Keyframing vs. Motion Capture
Keyframing: setup

Character Designer

- Define joint locations and bone heirarchy using a point and click interface
- Define joint limits
- Set up Inverse Kinematics handles (and other controls for the rig)
- Bind skeleton to its “skin”
Keyframing: process

Character Animator

- Use rig controls to set and adjust keyframes to create the character’s performance
**Keyframing: process**

Changing keyframed data can be straightforward, especially early on

- Edit IK controls and joint angles in existing keyframes
- Add new keyframes to enhance / add detail to the motion
Working with Motion Capture is Quite Different...

http://mocap.cs.cmu.edu/
https://www.mixamo.com/
CMU Mocap Database

To define a motion, we need:

- A definition of the skeleton
- A description of the motion

Let’s look at these...
Editing Motion Capture Data

How can you edit motions in this format?

- Retiming
- Displacement curves
- Motion “filtering”
- Keyframe extraction / edit keyframes

*Train a network to generate varied motions based on context
Displacement Curves

Main ideas:
• User edits $\rightarrow$ displacements to the original motion
• Displacements can be made at different resolutions in a hierarchical scheme

Motion Filtering

Main idea:
• A simple filter applied to a motion sequence can create squash and stretch effects and cartoon like exaggeration

The Cartoon Animation Filter
Jue Wang, Steve Drucker, Maneesh Agrawala, Michael Cohen
Keyframe Extraction

Main idea:
• Keyframes are local extrema of an embedding of the motion into a low-dimensional space

Jackie Assa, Yaron Caspi, and Daniel Cohen-Or
Action Synopsis: Pose Selection and Illustration
SIGGRAPH 2005
Main idea:
• Plausible motion can be determined by the character’s overall goal (walk, sit…) and local geometric context

Sebastian Starke, He Zhang, Taku Komura, and Jun Saito
Neural State Machine for Character-Scene Interactions
SIGGRAPH 2019

https://www.youtube.com/watch?v=7c6oQPLu2eQ