

Geo-Grafting™ (WIP)

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This term is used to describe the technology behind the seamless integration of one weight-mapped figure into another, with one figure serving as a host or *base* and the other as an *attachment*. Geo-Grafting technology is an expansion on the concept of a *fitted* figure, whereby one articulated mesh that shares rigging and/or shaping information with another articulated mesh can be made to follow or [Fit To](#) that mesh. In items such as clothing or hair, there is no particular need to integrate the meshes. Blending of textures on polygon based hair is typically/reliably done through the use of opacity/transparency maps, and clothing is an entirely separate object. But what about adding a tail? What about doing it in a way that allows the transition between the base and the attachment to be seamless? That is where Geo-Grafting comes in.

With Geo-Grafting, the geometries of the articulated meshes become one while the figure providing the graft is *Fit To* the figure receiving the graft. As with any other fitting of an item (i.e. clothing, hair, etc) to a figure in DAZ Studio 4.x, shapes present on the host figure are projected onto the fitted item when those shapes are applied to the host¹⁾.

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Technical Details

- The grafting figure is set to the Content Type *Follower/Attachment[/Region]*²⁾
- The grafting figure is set to be compatible with a Compatibility Base (i.e. Genesis)
- The grafting figure maintains a list of polygons in the geometry of the Compatibility Base that will be hidden³⁾ when the grafting figure is Fit To said Compatibility Base
- The grafting figure maintains a map of welds between vertices of the grafting figure geometry and vertices of the Compatibility Base geometry
 - The [polygon_group_editor](#) is used to select polygons in the Compatibility Base geometry and the boundary vertices of that selection are checked for coincidence with vertices of the grafting figure geometry to determine which vertices to store in the map
- The grafting figure maintains its own set(s) of UVs
 - UV sets on the grafting figure should be named according to the corresponding UV set in the Compatibility Base it attaches to⁴⁾
- When a blending area for the texture is desired, the grafting figure geometry should include at least one loop of the outermost polygons and UVs that reside inside the perimeter of the hidden polygons of the Compatibility Base geometry
 - A feature under development removes the need for coincident UVs on the coincident polygons, as the UVs from the Compatibility Base geometry are projected to the coincident polygons of the grafting figure geometry
 - Another feature under development includes the use of a property on the surface assigned to the coincident polygons of the grafting figure geometry, to store blending information that is used for producing composite layered images - each consisting of the image(s) applied to the corresponding Compatibility Base surface and a projection of the grafting figure surface images into the Compatibility Base UV space

- When the grafting figure is Fit To the Compatibility Base, the grafting figure is integrated into the Compatibility Base
 - The original assets on disk are not modified, this only happens in memory
 - Polygons in the Compatibility Base geometry that are defined as being hidden by the grafting figure are temporarily removed⁵⁾ and the geometry of the grafting figure is welded in
 - The grafting figure will assume the Resolution Level and SubDivision Level of the Compatibility Base it is Fit To⁶⁾
 - Any additional rigging provided by the grafting figure (i.e. a tail) is retained and it remains separately poseable while the grafting figure is Fit To
 - The UVs on the Compatibility Base geometry, as they relate to the unaffected polygons, remain untouched

¹⁾
unless a hand crafted corresponding shape already exists on the item, in which case it is applied instead

²⁾
/Region is optional

³⁾
temporarily removed

⁴⁾
this is purely for user clarity, being named alike is not a requirement

⁵⁾ , ⁶⁾
while the grafting figure is Fit To

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