



# (Super)Humans of New York: Managing Marvel's Spider-Man's Many Faces

GDC March 2019





# Noah Alzayer

## Character TD



MARVEL

# SPIDER-MAN





# What's Being Covered

Process For Setting Up Working Relationship With a 3<sup>rd</sup> Party for Facial Rig Creation



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GAMES



# What's Being Covered

How We Added Our Own Twists After Delivery



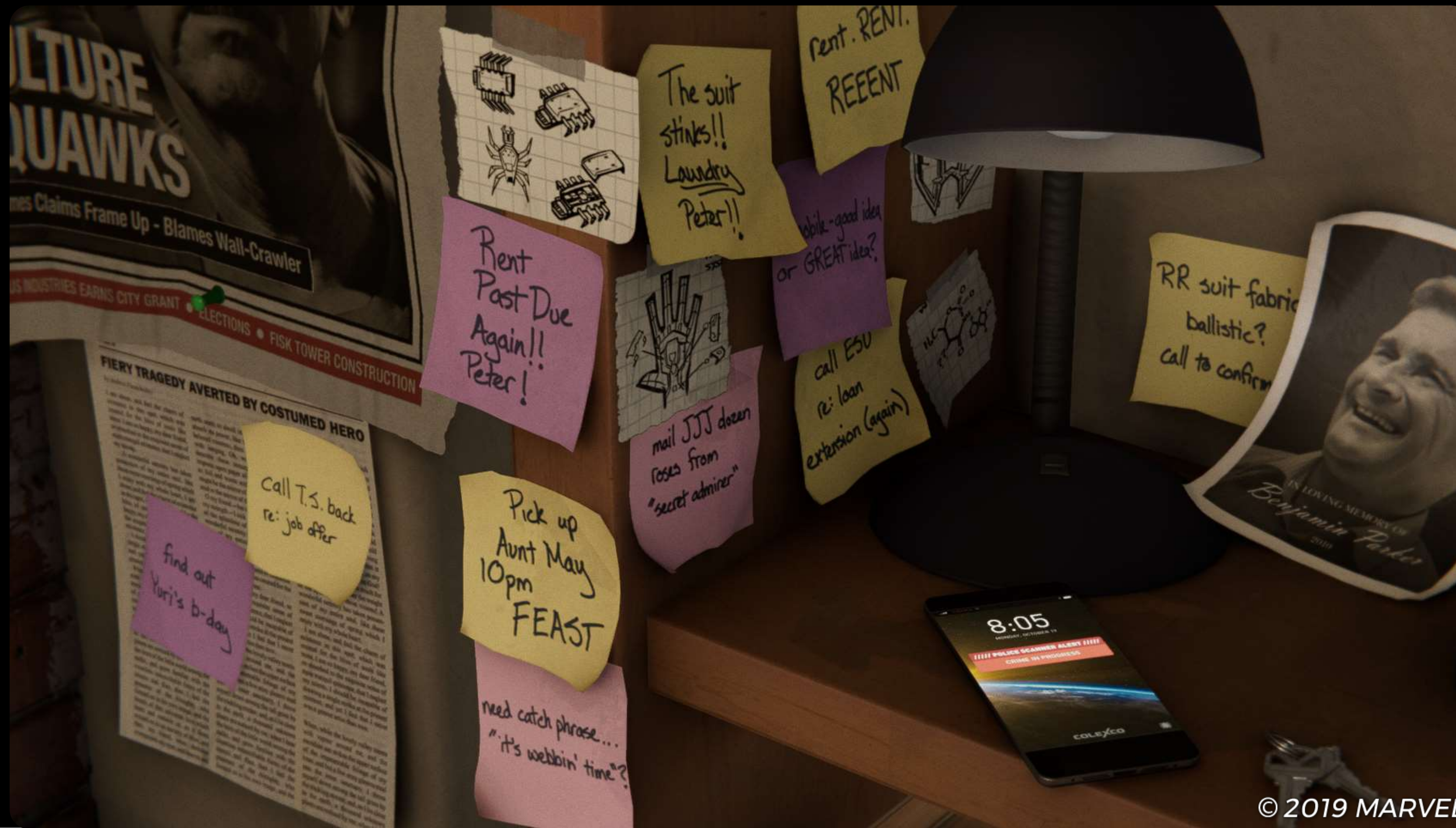
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# What's Being Covered

How We Tracked Changes We Made With Subsequent Iterative Deliveries



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# What's Being Covered

Heads in the Open World



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# Expectations

A Living, Breathing New York.



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# Expectations

Very High Bar



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# Expectations

Character-Heavy Story



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# Utilized a 3<sup>rd</sup> Party

Extensive R&D and dedicated blendshape sculptors would be needed to do it all internally.

Needed people who knew their stuff and had system in place.





# 3Lateral Summary

- Based on Photogrammetry Scanning
- FACS Based



# FACS?

“Facial Action Coding System (FACS) is a system to taxonomize human facial movements by their appearance on the face”



AU4 - Brow Lowerer

AU7 - Lid Tightener

AU9 - Nose Wrinkler

AU10 - Upper Lip Raiser

AU16 - Lower Lip Depressor

AU21 - Neck Tightener

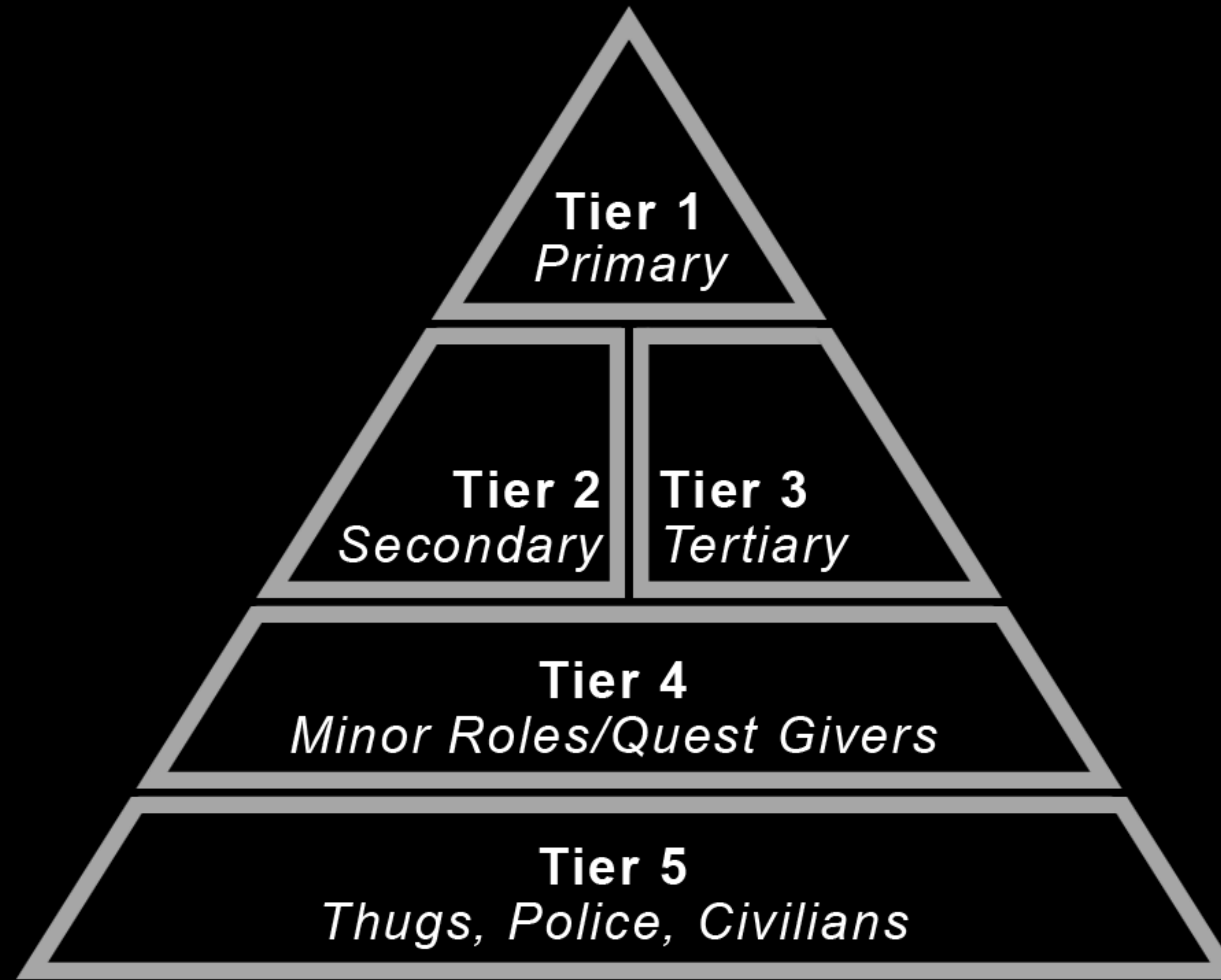


# 3Lateral Summary

- Based on Photogrammetry Scanning
- Facial Action Coding System (FACS)-Based
- Joint Deformation with Correctives
- Blending Normal Maps and Color Maps for Wrinkles and Blood Flow
- Custom Rig Logic Node Helps Speed
- For More Info, See Their Many GDC Talks/YouTube

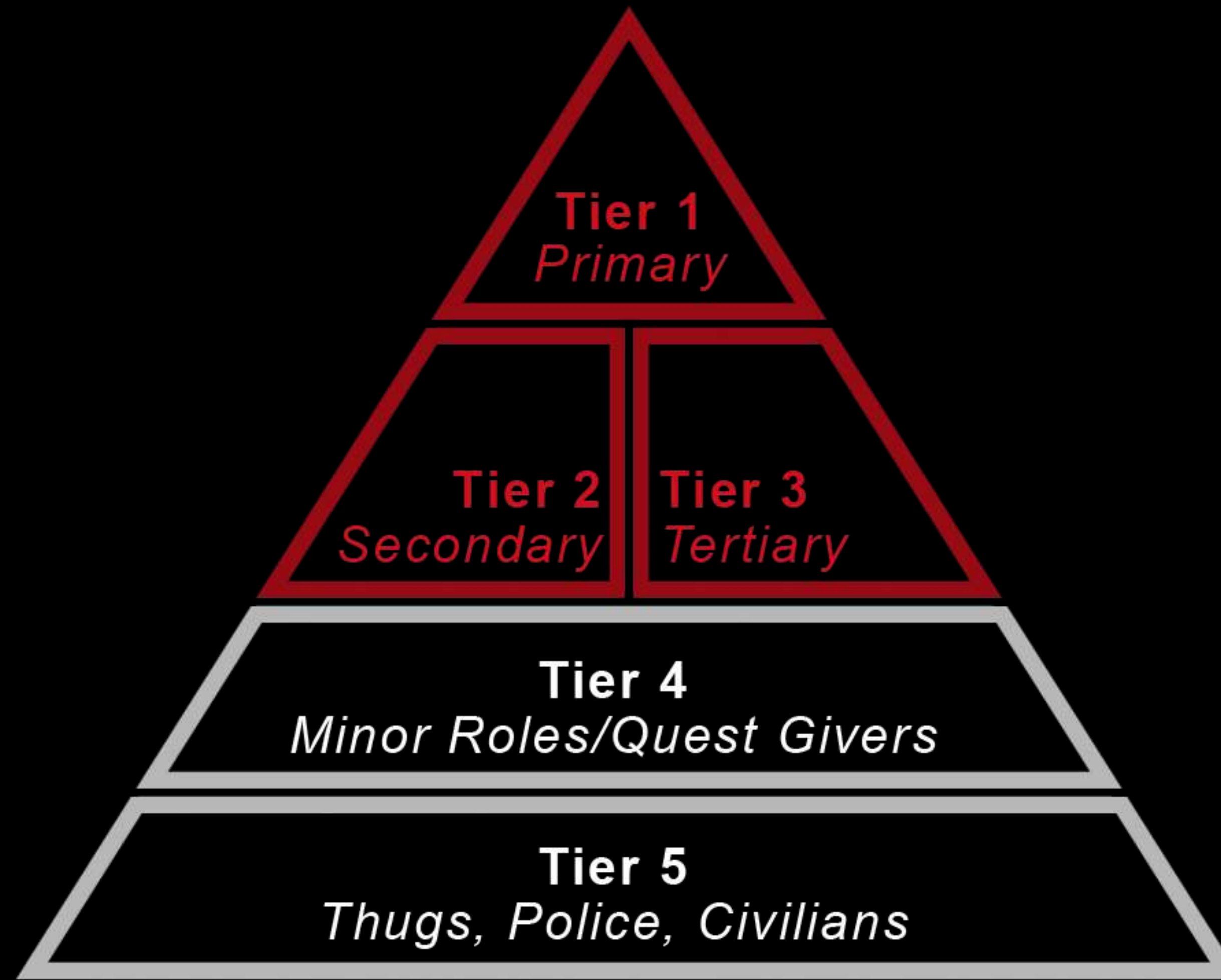


# Character Tiers





# Character Tiers





# Tier 1-3: “Named” Characters

21 Rigs Based On FACS Scans

- DX11 shaders for Maya visualization
- Tier 1: Peter, Tier 3: Tombstone
- 257 joints
- 400-600+ correctives for head mesh
- 37 wrinkle and color tracks from 3 masked normal and 3 blood flow maps working in concert
- Stan Lee Cameo



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# Tier 4: Minor Roles/Quest-Givers

39 Rigs Based on Single Neutral Scans

- Scans of Studio Employees/Family
- 177 joints
- 402 correctives
- 24 wrinkle tracks from 2 textures came in additively





# Tier 5: Thugs, Police, Civilians

90 Rigs Based on Previous Characters

- “Character Creator” made models using existing heads as seeds
- Gene Splicer (demoed at GDC 2017)
- Similar to T4:
  - 24 additive wrinkle tracks
  - 177 joints
  - 402 correctives



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# Deliveries

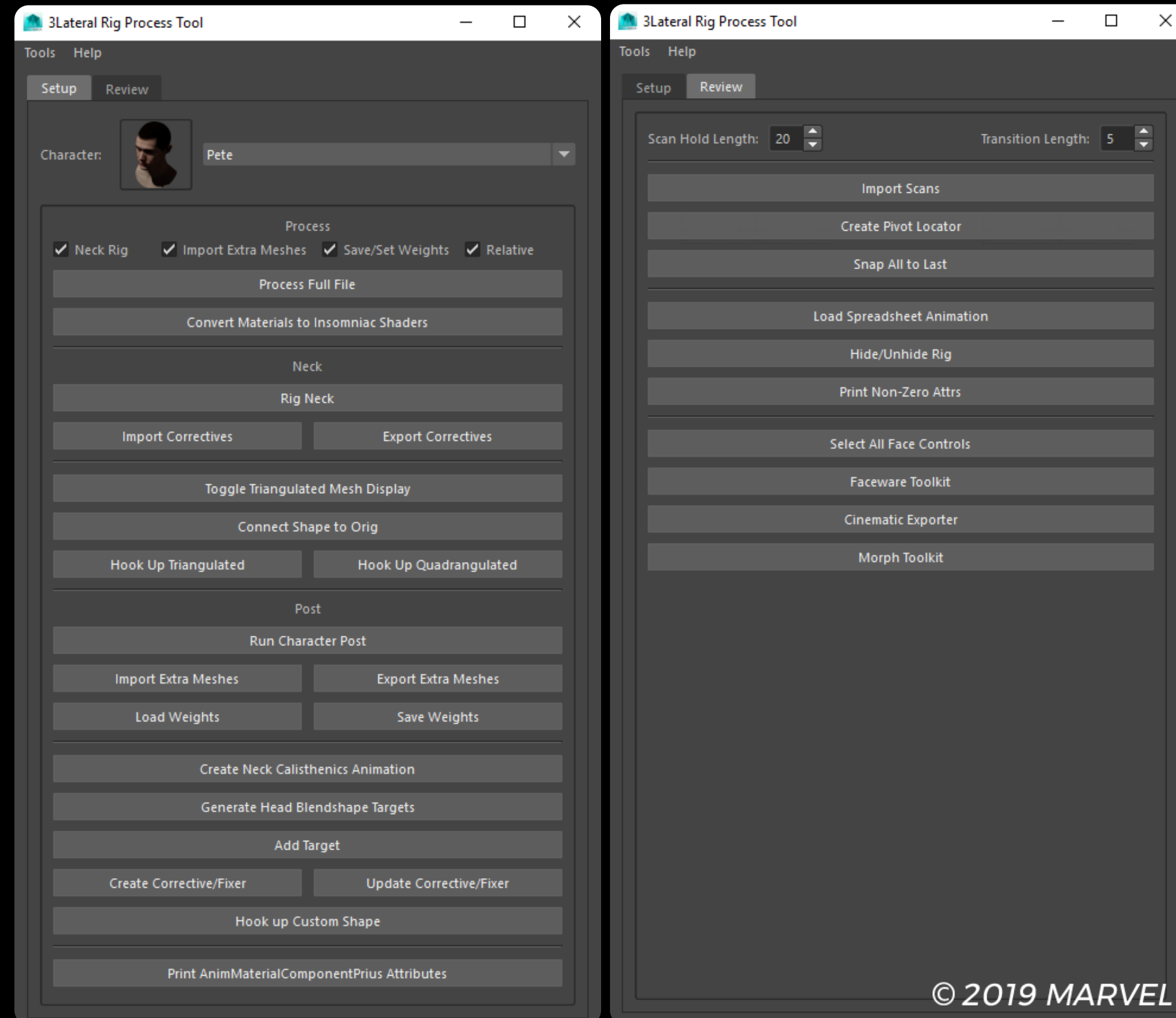
3Lateral Wasn't On Our Depot. Clean Files With Each Delivered Version.

s/hero_peterparker_head_master.mb						
Files Pending History						
Revision		Changelist	Date	Subm	FileType	Description
✓ 52		2284038	3/...	gg...	binary+lm	angled eyelashes down
✓ 51		2283975	3/...	ad...	binary+lm	updated head with latest 3Lat rig
✓ 50		2283913	3/...	nal...	binary+lm	updated to 3/31 delivery
✓ 49		2256755	3/...	gg...	binary+lm	Refining eyelids, eyelash position, cornea reflectance, and iris color
✓ 48		2246289	3/...	nal...	binary+lm	worked on neck deformations, turned down bias towards overturning at base, a...
✓ 47		2241804	3/...	nal...	binary+lm	removed blendshape deformer on gums to avoid LOD freakout
✓ 46		2239073	2/...	gg...	binary+lm	updating hair line and shadowcaster
✓ 45		2238311	2/...	gg...	binary+lm	updating gloss following feedback, updating texture resolution and compression s...
✓ 44		2238135	2/...	nal...	binary+lm	corrective blendshape iteration
✓ 43		2237440	2/...	gg...	binary+lm	Adding vert colors for AO and spec occ
✓ 42		2235059	2/...	gg...	binary+lm	Updating shirt detail map, hair shadows, brightness, and spec
✓ 41		2234351	2/...	gg...	binary+lm	reducing shadow caster,, adjusting spec and color
✓ 40		2234290	2/...	nal...	binary+lm	messed with correctives
✓ 39		2233459	2/...	nal...	binary+lm	deleted eye blendshape
✓ 38		2233445	2/...	nal...	binary+lm	added neck rig/correctives
✓ 37		2229789	2/...	nal...	binary+lm	resaved with plugin loaded
✓ 36		2228399	2/...	gg...	binary+lm	added shadow caster
✓ 35		2227946	2/...	nal...	binary+lm	updated to 2/21 delivery rig
✓ 34		2218726	2/...	nal...	binary+lm	brought in new pete head rig for 2/14 delivery, re-exported otto health
✓ 33		2212056	2/...	nal...	binary+lm	updated to 2/9 delivery of rig
✓ 32		2210538	2/...	gg...	binary+lm	updating eye mesh to match 3L, updating textures to be a blend between ours ...
✓ 31		2137748	12...	ad...	binary+lm	updated smile from 3Lateral
✓ 30		2130451	11...	gg...	binary+lm	adding eyes and hair to lods, adjusting otto eye uvs
✓ 29		2130366	11...	gg...	binary+lm	Switching back eyes
✓ 28		2127767	11...	nal...	binary+lm	updated to version 5 of the rig.
✓ 27		2124626	11...	nal...	binary+lm	added new head rig
✓ 26		2071043	10...	ss...	binary+lm	Hair update



# Processing Tool

## Created A Tool For The Boring Stuff





# Feedback Process

3Lat made spreadsheets for poses vs. scans with issues they had spotted

Scan Name		Scan Type	RIG Controls
1	Neutral	FACS	
2	JawOpen	FACS	CTRL_C_jaw TranslateY=0.743



# Feedback Process

Made tool to read the spreadsheet, import scans, and update cinematic in engine to make comparison videos



Neutral



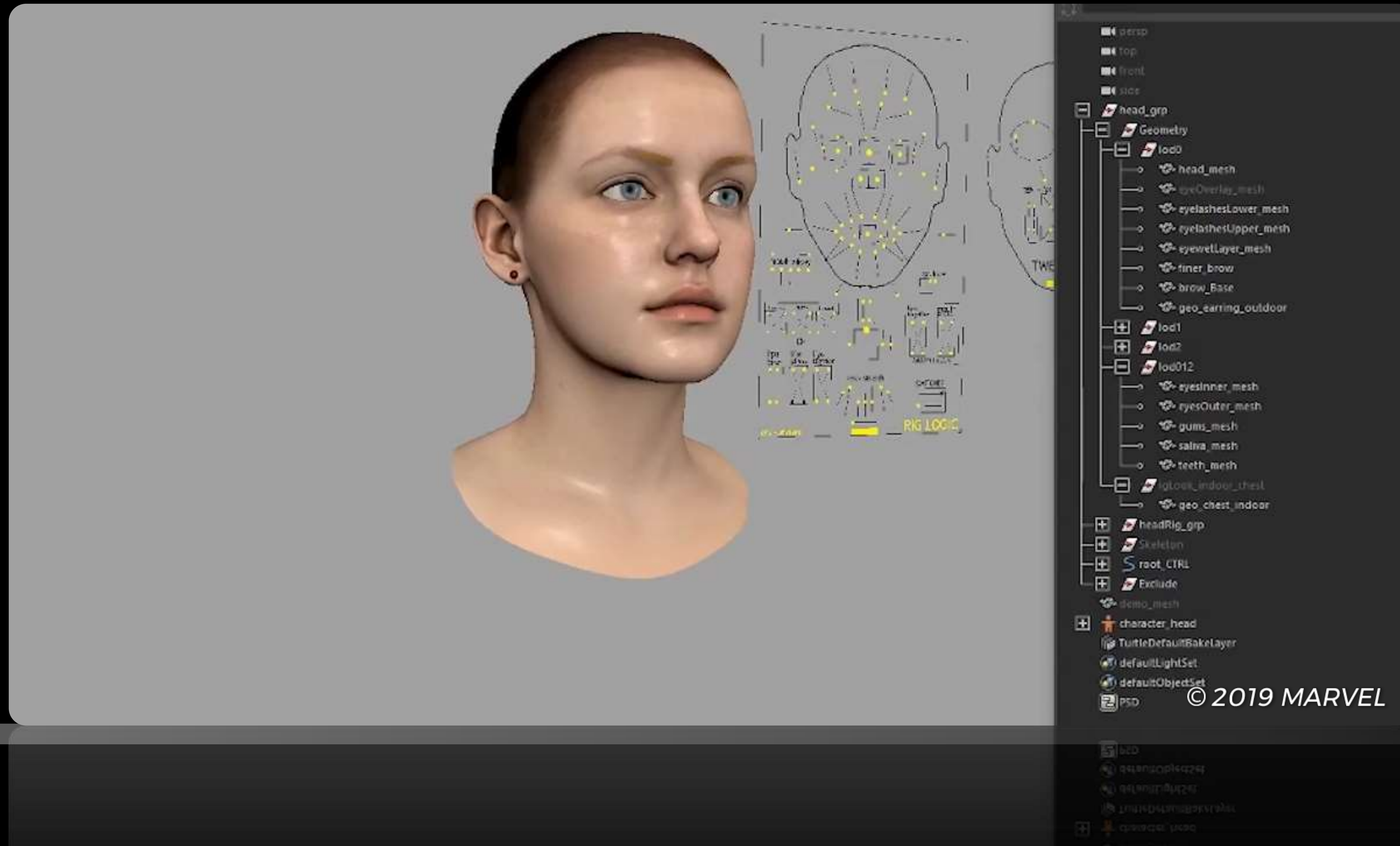
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# Tracking Art Changes

Character team created custom art for brows, lashes, etc.  
Saved that geo with hierarchy, skinning, etc. to a “Character Post” folder



# The Head Bone's Connected to the...

Deformations For Body Mechanics Weren't Their Responsibility



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# Head Look Correctives



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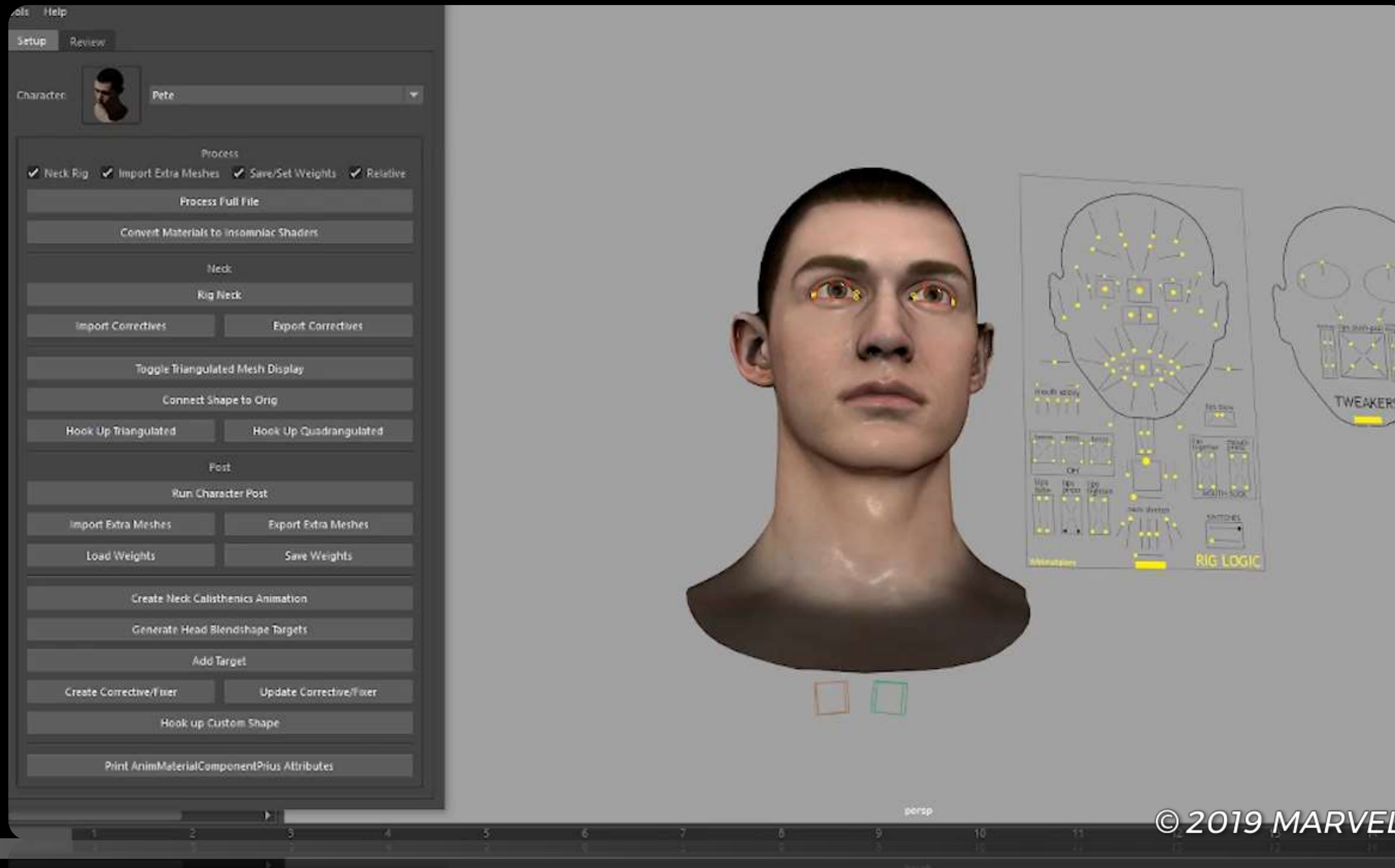


# Corrective Workflow





# Corrective Workflow



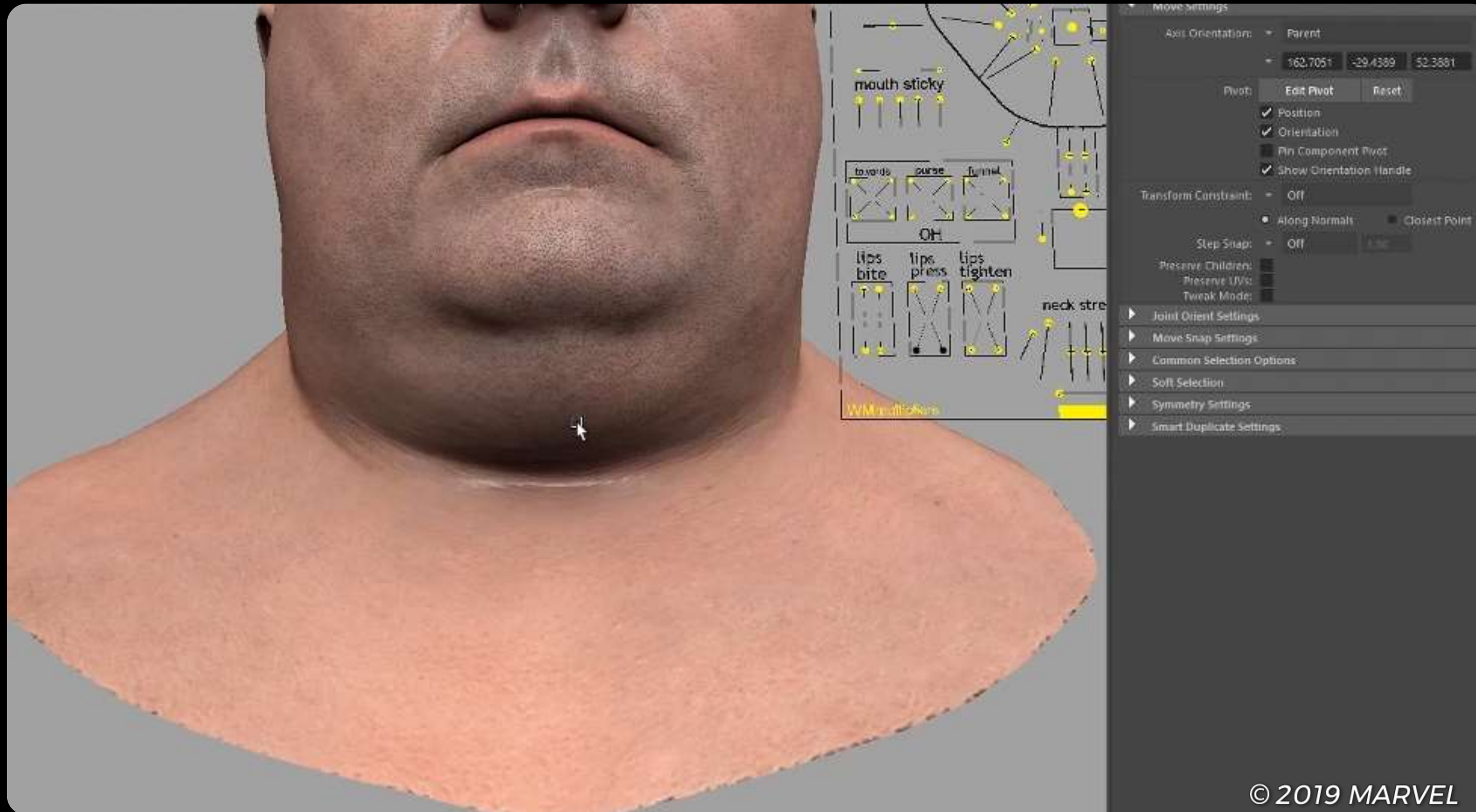
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# Secondary Uses

## Neck jiggle rig for Kingpin

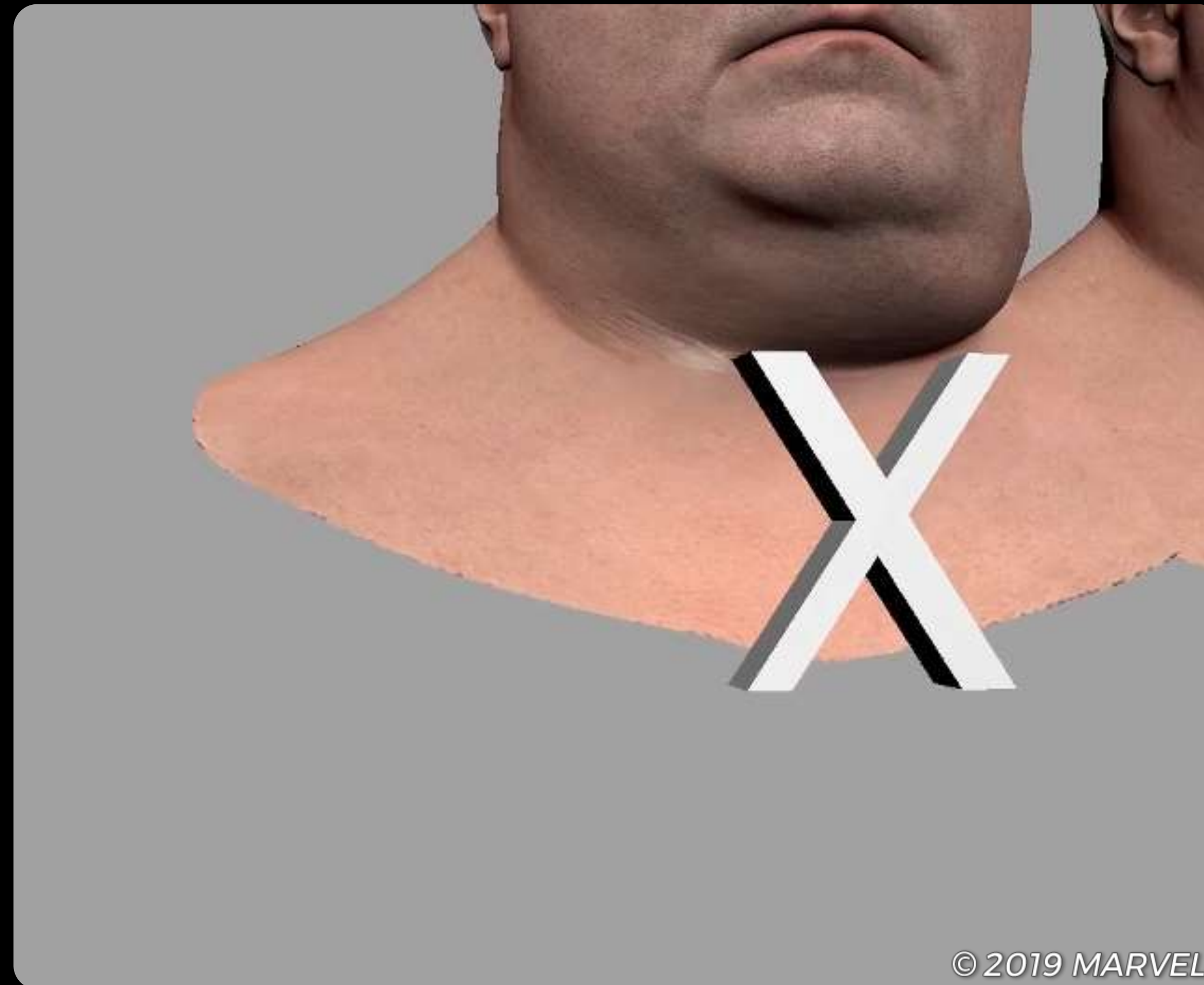


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# Secondary Uses

Blendshapes to move jowels in X, Y, and Z







Jiggle Blendshapes On

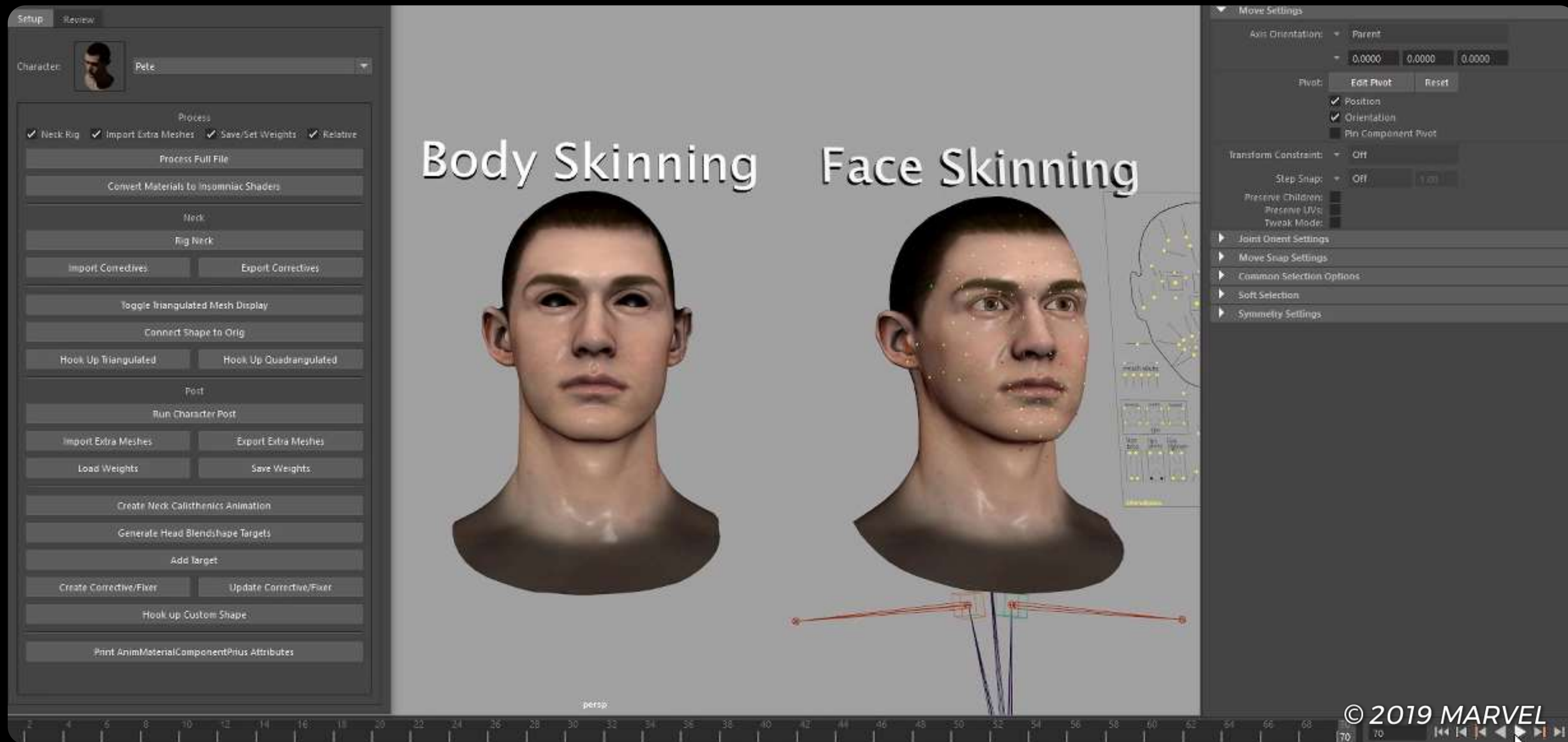


Jiggle Blendshapes Off

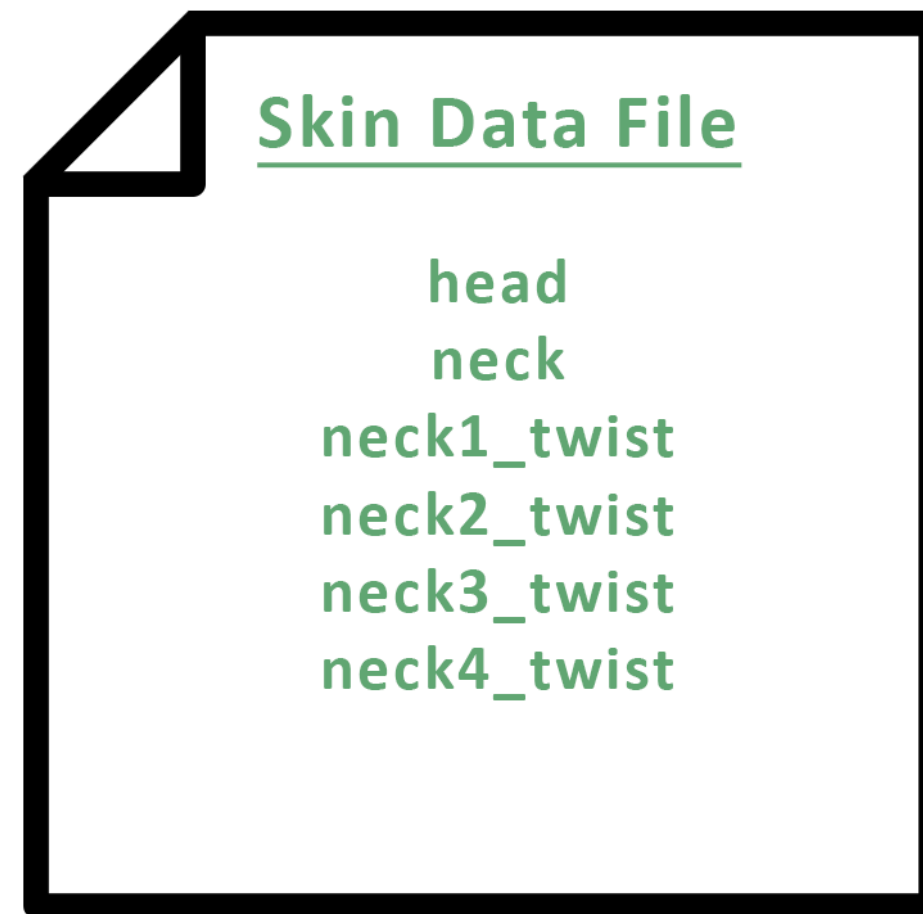


# Relative Skin Loading Tool

Imports body weighting without changing face

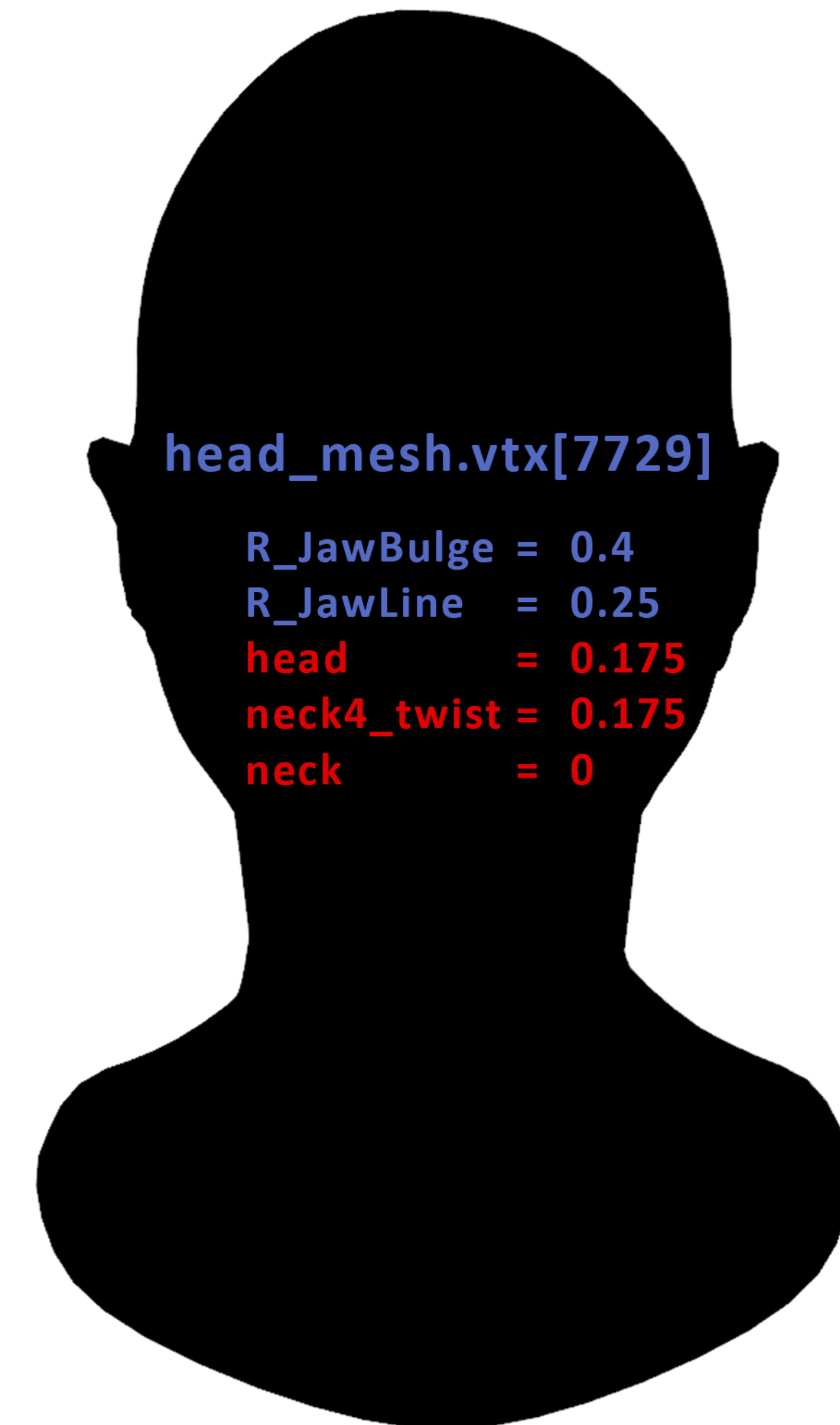
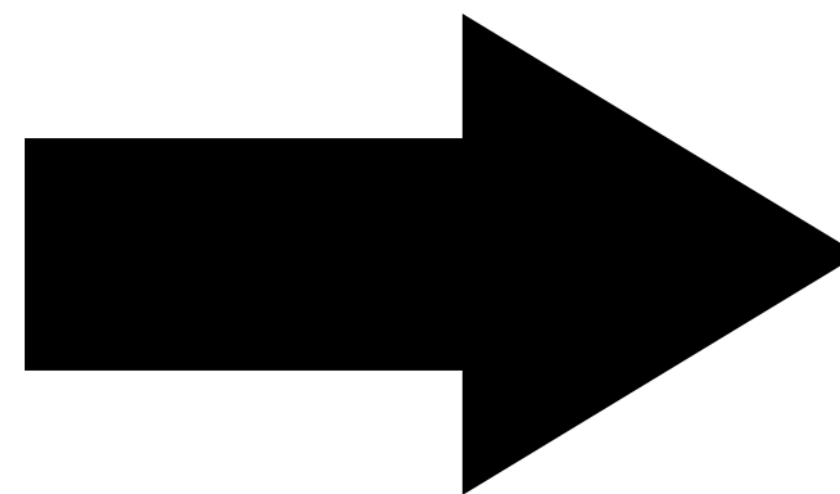






head\_mesh.vtx[7729]

neck4\_twist = 0.5  
head = 0.5

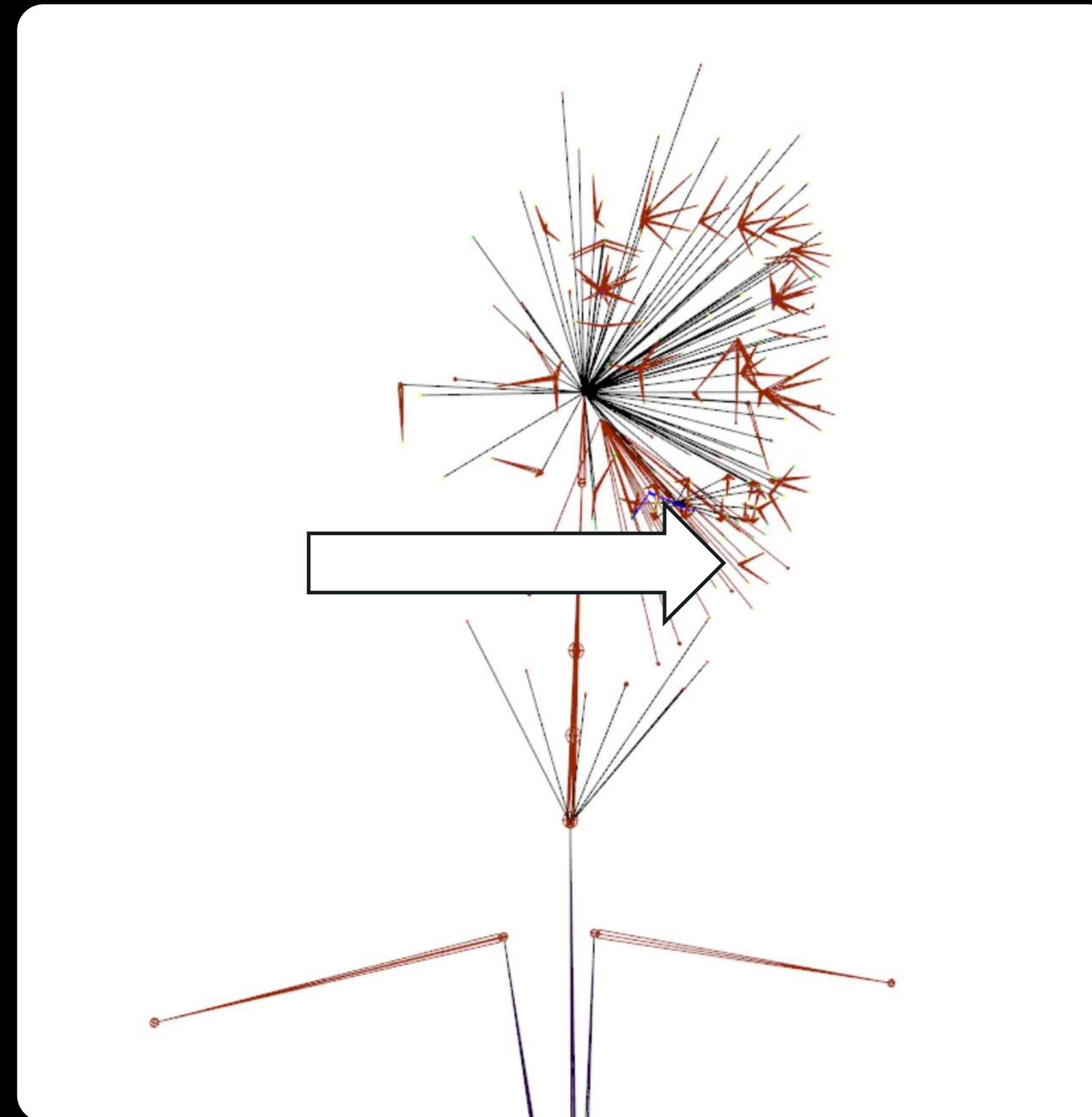


head\_mesh.vtx[7729]

R\_JawBulge = 0.4  
R\_JawLine = 0.25  
head = 0.175  
neck4\_twist = 0.175  
neck = 0

# Relative Skin Saving

Inverse (saving only body weights) when saving weights to *character post*

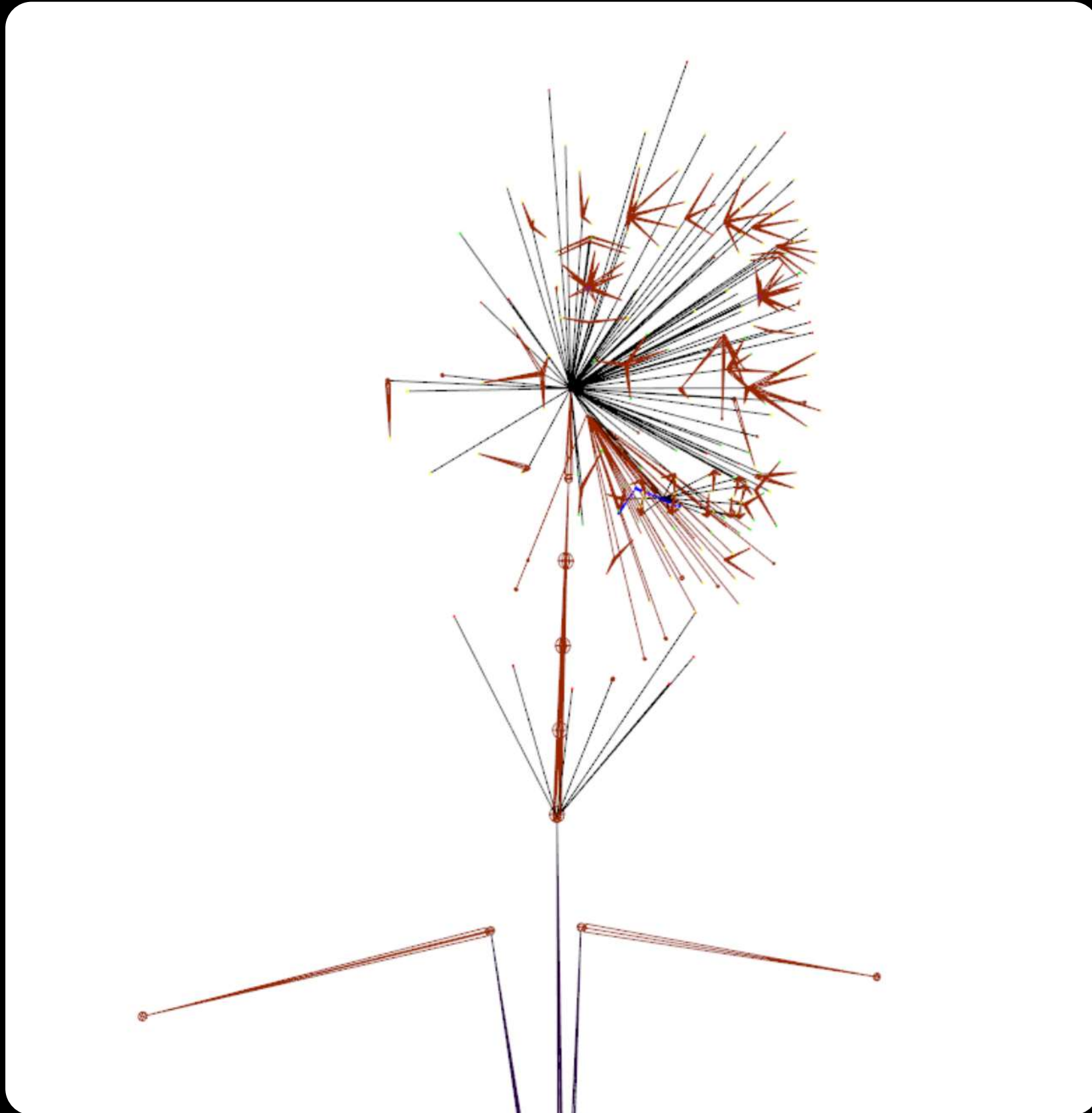


`_mesh.skinData`



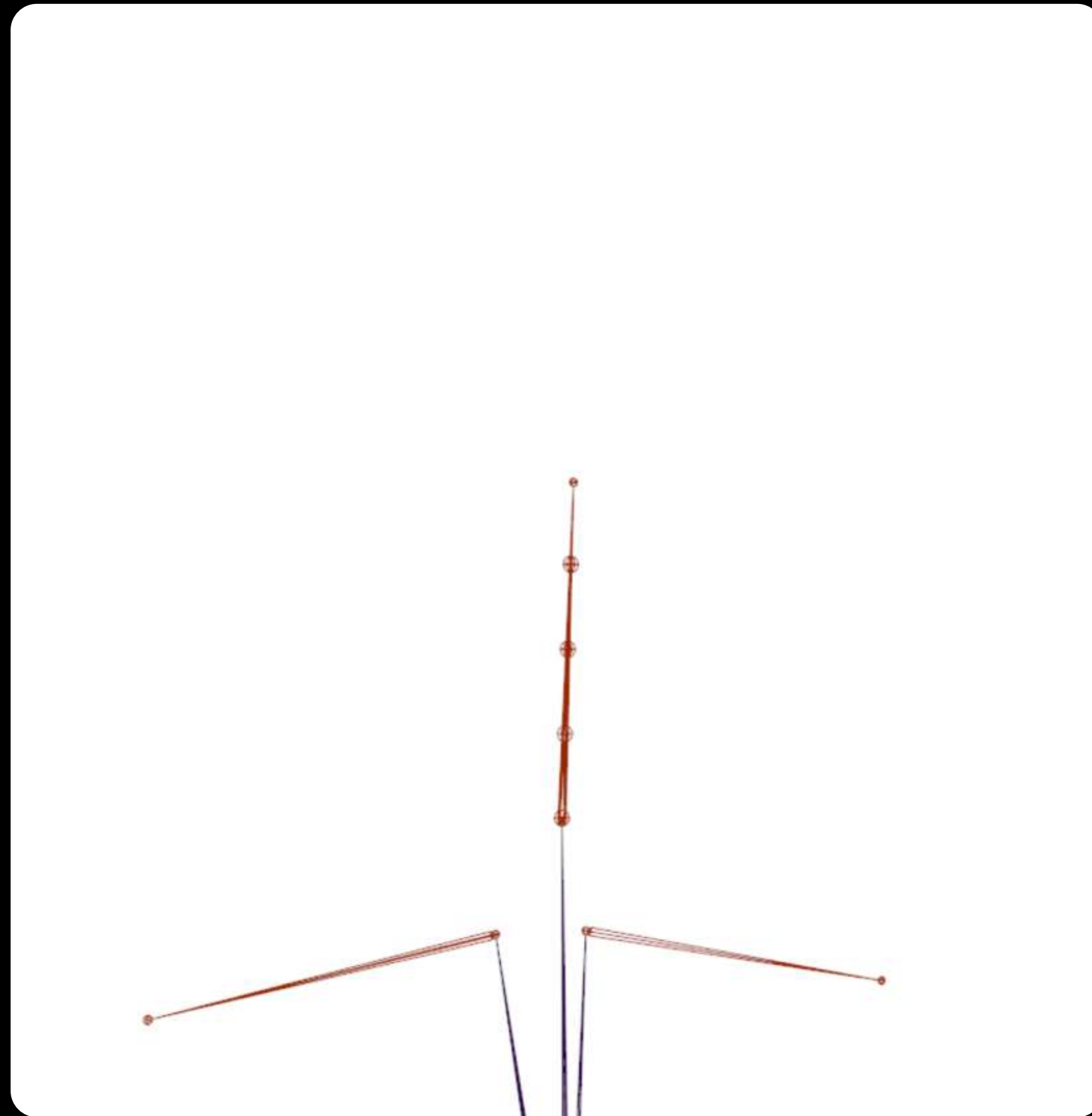
# Relative Skin Saving

Inverse (saving only body weights) when saving weights to *character post*



# Relative Skin Saving

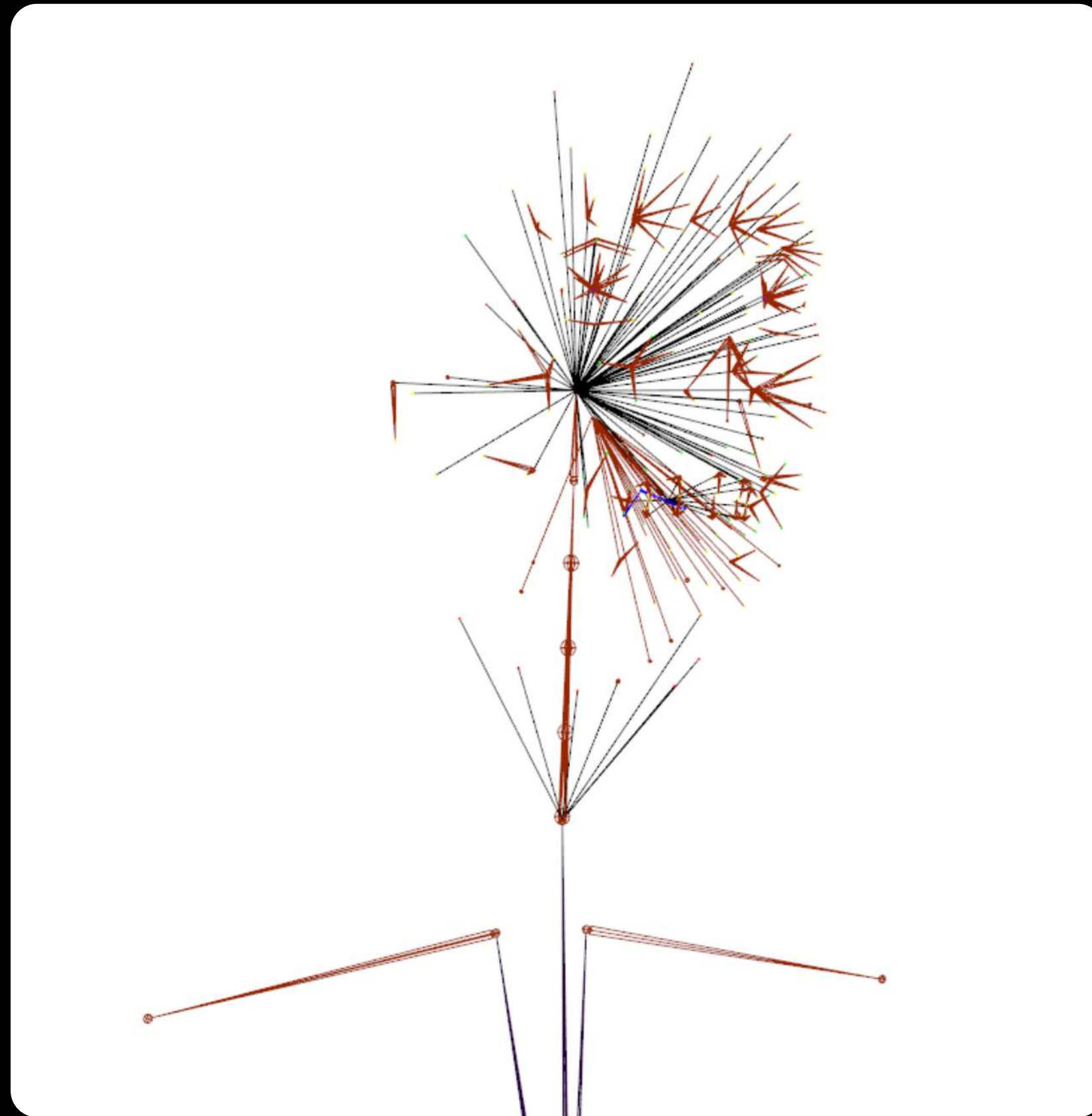
Inverse (saving only body weights) when saving weights to *character post*





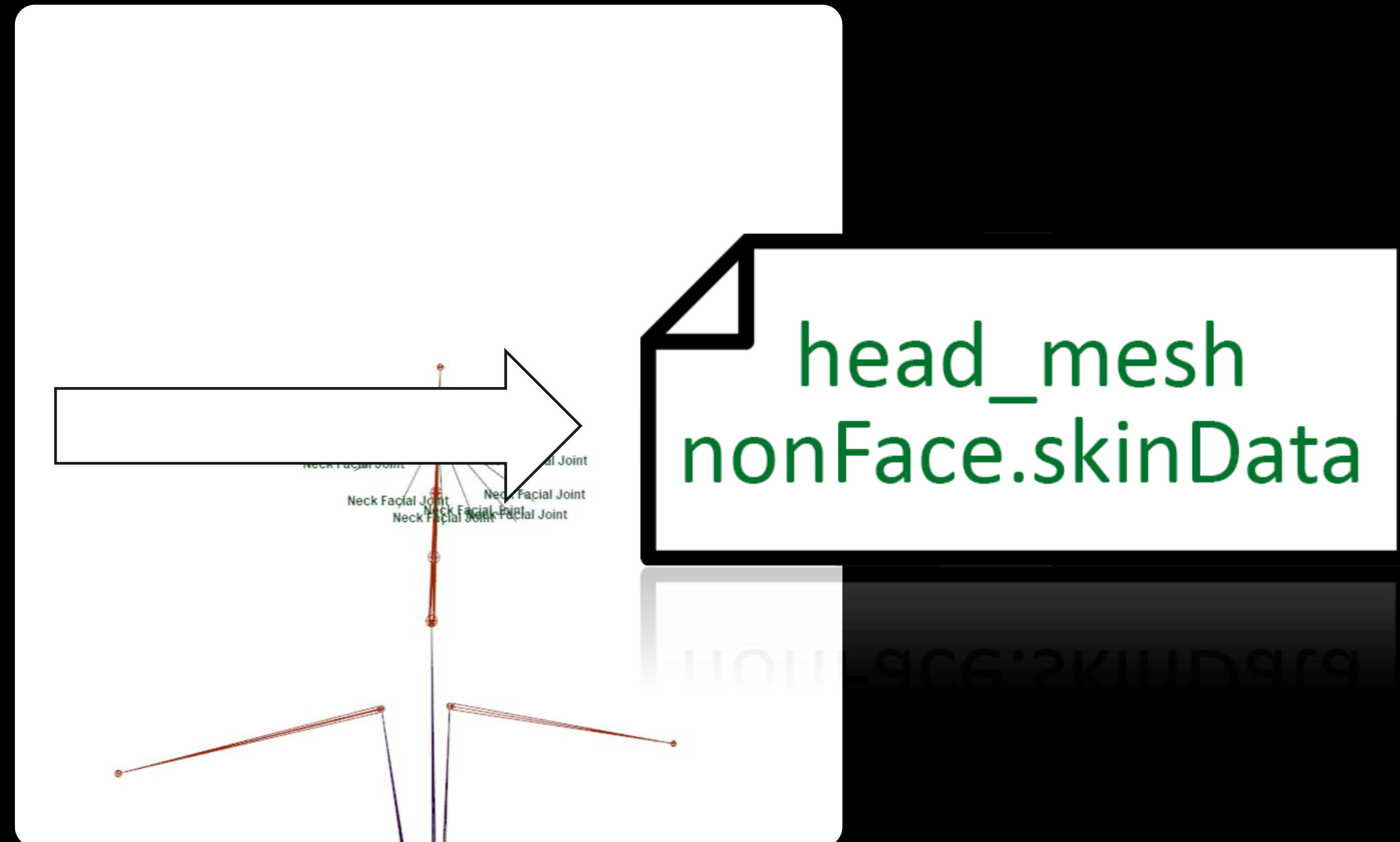
# Relative Skin Saving

Inverse (saving only body weights) when saving weights to *character post*



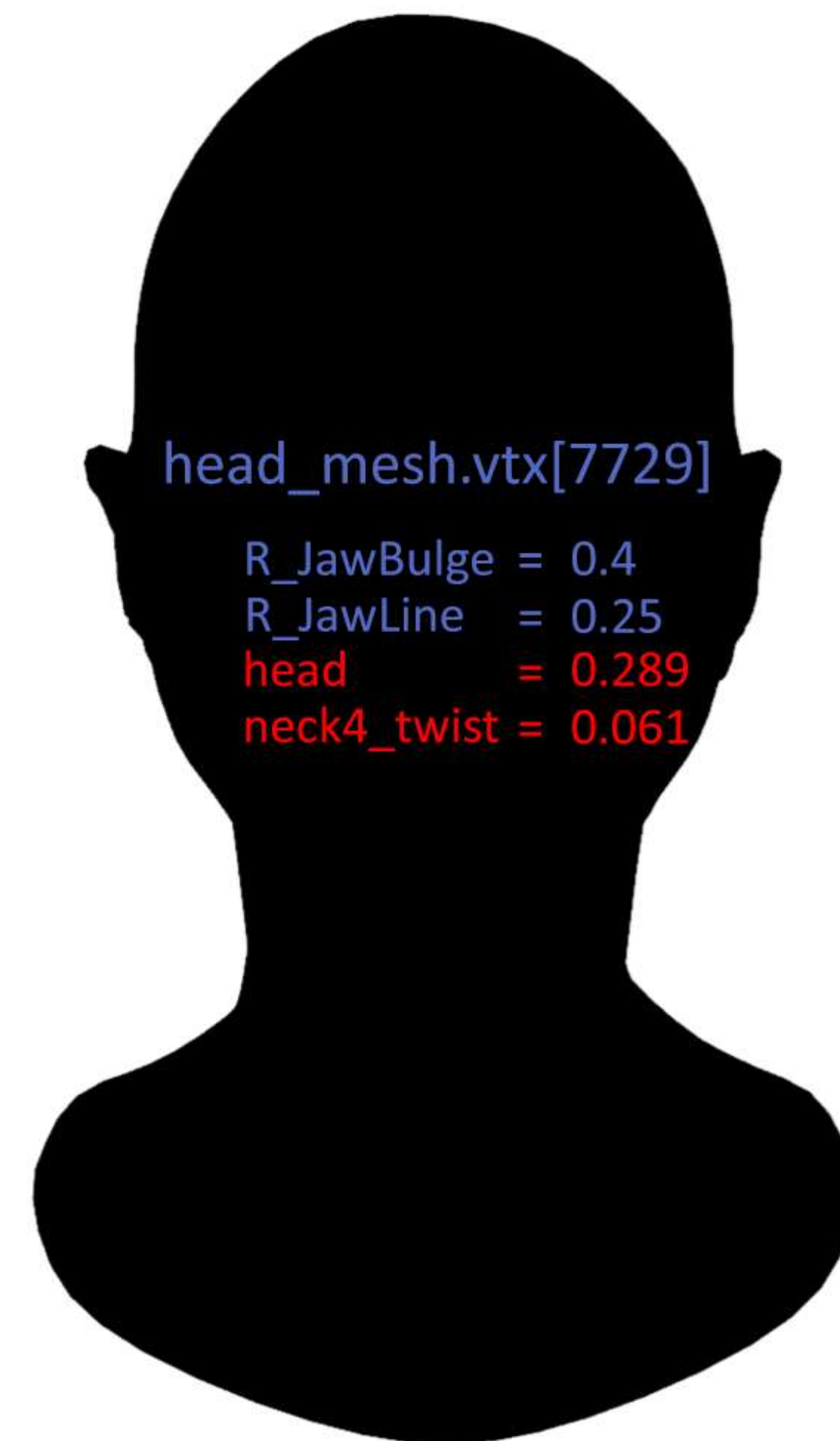
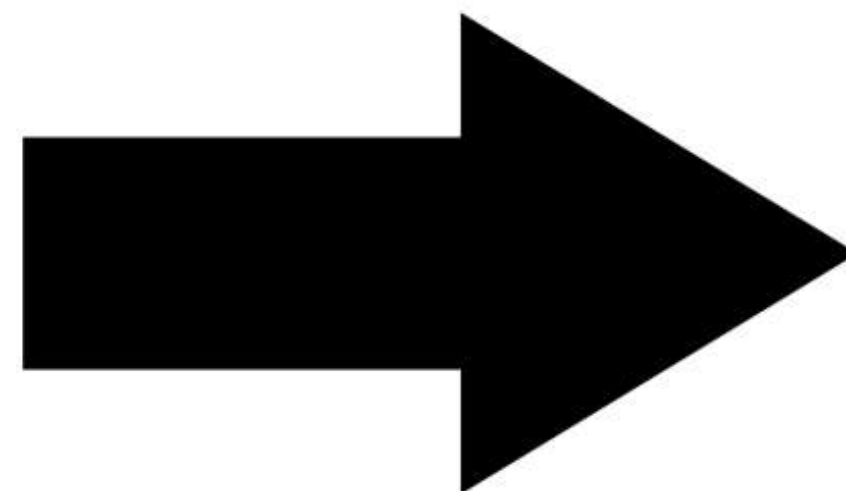
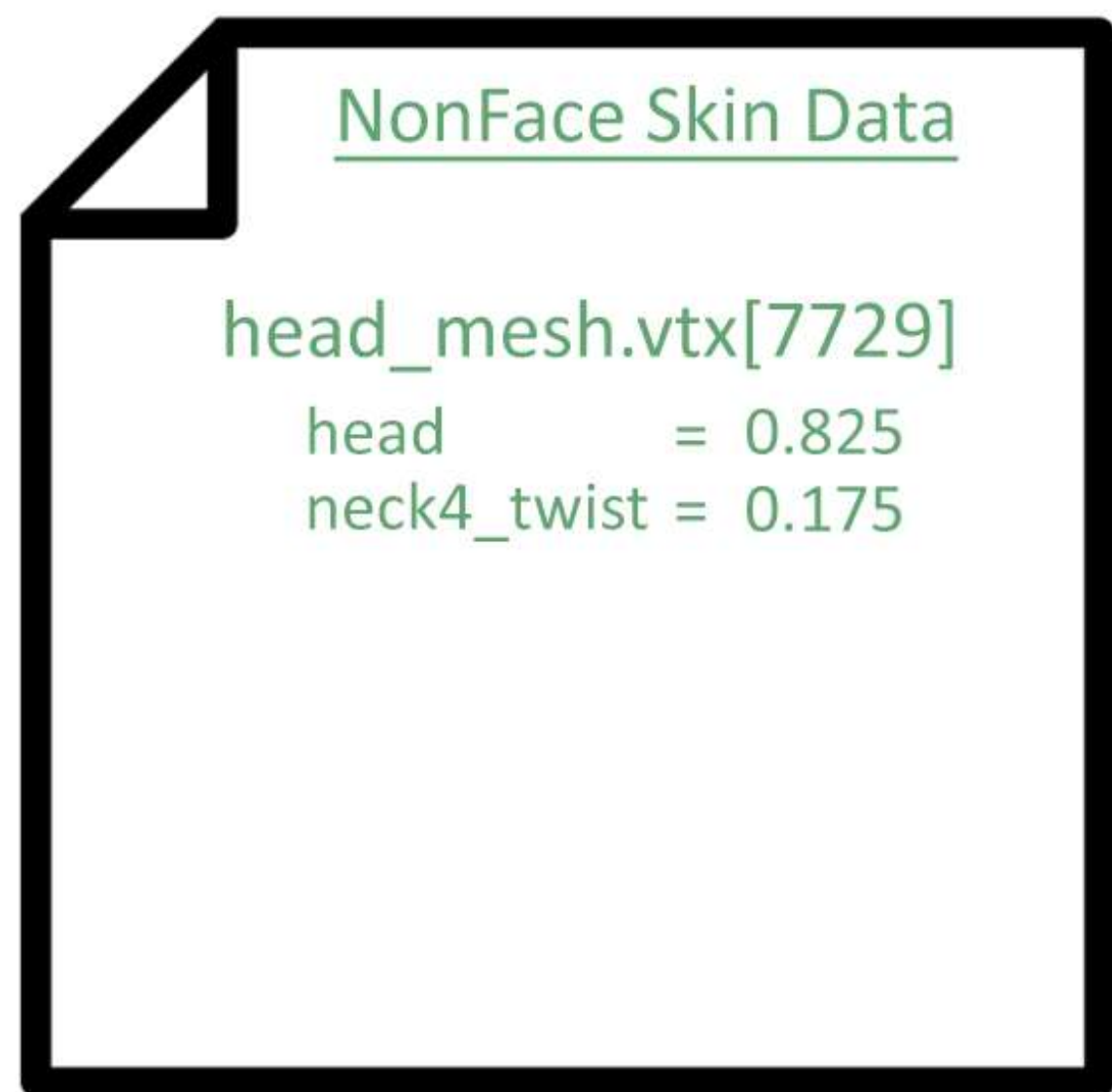
# Relative Skin Saving

Inverse (saving only body weights) when saving weights to *character post*











A close-up shot of Tony Stark in a laboratory setting. He is wearing a white lab coat over a teal polo shirt and black-rimmed glasses. He has a serious, slightly distressed expression and is looking down and to his left. In the background, another person is partially visible, looking up at him. The scene is dimly lit with industrial-style lighting.

I miscalculated.



# Triangulation Woes

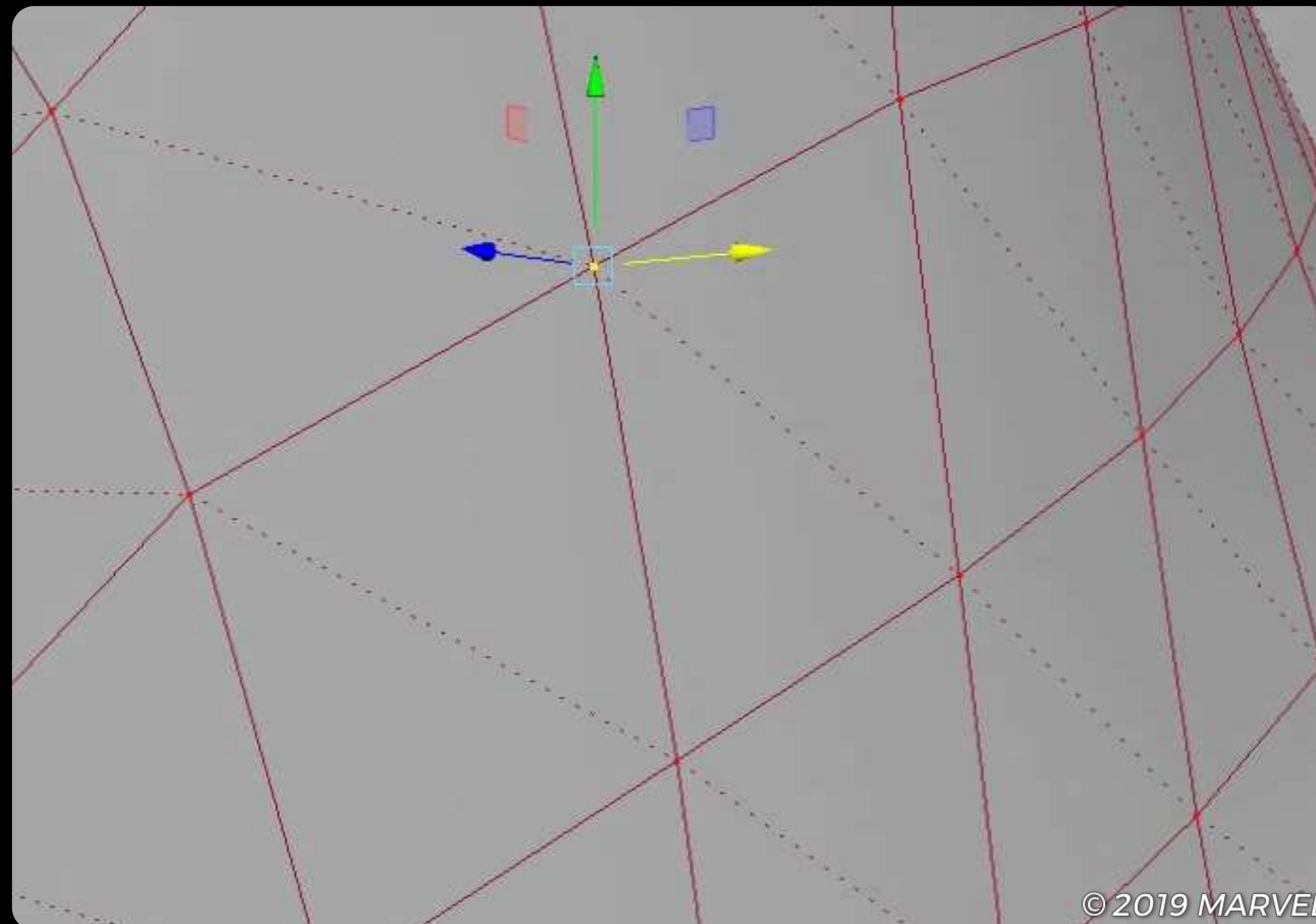
Triangulation caused artifacts that were only showing up in engine, not Maya





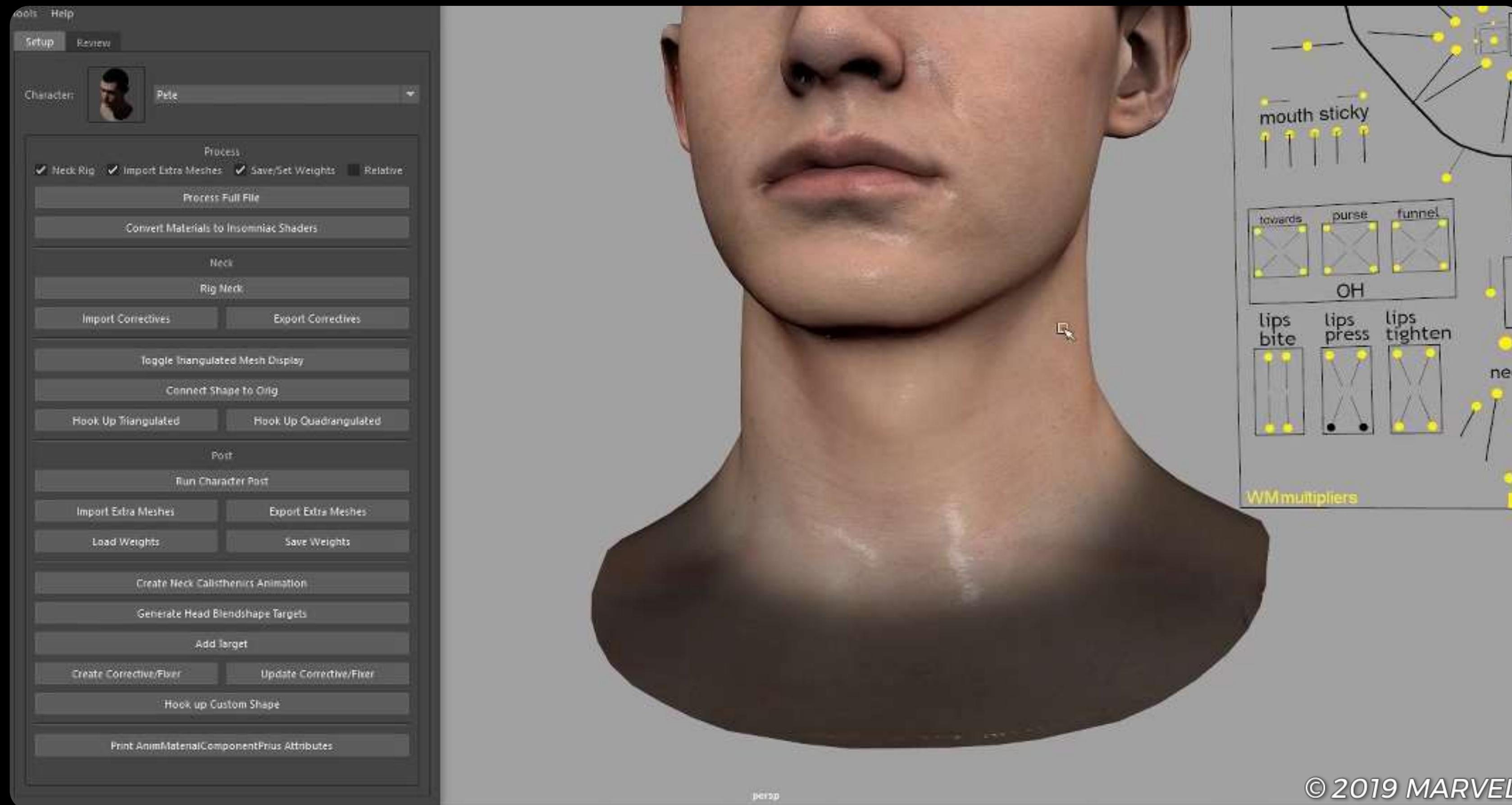
# Triangulation Woes

Triangulation caused artifacts that were only showing up in engine, not Maya



# Triangulation Woes

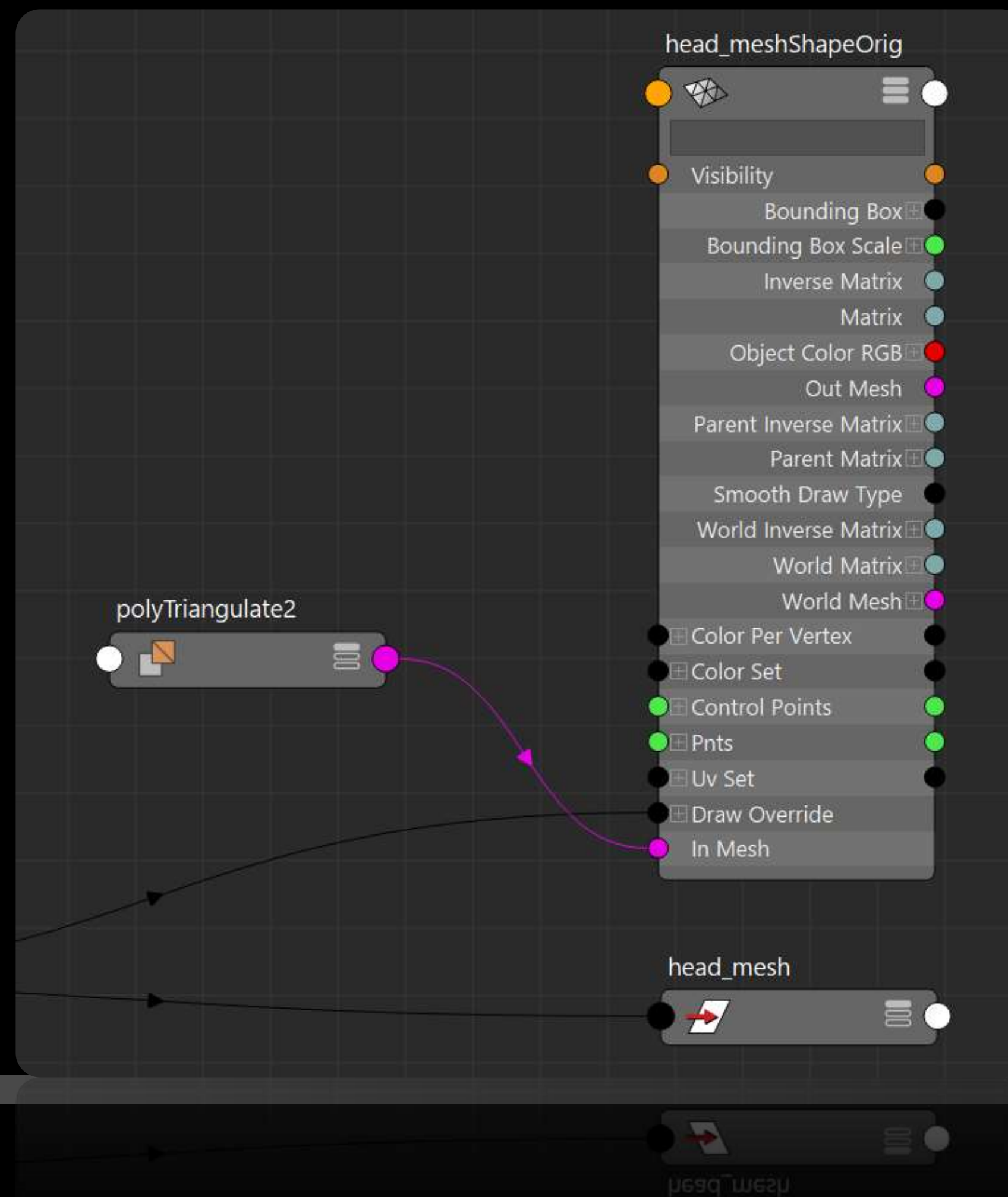
The display workaround for Maya





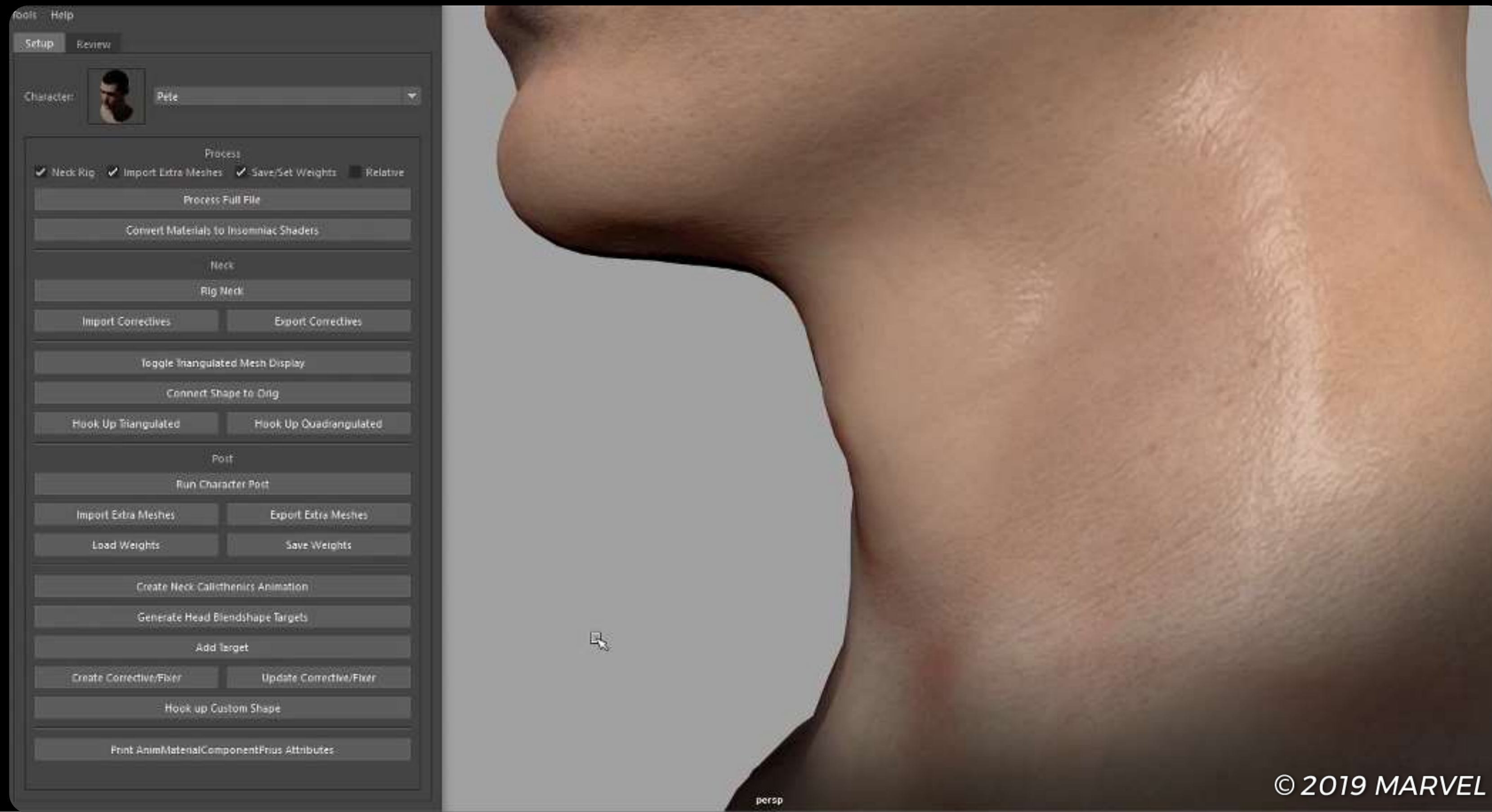
# Triangulation Woes

The display workaround for Maya



# Triangulation Woes

Used similar method to replace mesh. Custom tri-mesh gave better silhouette



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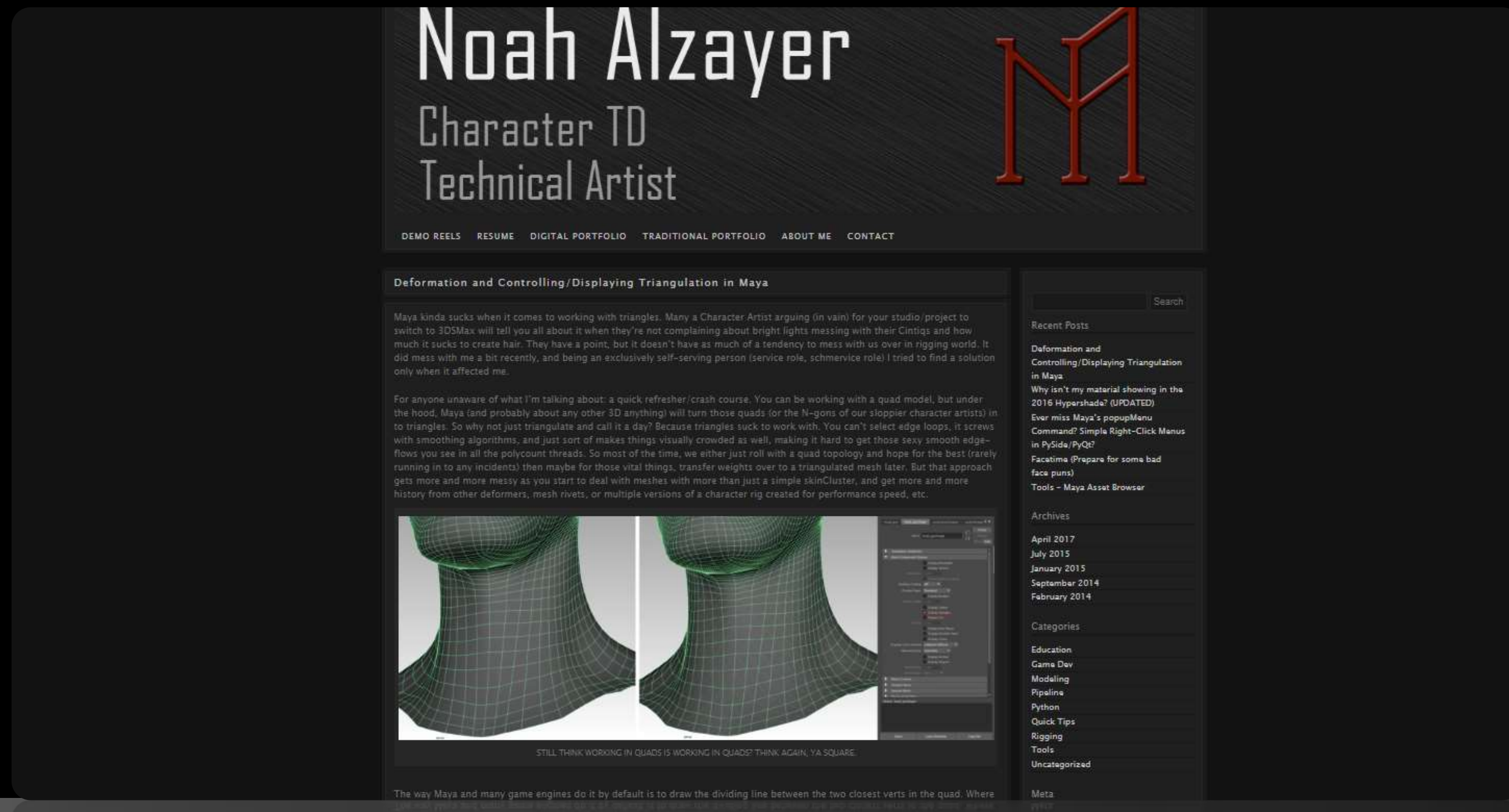


# Shameless Plug

<http://bit.ly/maya-tri>

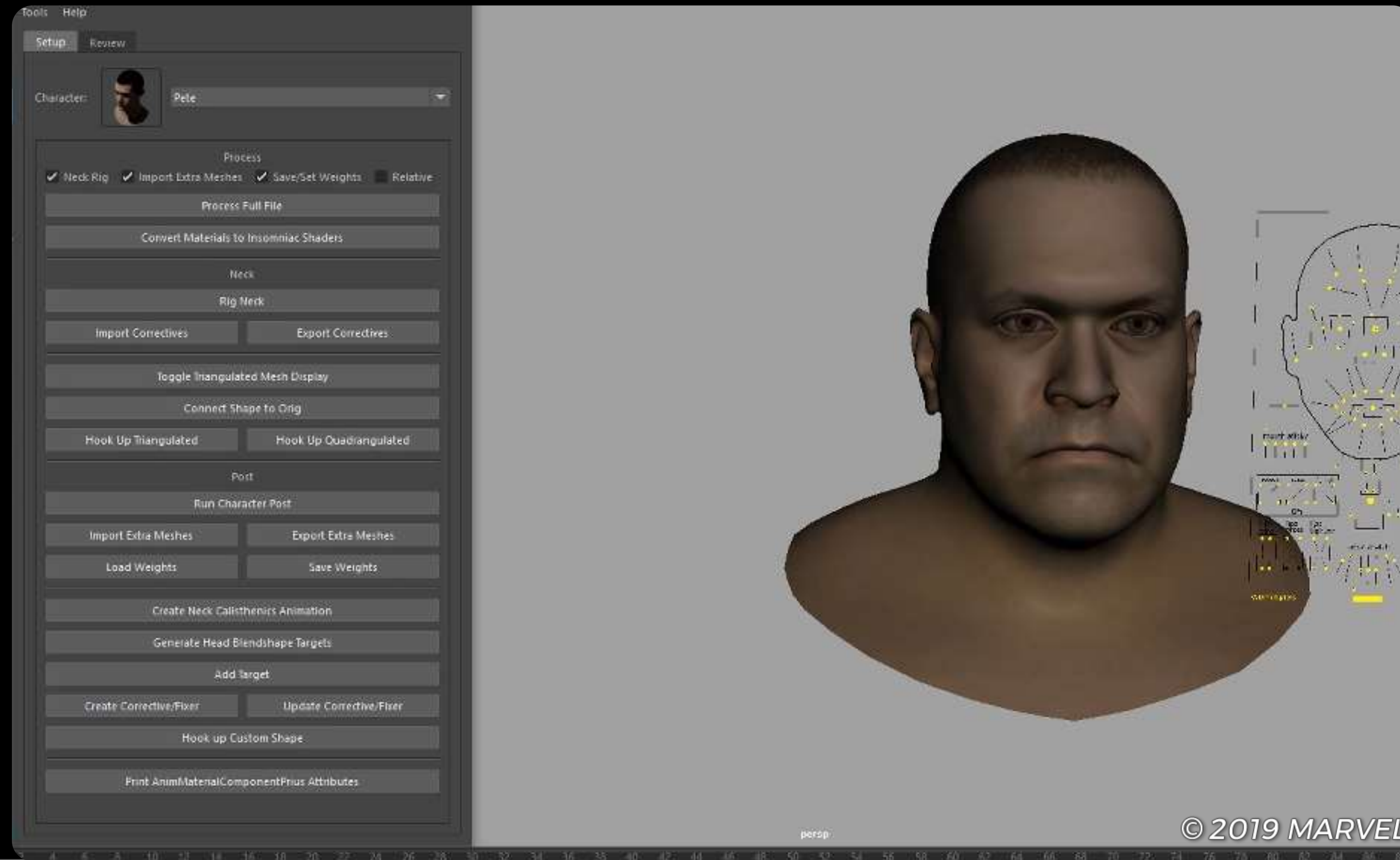
or

<https://noahalzayer.net/2017/04/11/deformation-and-triangulation-in-maya/>



# More Secondary Uses

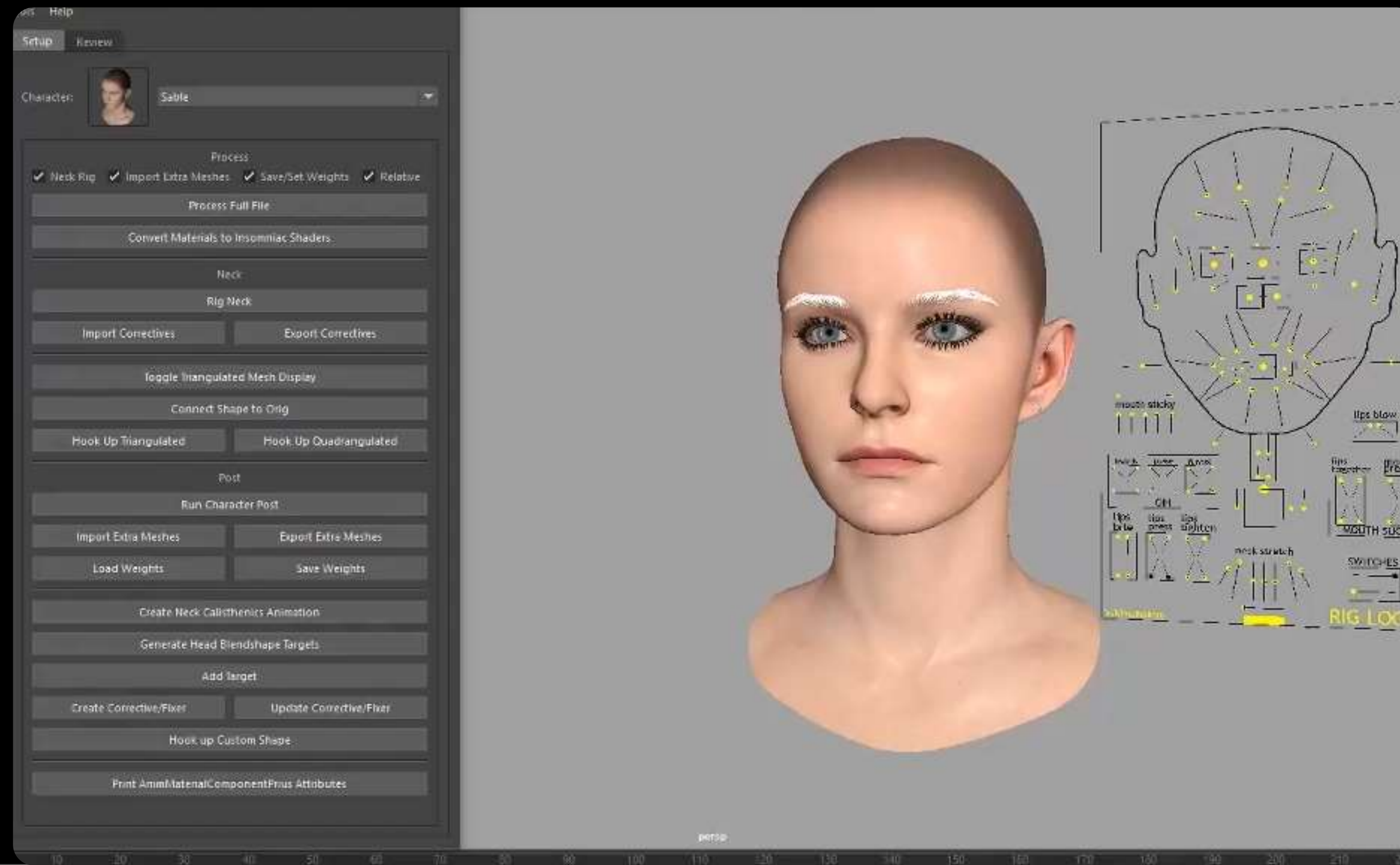
Editing mesh proportions after the fact





# More Secondary Uses

Recycling neck correctives from other characters.



# Heads in the Open World - Experiments

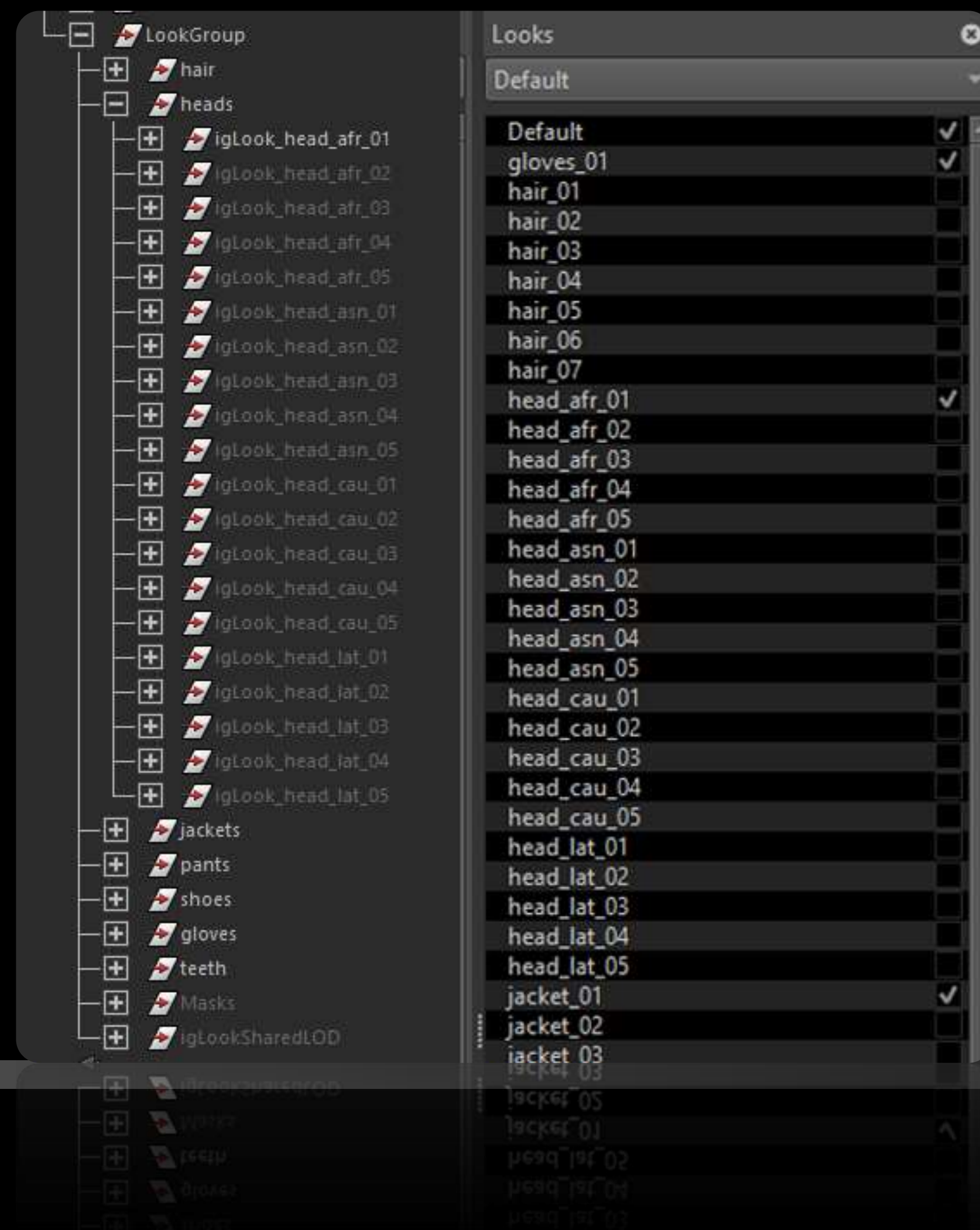
- T5 heads worked for thugs, too heavy for civilians, cops in open world
- Planned on creating simple rigs for basic expressions





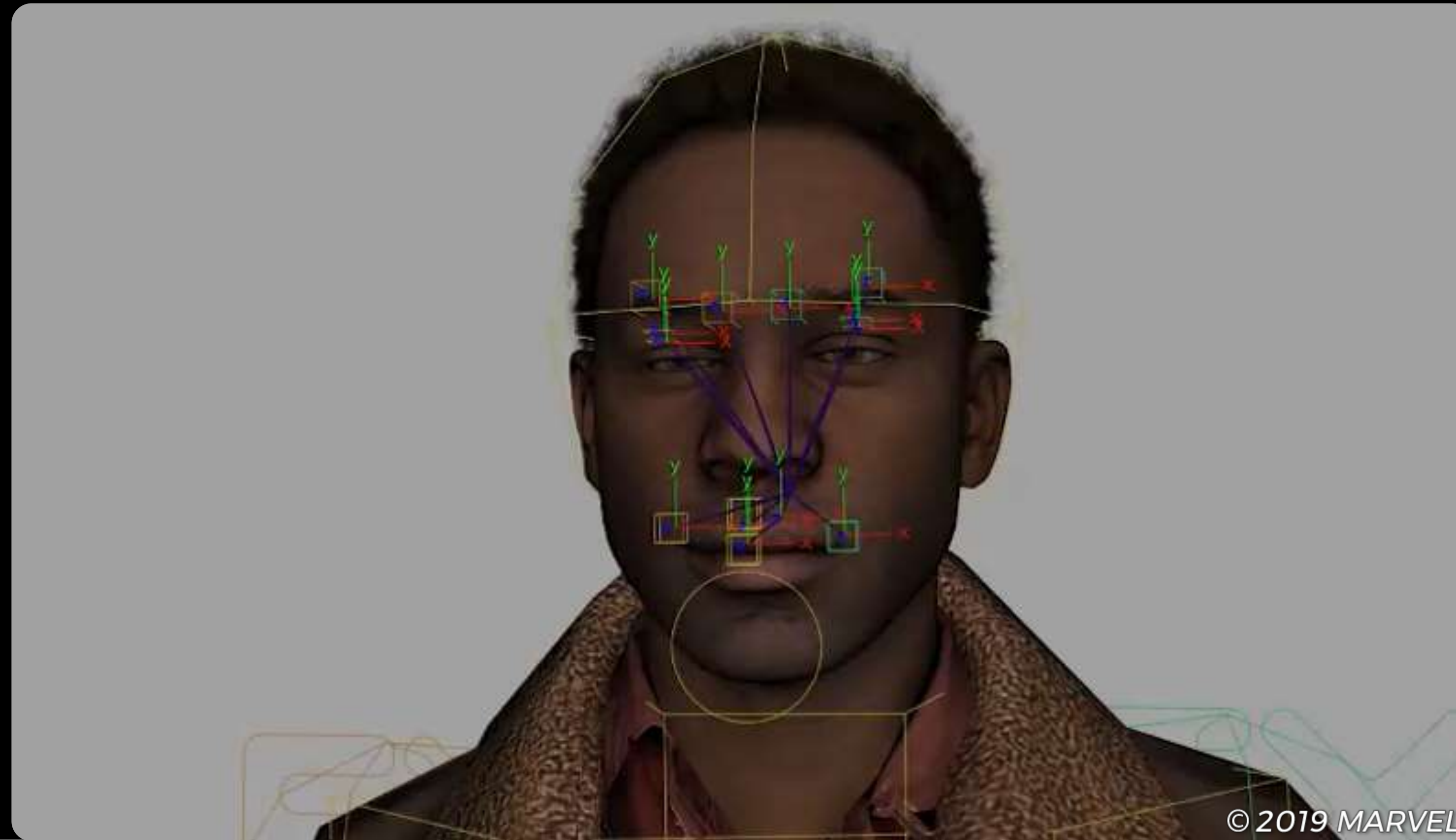
# Heads in the Open World – All In One

Even that was too heavy, so we combined heads into body rig



# Heads in the Open World - All In One

- Combining to one rig meant no custom joint positions per-head.
- Solution? As few rotations as possible. All but jaw are translate.



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# Heads in the Open World - Eyeballs

Had surprisingly good results with blendshapes



**Eyes Are Small**  
**Thanks for Coming to my TED talk...**





# Heads in the Open World - Eyeballs

Had surprisingly good results with blendshapes.  
Scrapped due to lack of benefit.



# What Could Have Been a Cautionary Tale

Batch Tools and Naming Conventions Saved Me





# Moving Forward

Conditional script additions for characters got messy. Separate out.

```
# Delete some nodes
if character in ['may', 'fisk', 'yuri']:
    pm.delete('eyebrows_mesh', 'eyelashesUpper_mesh', 'eyelashesLower_mesh')

elif character in ['mary', 'li', 'miles', 'sable', 'pete', 'osborn']:
    pm.delete('eyebrows_mesh')

elif character == 'tombstone':
    pm.delete('teeth_mesh')
```

```
# Final touches
if character == 'pete':
    pm.parent('FACIAL_C_NeckRoot', 'neck4_twist')
    wmBlendOut()

elif character == 'li':
    if pm.objExists('shader_eyesInner_shader'):
        pm.rename('shader_eyesInner_shader', 'npc_eye_brown')

elif character == 'fisk':
    neckJiggleRig(character)
```

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# Moving Forward

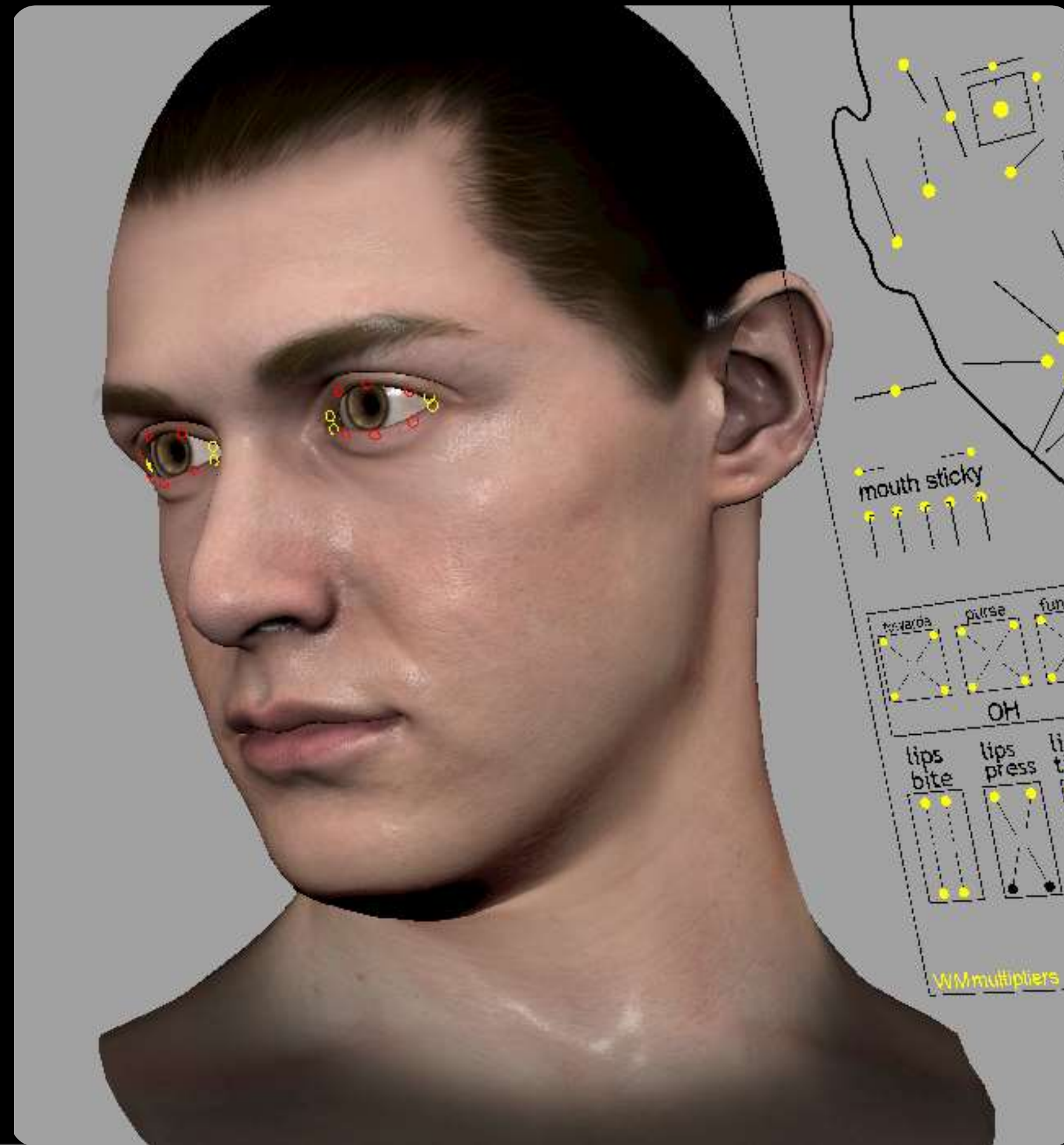
Deciding on a generic clavicle weight. Lots of clipping bugs





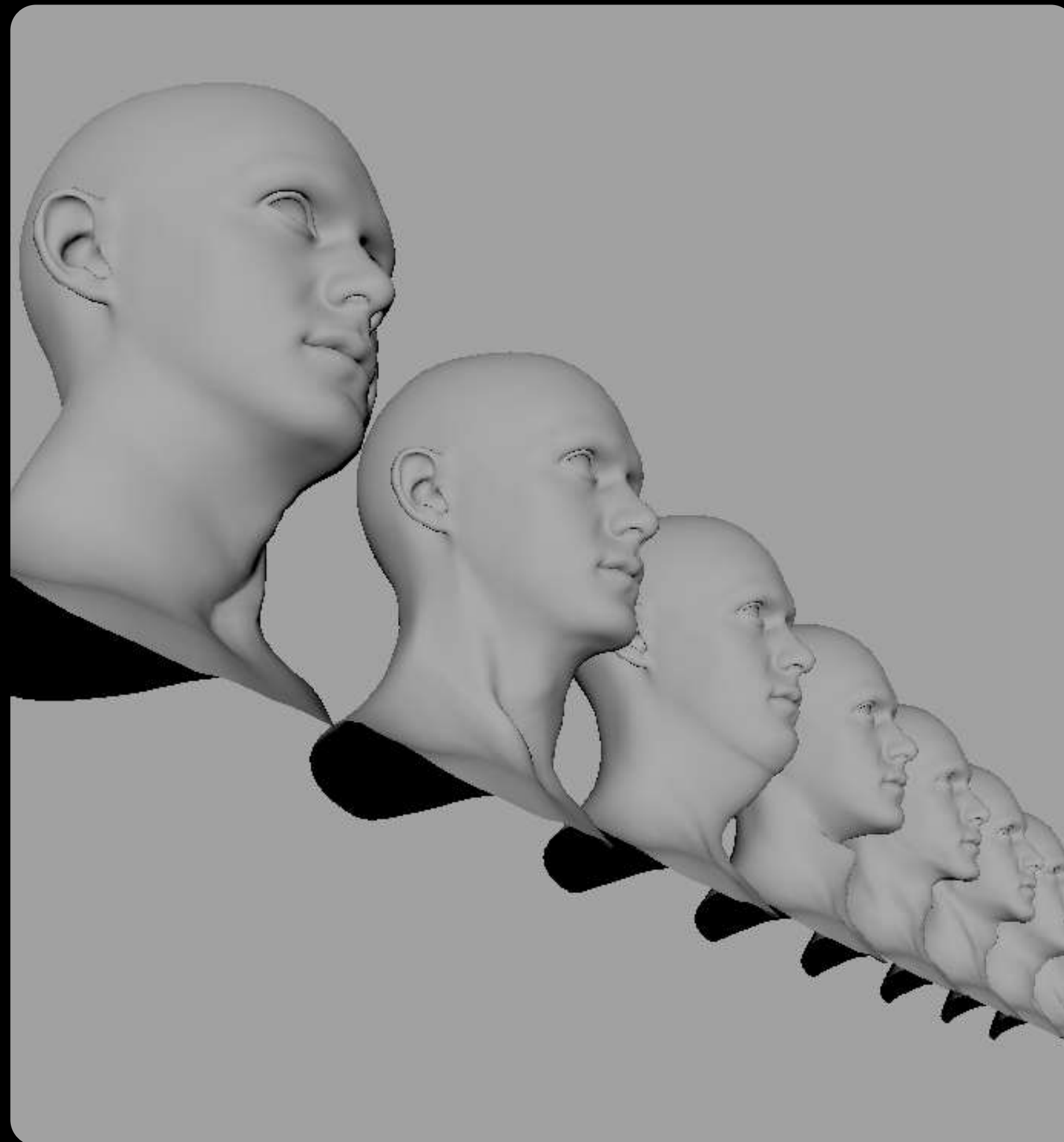
# Moving Forward

Adding correctives beyond standards were too cumbersome



# Moving Forward

Save out blendshape deltas rather than targets





# Moving Forward

Be more conscious of engine parameters. Stress test early, often.

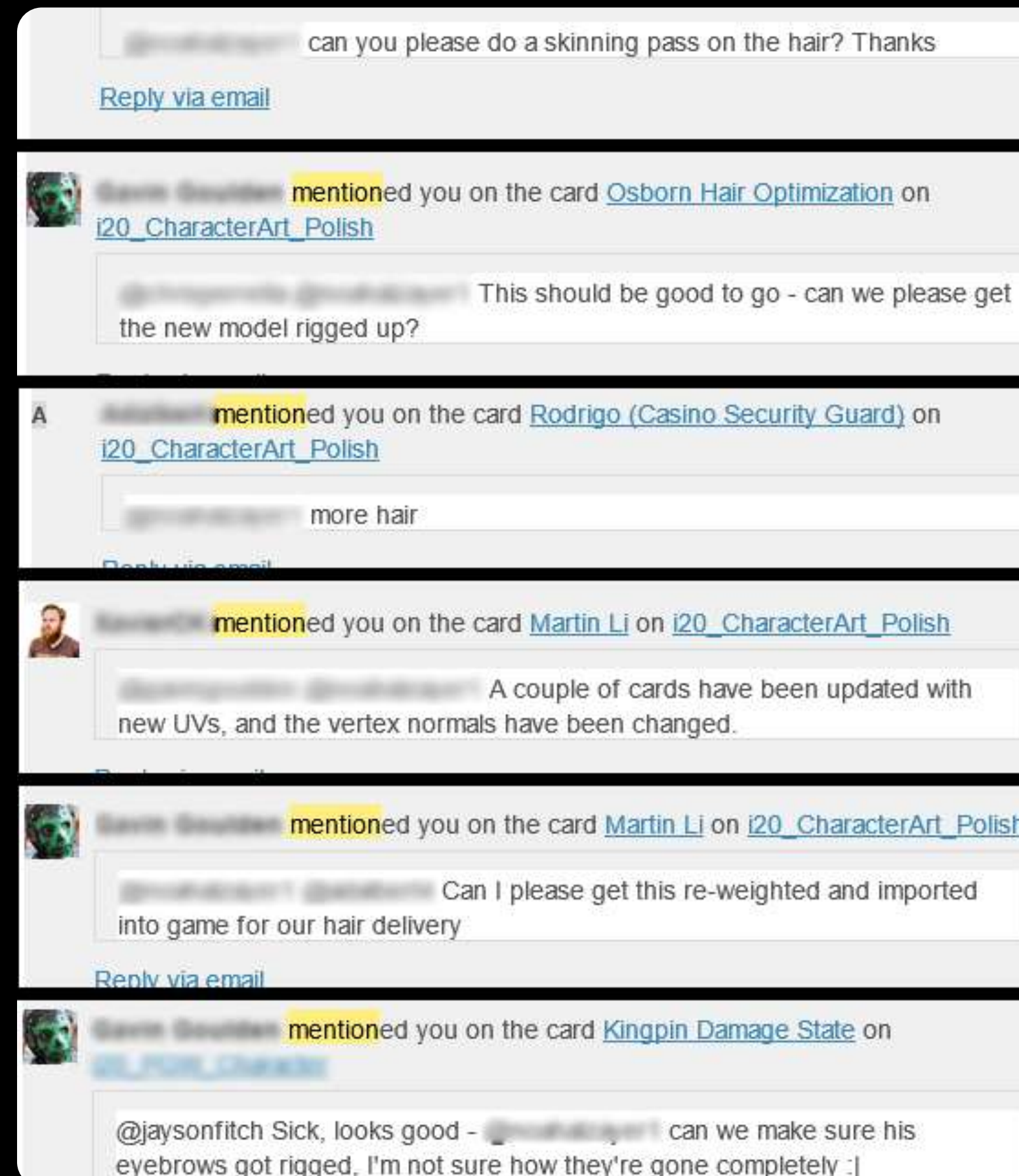


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# Moving Forward

Give character artists tools for updating art meshes. Get that off my plate





# Special Thanks

## TechAnim Team (Past and Present)

Sophie Brennan  
Adam Engel  
Nina Fricker  
Dustin Han  
Adalbert Kinsey  
Derek Lewis  
Sergio Sykes  
Alan Weider

-

Erik Eidukas  
Josh Huber  
John Lee  
Ben Morgan

## Shader Team

Craig Goodman  
Chris Perella  
J Tuason

## Animation Team

Too Many To List...

## Character Team

Leroy Chen  
Henrique Jardim  
Colton Orr  
Xavier C.K.  
Gavin Goulden  
Marco Villapalando  
Jayson Fitch  
Dustin Brown

## Core Team

Also Too Many To List...

## Jeff Hanna

## 3Lateral

## Cubic Motion

## Our Amazing Actors

## Marvel Games

## Sony Interactive Entertainment

## Many More I'm Probably Forgetting



# Thanks To You





# We Need Some Heroes

**South Hall Booth 360**  
**[insomniac.games/careers](https://insomniac.games/careers)**

## Burbank

Director, Animation Management  
Director, Art Management  
Director, Audio Management  
Director, Production Management  
Outsourcing Manager  
Outsourcing Artist  
Material Artist  
Sr. Environment Artist  
Audio Lead

### **Associate-Mid level Character TD**

Sr. Destruction Artist – Particles 2  
VFX Artist  
Material Artist

## Either Location

Sr. Engine Programmer: Physics  
Engine Programmer: Maya/Pipeline  
Mid/Senior Engine Programmers: Tools  
Sr. Engine Programmer: Audio  
Sr. Engine Programmer  
**Rigging Interns**

## Durham

Designer





# Any Questions? Evaluations to Fill? (hint hint)



 @NoahAlzayer

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 tech-artists.slack.com

[www.NoahAlzayer.net](http://www.NoahAlzayer.net)

(I'm not actually in this picture... I missed it being taken by about a minute, so I'm probably somewhere in the vicinity of the E3 Banner)