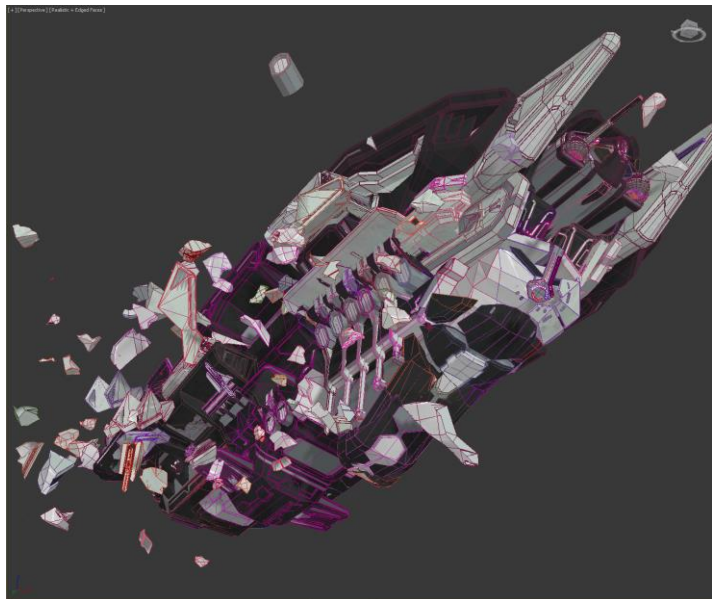


"Transformers"





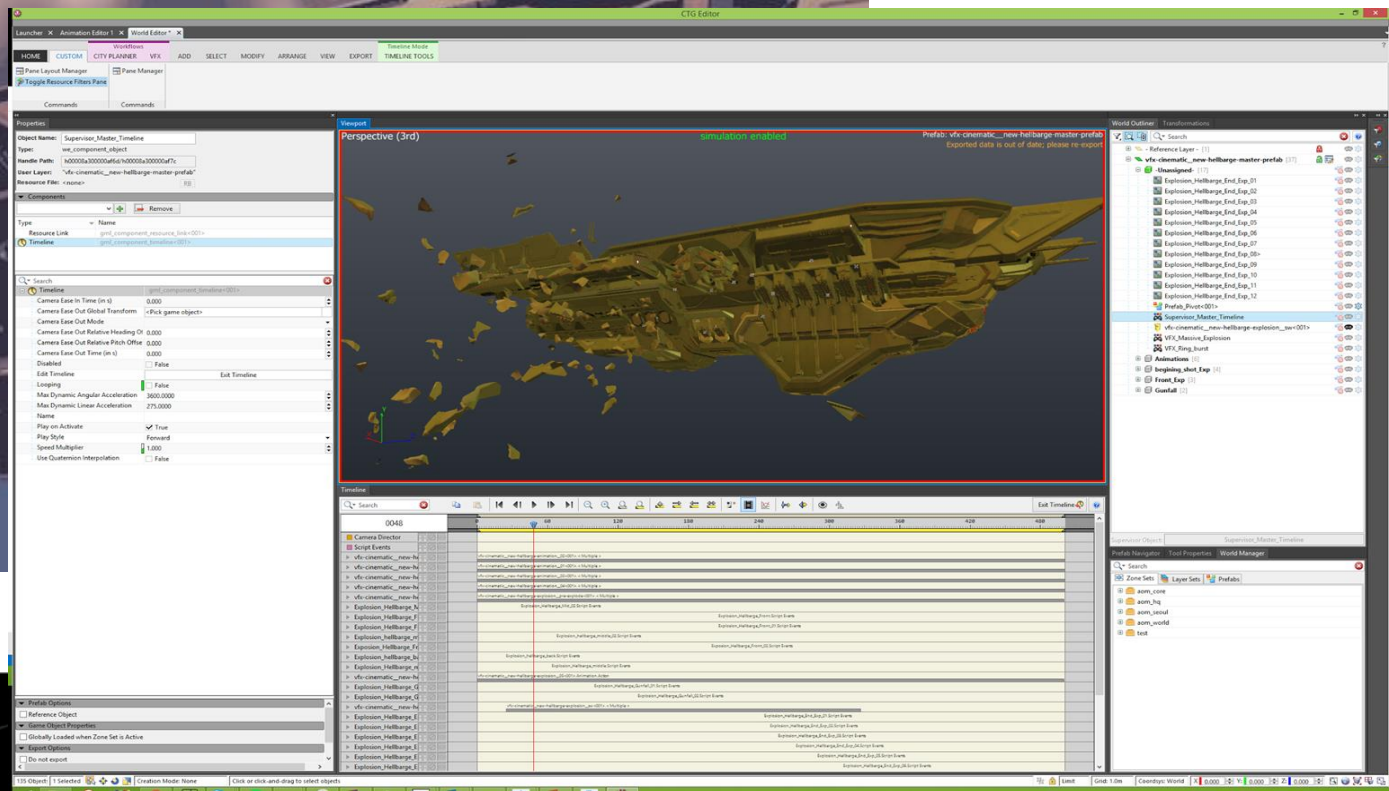
Theatrical in VFX

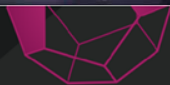


- Big “theatrical” moments necessary to drive narrative
- Player reward for completion of missions
- Blowing stuff up is FUN, and fits in with the tone of 80s cartoons!











Tips & Conclusion

- The best place to start is by breaking down your artistic influence/reference
- You may fail at first and that's ok – simplify and iterate
- The fundamentals of layering, timing and presentation are keys to success





Questions?