

VWD's Cloth & Hair

Usage Guide

Version 2.x



(c) 2019 Virtual World Dynamics

<https://www.virtualworldynamics.net>

Welcome!

Welcome to Virtual World Dynamics' Cloth & Hair Usage Guide for Version 2.x.

It's our belief that the best way to learn how to operate a program like VWD is through a variety of examples - ranging from simple to complex. This document was created to provide those examples.

While many of these examples are extracted directly from the original VWD version, the basic operation has not changed for these examples. Almost all of the version 2.x updates are distinct from these early examples, meaning that there are new buttons that do new things, and the older buttons continue to behave as they always have.

Because this program is so dynamic, we'll be changing the way we preset the documentation, both in form and style. We expect to provide more bite-size and task-specific tutorials, and more video tutorials where the actual mouse-clicks, key-strokes and results are more closely bound.

As this document ages, we expect to replace it through attrition with always-current online versions that will be find-able through our main website: <https://www.virtualworldynamics.net>, specifically under our 'Resources' menu.

We hope these older but still-relevant examples prove helpful, whether you've upgraded from Version1 and need the review, or you've just entered the world of VWD as a new owner.

So, let's do this!

Gérald and Dan

Note: Please note that there is a separate and definitive *VWD Program Manual V2.x* that details the current VWD Cloth & Hair program installation, operation, and controls in a technical manner. The use of this document assumes the availability of, and familiarity with that document.

Table of Contents

Welcome!.....	2
1 Before We Really Start.....	4
1.1 VWD's Cloth & Hair... It's a way of thinking.....	4
1.2 VWD Paradigms and the Workflow Ideas.....	4
1.3 A Typical Workflow Overview.....	7
1.4 Additional Notes and Conventions.....	8
1.5 Terms, Conventions, and Hints.....	9
1.5.1 VWD's Commonly Used Terms.....	9
1.5.2 Hints.....	12
2 Using VWD's Cloth & Hair: Examples.....	17
2.1 Simulation of a single dress.....	18
2.2 Simple hair simulation.....	21
2.3 Simulation of earrings.....	24
2.4 Simulation of a more complex outfit.....	27
2.5 More complex hair simulation.....	30
2.6 Smooth hair simulation.....	33
2.6.1 First méthode (using Poser® morphs) :.....	33
2.6.2 Second method (using rigidity by-extension):.....	36
2.7 Deformation of a seat for a sitting pose.....	38
2.8 Wind Simulation.....	40
2.9 Hanging clothes vertices by a collision object.....	41
2.10 Name correction for the error components.....	43
3 Additional Resources:.....	44

1 Before We Really Start...

1.1 VWD's Cloth & Hair... It's a way of thinking.

First of all, from here on out, even though the formal name of this product is *VWD's Cloth & Hair*, let's make life easier and call it '**VWD**' for short. It's simply what we call it everywhere else (internal messages, forums, etc.), so let's just go with it. Yeah, VWD...

As far as using it, well, the interface is a little bit unorthodox, but not only does VWD grow on you, but there are some really clever interface features that you start to wish were in your other programs. We're still working on interface enhancements that will help simplify some of the complexities of simulations, but getting the internal simulation engines right is still our highest priority.

The simulation workflow requires what some users might consider a new way of thinking - to help separate and manage the necessary preparation, execution, and adjustment stages available (and required) in a typical simulation process. But, it is not so much a radical difference from good organizational thinking, as it is an identification, appreciation, and division of the distinct stages that make up any *simulation* workflow. Add the all-important idea of 'springs', attachments, and forces to the mix, and it *will* make you think a bit. But we think the results are worth it...

Really getting the most out of VWD also requires that you let go of the usual "set-pose then render, repeat..." modal way of thinking. VWD certainly lets you work that way, but it also lets you sculpt your dynamic-actor meshes in real-time, while it's simulating! Consider turning on wind for a short while to get most of the hair where you want it, then dragging wisps around for 'the right look', then sending the result to the host application, saving that version, then back in VWD, switching the wind direction around, and watching until the hair swirls back until another completely different look is achieved, saving that, then ...

It's also good to know that there are a few tools withing VWD that allow you to manipulate 3D-meshes that have nothing to do with simulation. Some of these tools simply let you load a mesh, run some actions on that mesh that will result in new files on your system, or elements in your host-application scene. These utilities have their own mini-workflows and have little or nothing to do with the usual workflow of VWD's simulation functions. Odd, but sometimes very handy.

1.2 VWD Paradigms and Workflow Ideas

Your stuff - The hard and the soft...

In all cases, using VWD requires that you take all of your scene's relevant 'hard things' - we call them *collision-items* - like figures, furniture, props, etc., and import them into VWD from from your host-application. You then import *one* of your 'soft things' - we call it the *dynamic-actor* - like a shirt, a sheet, or a hair item. (Occasionally we'll call it the *dynamic-cloth-actor*, or *dynamic-hair-actor* for clarity...)

Important idea!: As odd as it sounds, when you import a soft sexy looking animated 3D female figure to drape your 3D clothes onto, she's actually the 'hard' collision-item in the simulation!!! Even in her sultry or warrior-like animations, she might as well be made of concrete as far as her simulating hair or clothes are concerned! This is sometimes hard to get your mind around, but it makes sense if you take the perspective of the simulation engine, and consider that the hair and clothes are soft and flowing *against* the 'harder' stuff (her).

Once imported and configured with some starting fabric and hair characteristics or properties, you can fine tune your VWD session's items by selecting various mesh areas or sections of your imported items and applying the appropriate material properties for precise stiffness, stretch, collision, and self-interaction effects that will help you produce exactly the right look and feel with your 3D-mesh items.

The forces...

In the Simulate tab there are adjustable forces like gravity, inertia, and air-resistance that you can adjust for realism or effect. There's also a tab dedicated to wind and force-fields that will let you insert both constant and varying forces into your simulations, both static and animated. Many of these forces can be adjusted during the simulation too!

The processing engine...

Next, you configure your simulation engine settings, both mechanical: GPU/CPU and processors, and virtual: intra-frame interpolation settings, etc.

The simulation...

You then run the simulation. In this phase, your imported dynamic-actor (cloth or hair) will become a flowing mesh, interacting with any-and-all collision-item(s) in the VWD scene. In a *static* scene (not animated), the dynamic hair or cloth should respond to the scene forces(like gravity and wind), and generally settle into the natural drape and final position after a while. In a *dynamic* scene (animated), the dynamic hair or cloth will also respond to the scene's forces and collision-item(s), and it will also interact with the changes occurring in each animated frame as it is requested from the host-application, one-at-a-time, responding to those changing collision-item influences as they occur.

Tweaking things...

Just when you believe the simulation configuration is 'done' and you're ready to sit back and watch..., even more of VWD's power becomes evident! At any point while the simulation is running, you can either pause it to make adjustments, or you can just let it run, saving the results as they complete. In the *static* mode, you can use your mouse to manually tug and pull at parts of your dynamic-actor that may 'need some help' in any way you see fit, **while the simulation engine is still running**. You can then pause, adjust, and resume the simulation repeatedly, or stop and save the result when it's exactly 'right'...

Sometimes this process gets interesting when your 3D-mesh items have been designed without welds, and parts fall off during the simulation. Or, when a belt is supposed to stay on a pair of pants. Or, when hair strands are not welded to the skull-cap and the hair falls to the ground... VWD is designed to help manage these scenarios, but... you have to help it do so - because each mesh is unique in its design and density variability (and there are a *lot* of odd meshes out there!).

What's amazing is rather than having to exit VWD pull your 3D-mesh into a modelling program and make welds and similar fixes, most of these adjustments can be made from within VWD, just before the simulation phase begins. Attachments, collision, scaling, softness - can all be set on the entire mesh or small parts and accessories like buttons or ribbons.

Rendering...

This is done back in your host-application, but there are a few residual things that using VWD sometimes adds to this last step. In some cases, VWD may need to be used to re-apply textures to its own simulation copy, and it may be necessary to 'reload' all of the simulations in a scene, to re-coordinate a multi-item animation for the rendering sequence. These steps aren't that involved or complicated, but they add an extra step to that last pre-rendering step, and bear mentioning here.

Generally...

The biggest challenge for users of any simulation tool is getting a feel for the relationship between the various 3D-mesh item characteristics (e.g. polygon density, layout, and construction), the simulation settings (stiffness, stretch, attachments, forces, collisions, and springs, springs, and more springs...) and how they relate to each other, such that the desired effect(s) can be realized.

Because each 3D-mesh item is unique in its construction (polygon density, seams, welds, etc.), so are the respective 'correct' settings for each! Consistent meshes will promote consistent configurations and results. Varied meshes will take more effort, but VWD has the capacity to handle those as well, and that capability may be just what's needed to make your project(s) pop. Clothing items from the Poser cloth-room and DAZ's d-Force meshes are fairly dense and properly welded for simulations, so there are plenty of well-made clothing meshes to work with. Even the strand-based hair products that are hitting the market can be finessed to work well with VWD!

So, yes, if you're reading this correctly, you're probably starting to realize that this configuration process becomes an art in itself, an adventure, like a pallet of paints and a blank canvas... and may sometimes require a good number of iterations and experiments before getting your results 'just right'.

But while 'just right' is sometimes amazing, and always fascinating to watch as the simulations run, there's more... you can pause the thing, and get in there and tug and pull on the fabrics and hair with your mouse!, all while the simulation is running! How cool is that?! Really! Once you get things set up and running, then start to tug at 'living' cloth and hair, you'll be hooked!, and your results will almost always impress!

1.3 A Typical Workflow Overview

The typical workflow used to manage the scene setup in your host-application, the VWD simulations, and rendering processes back in your host-application, goes something like:

1. In your usual way, build a scene in your host-application - DAZ Studio, Poser, (or Carrara - with the Add-On Bridge product). If desired, set up any animations in the scene.
2. Start VWD from your host-application.
3. Within the VWD session you will:
 - Define each session item's role in the simulation *as you import it* (one or more collision-items, and a single cloth or hair dynamic-actor). While anything in the scene can be imported, you only need to import items that will be actively involved in the simulation: figures, clothes, hair, props, furniture, etc.
 - Apply additional material properties and characteristics (stiffness, friction, stretch, etc.) to any of the imported elements.
 - Enable and adjust any forces that will impact the scene/simulation (e.g. wind/gravity/inertia, etc.).
 - Configure the simulation settings (CPU/GPU, processors, etc.)
 - Run the simulation(s), pausing to adjust and tug at things if you like
 - Reset/adjust/simulate until you achieve the desired results.
 - Send the results back to the host program.
4. Repeat the above cycle step for each dynamic element in your scene (e.g. hair, then pants, then shirt, then sheets, etc.) until all of the dynamic elements have been simulated to your liking.
5. Back in your host-application, reload and (re)activate any/all of the VWD simulation animations (if needed) and re-apply any textures (if needed), then preview and finally render your image or animation sequence.

Reminder: Each active VWD simulation session can only have *one* active dynamic-actor (hair or cloth) item being simulated 'against' one or more collision-item(s) at a time.

Hint: To produce a scene with multiple simulated dynamic-actors (e.g. a scene with hair, a dress, blankets, etc.), each dynamic-actor will need to be simulated in its own VWD session, many of which will become the underlying basis for the next simulation session, now acting as collision-items - in a sort of cumulative 'layering' model. This is exactly how layered clothes are handled (e.g. a coat over a shirt, over a figure, etc.). This process will be covered later in this document.

There are some basic examples of the setup and use of the VWD tools near the end of this document. The above information is intended to generate a 'feel' for the VWD workflow before you start using it.

1.4 Terms, Conventions, and Hints

These are a few of the things we think everyone should know before using VWD.

1.4.1 VWD's Commonly Used Terms

Simulation has a language of its own, and we have terms we've also come to rely upon to exchange ideas on the use and control of VWD's Cloth & Hair. We can't emphasize enough how much more you'll enjoy the learning and use of this tool if you peruse and become familiar with our own way of describing and managing some of these ideas that permeate this tool and simulation environment. There's just no shortcut to taking a few minutes to sneak these terms into your new 3D-simulation domain.

- **Virtual World Dynamics (VWD)** - our company. Also the nickname for our *Cloth & Hair* product...
- **VWD's Cloth & Hair (VWD)** - Our flagship product. Allows users to convert virtual frozen clothes and hair into virtual flowing gowns and lockes. Everyone just calls it *VWD* for short...
- **dynamic-actor** - Our term for the one item in a simulation session that 'flows', interacting with the things in the scene that aren't dynamic. Note that there can only be one dynamic-actor in a VWD session. For each dynamic element in a complex 3D scene, a new VWD simulation session must be run. In such cases, many of the early dynamic-actors will take on non-dynamic but animated roles in later sessions.
- **collision-item** - Our term for the fixed or animated 'hard' thing(s) in a VWD session. There can be many, and they can either be still or pre-animated. A window frame may be a collision-item for a set of dynamic-actor curtains. More commonly, a walking female figure collision-item may be wearing a dynamic-actor dress that reacts to her body's animated motion and gravity.
- **xxxx_VWD** - This is how we describe an arbitrary VWD working item that is added to your scene when an item is imported into VWD as a dynamic-actor (cloth or hair), where **xxxx** is the name of the original scene item. VWD hides the original item in your scene and does its magic on this stand-in unrigged mesh-duplicate of that item. It is generally OK to remove these **xxxx_VWD** scene items when you are resetting your scene and any simulations, but if you are actively working on a scene/simulation, this item is the simulation target and where the results are applied, so removing it won't damage anything, but will remove your work/results... e.g. If you have a scene item called **My_Dress**, and you import it as a dynamic cloth actor into VWD, a new item will appear in your scene called **My_Dress_VWD**.
- **Selection** - Much like a word-processor, where you select words before you cut and paste them... After some base settings and properties are assigned to the actors and items being imported, almost all of the fine-tuned properties and characteristics of the VWD sessions fabric, hair, and collision-items are assigned to 'selected' mesh vertices and areas.

This process will be very natural to those that do a lot of 3D modeling but it can be pretty simple for those that don't model as well. For anyone new to VWD, it will take some playing with the available selection tools to appreciate how to get *just the vertices you want* for a particular effect. Worth mentioning here, is that the mesh navigation and selection memory buffer tools are simple but amazingly powerful. Once you've gotten used to them, you will wish you had them available on all of your other mesh manipulation tools.

- **Soft-Selection** - This selection method extends the current selection in an outward direction, having a reduced influence as the distance increases from that current selection. It is used to soften transitions between various cloth or hair properties (e.g. very firm to very soft). It is not always available in all selection scenarios.
- **Springs** - These very important virtual connections between various vertices or mesh-points drive almost every behavior you see in VWD's simulations. They are stretchy, stiff, long, short, ... and *you* set them the way you want them - like it or not... Like paint on a canvas, you paint your stiffness and attachment properties onto selected areas of your 3D-meshes, and when you get it right, you'll watch in fascination as the simulation magic unfolds. Yes, if you master VWD, you'll be thinking in 'springs'...
- **by-neighborhood** - This is a method of scanning for nearby 3D-mesh vertices from a given location or current selection-set. When using the by-neighborhood method of selection scanning, only the distance between the relevant points matter, and where on the mesh(es) they reside is irrelevant. If the points are within the sphere of the specified distance radius, they are 'included', usually in a selection-set. In cases like pleats on a dress with zig-zag folds, or layers of hair meshes, points can be selected across 'air gaps', or across open space between meshes. While this is good for some selection scenarios, it can also be used together with the other vertex selection methods (e.g. by-extension described below).
- **by-extension** - This is a method of scanning for nearby 3D-mesh vertices from a given location or current selection-set. When using the by-extension method of selection scanning, all connections between vertices or mesh-points have to occur across contiguous edge-connections on the nearby mesh structure. This means springs will only be added to the selection when they are located across the same mesh surface by hopping from connected vertex to vertex within the given distance. While this is good for some selection scenarios, it can also be used together with the other vertex selection methods (e.g. by-neighborhood described below).
- **Inter-penetration** (poke-through) – This is when meshes intersect or overlap *through* each other. Also called poke-through. This occurs most often when collision is either disabled on or between meshes, or when meshes are moving quickly into each-other, or when mesh polygons are too big to calculate collision effectively.
- **Rigidity** - We use this word a lot in this program and documentation. It's our way of describing flexibility and softness. More springs and less softness make things more rigid, stiff, inflexible, 'untwisty', etc.... (it's actually pretty tough to articulate some of these properties, given the many uses we've attached to some of these words - e.g. soft music, a soft throw, soft fur, a soft impact, and soft jello, etc....)
- **Nail to** - Our current way of describing attaching or gluing things together. These things are nailed together using our virtual *springs* (see above) of various softness, or stretchiness. e.g. *Nail to collision*, is when you attach all or part of a dynamic-actor's mesh to a selected part of a collision-item - like dress straps to a figure's shoulders, etc.
- **DAZ Studio (DS), DAZ, DAZ Inc., DAZ Carrara, dForce** - These are the names and terms of a 3D image and animation rendering tool (DAZ Studio), and the company that produces it (DAZ Inc.). DAZ Inc. also produces 3D content for use in 3D workflows and sells them as a brokerage. Virtual World Dynamics acknowledges and respects all copyright and trademarks related to DAZ Inc. and their products. <https://www.daz3d.com>

- **Poser, Renderosity, Bondware** - These are the names related to a 3D image and animation rendering tool (Poser), and the company that produces it (Renderosity/Bondware Inc.). Renderosity is also a 3D model, software, and general 3D resource brokerage. Renderosity sells VWD's Cloth & Hair products, Poser 3D software and a variety of 3D products. Virtual World Dynamics acknowledges and respects all copyright and trademarks related to Renderosity/Bondware Inc. and their products.
<https://www.renderosity.com>
- **Windows** – This is the trademarked Microsoft Inc. operating system series (Windows XP/7/8.1/10, etc.) that VWD's Cloth & Hair runs on. Virtual World Dynamics acknowledges and respects all copyright and trademarks related to Microsoft Inc.

1.4.2 Hints

As you use any software tool and develop your own favorite workflows, you'll learn things as you go. Here are a couple of tips, techniques, and mechanical quirks that we have learned while using VWD in no particular order...

- **Release notes and Known Issues:** Please review the release notes that are included with your version in the version-specific release-notes that are included in each release package! There may be known issues (a button that is present but simply isn't working...) in the release that should be described in these notes and may save you some grief and time. These release notes should always be available in the core VWD directory that looks something like:

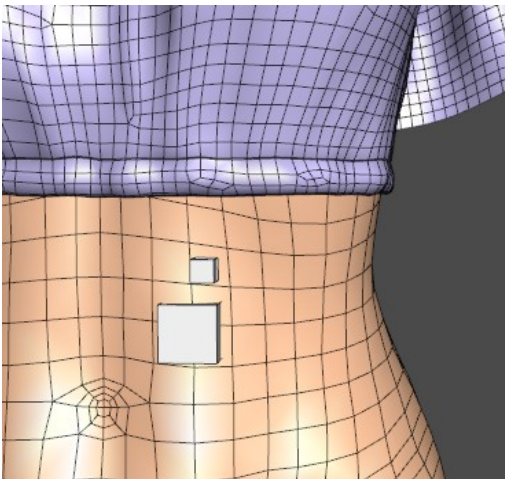
`C:\VWD\2.2.333.4444\VWD_V2.2.333.444_release_notes.txt`

(or wherever you installed the core VWD directory). These kinds of notes are specific to the latest releases, so it does not make good sense to include these transient issues in this core documentation.

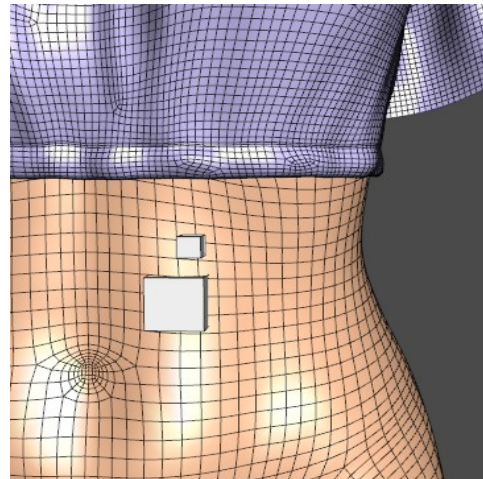
- **Only one dynamic-actor (simulated item) is allowed in each VWD session** - This is mentioned all over this document, but it is really important, so it's also here as a *hint*. There can be many items in a VWD simulation session, but the dynamic-actor is the only element in the scene that will be simulated during that session. Everything else will be available for the dynamic-actor to interact with (or against).

Note: To create an image with multiple simulated items (e.g. a simulated hair, simulated dress, and simulated blankets on a bed), you will need to run VWD at least three (3) times - once for each simulated item. This is true in both static and dynamic/animated scenes. Simulated items are layered in sequential sessions.

- **DS 'Smoothing modifier':** When using DAZ Studio, imported collision-items must have their smoothing function removed completely to work properly with the VWD simulation engine. If smoothing is enabled in DS on a clothing item that is animated by the host, it will probably 'explode' in VWD during the simulation. This smoothing can be re-added to the item, re-activated, and configured once the VWD simulations are completed and returned to DAZ Studio session.
- **Mesh density** – The polygon density of the various 3D-meshes has a *huge* effect on how that mesh will behave during the simulation processing! 'Sparse' meshes, or meshes that have large polygons, will be look blocky and often simply confuse or break the simulation engine. Dense meshes, or meshes with a large number of polygons will simulate beautifully, but more slowly, and react slowly to dynamic deformation adjustments. So, what are the 'best' polygon densities in your scene items to shoot for when using VWD? Here are some rough guidelines:



Genesis 8 Female and dforce top, both at their 'Base' resolutions. Probably OK for simulating in VWD.



Genesis 8 Female and dForce top at 'High' resolution (level 1 smoothing in DAZ Studio). Better for simulating in VWD, but slower.

While each host-application uses its own units of measure internally, the typical (above) DAZ Inc. figure 'open' surfaces (not faces, hands, etc.) seem to *average* around $\frac{3}{4}$ inch per polygon in base resolution in DAZ Studio units, and $\frac{1}{4}$ inch polygons in level 1 smoothed sub-division 'High Resolution' mode. In the images above, the larger cube in G8F's belly is one DAZ Studio inch per edge. The smaller cube is one DAZ Studio centimeter per edge. This will give you an idea how those figures and clothes meshes are designed and what a decent mesh range is for VWD. Using items with polygons that are much larger or smaller will diminish your VWD simulations in quality or time, respectively. Technically, this means good polygon density from a DAZ Studio frame or reference is around 9 to 16 polygons per square inch, or a bit less than 1 polygon per centimeter, but you have success with variations from this.

Hint: Like I do in the above images, I recommend taking a look at clothing items made for DAZ Studio's dynamic tools like dForce or dynamic-clothing-control, and/or Poser's Cloth-Room products. These are usually pretty close to the right density for VWD simulations. Bring one of these items into a new scene along with your own scene item(s), then set the viewport to one of the mesh viewing modes (in DS I prefer *hidden-line* or *wire-shaded*), and zoom around the items and compare the polygon sizes to the dynamic items and see if they are similar in mesh-density.

Note: In a given scene, collision-item meshes can be less dense and still be useful, but sparse meshes used in simulations and renders will show more apparent mesh structure (facets and corners) and may suffer from more poke-through issues (especially in animations).

- **Toggle Buttons** - I made up this term, which describes a bunch of clever VWD program buttons that have multiple functions, which can only be seen/activated (toggled...) by floating over them with your mouse cursor while having the Windows **Alt** or **Ctrl** key pressed.

Important: The text on any/all of these dual-mode "toggle buttons" is italicized in the VWD interface!!!

Most of these dual-use 'toggle buttons' are logical, in that the function of the default button is inverted when 'toggled' by the **Ctrl**-float-over action, but a few are just convenient and completely unrelated in their functions... All of these buttons are documented in the sections below, but it's *good to know that they exist* early in your VWD explorations!

One easy example to try is in the **Forces and springs** tab, the **Apply inflate** button: float over it with your mouse cursor (no buttons pressed), then press and hold the **Ctrl** key as you move the mouse slightly, and watch the button's caption change to **Remove inflate**! Obviously, if you click the button in this state, it will do as the caption indicates.

Note: Some of the buttons will also automatically change their purpose depending on the state of a VWD process. Most notably, in the **Simulate** tab, the **Start dynamic simulation** button will change to **Stop dynamic simulation** while running, then **Send animation to host** when the simulation is complete. Similarly, the **Start static simulation** will change to **Stop static simulation** (which is really more like a pause button).

- **There are multiple display modes** for the items in the VWD **Scene viewer** tab - Try pressing the 'a', 'h', and/or 'o' keys while the mouse is within the **Scene viewer** viewport. The active-item's display style will change! Press each button again (they are toggles) and the display will return to its previous mode. You can press any of these buttons at any time to help in your navigation and vertex selection efforts. Details are added below, but this is good to know early...
- **Reset/Fresh start in VWD** - To really get a fresh start with a VWD session and scene, you need to clean out any VWD items from your host-application scene, and clean out the VWD working files so you don't get any residual working files competing with your new session files. First, remove all of the files in your scene that have the **_VWD** suffix (just select and remove them), and then open VWD and first thing: run the **Delete all "Exchange" files** tool from the **Utilities** tab.

Important: Remember that **Delete all "Exchange" files** clears *all* of your available VWD animations from its animation file-cache, which removes all (past) results from all projects. Backup the Exchange folder if this may be a problem (see **Backing-up and Restoring VWD Project Files** for details). You may also wish to run the **Restore program parameters** from that same **Utilities** tab to ensure that some residual settings are being applied to your simulations without your knowledge or intention.

- **Consider animating your figures 'into' their final positions/poses** – Non-animators can use the new **Pose to animation** function (see section 5.9, 'The Utilities tab') to generate a short transition animation. Even for those of you who do not animate, you might consider running a very simple pose-to-pose animation from your base T/A-pose to your intended final pose and position. VWD can take a cloth or hair mesh from any configured pose/position and drape it to its final resting drape just fine, but you may find that you achieve better results by starting a scene with both the cloth/hair and figure in their as-shipped A-poses - fitted and stable. Starting from this stable point, set up a 3-5 second settling time (90-150 frames @30fps), then have the figure move into their final pose over a 5 second time-range, letting that pose settle for another 5 seconds at the end.

Not only will the clothes and hair fall more naturally as the animation progresses, but you can pause and help the dynamic-actor find its way to where you want it to go and settle. When you send the sequence of frames back to the host-application, you can render any of the resulting frames, rather than just the static frame that was produced in the static render mode.

- **Question:** What are these **xxxx_VWD** files that are created in my host-application scenes when I run a VWD session? (e.g. After I simulate my **CoolDress** scene item in VWD, there's a new **CoolDress_VWD** item in my scene tree and my **CoolDress** is hidden...).

These files are mesh duplicates of the original items that are then imported into VWD for the simulation session. These are the mesh-files that VWD actually works with, leaving your original scene items alone (other than to hide them after VWD successfully returns the new simulated version of the original item to your original scene).

If you decide that there's no remaining value to having these **xxxx_VWD** files in your scene, or you want to start a new VWD session from absolute scratch, you can remove these items from your scene and your scene will be just like you started, and VWD can be run again from scratch with no ill effects.

Note: Do not place these **xxxx_VWD** files in your DAZ Studio groups or hierarchies while you are in the process of generating simulation results. Only *after* you have completed all VWD simulations should you consider temporarily grouping these items so you can manipulate the groups as a unit. If you wish to re-apply the textures or animations to the **xxxx_VWD** items, they must be visible to the VWD program at the top of the DAZ Studio scene tree hierarchy. Once re-applied, you can re-group these items for further adjustments and rendering.

Also of related interest: These scene objects are un-rigged standalone duplicated meshes. In DAZ Studio, these meshes are stored right within the scene or scene-subset *.duf files, meaning that these saved scene-files may grow rather large if hi-poly items are being simulated in VWD. They can be exported as items using the scene-subset or export options of your host-application.

- **Switching between VWD and your host-application** - Changes can be made to your host-application's scene while VWD is still open, and by pressing the **Host List** button in the **Scene import** tab, you can access and import any new scene elements into VWD without having to restart your session.

Hint: While I tend to try to finalize my DS/Poser scenes before working in VWD, there might be times that I need a small collision or nail-to sphere in my VWD scene to help with a simulation effect. By quickly adding this to my DS/Poser scene and pulling it into my active VWD session, I can keep my workflow moving forward.

- **Avoid abrupt motions in animation sequences** - Be sure your animations are fairly smooth, especially if you are melding motions together in your host-application (e.g. using BVH files and aniblocks). Abrupt movements and jerkiness between frames will become very apparent in some of your VWD results, as the simulation engine senses, and accurately 'renders', these rough transitions. Upping the frame-rate may help in fast animations, and lowering the frame-rate may result in very rough simulation results.
- **Backing up VWD project files** – If you wish to return to a VWD-based project (esp. animated/dynamic scenes), you must save some specific VWD working files and restore them when you return to the scene. If you use the VWD Utilities tab to clean out your Exchange files, you will have to redo your VWD work! Buried in the main VWD directory (e.g. C:\VWD\...) are a few folders that contain VWD presets as-well-as the workfiles and result-files created by VWD during the simulation sessions.

Because some of these files may get large and inspire periodic clean-outs after working on a few projects (especially animations!) it may be wise to backup some of these files with your project's scene-files after the project is complete or put on hold. There is a section on how to do this elsewhere in this document: **Backing-up and Restoring VWD Project Files**.

- **Reset controls to their default values** - You can reset specific tab, button, or field's setting by pressing the interface item while pressing the **right-mouse button** and **Alt** key together, returning the item's setting to its default value(s). If you are resetting a tab, all of that tab's controls and values should return to their default settings too. To reset all of the VWD tab interface settings at one (all of the program's controls), open the *Utilities* tab, and press the *Restore default parameters* button.
- **Resetting a static or dynamic simulation** - It's documented below, but worth a mention as a 'hint'. To reset a simulation to its starting state after it's been run and stopped or finished:

In the VWD Simulation tab, press and hold the **Alt** key as you **left-click** the appropriate *Start simulation* button that you used to run the previous simulation (static or dynamic).

When trying out many settings, it's really handy to set things up, try a simulation, then reset things, then make some more adjustments and try another simulation run - using this reset function.

Hint: You can switch between running dynamic and static simulations once the simulation state has been reset, but always use the **Alt** / *Start simulation* sequence on the same button you used to start the current simulation...

Important: Changing between the CPU and GPU (either way) after a simulation reset will probably not work the way you want. Not recommended, even if it allows you to do it. But it might work...

- **Saving Presets** - Across the VWD program tabs, many of the preset 'save' functions available to you are not very obvious or conventional. Generally, if you find that you can type characters into a preset pull-down field, that means you can probably create your own preset (from the current settings) by simply inserting your own filename in that field and pressing Enter.

Important: When saving, there is currently no visible confirmation (just a Windows alerts sound), no overwrite prevention/protection, and the new item doesn't appear in the pulldown listbox until the next time you run a new VWD session, so it's hard to know if the preset was actually created. Sometimes I use Windows to browse to the programs preset folders to be sure.

- **Adjust session properties while simulating** - A very powerful feature in VWD is the ability to pause/stop an active simulation (static and dynamic/animated) at almost any point, make major changes to almost any property on any element, and continue the simulation, which will then continue, responding to the new state of the properties. One example would be to have a strong wind blowing a flag on a pole and then having the flag 'let go' of the pole half-way through the animation, and blow away... Those who 'see' this feature's power will do amazing things with VWD.
- **Different scenes with the same item names:** If you use the same item names in a variety of your host-application's scenes, and these scenes also have the same animation length, it's possible that pre-recorded VWD animation cache-files for your collision items will have the same names and result in side-effects into your animations (not be the animation you expected). The two best ways to manage this side-effect is:
 - Save, then clear your Exchange directory between projects and scenes via the *Utilities* tab's *Delete all "Exchange" files* button (Remember to back them up first if you have other project results you need to save!).

- When importing collision-items into your VWD session, consider checking the **New animation** box in the **Collision parameters** tab. This will tell VWD to ignore existing animation cache-files. You can also select an oddly-behaving collision-item in your scene, open the **Collision parameters** tab and press the **Record** button to force a rebuild of that animation cache-file from the current scene's animation.
- **Scene recording:** When you choose to use the VWD **Video** recording function in the **Simulate** tab, you should set your viewport view once and probably leave it as-is until the simulation is complete. Moving the viewport view *while* the recording is active will also record that viewport motion, and will result in very abrupt (not smooth) frame jumps in the recording.
- **Poser vs DAZ Studio Vertex order:** Poser and DAZ Studio seem to look at the imported vertices of the same item differently. This means that many of the files that might be useful for presets and animations will not be portable between these applications. This means that dynamic morphs, rip-files, hair vertices-sets and other presets like this may need to be created and saved in their respective applications (twice...). Animation cache files and simulations will also probably not transfer across the applications.

2 Using VWD's Cloth & Hair: Examples

Learning how to actually use the VWD commands and controls in the accompanying *VWD Program Manual V2.x* is best approached through examples. In parallel with the tutorial videos that we will publish, a little bit of show-and-tell should get you going with VWD. This list will grow as the program evolves.

A few things worth mentioning before we start into the examples:

- Since the examples that follow were written when VWD was a Poser-only program, the examples that follow were written with Poser users in mind, but the operation and concepts are quite similar to those same functions in DAZ Studio (DS).

Note: We will highlight the few places where the differences between the programs are worthy of mention.

2.1 Simulation of a single dress.

The animation of a simple dress is really easy to achieve because you just leave the default settings when importing items.

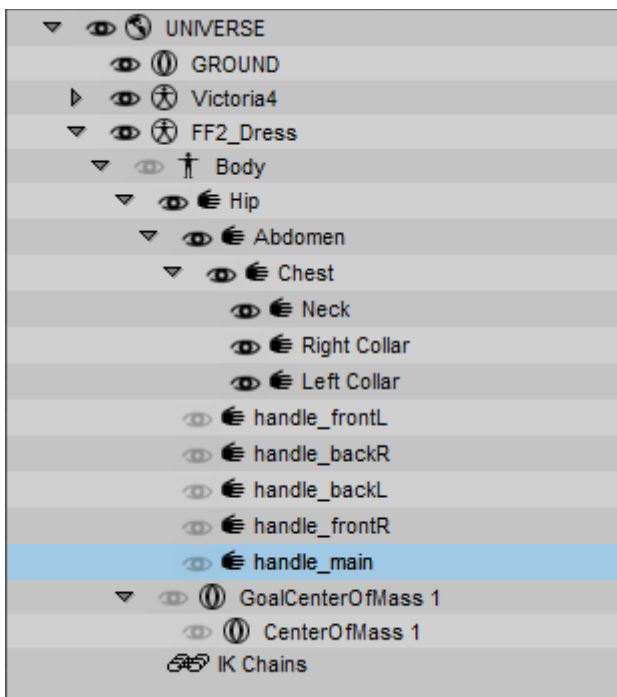


Open a **Poser®** file or import a character and a conforming cloth. The dress used for this demonstration is **FF2 Dress** by **AL3d**.

Very often conforming clothes have handles that allow to deform it locally.

With **VWD**, these handles are unnecessary or even annoying, because if they are present during the simulation, they will participate in it.

The first thing to do is to hide these handles using the **hierarchy editor** that is in the "**Window**" menu of **Poser®**.



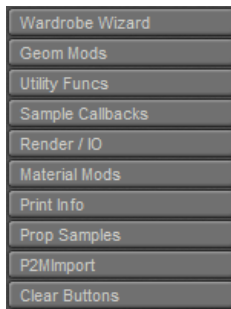
Hide all handles.

VWD will import only the visible parts of a character.

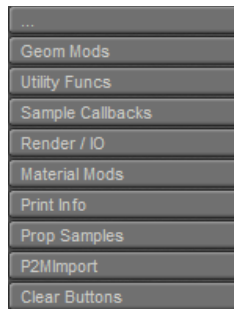
It is possible to hide parts of the body to speed up the simulation or to avoid annoying contacts.



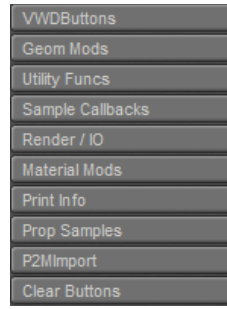
After missing handles, start the program.



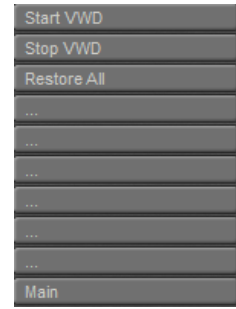
Start Python.



Delete the first button.

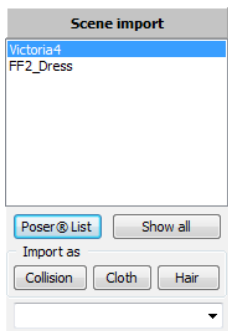


Choose VWD.



Click on VWDButtons.

You can press the **Start VWD** button to see appear the program.



Press the **Poser® list** button.

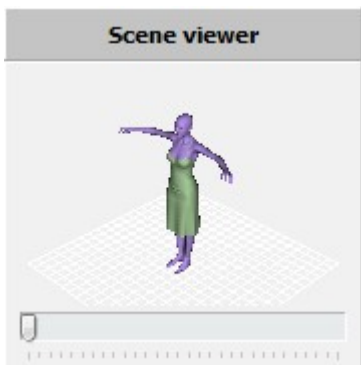
All elements in the **Poser®** interface appear in the list box.

Select **Victoria4** and press the **Collision** button.

Leave the default settings and press again on the **Collision** button.

Select **FF2_Dress** and press the **Cloth** button.

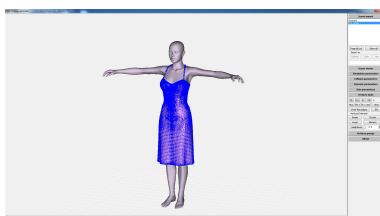
Leave the default settings and press again on the **Cloth** button.



The character and the clothes are now present in the viewing window.

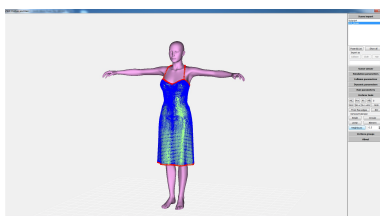
You can right click on the header of the **Scene viewer** tab to expand the interface to full screen.

You now need to hang the clothes on the character.



Press the header of the **Vertices tools** tab.

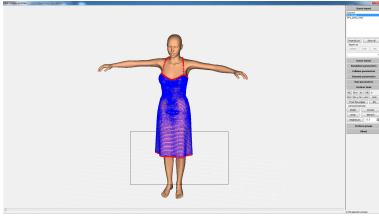
The vertices corresponding to the mesh of the dress appear.



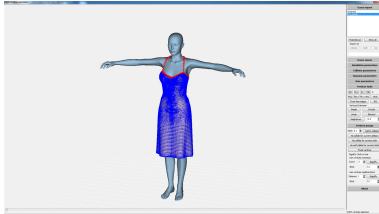
Click the **From free edges** button.

Click the **Neighbours** button, leaving the default value of 0.5.

The edges vertices appear with an extended selection.



To deselect the vertices of the bottom of the dress, press the Alt key and draw a rectangular box around the vertices to be removed.

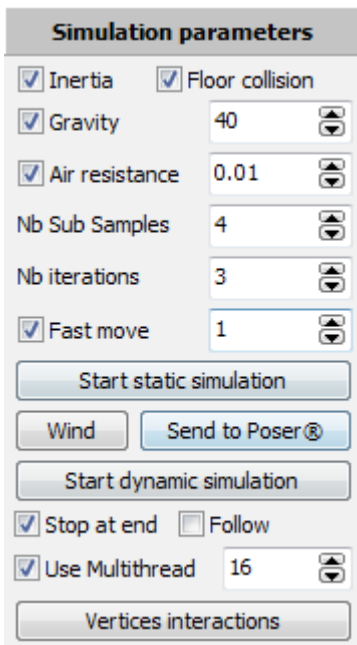


Once the vertices deselected, click on the header of the **Vertices groups** tab for expanding it.

Click the **Nail to collision** button leaving the default value.

The vertices are flashing orange and then all become blue (not selected).

The elements are ready for simulation



You can click on the **Start static simulation** button to see the dress position on the character. The animation of **Victoria4** will not run.

It is possible at any time to click on the **Send to Poser®** button to see the deformation of the cloth in **Poser®**.

You can click on the **Start dynamic simulation** button to see the dress follow the character. The animation of **Victoria4** will run either:

- By asking the animation to **Poser®** at every frame, if the animation is not known by **VWD**.
- Reading the animation from the cache file generated from the same animation on a previous simulation, or recorded using the **Record** button of the **Collision parameters** » tab. At the end of the simulation, the **Start dynamic simulation** button is renamed to **Send animation to Poser®**. Pressing this button closes **VWD** and modifies **Poser®** to incorporate the new simulation.

2.2 Simple hair simulation.

The animation of a single hair is also easy to realize. For this example, we will take hair that are very aesthetic and yet very easy to animate because you can keep the default settings.



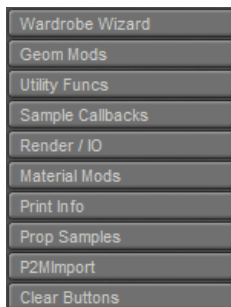
Hair chosen for this simulation are ***Christine Hair*** by ***Littlefox***.

Open a ***Poser®*** file or import a character and a hair.

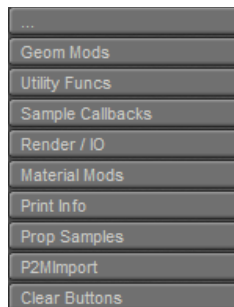
The hair have, in general, no handles, but there are however some hair who own ones.

If these handles exist, it is necessary to remove them as with a cloth, using the ***hierarchy editor*** that is in the ***Window*** menu of ***Poser®***.

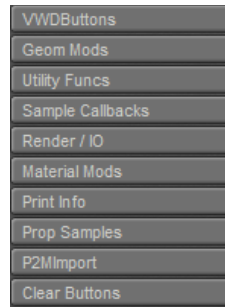
You can start the program.



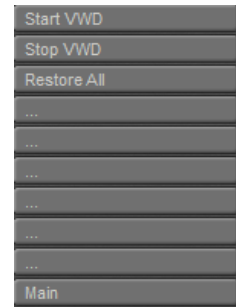
Start Python.



Delete the first Button.

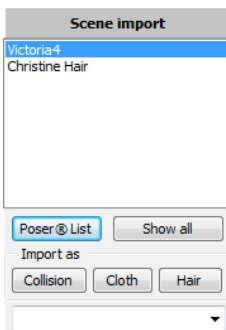


Choose VWD.



Click on VWDButtons.

You can press the ***Start VWD*** button to show appear the program.



All elements in the ***Poser®*** interface appear in the list box.

Select ***Victoria4*** and press the ***Collision*** button.

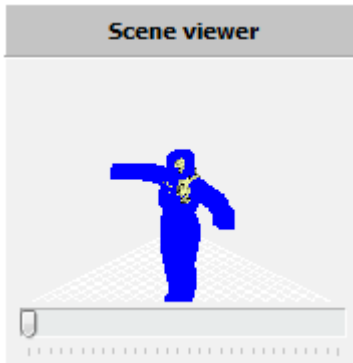
Leave the default settings and press again on the ***Collision*** button.

Select ***Christine Hair*** and press the ***Hair*** button.

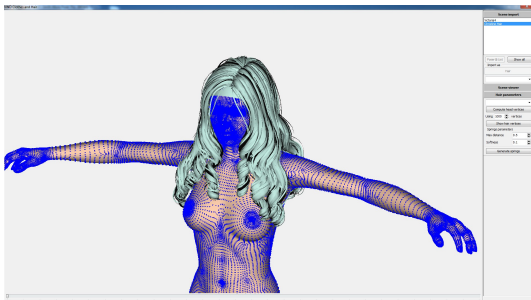
Leave the default settings and press again on the ***Hair*** button.

The character and the hair are now present in the viewing window.

The character appears blue because the vertices are displayed.

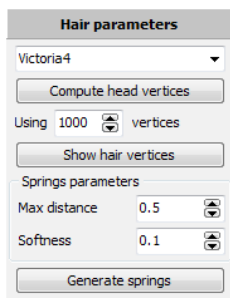


This means that the integration of hair is not yet fully complete. It is now necessary to hang the hair on the head of the character.



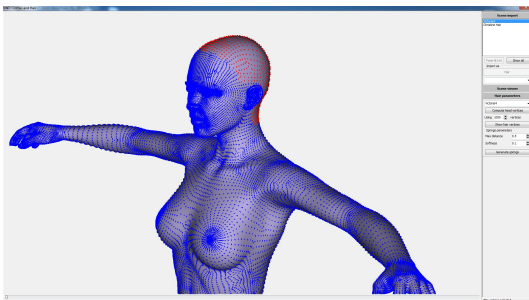
Click on the header of **Scene Viewer** to enlarge the image and zoom using the wheel. The camera is positioned on the barycenter of the hair.

Click on **Victoria4** in the list box and click again on **Victoria4** by pressing the **Ctrl** key. This action will leave visible the character and hide all the other elements.



In the hair selection combo box, choose the character suited to the character present in the interface, in this case **Victoria4**.

It is possible to perform a different selection of hair vertices. These other selection methods will be seen in another tutorial.

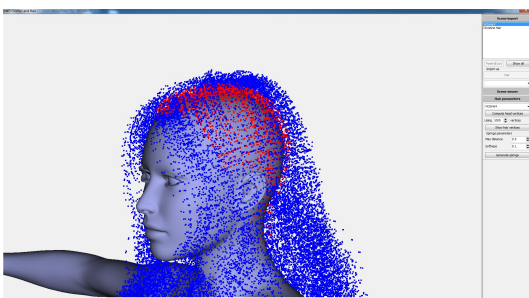


The vertices that will be used for attaching the hair appear red in the interface.

These selected vertices may not correspond to the need for the desired simulation. You can add or remove vertices to the selection.

The **Compute head vertices** button was not used but will be studied in another tutorial.

Leave the default settings and press the **Show hair vertices** button.



The hair mesh remains hidden but the vertices of the hair appear.

The red vertices correspond to those located at a distance less than the value, defined by **Max distance**, of the selected vertices of the collision element.

This value can be modified to increase or decrease the number of vertices used for hanging.

A value between 5,000 and 10,000 vertices is correct in general.

Once the vertices properly selected, press the ***Generate springs*** button to generate the springs that allow the attachment of hair selected vertices to the character's head.

The hair mesh reappears and the interface elements are ready for simulation.

As for the dress simulation, you can do a static or dynamic simulation based on the work you want to perform.

As in the case of a dress simulation, character animation will be made asking the deformation of the character at each frame or using the deformation stored in the file cache of ***VWD***, if the current animation has already been played or recorded.

2.3 Simulation of earrings

The simulation of earrings is a bit special because we ask to the program to animate an actor composed of rigid articulated elements so that it is made to animate flexible elements.

In fact, this feature will only work properly for the earrings that will have parts with a certain volume to avoid deformations. Very flat earrings can be animated but the collision with the head can bend them when they should stay flat.

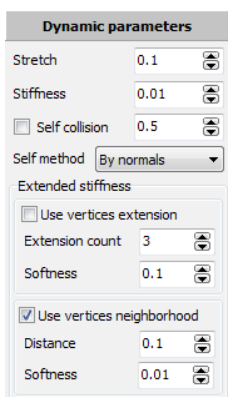
A future version may include the possibility of considering some parts of a mesh as rigid element.



Open a **Poser®** file or import a character and earrings as **cloth** element.

Some earrings have a very large number of vertices and can not be simulated.

The earrings have a very different mesh structure than clothes and hair structures. Some parts of the mesh can be extremely dense and can not be stiffened in the same way. Yet it is necessary to weld the various elements together as they are generally all separated and would separate during simulation if it were not bound by a rigidity by-neighborhood. However, if one does not want to have memory overflow issue, it is necessary that this neighborhood distance is the smallest possible.



Import "Victoria 4" as collision element with the default settings.

To do this, select **Victoria4** then click on the **Collision** button. Click again on the **Collision** button to accept the default settings.

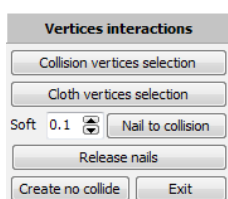
Import **FF2_Earrings** as **cloth** type using a value of 0.1 for neighborhood distance and a spring softness of 0.01.

To do this, select **FF2_Earrings** then click on the **Cloth** button. Edit the values in the **Dynamic parameters** tab and then click again on the **Cloth** button to generate the earring as a dynamic element.

These values will be essential to successfully import earrings.

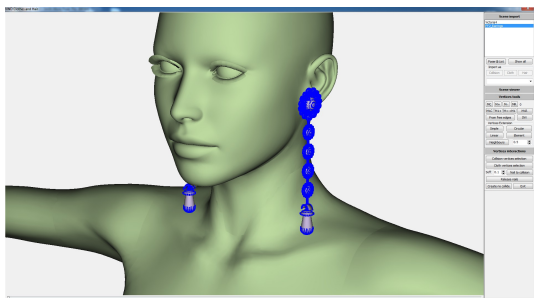
Click on the **Simulation parameters** tab header to open it.

Click the **Vertices interactions** button to open the following interface.



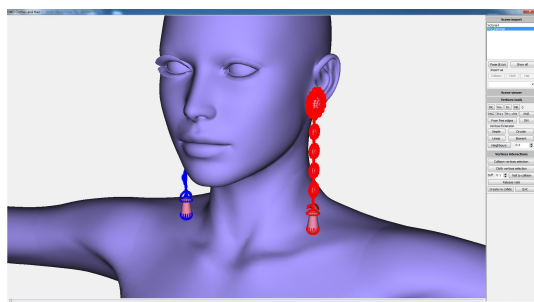
This interface allows you to establish relationships (springs) between some vertices of a collision element and some vertices of the dynamic element.

The opening of the **Vertices interaction** tab also opens the **Vertices tools** tab that displays the vertices of earrings.



Each earring will have its own generation of interaction at vertices level.

The program is able to record multiple vertices interactions. By against, Their definition will be done independently.

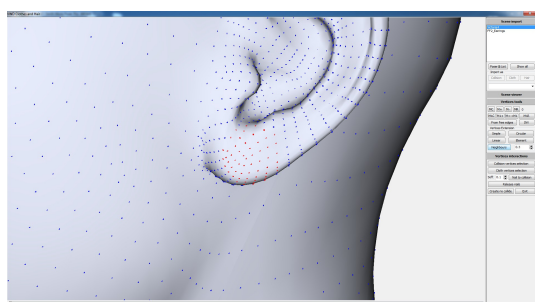


To the left earring, select all vertices of the earring.

Click the **Cloth vertices selection** button to save selected vertices in the array of cloth vertices for the current interaction.

Click on **Victoria4** in the list box to select the character.

Click on **Victoria4** in the list box with the **Ctrl** key to display only the character.



Zoom to **Victoria4** ear using the wheel and click with the middle button on the lower part of the ear.

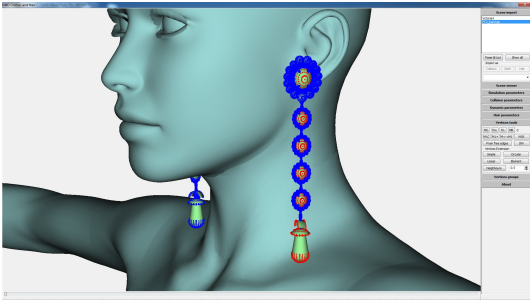
With the **Shift** key pressed, move on the bottom of the ear to select the vertex which seem to be the best placed to be the main point of attachment of the earring.

Keep the value 0.5 in the selection extension value by-neighborhood and click on the **Neighbours** button to expand the selection of the selected vertex.

Enter 0.01 in the value **Soft** of the **Vertices interactions** tab to define a rather rigid spring value as it is not necessary that the earring goes down under the effect of the gravity. However, it is essential that the gravity is applied because it is she who will give to the final animation, its realistic touch.

Click the **Nail to collision** button to generate the springs.

This selection in volume of the ear vertices takes the vertices of the earring in a single direction which avoids particularly the earring to pivot on itself, which would be the case if a single vertex has been selected on the character.

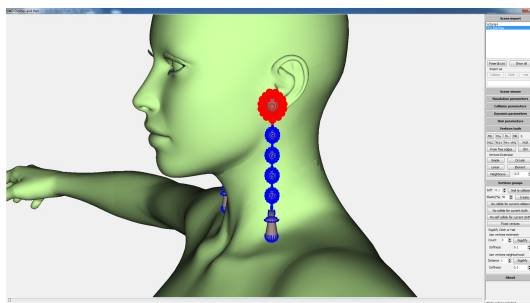


In order to make more realistic the parts the most in volume of the earring, it is preferable to stiffen them to avoid deformations of these parts during possible collisions.

For this, with the **Shift** key down, select a vertex on one of the earring balls. Release the **Shift** key, press the **Ctrl** key and position the mouse near a vertex of another ball and press the **Shift** button to select it. Repeat this action on each ball.

When each ball has a vertex selected, click the **Element** button on the **Vertices tools** tab to select all contiguous vertices.

Open the **Vertices groups** tab. Change the value of the neighborhood distance to 0.5 and the softness value to 0.01 and click the **Rigidify** button to generate the springs.



To complete the processing of the earring, it is necessary to eliminate of the collision constraint, all vertices which are at a distance less than that corresponding to the collision distance of the character, which is 0.2 by default. If this action was not made, the vertices of the earring near the ear will be repelled by the character and the top of the earring would be distorted.

It is now necessary to perform the same actions for the right earring to create a new vertices interaction.

These actions seem a little long to realize even if they are not so in reality. You can watch the video presentation of this tutorial on **YouTube**. Don't forget these actions have to be made once. The next time you want to simulate these earrings on the character, you could click on **FF2_Earrings** in the combo box of the **Scene import** tab to play the file which contains all the importation informations for these earrings.

Once all these actions done, you can run the simulation.

2.4 Simulation of a more complex outfit.

This tutorial aims to show how to solve a recurring problem with conforming clothes.



Eleanor Dress by **Nikisatez** is a dress that gives very good simulation results. However, a problem occurs regularly: the fabric of the dress through the belt. This problem is normal since the dress and belt are pushed at the same distance which necessarily generates an inter-penetration. But there is a stiffening by-neighborhood which is expected to hold off the vertices of the dress and the vertices of the belt. With experience, you realize that this stiffening is not enough if the animation is fast.

In addition, the belt tends to bend with a little unrealistic way if default parameters are kept.

The solution to these problems is the purpose of this tutorial.

The first thing to do is to hide the handles using the **Hierarchy Editor** in **Poser®** as shown in the first tutorial.

Eleanor dress works well with relatively high stiffness parameters. The reason perhaps is that its mesh is not very tight.

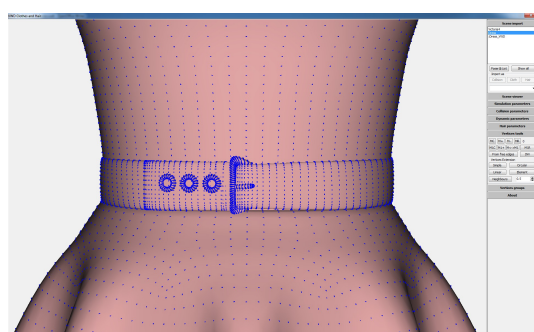
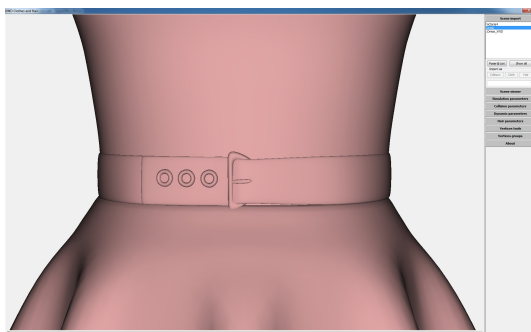
I take this opportunity to remind the benefit of memorizing simulations. Each cloth or hair, especially conforming will have a particular behavior for a simple reason is that it was not created for the simulation. It is interestingly to make enough trials to make sure of the correct settings of the simulation for this element (clothes, hair, earrings) and then rename the .RIP file (Recorded Import Parameters) with a sufficiently precise name to not be erased by a new simulation. You can record several **.RIP** file for the same cloth, for obtain different effects.

Correcting the belt is specifically in stiffening the belt.

The selection of the belt will allow to show a feature that is both powerful and flexible in VWD.

Select **Eleanor dress** in the list box and zoom in on the belt by clicking the middle mouse button. Bringing the cloth by using the wheel to view the belt with maximum accuracy.

Then click on the **Vertices tools** tab to display the vertices.



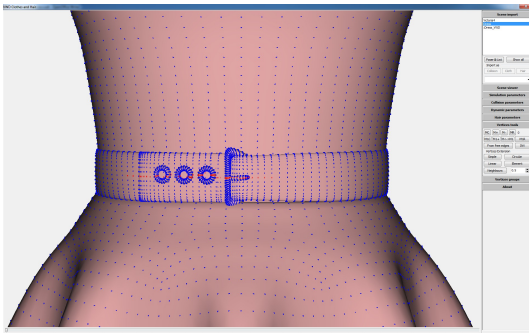
The individual selection of vertices is done using the **Shift** key.

When you press the **Shift** key and move the mouse, you see the vertex located closer to the mouse in red color. Pressing the **Ctrl** key, you see a red selection of all vertices on the path used by the mouse.

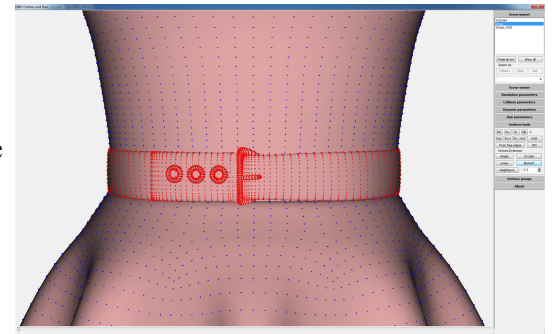
This feature will be extremely convenient to select the various belt elements which in reality are fully dissociated.

To verify this separation, you can click a vertex of the belt and press the **Element** button of the **Vertices tools** tab. The belt will be selected but not the buckle or eyelets. You can do the same test by selecting a vertex of the buckle and pressing the **Element** button. You will see that only the buckle will be selected.

To select all elements of the belt, select a vertex on the left part of the belt and move on the right along the belt and buckles by pressing the **Ctrl** key. The result should look like the following image.



Pressing the **Element** button should display the right image.



We must now stiffen these vertices by hooking them and tying them rigidly to the vertices of the fabric.

Open the **Vertices groups** tab by clicking on the header of this tab.

In the **Use vertices neighborhood** area, keep the distance to 1.0 and set the softness to 0.01. This softness value generates relatively stiff springs, that is what we want.

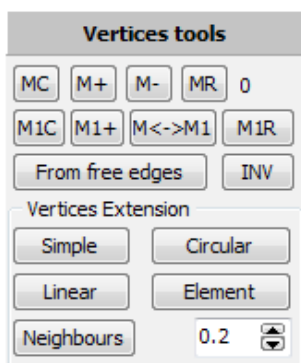
Press the **Rigidify** button to execute the spring generation.

The belt is now stiffened. you might think that this stiffening will prevent inter-penetration of the fabric, but it is not so because the knockback of vertices runs at a higher level than stiffening.

To solve the problem of inter-penetration, there is a way. Prohibit vertices tissue under the belt to being pushed back by the collision system.

To do this action, select all vertices of the belt as seen previously. You would also have been saved those vertices having pressed the **M+** from "**Vertices tools**" tab.

Once the vertices selected, press the **M1+** of **Vertices tools** tab to put the vertices in the secondary memory. Extend the vertices by-neighborhood with a distance of 0.2 by pressing the **Neighbours** button



This will select the neighboring vertices of the belt by incorporating the vertices of the fabric without taking vertices too distant to the belt.

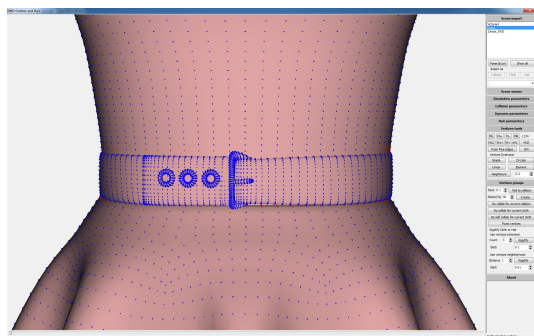
Press the **M+** button to add these vertices to the main memory. To be certain of having only these vertices, you can press on the **MC** button to empty the main memory.

Press the **M1R** button to show the vertices stored in the secondary memory, ie the vertices of the belt.

Press the **M-** button to subtract the displayed vertices to the vertices of the main memory. This action is designed to leave only the vertices of the cloth near the belt.

Press the **MR** to see the result of the last operation.

The result shows only a few vertices of the cloth that appear near the belt.



Then you remove these vertices from the collision system of the the simulation by pressing the *No collide for current cloth* button.

The simulation is ready to run.

This tutorial was intended to show how to solve the problem that exists with *Eleanor Dress* but is mainly there to show the versatility of *VWD*. This flexibility is needed to resolve problems which may arise using conforming clothes that repeat it, were not designed for dynamic use.

All these actions can seem complex and lengthy. It is true that they can be. It is important to remember that they are to be executed only once. Automatic recording of the simulation parameters is here to avoid repeating these complex actions. When a dynamic element is in the *Poser*® scene and its simulation parameters were tested, simply clicking on its name in the combo box of recorded simulations, will import this element with the same parameters.

2.5 More complex hair simulation.

This tutorial aims to show how to solve a problem related to certain hair.

In general, hair is composed of textured strips whose upper portion is defined close to the head of the character on which it is desired to position the hair.

For aesthetic purposes, some hair have volumes that make them difficult to simulate using the attachment of the default method. It is therefore necessary to perform additional actions to achieve a realistic simulation.

The hair used for this demonstration is *Anastasia hair* by *SWAM*.



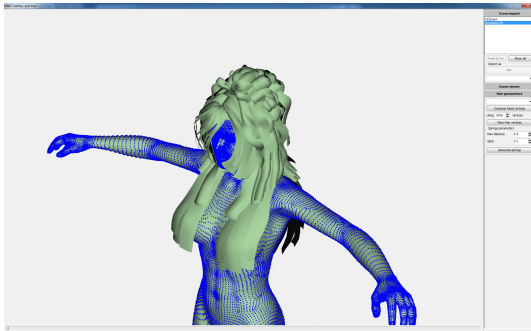
This hair appear as long hair having a kind of bun in the top.

It is possible to make a simulation using the default settings. However, the top of the bun will tend to collapse under the effect of the gravity because the rigidity of this part is not enough strong.

Open *VWD*.

Import *Victoria4* leaving the default settings.

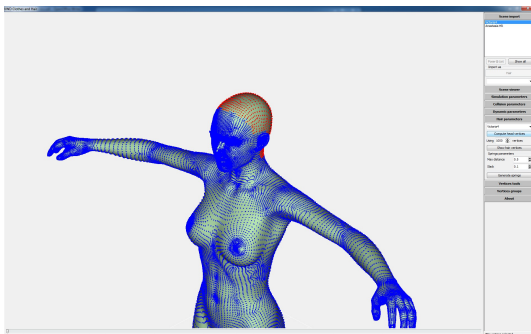
Import *Anastasia hair*, and also leave the default settings.



Click on *Victoria4* in the list box to select the character.

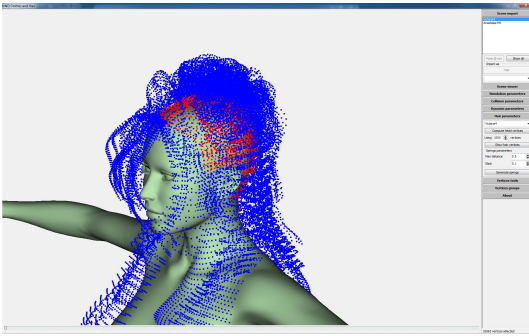
Hide the hair by pressing *Victoria4* with the **Ctrl** key.

Select *Victoria4* in the list of registered hair or use a personal method for the vertices selection.



The vertices that will be used for the attachment of the hair are selected on the character.

Press the *Show hair vertices* button to let appear the selection of hair vertices.



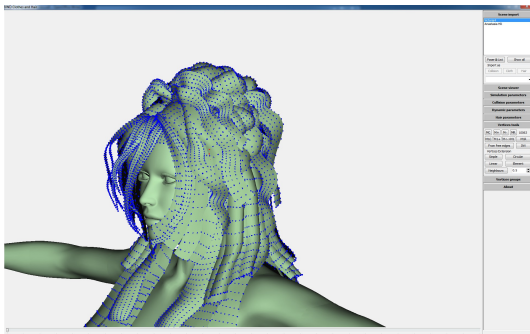
The vertices that will participate in the attachment of hair are now selected.

The number of selected vertices is relatively large (more than 10,000), but the hair will require a greater height for hanging than for less high hair.

Press the **Generate springs** button to generate the springs that hang the hair on the head of the character.

You can now attempt a simulation, but the part of the bun will collapse under its weight. It is therefore necessary to stiffen this part of the hair.

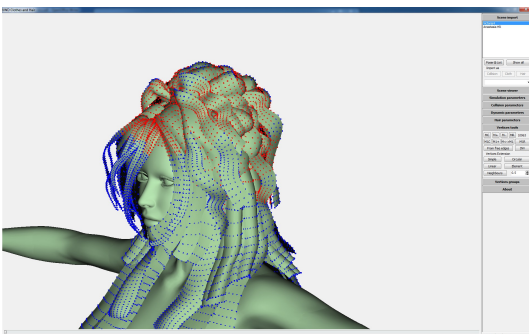
Only stiffen the bun does not really make sense because why stiffen an element that does not have good foundations. It is therefore necessary to start from the base and extend the selection then create springs for the stiffening.



Click on the header of the **Vertices tools** tab to display vertices.

Press the **MIR** button to select the vertices having served for hanging. These vertices have been copied to the secondary memory at the time of generation of the springs.

Click on the Neighbours button 6 times, keeping the default value of 0.5 for the distance.







The interface should look like the left picture.

The number of vertices may seem impressive, but the springs will be part of millions of springs often generated for each simulation.

The number of springs is always much more important than during a simulation of dynamic elements which have been designed for this kind of simulation.

Vertices groups

Slack 0.1   Nail to collision

Elastic(%) 50   Create

No collide for current collision



No collide for current cloth



No self collide for current cloth

Fixed vertices



Rigidify Cloth or Hair



Use vertices extension

Count 3   Rigidify

Slack 0.1  

Use vertices neighborhood

Distance 0.5   Rigidify

Slack 0.01  

Put the distance selection to 0.5 and stiffness of spring to 0.01.

To generate the springs, press the button ***Rigidify*** in the ***Use vertices neighborhood*** part of the ***Rigidify Cloth and Hair*** part.

The springs are created and the bun should no longer fall under its weight during the next simulation.

The next tutorial will discuss the two methods used to manage the stiffness of hair. One such method is the use of a stiffening by-extension ie following the mesh. This method has the advantage of leaving the hair more flexible because they are not lied together. He has against the disadvantage of not attaching the hair completely dissociated from others. These dissociated hair will fall if they are not retained by the springs between the head and hair.

If you wish, you can do a simulation test on the current hair and you will see at the beginning of the simulation, some hair to fall to the ground.

These hair like some others, require, at the time of importation, a minimum of rigidification by-neighborhood.

2.6 Smooth hair simulation.

Curly hair behave generally well using the default settings. This is understandable because the stiffening of the hair is weaker on curly hair because of the spacing of the vertices.

Concerning the smooth hair, the default settings can give the feeling of wet hair or dirty hair as they are grouped in packets.

This effect may well meet your needs. On some hair, these settings work extremely well. In this case, you can keep the default settings.

However, you may want that hair come off more during fast movements or when the wind blows.

For this purpose, there are two solutions:

1. The first solution is to use the conforming hair morphs to help separate the strands and thus allow better separation of hair during simulation. Note that all the clothes and hair deformations available in **Poser®** can be used before the import. These deformations will be reflected in the simulation.
2. Use a method of stiffening by-extension. In this case, it will be necessary to make an additional stiffening.

Both methods will be studied in this tutorial.

Note that the ability to save different simulation rules as .RIP file will allow to quickly make different simulations using at the base, the same hair.

Hair that will serve as an example for this tutorial is ***Ourania Hair*** by ***plus3d*** and ***3Dream***.

2.6.1 First méthode (using Poser® morphs) :



The hair is first imported into their original shape and positioned on the character in **Poser®**.

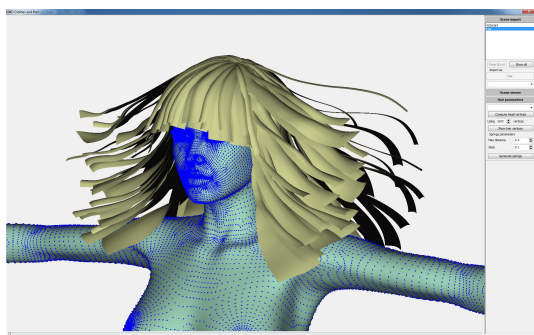
This method uses **Poser®** morphs before importing in **VWD**. The hair usually have morphs which allow to repel hair from the face and separate the strands. Some hair have also the ability to access settings such as rotations.



The hair, after modification may seem useless because it is wide apart and appear to float in the air.

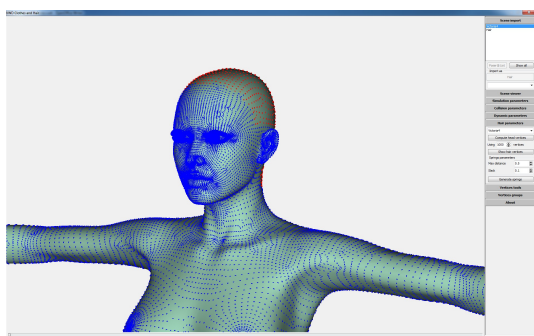
In our case, this is not a problem since it is the gravity that will allow the hair to fall and give them a natural form.

When fast movements, the hair will come off and give clearly superior results to those obtained by leaving the default settings.



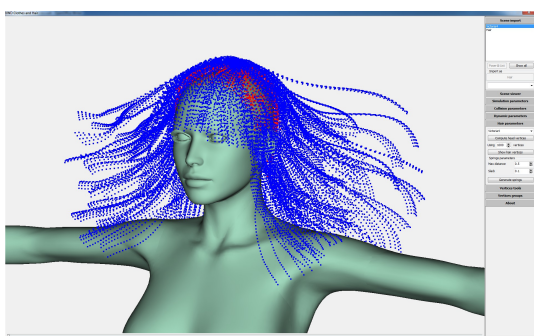
The management of the simulation can proceed as for simple hair.

Hair appear as it was in the *Poser*® interface but is not textured.

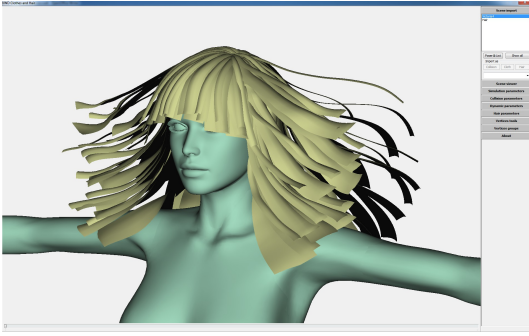


Select the item *Victoria4* in the combo box in the *Hair parameters* tab to view the default vertices for the *Victoria4*

character. These vertices can be kept as is, or can be chosen differently by changing the current selection.



Press the *Show hair vertices* button. This action aims to show vertices hair that will be hung on the vertices of the character's head. As for the vertices of the head, this selection is editable.



Press the ***Generate springs*** button to generate the springs. The hair reappear and the elements are ready for simulation.

You can then open the ***Simulation parameters*** tab and start the simulation by pressing the ***Dynamic simulation*** button.

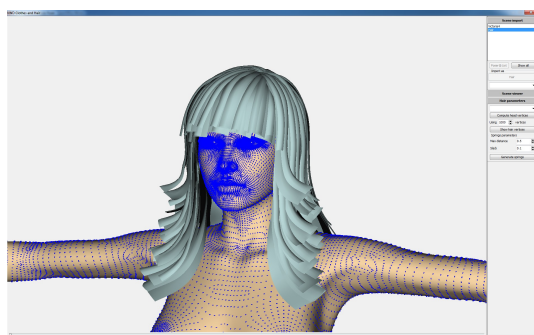
The hair will fall under the influence of the gravity and will move under the action of the movement of the character.

2.6.2 Second method (using rigidity by-extension):

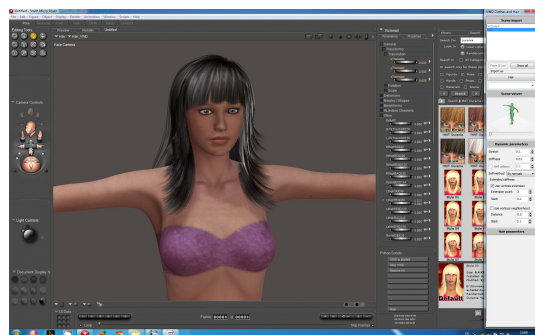


The hair is imported into their original shape and positioned on the character.

No further changes are applied to the hair.



The hair is imported with the default settings as in the first method.



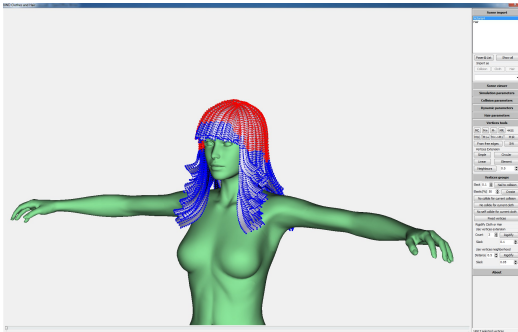
When setting dynamic parameters, check the *Use vertices extension* and uncheck the *Use vertices neighborhood* retaining the default values.

The strands of hair will not be linked together. The hair will be hanging on the character only by vertices linking. Leave the default settings for hooking between the vertices of the head and vertices of the hair as for the first method.

Press the **Generate springs** button to generate the springs and let reappear all the elements of the scene. The simulation of hair could be launched.

You can try, but you'll see the hair fall on the head without any stiffness. its behavior is not at all realistic.

For a more realistic behavior, it is necessary to stiffen the part of the hair that is on the top of the head.



To do this, press the M1R button to recall the selection of vertices recorded at the time of pressing the "Generate springs" button.

Repeatedly press the Neighbours button of the Vertices tools tab, to extend the selection and cover the entire top of the head. The result should match the left image.

In the **Use vertices neighborhood** area of the **Vertices groups** tab, put the distance to 0.5 and leave the softness to 0.1. These values are the default values for the hair stiffening. Press the **Rigidify** button to generate the springs. This action will aim to stiffen the part of the hair that is at the top of the head. It will also aim to link the hair vertices that have not been hooked by pressing the **Generate springs** button in the **Hair parameters** tab, at time of importation of the hair.

You can now run the simulation and view the behavior of the hair.

Applying wind or during a fast animation, you will see the hair move, leaving their strands which move separately. That seems much more natural.

2.7 Deformation of a seat for a sitting pose.

The deformation of a seat, a pillow, a bed or other soft element that can be deformed under the weight of a character requires an element with a sufficiently fine mesh to be deformed properly. If an item has a mesh with very large faces, it is possible to use the ***Make it compatible*** button on the ***Collision*** tab . The action of this button will decompose all big sized faces iteratively until the segments of all the faces are smaller than a size compatible with the simulator. This action will not allow to animate this object. The check box ***Use animation*** will be unchecked.



The chair used for this example is ***Hi-Tech Chair*** by ***Hameleon***.

This chair has a fine mesh and may be used both in a fixed position or in an animation.



The final result to obtain is this shown on the left.

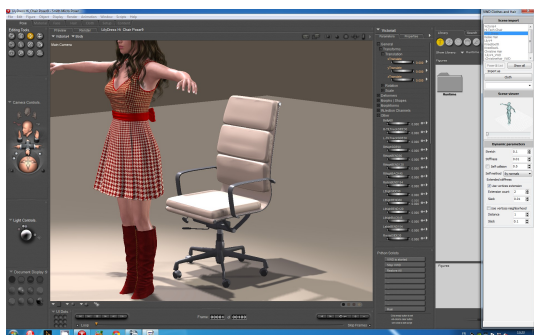
To achieve this position, I chose to use 100 frames.

It is certainly possible to achieve the same result with less frames but this decomposition allows you to properly view the displacements made on the seat.

The scene is really interesting because the character is positionned on the seat part of the chair, but also on the back part. Both parties must be modified to keep place for the dress for both parts and for the hair for the back part.

The hand of the character rests on the armrest of the chair. It is not necessary that this part is deformed, it will therefore necessary to prohibit the modification of that part at the time of calculation.

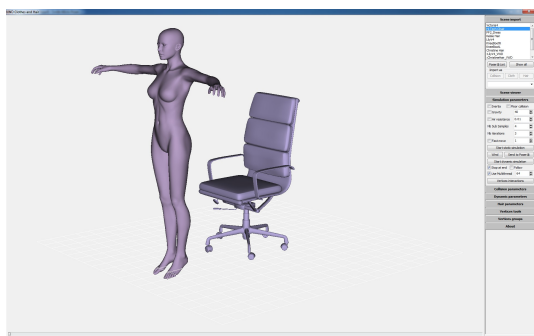
If your scene consists of a few keys and has already been saved, it may be that the movement does not match with that which has been calculated. ***Poser***® appears to automatically record a key at the last frame which results in a different movement than the original. It is often necessary to remove this last key to return to the initial movement.



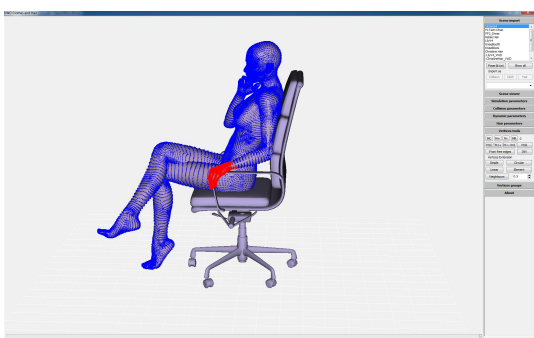
Import the character with the default settings.

Import the chair as **cloth** using a rigidity by-extension with a very high value: 0.01 and a value of 2 for the extension value which generates a strong but relatively local stiffening.

These values will achieve a realistic effect of deformation without exaggeration.

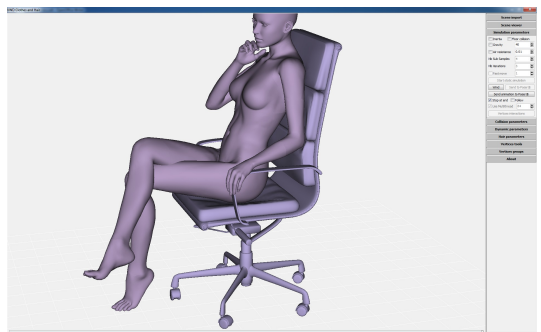


When running the simulation, uncheck the boxes **Inertia**, **Floor collision**, **Gravity** and **Air resistance**. Although the latter is not necessary.



It is now necessary to remove the simulation vertices of the left hand so as not to cause deformation of the armrest of the chair. Select the vertices of the left hand using a rectangular area and press the **No collide for current collision** button to remove the selected vertices from the simulation.

The simulation can be started.



The simulation is quite fast because the calculation is relatively simple. You can see the deformation of the seat and near the character elbow.

The deformation of the back part of the chair has also occurred even if it is not visible on the left image.

By cons, you can notice that there is no deformation on the armrest near the left hand of the character.

Pressing the button **Send animation to Poser®** closes the program and transfers the simulation to **Poser®**. It will then be possible to do the simulation of the dress and hair. The dress will be positioned correctly as it will be enough room for the simulation.

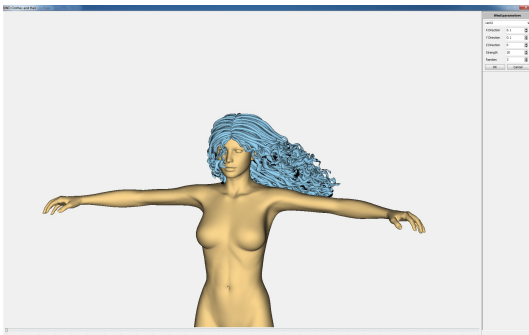
2.8 Wind Simulation.

The wind simulator is currently in a basic release.

The future version of the program will see this simulator to evolve.

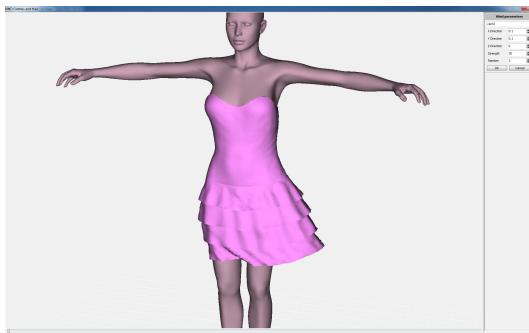
The simulator can be started and changed during a static or dynamic simulation. The changes applied to the parameters of the wind immediately interact on the dynamic element of the scene during the simulation.

The wind is a practical tool to implement a realistic effect to a fixed or animated scene. But it is also extremely useful to observe the behavior of dynamic elements. It is a simple way to simulate a more or less strong effect in a dynamic element using a static simulation to see how will behave a cloth or hair during more or less rapid movements.



Here is an example realized in a static simulation with a wind directed to the right and upward with identical values. The wind has a strength value of 20 which corresponds to an average value. The random value has been set to 3 which helps to break the uniform motion of the hair.

The hair used for this simulation is *Melite Hair* by *Mairy* and *plus3d*.



Here is another example realized in a static simulation with a wind identical than the one used in the above example.

The dress used for this simulation is *Ruffle Dress* by *LMDesign*.

Future versions of **VWD** will generate parameterizable abrupt rush of wind that will provide much more realistic effects in dynamic simulations.

2.9 Hanging clothes vertices by a collision object.

The hanging of some vertices of a cloth with a part of a collision actor can solve situations impossible to achieve otherwise.

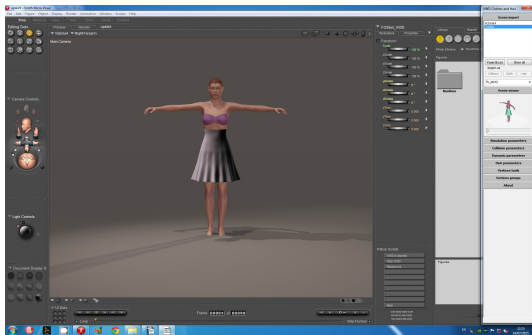
Examples are numerous:

1. Lift part of the cloth,
2. Pull the curtain,
3. Catch a handkerchief and shake it.
4. ...

These actions often occur during the animation and ask to be able to interact with the dynamic element and the collision element at a particular time.

It will therefore be necessary to interrupt the simulation, to make connections between vertices and restart the simulation.

The simulation example we will study, shows how a character can lift some vertices of his dress and then drop it.



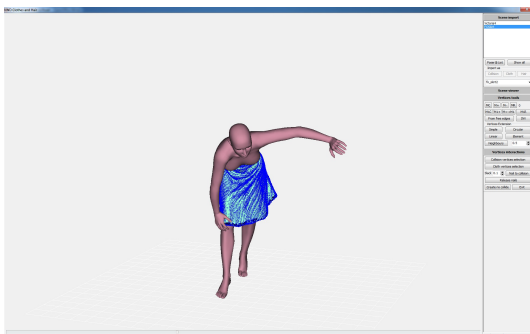
Import the scene as seen in previous tutorials.

The scene consists of 2 keys animation.

The character starts from a default position.

1. The first key at position 30 corresponds to the character leaning slightly forward to catch her skirt at its knee.
2. The second key at position 60 shows the character that rises by lifting the skirt. At the same position, the character releases the skirt that falls.

Run the animation until the character is in a position that will allow her to catch the skirt. At this time, stop the simulation.



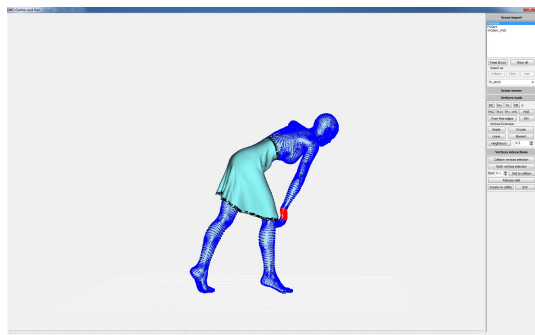
Click on the ***Vertices interactions*** button.

The interface changes and the ***Vertices interactions*** tab opens and thus opens the ***Vertices tools*** tab.

The vertices of the skirt appear.

Select the vertices of the skirt that will follow the hand of the character.

Press the ***Cloth vertices selection*** button to save these vertices in an array that will serve to link these vertices and those of the character.

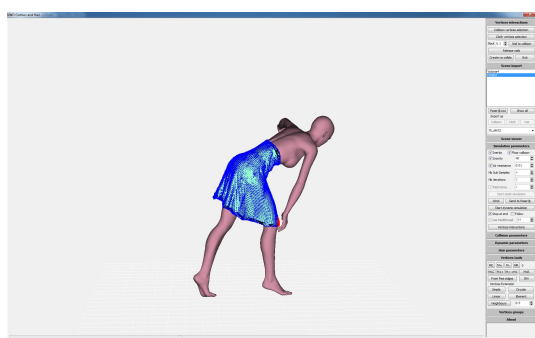


Select **Victoria4** in the list box of the **Scene import** tab.

The vertices of **Victoria4** appear.

Select a vertex of the right hand using the **Shift** key and moving the mouse on the hand. Press the **Element** button to select all the vertices of the hand.

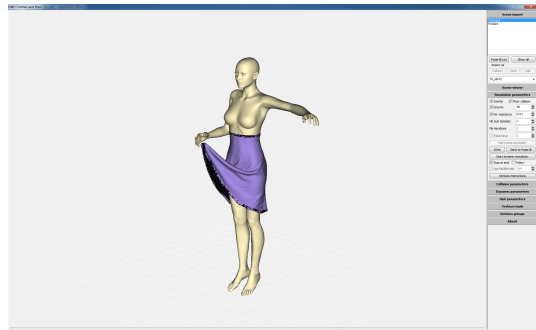
Press the **Collision vertices selection** button then press the **Nail to collision** button to generate the springs.



Restart the simulation. The vertices of the skirt follows the hand while **Victoria4** gets up.

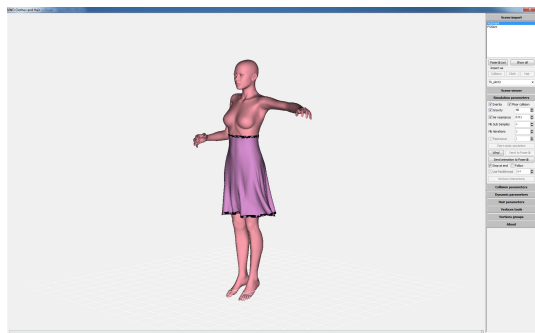
Stop simulation to position 60.

The **Vertices interaction** button is again accessible. Click this button to open the **Vertices interaction** tab and click on the **Release nails** button to release all connections between the hand and the bottom of the skirt.



Restart the simulation and let it finish.

When the animation is played, you see **Victoria4** bend herself, catch the bottom of her skirt, rise by raising the skirt and then drop it.

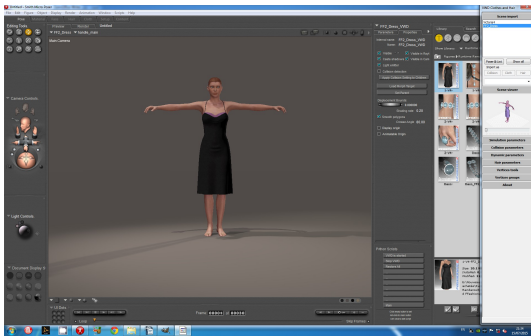


2.10 Name correction for the error components.

Among the problems I have encountered during my development, there is one that really surprises me, but it must of course have a rational explanation as any computer problem.

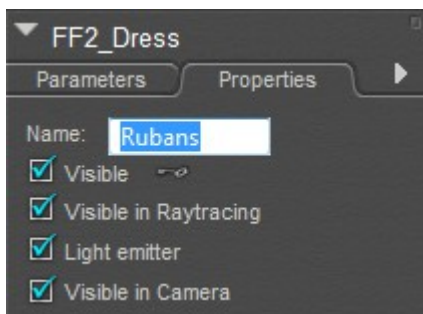
Some characters or actors are rejected at the time of importation because of their name.

I particularly noticed this case by performing the ribbons simulation. This example is particularly curious and I don't understand the problem.



Consider a scene with *Victoria4* and *FF2_Dress* and import the scene keeping the default names.

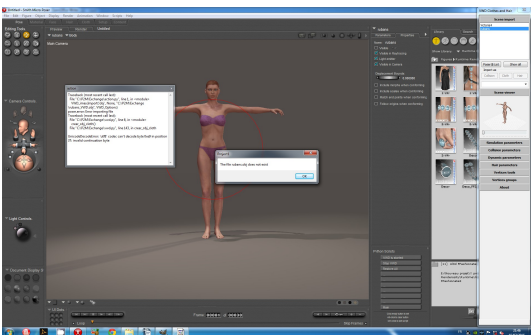
The scene is imported properly and can be simulated easily.



Rename *FF2_Dress* into *rubans*.

A priori, the change seems insignificant and should not result in error.

Now redo the import of dress called *rubans*.



From the beginning of the import, an error message appears indicating an error such UTF8 decoding.

It might seem that the error comes from the first lowercase letter because the use of the word *Rubans* enables the import function properly. However renaming *FF2_Dress* to *dress*, the import works quite correctly.

I personally do not have a miracle solution to this problem. if the problem occurs, you can rename the actor who is in error by a simple name such as *dress*. This inelegant solution always solves the problem.

However, it must be remembered that the automatic recording of simulations is made by the name of the dynamic element but the name of the *.RIP* file can be changed. Each time a new *dress* element is simulated, it will overwrite the previous *dress.rip* file. It is interesting to enter a new name in the combo box or change the name of the text file in the *Recorded simulations* directory.

The name of the recorded simulation and renamed does not matter. It corresponds to a scene imported in Poser®. The name of the simulation (*.RIP* file) may be different from the dynamic-actor name in the simulation.

3 Additional Resources:

After you've perused this VWD Usage Manual to get a sense of the program's available controls and functions, you will probably want to follow some typical usage examples and view some video tutorials. Here's a list of the resources that are available at this time:

- The official program documentation and usage guides are located in the main VWD program's **Documentation** folder. (e.g. **C:\VWD\Documentation**) and version-specific notes and issues are also located in the main VWD program's **_V1.2.333.4444** directory (where the version number is real, e.g. **C:\VWD_V2.1.892.6290**).
- **The VWD website resources page(s):** This should always be the best and most current source of the available VWD resources. If there's information about the status, versions, help-files, tutorials, test-files, or any other VWD-related support assets, this should always be the first place to look.

<https://www.virtualworldldynamics.net/support/>

- **The VWD youtube page(s):** (demos, tests, and tutorials)

<https://www.youtube.com/channel/UCOpGh2GKgryXyMlbcTQ45dg/feed>

- **The VWD Patreon page:** This is where we'll share information, presets, and other VWD-related tidbits, news, and resources.

<https://www.patreon.com/VWD>

- **The VWD Usage Guides:** Usage guides that show real-world examples of the techniques that can be used to produce various effects using VWD's various capabilities. While these should be included in your installation package, it is likely that we might update them (without notice) with corrections and new tricks and techniques. Follow the notes on the website, Patreon site, and/or Renderosity VWD forums to get word of such updates.

(See the VWD website support page up above for the latest versions of our Usage Guides)

- **The Renderosity VWD forums:** Our main product and information discussion users forum. User issues, product help and announcements, etc., are all consolidated here.

https://www.renderosity.com/mod/forumpro/?forum_id=12511

Any other resources that we add or any changes we make can be found via the **support** page on our website (<https://www.virtualworldldynamics.net/support>).