# Carrara Studio 3 Tutorial:
# Infinite Motion Loops

**Carl E. Schou**

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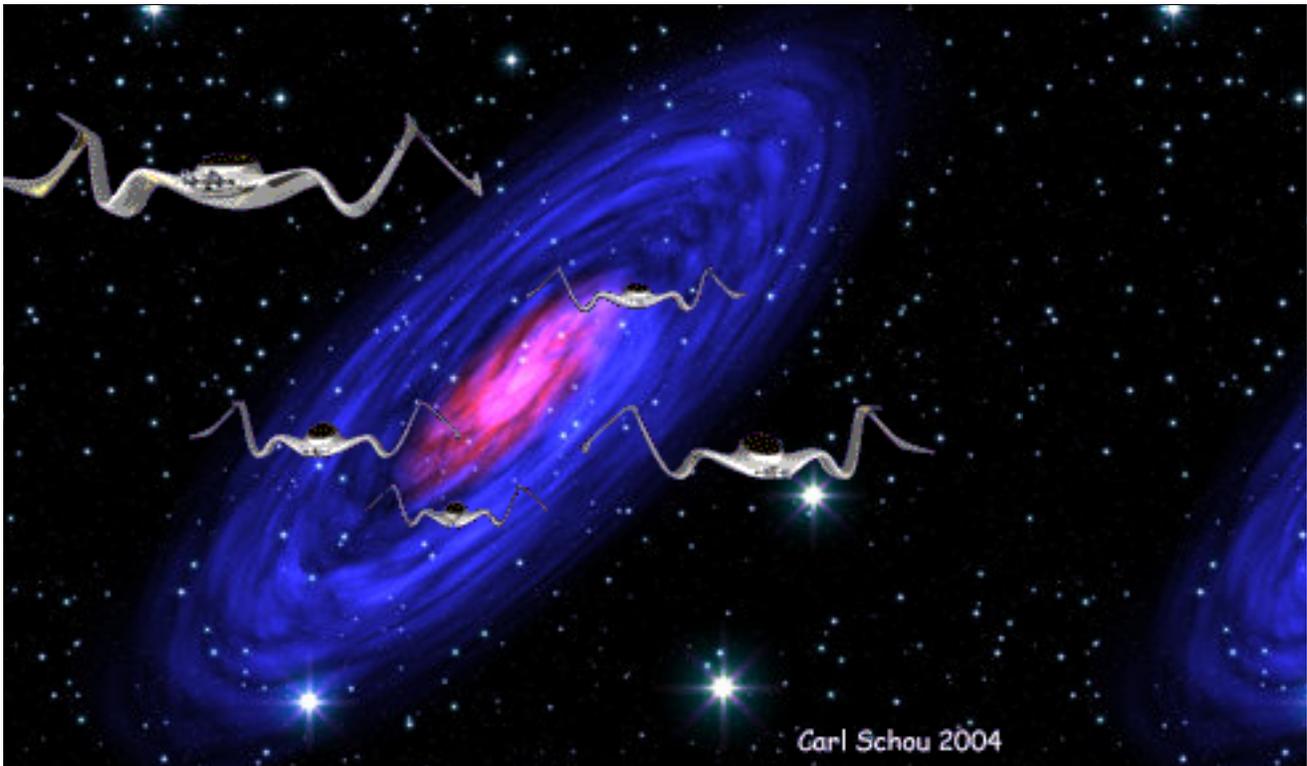


Emergence

The animated image shown above is a one second repeating loop that was produced in Carrara Studio 3. The purpose of this tutorial is to cover one technique for creating near seamless looped animations in Carrara. We will start the tutorial by looking at the particular strategy to be used, before we start in with the actual animation work.

Walk Before You Run - Starting Simple

The approach we are going to take will be to build a simple looped animation using spheres to get the scene set up.  Once this works satisfactorily, the spheres will be replaced with more complex and interesting models.  The benefit of this approach is that it is very quick and easy to set up an animated scene with basic primitives.  Trying to do the initial set up of the animation with a large number of complex models can add a lot of extra work when you have to backtrack, and it can slow down the system in some extreme cases.


Strategy for Perpetual Motion Loop

(1) Determine the time duration of the loop segment.

(2) Determine how far your model will move during a single loop segment.

(3) Determine how far your model will move during a single frame.  This is called FrameDistance.

(4) Create a clone of your model with a starting position set one FrameDistance beyond the ending position of your original model.  The clone will move the same distance as the original, and it will travel in the same direction.  When the animation repeats, the clone will appear to continue from the ending position of the original model.

(5) Group the original and the cloned model together.

(6) Replicate the groups as many times as desired, at various positions.

(7) If you did your setup using simplified models, replace them with the actual models to produce the final version of the scene file.

(8) Render the final animation.


Start With a Single Simple Sphere

To begin, we will set up a scene in Carrara's Assembly room using a single sphere.  The result will be a one second animation running at 24 frames per second.  Looking at the top view of frame 1 (shown below), the sphere's starting position is a large distance from the camera, which can be seen at the bottom of the screenshot.  In frame 24, the sphere has been moved closer to the camera.  The animations show the sphere moving from the top view and the camera's view.
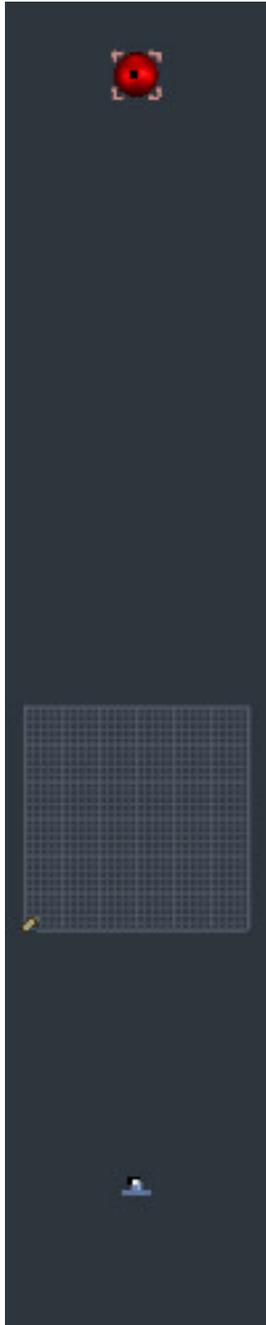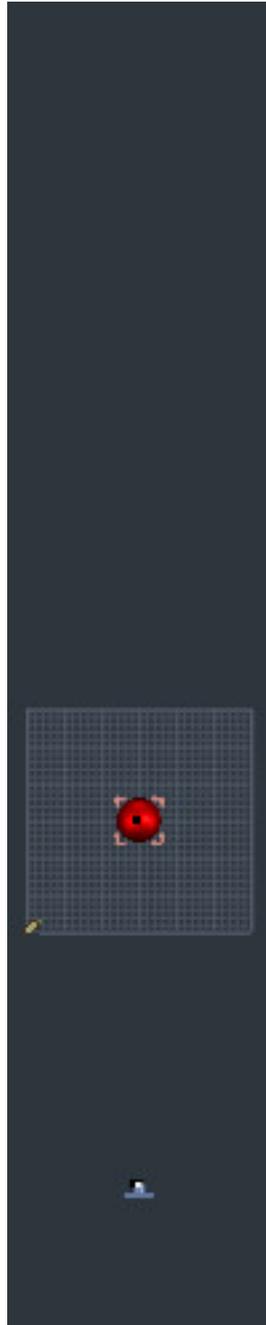
| Frame 1 | Frame 24 | Frame 1 to 24 | Frame 1 to 24 |
|---------|----------|---------------|---------------|
| Top View | Top View | Top View | Front View |

The Sequencer tray for the single sphere scene is shown below.  To produce the animation, the time scrubber was set to 1 second (frame 24) and the position of the sphere was changed in the Properties tray.  This produced the Keyframe indicated by the arrow in the timeline for the object SphereRear1.
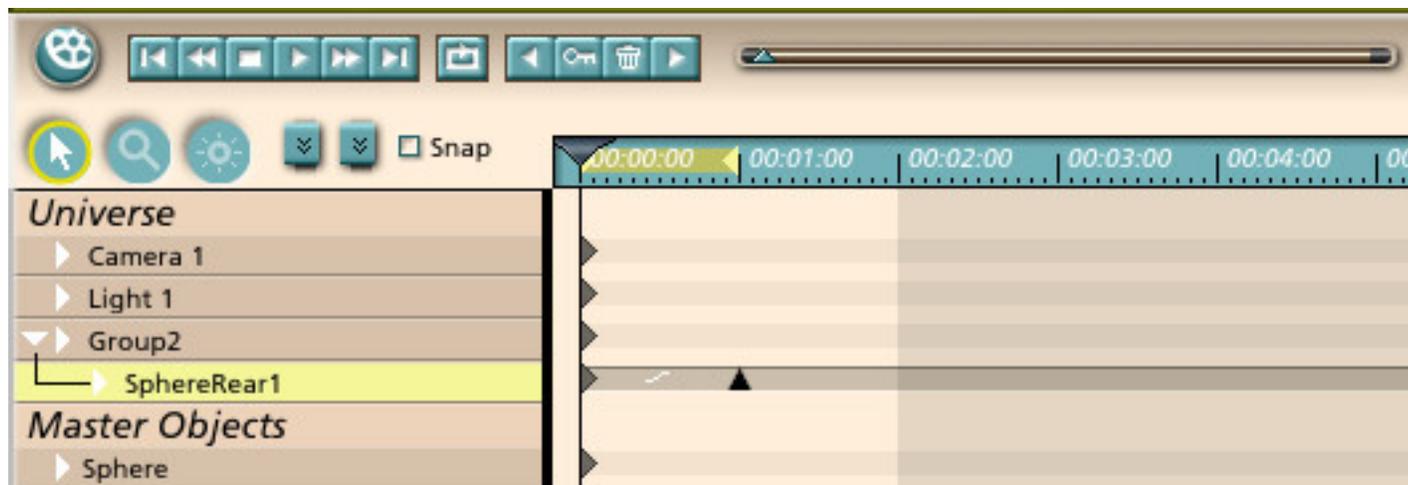


## Add a Second Sphere to Continue the Motion

By stepping through the animation and monitoring the position of the sphere in the Properties tray, it was easy to determine how far the sphere moved from one frame to the next.  This distance was added to the end position of the sphere to determine the start position of a second sphere.  This clone was set to travel the same distance and direction as the original sphere.  To make things easier to handle, the original and the cloned sphere will be grouped together.

Shown below in frame 1, you can see the start positions of the original sphere (labeled 1) and the cloned sphere (labeled 2).

In frame 24, the original sphere 1 has moved to its end position, which is FrameDistance less than the start position of sphere 2.  The end position of sphere 2 is not visible since it has moved out beyond the position of the camera.

In the animations, it can be seen that sphere 2 picks up where sphere 1 leaves off when the loop repeats.  The beginning of the loop is still very evident because of the sudden reappearance of sphere 1 at its start position.

| Frame 1 | Frame 24 | Frame 1 to 24 | Frame 1 to 24 |
|---------|----------|---------------|---------------|
| Top View | Top View | Top View | Front View |
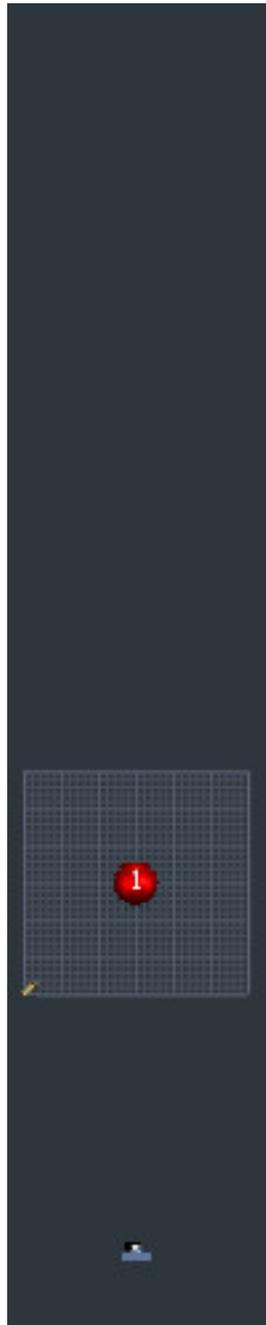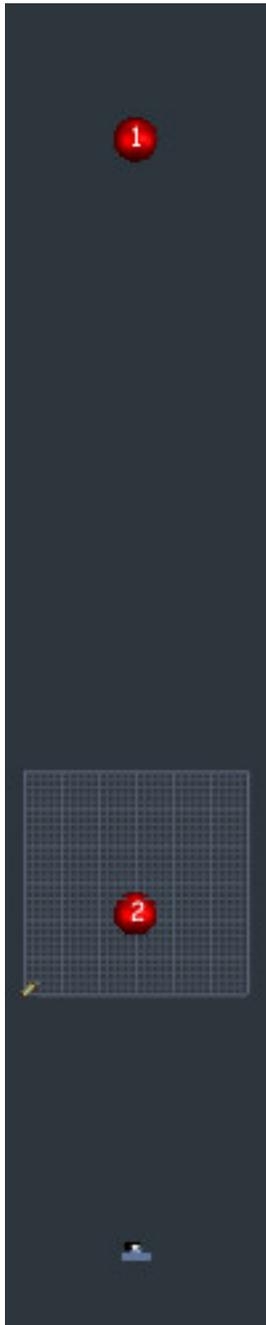
# Replicate the Moving Pairs of Spheres and Create a Fade-In

Next, the first group was replicated three times and arranged in a circle around the camera, at different distances from it.

In the animations, the effects of two different types of fade-ins are compared against the abrupt startup produced with no fade-in. For the Fog fade-in, Distance fog was added to the scene to obscure the distance at which the spheres suddenly appear at the start of the loop.

For the Size fade-in, the more distant original sphere of each group started the loop with its size set to 1%, and it finished the loop with the size set to 100%. The size of the second cloned sphere in each group was not changed.

Frame 1

Top View

Frame 24

Top View

Frame 1 to 24

Front View, No Fade-In



Fog Fade-In

**Size Fade-In**
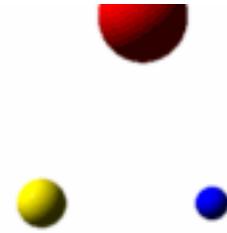
The Sequencer tray for the quad sphere scene is shown below.  The four groups are open to show the original sphere in the rear and the cloned sphere in the front.  Also note that each object has its own keyframe at the end of the one second loop.

00:00:00  00:01:00  00:02:00  00:03:00  00:04:00  00

Universe
   Camera 1
   Light 1
   Group1
      SphereFront1
      SphereRear1
   Group2
      SphereFront1
      SphereRear1
   Group3
      SphereFront1
      SphereRear1
   Group4
      SphereFront1
      SphereRear1
Master Objects
   Sphere
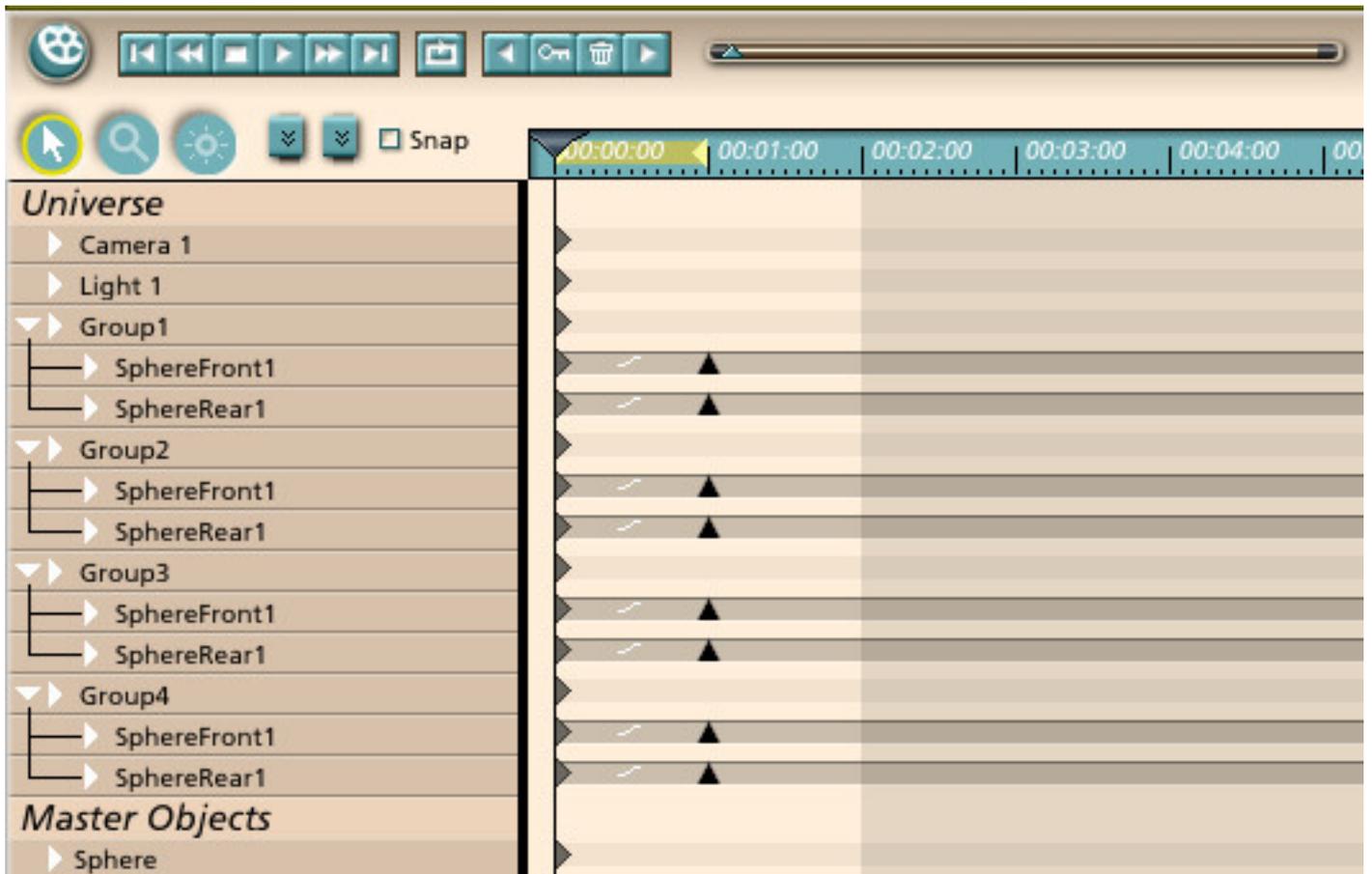
## Replace the Spheres With Complex Models

Once you are satisfied with the behavior of your looped test animation, you can replace the spheres with more complex models to produce the final animation.  For this particular project, the start and end positions of each group were recorded.  A new scene file was created with two models grouped together in the same relative start and end positions as the spheres from the first group.  This group was then replicated, and each new group was given the proper start and end positions to mimic the sequence which had been created with the simple sphere model.

## The Rest of the Picture

The animation at the top of this tutorial, "Emergence", was made by extending out the procedures we followed here.  A simplified version of the animation was made using seven grouped pairs of spheres, arranged in a circle, with each group starting at a different distance from the camera.  When the animation worked correctly, the spheres were replaced with the spacecraft models which had been built in Amapi.  The animation was rendered as a sequence of Photoshop PSD files with alpha channels so the background of each frame could be made transparent in Photoshop.  The files were then made into an animated GIF using Image Ready.  The backdrop of the galaxy and starfield was made using the StarBits program.

## Related Links

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StarBits Starfield Generator

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