**Gimbal Lock and You!**

**Euler Rotations**

* Local transform handles: It's a lie!
* Gimbal mode shows each individual rotation and what they look like
* A 'gimbal' is just an axis of rotation

**Gimbal Lock**

* Rotating such that you lose an axis of rotation
* Why does this happen?

**Rotation Order**

* Determines how these three Euler coordinates stack
* Default is 'xyz'
* Kind of like a parent hierarchy (in reverse)
* z (topmost parent) -> y -> x
* So in this analogy, rotating the middle child (y) lines x up with z, thus gimbal lock

**Animation**

* A single pose can be created by many different Euler rotation combos
* Things go wrong when we interpolate between two very different configurations
* How to fix?

**Fix 1: Manual**

* Pose incrementally until it looks right.  Pretty crazy for long animations.

**Fix 2: Reverse Engineer**

* Recreate pose relative to a good gimbal rotation.

**Fix 3: Euler Filter**

* Fixes many of this problems.  Good for long animations.
* Not a panacea, still may have to use Fix 1 and Fix 2 for things that don't work

**Fix 4: Be prepared**

* Start from a rotation order that makes sense. Not always possible for wildly active animations.