AUTODESK **UNIVERSITY** 2014

Making Fast and Effective Animation: Procedural Animation Tools in 3ds Max Software

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VI5392   Class Description (use edited version off the AU Website) [Arial 10]

Learning Objectives

At the end of this class, you will be able to:

- Understand the basic animation tools and methods

- Learn fast and effective methods for creating animations

- Learn how to solve everyday animation problems with procedural animation tools

- Learn how to evaluate when procedural animation will be the most effective Solution

About the Speaker

For almost 2 decades, the international 3D animation industry has recognized Paul Neale. His extensive involvement as both the senior director of Research and Development and art director of 3D for PEN Productions Inc. has encompassed areas in TV series, feature films, special effects, and high-profile games. Paul specializes in character rigging and modeling, as well as in writing plug-ins and scripted tools for system, software, and production needs.

You can see the work of Paul and PEN Productions worldwide in feature films, TV series, AAA game titles, and broadcast television. At PEN Productions, Paul excels as a MAXScript scripting language tools developer, technical director, and rigging specialist for clients worldwide. He has also provided 3ds Max software training to the effects staff at The Walt Disney Company, Canada, where he worked for almost 2 years. Paul is well known for his support of the 3ds Max community through teaching, public speaking, and production.

Animation Tools:

3DS Max has a host of animation tools that allow users to control and time animations in many different wants. Procedural animation tools are ones that allow users to control animations via mathematical algorithms that are built into the controller system.

The animation controller system is powerful layered stack based system where many inputs can control a single tracks output to the scene. Layering controllers in creative ways can allow users to build complex systems from simple controllers.

Layer controllers in 3DS Max allow for additively layering controllers onto a single track of animation. Each controller in a list has its output added to the previous controllers output. Each controller in the list can also have a weight assigned to it. In many cases the weight can be a negative value as well as a value over 100%. List controllers can also be layered into other list controllers building nested controller layers and even more complex associations.

As well as controllers there are also a host of procedural modifiers that when layered and mixed can produce complex results for the deformation of meshes. Combine those modifiers with controllers and the possibilities are endless.

Procedural Animation Controllers:

- Noise
- Wave
- Audio
- Expression
- Script
- Parameter Wire
- Reactions
- Spring
- List Controller

Procedural Modifiers

- Flex
- Ripple
- Wave
- Noise
- Volume Select
- Mass FX

Fast and effective methods for creating animations:

Animating can be a slow and tedious task when key framing animation so when ever there is the opportunity to procedurally create animation it can save time and allow for fast and flexible changes to be applied to keep a production on track and on time.

## Assigning and working with controllers:

Working with controllers is an easy task, select the track of animation in Curve Editor, Dope Sheet or Track View that you want to set a controller on and right click to bring up the Track View Quad Menu and from the lower right quad choose Assign New Controller. The Assign Controller dialog will open and show you a list of possible controllers for the track that was selected. If a float track is selected only float controllers are displayed to simplify the list. Other controller classes are Positions, Rotations, Scale, Float and other specialty tracks.

Once a controller is assigned you can access the properties by again right clicking on the controller and choosing Properties from the lower right quad.

The properties dialog for each controller will be different with controls and options specific to the controller used.

Controller dialogs and basic usage:

Below is a list of some of the controller dialogs that are covered in the class.
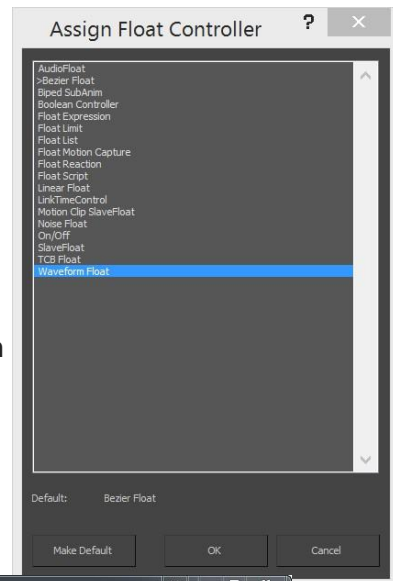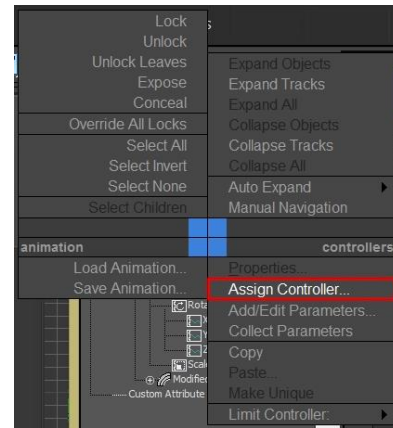
- Audio Controller allows for driving animations using a .WAV file as the input.

- Noise controller uses a standard noise algorithm to create random curves.

- Parameter Wires allow for connecting two tracks together and applying expressions to change the input value.

- Script Controllers can take multiple inputs and use any Max Script commands to write complex expressions.

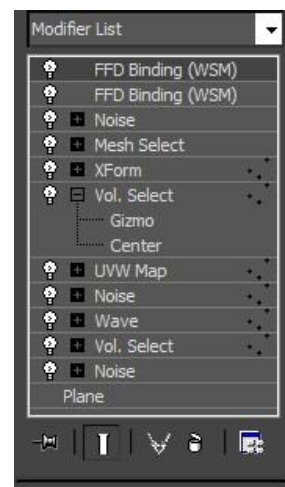- Spring Controllers create a simple dynamics
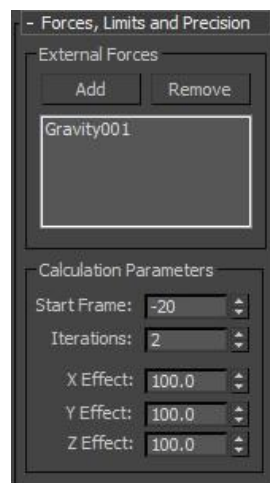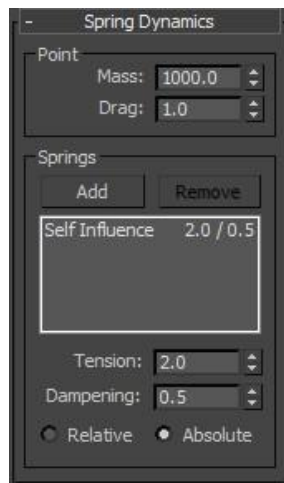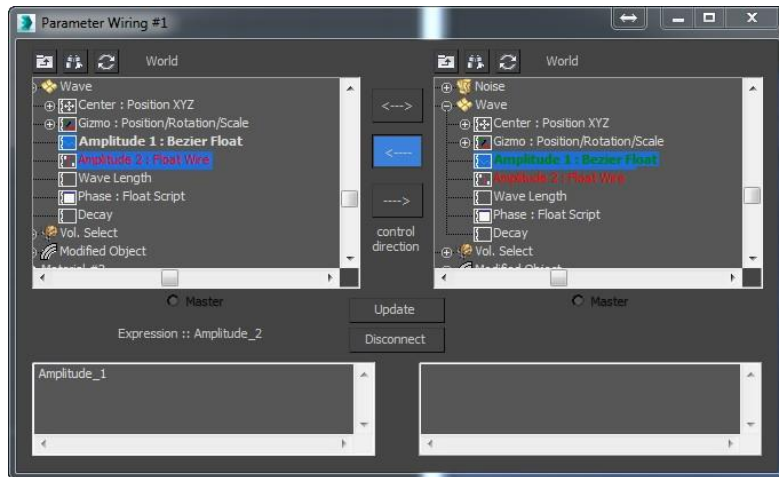
solutions for generating animations that react to position changes.

## Assigning and working with procedural modifiers:

There are a number of choices when working with procedural modifiers. Flex, noise, even mapping using UVW Map can be applied and animated.

Modifiers stacks can become complex when selections are used via the Volume select modifier that can dynamically change the selection as parameters are updated. Procedural stacks can become slow but the time saved and the flexibility gained can dramatically speed up production.
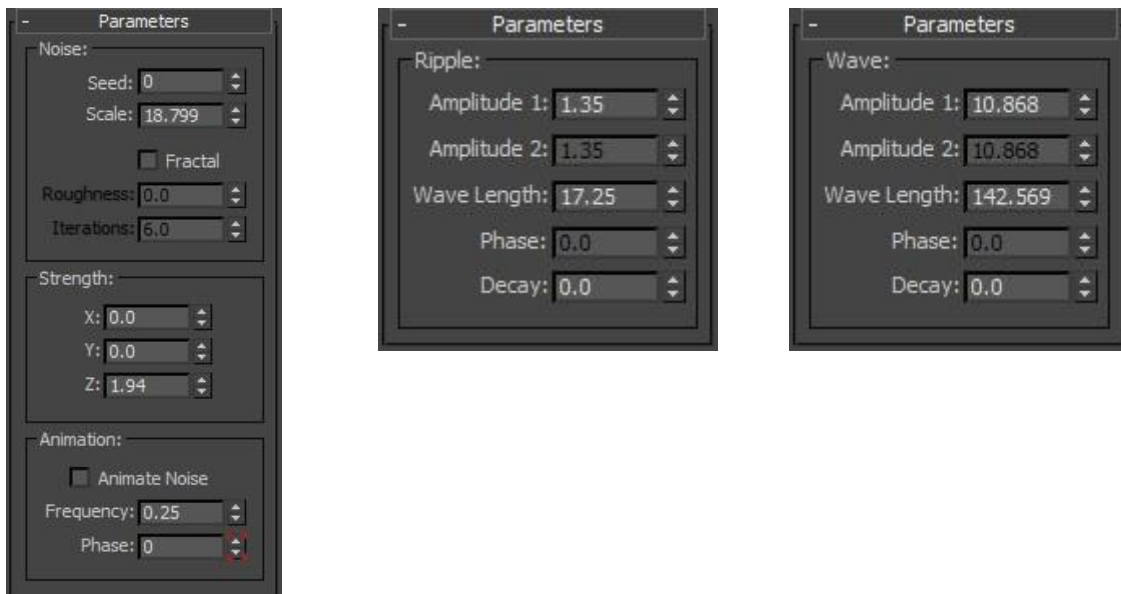
- Flex Modifier creates a spring system for geometry and splines   that can be used to drive jiggly type animations. Flex runs real time in the viewport and is time dependent so it is important to note that it will slow down the viewports considerably and should be
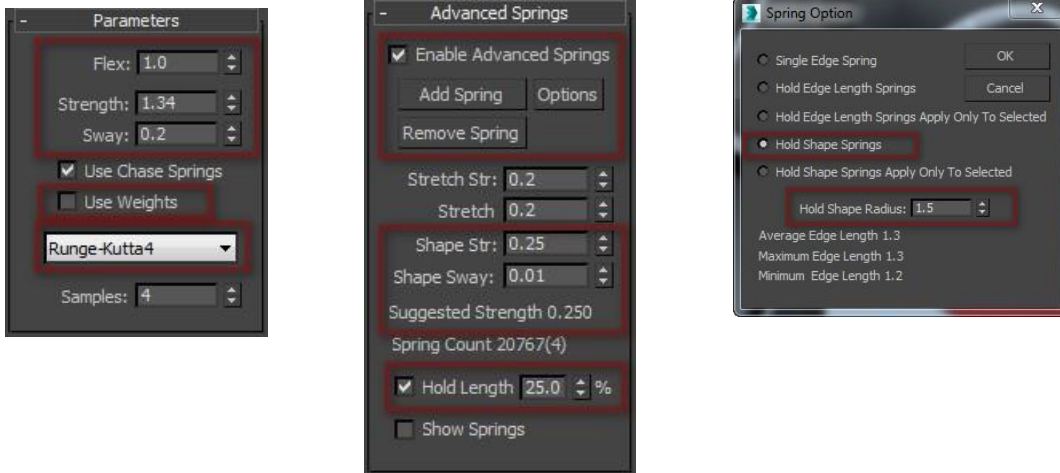
cached or turned off in the viewport when ever possible. Flex can provide solutions for
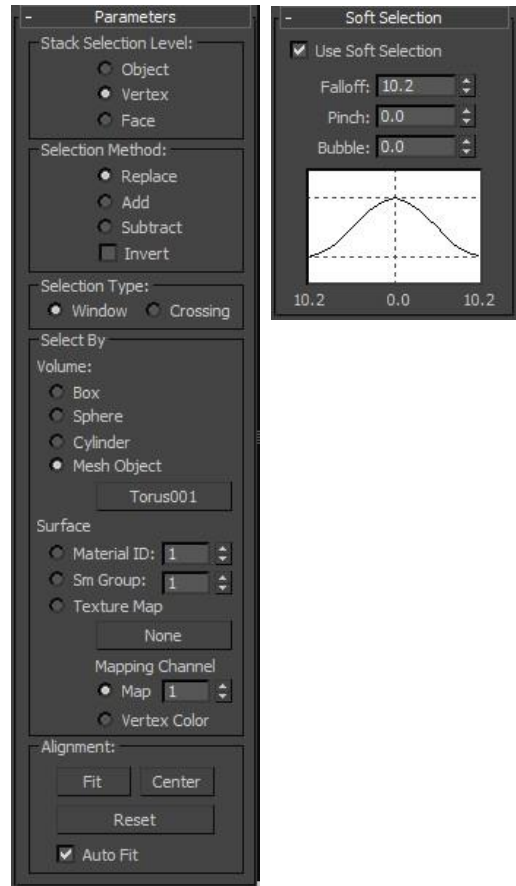

many kinds of simple animations.

- Modifiers such as the Noise, Ripple and Wave modifiers create surfaces that can mimic water and other undulating surfaces. These modifiers are fast and easy to mix together to create all sorts of dynamic surfaces. They can also be used to drive Flex and create and even more dynamic solution.

- Bend, twist, taper and many many more modifiers can be layered to create simple procedural animations.

- Volume Select is a modifier designed to create selections to be passed up the stack to other modifiers. Dynamic selections can be created this way and used to drive animations in more complex ways. Objects can be used as well as texture maps to aid in creating the selections. Volume select modifiers can be stacks and add subtract and invert selections passed to it.