

# IdlePoser v4

MacGruber's Tutorial Series

This guide is intended to give you a short intro into using my IdlePoser plugin to animate your scenes.

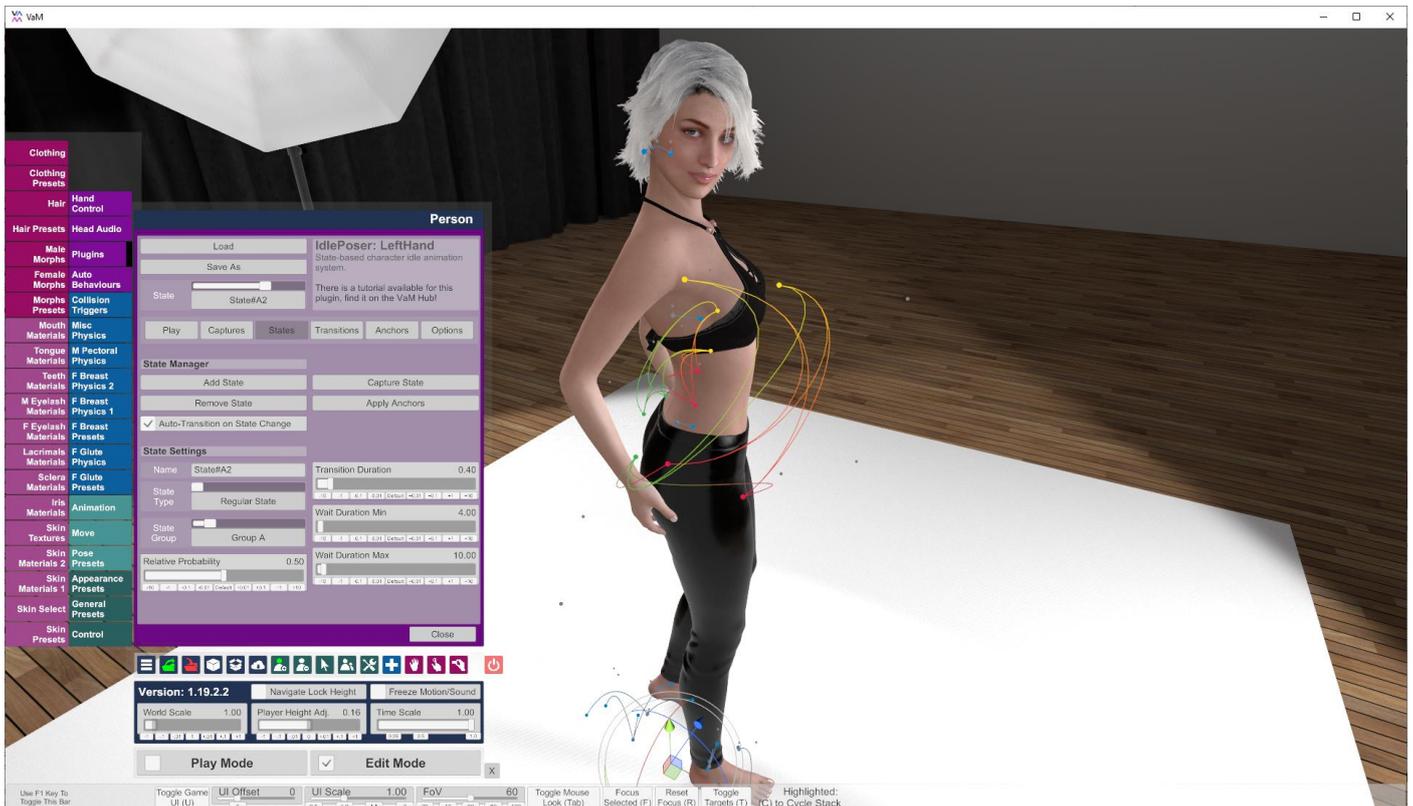
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## Introduction

You do create animation with IdlePoser by defining poses, called "States", and animated blends between them, defined by so called "Transitions". If you are familiar with the technical term, it is essentially a "StateMachine". Each state has a random wait time after which IdlePoser will select a random path among the available transitions into another state.

Using direct transitions between poses would look strange and robot like. To achieve nice smooth animations, you can define additional control points, which are just specialized states/poses. For similar poses these control points can even be shared between different paths, allowing you to define complex animations with very little input.



## Background: Bézier curves

For better understanding on how IdlePoser works, it might help to give a very quick background on Bézier curves. Essentially you take a number of points, in the image below we have four points,  $P_0$  to  $P_3$ . A simple way to calculate a point on the curve defined by these points is called De Casteljau's algorithm.

Let's say we would like to calculate a position on the curve at 25% of the curve. In the first step, we calculate helper points  $Q_0$  to  $Q_2$ . These are just on a straight line between the points  $P_0$  to  $P_3$ . For example, to calculate  $Q_0$  we just take the position 25% on the way from  $P_0$  towards  $P_1$ .

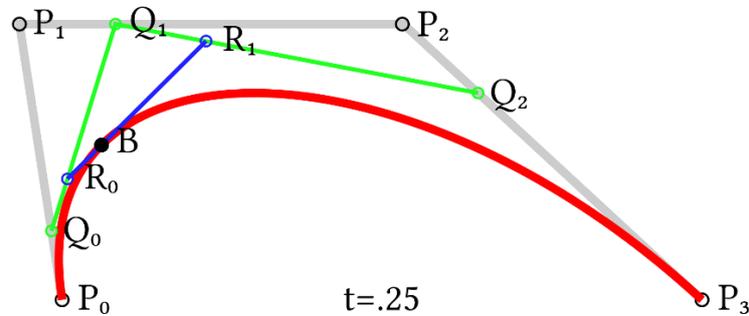


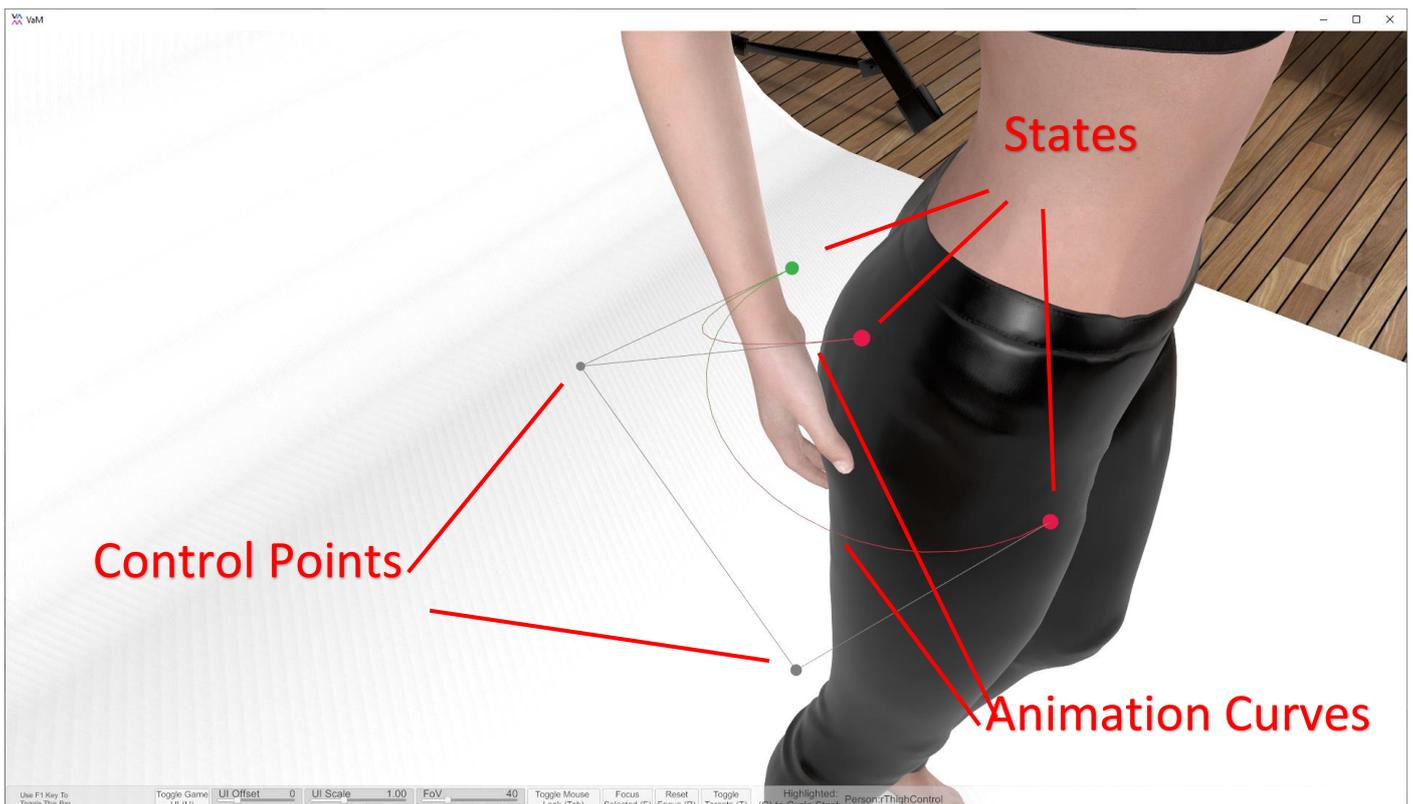
Image: Wikipedia

In the next step we calculate another set of helper points  $R_0$  and  $R_1$ . This is just the same method, except that we use  $Q_0$  to  $Q_2$  as input. We just keep doing this until there is only a single point left, which is the position on the curve  $B$  we wanted.

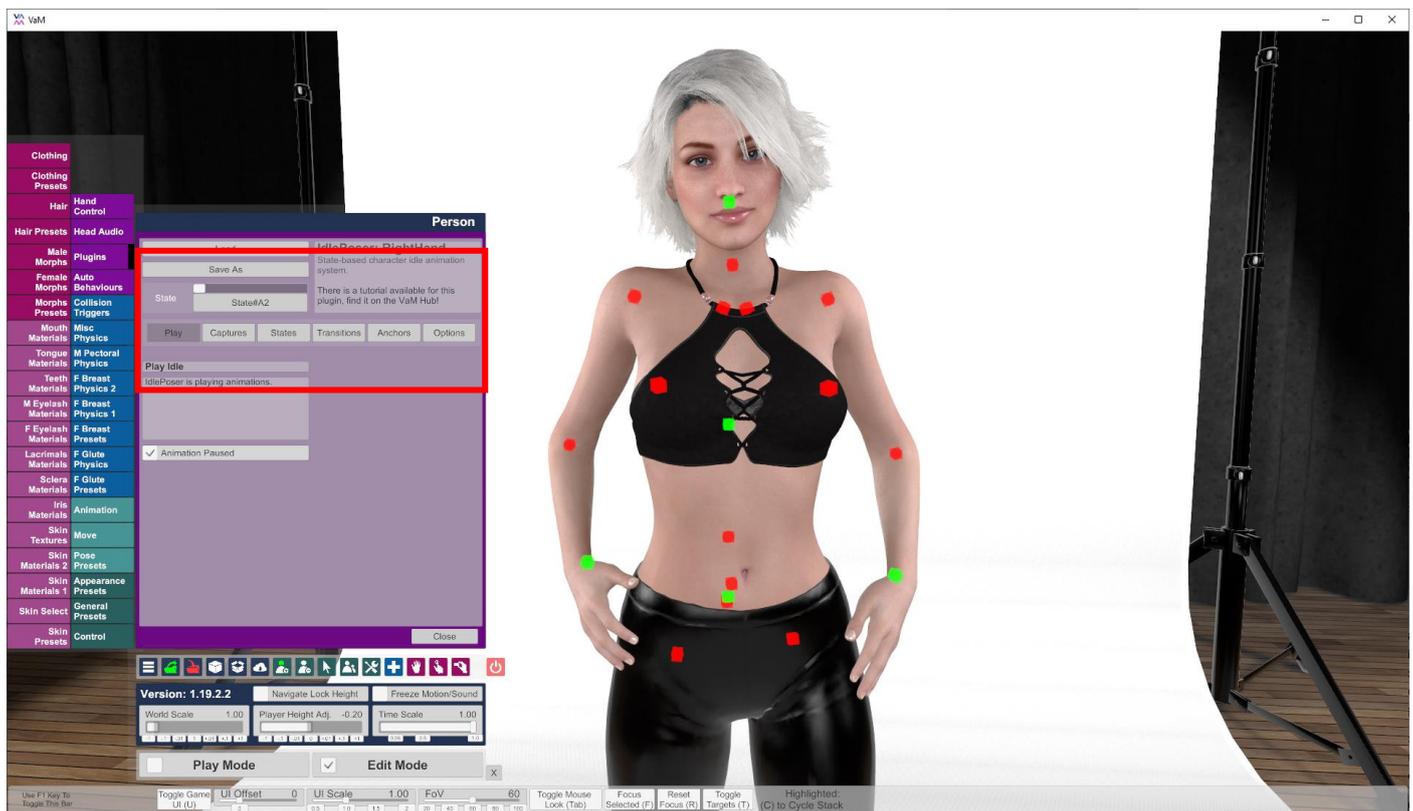
This method works with any number of input points and also works with rotations and morph values.

With IdlePoser the end points  $P_0$  and  $P_3$  are called *States*. The points in-between are called *Control Points*, in IdlePoser you can have none, one or two of them.

*Note: IdlePoser actually uses Bernstein polynomials to evaluate positions and morph values, since De Casteljau's algorithm is a bit inefficient and we restrict ourselves to low-order curves, so the numerical issues of Bernstein are not a problem. However, this math babble is not relevant for understanding the basic concept.*



## Main Menu



IdlePoser features a number of sub-menus which can be selected from the *tab bar*. These currently are:

- **"Play"**: Just plays the animation, this is the initial selection when the plugin loads.
- **"Captures"**: Manage which character controls and morphs you want IdlePoser to drive.
- **"States"**: Manage states/poses of your animation.
- **"Transitions"**: Manage transitions between the states.
- **"Anchors"**: Define states as anchored to other parts of the same or other characters. This is helpful if those other parts are also animated and you don't know exactly where they will be.
- **"Options"**: Enable some debug drawing.

The *State* dropdown lets you switch between the states. When you just added the plugin, you won't have states, yet. If you change to a different state and there is a valid path between the current state and the one you select, that path will be played. If there is no direct connection, IdlePoser will just use a quick direct blend to the new pose.

Your IdlePoser animation is automatically saved as part of your scene. However, you can also explicitly save an animation into a separate file. Use the *Load* and *Save As* buttons. This is helpful to transfer animations between characters and scenes.

**Note:** IdlePoser displays the plugin name in the info text in the top right. In the screenshot above it says "IdlePoser: RightHand" because I labelled the plugin "RightHand". This is very useful if you have multiple IdlePoser plugins on the same character.



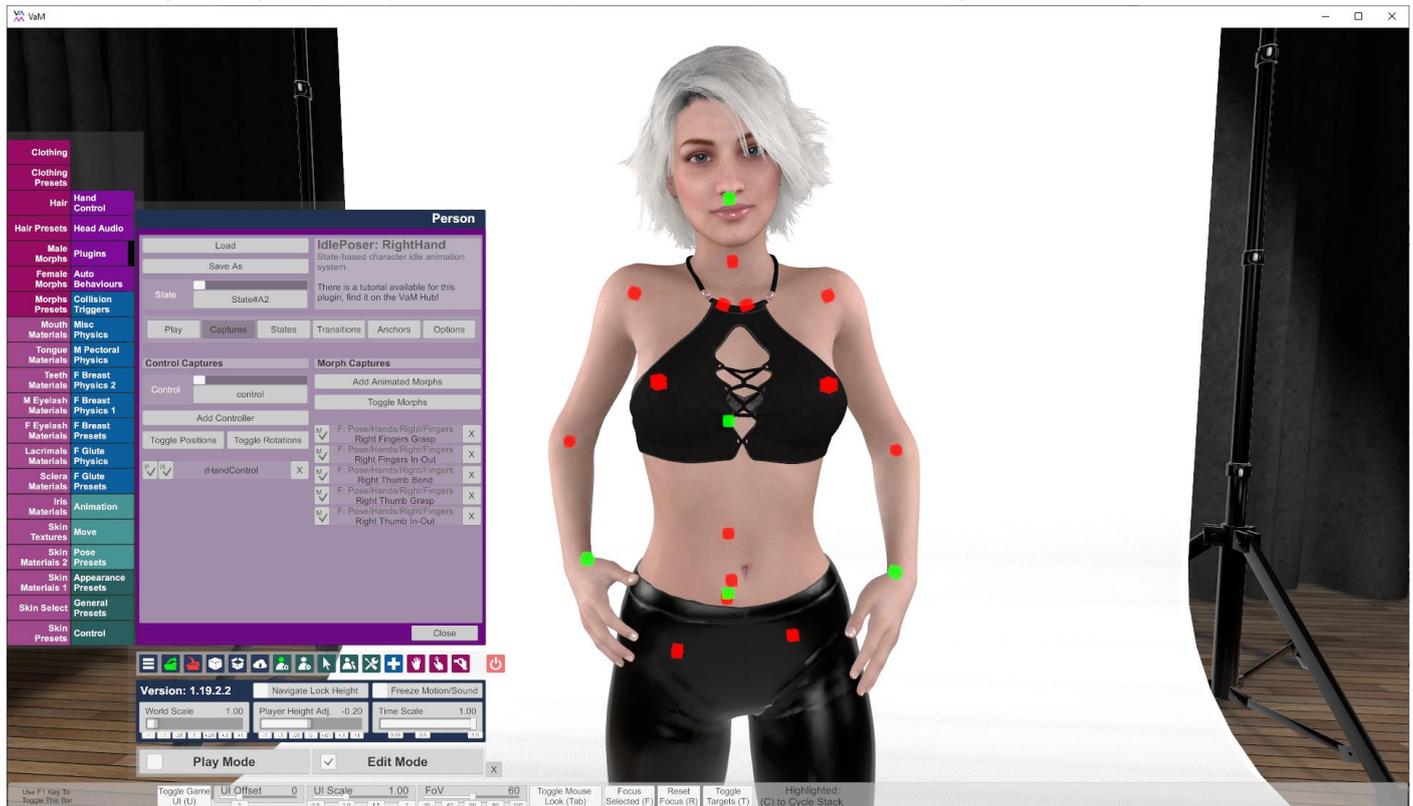
## Play Menu

This is the initial menu selection when the plugin loads. While in "Play" and the "Animation Paused" checkbox is unchecked, IdlePoser just plays the animation.

"Play" is also the only menu where *Anchors* are automatically updated. This happens even when "Animation Paused" is enabled.

## Captures Menu

Each IdlePoser needs a number of so-called "Captures". Essentially you need to tell which character controls or morphs you want to drive with your animation. For example, for a hand animation you would capture rHandControl and some finger morphs, while you are not interested in what the feet are doing.



On the left you find "Control Captures" which correspond to the various character control nodes offered by VaM. Essentially select one from the drop down and press "Add Controller". Below you see the list of active control captures. You can press the corresponding X button to remove a control again. By default, IdlePoser captures lHandControl and rHandControl. With the two little P and R checkmarks on the left of each entry you can configure whether you want to have this controller update position and/or rotation of the control node. With the two toggle buttons you can quickly change all the checkmarks.

**Note:** For example, when using the Gaze plugin, you would want head rotation be controlled by that plugin. Therefore, you would disable the rotation checkmark for headControl, so IdlePoser does not interfere.

On the right you find "Morph Captures" which correspond to the character morphs. In the image you see a couple of finger morphs activated. To make morph selection easy and convenient I have added a button to add all morphs that are marked as "Animatable" in VaMs morph UI screen. This allows you to use all the fancy filtering and other nice features of that screen. IdlePoser can capture male and female morphs on both genders.

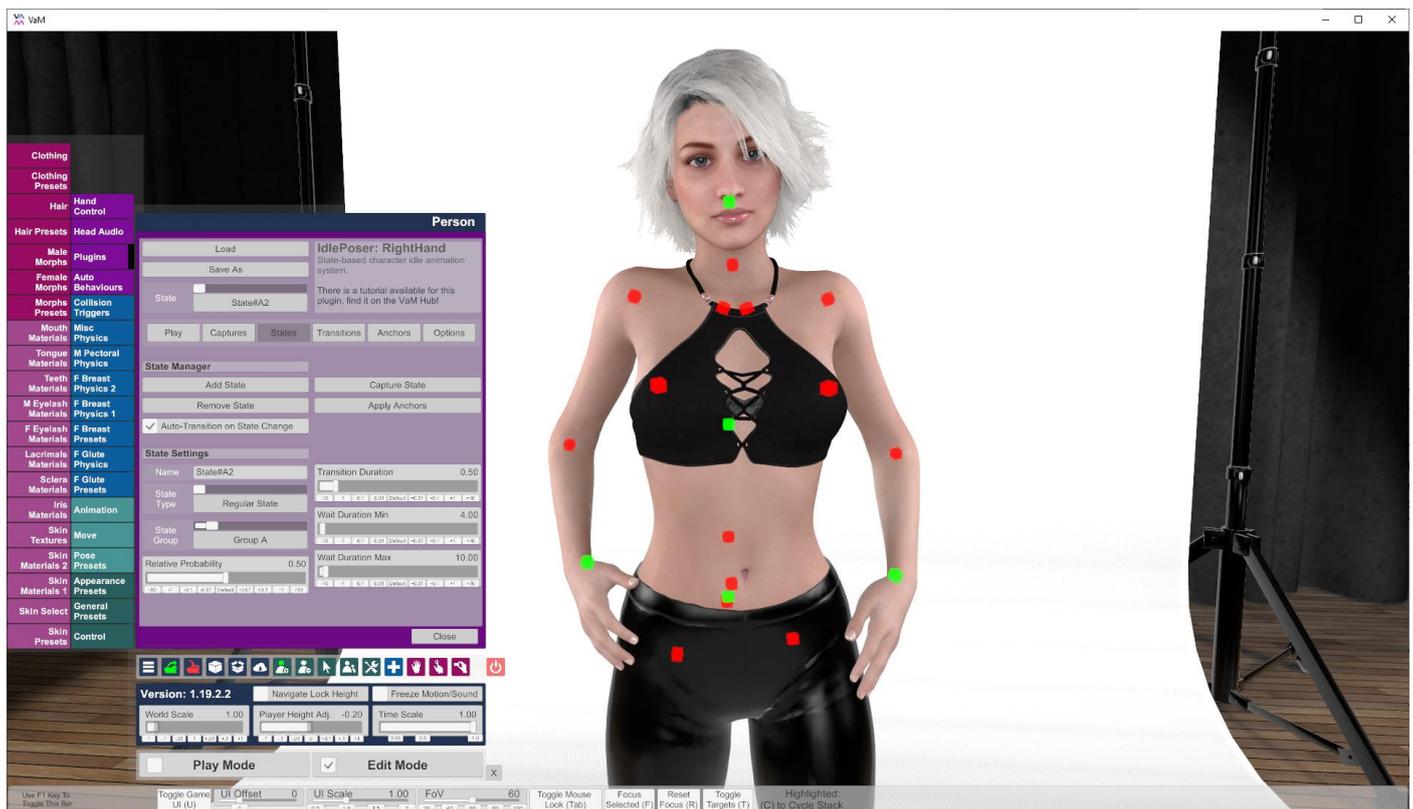
The little M checkmark on the left of each entry just works the same as with the control captures.

**Note:** IdlePoser does not need morphs to stay "Animatable" after they have been added, but it's a nice reminder which morphs are captured. Before shipping a scene, I recommend to unset the "Animatable" flag again for better performance.

**Note:** Do not try to animate morphs that are labelled in red. These are "high-cost" morphs that can't be updated every frame, causing hiccups in your animation.



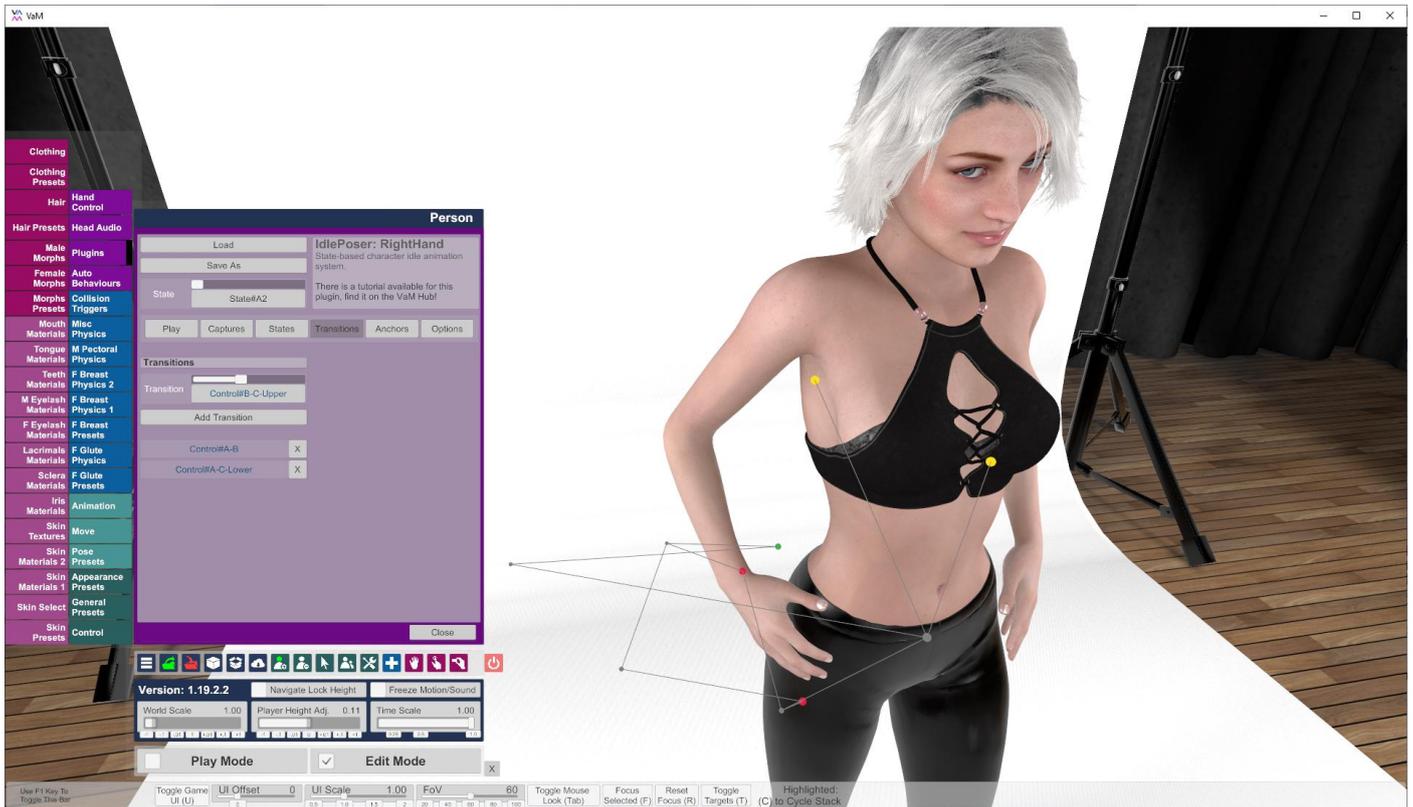
## States Menu



Here where you define the poses for your animation! Let's go through the buttons and other options:

- **"Add State"**: Adds a new state by capturing the current character pose.
- **"Remove State"**: Spoiler-Alert....it removes the selected state.
- **"Capture State"**: Updates the selected state with the current character pose.
- **"Apply Anchors"**: While in any other menu than "Play", anchor positions are not updated as that makes editing easier. If needed, you can manually trigger an update here.
- **"Auto-Transition"**: Uncheck if you want to switch the state without actually applying the new pose. Helpful in combination with the "Capture State" button, if you need to copy one pose onto another.
- **"Name"**: You can rename the state anyway you want. Keep your states organized, otherwise you will lose track quickly!
- **"State Type"**: There are three different state types:
  - **"Regular State"**: The most common state type, this is a regular pose.
  - **"Control Point"**: This state type is used as control point for an animation. The animation will not actually reach this state, you have to exaggerate the pose a bit.
  - **"Intermediate Point"**: These behave almost like a regular state, except that they can't be the end point of a path. A good example is foot placement of a walking or turning character. You need to make sure one foot is always on the ground. You kind of chain multiple animations.
- **"State Group"**: Only valid for regular states. When set to something other than "None", IdlePoser will not switch to a state within the same group. This allows you to group similar states, enabling to use the same control points for them. Clever use can reduce the setup complexity a lot.
- **"Relative Probability"**: Only valid for regular states. Controls how likely it is for IdlePoser to select this state among the available options. If there are multiple valid paths to a state, each path is taken into account individually.
- **"Transition Duration"**: The sum of all states on a path define the animation length.
- **"Wait Duration Min/Max"**: These define the random wait time for this state. This is ignored for control points.

## Transitions Menu



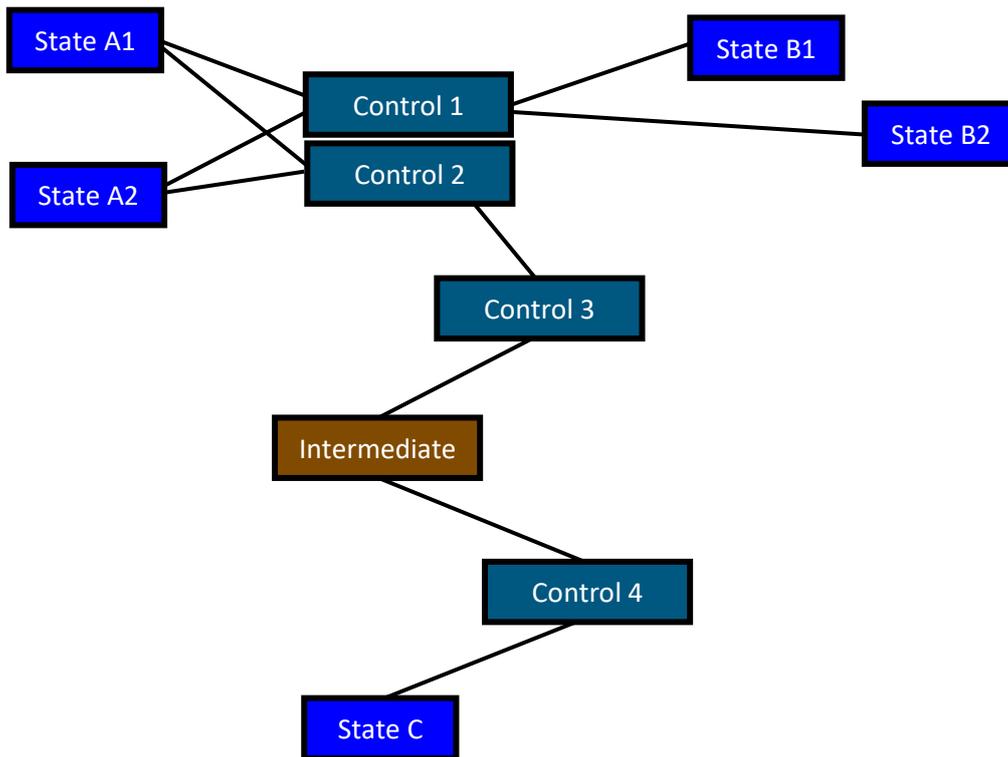
In the *Transitions* menu you define which state is connected to which one. For the sake of simplicity IdlePoser enforces transitions to be bi-directional. If you add a transition from A to B, it will automatically add another transition from B to A.

A transition can be removed using the X button. Removing a transition from A to B will automatically remove the opposite transition from B to A.

If you enable “Draw Transitions” in the Options menu, transitions are rendered as gray lines. Its very helpful to keep track of what is connected to what.

## Path Search

It's probably helpful at this point to explain how IdlePoser selects a path from one state to the next. Let's consider the following setup with **regular states**, **control points** and one **intermediate point**:



If we are currently at State A1, the plugin will search for reachable regular states from there:

- State A2 is NOT reachable, as it is in the same state group "A". See the "State Group" setting in the section "States Menu" for details.
- State B1 is reachable via the path **A1 → Control 1 → B1**, defining an animation curve from these 3 points.
- State B2 is reachable in the same way via **A1 → Control 1 → B2**
- State C is also reachable using two animations chained:
  - **A1 → Control 2 → Control 3 → Intermediate**
  - **Intermediate → Control 4 → C**

If we are currently at State B2, the plugin will search for reachable regular states from there:

- State B1 is NOT reachable, as it is in the same state group "B".
- State C is NOT reachable, as the only connection is via A1 or A2.
- State A1 is reachable via **B2 → Control 1 → A1**
- State A2 is reachable via **B2 → Control 1 → A2**

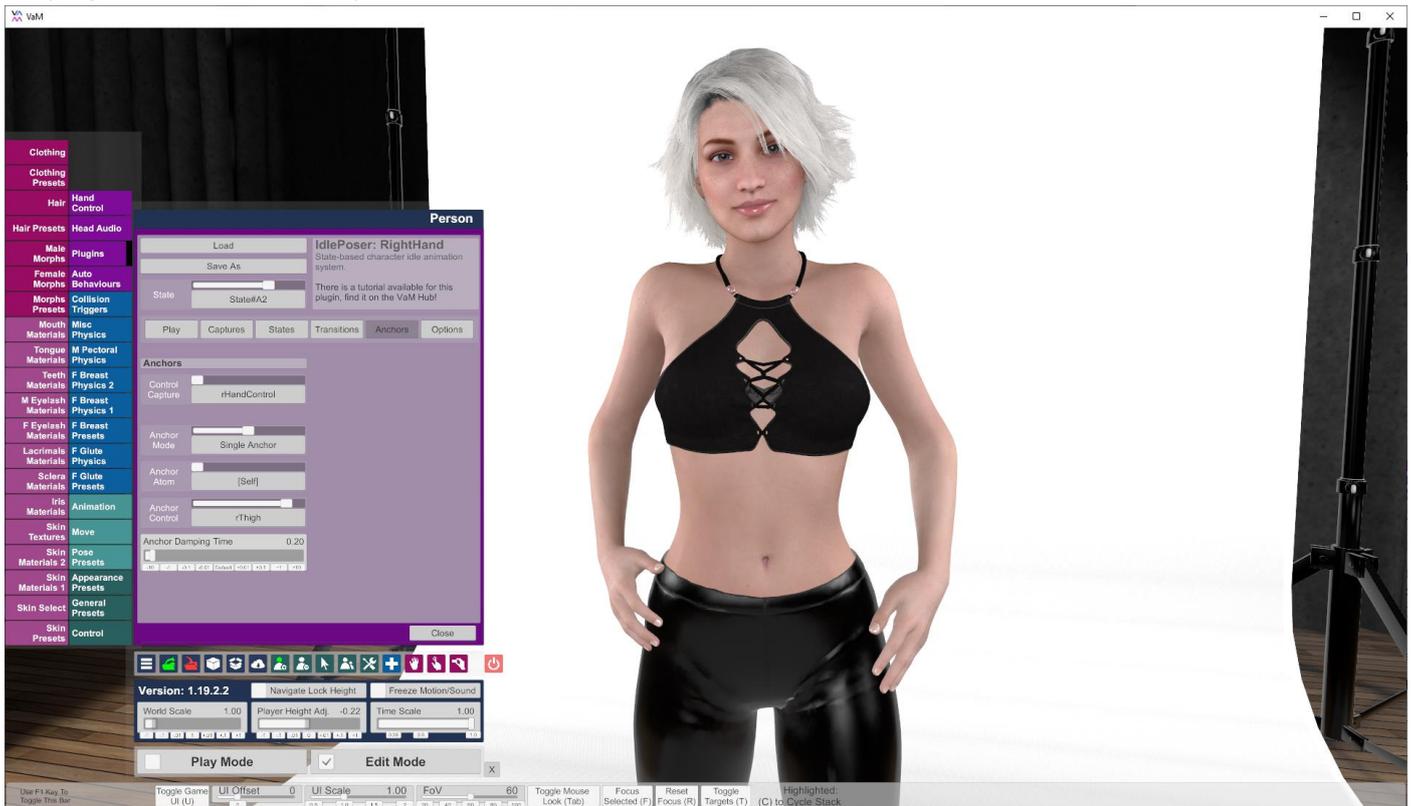
Among the available paths, the plugin chooses one at random, based on the "Relative Probability" of the target states. The length of the animation is the sum of all "Transition Duration" values along the path.

*Note: Note that for performance reasons you are limited to a maximum of 2 control points within a path. This corresponds to using a cubic Bézier curve for the animation. You can use an arbitrary number of intermediate points, though.*

*Note: It's very helpful to enable "Draw Curves" in the "Debug" menu to see which paths are valid.*

## Anchors Menu

Anchors allow you to position a control capture for a state relative to some other body part. By default, control captures are relative to character main control node. This allows you to move the character around while still keeping the animation exactly the same.



However, in the screenshot you see *rHandControl* being tied to the *rThigh* bone. This makes sense for cases like this one as the hand is actually touching close to that bone. If now the character moves, for example because of some other IdlePosers animating the hip and legs, the hand can still keep touching the skin. This method is not perfect, but it helps a lot.

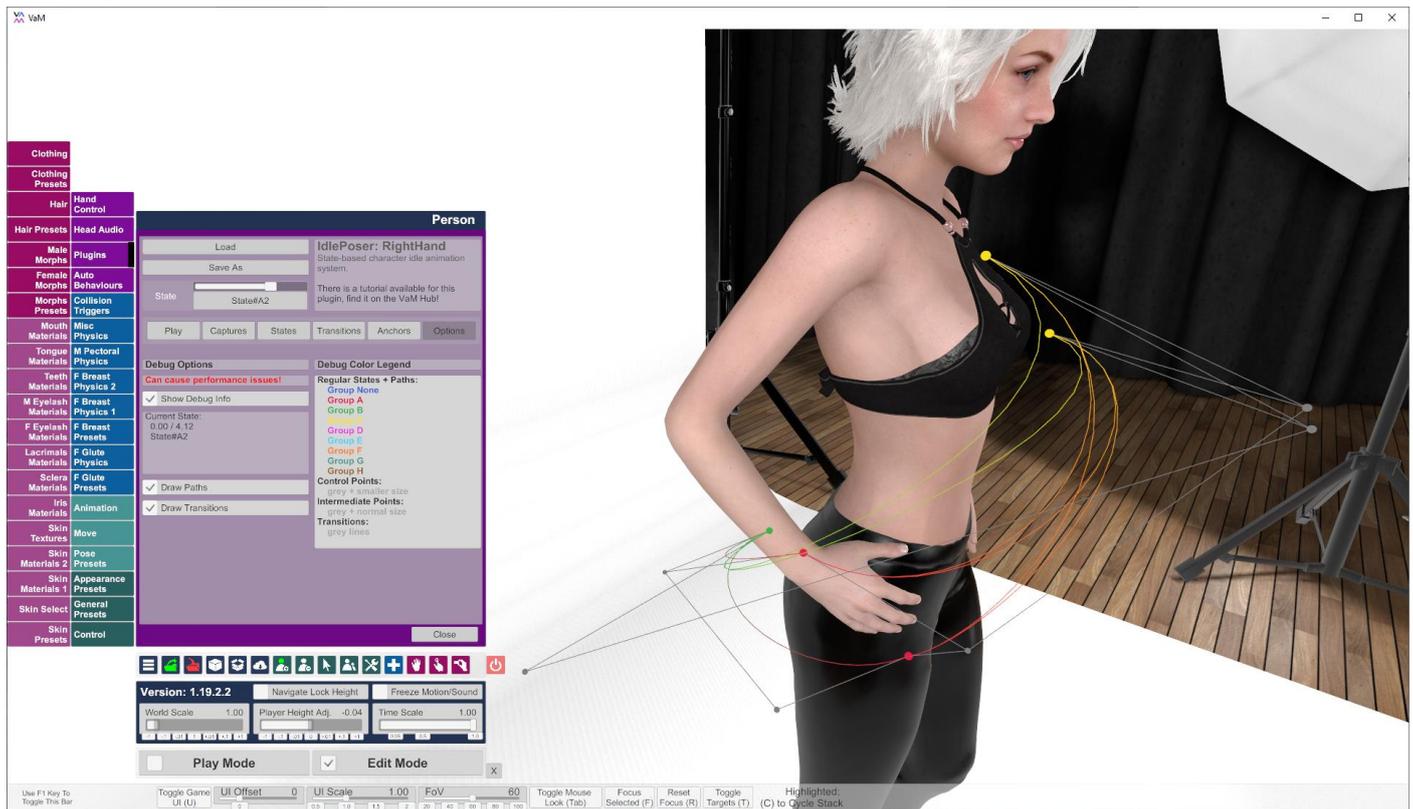
There are three different anchor modes:

- **“World”**: Position/Rotation is relative to the world.
- **“Single Anchor”**: Position/Rotation is relative to another control or bone. This can also be another character or even a non-character atom.
- **“Blend Anchor”**: Position/Rotation is a blend between two anchors. You can tweak the blend ratio with a slider. This would be a common thing for control points that are between states. For example, the demo scene uses some blends of the thigh and nipple bones.

**“Anchor Damping Time”** is used to put a bit of damping on the anchor update to avoid sudden changes.

*Note: Anchors are currently only evaluated in “Play” mode! It makes editing easier. Use the “Apply Anchors” button in the “States” menu to manually trigger an update.*

## Debug Menu



There are currently three debug options:

- “Show Debug Info”: Shows you the current state or transition as well as the internal timer in the *Debug* menu as well as the *Play* menu.
- “Draw Paths”: Renders a colored line for each valid path, colored spheres indicate regular states. The color of lines and spheres indicates the state group, see Color Legend on the right. Control and intermediate points are displayed as grey spheres.
- “Draw Transitions”: Draws the transitions between regular states, control and intermediate points as grey lines.

**Note:** These debug options are NOT cheap and can cause performance issues. If you are on the edge of stable 45fps in VR these might cause you to drop below that.

## Tips & Tricks

- **Tweak VaM physics so body parts don't slap into each other:**
  - At default settings, when VaM body parts touch each other they equally give way to each other. However, the hip moving by a centimeter to avoid some touching hand looks strange.
  - Increasing "*Hold Position Spring*" to about 10000 and "*Hold Rotation Spring*" to 1000 for the heavier of the colliding body parts (such as hip and chest) reduces this issue a lot.
  - Do this early, otherwise you might have to redo parts of your animations.
- **Working with multiple IdlePoser instances on the same Person:**
  - Moving one part of a Person body can easily cause movements in entirely other parts. While working on one IdlePoser instance, have your other IdlePosers in the "Play" menu, but use the checkbox there to have the animation paused. This is having them update their Anchors, but otherwise do nothing.
  - Before saving your scene (for a release) go through all your IdlePosers, transition them into your desired initial state, disable the "Paused" checkbox in the "Play" menu, then quickly switch to another menu, for example "States". This way you can save your scene in a defined state and still have it automatically start playing on load.
- **Copy all values from one state to a new state:**
  1. Go to the "States" menu and select the source state.
  2. Press "Add State".
- **Copy all values from one state to another existing state:**
  1. Go to the "States" menu and select the source state.
  2. Disable "Auto-Transition".
  3. Select the target state.
  4. Press "Capture State"
  5. Reenable "Auto-Transition".
- **Copy some (but not all) values from one state to another existing state:**
  1. Go to the "States" menu and select the source state.
  2. Go to the "Captures" menu and deselect the checkboxes (P,R and M) next to those control/morph captures you want to copy.
  3. Go to the "States" menu and select the target state.
  4. Press "Capture State"
  5. Go to the "Captures" menu and select checkboxes again you. Possibly use the Toogle buttons to select all at once.