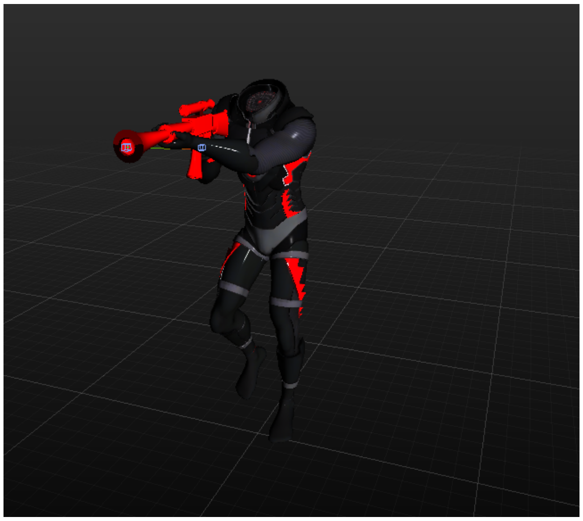
- Creating Triggers for Footsteps and Foley
  - FMOD Studio
  - Wwise
  - SDL Mixer
- Adding Triggers to Animations via the Character Tool
  - Creating an Animevents file
  - Creating Animation Events
- Conclusion

After adding sounds of gunfire and ambience to our Chinese garden level in the previous chapter, we now move towards adding sounds of footsteps and foley to the first-person player character.

Take a moment to go through the audio files located in the *chapter_02* folder of your chosen middleware implementation, located within the Audio Showcase assets' installation directory. The files *c_player_fts_wood_01 - 03* (or *Play_c_player_fts_wood_L/R,* if using SDLMixer) are sounds for footsteps, while *c_player_foley_leather_long_01 - 03* (or *Play_c_leather_long,* if using SDL Mixer) can be used as foley for the player character's leather outfit.



Player Character

In this chapter, these audio files will be added as sounds and foley to the player character's footsteps via your choice of middleware implementation and the Character Tool.

Creating Triggers for Footsteps and Foley

FMOD Studio

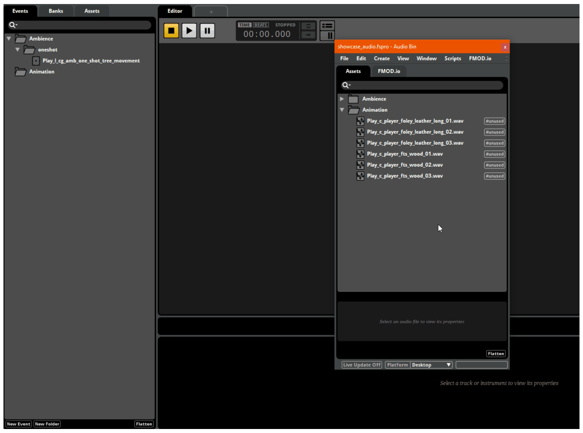
Creating Events

Three events need to be created and added to our first-person character:

- One 2D multi-instrument for foley sounds,
- One 3D multi-instrument for the left footstep,
- One 3D multi-instrument for the right footstep.

To do this, as in Chapter 01, the audio files need to first be added to FMOD's Audio Bin.

- Create a new folder called *Animation in* the Audio Bin.
- Drag and drop the six audio files included in the *_Audio_Assets/FMod Studio/chapter_02/* folder of the Audio Showcase assets' installation directory, into the *Animation* folder of the Audio Bin.
- Drag the *c_player_foley_leather_long_01.wav, c_player_foley_leather_long_02.wav* and *c_player_foley_leather_long_03.wav* files from the Audio Bin, into the **Events** tab of your FMOD project to create a 2D instrument with one multi-instrument. This Event corresponds to our foley, so let's name it *c_player_foley_leather.*
- Then, drag the *c_player_fts_wood_01, c_player_fts_wood_02* and *c_player_fts_wood_03* audio files from the Audio Bin into the **Events** tab of your FMOD project to create a 3D instrument with one multi-instrument for the left footstep. We'll call it *c_player_fts_L.*
- Similarly, create another 3D instrument with one multi-instrument using the same files for the right footstep. Call it *c_player_fts_R* as in the GIF below.


Events
Banks
Assets
Ambience
oneshot
Play_l_cg_amb_one_shot_tree_movement
Animation
New Event
New Folder
Flatten
Editor
TIME
BEATS
STOPPED
00:00.000
showcase_audio.fspro - Audio Bin
File
Edit
Create
View
Window
Scripts
FMOD.io
Assets
FMOD.io
Ambience
Animation
Play_c_player_foley_leather_long_01.wav
Play_c_player_foley_leather_long_02.wav
Play_c_player_foley_leather_long_03.wav
Play_c_player_fts_wood_01.wav
Play_c_player_fts_wood_02.wav
Play_c_player_fts_wood_03.wav
#unused
Select an audio file to view its properties
Flatten
Live Update Off
Platform
Desktop
Select a track or instrument to view its properties

Import Animation

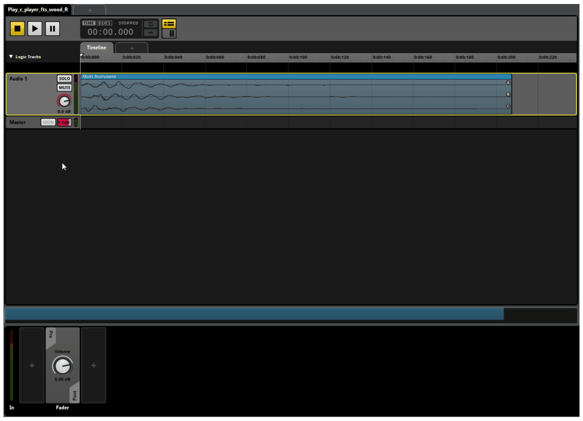
Positioning Sounds

While the foley sound in this tutorial plays in the center of the stereo panorama, it's more appropriate to hear the *c_player_fts_L* event on the left and the *c_player_fts_R* event on the right, since they correspond to the left and right footsteps respectively.

To position the sounds of these two Events:

- Click on either the *Play_c_player_fts_L* and *Play_c_player_fts_R* Event in FMOD, and then look for the **Spatializer** plugin at the bottom of the FMOD project window.
- Inside the Spatializer, click the ▶ button and turn the **Mix** knob in the **Pan Override** section all the way to 100%.

  When the **Mix** knob is set to 100%, FMOD only takes the sound positioning defined in the **Pan Override** section into account; the position set by the Game Engine is ignored.
- Next, position the small white dot inside the black circle in the **Pan Override** section to define the playback position of the footstep sound. Position the *c_player_fts_L* Event to play on the left, and the *c_player_fts_R* Event to play on the right.



Spatialzier

You can preview Events in FMOD Studio while playing with the positioning of their sounds by pressing **spacebar**.
The positioning of an Event's sound as defined in the **Pan Override** section, overrides any influence the game Engine might have on it.

Building Soundbanks

The last thing that needs to be done is to create a new Soundbank that will contain the metadata relevant to the *Play_c_player_foley_leather, Play_c_player_fts_L* and *Play_c_player_fts_R* Events.

- Create a new Soundbank called *Animation* in the **Banks** tab of your FMOD project.
- Drag the *Play_c_player_foley_leather, Play_c_player_fts_L* and *Play_c_player_fts_R* Events from the **Events** tab into the *Animation* folder of the **Banks** tab.

Once done, save your FMOD project and build all Soundbanks by pressing **F7.** If you now switch to the ACE, you'll find the new Events and the *Animation* Soundbank listed in the Middleware Data panel. Recall that in order to use Events and their Soundbanks within your CRYENGINE project, Events need to be connected to Triggers and Soundbanks to Preload Requests.

- Create a new Library in the Audio System Controls panel, and name it *Animation.*
- Drag and drop the *c_player_foley_leather, c_player_fts_L* and *c_player_fts_R* Events from the Middleware Data panel to the *Animation* folder on the Audio System Controls panel.
- Copy the *Animation* Soundbank from the Middleware Data panel to the *Preloads* Library of the Audio System Controls panel.

As always, remember to save and refresh the ACE before proceeding.

Wwise

Creating and Positioning Events

Three Events, for foley, left and right footsteps respectively, need to be created for our first person character.

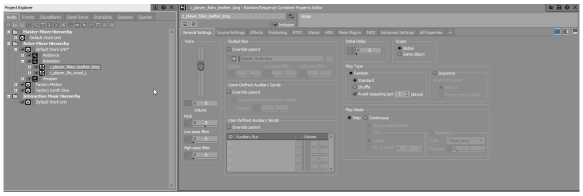
- Begin by adding a new *Actor-Mixer, named Animation,* to your Wwise *Actor_Mixer_Hierarchy,* and a folder of the same name in the **Event** tab.
- Create two new Random Containers within this Actor Mixer. Name the first one *c_player_foley_leather_long*, which will contain our foley sounds, and the other *c_player_fts_wood_L* for the player's left footsteps.
- Import files *c_player_foley_leather_long_01 - 03.wav* from the *_Audio_Assets/Wwise/chapter_02/* folder of your Audio Showcase Level assets directory, into the *c_player_foley_leather_long_* Random Container*.* Similarly import files *c_player_fts_wood_01-03.wav* into the *c_player_fts_wood_L* Random Container.

Since we need only a generic 2D Container for foley, the *c_player_foley_leather_long* Random Container can use the same simple setup as the *l_cg_amb_one_shot_tree_movement* Container created in the previous chapter.

We'd like to hear the footsteps on both the right and left positions of the stereo however, which is why we'd like to set the *c_player_fts_wood_L* Container to 3D playback. Normally the sounds in a 3D Container would be positioned by the game engine; but since we'd like them to play at a specific position on the left/right foot, we'll position the sounds ourselves.

We do this by first selecting the *c_player_fts_wood* Random Container, and then the **Positioning** tab in the Property Editor on the right.

- Activate the **Override parent** checkbox.
- From the 3D Spatialization drop down, select the **Position + Orientation** menu item.
- Under the **3D Position**, pick the **Listener With Automation** menu option. Click the **Automation ...** button to open the 3D Automation Window.
- Click the **New** button within the 3D Automation Window to create a new positioning path for the *c_player_fts_wood* Container.
- This activates the grid display with a small dot at its center, that represents the position of the sound emitter. For the left footstep, position the dot a little to the left in the first quadrant as shown in the GIF below (x= -20, y=100).



Left footstep

Press the **spacebar** at any time to preview the outcome of your positioning. When satisfied, go ahead and rename the Random Container to *c_player_fts_wood_L* since it now corresponds to the sound of the left footstep. To create a similar Random Container for the right footstep, create a copy of the *c_player_fts_wood_L* Container in the *Animation* Actor-Mixer, then simply rename the copy to *c_player_fts_wood_R* and set its playback position to the right.

To make Events of the three Random Containers we've created in this section:

- Select the *c_player_foley_leather_long*, *c_player_fts_wood_L* and *c_player_fts_wood_R* Random Container, right-click one of them, and select the **New Event (One Event per Object) Play** option from the menu.
- If you switch to the **Events** tab in the Project Explorer, you should see three new Events created for each of the three Containers. Move them into a folder called *Animation*.

Finally, create a new Soundbank called *Animation* and add the *Animation* Events folder to it as we did in Chapter 01.

Once done, save your Wwise project and generate Soundbanks by pressing the **Generate All** button. If you now switch to the ACE, you'll find the new Events and the *Animation* Soundbank listed in the Middleware Data panel. Recall that in order to use Events and their Soundbanks within your CRYENGINE project, Events need to be connected to Triggers and Soundbanks to Preload Requests.

- Create a new Library in the Audio System Controls panel, and name it *Animation.*
- Drag and drop the *c_player_foley_leather, c_player_fts_L* and *c_player_fts_R* Events from the Middleware Data panel to the *Animation* folder on the Audio System Controls panel.
- Copy the *Animation* Soundbank from the Middleware Data panel to the *Preloads* Library of the Audio System Controls panel.

As always, remember to save and refresh the ACE before proceeding.

SDL Mixer

- Begin by creating a new folder called *animation* in the */Assets/Audio/SDL_Mixer/assets* directory of your project, and copying the *Play_c_player_foley_leather_long.ogg*, *Play_c_player_fts_wood_L.ogg* and *Play_c_player_fts_wood_R.ogg* files into it.
- Create a new Library called *Animation* in the ACE's Audio System Controls panel; within it, create audio Triggers for each of the imported foley and footstep sounds.
- Deactivate the **Enable Panning** and **Enable Attenuation** properties for each Trigger, via the Properties panel.

Save and reload the audio engine before proceeding.

If using the SDL Mixer implementation, it is not possible to position the footstep audio assets via the middleware. Rather these assets, being stereo files, will have to be positioned before being imported into the Engine.

Adding Triggers to Animations via the Character Tool

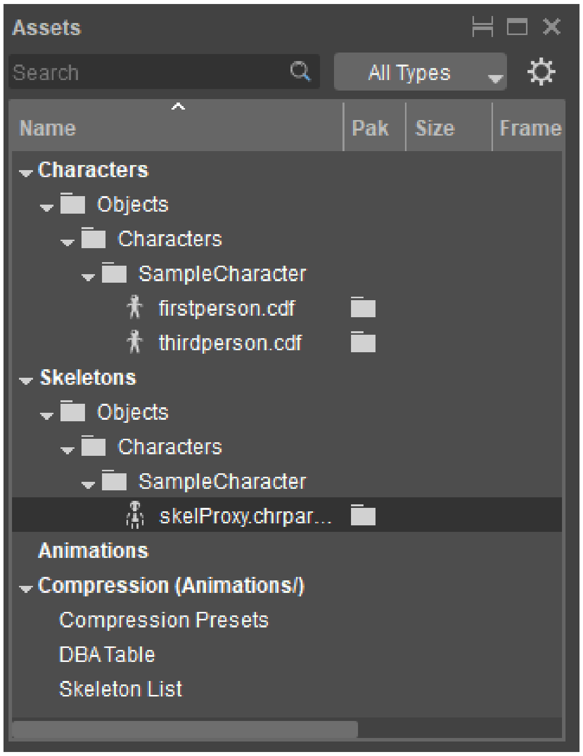
The Triggers that were created for footsteps and foley have to now be associated with our character's movements.

For this, we use the Character Tool, which allows users to define and set up characters by importing assets authored in third party tools. A fully authored character usually consists of a 3D model, a skeleton, physical properties and an associated animation set.

Go ahead and open the Character Tool by clicking on the **Tools Animation Character Tool** option from the Sandbox's Main Menu.

For more information on the Character Tool, please refer to its user documentation.

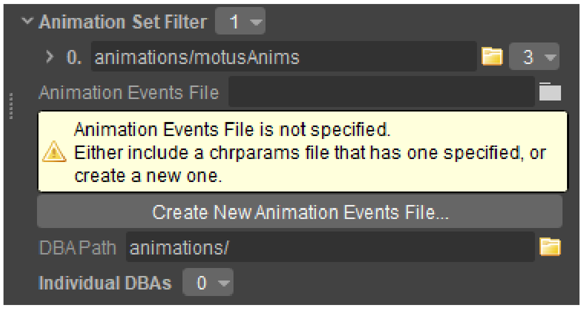
On the left of the tool window is the **Assets** panel which provides an overview of all character-related assets. Navigate to the skeleton of the player character located under *Skeletons/Objects/Characters/SampleCharacter/skelProxy.chrparams.*



Skeletons

Creating an Animevents file

The first step is to create and associate an **.animevents** file to the skeleton of the character, which will contain information regarding the different triggers an animation must execute while running. These triggers can be audio Triggers, Switches, or even particle effects.



Animation Set Filter 1

0. animations/motusAnims 3

Animation Events File

Animation Events File is not specified.
Either include a chrparams file that has one specified, or create a new one.

DBA Path animations/

Individual DBAs 0

Create new Animation Events file

- Click on the **Create a new Animevents File...** button under the Character Tool's Properties panel on the right, and create a new **.animevents** file under *../Objects/Characters /SampleCharacter/.*
  Let's name it *player*.

  Save the *Skeletons/Objects/Characters/SampleCharacter/skelProxy.chrparams* file by right-clicking it in the Assets panel, and selecting the **Save** option from the menu.
- Once created, open the player character's Character Definition File (**.cdf**) from the **Assets** panel under *Characters/Objects/Characters/SampleCharacter/firstperson.cdf.*
  Double-click the CDF to choose it as the active character; this loads the character model in the middle of the tool window, and its properties on the right.

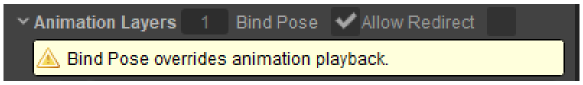
  If you're seeing proxies/physics helpers over the character model, deactivate them by clicking the little mannequin and cross at the top of the screen.
- You can now open the animations for the first-person character, which are stored under the Animations panel situated on the left of the Character Tool.

  The left panel of the Character Tool can be split, so that the bottom half is filtered to only show animations for the active Character Definition File.

  To do so, click the icon above the left panel to split it, then click the **All Types** dropdown to select which type files you'd like to see.

  Since we're looking to add triggers to the player's footsteps, it's the walk-cycle animation of the character we're interested in, stored as *2DONE-BSpace_MoveStrafeRIFLE* in the *bspace* folder. Click it to play the animation.

  If the walk-cycle animation fails to play on click, deactivate the **Bind Pose** toggle in the **Scene Parameters** column on the upper-right of the character tool.

  Animation Layers 1 Bind Pose ✓ Allow Redirect

  Bind Pose overrides animation playback.

  Bind Pose

As the animation plays, the timeline at the bottom of the Character Tool displays its progress in seconds, frames or normalized units where the length of the animation is scaled to 1.0.

Creating Animation Events

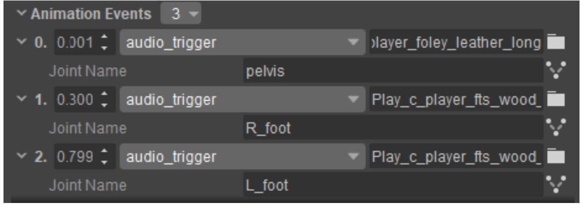
You now need to create Animation Events for the character's left footstep, right footstep and foley each, associating the *Play_c_player_fts_wood_L, Play_c_fts_wood_R* and the *Play_c_player_foley_leather* aud io triggers to them respectively.

Since Animation Events use normalized units for timestamps, it is recommended to set the animation timeline's units to 'normalized'.

- With the animation playing, double-click the animation timeline as soon as the character's right foot hits the floor, which is normally around the 0.35 mark (in normalized units). The created

Animation Event will now be listed under the **Animation Events** panel at the bottom-right corner of the Character Tool window. Then, assign the *Play_c_player_fts_wood_R* trigger to this Animation Event by clicking the icon next to it.

- Similarly, create Animation Events for the left footstep trigger *Play_c_player_fts_wood_L,* and foley trigger *Play_c_player_foley_leather_long,* respectively. Feel free to use the timestamps shown in the image below.



Animation Events 3

0. 0.001 audio_trigger layer_foley_leather_long
Joint Name pelvis

1. 0.300 audio_trigger Play_c_player_fts_wood_
Joint Name R_foot

2. 0.799 audio_trigger Play_c_player_fts_wood_
Joint Name L_foot

Animation Events

For animations that play in third person, it makes more sense to attach triggers to specific bones of a character. To associate a trigger to a joint at a specific Animation Event, click the icon next to an Animation Event's listing.

This brings up a list of all joints used by the character. Select the most appropriate one by double clicking it.

Character Tool Best Practices

- Ensure that the footsteps have a steady rhythm by timing their Event Animations appropriately.
- When designing audio triggers, attempt to consolidate as much audio information into a single trigger so as to reduce the number of animation events. At the same time, your animation should have more than one trigger to be able to react to different scenarios.
- If you're unable to be accurate with the placement of your Animation Events/Trigger, it's always better for the trigger to be audible a few moments before the animation takes place, rather than the other way around.

Conclusion

Known issue in CRYENGINE Release 5.5.2: Animation Event audio triggers might not play correctly sometimes.

You're now ready to test the character's footsteps. Make sure to save all changes made in the character tool by selecting the **File Save All** option from the menu, before jumping into game mode (**Ctrl** + **G**) in the Viewport. If timed correctly, the left/right footstep audio triggers should play with every step of the player character, interjected by the sound of foley.

You might feel that the footsteps are quite repetitive, especially since only three assets have been used for both feet. Variations can be added by adding pitch randomization to the sounds on FMOD or Wwise.

FMOD

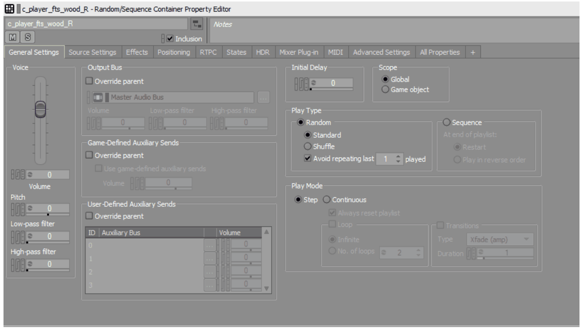
- Select one of the created footstep Events in your FMOD project, and then click on the blue **Multi-instrument** area in the center panel.

- On doing so, you should see a playlist of audio assets that make up the Event in the bottom panel, and a handle for pitch . Pitch in FMOD is used to increase/decrease the playback speed of audio assets; play with different values to see how they influence the footsteps.

- The effect of pitch can be made more pronounced by randomizing it. To randomize the pitch, right-click the **Pitch** handle and select the **Add Modulation Random** option from the menu.
- This should create another **Pitch** knob to the right of the playlist; this can be used to set the range of randomization (such that a value of 3.00 st, for example, represents +3 semitones and -3 semitones, for a total variation of 6 semitones).
- Don't forget to randomize both footsteps.

Wwise

- Select either the *c_player_fts_wood_L* or *c_player_fts_wood_R* footstep Containers and switch to the Designer Layout (**F5**).
- In the **General Settings** tab of the Actor-Mixer property editor is a dial for **Pitch,** that lets users change the overall pitch of the selected Container. Although this is a static value, we'd like a different pitch every time the Container is triggered.
- Double-click the symbol on the **Pitch** dial; on the Randomizer window that opens, tick the **Enabled** checkbox and set the **Min Offset** and **Max Offset** as desired. A randomization range of 300 Cent (-150 and +150, where 100 cent =1 semitone) is enough to have a bit more variety.
- Don't forget to randomize both footsteps.



c_player_fts_wood_R - Random/Sequence Container Property Editor

c_player_fts_wood_R

☑ Inclusion

Voice: Volume 0; Pitch 0; Low-pass filter 0; High-pass filter 0

Output Bus: □ Override parent; Master Audio Bus; Volume 0; Low-pass filter 0; High-pass filter 0

Game-Defined Auxiliary Sends: □ Override parent; □ Use game-defined auxiliary sends; Volume 0

User-Defined Auxiliary Sends: □ Override parent

ID	Auxiliary Bus		Volume
0		...	0
1		...	0
2		...	0
3		...	0

Initial Delay: 0

Scope: ● Global ○ Game object

Play Type: ● Random (● Standard ○ Shuffle ☑ Avoid repeating last 1 played) ○ Sequence (At end of playlist: ● Restart ○ Play in reverse order)

Play Mode: ● Step ○ Continuous; ☑ Always reset playlist; □ Loop (● Infinite ○ No. of loops 2); □ Transitions (Type Xfade (amp); Duration 1)

Randomizer

This concludes Chapter 02 of our level's audio design.

You may have noticed a campfire in the center of your Chinese garden level. The next chapter will have us adding audio effects to this campfire, before we finally move towards developing a dynamic ambience for the entire scene in Chapter 04.