

Vanguard HairFX

Hair and fur for 3ds Max - grown, groomed, simulated and ray traced on the GPU.

Version 1.0.15 3ds Max 2024 - 2027 vanguardfx.pro

1 Getting started

Requirements

- Windows 10 or 11, 64-bit, with administrator rights to install.
- 3ds Max 2024, 2025, 2026 or 2027 in its default folder.
- Optional NVIDIA GeForce GTX 16 / RTX 20 series card or newer: dynamics run on the GPU, and HairFx Live requires it. Without one, dynamics run on all CPU cores.
- Internet only to get the licence; HairFx then works offline.

Installing

1. Close every 3ds Max window.
2. Run VanguardFX_HairFx_Setup_v1.0.15.exe. It installs HairFx into every 3ds Max 2024-2027 it finds.
3. Start 3ds Max. No other setup is needed.

The plugin goes into each 3ds Max Plugins folder, this guide into C:\Program Files\VanguardFX\HairFx, and 14 sample scenes into C:\Users\Public\Documents\VanguardFX\HairFx Samples. To update, run the newer installer over the old one; it does not touch your licence.

Activating your licence

1. Select a HairFx object, open the Modify panel and expand the **HairFx - Licence** rollout.
2. Press **Copy** next to your Hardware ID.
3. Press **Get a licence**, sign in, choose HairFx in the Tools tab, paste the Hardware ID and attach your receipt.
4. When the licence is approved, press **Download licence** under My Licenses.
5. Press **Load file...** and choose the .lic file, or paste both lines and press **APPLY LICENCE**. No restart is needed.

> The licence file is not the licence key in your receipt. A 7-day trial installs the same way; when it ends, HairFx returns to demo mode.

Demo mode (no licence)

Every control works, with no time limit, but each HairFx object grows at most 2,000 hairs in the viewport and render. Dynamics run only on surfaces up to 2,000 vertices, **Save sim cache** does not work and Vanguard Render ignores **Render multiplier**.

Where HairFx appears

What	Where
Vanguard HairFx	Create panel > Geometry > VanguardFX
HairFx action	Customize User Interface > Toolbars, category VanguardFX; grows hair on the selected meshes
Vanguard HairFx Wind	Create panel > Space Warps > VanguardFX
Vanguard HairFx Material	Material Editor > Materials > VanguardFX
HairFx Live	HairFx - Tools > Live render (NVIDIA GPU)
Renderer	None of its own; any geometry renderer, or Vanguard Render

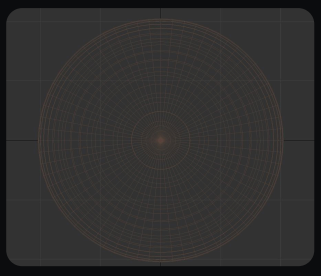
How HairFx works

HairFx is an object, not a modifier. It grows hair on the mesh picked in **Grow on** and follows its whole modifier stack. Guides, one per surface vertex, carry the shape, grooming and simulation. Hairs (**Hair count**, default 50,000) take their shape from the three guides of their triangle, plus clump, curl, kink and frizz. The viewport shows **Display %** (default 20%) of them, at most **Display max** (default 300,000); renders use **Render %** (default 100%).

2 Your first result in 5 steps

Step 1 - Set up units and make a sphere

Reset the scene (File > Reset). In Customize > Units Setup, set System Unit Setup to 1 Unit = 1.0 Centimeters and Display Unit Scale to Metric > Centimeters. Create a **Sphere** (Standard Primitives) in the Perspective viewport: **Radius** 20, **Segments** 32. HairFx grows one guide hair from every vertex.



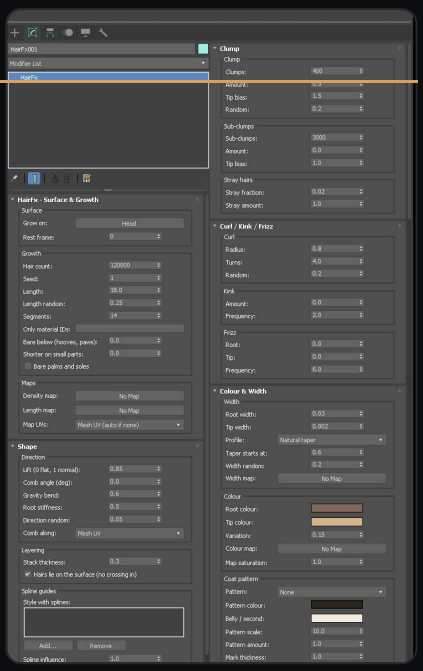
The sphere the hair will grow on.

Step 2 - Create HairFx and pick the sphere

In Create > Geometry, choose VanguardFX from the drop-down, click **Vanguard HairFx**, then click once anywhere in a viewport. In the Modify panel, HairFx - Surface & Growth rollout, click the **Grow on** button (it reads None), then click the sphere. Hair appears on the sphere.



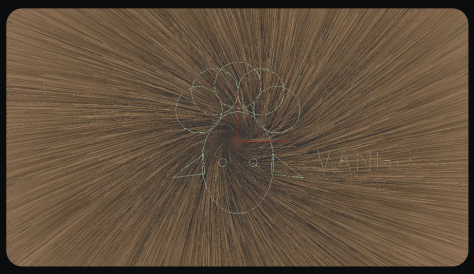
HairFx with its defaults, picked onto the sphere.



The HairFx object in the Modify panel: Surface & Growth, Shape, Clump, Curl / Kink / Frizz and Colour & Width.

Step 3 - Set the hair count and length

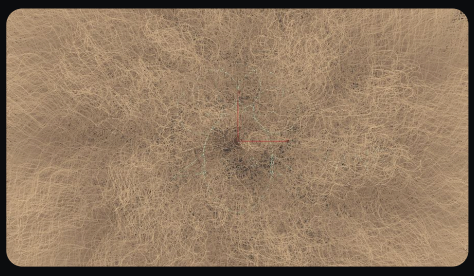
In HairFx - Surface & Growth, Growth group, set **Hair count** to 300000 and **Length** to 4. Leave **Segments** at 10. In the Shape rollout, set **Lift (0 flat, 1 normal)** to 0.5 (default 0.85) so the fur leans over. Leave **Gravity bend** at 0.3.



More hairs, longer.

Step 4 - Colour the hair and assign the material

In Colour & Width, set **Root colour** R 60, G 38, B 22 and **Tip colour** R 160, G 110, B 65. Press M and drag Vanguard HairFx Material (VanguardFX group) into the view. Assign it to the HairFx object, not the sphere. Leave **Use HairFx object colours** ticked.



Clumped, curled and coloured.

Step 5 - Render

Press F10 and choose **Vanguard Render** from the Renderer list (a separate VanguardFX renderer, not installed by HairFx). Its own sun lights the scene; no lights are needed. Press Shift+Q in the Perspective viewport. For a real-time preview, click **Live render** in HairFx - Tools (needs an NVIDIA CUDA card).

> Lengths are in scene units and assume centimetres; in a metre scene, divide by 100. The viewport draws only **Display %** of the hairs (20 % by default); the render uses **Render %** (100 %). Without a licence, each HairFx object is limited to 2,000 hairs (see HairFx - Licence).



A finished render in Vanguard Render: clump and curl, as in the sample scenes.

3 Every control explained

Every control, rollout by rollout, in panel order. Ranges and defaults are as shown in the panel; lengths are in scene units (the defaults assume centimetres). The same names, without spaces, are the MAXScript properties.

HairFx - Surface & Growth

Picks the mesh hair grows on and sets hair count, root placement and length. Roots are scattered on the rest frame, then ride the surface.

SURFACE

Grow on node (geometry) · default None
Mesh the hair grows from, with its modifiers; one guide per vertex. Picking another object erases grooming and simulation.

Rest frame -100000 to 100000 · default 0
Frame roots are scattered on; maps, material IDs and Bare options are read here. Use a neutral bind pose.

GROWTH

Hair count 1 to 20,000,000 · default 50000
Hairs scattered by area, capped by **Memory use %**; existing hairs stay put when raised. Unlicensed: 2,000 hairs at most.

Seed 0 to 999999 · default 1
Picks another random root placement. Give two HairFx on one mesh different seeds so roots do not coincide.

Length
0 to 1,000,000 scene units · default 10.0 scene units
Guide and hair length in scene units. Set it first, to the real coat length; long hair needs more **Segments**.

Length random 0 to 1 · default 0.25
Shortens each hair randomly by up to this share: 0.25 gives 75-100% length. Lower for trimmed or velvet looks.

Segments 2 to 64 · default 10
Segments per guide; higher bends smoothly but costs memory. Raise for long or simulated hair. Changing it erases grooming and simulation.

Only material IDs text, e.g. 1,3 · default (empty)
Grows hair only on faces with these IDs, comma or space separated; 2-4 means IDs 2 and 4. Empty = all faces.

Bare below (hooves, paws) 0 to 0.5 · default 0.0
No hair below this fraction of mesh height (world Z, rest frame); 0.05 bares the lowest 5%. For hooves or paws.

Shorter on small parts 0 to 1 · default 0.0
Shortens hair where surface radius is under 2.5% of mesh size: fingers, toes, ear edges. At 1, tightest spots get almost none.

Bare palms and soles on/off · default off
Removes hair on tight, downward-facing curves at the rest frame, such as palms, soles and paw pads.

MAPS

Density map map · default None
Where roots grow: white full, black none. Moves hairs rather than reducing **Hair count**; use for hairlines, partings, bellies.

Length map map · default None
Multiplies hair length by the map's greyscale at the root: white full, black none, above 1 longer. Read every frame.

Map UVs
Mesh UV (auto if none) / Auto: spherical / Auto: cylindrical / Auto: box · default Mesh UV (auto if none)
UVs all maps are read through. Mesh UV uses channel 1; use Auto when UVs are missing or overlap.

BUTTONS

Grow on (pick button)
Click, then pick the mesh; the VanguardFX > HairFx macro fills it from the selection.

Density map (map button)
Click to choose a map; drag it to the Material Editor as an instance to edit.

Length map (map button)
Same as Density map: click to assign, drag to the Material Editor as an instance to edit.

> Tip **Density map**, **Only material IDs** and the Bare options crowd the whole **Hair count** onto the remaining area. Lower **Hair count** to keep density.

Shape

Sets the direction hair leaves the skin, how it bends toward the ground, how hairs stack on the surface, and styling with your own splines.

DIRECTION

Lift (0 flat, 1 normal) 0-1 · default 0.85
Hair angle off the skin: 0 lies flat along the comb, 1 along the normal. Lower for sleek hair; near 1 for grass.

Comb angle (deg) -360 to 360 · default 0.0
Rotates the comb direction around the surface normal, positive counter-clockwise from outside. Adds to any **Comb along** mode; no effect at **Lift** 1.

Gravity bend -1 to 1 · default 0.3
Bends hair toward world −Z without stretching; at 1 tips point straight down, negative values bend up. Raise for long hanging hair.

Root stiffness 0-1 · default 0.5
Where gravity bends hair: 0 evenly from the root, 1 mostly near the tip. No effect at **Gravity bend** 0.

Direction random 0-1 · default 0.05
Randomly tilts each guide hair's start direction (one per vertex; coarse on low-poly meshes). Raise for wild grass, keep low when groomed.

Comb along
Mesh UV / Fur flow (from the face, down the limbs) / Straight down (0, 1, 2) · default Mesh UV
Mesh UV: map channel 1 U direction. **Fur flow**: away from Face helper or body centre, down limbs. **Straight down**: world −Z.

LAYERING

Stack thickness
0-100000 scene units (default assumes cm) · default 0.3
Lifts each hair's root section a random height, up to this value, off the skin; released by a third of its length.

Hairs lie on the surface (no crossing in)
on/off · default on
Pushes hair that dips below its root's surface plane back out near the root. Leave on for hair and fur.

SPLINE GUIDES

Style with splines shape nodes (list) · default empty
Hairs copy the blended shape of their three nearest splines, weighted by distance to the splines' first vertices. Draw splines root outward.

Spline influence 0-1 · default 1.0
0 keeps the hair's own shape, 1 the splines'. At 1 Direction, grooming and Dynamics stop; clumping, curl and frizz still apply.

BUTTONS

Add...
Pick a shape in a viewport to add it; each spline in it is a guide.

Remove
Removes the highlighted shape from the list; the shape stays in the scene.

> Tip Splines have no falloff and are read in world space: every hair follows its three nearest, however far. Link splines to the head.

Clump

Gathers hairs into locks on two levels: Clump pulls tips onto a centre hair; Sub-clumps makes finer groups share one shape. Both Amounts default to 0.

CLUMP

Clumps 0-200000 · default 300
Number of clump centres; each hair joins the nearest. Raise for smaller, finer locks, lower for chunky ones. Capped at hair count.

Amount 0-1 · default 0.0
Pulls each hair onto its clump's centre hair; 0 is off, 1 with Random 0 joins tips exactly. Try 0.2–0.4 for fur.

Tip bias 0.1-8 · default 1.5
Where the pull acts: 1 evenly root to tip, higher mainly the tips, lower from near the root for rope-like locks.

Random 0-1 · default 0.2
Varies the pull per hair between (1 − Random) × Amount and Amount, Sub-clumps included. Raise for loose hairs around locks.

SUB-CLUMPS

Sub-clumps 0-1000000 · default 3000
Number of finer groups, applied before the main clumps. Usually several times **Clumps**; very high values add build time.

Amount 0-1 · default 0.0
How strongly each hair copies its sub-clump centre's shape while keeping its own root, so hairs run parallel in strands.

Tip bias 0.1-8 · default 1.0
Where the sub-clump shape takes over: 1 evenly root to tip, higher mainly the tips, lower from near the root.

STRAY HAIRS

Stray fraction 0-1 · default 0.02
Random share of hairs that skip both clump levels and get extra frizz; fewer where wet. Set 0 for perfectly groomed hair.

Stray amount 0-100000 (scene units) · default 1.0
How far stray hairs wander at the tip, using **Frizz > Frequency**. Default assumes centimetres; scale with hair **Length**.

> Tip Wet hair reuses these clumps and does nothing while Clumps or Amount is 0; a tiny Amount such as 0.01 enables it.

Curl / Kink / Frizz

Texture on rendered hairs, on top of brushing and dynamics: Curl winds spirals, Kink adds slow bends, Frizz adds fine wander. All off by default.

CURL

Radius 0-100000 (scene units) · default 0.0
Radius of the spiral each hair winds around its path; 0 turns curl off. Roots stay straight. Waves and curls: 0.5-1.6 cm.

Turns 0-200 · default 3.0
Full turns per hair, root to tip; shorter hairs curl tighter. 0 = off. Above about 23, hairs look faceted.

Random 0-1 · default 0.2
Per-hair variation of curl radius and turns. 0.3-0.5 for natural, uneven curls; near 0 for uniform, stylised spirals.

KINK

Amount 0-100000 (scene units) · default 0.0
Slow random bends; roughly how far each tip is pushed off its path. 0 = off. Use for grass, straw, unkempt coats.

Frequency 0-100 · default 2.0
Roughly how many bends per hair; 0 makes each hair lean instead. 1-3 for long, lazy bends; use **Frizz** for fine crinkling.

FRIZZ

Root 0-100000 (scene units) · default 0.0
Fine random wander at the root, blending into **Tip** along the hair. Usually 0; large values make hair fuzzy from the scalp.

Tip 0-100000 (scene units) · default 0.0
Fine random wander at the tip; the main frizz control. Presets use 0.04-0.35 cm; raise for dry, flyaway or weathered hair.

Frequency 0-500 · default 6.0
Roughly how many wiggles per hair, also for stray hairs. 6-10 gentle, 20-30 coily hair or wool. Above about 42, frizz turns jagged.

> Tip Curl is applied before clumping, so a high **Clump Amount** forms ringlets; kink and frizz apply after and roughen clumps.

Colour & Width

Sets hair thickness along its length and hair colour: root-to-tip blend, optional texture, animal coat patterns, a face guide for animal faces, and highlight streaks.

WIDTH

Root width 0-10000 (scene units) · default 0.03 cm
Hair thickness at the root (0.03 cm = 0.3 mm). Human presets use 0.006-0.011 cm; raise for thick fur, whiskers or grass.

Tip width 0-10000 (scene units) · default 0.002 cm
Thickness at the tip. **Constant** ignores it; **Thick tip** and **Brush (thin root)** use it at the root. Keep well below **Root width**.

Profile
0 Linear root to tip, 1 Natural taper, 2 Constant, 3 Thick tip (inverse), 4 Thick middle, 5 Brush (thin root) · default Natural taper
Natural taper suits hair and fur, **Linear** whiskers, **Constant** fibres; **Thick tip** reverses, **Thick middle** bulges, **Brush** starts thin.

Taper starts at 0-0.99 · default 0.6
Fraction of length where width starts changing (Natural taper, Brush only). Lower (0.2-0.4) thins most of the hair; higher keeps it full.

Width random 0-1 · default 0.2
Scales each hair's width by a random factor from 1 - value to 1 + value. Raise for uneven fur or grass.

Width map map · default None
Greyscale map scaling each hair's width at its root: white keeps it, black hides the hair. Use to thin hairlines and edges.

COLOUR

Root colour
colour · default dark brown (approx. 26, 15, 8)
Colour at the root, blending evenly to **Tip colour**. Set mid grey (128) when using a **Colour map**.

Tip colour colour · default brown (approx. 89, 56, 31)
Colour at the tip. Lighter than the root gives sun-lightened ends; equal to **Root colour** gives an even colour.

Variation 0-1 · default 0.15
Random brightness per hair (1 - value to 1 + value), hue kept. 0.1-0.3 breaks up a plastic look; 0 is uniform.

Colour map map · default None
Texture read at each hair's root; multiplies **Root colour** and **Tip colour** around mid grey (0.5 keeps, white doubles).

Map saturation 0-3 · default 1
Saturation of the **Colour map**: 0 grey, 1 as painted, above 1 richer. Lower it for over-colourful photo textures.

COAT PATTERN

Pattern
0 None, 1 Tiger stripes, 2 Leopard / jaguar, 3 Cheetah spots, 4 Tabby cat, 5 Belly / back, 6 Greying (salt & pepper), 7 Wolf agouti, 8 Zebra · default None
Procedural coat fixed to the skin. Expects a Z-up model standing on its legs, body along its longest side.

Pattern colour
colour · default near black (approx. 5, 4, 3)
Colour of the dark marks (stripes, spots, rosettes, dark back, agouti tips) and the Face guide's dark markings.

Belly / second
colour · default cream (approx. 230, 217, 191)
Pale pattern colour: belly, tiger chest and inner legs, Greying hairs, and Face guide white markings. Zebra uses none.

Pattern scale
0.001-1000000 (scene units) · default 10 cm
Roughly the distance between stripes, spots or rosettes. Presets: Tiger 14 cm, Leopard / jaguar 5, Cheetah 3.5, Zebra 12. Greying ignores it.

Pattern amount 0-1 · default 1
Pattern strength, 0 none to 1 full. For **Greying**, the share of grey hairs (1 = half); the salt & pepper preset uses 0.6.

Mark thickness 0.1-3 · default 1
Stripe width for Tiger stripes and Zebra, ring width for Leopard / jaguar rosettes. Other patterns ignore it.

Breaks and forks 0-1 · default 0.5
Tiger stripes only: how often stripes break and fork, and how broken the leg bars are. 0 gives long, unbroken stripes.

FACE GUIDE

Face helper node · default None
Object (ideally a Point helper) between the eyes; only its Rest frame position counts. Animal heads only.

Face size 0.001-1000000 (scene units) · default 20 cm
Face size: markings and ruff lie within about 1.1 x this of the helper. Start near 1.7 x the eye-centre distance.

Face markings 0-1 · default 1
Strength of tiger-style face markings in the Coat pattern colours. Keep 1 for tigers; 0 for wolves, dogs and unmarked animals.

Ruff length x 1-20 · default 2.5
Length multiplier for long fur on the face sides and under the jaw. 2-4 for tiger or lynx; 1 turns it off.

Ruff colour
colour · default off-white (approx. 235, 230, 219)
Colour blended into the ruff: up to 85% at tips, 50% at roots. Set to the coat colour to avoid a pale tint.

Grow only in
0 Everywhere, 1 Whisker pads, 2 Brows (over the eyes), 3 Chin · default Everywhere
Limits this object to one face region; **Hair count** then counts hairs there. Use on a second HairFx object, **Face helper** set.

Bare nose and eyes on/off · default off
Adds bare nose leather and eyelids, and shortens muzzle fur by **Face fur length x**. Use for animal close-ups.

Face fur length x 0.05-5 · default 1
Length multiplier for face hair (ruff excluded) and, with **Bare nose and eyes**, the muzzle. 0.2-0.5 gives short, sleek face fur.

Face colour from coat 0-1 · default 0
Pulls face and muzzle hair towards the coat's average colour. Raise when a texture's white eye or muzzle mask looks too stark.

HIGHLIGHTS

Highlights (streaks) on/off · default off
Lightens whole sections of hair towards **Highlight colour**, chosen by where they grow, as foiling does.

Highlight colour
colour · default light caramel (approx. 199, 173, 140)
Colour highlighted strands blend towards; **Variation** still applies. A lighter base shade looks natural; any colour for dyed streaks.

Share of the hair 0-1 · default 0.35
Share of sections highlighted; with **Strands in a streak**, sets how much hair lightens (0.35 x 0.7 = about 25%).

Streak width 0.001-1000000 (scene units) · default 1 cm
Section size across the scalp; edges are noise-warped. 0.3-0.5 cm for fine babylights, 2-3 cm for chunky streaks.

Strands in a streak 0-1 · default 0.7
Share of strands lightened inside a section; the rest keep their colour. 1 makes solid blocks; lower for softer highlights.

From the root (0 = tips only) 0-1 · default 1
How much the root lightens: 1 highlights whole strand, 0 builds from root to tip. Ignored when **Starts at** is above 0.

Shade variation 0-1 · default 0.3
Random strength per highlighted strand, from 1 - value to full. 0 gives one flat colour; 0.3-0.6 natural multi-tone highlights.

Seed 0-99999 · default 1
Picks and reshapes a different set of highlighted sections, strands and shades. Change it when a streak lands badly.

Starts at (0 = root) 0-0.95 · default 0
Fraction of length where the highlight begins; before it the strand keeps its colour. 0.3-0.6 for grown-out roots or balayage.

Soft edge 0-1 · default 0.15
Blend length around **Starts at**, as a fraction of hair length; 0 is a hard line. Needs **Starts at** above 0.

Streak along the fall 0-1 · default 0
New in 1.0.15. Stretches sections along world Z so long hanging hair shares one streak. Keep 0 for short hair, fur.

BUTTONS

Width map (None)
Click to choose a map, or drag one from the Material Editor; shows the map's name.

Colour map (None)
Works like Width map; usually a Bitmap holding the model's colour texture.

Face helper (None)
Click, then pick the helper in a viewport. Picking another discards simulated frames.

> Tip With a **Colour map**, set **Root colour** and **Tip colour** to mid grey (128); the dark defaults make a texture very dark.

Viewport & Render

Sets viewport and render hair counts, how mesh renderers receive hairs, a memory limit, and Vanguard Render multiplication. Does not change shape or colour.

VIEWPORT

Display % 0-100 · default 20
Share of hairs drawn in the viewport, evenly spread. Lower it when the viewport is slow; raise it to judge density.

Display max 100-20,000,000 · default 300,000
Caps hairs drawn in the viewport; the lower of this and **Display %** applies. Brush strokes draw at most 30,000.

Show guides on/off · default off
Draws guide strands in yellow, one per surface vertex. Turn on while grooming or checking dynamics.

Colours
Hair colour / Random per clump / Random per hair · default Hair colour
Viewport only: real hair colours, one colour per main clump, or per strand. **Random per clump** needs Clump **Amount** above 0.

RENDER

Render % 0-100 · default 100
Share of hairs rendered, evenly spread; used by every renderer, Live render density and PRT export. Lower for tests, 100 for finals.

Ribbons
Face camera / Lie on surface / Tubes (3 sides) · default Face camera
Hair geometry for mesh renderers: camera-facing strip, strip on the skin, or three-sided tube. Tubes triple faces; Vanguard renderers ignore this.

Memory use % 10-95 · default 90
Caps hairs to this share of free RAM and CUDA video memory. Raise it when fewer hairs render than asked.

Render multiplier (x hairs) 1-200 · default 1
Vanguard Render only: each hair becomes this many at render time, filling gaps. Ignored by the viewport, other renderers and demo.

> Tip Changing **Memory use %** or **Render multiplier** discards simulated frames in memory; run **Simulate range** again.

Dynamics

Simulates hair guides on the GPU (CUDA) or CPU, with collisions, wind, water and fire. Set **Mode** to **Live** and play, or use **Simulate range**.

SIMULATION

Mode Off / Live / From cache · default Off
Off shows the groom; Live simulates as time moves forward, keeping frames in memory; From cache plays the **Cache file**.

Start frame -100000-100000 · default 0
Frame where simulation starts, with hair at its groom. Set 20-30 frames before the shot so hair settles; negative values are fine.

Substeps 1-64 · default 4
Steps per frame; more steady fast motion and reduce pass-throughs, but run slower. Raise to 8-16 for fast action or thin colliders.

Iterations 1-100 · default 8
Shape-solving passes per step; more give stiffer strands. Raise if stiff hair looks too soft; lower to speed long, soft hair.

Live at the start frame on/off · default on
In Live mode at or before **Start frame**, hair keeps simulating as you move body or colliders. Turn off if the viewport slows.

STRAND

Bend stiffness 0-1 · default 0.6
How strongly strands keep their groomed bends: 0 limp, 1 holds curvature. Lower for long flowing hair; raise for short fur, whiskers.

Hold shape 0-1 · default 0.15
Pulls points toward their groomed position on the animated body. Raise (0.5-0.9) for fur and styled hair; keep low for loose hair.

Damping 0-1 · default 0.05
Removes part of each point's speed every step, calming bounce and jitter. Raise if hair keeps swinging; high values look syrupy.

Air drag 0-1 · default 0.02
Air resistance on hair movement; high values feel like water. Raise for fine hair that floats down; keep low for heavy hair.

Gravity scale -10-10 · default 1.0
Multiplies real gravity along world -Z; 0 is weightless, negative makes hair rise. If hair falls in slow motion, check System Unit Setup.

COLLISION

Collide with surface on/off · default on
Keeps hair outside the growth mesh; also toggles **Extra colliders** and other HairFx meshes. Turn off only for hair touching nothing.

Collision offset 0-10000 (scene units) · default 0.2
Gap kept between hair and collider faces. Raise if hair dips into skin or slips through thin colliders; lower if it floats.

Friction 0-1 · default 0.3
Share of sliding motion removed on contact: 0 slides freely, 1 sticks. Raise for hair resting on shoulders; lower for silky hair.

Hair volume (self) 0-1 · default 0.2
Spreads strands apart where they compress, keeping volume; 0 is off. Raise if big hair flattens; lower if hair puffs without wind.

Extra colliders node list · default empty
More objects the hair collides with, such as shoulders, clothing or props, using **Collision offset** and **Friction**. Needs **Collide with surface**.

Collide with other HairFx on/off · default on
Pushes this hair out of other active HairFx hair; layers on one mesh ignore each other. Turn off to save time.

Hair-hair thickness 0.1-5 · default 1.0
Scales thickness for hair-against-hair contact; 1 is automatic. Raise if tips pass through each other; lower if coats repel from afar.

CACHE

Cache file file path (.hfxc) · default empty
The .hfxc file played in From cache mode; **Load sim cache...** fills it in. Frames outside the file show the groom.

FORCES

Forces / Wind node list · default empty
HairFx Wind objects and 3ds Max force space warps acting on this hair. Scene forces are not picked up automatically; add each.

WATER

Water (VanguardFluid / particles)
node list · default empty
Particle systems acting as water: VanguardFluid, tyFlow, Particle Flow and others. Affects timeline frames only, not the start-frame preview.

Particle radius 0.001-100000 (scene units) · default 2.0
Reach of each water particle; hair within it is under water. Set near the fluid's particle spacing; raise if water slips through.

Buoyancy 0-10 · default 1.2
Upward push under water, in multiples of real gravity. Default 1.2 sinks slowly; raise to float, lower toward 0 to sink.

Follow the current 0-1 · default 0.6
How strongly underwater hair moves with the water's velocity: 0 not at all, 1 quickly. Raise for streams and waves.

Soaks in 0-1 · default 0.6
Wetness gained per frame under water; 1 soaks at once. Wet hair hangs heavier and has fewer strays. Lower for damp splashes.

Dries in (s) 0.1-10000 · default 20.0
Seconds for soaked hair to dry fully once out of water. Lower for a quick shake-dry; raise to stay wet all shot.

Wet hair clumps 0-1 · default 0.85
Clump amount soaked hair is pulled up to. Needs the Clump rollout's **Clumps** and **Amount** above 0. Raise for stringy hair.

FIRE

Fire (empty = every VanguardFire)
node list · default empty
Vanguard Fire objects that burn this hair; empty means all. Works in any Mode. List only fires that should reach this hair.

Burn sensitivity 0-20 · default 1.0
Multiplies heat dose per frame; burnt hair shortens, curls, chars and drops out. Raise to catch fast; 0 makes hair fireproof.

BUTTONS

Add... / Remove
Under each list: Add..., then click an object in a viewport; Remove deletes the highlighted entry.

Simulate range
Tools. Discards frames, simulates Start frame to range end; sets Mode Off to Live. Esc cancels.

Reset
Tools. Forgets all simulated frames of this object. Use after changing body or collider animation.

Save sim cache...
Tools. Writes in-memory simulated frames to a .hfxc file. Licensed copies only; simulate first.

Load sim cache...
Tools. Loads a .hfxc file, sets Mode to From cache. Guide count and Segments must match.

Status line (Tools)
Shows Not simulated, or CUDA, CPU or CACHE with guide count and frame range.

> **Tip** Simulated frames live in memory, not the .max file; save a cache to keep them. Body or collider animation edits need Reset.

HairFx - Tools | HairFx - Licence | HairFx - About / Help | Vanguard HairFx Renderer

Tools (open), Licence and About / Help (closed) sit below the HairFx parameter rollouts. Render Setup shows the HairFx Renderer settings plus About / Help.

HAIRFX - TOOLS

Preset (list)
Human - long straight / Human - short / Human - wavy / Human - curly / Human - coily / afro / Human - blond long / Human - red / ginger / Human - grey / white / Beard / stubble / Eyebrows / Eyelashes / Fur - short (cat, dog) / Fur - long (dog, yak) / Sheep wool / Peach fuzz / velvet / Grass - lawn / Grass - tall meadow / Carpet / shag rug / Moss / Women - long layered brunette / Women - long blonde waves / Women - bob / Women - curly auburn / Women - straight black (East Asian) / Women - platinum pixie / Men - short crop / Men - textured quiff / Men - medium swept / Men - salt & pepper / Men - full beard / Tiger / Leopard / jaguar / Cheetah / Wolf (grey) / Fox (red) / Cat - tabby / Cat - ginger / Monkey / chimp / Bear (brown) / Zebra / Horse mane / Whiskers (set Face guide, Grow only in: Whisker pads) / Grass - wild with flowers colour · default Human - long straight
Chooses a ready-made look; nothing changes until **Apply**. Lengths and widths are centimetres, converted to scene units. Use before brushing.

(simulation status line, under Simulate range)
read-only · default Not simulated.
Shows simulated frames held: CUDA, CPU or CACHE, guide count, frame range. Refreshes after **Simulate range**, **Reset** or loading a cache.

Groom brush (mode list)
Comb / Lift / puff / Flatten / Lengthen / Shorten / cut / Smooth / Twist / Erase grooming / Clump (gather locks) / Part / Curl / Straighten / Frizz / Density: paint more / Density: paint less · default Comb
Sets what a stroke does. Shaping modes bend guides (one per surface vertex; child hairs follow); Density modes paint where hair grows.

Mode: Comb brush mode · default default mode
Drags hair along the mouse direction, more at tips than roots, keeping length. Sets main flow: fringes, fur direction, styling.

Mode: Lift / puff brush mode · default —
Bends hair up toward the surface normal, adding volume at the crown, in fluffy fur, or on flat areas.

Mode: Flatten brush mode · default —
Lays hair along the surface with a very slight lift. For sleek styles, close-lying coats, or hair under a hat.

Mode: Lengthen brush mode · default —
Lengthens hair under the brush, up to 12% per mouse movement at full effect, keeping shape. For fringes, manes, ruffs, tail tips.

Mode: Shorten / cut brush mode · default —
Shortens hair under the brush, up to 12% per mouse movement at full effect, keeping shape. Trims edges, sideburns, eyes, ears.

Mode: Smooth brush mode · default —
Averages each hair point with its neighbours, removing kinks and zig-zags while keeping length. Use after combing, curling or frizzing.

Mode: Twist brush mode · default —
Rotates hair around the surface normal at its root, about 17 degrees per mouse movement at full effect. For whorls and cowlicks.

Mode: Erase grooming brush mode · default —
Gradually returns hair under the brush to its ungroomed shape. Undoes grooming locally, unlike **Reset grooming**.

Mode: Clump (gather locks)
brush mode · default —
Pulls hairs under the brush toward their average shape, most at tips, into one lock. For wet locks and fur tufts.

Mode: Part brush mode · default —
Pushes hair away from the stroke line to both sides, more at tips. Drag along the parting line.

Mode: Curl brush mode · default —
Adds a spiral around each hair's root-to-tip line, stronger toward the tip. Local curls on top of **Curl / Kink / Frizz** settings.

Mode: Straighten brush mode · default —
Pulls hair toward the straight line from root to tip, removing curl, kink or frizz in one area.

Mode: Frizz brush mode · default —
Adds random disorder, stronger toward the tips. For flyaway, messy or wind-tousled areas.

Mode: Density: paint more
brush mode · default —
Restores hair thinned by **Density: paint less**, up to full; the Density map still applies. Repairs over-thinned areas.

Mode: Density: paint less brush mode · default —
Thins hair, down to none; hair count stays, so hair moves elsewhere. Saved with the scene; Ctrl+Z does not undo it.

Size (px): 4-1000 · default 60
Brush circle radius, smooth falloff to edge; on sparse guides it reaches the 8 nearest. Larger for broad combing, smaller for partings.

Strength: 0.01-1.0 · default 0.5
Effect per mouse movement; shaping modes reach full effect at 0.5, above which only density painting strengthens. Use 0.1-0.3 for refining.

(message line, bottom of rollout)
read-only · default empty
Reports the last action: progress (Esc cancels), simulation, brush hints, cache and PRT results. Check it when a button seems inactive.

HAIRFX - LICENCE

Your Hardware ID - send this with your order:
read-only text · default this computer's ID
Identifies this computer; licence files are signed for it and work only here. Copy it when ordering or changing computers.

Paste your Vanguard HairFx licence file:
multi-line text · default empty
Paste the whole two-line licence file (starting hwid=), then press **APPLY LICENCE**. A one-line licence key is not the file.

(licence status line) read-only · default Not licensed
Licence state: active, expired, updates locked, build newer than term, other computer or product, withdrawn, or refusal reason.

(days line)
read-only · default No licence (2,000 hairs per object)
Days left on the licence term, or days since it expired. Renew at vanguardfx.pro before it reaches zero.

HAIRFX - ABOUT / HELP

(version line)
read-only · default Vanguard HairFx 1.0.15 (built <yyyymmdd>)
Shows version, build date and licence status; also in Render Setup under the renderer. Quote it to support or check after updating.

Help: Start menu > VanguardFX > HairFx User Guide - vanguardfx.pro
static text · default —
HairFx Material and HairFx Wind show only the banner and this line, with no version line or buttons.

VANGUARD HAIRFX RENDERER

Passes (samples per pixel): 1-100000 · default 128
Samples per pixel; more passes, less noise, proportionally longer renders. Cancelling keeps finished passes. Raise for close-ups or backlit hair.

Exposure: 0.01-100 · default 1.0
Multiplies final image brightness, including the EXR beauty layer but not other passes; 2.0 is one stop brighter. Balance lights first.

Environment light: 0-100 · default 1.0
Even sky light, coloured by the Environment background colour plus Ambient lights; background unchanged. Lower for contrast, raise to lift deep shadows.

Denoise on/off · default on
Edge-preserving denoise of the beauty image, guided by normals, depth and albedo; needs 2+ passes. Turn off for your own denoiser.

Save every pass as a multi-layer EXR
on/off · default on
Writes each frame as one EXR with beauty, lighting, data, ID and mask layers. Keep on for compositing: Render Elements are unsupported.

(EXR path field) file path · default empty
Layer EXR location; frame number is appended. Empty: beside Max's render output as name_layers_####.exr, or nothing if Max saves no output.

BUTTONS

Tools > Apply
Resets parameters (keeps Rest frame, Map UVs, surface, maps, colliders, forces), sets the preset. Undoable.

Tools > Simulate range
Simulates Start frame to segment end; Esc stops. Sets Mode Off to Live; From cache reloads.

Tools > Reset
Discards simulated frames in memory, e.g. after changing colliders or wind. Cache files are untouched.

Tools > Brush
Toggles the groom brush (green while on). Drag in a viewport; each stroke is one undo step.

Tools > Reset grooming
Returns guides to their ungroomed shape and discards simulated frames. Undoable; painted density is kept.

Tools > Save sim cache...
Writes simulated frames to a .hfxc file. Needs a licence and simulated frames.

Tools > Load sim cache...
Loads a .hfxc file as the Cache file and sets Mode to From cache for playback.

Tools > Live render
Opens HairFx Live GPU viewport render (NVIDIA CUDA). Keys: D denoise, F density, +/- exposure, R re-read.

Tools > Export PRT sequence (every hair point, all channels)...
One Krakatoa PRT per frame of the active segment, all channels, at Render % density. Esc stops.

Tools > Make Corona / V-Ray material (keeps strand colours)
Assigns Corona Hair (else V-Ray Hair Next) material to selection, coloured by strand colours via Vertex Color.

Licence > Copy
Copies the Hardware ID to the clipboard for your order or account.

Licence > APPLY LICENCE
Installs a valid HairFx licence for this computer at once, no restart; anything else is refused.

Licence > Get a licence
Opens vanguardfx.pro/panel.php; sign in, open MY LICENCES, press DOWNLOAD LICENCE FILE.

Licence > Load file...
Opens a downloaded .lic file, fills the box and applies it immediately.

Licence > vanguardfx.pro
Opens the VanguardFX website.

About / Help > User guide / Help
Opens this installed user guide, or vanguardfx.pro if it is not installed.

About / Help > vanguardfx.pro
Opens the VanguardFX website.

Renderer > Browse...
Chooses the folder and name for the layer EXR; the frame number is appended.

> **Tip** Apply the preset and set Segments before grooming: a preset, or changing Segments or Grow on, discards brush grooming.

HairFx Wind

A space warp that blows simulated hair with steady wind, gusts, turbulence and tip flutter. Aim its arrow, then add it to **Forces / Wind**.

WIND

Type
Directional / Spherical / Vortex · default Directional
Directional blows along the arrow, Spherical outward from the icon, Vortex around the arrow's axis. No falloff unless **Range** is set.

Strength (x gravity) -100 to 100 · default 1.0
Push on still hair in multiples of gravity; negative reverses. At 1, loose hair in level wind leans about 45 degrees.

GUSTS

Gust amount 0-10 · default 0.5
Wind swings between (1 - amount) and (1 + amount) times **Strength**; above 1 it briefly reverses. Set 0 for steady wind.

Gust frequency (Hz) 0-20 Hz · default 0.4
Gusts per second: 0.4 is one every 2.5 s. Lower for slow swells, higher for buffeting. Seed shifts the timing.

Gust travel speed 0-10,000,000 · default 300.0
Speed, in scene units per second, of gust fronts sweeping along the arrow; 0 gusts all hair at once. Lower to see waves roll.

TURBULENCE

Turbulence 0-10 · default 0.6
Random swirling air that scales with wind speed, so **Strength** 0 gives none. Set 0 for a clean fan look and faster simulation.

Scale 0.001-1,000,000 · default 30.0
Size of the largest swirls. Smaller than the hair length splits hair into locks; larger moves whole sections together.

Speed 0-100 · default 1.0
How fast the swirl pattern drifts along the arrow. Set equal to **Scale** to pass a new swirl about every second.

Detail (octaves) 1-6 · default 3
Swirl layers, each about half the size and strength of the last. 1-2 for smooth waves, 4-6 for chaotic air.

Swirling (curl noise) on/off · default on
On: air turns in eddies. Off: plain random pushes per axis, jittery and cheaper; use it to speed up heavy simulations.

SHAPE

Range (0 = infinite) 0-10,000,000 · default 0.0
Distance where the wind fades smoothly to nothing; at half range a quarter remains. 0 blows everywhere at full strength.

Vortex inward pull -5 to 5 · default 0.3
Vortex only: pull toward the axis as a fraction of circling speed; negative pushes outward. Flip the icon to reverse spin.

Seed 0-99999 · default 1
Changes gust timing, turbulence and flutter pattern, not strength; only the last three digits count. Give each wind its own.

DISPLAY

Icon size 0.001-1,000,000 · default 20.0
Viewport size of the icon. Display only: neither this nor scaling the icon changes the force.

HAIR

Tip flutter 0-5 · default 0.3
Fast random shaking toward the tips, scaling with local wind. Raise for wispy hair or fur; lower or 0 for heavy hair.

Wind shadow (back hair sheltered)
0-1 · default 0.5
Shelters hair behind other hair along the wind. 0: full wind everywhere; 1: deep hair gets almost none. Raise for thick manes.

Air grip (1/s) 0.1-50 · default 4.0
How fast hair is dragged to air speed; still air also holds moving hair back. Raise to settle quickly, lower for whipping.

BUTTONS

Vanguard HairFx Wind (Create panel button)
Space Warps > VanguardFX; click once to place. Link through Forces / Wind, not Bind to Space Warp.

> **Tip** Hair feels the wind only through **Forces / Wind** with **Mode** at Live. After editing the wind, click **Reset**, then replay.

HairFx Material

Fibre shader for HairFx hair (Materials > VanguardFX); assign it to the HairFx object. Used by Vanguard HairFx Renderer, HairFx Live, Vanguard Render and Scanline.

COLOUR

Use HairFx object colours on/off · default on
On: colour comes from the HairFx object. Off: from **Melanin** and **Red pigment**, for natural human hair.

Melanin (dark) 0-1 · default 0.5
Dark pigment amount: about 0 white, 0.2 blond, 0.4 brown, 1 black. Ignored while object colours are used.

Red pigment 0-1 · default 0.15
Red-yellow pigment added to Melanin, for ginger and auburn; 0.3-0.6 with low **Melanin** gives ginger. Ignored with object colours.

Dye colour colour · default white (255,255,255)
Dye colour multiplied onto the hair colour; it tints, not bleaches. No effect until **Dye amount** is above 0.

Dye amount 0-1 · default 0
Dye strength: 0 keeps the natural colour, 1 applies the full dye.

Lighter tips 0-1 · default 0.15
Lightens hair toward white from root to tip (60% at 1), for sun-bleached ends. 0 = uniform colour.

Melanin random 0-1 · default 0.1
Varies pigment from hair to hair; 0 = identical, 0.2-0.4 for natural hair. Ignored with object colours.

Grey hairs 0-1 · default 0
Share of random hairs rendered without pigment: 0.3 makes about 30% grey. Works with both colour sources.

SPECULAR

Primary (R) 0-5 · default 1
Strength of the uncoloured surface highlight; 1 is physically correct. Lower for matte fur, raise slightly for oiled hair.

Secondary (TRT) 0-5 · default 1
Strength of the hair-coloured internal highlight, offset toward the tip. Raise for a richer sheen on light hair.

Back-light (TT) 0-5 · default 1
Strength of light passing through the hair: the rim glow when back-lit. Lower if silhouettes glow too much.

Roughness 0.02-1 · default 0.2
Highlight width: low is sharp and glossy, high soft and dull. 0.1-0.2 for shiny hair, 0.3-0.5 for fur.

Azimuthal roughness 0.02-1 · default 0.3
Light spread around the fibre; low gives intense back-light and secondary. Raise toward 0.5 for frizzy hair and dense fur.

Cuticle tilt (deg) -10 to 10 · default 3
Separates the white primary (toward root) from the coloured secondary (toward tip); 0 overlaps them. 2-4 suits most hair.

IOR 1-3 · default 1.55
Fibre index of refraction: higher gives a stronger primary and weaker back-light. Leave at 1.55 for hair and fur.

Spec tint colour · default white (255,255,255)
Colour multiplied onto the primary highlight; iridescence blends onto it. Keep white for natural hair.

Physical model (Chiang 2016) on/off · default on
On: energy-conserving Chiang 2016 model. Off: older artistic lobes; **Back-light tint** and **Secondary tint** are ignored. Keep on.

Back-light tint colour · default white (255,255,255)
Colour multiplied onto the back-light, over the hair colour. Physical model only; leave white for realism.

Secondary tint colour · default white (255,255,255)
Colour multiplied onto the secondary highlight, over the hair colour. Physical model only; leave white for realism.

BODY

Multiple scattering 0-2 · default 0.1
Soft hair-coloured body light from bounces between hairs. Raise (0.3-0.6) if light fur looks too dark inside.

Shadow density per hair 0-1 · default 0.35
Light each hair blocks in shadow; 0 = no shadow. Lower for blond or thin fur. HairFx Renderer and HairFx Live only.

Tip transparency 0-1 · default 0.3
Fades each hair to transparent toward the tip for soft coat edges; 0 = solid. Try 0.5-0.8 for fur.

Glints 0-1 · default 0.2
Random sparkle: the secondary highlight flares up to three times brighter on some hairs. 0 = an even sheen.

SCATTERING

Scatter colour colour · default warm (255,204,153)
Tint of light scattered through the hair mass, multiplied with hair colour. Warmer for a sunlit glow; white for plain.

Scatter amount 0-3 · default 0.3
Strength of soft light scattering through the hair mass, strongest back-lit. Raise for blond, white or ginger fur.

Forward spread 0-1 · default 0.5
How much scatter favours back-light: 0 = even, 1 = twice as strong from behind. Lower for evenly lit studio renders.

LIGHT WAVES

Highlight waves 0-2 · default 0
Ripples the highlights along each hair; above 1 they break into bands. 0.2-0.5 breaks up too-perfect highlights.

Waves per hair 0-100 · default 6
Ripples from root to tip. Lower for long gentle waves; raise for fine shimmer.

Wave random 0-1 · default 0.5
Offsets ripples per hair: 0 lines them up into bands across the hairstyle; 1 makes every hair independent.

SPECIAL

Iridescence 0-1 · default 0
Blends angle-dependent thin-film rainbow colours into the primary highlight. For oily, synthetic or fantasy looks; 0 for natural hair.

Film thickness (nm) 100-1200 · default 400
Film thickness; sets which colours appear. Only matters when **Iridescence** is above 0. Change in small steps.

Wet 0-1 · default 0
Darker colour, smoother surface, stronger primary highlight. In HairFx renderers, hair soaked by Dynamics > Water gets wet automatically.

Emission colour · default black (0,0,0)
Constant glow independent of lights; does not light surroundings. Ignored by Vanguard Render. Embers come from Dynamics > Fire.

BUTTONS

About / Help
Closed rollout: product picture, summary, and pointer to the HairFx User Guide. No settings.

> **Tip** V-Ray and Corona cannot render this material: select the hair and click HairFx - Tools > "Make Corona / V-Ray material (keeps strand colours)".



Clump, Curl / Kink / Frizz and Colour & Width as they appear in the panel.



HairFx Material in the Compact Material Editor.

4 Presets and recipes

HairFx has 43 presets in the **HairFx - Tools** rollout. Pick one in the **Preset** group and press **Apply**. A preset resets every number, checkbox and drop-down to its default, then sets its own values and colours.

- Human - long straight, short, wavy, curly, coily / afro, blond long, red / ginger, grey / white.
- Women - long layered brunette, long blonde waves, bob, curly auburn, straight black (East Asian), platinum pixie.
- Men - short crop, textured quiff, medium swept, salt & pepper, full beard.
- Fur and fuzz: Fur - short (cat, dog), Fur - long (dog, yak), Sheep wool, Peach fuzz / velvet.
- Animals: Tiger, Leopard / jaguar, Cheetah, Wolf (grey), Fox (red), Cat - tabby, Cat - ginger, Monkey / chimp, Bear (brown), Zebra, Horse mane.
- Face: Beard / stubble, Eyebrows, Eyelashes, Whiskers (set Face guide, Grow only in: Whisker pads) - pick a Face helper first.
- Surfaces: Grass - lawn, Grass - tall meadow, Grass - wild with flowers colour, Carpet / shag rug, Moss.

Start each recipe from a new HairFx object, not a preset; anything not listed stays at its default.

Long straight hair with ash highlights

Dark, glossy, straight hair with ash-blonde streaks, grown on an upright plane.

Control	Value
Hair count / Segments	1,500,000 / 28
Length / Length random	38 cm / 0.15
Lift (0 flat, 1 normal) / Gravity bend	0.0 / 1.0
Clump: Clumps / Amount	20,000 / 0.15
Root colour / Tip colour	RGB 14,13,13 / RGB 22,20,19
Highlights (streaks) / Highlight colour	On / RGB 196,172,142
Share of the hair / Streak width	0.4 / 0.7 cm
HairFx Material: Roughness / Primary (R)	0.12 / 1.5

Curly ringlets

Springy ringlets in separate locks; high **Clump: Amount** and low **Clump: Tip bias** hold each lock together.

Control	Value
Hair count / Segments	36,000 / 64 (the panel maximum)
Length / Length random	46 cm / 0.3
Lift (0 flat, 1 normal) / Gravity bend	0.55 / 0.85
Curl: Radius / Turns / Random	1.7 cm / 6 / 0.3
Clump: Clumps / Amount / Tip bias	1,400 / 0.92 / 0.25
Root colour / Tip colour	RGB 9,4,2 / RGB 77,38,11

Short animal fur (fox)

A short red-fox coat coloured by the model's own texture through **Colour map** (sample HairFx_08_fox.max, body 135 cm long).

Control	Value
Hair count / Segments	1,300,000 / 10
Length / Length random	2.59 cm / 0.4

Control	Value
Clump: Clumps / Amount / Tip bias	40,000 / 0.45 / 1.3
Root width / Tip width	0.012 cm / 0.0015 cm
Colour map / Map saturation	The fox's colour texture (Bitmap) / 1.8
Root colour / Tip colour	RGB 128,128,128 (texture unchanged) / RGB 140,140,140
Comb along	Fur flow

Tiger stripes (Coat pattern)

Black stripes on a lioness model (sample HairFx_04_tiger_from_lioness.max, body 243 cm); scale **Length** and **Pattern scale** to your model.

Control	Value
Hair count / Segments	1,500,000 / 8
Length	2.91 cm
Clump: Clumps / Amount / Tip bias	60,000 / 0.35 / 1.5
Root colour / Tip colour	RGB 200,85,20 / RGB 235,125,40
Colour map / Pattern	The lioness's colour texture (Bitmap) / Tiger stripes
Pattern colour / Belly / second	RGB 12,9,7 / RGB 238,232,220
Pattern scale / Pattern amount	9.71 cm / 1.0



Tiger fur: the Coat pattern, 1.4 million hairs.



Highlights with Streak along the fall: whole sections run root to tip.

5 Rendering and export

Renderers

Renderer	How it renders / what to set
Vanguard Render (1.8.29 or later)	Reads the strands directly: choose it and render. Uses the HairFx Material. Only renderer with render-time children, ember glow and the GPU memory safety net.
Vanguard HairFx Renderer	HairFx's own GPU renderer; needs an NVIDIA card with CUDA. Other objects render as plain diffuse surfaces.
Scanline, Corona, V-Ray, Arnold, others	Render a ribbon mesh. Scanline uses the HairFx Material. For Corona or V-Ray, press **Make Corona / V-Ray material (keeps strand colours)**. Others need their own hair material: strand colour is in map channel 0.

Render settings

In Viewport & Render > Render; **Segments** is in HairFx - Surface & Growth.

Setting	Default	Effect
Render %	100 (0-100)	Share of Hair count rendered, also in PRT export.
Ribbons	Face camera	Mesh renderers: Face camera, Lie on surface or Tubes (3 sides, three times the triangles).
Memory use %	90 (10-95)	Caps hairs at this share of free RAM and video memory.
Render multiplier	1 (1-200)	Vanguard Render, licensed: each strand plus children.
Segments	10 (2-64)	Main memory cost. Curl, Kink and Frizz add points, up to 256.

Close-ups and full animals

	Close-up	Whole animal
Hair count	110,000-200,000	250,000-600,000
Segments	20-56 long or curly, 6-16 short	4-14
Render multiplier	1	2-10
Ribbons	Tubes (3 sides) if flat ribbons show	Face camera

GPU memory safety net

With Render multiplier 1, HairFx checks before every final frame: 75% of free video memory (RAM when rendering on the CPU) is shared between HairFx objects. An object over its share keeps an even, fixed selection of strands (no flicker, never under 2%), widens them by 1 / square root of the share kept, and logs a warning.

To keep every strand (licensed), set **Render multiplier** above 1 and divide **Hair count** by the same factor: only parents go to the card while strands have at most 64 points. Or lower **Segments** or the curl and frizz frequency.

Vanguard HairFx Renderer

Assign it in Render Setup > Common. Settings: **Passes** 128 (1-100,000), **Exposure** 1.0 (0.01-100), **Environment light** 1.0 (0-100), **Denoise** on, **Save every pass as a multi-layer EXR** on. Not rendered: Render multiplier, highlights with Starts at above 0, ember glow. **Live render** (HairFx - Tools) re-renders the active viewport.

Export

Press **Export PRT sequence (every hair point, all channels)...** in HairFx - Tools > Cache, export & view. It writes one PRT file per frame; each rendered hair point is a particle. PRT is the only export of the finished strands; the demo writes at most 2,000 hairs per object.

6 Troubleshooting and FAQ

Q I asked for millions of hairs but see only a few thousand.

No licence is installed, so HairFx runs as a demo: at most 2,000 hairs per object. Press **Get a licence**, download the licence file from MY LICENCES, then press **Load file...** in HairFx - Licence. No restart is needed.

Q The licence will not install.

A failed licence is never installed. "LICENCE KEY, not your licence file": load the licence file instead. "...different computer": it was issued for another Hardware ID; send the new ID to support@vanguardfx.pro. "...different VanguardFX product": load the HairFx licence.

Q The licence line says this build is newer than your term.

Your licence includes one year of updates. Builds released during that year keep working afterwards; a later build runs as the 2,000-hair demo. Use a build from your year, or renew at vanguardfx.pro.

Q The hair is huge: a ball of hair around the model.

Lengths are in scene units; defaults assume centimetres, so in a metre scene **Length** 10 is 10 metres. Apply a preset in HairFx - Tools (converts units, resets other settings), or retype **Length**, **Root width**, **Tip width** and **Collision offset**.

Q The viewport is slow.

In Viewport & Render, lower **Display %** (default 20%) or **Display max** (default 300,000). The render uses **Render %** and is not affected. While you groom, a light preview draws until the stroke ends.

Q Strands pass through the head, shoulders or body.

For a static groom, lower **Gravity bend** or raise **Lift**. For moving hair, set **Dynamics > Mode** to Live with **Collide with surface** on; add a separate body mesh to **Extra colliders**. Raise **Collision offset** or, for fast motion, **Substeps**.

Q The hair does not move.

Check **Dynamics > Mode**: Off never moves; From cache plays **Cache file**; Live starts at **Start frame**. **Simulate range** (HairFx - Tools) simulates to the end of the time slider. Unlicensed, dynamics run only on meshes up to 2,000 vertices.

Q There is no Vanguard HairFx Renderer in the renderer list.

It was removed in HairFx 1.0.8. Vanguard Render reads the hair directly, with HairFx Material and hair render elements. Corona, V-Ray and other renderers receive a ribbon mesh, set by **Ribbons** in Viewport & Render.

Q Fewer hairs render than asked, or "Unknown system exception" in Vanguard Render.

HairFx renders only what fits in **Memory use %** (default 90%) of free RAM and graphics memory. Use Vanguard Render 1.8.31 or later. Lower **Hair count** and raise **Render multiplier** (licensed): 200,000 x 10 instead of 2,000,000.

Q In Corona or V-Ray the hair is one flat colour, or memory runs out.

Select the HairFx objects and press **Make Corona / V-Ray material (keeps strand colours)** in HairFx - Tools. To save memory, lower **Render %** and **Segments**, and use **Face camera** or **Lie on surface** rather than **Tubes (3 sides)**.

Requirements and licence

- 3ds Max 2024, 2025, 2026 or 2027 on Windows 10 or 11, 64-bit.
- NVIDIA GPU (GeForce GTX 16 / RTX 20 series or newer, current driver): required for the Live render window. Dynamics and Vanguard Render use the CPU without one. Growing, grooming, the viewport and Corona or V-Ray rendering need no NVIDIA card.
- One licence per computer, issued for the Hardware ID shown in HairFx - Licence. Without a licence, HairFx is a 2,000-hair demo.
- One year of updates. After the year, the build you have keeps working; newer builds ask you to renew.
- Support: support@vanguardfx.pro. Include your Hardware ID and the version line from HairFx - About / Help.