**Unreal: Physical animation component (PAC):**

Hit-based physics reactions are a common use case for simulation on characters, such as when a character is struck by a projectile. At a high-level, this requires that you:

* Get the name of the bone that was hit. This can be done via a trace for instant-effect weapons, or within a projectile class where applicable.
* Transfer that bone name into the Character's Animation Blueprint for the Event Graph to use, generally through a Set All Bodies Below Simulate Physics node. This activates the simulation system.
* Control the Physics Blend Weight property via a Set All Below Physics Blend Weight node. Generally, you want to quickly animate this going up to 1.0 and then back down to 0.0 so that the physics reaction blends in and then back out. This would generally be done within the Animation Blueprint's Event Graph.
* Once the reaction is complete and the Physics Blend Weight returns to 0, you should use the Set All Bodies Below Simulate Physics node once more to deactivate the simulation.

**Useful Tutorials:**

<https://www.youtube.com/watch?v=N1tDjbFXeOo> - Physical animations overview

<https://www.youtube.com/watch?v=2AapLKCntvc> - Physical animation component with combat system

<https://www.youtube.com/watch?v=6ipQxbZ_tUI> - Setting up meshes for use with PAC

**Gesture Tracker VR Plugin for Unreal Engine**

In order for us to use Leap Motion as a primary means for the player's (mech's) Movement, Rotation and combat we should look at the following plugins and third party software used for recognizing Leap Motion gestures and translating them for use into a gaming engine.

<https://www.youtube.com/watch?v=bsQK3ab3YhQ> - GameWave, used for calibrating and converting leap motion gestures to keys/gamepad controls

<https://www.youtube.com/watch?v=szZP_sTB7ew> - GameWave example, this is the type of movement that we will be aiming to achieve using GameWave and Leap Motion.

(Left hand to control: Move forward, back, left and right. Right hand to control: Rotate player camera on x and y axis. Clutching both fists will activate "combat mode".)

<https://www.youtube.com/watch?v=0D1Iy3Nprik> - Gesture Tracker Plugin for Unreal. (This plugin allows the developer to record gestures within the engine and assign to a specific game action.)