Motion

Creating Animation with Behaviors

Part 7
Animating Cameras

Now that you've learned how to arrange layers and groups into virtual sets in 3D, the real fun begins: animating the camera to fly from set to set, examining each one before moving to the next.

In this lesson, you will animate your camera using behaviors.

Animating a Camera with Behaviors

In this exercise, two camera behaviors—Framing and Sweep—will animate the camera through a scene. The Framing behavior flies the camera to a new location in 3D space, and the Sweep behavior orbits the camera around its point of interest.

Using the Framing Behavior

The Framing behavior makes it fast and easy to fly the camera right to a specific layer. It even orients the camera to face the layer.

1   Navigate to Motion4_Book_Files > Lessons > Lesson_16 and open the Camera Animation – Behaviors Start project. Then save it in the Student_Saves folder. Let's take a quick look at this project's structure.

   **NOTE ▸** You can open this project from the Finder or directly from the File Browser in Motion.

2   Open the Layers tab (F5), select the camera, and use the Compass to go to the Top view.
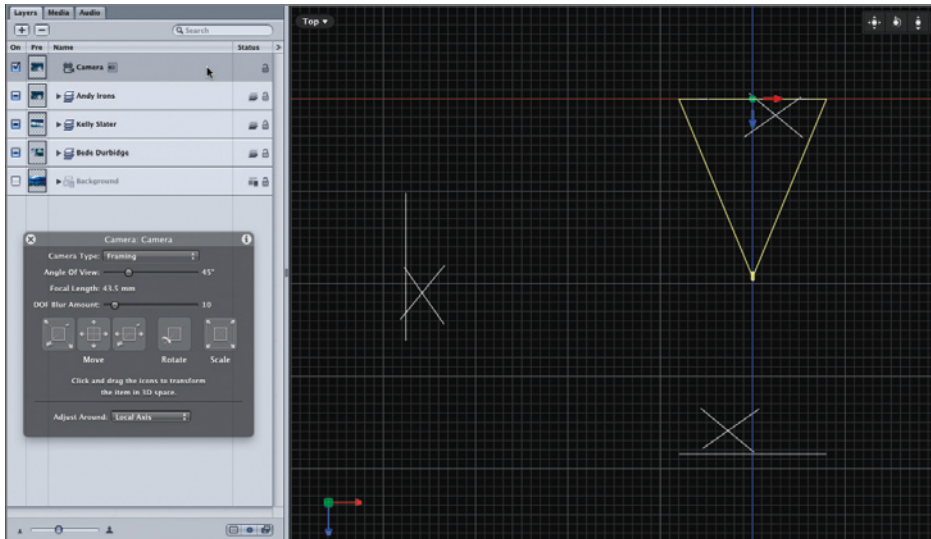
The three surfing groups are spread out in 3D space, each one containing a video layer and layers for the first and last name graphics, which have been rotated and positioned in front of the video. The camera is located at 0,0,0—the center of the virtual world—framing the *Andy Irons* group.

We'll animate the camera from this Top view. You want to move the camera from its current location to the *Kelly Slater* group. But when should the move start?

3   Play the project, and stop just after the voiceover says, "Andy Irons, four-time Triple Crown Champion"—at about 3:02. Because the voiceover has finished introducing Andy but has not yet introduced Kelly, this is a great time to move the camera to look at Kelly, using the Framing behavior.

4   In the Library, choose Behaviors, then Camera. The six different behaviors in this folder animate a camera in different ways. The Preview area displays information and a sample animation that shows how each behavior works.
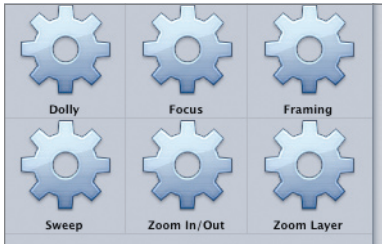
> **TIP** In addition to the Camera behaviors, cameras can be animated using Basic Motion behaviors like Throw, Spin, Motion Path, and Point At. Parameter behaviors will also animate cameras. For example, try adding a Wriggle Parameter behavior to the camera's position to create some camera shake.

5   Drag the Framing behavior onto the *Camera* layer in the Layers tab. Click the framing behavior now under the Camera layer to make the Canvas to make it the active window, and then press I to trim the behavior's In point to the playhead.

The behavior appears under the *Camera* layer, and like most behaviors, it is applied to the entire duration of the layer, so you also need to trim the Out point.

6   Play the project and stop just after the voiceover says, "Kelly." Then press O to trim the behavior's Out point to the playhead.

7   Set a play range around the behavior, starting a little before the In point and ending a little after the Out point. Resume playback to see the animation.

TIP ▶ You can drag the play range In and Out points, but it may be faster to press Command-Option-I to set the play range In point and Command-Option-O to set the Out point.


TIP ▶ While looping a short playback range, you may want to mute the audio by clicking the Play/Mute Audio button at the bottom of the Canvas.

The camera doesn't move, because you need to give the Framing behavior a target for it to frame.

8   Drag the *Kelly Slater* group from the Layers tab to the well in the HUD.

TIP ▶ You can also drag the target layer or group directly onto the Framing behavior underneath the *Camera* layer.
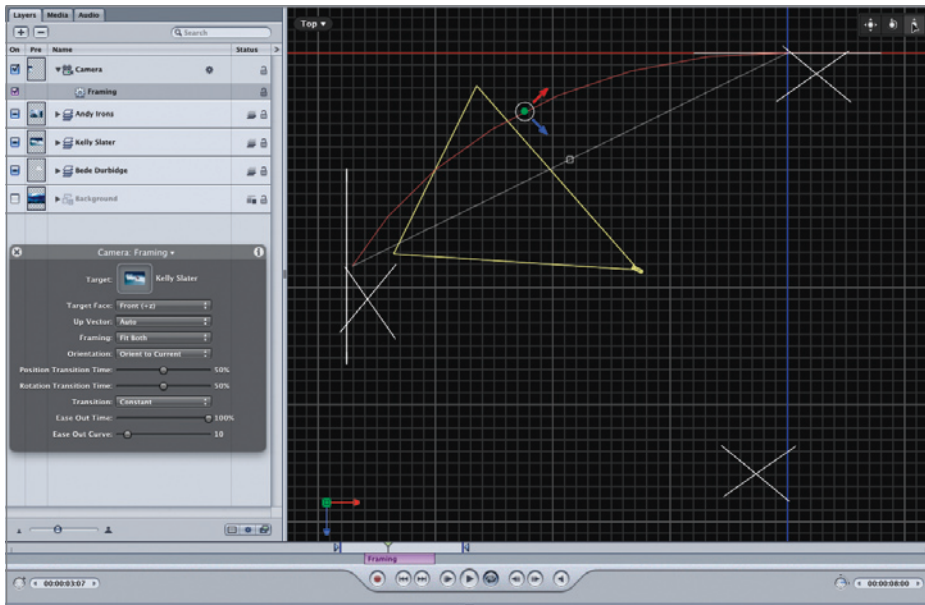
The camera now moves to the *Kelly Slater* group, rotating as it moves so that when it arrives, it's squarely facing the front of the group. It moves quite quickly because, by default, it completes its position and rotation changes halfway through the behavior. It also starts and stops rather suddenly. You can adjust these default settings in the HUD.

9   In the HUD, drag the Position Transition Time and the Rotation Transition Time sliders to 100%. The camera now lands on the *Kelly Slater* group at the end of the behavior.

10 From the Transition pop-up menu, choose Ease Both.

Position Transition Time:	100%
Rotation Transition Time:	100%
Transition:	Ease Both
Ease Out Time:	100%
Ease Out Curve:	10
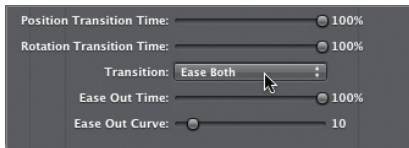
The camera now accelerates and decelerates more naturally. Let's see how things look from the camera's point of view.

11 Press Control-A to display the Active Camera view.

The camera move works well, but if you drag the playhead a bit beyond the play range, the video suddenly disappears. That's because all the video clips start at the first frame of the project. It was helpful to build the project this way so that you could see all the layers in 3D space without moving the playhead, but now you need to shift the layers in time so that each video is playing when the camera arrives to view that layer.

12 Stop playback, and press D, if necessary, to select the Framing behavior. The D key changes which element is selected by rotating through a selected layer and any effects applied to it.

13 Press Shift-I to move the playhead to the In point of the behavior.

14 Select the *Kelly Slater* group and press Shift-[(left bracket) to move the group's In point to the playhead.

15 Press Option-X to reset the play range, unmute the audio if necessary, and play the project. The Kelly Slater video now lasts until after the voiceover introduces Bede Durbidge, at which point the camera will have moved on to Bede. To move the camera, we'll duplicate the Framing behavior we just adjusted.

16 Move the playhead to just after Kelly Slater's voiceover intro is complete, at about 6:07. This is where you want the next Framing behavior to begin.

17 Rename the Framing behavior to *Frame Kelly*, press Command-D to duplicate it, and rename the copy to *Frame Bede*. Drag the *Bede Durbidge* group into the HUD well, and then press Shift-[(left bracket) to move the behavior's In point to the playhead.

Because you copied the existing behavior, it already has the right duration and animation properties. All you need to do is move the *Bede* group to start when the behavior starts.

18   Select the *Bede Durbidge* group, and press Shift-[(left bracket) to move its In point to the playhead. Play the project.

The camera now animates quickly and smoothly to each of the surfers as they are introduced. It works well, but nothing is moving during the time that the camera is looking at each surfer. You can make things more dynamic by applying a Sweep behavior to keep the camera in motion as it looks at the layer or group that it is framing.

Using the Sweep behavior

The Sweep behavior animates a camera to rotate or "sweep" around the scene that it is framing—its point of interest—as if it were attached to the scene with a string and can't look away.

1   While playing the project with the camera or one of its Framing behaviors selected, click the Add Behavior icon and choose Camera > Sweep.
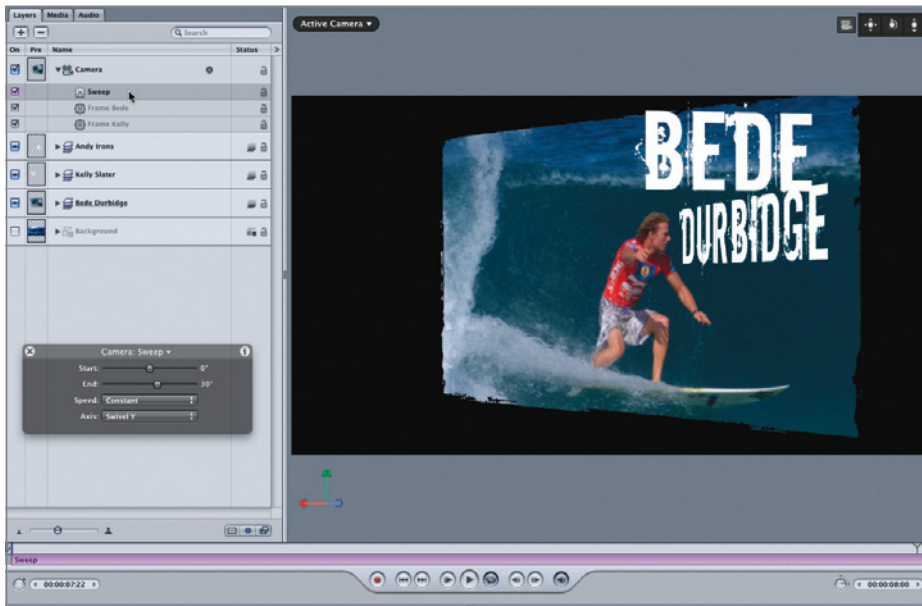
The behavior is applied to the full project duration, and the HUD indicates that the camera rotates from 0 to 30 degrees over the length of the behavior. This means that the camera looks at the first group straight on, and then rotates as it frames each group. Because you added the Sweep after the Framing behaviors, the rotation is continuous, which you can best see in the Top view.

2   Use the Compass to switch to the Top view, and continue playback.

The animation might look better if the camera were to start with a slight rotation in the opposite direction.

3   In the HUD, set the Start slider to -15 degrees and the End slider to 15 degrees.
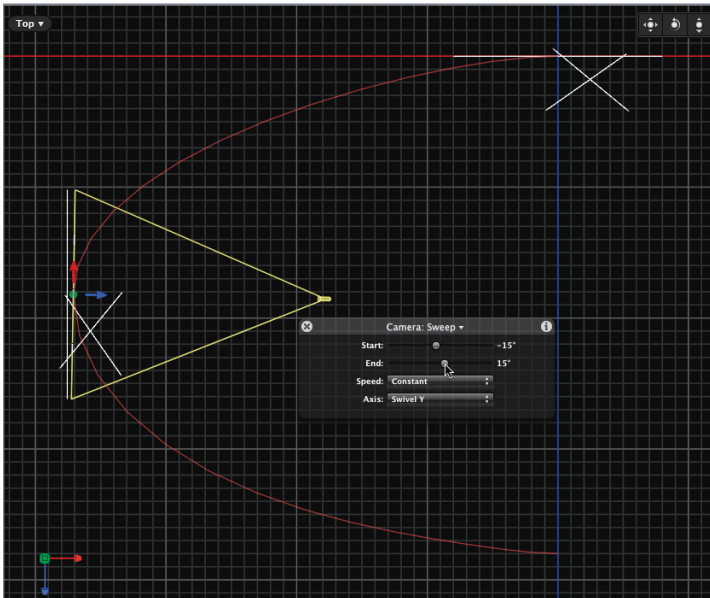

The camera now reaches 0 degrees when it is directly facing the *Kelly Slater* group, creating a more balanced look. If the Sweep were applied *before* the Framing behaviors, you would get a different result.

4   Reset the Start and End values to 0 and 30, respectively, and in the Layers tab, drag the Sweep behavior under the two Framing behaviors.

Because the Framing behaviors are now applied *after* the Sweep, they force the camera to frame each group face-on with no rotation, and the Sweep restarts the rotation from 0 degrees. As a result, each group gets the same look: starting face-on and then rotating in the same direction.

Let's say that you'd like the camera to sweep in the opposite direction on the middle *Kelly Slater* group. To do so, use separate Sweep behaviors.

5 Press F6 to open the Timing pane. We'll rename, duplicate, and trim the behaviors in the Timeline.

6 Rename the Sweep behavior to *Sweep Andy*. Then duplicate it and rename the copy to *Sweep Kelly*.

7 Duplicate *Sweep Kelly* and rename the copy to *Sweep Bede*.

8 Drag to trim each of the Sweep behaviors to fill the gaps between each Framing behavior.
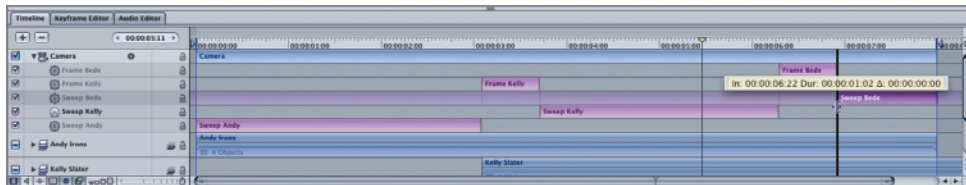
TIP ▶ Shift-drag to snap the In or Out point of the behavior to the In or Out point of the Framing behaviors.

9 Make sure the Start value for all the Sweep behaviors is set to 0, and then set the End value to 15 for Andy, -15 for Kelly, and 6 for Bede.

Because the Framing behavior is on top in the Layers tab, the camera is forced to face each group. So, if you use a nonzero Start value for the Sweep, the animation will jump. The negative value for Kelly causes the camera to sweep in the opposite direction. And the lower value for Bede is needed because the final sweep doesn't last as long.

NOTE ▶ If you move the Sweep behaviors above the Framing behaviors in the Layers tab, you can set a nonzero starting value for each sweep to create an initial rotation. However, that stacking order may change the animation if you move the groups, as you will do shortly.

10 Press Control-A to return to the Active Camera view, and play the project. The animation is looking more interesting. A few tweaks should finish it off.

11 Press F6 to close the Timing pane, and save your work.

Finessing Behaviors

In this exercise, we'll set an initial rotation of the first set so that it starts at an angle rather than squarely facing the camera. Then we will change the location and orientation of an entire group. Because the camera is animated with behaviors, it will still find and frame a target group no matter how you move it or rotate it.

1 Select the *Sweep Andy* behavior, and set the Start slider to -15 and the End slider to 0. The video now turns to face the camera in a subtle reveal move.

For the *Kelly Slater* group, you can't adjust the Start value because the Framing behavior forces the camera to view the group face-on. However, you can rotate elements *inside* the group.

2 Select the *Sweep Kelly* behavior, press Shift-I to move the playhead to the In point of the behavior, and open the group.

You want to rotate the video, but keep it aligned with the mask, so you also need to rotate the mask source.

3 Command-click the *Kelly Slater* video layer and the *grunge-bk.psd copy 1* layer to select them, and in the Properties tab of the Inspector, set the Rotation Y value field to about -15 degrees.

This action rotates the video and its mask while keeping the group framed in the camera. We'll do the same for the Bede video, but in the opposite direction.

4   Select the *Sweep Bede* behavior, press Shift-I to move the playhead to its In point, and open the *Bede Durbidge* group. Command-click the *Bede_g1* and *grunge-bk.psd copy* layers, and in the Inspector, rotate them 15 degrees.
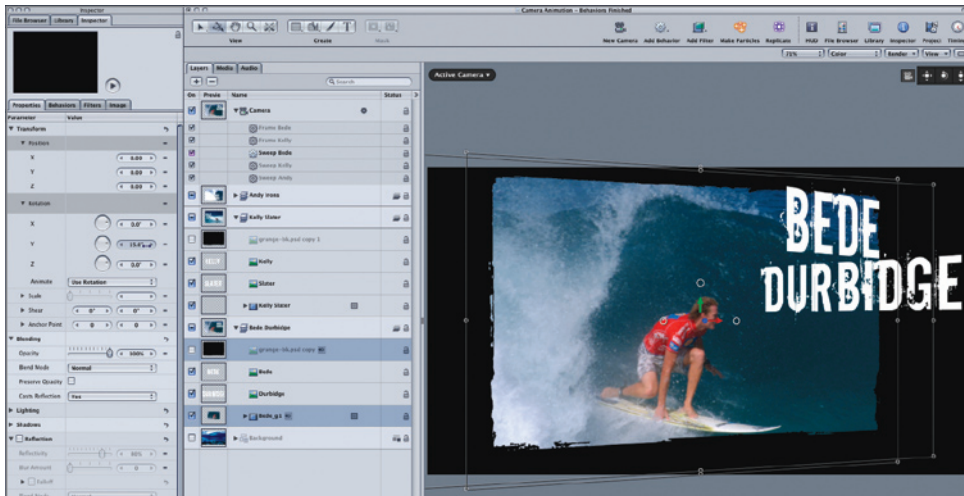

5   Save your work and play the project. Each group now starts a little off-axis, and the camera sweeps in the opposite direction on the middle group.

The overall camera movement is a little repetitive: It sweeps, moves to the left, stops and sweeps, moves to the left, stops and sweeps. The result is that the video and text graphics always appear to fly off to the right.

Because you framed each group using the Framing behavior, you can freely change the position and rotation of a group, and the camera will still frame it, which forces the camera to take a different route to the new destination. Moving a group can be a quick way to spice up the camera animation.

6   Stop playback, and move the playhead to about 7:00. Close all open groups, and use the Compass to display the Right view.

> **TIP** ▶ Press Shift-Z to fit any view to the Canvas.
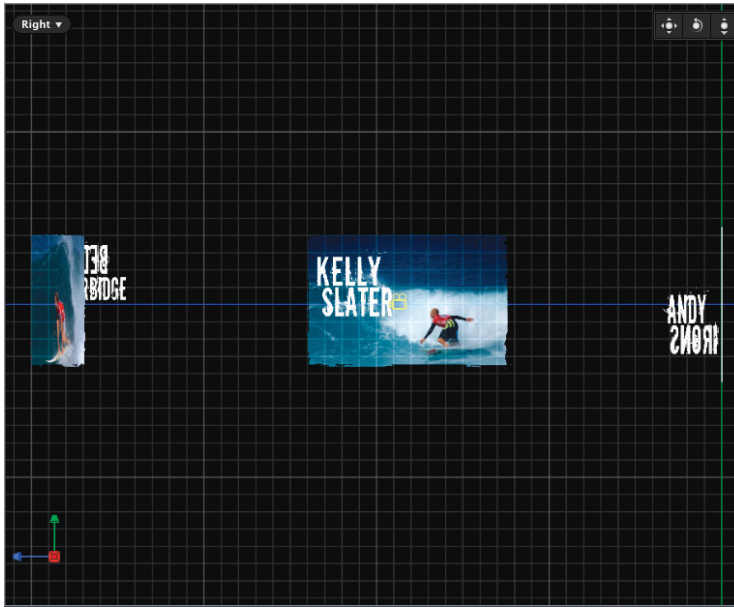
At 7:00, all the videos in the project are visible. In the Right view, you can see that each group is on a single horizontal plane and standing upright. Now let's transform the *Kelly Slater* group.

7 Select the *Kelly Slater* group. In the Canvas, use the z-rotation handle to rotate the group 90 degrees clockwise, and move it up about 800 pixels.
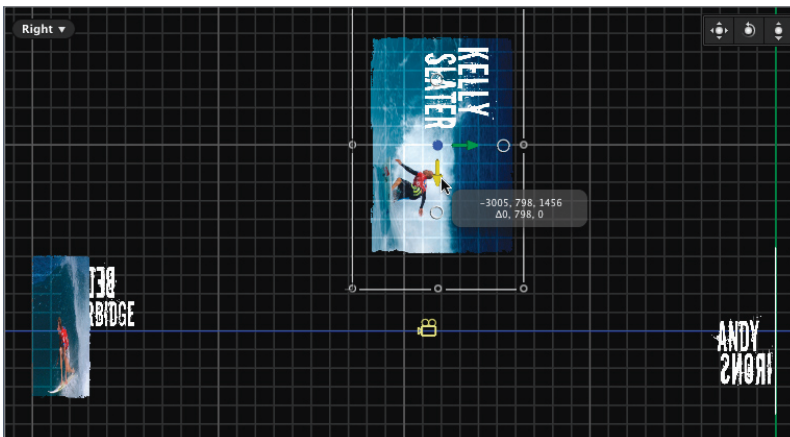
NOTE ▶ Make sure that the Adjust Around pop-up menu in the HUD is set to Local before rotating the group.

8   Select the camera so that you can see the focal plane outline; then play the project in the Right view. The red line indicates the new motion path of the camera, which rotates on both its y and z axes as it moves up to frame the *Kelly Slater* group. It then rotates again to frame the *Bede Durbidge* group.
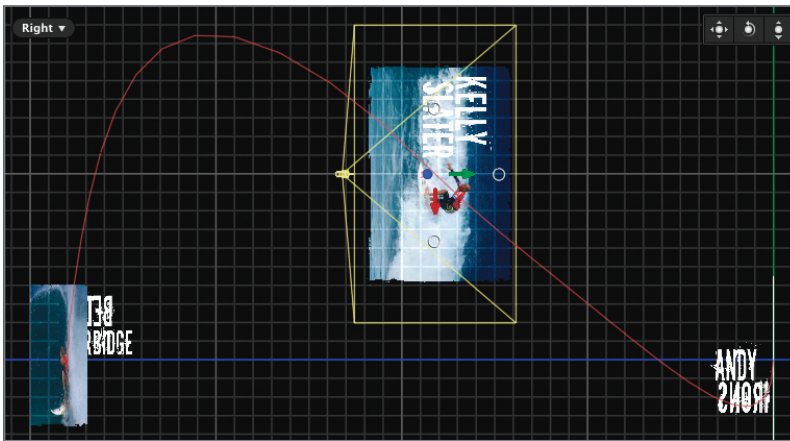
9   Press Control-A to return to the Active Camera view and see the result. The new camera animation creates a more dynamic transition between the groups, but the camera is now sweeping around the wrong axis for the *Kelly Slater* group. Also, the gridlines can be distracting because they won't appear in the final rendered animation.

10 To turn off the grid, from the View and Overlay pop-up menu, choose 3D Grid, or press Command-Shift-' (apostrophe).

11 Select the *Sweep Kelly* behavior, and in the HUD, set Axis to Tilt X.


The Axis pop-up menu refers to the camera's axis of rotation. Because the camera had to rotate 90 degrees to frame the group, you needed to change the axis of rotation for the Sweep behavior.

The final step is to turn on the background.

12 In the Layers tab, select the activation checkbox for the *Background* group, and play the project.

The *Background* group is a 2D group, so it is not affected by the camera and remains fixed in place as the camera moves, providing a consistent frame for the animation.
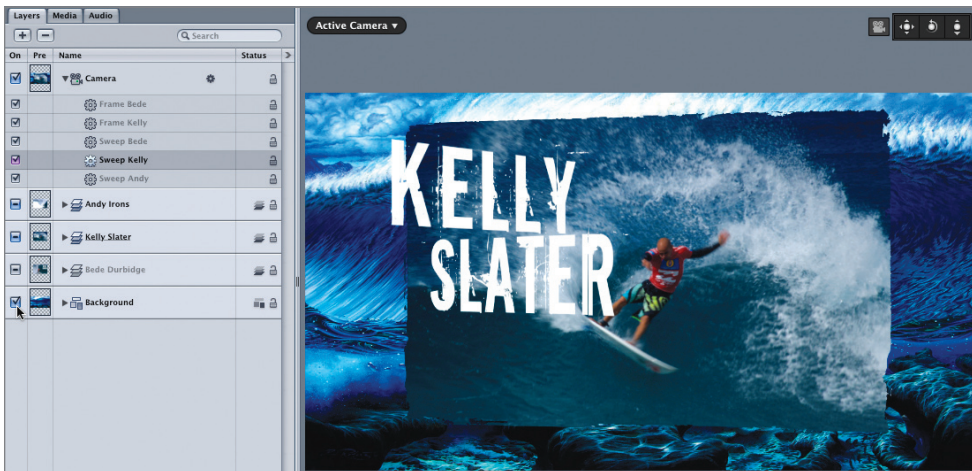
Well done. You've created and adjusted a camera animation in 3D space using behaviors.

Keyboard Shortcuts

A	Turn keyframe recording on and off
Command-Shift-' **(apostrophe)**	Toggle 3D grid visibility
Shift-V	Turn the full view area on and off

NOTE ▸ This tutorial is excerpted from *Apple Pro Training Series: Motion 4*, by Mark Spencer, 0-321-63529-9. For more information or to buy the book, go to www.peachpit.com/apts.