xgen 制作文档

原文链接：http://docs.sharktacos.com/vray/xgen.html

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This tutorial proposes workflows for incorporating xGen for character hair grooms into a production pipeline using alembic caches. This is divided into the following sections:

这个教程整合了groom引导hair以及使用abc缓存来创建xgen头发的工作流程，教程分为了以下几个部分：

[-] PART I: Creating and Grooming
[-] PART II: Rebuilding (export/import)
[-] PART III: Alembic Cache Pipeline
[-] PART IV: Textures and Rendering
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第一部分：创建和引导
第二部分：重建曲线（导出/导入）
第三部分：abc缓存流程
第四部分：贴图和渲染
第五部分：常见问题

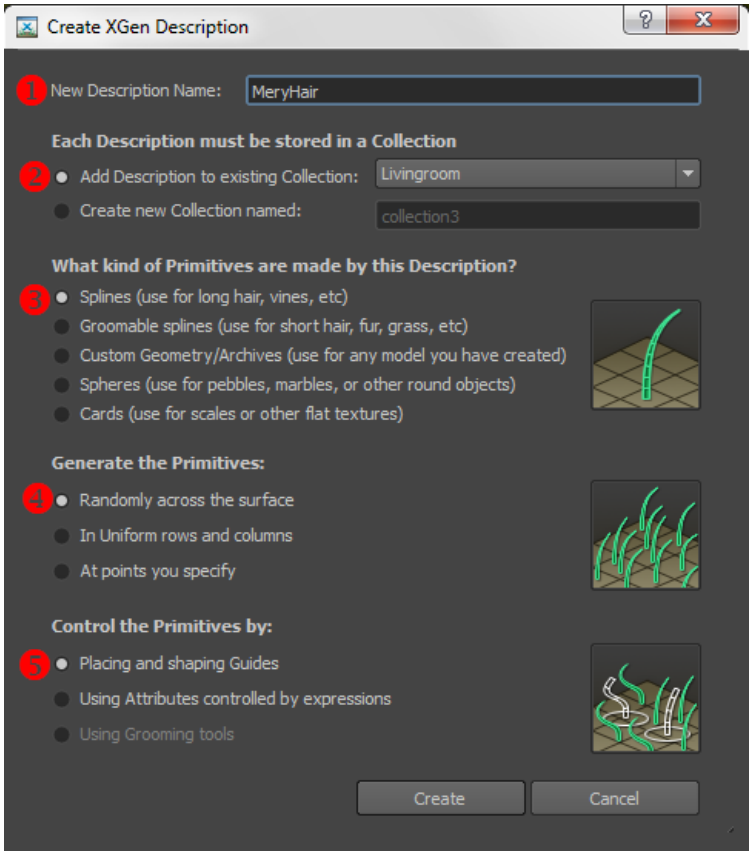
PART I: Creating and Grooming **第一部分：创建和引导曲线**

This first section presents a survey of possible workflows for grooming hair with xGen. Extremely helpful in this regard are the many xGen videos by Autodesk, both in the Maya Mondays series, as well as the Maya Learning Channel. So in addition to the videos embedded below, be sure to check out these playlists as well. Finally, although not covered here, this video by Steven Roselle gives a great intro to working with archives.

第一部分主要整理了一些可行的xgen梳理毛发的工作流程。最有帮助的教程应该是Autodesk官方发布的 Maya Mondays系列，以及maya learning channel。所以除了本文章下贴出的教程外，大家最好先看看上面提到的这些教程。另外虽然和本章无关，由Steven Roselle出品的一套archives教程也很不错。

Let's begin with the initial creation of an Xgen description:

好了，先开始xgen description的初始创建：



Annotations:

1. *The description (1) is the name of what you are making (in this example "Mery's Hair" and in contained in a collection (2). Note that xGen is very pedantic about naming and it is quite an ordeal to rename an xGen stuff. Most important are the names of the collection and the name of geometry you bind to. You will want these to have unique names. For example, ones that include the name of the asset like "MeryScalpGeo" rather than just "scalpGeo".*
2. *In order to add the description to an existing collection, the collection must be present in the Maya scene. Otherwise this option is greyed out.*
3. *Here we pick "splines" which will allow us to use curves as guides for the hair groom. As stated in the above pic, this is best for most hair styles. For buzz cuts, beard stubble, eyebrows, and fur the "groomable splines" option is recommended, although as we will see below (section I.B) splines often work better for this too.*
4. *We want to spread the primitives "randomly across the surface" the way that hair grows evenly from the scalp.*
5. *Finally, we want to control the hair primitives by "placing and shaping guides"*

Note that it is also possible to control the description using both guides and expressions. To do this pick "using attributes controlled by expressions" and then after setting up your expressions, change the "control using" to "guides" and add guides.

标注：

1、description (1)是你要制作的毛发的命名（在这个案例中命名了“MeryHair”并且在collection中）(2). 需要注意的是xgen对命名的要求非常严格，而且重命名xgen的物体也是一件很折磨人的事情。所以最重要的事情是命名好你的xgen collection和要创建xgen的模型。所以在创建xgen之前一定要讲你的模型命名为独一无二的名字才行（例如在本案例中，讲人头命名为“MeryScalepGeo”而不要只是“scalepGeo”）。

2、如果要添加description到现有的collection中，场景中一定要已经有创建好的collection。

3、在本案例中，我们要选择“splines”，这样后面我们就可以用curve曲线来引导梳理毛发。在上图中，很明显选择这一方式是最适合头发造型的。如果是制作寸头、胡渣、眉毛等效果，则选择“Groomable splines”。

4、使用随机分布在表面上来生成原始几何体的毛发。

5、最后我们要使用“placing and shaping guides”来引导毛发

要注意的是，其实可以同时用表达式和引导曲线来控制description。实现的方法是在“control using”上先选择“using attributes controlled by expressions”，然后在设置完表达式以后再在“control using”中切换为“guides”再添加引导曲线。

This will create the xGen description, but we will not see any hair primitives until we have placed some guides. Here we need

a strategy:

这样我们就创建了xgen description，但是这样我们在视图中是看不到头发的，除非我们放置一些引导曲线在模型上，好了，现在我们有以下几种方式来实现：

A. Spline Methods

Spoiler Alert In the following section I will discuss various approaches to approaching hair grooms, and in the end conclude that a spline based method (the "strait-ahead method described below) is best, even for short hair. I would not recommend using the "groomable splines" method, and the tube method is often too complex.

1. Tube method

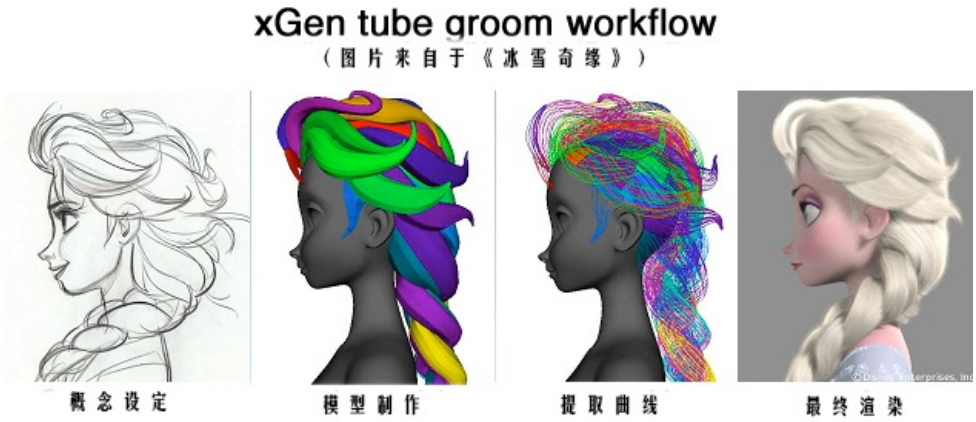
One method is Disney's tube method. This requires a fairly complex model which defines hair clumps. The geo tubes are then used to generate hair clumps. The workflow is illustrated here:

A:曲线方式

剧透一下：接下来我会介绍几种不同的方式来实现毛发曲线的创建，并在最后决定使用哪一种方式是最佳的选择。我个人不建议使用“groomable splines”的方式，同时“Tube method”也太复杂了。

1、管状建模方式

这是其中一种方式，是由迪斯尼研发的一种制作方式，要求使用很复杂的管状模型来定义打结的范围。下图展示了实现的方法：



The details for setting it up are described here:

具体的设定方法观看下面这个视频即可：

https://www.youtube.com/watch?v=yBzQGgMG3dg

2. Strait-Ahead method

While the above method affords a great deal of control and art direction, in many cases a more strait ahead approach is more manageable. The key here is to have a plan, beginning with concept art for the hair style, real-world research, and the final implementation:

2、少量曲线控制方式

尽管上面的方式可以有更多的控制曲线，但是大多数情况下是不使用这种方法的，更多的还是使用少量曲线的控制方式，关键的还是在前期有一个明确的计划，包括好的角色设定、真实的毛发参考以及最终的成品效果：

The workflow is to create guide splines which drive the hair primitives direction. While it is possible to do this by first creating a rough NURBS geometry (sometimes called a "hair helmet") which can be used to generate the curves, it is also relatively easy to simply create the guides from scratch in xGen as described in this video:

简单来说流程就是先创建基本的大致造型的引导线。当然有时候也可以先创建nurbs的曲面和模型来粗略的观察一下大致的造型。当然也可以在xgen的面板中选择添加引导线来制作，下面的这个教程就演示了基本的效果：
https://www.youtube.com/watch?v=yLwVLj3zFg0

Topics covered:
creating guides:

- *rebuilding a normalizing curves buttons*
- *copy & paste curve utilities*

primitive tab:

- *modifier CV count (for resolution)*
- *increase primitive density*
- *setting primitive width, taper, etc.*

adding details:

- *region maps & masks*
- *clump, noise, cut, noise, and curl modifiers*
- *expressions (randomizing)*

课程内容:
创建引导线:

- 细分曲线按钮
- 复制和黏贴曲线工具

原始几何体面板:

- 自定义曲线段数
- 增加毛发数量
- 设置毛发的宽度和尖度

增加细节:

- 毛发生长范围贴图和遮罩
- 簇、扰乱、裁剪、卷曲编辑器
- 表达式

Paint Effects

Because curves and can easily be converted to guides in the utilities, one can use paint effects to create things like braids, convert these to curves (modify > PFX to curves) to generate guides for braids. In this video, Paint Effects is used to draw lines on a polygon model of hair. This is then converted to curves, and then to xGen guides. The basic idea here is that there are lots of ways to create curves (Fiber mesh in Zbrush, Xgen Groomable splines, and xGen interactive grooming introduced in Maya 2017, etc). These curves can then be converted to guides which drive your xGen groom.

笔刷工具

因为在xgen中曲线可以很方便的转换为引导线，所以另一种方式就是使用paint effects来创建一些特殊的效果如辫子，然后将pf转化为曲线。在下面这个视频中，作者在一个创建好的头发粗略模型上使用笔刷工具，然后将笔刷转换成曲线最后转化为xgen的引导线。这里主要想说明的是其实现在有很多种方式来完成基本的造型（zbursh的fiber mesh、xgen的groomable splines以及最新的xgen interactive grooming），他们都可以用来创建曲线并转换为引导线。

https://www.youtube.com/watch?v=6PCreLXlnVk

B. Groomable Method

Groomable Splines use brushes to "comb" the hair. These brushes create PTEX maps which replace the sliders in the primitive section. The initial creation of Groomable Splines is simple: Select "groomable splines" in the xGen Create Description window, and all other options are greyed out.

Beards and Stubble

1. *Begin with a clean scene. When using geo from Maya 2013 & earlier, xGen fails to create the groom PTX maps when creating the xGen description. To solve this, import the geo as an FBX into a new scene in Maya 2015.*
2. *Select faces (tip: selecting faces in the UV texture editor)*

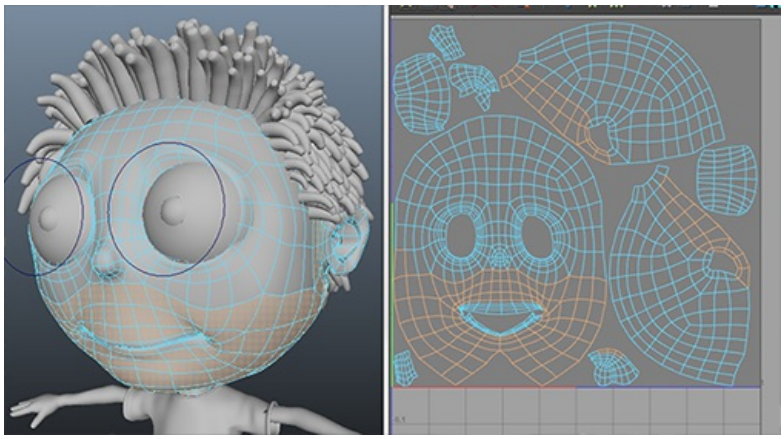
B. Groomable Method

可引导的曲线方式主要是使用笔刷去“梳理”头发。每一个笔刷都会创建单独的ptex贴图来控制原始几何体中的各项属性。要使用这种方式很简单在创建的description时，选择"groomable splines"，其他选项就不可编辑了。

胡渣的制作

1、从一个干净的场景开始。这里要注意使用maya2013和之前版本创建的模型，会造成ptex贴图的失效。解决的方法是将模型以fbx的格式导入到2015以后的新版本中即可。

2、选择要创建毛发的面（小技巧：可以在uv编辑器中选择模型）



3.Make a selection set (create > Sets > set > options) and name it "stubbleSet"

4.With the faces selected, create a new description.

5.Increase the groom and primitive density as desired. (Note: if you display the grooms as cards instead of lines you can see the width)

6.Add a density mask in the Primitive Generator section. Name it "density" and give it map resolution of 15 TPF (texels per face).

We will paint black for the stubble and white for clean skin, and then use an expression to reverse the map (since white=1

and black=0 density). You could alternately use a map created in a 3D paint package (see importing maps). It's important to note that the brush tip needs to be hard rather than feathered as the feathered brush never paints fully black and will thus leave stray hairs.

7.Save the map and open the expression editor. Add the following line (indicated in bold) into the expression:
$a=map('${DESC}/paintmaps/stubbleDensity');#3dpaint,15.0
$a = 1.0 - $a;
$a
To shorten hair, use the Length brush with the goal set lower (0.1) and a negative increment (-0.1). You can also use this method to effectively remove the guides (setting their length to zero) to match with your density map.
As you comb the stubble/fur with the Pose brush a common problem is that the hair becomes buried under the skin, creating bald spots

3、创建一个选择set(create > Sets > set > options) 同时命名为"stubbleSet"

4、在选择面的状态下，创建一个新的description

5、增加引导线和毛发的数量（注意：如果将groom的显示方式由line改为cards，就可以看到毛发的宽度了）

6、给原始几何体创建一个名为“density”的遮罩贴图，并将分辨率设置为15

我们要在模型上绘制贴图用黑色部分来标记出胡渣的区域，用白色表示干净的皮肤。然后使用表达式来反转这张贴图（因为在density中白色=1 黑色=0）。你也可以在别得贴图绘制软件中画一张贴图再导入（如何导入将在下面的章节讲解）。一个非常重要的点就是在使用maya的笔刷工具时，笔刷一定要选择hard（即硬边）而不要选择有羽化的笔刷。因为有羽化的笔刷刷出的黑色并不是纯黑，这样就会导致在黑色的地方还是有零星的毛发产生。

7、保存贴图，然后打开表达式编辑器。添加下面的表达式：

```
$a=map('${DESC}/paintmaps/stubbleDensity');#3dpaint,15.0
$a = 1.0 - $a;
$a
```

对于短发来说，将长度笔刷的goal set设置到0.1，然后给increment 一个负值（-0.1），你可以使用同样的方法来去除一些引导线，将goal set设置为0即可。

这时候一般用pose 笔刷来造型，但是这样刷的不好的话，就会造成如下图所示的斑秃的效果：

This can be addressed with the Elevation brush, however, in many cases it is easier to work with spline guides instead, even when working on short hair and stubble. In the case of beard stubble, you can paint a map to control the density and length, as described above, allowing us to achieve both short and long hair in a single description,

这时候通过Elevation 笔刷来复位，在大多数情况下，一般还是用spline guides来引导，即使是这样的胡渣和短发。

Working with splines allows us to get curved hair (groomable guides can bend but not curve), and do so with only a few guide splines,

使用splines可以得到弯曲的曲线（groomable guides可以变形，但是不能扭曲），同时使用splines可以只用几根就能实现大致的走向

PART II: Rebuilding (export/import) **第二部分：重建曲线（导出/导入）**

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It's a good practice to be able to re-build a scene. This can be helpful when troubleshooting issues that arise as a scene gets more and more complex. This also allow one to go back a step in the process if changes need to be made.

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重建场景是很好的操作，文件在修改的过程中会有越来越多的冗余节点往往会造成文件产生很多不必要的问题。同时这样的操作也可以方便后期的修改。

A. Exporting xGen files

The two ways to do this in xgen are by exporting the collection or description. Exporting a collection includes spline guides. A

description does not, and so the guides must be exported additionally as curves, and then converted back to guides. Further, to import a description into a collection, that collection must be present in the Maya scene. From this we derive the two following workflows:

A、导出xgen文件

导出xgen文件有两种方法：collection或者description。导出collection的话就同时导出了spline guides。而description不能导出guides，所以要将guides转化为curves导出，然后在导入场景后在转为guides。进一步的，如果要将一个description导入到collection中，这个collection必须已经在maya中创建好了。所以两种流程的操作方式如下：

1. Export Collection (simple)

a. *From the xGen window choose xgen > Export collections or descriptions. Then export the collection (.xgen)*

Done! (Note that when working with groomable splines for fur you would also need to export the groom from the Xgen Window file menu (file > export grooming)

2. Export Description (complex)

a. *Save the spline guides as curves: Modifier tab: select bottom modifier stack (clumping1), click Export guides. This creates a "curves" folder containing a mel file in the collections folder. This mel file can later be opened and run in the Script Editor when importing. Alternately, you can use the xGen Utilities Tab to convert the guides to curves and export them as FBX or MA.*

b. *Save the description or collection: xgen > Export collections or descriptions exporting the description (xdsc).*

c. *Delete the description in the outliner, keeping empty collection, then "save-as" the file to import the description into.*

(As noted above, if working with groomable splines for fur you would also need to export the groom)

3. Saving Modifiers

Right-click on a modifier and save it as a .xgfx file. Alternatively you can click the little "open folder" button in the modifier toolbar (top right of the tab).

1、导出collection（简单）

a、在xgen的菜单中，选择xgen->Export collections or descriptions。然后选择导出collection（后缀名为.xgen）

完成！（如果你使用的是groomable splines模式，你同时还需要导出groom，在菜单上file->export grooming）

2、导出description（复杂）

a、导出spline guides为曲线：在modifier面板：选择你创建的最下面的编辑器（例如clumping1），然后在属性的最下面有export guides选项。这样就会在工程目录里就会创建一个名为“curves”的文件夹里面包含了一个mel文件。这个mel文件可以用于后面的导入流程。当然也可以在utilities面板中选择guides to curves老导出曲线为fbx或者ma格式。

b、菜单中xgen > Export collections or descriptions（xdsc格式）。

c、删除大纲中的description，保留空的collection，然后另存为一个新的文件用来导入description。

（如果你使用的是groomable splines模式，你同时还需要导出groom，在菜单上file->export grooming）

3、保存modifiers

右键选择你要导出的modifier，保存为.xgfx文件。也可以使用面板右上角的文件夹图标来导出。

B. Importing xGen files

The trick here is to keep the description name the same so that the ptex maps connect. To work with Maya, IFF maps are painted onto the geometry that xGen grows out of, and applied to the geo using custom attributes. When the name of the collection or description is changed, these attributes no longer match and must be re-created manually, which is possible but tedious. Therefore, when possible it is desirable to keep the names of the xGen collection and description the same as in the original export.

B、导入xgen文件

这个步骤的关键技巧是保持description的命名和导入之前一样这样ptex贴图才不会失效。maya的工作方式是，使用iff贴图来控制xgen的生长范围，然后将自定义的属性赋予到模型上。所以当collection或者description的命名被改变了，这些属性就会失效，你可以手动再添加回来当时这样太麻烦了。因此，就是保持导入的collection和description命名和导入时一样。

1. Import a Description (overwriting)

Xgen is very particular about names, so if you are importing and wish to keep the same name (which is desirable), xgen will want to instead create a new description name. To get around this,

a. *Temporarily rename the description folder (ex: descriptionName-tmp).*
b. *In Maya, select the scalp geo, and import the xGen description.*
c. *Convert the curves to guides (xGen utilities tab)*
d. *Delete the new description folder, and rename the original description folder back to its original name*
e. *Save the Maya file, and re-open it. The maps will now read in.*

2. Import a Collection (overwriting)

a. *Select the geo, import collection, choose "overwrite"*

Done! Since the maps are already in the folders on disc, the description, guides, and all the ptex maps read in perfectly.

3. Import a Collection (new collection)

a. *In a text editor, edit the xGen file (.xgen) and change the names as desired. To change the collection name, edit the name and xgDataPath in the palette section. To change the description, edit both the Description: name and the patches token with the same name (just do a search for the description's name in your text editor)*
b. *Create directories for this collection & description, copying the subdirectories and ptex map files into it from the old collection*
c. *In Maya select the geo, import collection, choose "overwrite"*

4. Reconnecting Ptex Maps

In the above workflows the maps will read in automatically. However if you wish to edit them further you will need to re-connect the IFF maps if the collection or description names have changed. The issue here is that xgen creates extra attributes on the scalp geo based on the collection and description name which have IFF maps connected to the geo.

You can use the following mel script to rename these attributes: xGenRename.mel. Source the script and type "xGenRename" to launch the GUI. The geo must be selected before you launch the script. You can make a mel shelf button for it with script editor > file > create shelf button

1、导入description（覆盖方式）

xgen对命名非常苛刻，所以当你试图导入同一个命名的description时，xgen会自动的重新命名你的description，所以为了避开这一点，

a、重命名工程目录里的description文件夹（例如：descriptionName-tmp）
b、在maya中选择模型导入xgen description
c、使用utilities面板中的功能转化曲线为guides
d、删除文件夹中自动创建的新的description文件夹，然后将a步骤中重命名的文件夹再改回原来的名字
e、保存maya文件重新打开即可

2、导入collection（覆盖方式）

a、选择模型，导入collection，在导入的提示中选择“overwrite”

完成！这样的方式文件名没有发生变化，所以所有的东西都不需要修改。

3、导入collection（创建新的collection）

a、用记事本或者写字板可以打开.xgen文件，然后就可以直接在文本中编辑collection、description和xgDataPath位置，个人建议用写字板打开看的比较清楚

b、为你命名的collection和description创建新的文件目录，然后将原文件夹里的子目录和贴图拷贝到新目录即可。
c、然后选择模型，导入collection，在导入的提示中选择“overwrite”

4、重链接ptex贴图

在上述的流程中，ptex贴图会自动重连到collection中，但是如果你需要编辑他们，你需要重新链接iff贴图，但是collection和description在模型上自动创建的一些额外属性就会丢失。

你可以使用下面这个文件来重命名这些属性，导入这个mel然后在脚本编辑器中输入“xGenRename”开启面板。在执行mel之前要先选择模型。你可以将脚本放入工具架中。

C. xGen Directory Structure and Files Locations
The majority of xGen files are located in the xgen folder of the Maya project. This is defined by the system environment variable $XGEN_ROOT which you can query with the following mel command:
getenv "XGEN_ROOT";
The two exceptions for this are the .xgen and .abc files that are used for batch rendering. These are instead located in the same directory as the Maya scene. If desired this path can be modified in the .ma file with a text editor.

c、xgen目录结构和文件位置
xgen的文件都存放在你设置的maya工程目录下。这个是由系统的环境变量 $XGEN_ROOT 来决定的，可以使用下面的mel来查询：
getenv "XGEN_ROOT";
有两个文件.xgen和.abc是例外，他们不在xgen的文件夹中，而是在scenes文件夹中，用来批量渲染的时候所用，要修改这两个文件的位置可以用写字板打开.ma文件来修改。

PART III: Alembic Cache Pipeline **第三部分：abc缓存流程**

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There are two basic ways the hair can be setup for animation: (A) As non-animated hair that simply follows the body's movement (B) As animated hair, either through key-frame animation of the hair, dynamics simulations, or a combination of the two. The first is very easy to setup, and the second is more complex.

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基本上就两种方式来为动画文件设置xgen：A方法是针对没有动态的毛发，那么只需要让毛发跟随模型即可。B方法：要么就是给头发K帧，或者是动力学解算，要么就是两者结合。方法A非常容易设置，方法B则比较复杂。

A. Animation Workflow (Simple)
Turntables
In this workflow the basic idea is that the scalp geo is animated, and the hair just follows. For a shot with an Alembic cache this is very straightforward. When doing a turntable it is a bit more complex since xgen hair does not update when the parent of a geo is moved and only when the geo itself is. Therefore the scalp geo needs to be rotated in the turntable directly, for example by parent constraining the geo to a rotating group, or by skinning the geo to a rotating joint.
In the turntables we use, the geo is parented under a locator that is parent-constrained to the rotating curve so it should follow the turnable animation correctly.

Note that when batch rendering turntables (as with all batch renders for xGen you will need to export the patches for batch render with xgen>file>export patches for batch render. This is described in more detail in the Shot Animation section below.

Shot animation

1. *Import the Alembic cache for the geo, the xgen hair automatically follows. This will work inside of Maya. To render it, we need a second step:*
2. *Use xgen>file>export patches for batch render. This will write an Alembic cache for the scalp geo to disc, which is kind of redundant since we already have an Alembic cache, but a necessary step for batch rendering to work with xGen. The file is saved to the project's scene folder and uses the following file naming conventions: __.abc.*

Notes:

- *Translate is locked in the scalp geo when an abc is imported. So once the cache is applied you can no longer move it (unless you disconnect the cache)*
- *If you translate geo manually you need to refresh the primitives*
- *Scalp geo must be parent constrained directly in rig, not under a parent. Otherwise the xGen will not update it's location on the timeline properly.*

A、动画制作流程（简易方式）

转圈展示

在这种制作流程中基本的理念就是让头发跟随运动的物体即可。对于一个使用abc缓存的镜头来说这就非常简单了。而对于一个转圈展示的模型来说就稍微复杂一点，因为如果物体是在其他物体的子集下运动的则xgen的头发不会跟随，而只会在物体自身运动时才更新。这样就意味着模型必须自身有位移信息，例如模型是约束在某个选择的组上，或者蒙皮在某个有旋转的骨骼上的。

在我制作的这个案例中，模型是在一个被曲线约束的locator的约束下面，所以毛发是可以跟随的。

要注意的是当批量渲染的时候，（我们在后台渲染之前要先导出路径，具体操作是xgen>file>export patches for batch render，下面的章节会讲到具体的操作）。

动画文件

1、选择模型导入abc缓存，xgen头发会自动跟随。为了渲染，我们需要下面的操作：

2、使用xgen>file>export patches for batch render。这样就会为头皮模型创建一个abc缓存，看上去是个多余的操作因为我们已经有模型的缓存了，但是这是后台批量渲染xgen的必需操作。这个文件会自动存储到scenes文件夹中命名为：_.abc

注意：

头皮文件的位移方向是锁定的，因为abc缓存已经使用了。所以一旦导入abc缓存就不可以移动物体了（除非断链缓存文件）

如果你手动的移动了模型，则你需要刷新primitives

头皮模型要约束到绑定上，而不是P给某个物体，否则就会导致xgen在移动时间条的时候不会自动更新。

B. Animation Workflow (Complex)

1. Exporting curves for animation

In this step we need to create curves from the xGen guides that we can pass to rigging in order to animate the hair.

a. *In the utilities tab convert the guides to curves (keeping the guides)*
b. *Rename the curves with modify > prefix hierarchy names. This will add the character's name to all the curves which Alembic likes (ex: Mery_xGenCurve2 etc.)*
c. *Export these curves as .ma or FBX. Suggested naming convention: FileName_nCurves.ma. (see the naming conventions doc for more details).*

Alternative method (this is more involved, so only use this method if the above does not work):

a. *In primitives tab, check "use animation" and click the "create hair system" button*
b. *Select the curves in the model view and group them (so they are not nested under the follicles)*
c. *Parent curves under character's name group, rename the curves with modify > prefix hierarchy names*

Export these curves (not the output curves) as .ma (open it to make sure nothing else was exported)

2. Setting up the Rig

Import the curves into the rig file. Make sure to remove any namespaces (with the namespace editor) when importing, otherwise you will get name clashes and your cache will not work. Here we see an example of a rig setup:

B、动画制作流程（复杂方式）

1、为动画文件导出曲线

我们需要将xgen 引导线转成曲线，用于绑定文件中来驱动毛发的运动。

a、在utilities面板中选择convert the guides to curves （保留引导线）

b、使用命令modify > prefix hierarchy names重命名曲线，这样会增加角色名到曲线中。

c、导出曲线为.ma或者.fbx.建议将文件命名为 ：文件名_nCurves.ma

替代的办法（这个方法更麻烦，如果上面的方法不可行再使用如下的方法）：

a、在primitives 面板中，勾选use animation，然后点击create hair system按钮

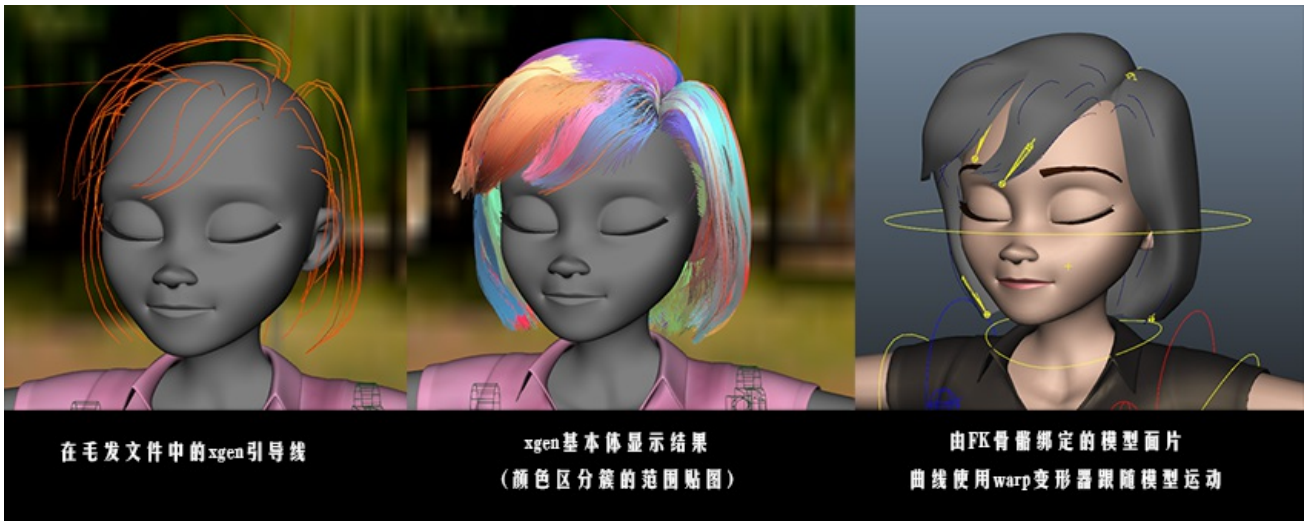
b、在视图中选择所有的转出的曲线，然后打组

c、把曲线都P给到角色模型组下，然后使用命令modify > prefix hierarchy names重命名

导出曲线（不要选择到output curves）为.ma（打开看一下，确认没有多选择其他东西）

2、设置绑定

导入曲线到绑定文件中。导入的时候确保没有命名空间（使用namespace editor），否则由于命名的冲突你的缓存就不起作用了。下面是一个简单的绑定示例：



Above we can see that the rig file has a simple mesh for the hair that the animators can see. This is rigged with FK joints for keyframe animation. The hair mesh is then wrap deformed to the curves which we exported from the groom file (III.B.1 above).

As noted above (III.A.notes) the scalp geo must be directly skinned or constrained to rig, not its parent.

3. Populating the character into the scene (importing Maya files with xGen descriptions)

Xgen gets lost when imported due to namespaces. For this reason xGen does not work with referencing since namespaces cannot be removed from referenced objects. They can however be removed from an import:

1. Import the character into the environment file (file>import) with the option "Merge into selected namespace and rename incoming objects that match" selected. With the "root" namespace selected. The file will import in without any namespaces so the maps will work, but you wont see xGen yet.

2. Save and re-open scene, and xGen will appear

4. Exporting/Importing ABC for xGen

Exporting the Alembic cache (from animation):

i. *Export curves to ABC (strip namespaces, world space, HDF5). Curves must be individually selected, not the group. Note that we use HDF5 because we observed errors using the newer Ogawa format both in Maya 2014 and 2015.*

ii. *Export the geo to ABC (strip namespaces, world space, UV write). The group can be selected for geo.*

Importing ABC (to lighting)

Note that in a normal production pipeline the character file would be populated into the environment (as described above in III.B.3) and the animation caches applied there.

Note also that the following covers the process of importing the Alembic curves to drive xGen hair. In a shot if the geo is

animated with Alembic caches these would also need to be imported. See the doc FG: Shot Setup for Alembic Caches for details.

i. *Import the Alembic curves: In the xGen Primitives tab, Guide Animation section, check "Use animation" and uncheck "live mode" and load the curve ABC cache file.*
ii. *Prep for batch render: Run xgen > export patches for batch render on scalp geo for batch rendering. Confirm that an .abc file was written to the project scene directory.*

5. Baking Modifiers

We can also bake the modifiers to an XPD file to make the scene render faster.

i. *In the modifiers section create a GroomBake modifier. It should be at the top of the mod stack, but below anim wires (if present). Click the bakeXPD button to write an XPD file to the bake folder of the xGen description.*
ii. *To use the XPD, in the Primitives tab change the Generate Primitives dropdown to "from XPD file" (instead of "randomly across the surface").*

如上图我们看到动画师可以使用这个简单的FK骨骼模型绑定文件来制作动画。然后头发模型wrap曲线。
如上面提到的，模型必须约束在绑定上，而不是P给某个骨骼。

3、导入角色到场景文件中（使用xGen descriptions导入maya文件）

如果导入的文件有命名空间那么xgen就会失效。所以参考文件是不适用于xgen的，因为你没法修改参考文件的命名。所以最好的方法还是导入：

1、导入角色到场景文件中（file>import）勾选Merge into selected namespace and rename incoming objects that match。选择root命名空间。这样导入的文件就不带任何命名空间了。所以xgen的贴图就是有效，但是你还是看不到xgen

2、保存然后重新打开文件，即可看到xgen了

4、为xgen导出和导入abc

导出abc缓存（动画环节）：

1、导出曲线的abc（勾选strip namespaces, world space, HDF5）。必须要选择到曲线而不是总的组。注意一定要选择导出格式为HDF5，因为新的Ogawa格式会容易出错。

2、导出模型的abc（勾选strip namespaces, world space, HDF5）。模型可以直接选择组。

导入abc（灯光环节）

在正常的工业流程中，模型都是导入到场景中的，并且abc动画缓存也给到了模型。

所以xgen hair也要由运动的曲线来控制，所以要导入abc缓存的曲线。

1、导入abc曲线：在xgen的Primitives 面板， Guide Animation选项，选择Use animation，取消勾选"live mode，然后导入abc曲线缓存。

2、为批量渲染做准备：执行xgen > export patches for batch render，然后检查文件夹中的.abc文件已被创建。

5、烘焙Modifiers

我们可以烘焙Modifiers为xpd文件，这样可以加快渲染速度。

1、在Modifiers面板中，创建一个GroomBake modifier，这个Modifiers应该在所有的Modifiers之上除了anim wires ，然后选择bakeXPD 输出一个xpd文件到烘焙文件夹中。

2、要使用这个xpd文件，在Primitives面板中，改变Generate Primitives为from XPD file即可。

PART IV: Textures and Rendering **第四部分：贴图和渲染**

The majority of the information in this section is gleaned from the xGen section of very helpful new Vray 3.0 manual.
Table of Contents

本文多数的资料是来自于vray3.0关于xgen在vray中使用的帮助文档http://docs.chaosgroup.com/display/VRAY3MAYA/XGen+and+V-Ray+3+in+Maya+2015+and+newer

目录

Texture Maps Overview

This is a three step process. Note that the texture UVs are based on the geometry the hair is growing from:

1. *Create an xGen root_color attribute to connect the texture map to*

(See C. Root and Tip Color: Complex method (with texture maps) below)

2. *Connect your texture map to the root_color attribute and convert it to ptex.*

(See A. Applying Texture Maps below)

3. *Finally we need to get the xGen root_color attribute into our hair material.*

In the Hypershade, create a VrayHairSampler node and MMB-drag it into the desired color channel(s) of a VrayHairMaterial in the Attribute Editor.
(The VrayHairSampler has many useful outputs, but the default is root_color)

A. Applying Texture Maps

1. *Open hypershade, drag the scalp geometry's shape node into workspace, graph it.*
2. *To create a new file node, click the "paintable texture" icon*

. The map will appear in the hypershade.

3. *Load the texture file you want into the appropriate file node (you can copy-paste the image path into the name slot in the attribute editor for the file node).*
4. *Click the xGen "save" icon*

to save as a ptex:

贴图环节概览

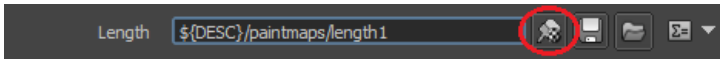
实现的方法是三个步骤。要注意的是贴图的UV是基于产生毛发的模型的：

1、创建一个xgen的属性命名为root_color 链接到贴图上（见下面的步骤）
2、链接你的 贴图到root_color ，然后将贴图转换为ptex格式
3、最后要将root_color 的属性链接给毛发材质。

在超图中，创建一个VrayHairSampler 节点，然后中键拖拽到VrayHairMaterial 的color通道上。

A、赋予贴图

1、打开超图，把头皮模型拖拽进来，显示链接
2、如果想创建一个新的file节点，只要点击属性旁边的这个paintable texture按钮，一个新的贴图节点就会在超图里自动创建了。



3、你可以加载贴图到任何你想要的file节点中（可以直接拷贝贴图路径到想要的file属性节点中）
4、点击xgen的保存按钮就自动保存为ptex格式了

B. Assigning Materials and Multimattes

In Maya 2015 with Vray 3.0 this works quite simply:

Materials: *Select the xGen description and assign the material.*

Note that for archive geometry you will also need to check "use per patch/material description for archive" in the Vray Settings section of the xGen Preview/Output tab. Otherwise it will use the material assignment saved with the archive.

Multimattes: *Either add a material ID to the VrayHairMtl3 (this did not work in previous versions), or add an Object ID to the xGen description.*

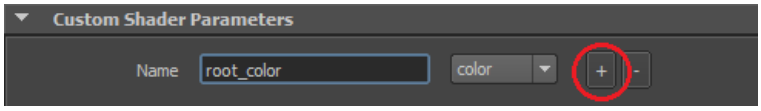
C. Root and Tip Color

Simple method (flat colors)

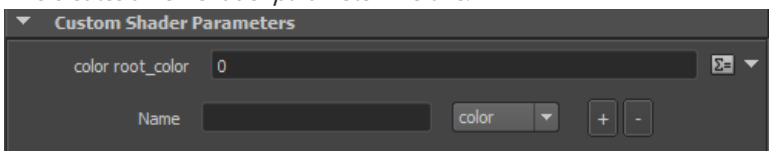
Connect the DistanceAlongStrand channel of a V-RayHairSampler node to the V-coordinate of a Ramp Texture using the Connection Editor in the HyperShade.

Complex method (with texture maps)

a. *In the Preview/Output tab, go to the Custom Shader Parameters section and type "root_color" in the name slot, set the type pulldown to "color" and click the + button*



This creates a new shader parameter like this:



You can assign a texture map to it, as described above, or use the following expression to create an editable color swatch.

$a=[0,0,0];#color
$a

b. *Repeat the above to create "tip_color". (Note: These are internal variables for xGen so the spelling matters)*
c. *To use the root and tip, Create a V-Ray Hair Sampler in the Hypershade and assign it to the Diffuse Color of the material.*

Note that these two approaches can be combined as well.

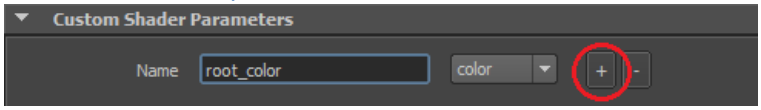
B、赋予材质和多层遮罩

在maya2015的vray3.0中非常简单：
材质：选择xgen的description然后赋予材质。
注意：如果你要单独给archive（替代物）材质 你需要勾选Preview/Output 面板中的vray设置选项use per patch/material description for archive
Multimattes：要么给VrayHairMtl3 一个材质ID或者给description一个object ID

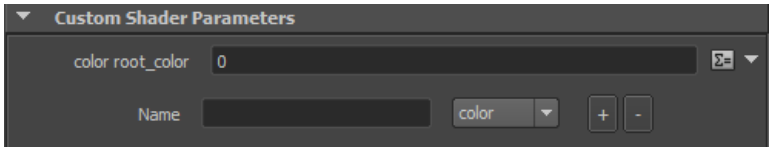
C、底部与尖部颜色

简单的方法：
链接VrayHairSampler 的DistanceAlongStrand 通道到ramp节点的V-coordinate 通道。
复杂的方法（贴图的方法）：

a、在Preview/Output面板中，在自定义材质属性中，在name中输入root_color，选择color模式，然后点击+号按钮



这样就创建了如下图所示的自定义属性:



你可以赋予一张贴图到属性上，或者使用下面的命令来创建一个可编辑的颜色属性

$a=[0,0,0];#color

$a

b、重复上面的步骤创建一个tip_color的属性（因为这是xgen的内部属性，所以命名非常重要）

c、要使用root和tip，就创建一个V-Ray Hair Sampler 节点然后将它赋予到材质的diffuse color上。

以上两种方法可以结合使用。

D. Randomness & Expressions

Simple method (if you just want randomization)

Similar to the simple method described above for using a ramp for the root and tip colors, the randomByStrand channel of the VRayHairSampler can be connected to the V-Coordinate of a ramp node to get color variation. This allows for a very intuitive workflow.

Complex method (sky's the limit)

You can use expressions to drive the color, either providing your own expressions, or using the library.

a. ***Expression Library*** *To load an expression click the little triangle*

and select something groovy from the Load expression menu.

b. ***Expression Editor*** *To write your own click the sigma icon*

and type away. For example this multiplies the color with a random number between 0.5 and 1:

$a=[1,0,0];#color

*$a= $a * rand(0.5,1);*

$a

D、随机和表达式

简单的方法（如果你只想要随机）

这个方法基本上和上面提到的方法类似，使用一个ramp来控制，链接VRayHairSampler的randomByStrand 通道到ramp 的V-Coordinate通道。这是一只非常直观的流程。

复杂的方法：

你可以使用表达式来驱动颜色，不管是使用你自己的表达式还是xgen的库提供的。

a、表达式库 要加载一个表达式，只需选择小三角然后选择任意一个表达式

b、点击按钮

创建表达式。例如创建一个随机的0.5~1的颜色值：

$a=[1,0,0];#color

$a= $a * rand(0.5,1);

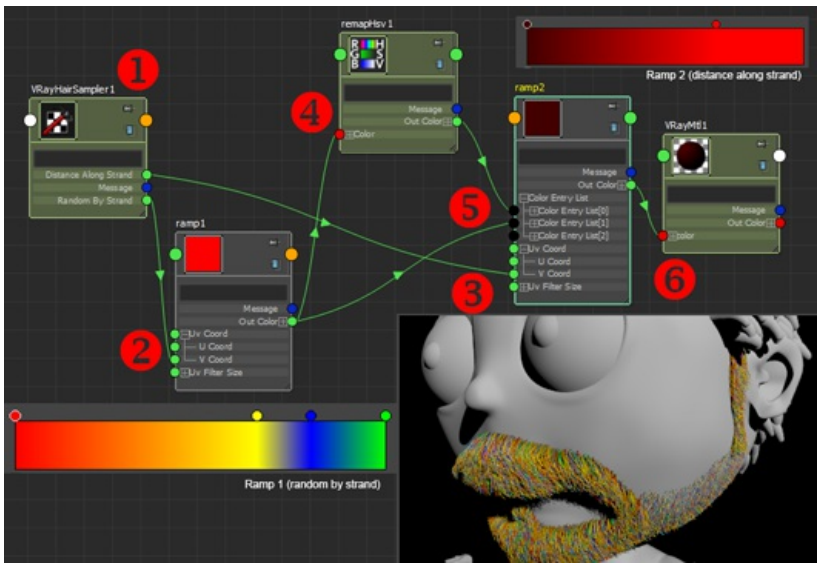
$a

E. Combined Methods

In the following example we will combine the root fade and randomization techniques described above. Notice that the colors on ramp1 are predominantly red-orange-yellow with smaller portions being blue and green. This balance is reflected in the distribution of random colors on the beard in the render. Next notice that ramp2 goes from dark to light. This drives the root to tip of each hair, making it darker at the root. Below you can see how these two ramps are combined with a numbered walkthrough below

E、合并各项

在下面的案例中，我们将把根部褪色和颜色随机两个结合使用。注意ramp1是一个从红到橘到黄加少量蓝到绿的渐变组成的。这些随机性将按他们的比重显示在下图中。另一个ramp2是从黑到白的渐变。用来驱动每根头发从底部到尖部的，从而使底部的颜色更深。下图你可以看到这两项合并的效果



Walkthrough

A VRayHairSampler's Ramp1 "random by strand" attribute (1) drives the colors (shown here as rainbow colors for illustration purposes) of Ramp1 to create random colors on each hair (2). The VRayHairSampler also outputs its "disatnce along strand" attribute into ramp2 (3). The output of ramp1 is piped through an HSVremap node which darkens the value (4).

The resulting darker random colors is then piped into the top of ramp2 along with the original random colors (5) so we get random colors that are darker at the root.

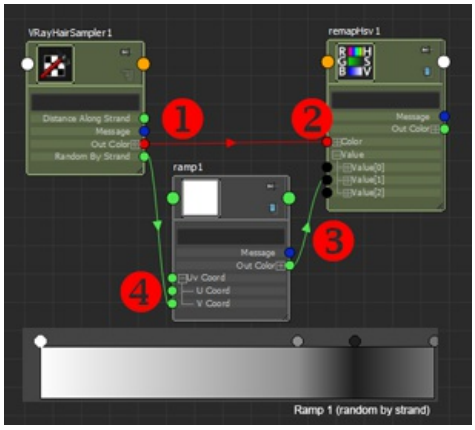
Note that a VrayMtl is shown here for simplicity sake (6), and one would instead use a VrayHairMtl (see Hair Material Setup)

With texture maps

步骤

VRayHairSampler 的random by strand属性（1）连接到ramp1来创建随机的毛发颜色（2）。VRayHairSampler 的disatnce along strand属性链接到ramp2（3）。ramp1的out color链接到remapHSV的节点来加深颜色（4）。然后将加深的颜色链接到ramp2的顶部颜色上（5），这样底部的颜色就偏深。注意这里用VrayMtl 只是为了方便展示，一般还是使用VrayHairMtl 。

使用贴图的方式



To do the above using a randomized texture map you could output the root_color through the VRayHairSampler (1), run that through an HSVremap (2) and drive its value attribute with a ramp using shades of grey (3) driven by a "random by strand" attribute (4).

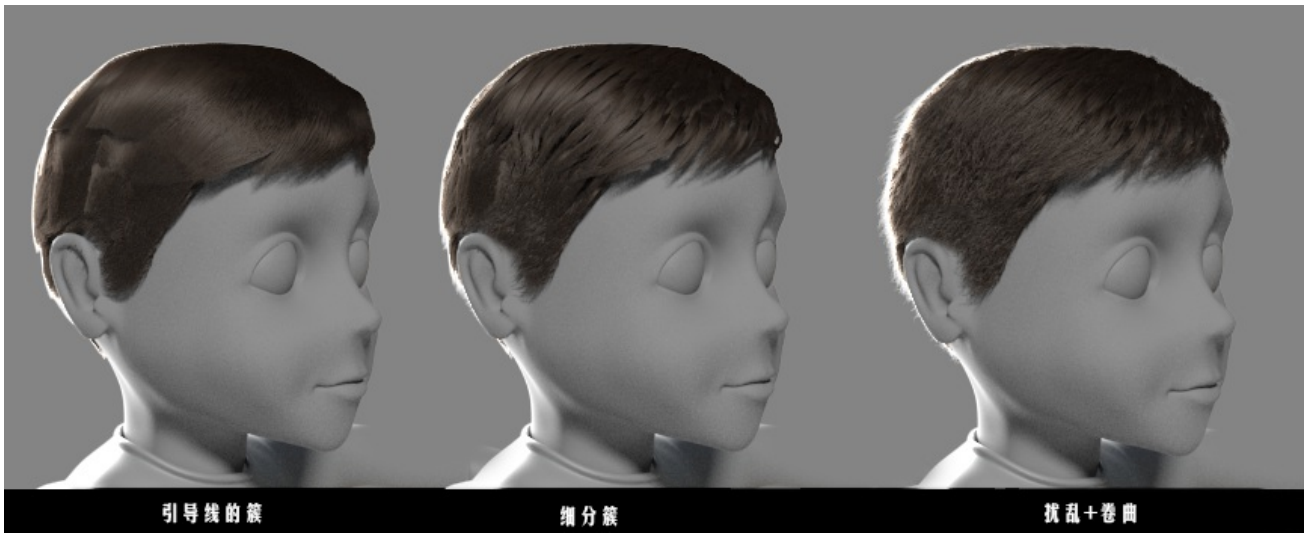
如图所示，你可以将root_color 写入VRayHairSampler（1），使用HSVremap来驱动VRayHairSampler 的值，然后用ramp的黑白颜色（3）来创建一个随机颜效果值，而ramp的随机由VRayHairSampler 的random by strand属性来控制（4）。

F. Modifiers

Modifiers allow one to add layers of detail beyond the spline guides. Working with these is essential to get a good final look. In the example below we have three modifiers:

F、修改器

修改器是用来添加多层细节到毛发上。通过多个修改器可以让毛发达到非常好的效果，下面的图片展示了添加三种修改器后的效果：



The first clumping mimics combing of the hair, following the guides. The second simulates the way hair tends to clump together. This modifiers has a mask so the hair clumps on the top but not the sides of the head where the hair is shorter. Finally a noise modifier adds random frizz at the ends of the hair. Notice how this creates more rim light.

Stray hair

Here are two methods for getting noise to only affect a certain percentage of the hair.

a. *Procedural noise expression*

Go to load expression>samples>xgen>waterRelatedExpresion>noise>noise smoothstep. This will load an expression with a texture noise pattern. Next increase the contrast, and raise the low slider to add more black. This will act as a mask to give you noise on the small percentage of white in the texture.

b. *Stray hairs*

Go to the menu Description > Set stray hair percentage and set it to 10%. Next in the magnitude of your noise modifier (or whatever you want to vary) type the following expression:

stray() ? 10 : 1

This is an if-then-else conditional statement that says if the hair is a stray make it 10, or else set it to 1. So 10% of the hairs will have a magnitude of 10 and the rest will have a magnitude of 1. Of course you can further control this with masks as well.

第一组簇是引导线来驱动的，第二组簇用来模拟真实毛发的打缕效果。可以看到这个修改器添加了一个遮罩这样只有头部的打缕而两边的短头发则不打缕。最后给头发添加了一个随机的卷曲值。注意看头发的边缘光。

Stray hair

有两种方法可以给一定比例值的头发产生扰乱。

a、程序化的扰乱表达式

load expression>samples>xgen>waterRelatedExpresion>noise>noise smoothstep。使用这个表达式可以创建一个随机的贴图纹理。下一步提高contrast值，拖动滑块来增加黑色。这样就可以创建一个白色区域很小的贴图遮罩。

b、Stray hairs

在菜单栏中Description > Set stray hair percentage，然后设置为10%。然后在你的noise modifier的magnitude 属性中输入：

stray() ? 10 : 1

这是一个if-then-else 的条件语句，所以当毛发的stray值在这10%中的时候noise强度为10，其他强度为1.当然你也可以用遮罩来控制强

度值。

PART V: Troubleshooting **第五部分：常见问题**

This is an ever expanding list of troubleshooting tips based on feedback of common errors. In addition, you can also check out the xGen troubleshooting section of the Maya manual (2015).

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这个版块会不断扩充一些问题的解决方法。另外，你也可以查看maya的帮助文档http://download.autodesk.com/global/docs/maya2014/en_us/index.html?url=files/GUID-463D1930-F3FC-4C65-8C16-5A2927EDE8A7.htm,topicNumber=d30e599755

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A. Grooming troubles

Can't add guides.Sometimes geometry created in earlier versions of Maya will not work with xGen. A good workaround is to export the geo as FBX and import it back into the scene.

xGen does not load masks.

This is usually caused by illegal path or file names (i.e. ones containing spaces or special characters). Look for an error message in the Script Editor (usually "Failed to find... Searched path includes...") and confirm that the path and file name exist, and do not contain any spaces or special characters. Once the naming is fixed you may need to re-start Maya.

Another possibility is that the maps cannot be found by xgen because when importing a file, a new xgen description was created. Consequently, all of the maps are missing. Go to the directory where the original xgen description is located and copy-paste the folders and maps into the new description folder. Reload the scene and all the maps will be there.

Can't paint masks.

Make sure you have a unique material assigned to the geo the xGen description is attached to. Additionally, if you have a material with maps assigned to the geo, in order to edit ptex maps you may need to temporarily assign a default material.

Masks set to black for density still show hair.

When painting the mask the brush tip needs to be hard rather than feathered as the feathered brush never paints fully black and will thus leave stray hairs.

Guides do not follow geometry.

In the Utilities, convert the guides to curves, then convert the curves to guides. A note on functionality: Guides will not update when the parent of a geo is moved, and only when the geo itself is. Primitives will update when refreshed.

Rogue guides: the end CV of a guide stays, while the rest moves in a turntable

In the Utilities, convert the guide to a curve, then convert back to a guide.

Guides do not follow geometry when Alembic is applied.

See the rigging section above. Scalp geo must be parent constrained directly in rig, not under a parent.

Guides "explode" (jump to random locations) when when Alembic is applied.

This is likely because of geo flipped UVs. Note that it is possible that flipped UVs may be on a geo that has the same Alembic cache applied, even if that geo is not used by xGen. To check this in Maya, open the UV Texture Editor and click the "shaded UV display" button. Flipped UVs will be red. You can also check this in Headus UVlayout by hitting "T" to display the numbered grid on the geo. Flipped UVs will have backwards numbers. You can flip the UVs on a shell in Headus with the keyboard arrow keys. This will need to be done on the geo in your scene, and on the rig file.

Guides "freak out" when animation "use animation" is turned off.

Either turn it back on, or recreate the guides by (1) creating curves (utilities tab: guides to curves). (2) deleting the guides (3) Making new guides from the curves (utilities tab: curves to guides).

xGen does not load when importing a character into a shot

Save the Maya file and re-open it.

xGen does not load when scene is opened in Maya. XGen appears in the Outliner, but there is no XGen window and the primitives do not appear.

This is an issue of an incorrectly set XGen project, often caused by moving the Maya project between network drives. First check to see that the project has been set in Maya before opening the file, and confirm that the XGen files are all present in the XGen folder. Also check that there are no spaces or special characters in the project directory path. If all of the above checks out, the problem is likely in the .xgen file in the Maya scenes directory corresponding to the Maya scene file (this is known as a sidecar). Open this .xgen file in a text editor and look at the directory paths in it. If they are incorrect (for example the XGen project path points to a non-existent hard drive) then edit the file to have correct directory paths, save it, and re-open the Maya scene.
It is too hard to control multiple descriptions.
Yes, it sure it. That's why it's preferable to create the groom using a single description, adding variation and styling with masks, modifiers and expressions.

A、引导线问题

不能添加引导线

有时候maya之前版本创建的模型无法生成xgen。处理的方法是导出模型为fbx，然后再重新倒回场景。

xgen不加载遮罩

有时候一些不合理的路径和文件名会导致出错。查看Script Editor上（一般都是"Failed to find... Searched path includes..."）的报错信息，然后确认相关路径和文件都存在，确保文件名没有空格和特殊字符。一旦确认和修改好以后重启maya即可。

另一种可能情况就是当你导入文件的时候，xgen的description的名字改变了就会创建一个新的文件夹，这时候只需要将原文件夹中的文件复制黏贴到新文件夹中，然后重新打开文件即可。

不能画遮罩贴图

要确保你的头皮模型的材质是单独给赋予的。如果你的模型已经被赋予了有贴图的材质，一般都需要赋予一个其他的材质来用于画遮罩。

遮罩贴图画成黑色还是有毛发显示

画贴图的时候一定要使用硬边笔刷（hard）而不要使用有羽化的软边笔刷（feathered），因为羽化的笔刷的黑色不是纯黑。

引导线不跟随模型

在面板中，先guides to curves，然后再将曲线curves to guides。另外上面也提到过如果头皮模型是P给物体的那么移动的时候引导线也会不跟随模型。

引导线的根部停留在原地，其他的点跟随模型

和上面方法一样，在面板中，先guides to curves，然后再将曲线curves to guides。

导入模型abc缓存以后，引导线不跟随

上面的绑定环节已经说过了，模型不能p给绑定。

导入模型abc缓存以后，guides到处乱飞

这可能是因为模型有反转的UV。也有可能是导入的abc缓存模型有反转的uv，即使这个模型并不是用于生成毛发的。要检查这个，打开UV编辑器，选择"shaded UV display"。反转的UV会显示为红色。或者你也可以使用Headus UVlayout软件按T显示网格数字，反转的uv会显示向后的数字。你可用使用方向键来改正uv。这个修改要在绑定文件上做。

当“use animation”关闭的时候引导线会“崩溃”

要么把“use animation”打开，要么使用上面的办法，在面板中，先guides to curves，删除原有的guides，然后再将曲线curves to guides。

导入角色到镜头的时候xgen没有加载

保存文件再重新打开

文件打开后xgen没有加载，但是大纲里面有xgen节点，但是xgen的窗口没有显示，基本体也不显示

这个问题通常是因为maya工程目录设置不正确或者工程目录在不同的服务器盘符上移动了。首先第一步是先设置好工程目录再打开文件，然后确认xgen的文件都对应了正确的文件目录。另外检查文件路径和文件名没有空格和特殊的字符。如果上面的都没问题，那么就要检查maya scenes文件夹中的.xgen文件，用记事本打开这个文件检查是不是有不存在的或者不对应的文件名，如果有就修改好。然后保存文件重新打开。

很难控制多个description

是的，的确是的。所以最佳的方法还是用一个description，然后添加变量和绘制遮罩。修改和表达式来控制。

B. Rendering troubles

Hair does not render in VrayCheck that vray is listed in the output settings and the xgenVRay.py is on auto in the plugin manager. See the xgen prerequisites in the Vray docs for more on this.

Hair does not appear in batch render

Make sure to export the patches for batch render. See Part III A in the Shot Animation section for details. This will write an ABC (alembic) file in the Maya scenes directory. If you do not see the .abc file in your scenes directory, it did not write. For this, see "Can't export patches for batch render" below.

See also "Hair does not render in Vray" above.

Can't export patches for batch render

First, make sure the patch has a unique material assigned to it. Then check that there are no spaces or illegal characters (&+! etc) in the project path or file name. Finally check the Script Editor for error messages.*

Render is slow or wont render

On the GI turn off "use camera path" and possibly "retrace threshhold" (the latter will cause flickering which you can fix by upping Light Cache subdivisions to three times their normal value (ex: 6000 for 1080p) and by using a fixed filter size of 0.02 and sample size of 0.01)

Hair "jumps" or "pops" to different positions on frames (on hair using Alembic animated curves)

When exporting the curves to Alembic, make sure that none of the Character's geo is hidden.

Hair flickers/wiggles

There are two common causes here.

First is the clump stack. The clumps that are first in the modifier stack (i.e. lower in the stack) need to have a lower clump count than the children clumps (clumps higher in the stack). When this is reversed, it can cause the hair to jitter or "wiggle" in the render.

The second possible cause is a noise modifier. Noise modifiers can cause the hair to be different on every frame, thus appearing to flicker. To fix this you can bake the noise modifier. At the bottom of the noise modifier, expand its "bake options" section and click the "bake noise data" button. Another approach is to apply a bake modifier to the top of the mod stack (see 5. Baking Modifiers above)

Hair primitives disappear after applying a bake modifier

This is caused by the bake modifier's XPD file being out of alignment with the clump modifiers. Autodesk lists the error as "Clumping guide ID larger than number in xuv file (bc_body_rhinAA): 132611(guide ID) 128777(xuv file size) (Clumping)." To fix it you just need to save the clump maps and bake mod again.

a. *Delete the bake modifier and set the primitives back to "random by strand" the primitives should now appear.*
b. *Next we need to save the clump maps to disc. Click the "setup maps" button at the bottom of the clump modifier section, in the window that opens click "generate" and then "save."*
c. *Create a new bake modifier and click the "bake XPD" button to save it. Check the date of the file to make sure it wrote the file. (Note: The XPD file does not overwrite if you click bake again. If you want to bake another one, set the Bake Dir to an absolute directory, then copy the new one back to the Bake folder to replace the old one.*
d. *in the Primitives tab change the Generate Primitives dropdown to "from XPD file" (instead of "randomly across the surface").*

B、渲染问题

vray不渲染毛发

确认xgenVRay.py 插件已经加载，然后xgen的outpt settings的设置里有vray，可以查vray的帮助文档看http://docs.chaosgroup.com/display/VRAY3MAYA/XGen+General#XGenGeneral-Prerequisites

批量渲染毛发不显示

确认导出了xgen的path，part3的部分已经说了方法。这样会导出一个abc文件到scenes文件夹中。如果abc文件无法导出，下面会讲到。

无法导出**xgen**的**path**

首先确保xgen已经赋予了单独的材质。然后检查文件路径有没有空格和非法的字符。最后查看script editor的报错。

渲染很慢或者根本不渲染

关闭GI的"use camera path"和 "retrace threshhold"（后者会导致渲染闪烁，你可以提高Light Cache subdivisions三倍于平

常的值，然后设置fixed filter size 0.02 sample size 0.01）

头发会到处乱飞（当头发使用abc曲线驱动的时候）

导出曲线缓存的时候，确保角色模型没有被隐藏。

头发闪烁/乱动

有两种情况会导致：

第一种是，修改器中有两层clumps时，底层的clump的值要比上层的clump的值要小，如果两者调换，那么就会导致毛发闪烁和抖动。

第二种可能是因为noise修改器。noise修改器会导致每一帧的毛发的扰乱不同，要修复这个问题，在noise的修改器的最下方，点击“bake options”的“bake noise data”按钮。或者使用bake修改器烘焙所有的修改器。

使用了bake修改器后毛发基本体就不显示了

这是因为bake的xpd文件和clump修改器不对齐而造成的。Autodesk官方也列出了这个错误 "Clumping guide ID larger than number in xuv file (bc_body_rhinAA): 132611(guide ID) 128777(xuv file size) (Clumping)." 要修复这个错误只需要保存clump贴图然后重新bake即可。

1、删除bake修改器，然后设置primitives 改为 "random by strand" ，这样基本体就显示了

2、然后我们要保存clump的贴图到硬盘上。在clump修改器的属性的最底部选择 "setup maps" ，然后会有一个窗口，渲染 "generate" 然后点击 "save."即可

3、创建一个新的bake修改器，然后点击"bake XPD" ，检查文件夹确保输出正确。（要注意的是，bake xpd文件并不会自动覆盖原文件，如果你之前已经bake过一次的话。那么只要设置一个绝对路径，然后bake完成后，把文件拷贝到原文件夹里覆盖即可）

4、然后再把primitives的Generate Primitives改为 "from XPD file"