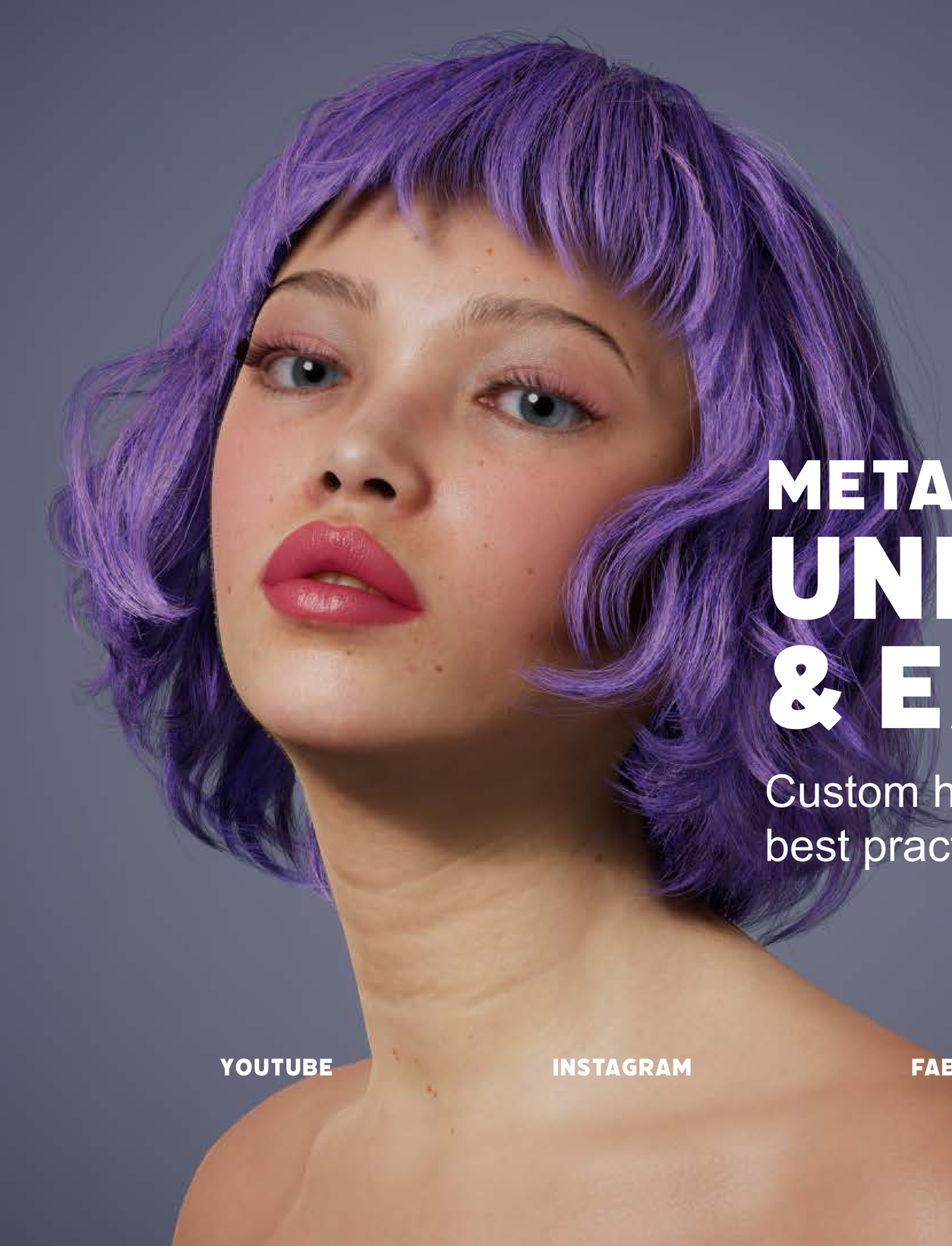


METAHUMAN GROOM GUIDE:
UNREAL ENGINE 5.7 & EARLIER

Custom hair creation and setup for MetaHumans:
best practices, groom settings, tools, and plugins.

YOUTUBE INSTAGRAM FAB STORE ARTSTATION LINKEDIN

note: viirtuals.com is my new name and home for what used to be realtimehair.com

IN THIS GUIDE:

- MetaHuman Groom System & Workflow Explained
- Making Hair in Blender, Houdini, and Maya
- Exporting Grooms & Importing Grooms to UE5
- Groom Asset Settings and attaching hair to a Metahuman
- Hair Simulation & Rendering tips

ABOUT ME

MARIIA ZATORSKA

I create custom MetaHuman characters for games and cinematics. Check out my Fab shop for MetaHuman hair grooms, clothing, and fully assembled characters.

ARTSTATION **LINKEDIN** **FAB STORE**

METAHUMAN GROOM SYSTEM & WORKFLOW

Unreal Engine's Groom System is a strand-based hair solution that lets you import, simulate, and render high-fidelity hair directly inside UE5.
It is built for both high-end cinematics and real-time performance.
It supports alembic grooms coming from Maya, Blender, and Houdini, and provides full control over strand width, shadows, physics, and materials.

In short, the MetaHuman Groom system is incredible.

The Groom system has been around for almost five years, giving us a completely free way to bring digital humans and creatures to life with real-time hair simulation (well… free within your performance budget).

And this year, Epic gave us groom templates for both Maya and Houdini, a Houdini Grooming Tool that lets you build hair procedurally and automate so many steps, and the new MetaHuman Creator where you can customize your characters with your own hair assets and share those custom creations conveniently between projects and teams.

And also no we have access to an experimental plugin that generates hair cards directly from spline grooms — with baked textures. It runs on the same physics system as strands, so your cards inherit the same movement and behaviour.

Hair Card Generator

METAHUMAN GROOM SYSTEM & WORKFLOW

UNDERSTANDING CARDS, MESHES, STRANDS, AND PHYSICS

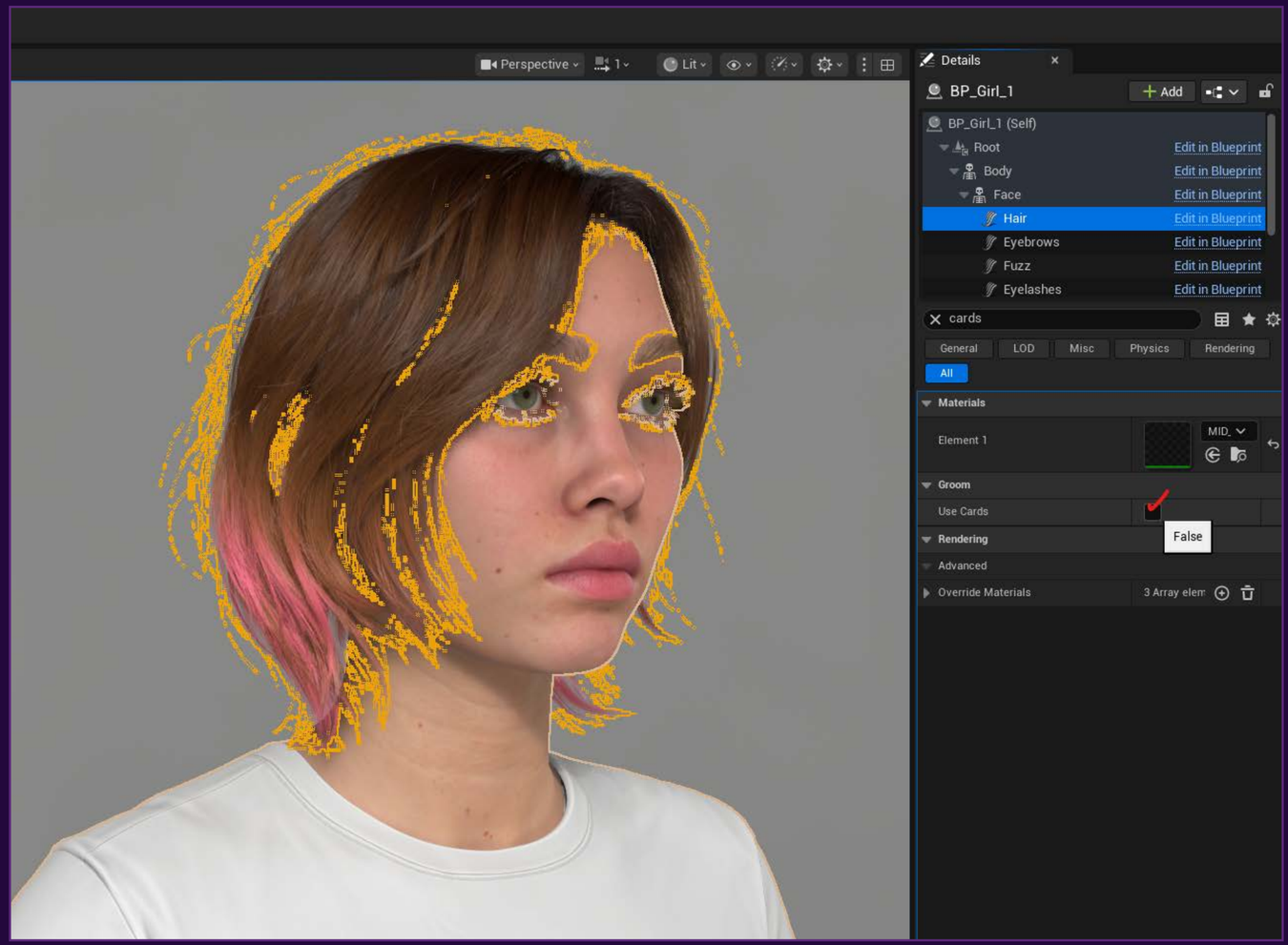
Strands are individual hair curves imported from your DCC and offer the highest visual quality, especially under close-up lighting.

Cards and mesh-based hair are lower-poly alternatives that work well for games or as LODs when the character is farther from the camera.

A groom can be represented as strands for the main asset, hair cards for LODs, and meshes for baked buzzcuts or the lowest LODs, similar to a helmet.

The standard MetaHuman hair material, M_Hair, is used across all of these groom types. (If you want to explore previous versions of Epic's hair-card shader, download any free **Paragon** character from Fab and look at the hair-card material they use.)

Hair simulation in UE5 is handled by the Groom Physics Solver. However, you can import an Alembic cache from your DCC to drive custom hair animation using baked simulation, which replaces real-time physics.



To view the Card mesh - Select the Hair Component of your MetaHuman Blueprint in the Scene, then in the Details panel enable **Use Cards** to switch the groom to its Hair Cards representation.

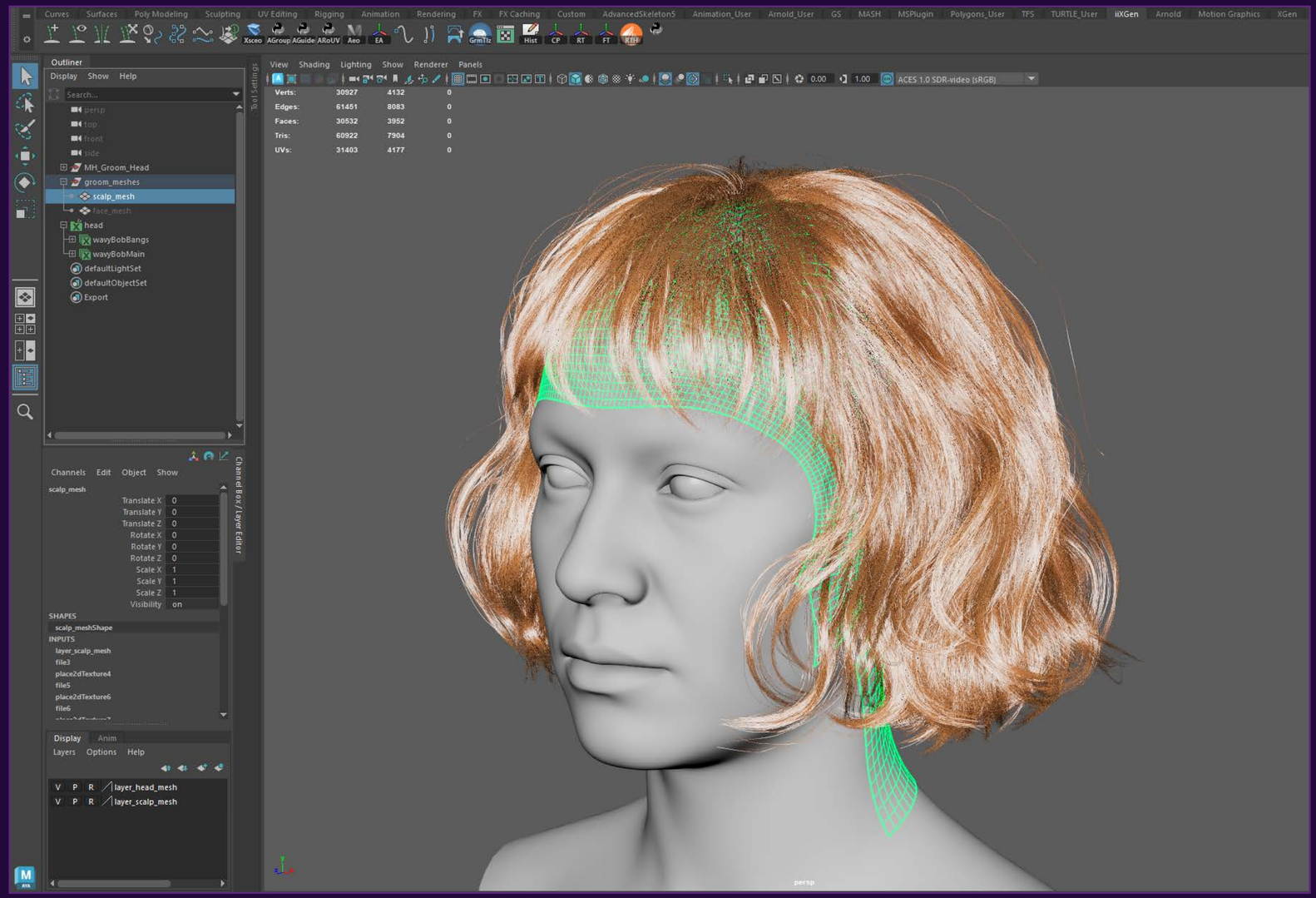
MAKE HAIR IN BLENDER, HOUDINI, AND MAYA

CORE PRINCIPLES FOR CREATING METAHUMAN-READY GROOMS (ALL DCC)

CREATE A HAIR CAP

Using a dedicated cap keeps your groom stable even when the character's head mesh changes during development, which is common in both game and cinematic pipelines. It also ensures the groom can transfer cleanly between DCCs and supports animated heads, blendshapes, and corrective rigs without breaking the roots.

- Simulation teams prefer capped grooms because the attachment surface staysstable across rigs and shots.
- Caps make it easier to paint masks, density maps, and root/tip attributes without touching the main character mesh.



BUILD FOR YOUR CHARACTER VS. BUILDING FOR METAHUMAN CREATOR

You can groom directly for your custom character head, but if you want full MetaHuman compatibility (parametric controls, facial morphs, MH Creator import), create the groom against Epic's **standard MetaHuman Groom Head template (see the links for each DCC on next pages)**. This guarantees correct skin weighting, binding, and transform behavior when driven by the MetaHuman FaceMesh.

PLAN THE GROOM: SPLIT INTO LOGICAL GROUPS

Break the hairstyle into meaningful components — front, sides, back, flyaways, fringe, coils, etc.

Groups allow you to:

• Assign different materials, widths, shadows, root/tip scales.

• Enable simulation only where needed (e.g., just the front section).

• Tune physics per group for stability and performance.

USING YOUR SCULPTING GUIDES FOR THE FIRST CLUMPING PASS

Make your first clumping pass based on the control guides you used to sculpt the hair. When exporting from Maya or Houdini, assign the guide attribute so these curves can be used in Unreal as simulation guides.

This makes it convenient to drive the groom's simulation with guides that follow its main structural features, which results in more realistic hair physics.

WITH PERFORMANCE OPTIMIZATION IN MIND

We use the groom's total vertex count to estimate how heavy it will be to render (Strands × CVs = Total Vertices). You can view these numbers for each groom group in the Groom Asset under the Strands section.

Unreal Engine also has a limit of 255 vertices per strand.

Plan your groom budget:

• Straight / wavy hair: keep total vertices under ~1.5M

• Coily / afro-textured hair: up to 4M is acceptable due to density

BEST PRACTICES FOR OPTIMIZATION:

• Control this by balancing strand count and CV count per strand.

• Keep simulation guides minimal.

• Only voxelize large groups that cast visible shadows.

• Reduce MSAA samples if needed (2–4).

• Always preview your groom in-editor and render to find the "sweet spot."

AUTHORING GROOMS IN DIFFERENT DCCS

MAYA

Maya is established grooming DCC for Unreal workflows, it has support for xGen Core and Epic's export tool (inside MetaHuman for Maya Tool).

MetaHuman Groom Starter Kits (Maya)

MetaHuman for Maya Tool

XGEN CORE VS INTERACTIVE GROOM SPLINES

xGen Core is the industry standard—supported by all export scripts and aligned with Epic's guidelines. Interactive Groom Splines can be exported manually but lack full metadata support, making them less ideal for UE5.

You can find how to manually export grooms made with Interactive Groom Splines here:

How to manually export grooms made with Interactive Groom Splines

TUTORIALS + USEFUL PLUGINS

Groom Tools by NoBrain - amazing tool to help with complex grooms creation in Maya LINK

Exporting groom from Maya (Free) MetaHuman for Maya Tool LINK

Official Epic tool documentation for modifying a MetaHuman in Maya and exporting back to UE LINK

xGen2UE Export Script (Gumroad) - this is my older tool. Since Epic now provides a free and more complete exporter, I recommend using mine only as an alternative: LINK

Great tutorial on Exporting from Maya (video): LINK

AUTHORING GROOMS IN DIFFERENT DCCS

BLENDER

Blender has no official MetaHuman starter kit, but you can download the UE project from Maya's version and export a MetaHuman head (template) from Unreal (FBX) and use it as your grooming base.

MetaHuman Groom Starter Kit for Maya

USING UNREAL GROOM TEMPLATE

Export MH head → import into Blender → groom using Curves/ Geometry Nodes → export Alembic for UE.

PARTICLE HAIR VS GEOMETRY NODES GROOMING

Particle Hair is Blender's legacy system—simple but not future-proof. Geometry Nodes Grooming is the modern, procedural system with better control, cleaner exports, and is the recommended approach for all UE5 work.

TUTORIALS + USEFUL PLUGINS

GN Grooming Basics

Advanced Curve Grooming

Procedural Hair Setup

Blender Groom Exporter (Alembic)

(Note: does not support Color Attribute export.)

AUTHORING GROOMS IN DIFFERENT DCCS

HOUDINI

Houdini is ideal for procedural grooming, with powerful control over clumping, masks, and exporting all the attributes per Epic's schema.

MetaHuman Groom Starter Kit for Houdini

Epic Groom Tools for Houdini - Official toolset for building UE-compatible grooms

DOCUMENTATION:

Tool

MH Groom Hairstyle Generator

TUTORIALS + USEFUL PLUGINS

Epic Groom Tool Overview

HAIR GROOMING Tutorial You Need! (Houdini for Artists)

Tutorial Grooming in MetaHuman for Houdini Plugin (video)

Groom Fundamentals & Resources by Creature Garage

CHECK OTHER TUTORIALS:

SideFX Hair & Fur Tutorials (YouTube / SideFX Docs)

Labs Groom Tools for procedural workflows

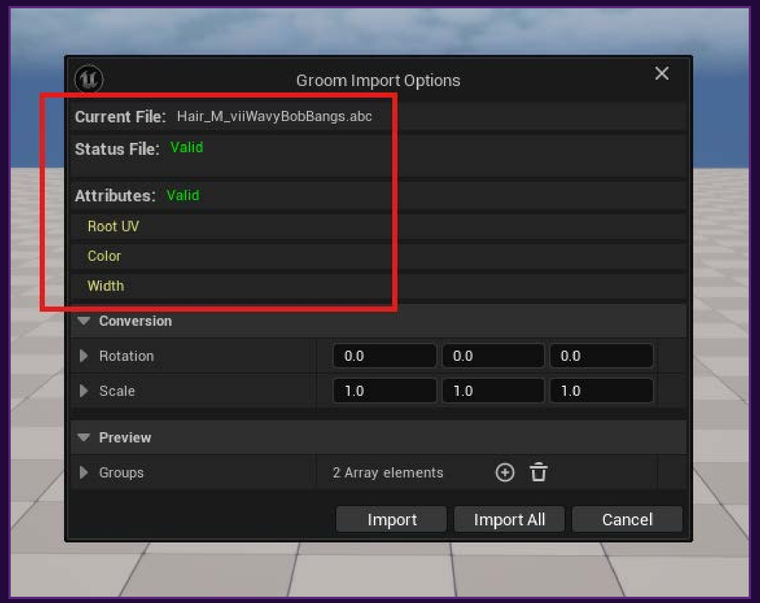
EXPORTING GROOMS

ALEMBIC ATTRIBUTES EXPLAINED

Detailed ocumentation

KEY ATTRIBUTES WE CARE ABOUT THE MOST

These four matter the most in a real production groom pipeline.



groom_group_id

This assigns each strand to a specific groom group — allowing UE to apply different materials, physics settings, or shading parameters to regions like bangs, side hair, beard, or flyaways. (Grooms in UE are structured by groups, and we tune each group separately.)

groom_guide

Marks your sculpted guide curves so they drive the simulation inside Unreal. A good practice is to generate first clumping based on these guides in DCCs, and then UE uses the same guides for physics — making the simulation follow the original structure of your groom.

groom_root_uv

Stores per-strand root UVs based on the character's head UV layout. UE can auto-generate this, but we prefer exporting it because:

• It allows generating follicle textures directly from the groom.

• It supports Highlight maps or any artistic color masks in the Hair Material.

• It links the groom precisely to the scalp UVs, which is essential for realistic root shading.

groom_color

Vector3 per-CV color attribute used for gradient/ ombré effects in the hair shader. This is required for the Ombre feature in MetaHuman's hair material. I've found that only Houdini can assign this attribute correctly. And Maya & Blender cant as they cannot assign Vector3 attributes per-point/CV natively, so no reliable way to export groom_color from them (at least not with stock tools).

FREE PLUGINS FOR EXPORTING:

Maya

+Epic Doc

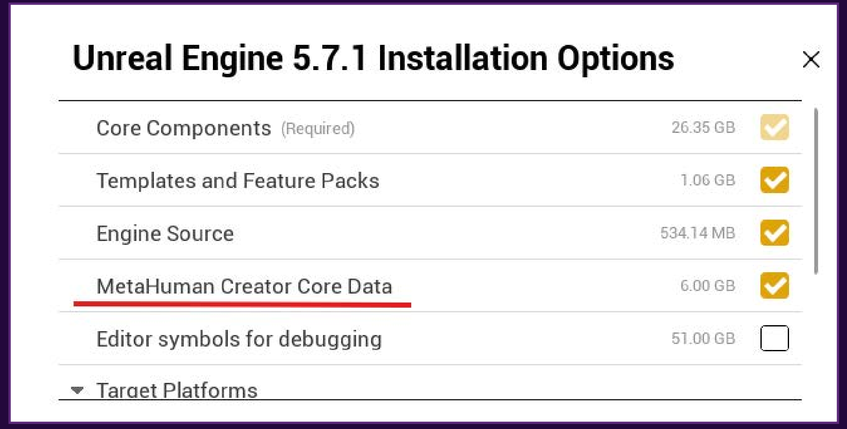
Houdini

Blender

UE5 PROJECT SETUP FOR HAIR

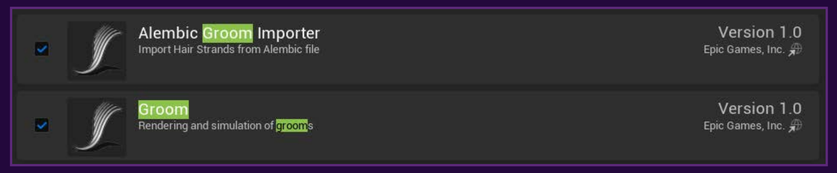
ENABLE METAHUMAN CORE

Right-click your Unreal Engine version in the Epic Games Launcher → Options, then enable MetaHuman Core in the list of optional components.



ACTIVATE REQUIRED PLUGINS

- Groom
- Alembic Groom Importer
- Optional - Metahuman Creator and any other Metahuman related plugins



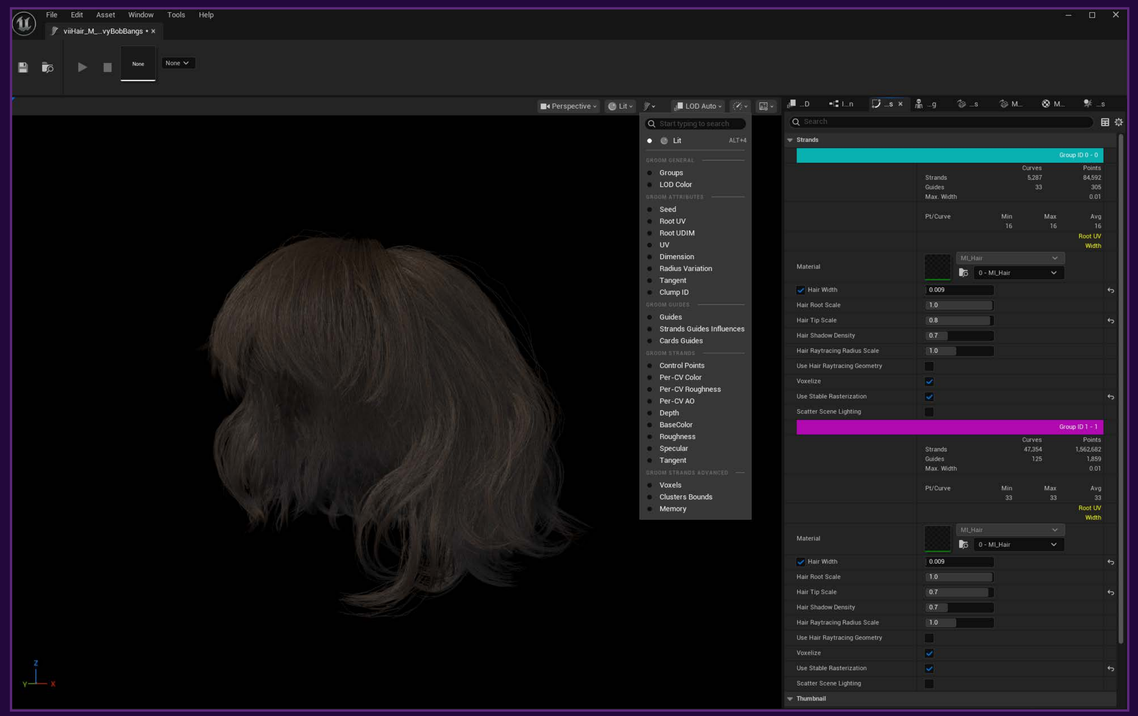
My favorite cVar to make the hair look nice is “r.HairStrands.RasterizationScale” This avoids overly thick hair caused by UE’s default rasterization scale.

r.HairStrands.RasterizationScale = 0.1 (default value is ‘0.5’)

GROOM ASSET SETTINGS

GROOM ASSET SETTINGS

To access your Groom Asset Settings, simply double-click the groom in the Content Browser. This opens the dedicated Groom Asset window, where you'll find all core controls for Strands, Physics, Materials, and Interpolation.



GROOM VISUALIZATION

Use the Groom Visualization button at the top of the Groom Asset window to debug and inspect your data.

Here you can display strand attributes, per-group visualization, root/tip widths, UVs, and other internal properties — extremely helpful when checking imported Alembic attributes and group assignments.

Some Strands Settings Inside the Strands panel, you can tune the essential rendering parameters of your groom:

- Width — Unreal does not use the native width from Maya, so adjust this to match your desired strand softness or realism.
- Root/Tip Scale — Controls how thick the hair appears at the root and how fine it tapers toward the tip.
- Shadow Density — Defines how strongly each group casts shadows, useful forbalancing realism and performance.

ATTACHING HAIR TO A METAHUMAN

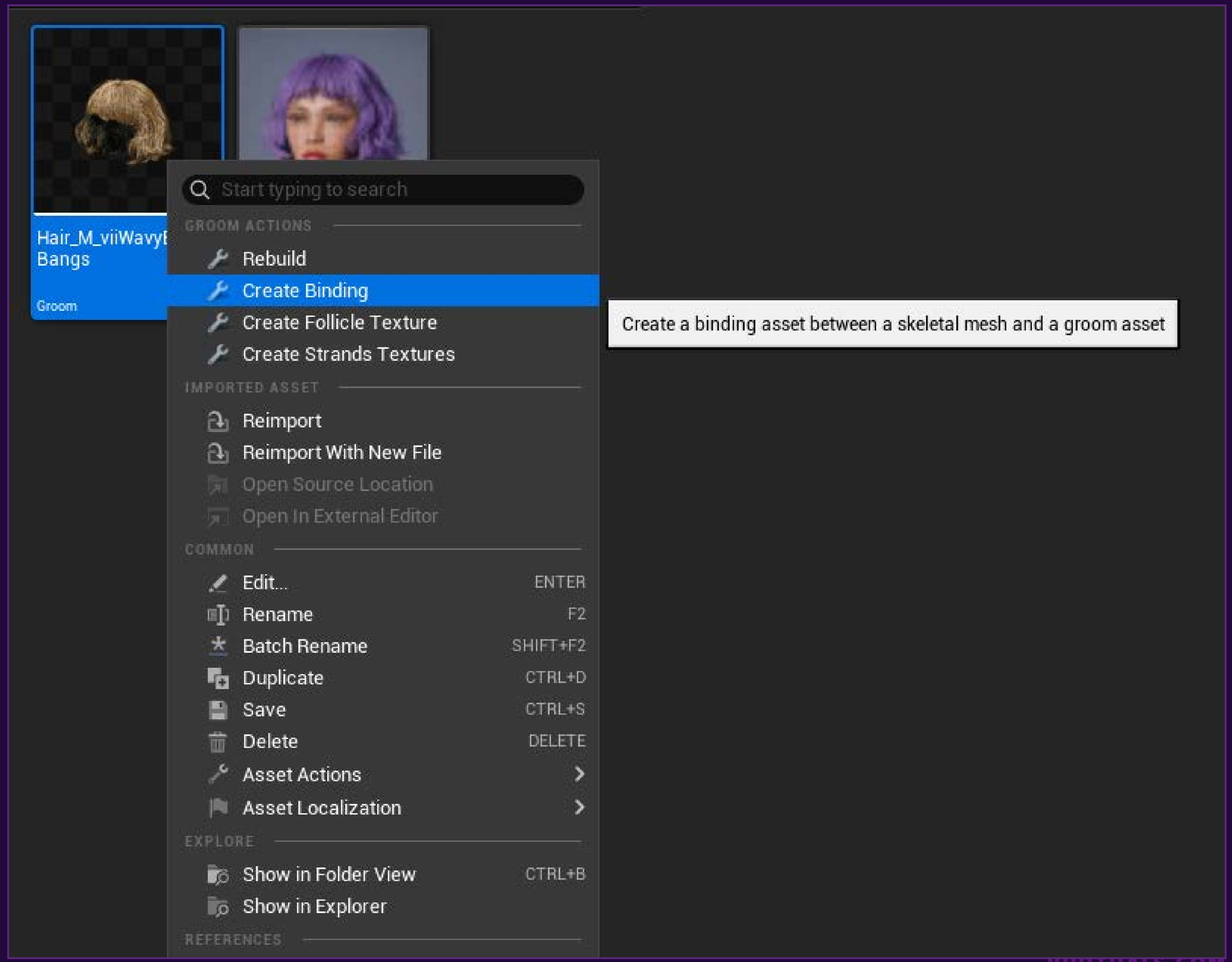
FOR ASSEMBLED METAHUMAN CHARACTERS IN UNREAL:

- Import your .ABC groom into the project.
- Right-click the groom asset and choose Create Binding.
- Select the MetaHuman's FaceMesh as the Target Skeletal Mesh and also as Source Skeletal Mesh (in Advanced) — this generates the binding asset that drives deformation.
- Apply the newly created binding to your groom in the Groom Component.
- Open the Groom Asset window to tweak strand width, root/tip scale, shadow settings, and physics if needed.

This ensures the groom follows the MetaHuman rig correctly and behaves as expected in animation and simulation.

If you're preparing hair for MetaHuman Creator 5.6–5.7, export it in the MHPKG format so it can be loaded as a wearable asset. Follow this tutorial for the full MHPKG setup workflow:

Full MHPKG setup workflow



HAIR SIMULATION

ENABLE PHYSICS SIMULATION

by opening the Groom Asset, going to the Physics tab, and turning on Enable Simulation. Adjust gravity, substeps, iterations, bend stiffness, and collision radius based on the groom's length and style.

I mostly tweak these settings:

- **Gravity**: 0 to 1, where 1 follow the original shape of the groom developed in Maya.
- **Sub Steps**: 5 - 20 for short hair, up to 40 for long.
- **Iteration Count**: 5 - 10 for short, 10-20 for long hair
- **Bend Stiffness**: 0.09 (for thick short hair), 0.001 (default is alright for long/medium hair). Use the graph Stiffness Scale to make Bend Stiffness lower on tips (use the curve graph)
- **Collision Radius**: 1 to 10

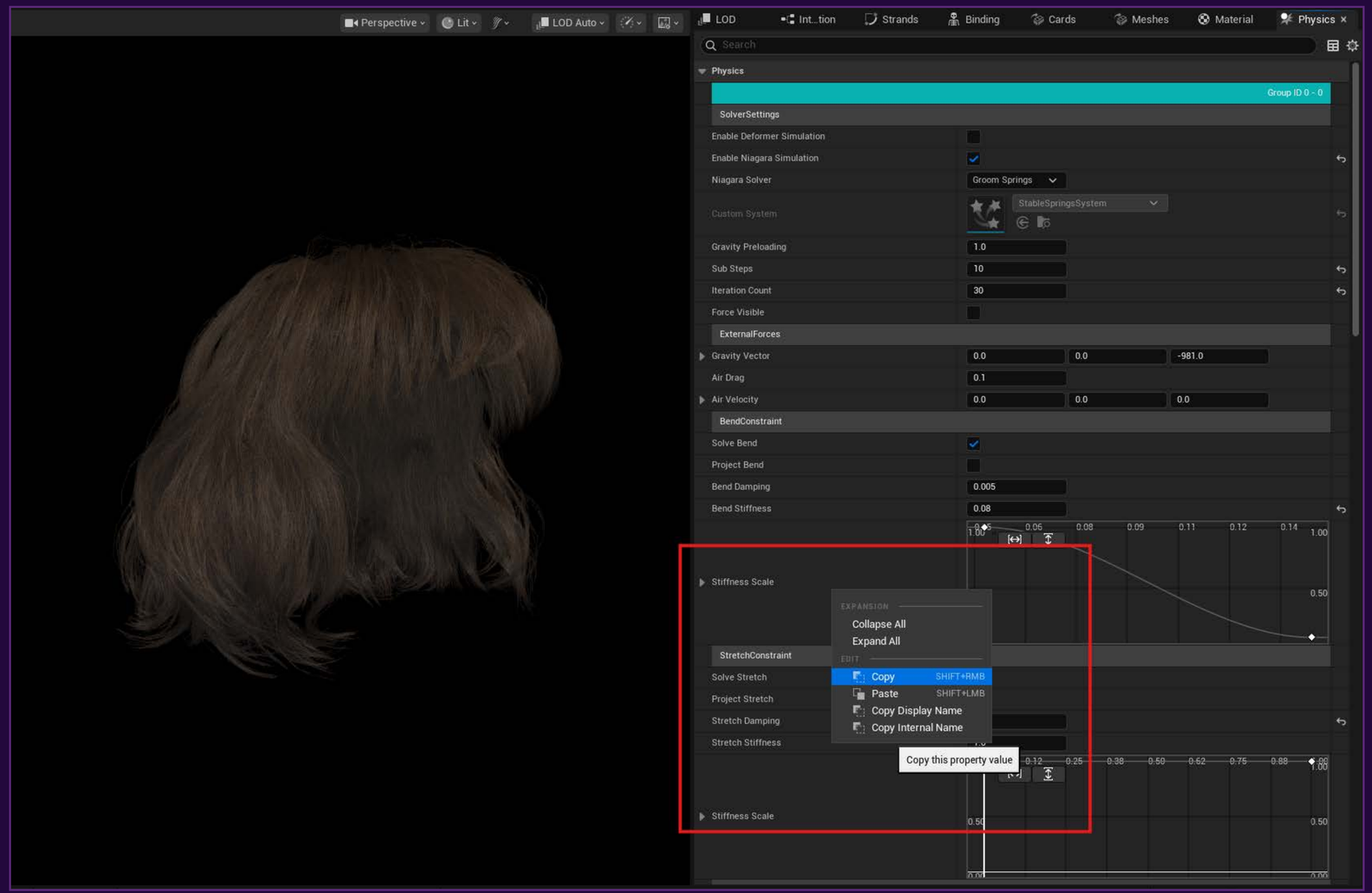
Copy settings from Epic's MetaHuman grooms if you want a solid starting point.

You'll find all official MH groom presets in your project under:

/All/EngineData/Plugins/MetaHumanCharacter/Optional/Grooms/GroomAssets/Hair

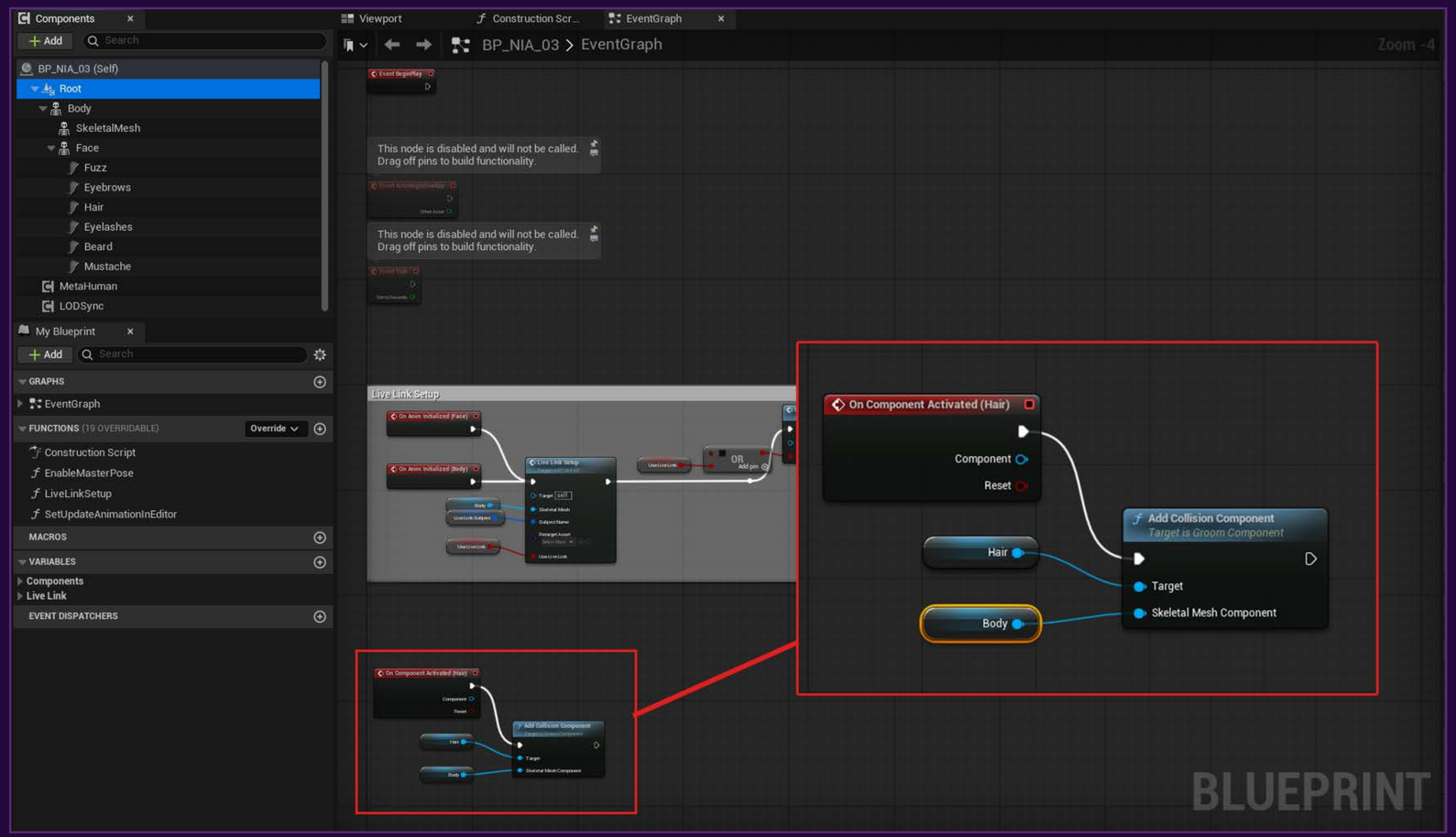
(Make sure you activated the Metahuman Core component for you EU Editor version -see chapter 5 - UE5 Project Setup)

Open any Groom Asset, go to the Physics tab, and simply mirror the parameters. You can right-click and copy–paste any parameter value or curve graph from one groom asset to another.



AVOID SIMULATION

Avoid simulation for very short, rigid, or helmet-hidden hairstyles, background characters, or any scenario where movement isn’t essential. This saves performance and reduces unnecessary solver cost.



ADDING BODY COLLISION FOR LONG HAIR

If your hair extends past the FaceMesh and you want it to collide with the hands or body,you can add the MetaHuman’s body mesh as an extra collision source for the groom inside the Blueprint.

How to do it:

- Open your MetaHuman Blueprint and select both the hair groom component and the body Skeletal Mesh.
- Add an On Component Activated event for the groom.
- From that event, add an Add Collision Component node.
- Plug the groom into Target and the body mesh into Skeletal Mesh Component.
- Compile and save.

SOME RENDERING TIPS

Rendering is always personal — everyone has their own taste for how hair should look, whether it's for a demo, a cinematic, or a final real-time experience. Lighting, shadows, post-process and colour grading all influence the final look, so there's no single perfect setup. If you're starting out, a professional can help a lot, but you can also learn everything through Epic's documentation and tutorials. For quick, cute product renders, these cVars usually give the nicest results:

r.HairStrands.RasterizationScale 0.1
(makes strands appear thinner and less "chunky")

r.HairStrands.Voxelization.Raymarching.SteppingScale 2
(cleaner, softer strand shadows)

r.HairStrands.Visibility.MSAA.SamplePerPixel
(smoother edges, less shimmering)

r.Shadow.Virtual.ResolutionLodBias -1
(higher-resolution directional shadows)

r.ScreenPercentage 150
(supersampling for sharper hair renders)

Additional high-quality hair rendering cVars can be added to your project settings or Movie Render Queue profile.

ADDITIONAL USEFUL TWEAKS:

• Adjust Root/Tip Scale, Hair Width and Shadow Density inside the Groom Asset

• Disable voxelization on small grooms like brows and lashes to reduce noise

For more hair-focused cVars and settings, I recommend this plugin:

Groom UE5.5+ Hair Cinematic Tool 2.0.2

And their video that breaks down everything you need to know about rendering highquality hair in UE5

Full video guide

IF THIS GUIDE HELPED YOU, FOLLOW ME

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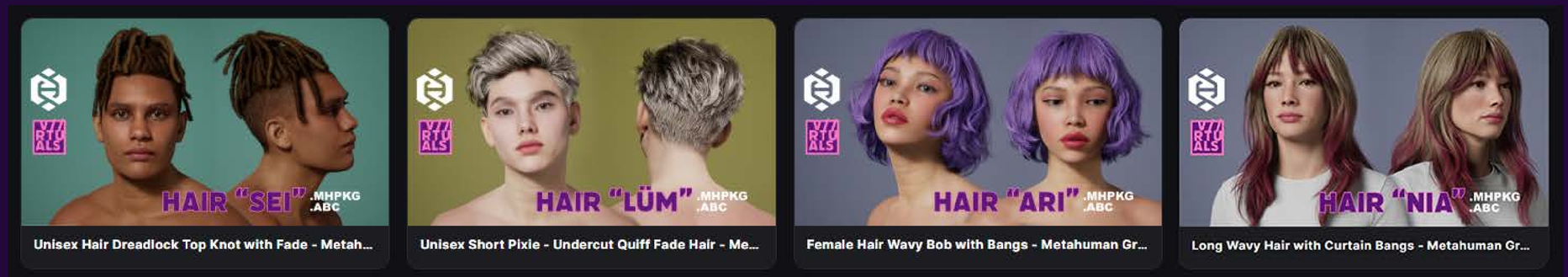
CHECK OUT MY HIGH-QUALITY METAHUMAN ASSETS ON MY **FAB STORE**



Reach out if you need any custom MetaHuman development —
I'm always happy to collaborate.

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