

# Rokoko Motion Capture Education Curriculum

250+

Universities

1,000+

Studios

30,000+

Users

Rokoko's mission is to **give every creator**, big or small, the power of animation.

Our hardware and software unlock studio-quality motion capture for the entire body, fingers, and face, which can be integrated into your final animation software or game-engine for real-time streaming.



# Table of Contents

*The primary purpose of this document is to provide educators with a sample curriculum that they can reference for their own classes, labs, and workshops. This document also provides general information regarding teaching with motion capture, professional areas connected to motion capture, and a handful of online resources for supplemental learning and tutorials.*

Pages 3-7	<b>10 Weeks motion capture curriculum</b>
Pages 8-13	<b>Discussing motion capture more broadly including teaching with Rokoko and professional applications.</b>
Pages 14-18	<b>Additional resources, online tutorials, and creators to follow.</b>

# Week-by-week Course Breakdown *(10-week plan)*

*Motion capture can be a tool for everybody regardless of age, grade level, or prior 3D experience. Schools report more engagement and excitement when introducing motion capture. We recommend exposing students to the possibilities of motion capture as soon as possible because there is both an incredibly strong positive reaction to seeing your motion in real time and it can help make high quality end results feel that much more approachable.*

## Week 1

### **Introduction to Motion Capture in Industry and Hands-On Demo**

- Lecture: Evolution and application of mocap across fields, introduction to projects
  - Film, games, VFX, etc
- Live demo: Rokoko suit setup, calibration,
- Exercise: Record basic body performance in class

Assignment 1: Watch retargeting video tutorial to show core motion capture character animation workflow.

## Week 2

### **Retargeting**

- Lecture: What is retargeting? Skeletons, proportions, and compatibility
- Studio: Importing Rokoko FBX into Maya/Blender/Unreal
- Exercise: Retarget to a rig

Assignment 2: Perform Basic Retargeting

- Share exported motion capture data from class and a rigged 3D character or instruct downloading characters from [Mixamo](#).
- Include a retargeting tutorial.

# Week-by-week Course Breakdown

## Week 3

### Cleanup and Control Rigs

- Lecture: IK/FK, jitter removal (smoothing filters), arc refinement
- Studio: Basic motion cleanup and editing
- Exercise: Use raw motion capture from shared library and polish

Assignment 3: Retargeting to a Control Rig and Cleaning Broken Motion.

- Instructors can encourage students to continue with practicing retargeting, including using different character types (of size and style).
- Instructors could introduce common character models like Metahuman or encourage further building out of 3D scenes.

## Week 4

### Facial and Hand Capture, Troubleshooting

- Lecture: Overview of Face Capture App + Smartgloves workflow
- Studio: Setup face capture via iPhone and gloves
- Exercise: Record facial and hand performance
- Troubleshooting: Sensor loss, jitter, foot sliding

Assignment 4: Retargeting to a Control Rig and Cleaning Broken Motion.

- Instructors should provide students with mocap files (*any quality, including poor*) and students will be responsible to clean the motion.

***These are the most important weeks and should not be rushed. We suggest at least 2 weeks, including a lot of hands-on practice. This is where you can connect to animation principles.***

# Week-by-week Course Breakdown

*Getting students to a comfortable place with motion capture retargeting and control rigs will have them relatively self-sufficient, meaning they can at a minimum handle generalized character animation, participate in online animation contests, and start adding more compelling renders to their portfolios.*

*Once students are familiar with these processes or at least have all of the reference resources and tutorials to follow along, it is a great idea to move into projects. Bringing together character animation concepts, motion capture technology, teamwork, and deadlines to produce portfolio type work.*

## Week 5

### **Project Proposal and Previz**

- Group project pitches: Each team presents a 1–2 min story concept
- Lecture: Previz and blocking in mocap-based storytelling
- Exercise: Record and edit a previs scene with placeholder rigs

Deliverable: Project Proposal

## Week 6

### **Advanced Retargeting and Blending**

- Lecture: Blend trees, motion layers, retargeting onto non-standard rigs
- Studio: Importing animations into Unreal Engine and creating blended behaviors

Assignment 5: Submit project with blend logic demonstration

# Week-by-week Course Breakdown

*At this point in the curriculum, particularly if the instructor wants to steer the class to a more professional environment, there is an opportunity to introduce best practices and what it would be like to work on larger teams. That said, these are good to teach regardless and are principles that will help students stay more organized and work more professionally.*

## Week 7

### **Pipeline Integration and File Management**

- Lecture: Working with version control, data naming, asset linking. When working with multiple
- Studio: Collaborative mocap scene building (use multiple performances)
- Exercise: project groups finalise recorded assets and scene assembly

## Week 8

### **Post-Production and Animation Polish**

- Lecture: Acting beats, motion exaggeration, rhythm in animation
- Studio: Final polish of animation.
- Individual check-ins: Review work-in-progress scenes

# Week-by-week Course Breakdown

*Keeping with the idea of producing portfolio-ready results, there are some really important areas that can often be overlooked. This is an opportunity to bring more of the directors energy and mindset into the classroom, introducing sound, or just really focusing on rendering to achieve that desired look.*

## Week 9

### Final Edits and Sound

- Workshop: Add audio/dialogue/music to performance
- Studio: Final composite with camera cuts, lighting, and render
- Assignment 6: Final deliverable with audio

## Week 10

### Showcase and Critique

- Final Project Presentations
- Peer critique session
- Self-reflection submission
- What was learned, what could be improved

# Teaching with Motion Capture

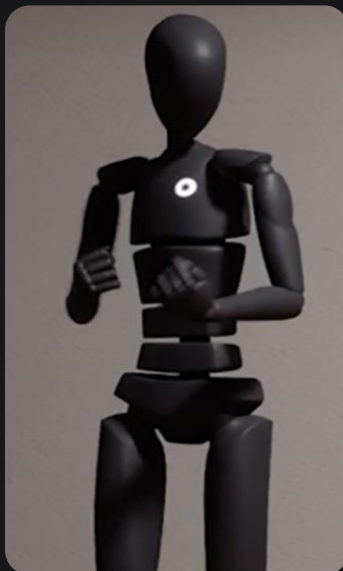
Implementing motion capture into the curriculum is easy and does not mean having to learn or having to teach a complex new tool.

With Rokoko and motion capture more broadly, there are a variety of use cases that can be explored. Core animation for 3D content, film, and games is the most common use case, however, with real-time technologies there are other use cases including live performances which is a great way to bring in other departments like performing arts and music. Lastly, virtual reality, research, medical, sports, robotics, and more technical departments can build on top of available motion data.

For a light introduction and to inspire potentially different applications, we will talk about a few of these subjects to help you get started.

## Just Get Started

First, the most important message is to just get started. Motion capture can very well be its own course but can also be a complement. There is nothing quite like experiencing new technology that you can physically touch and being able to see those results in real-time. It is a shock factor and will inspire creativity. We often hear that motion capture is reserved for more senior students but feedback from leading Universities suggests implementing it at all levels is the best way to get students excited about creating.





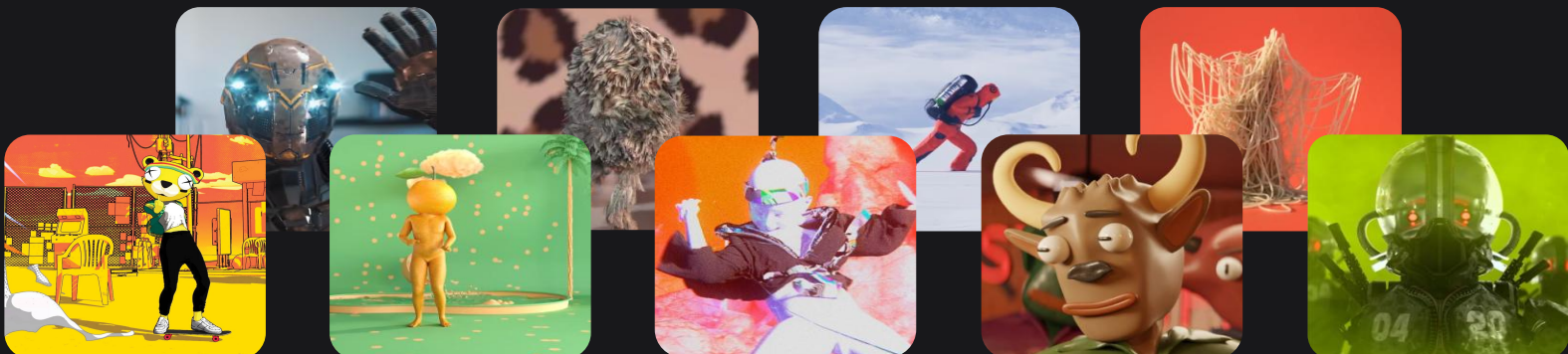
# Core Animation

In most of academia and throughout the world, motion capture is used for entertainment in films, series, games, short-films, and commercials. Motion capture speeds up character animation and often improves animation quality. Because the tools are standardized whether you are using Maya, Unreal Engine, Blender, Cinema 4D, Unity, iClone, or Houdini will not matter much as the core concepts will always apply.

A workflow will look something like this: record your motion capture, use the internal clean-up tools within the motion capture software, and export the most compatible skeleton type for the character and software that you want to use. The next steps are arguably the most important and will slightly differ across tools and character models. Importing the motion capture into your 3D software of choice, typically an FBX file, retargeting (*copying the motion capture data*) to your character, and as needed performing some keyframe/hand-animated adjustments to your character.

With motion capture, instructors can choose any part of the process to focus on. Because motion capture cleanup is tied to core hand-animation techniques, it is completely reasonable to connect motion capture directly to a standard intro animation course.

Other potential courses or portions of a curriculum that may focus on visual effects, environment design, or compositing can also benefit from having animated characters within a scene to give them more depth. Because motion capture can augment much of the character animation process, an inexperienced student could add character animation to their scene without any difficulty, enabling them to focus on the core curriculum, attain a more complete result for their portfolio, and ultimately tell more engaging stories.



# Films, Storytelling

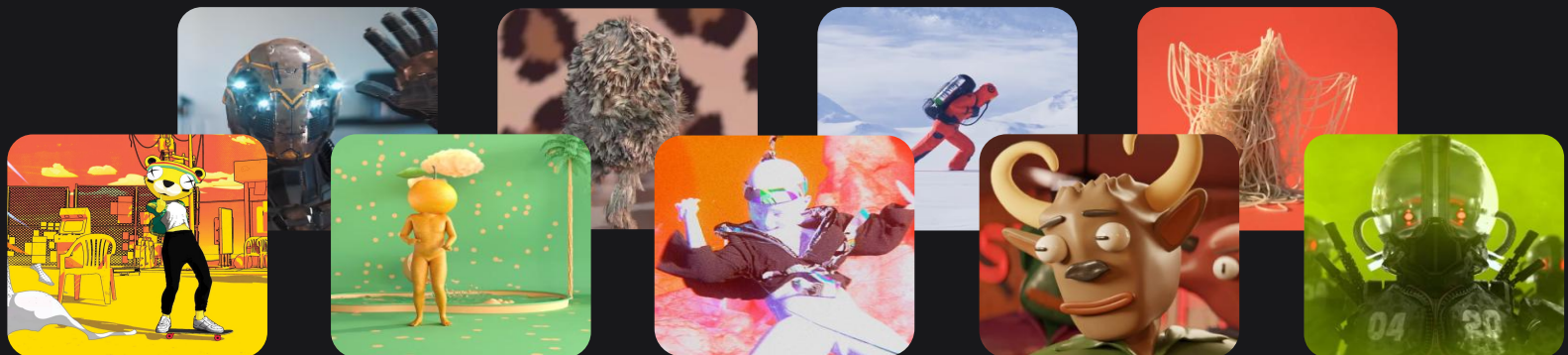
Motion capture is no longer reserved for million dollar budgets. For about as much as an entry-level digital camera, you can buy Rokoko's Smartsuit Pro II. What this has translated to is that even independent, solo creators are able to produce high-quality short films, some of which have been published by large publishers and many of which have accumulated millions of views online, won online animation contests, and secured creators freelance and client-work opportunities.

For those that dream of working at the large studios, nearly all of which utilize some motion capture. Hands-on experience with motion capture is a great way to understand animation pipelines and how it will be working in larger teams where work is much more specialized.

Studios of any size who specialize in hand-animation may yet still use motion capture as a way to previsualize and plan their scenes. This enhances animation blocking and video reference.

# Games

It is becoming easier than ever to animate characters directly in engine. Retargeting is almost entirely automated. With this a game curriculum can prioritize programming and game logic or level design, while creating a more complete game that includes character animation. There is also a huge movement towards narrative-driven storytelling within games, bringing to life characters in a more movie-like experience. Narrative-driven and game cinematics heavily rely on motion capture and high quality character animation.



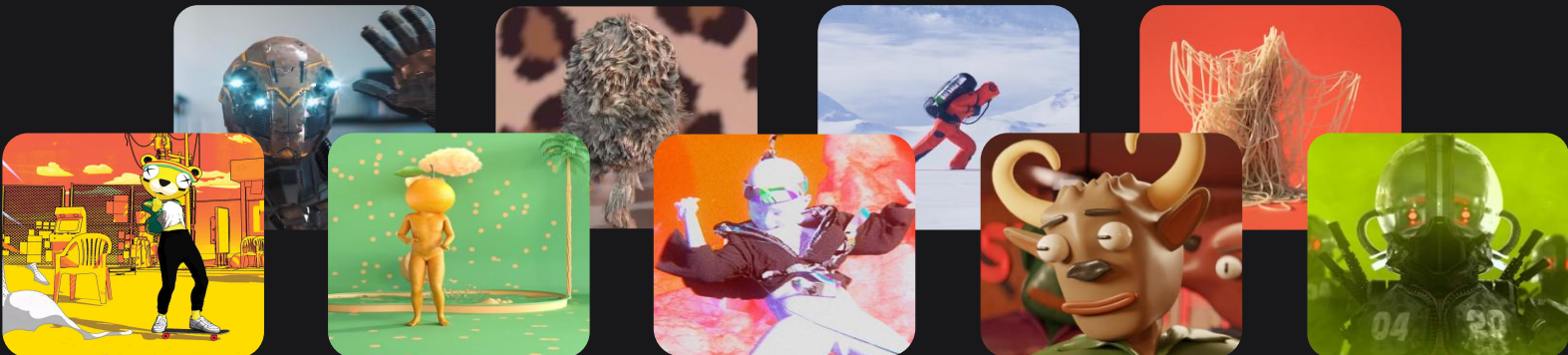
# Advertising and Social Media

An online advertising expert made famous this quote “Everything is an ad-network”. That may sound like an exaggeration until you take an Uber or Lyft to see an advertisement in their app while you wait for your ride. Or when listening to a podcast an automated advertisement pops up. Netflix created a cheaper subscription that includes ads. A 10-20 minute YouTube video could well include 4 or more ads. Because our attention is on apps and on web browsers, ads are more natively fit for 3D content, translating to a huge opportunity for 3D creators.

**Large Corporate Companies:** The largest companies like Apple, Amazon, Meta, Google, and Snapchat all have internal content production teams. They will still partner with outside creative agencies but it is worth noting that there is a clear corporate opportunity. The creative work may be for direct usage within a product or online, or could be promotional as well. For example, Meta has a lot of 3D artists working directly with their Reality Labs program for augmented and virtual reality.

**Any Size Agencies:** At any size agency there is a creative opportunity to produce 3D work. As a rule of thumb, the smaller the company, the more generalized the work. This means that a traditional motion graphics artist can benefit from some experience and knowledge about 3D and character animation as it creates a greater service offerings for clients and potential clients.

**The Freelancer / Independent Creative:** Even independent creators can win incredibly large customers. Within our Rokoko Creator community, we have many customers whose individual works can be tied to large brand advertisements ranging from Nestle to Lyft. When you start building a portfolio from day 1, you can start building momentum and credibility within the community, be discovered more easily, all of which will lead to more potential opportunities over time.





# Livestreaming, Realtime

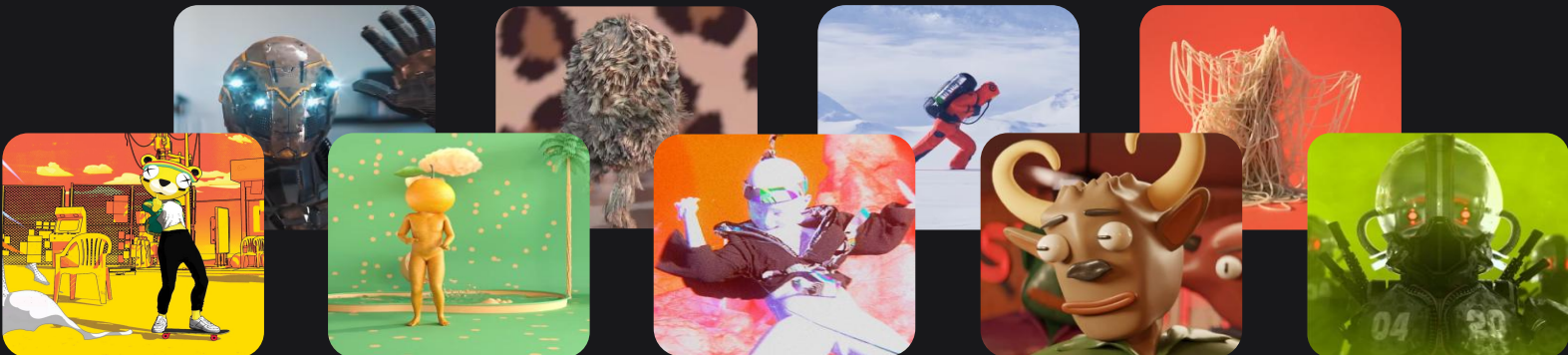
There may not be a better example of how much technology has progressed within 3D creation over the past 5 years than realtime capabilities. In a classic sense, motion capture can be used to previsualize character animation for pre-production. Increasingly, motion capture is being used to power live entertainment experiences ranging from music performances to theater shows.

Using tools like Rokoko and Unreal Engine you can stream realtime motion data onto incredibly realistic characters while maintaining HD visuals. We have examples from Denmark's National Radio program using realtime motion capture of a dancer during a symphony orchestra that displays moving particles in a human form. Creativity is the only limit in this case.

## Previsualization

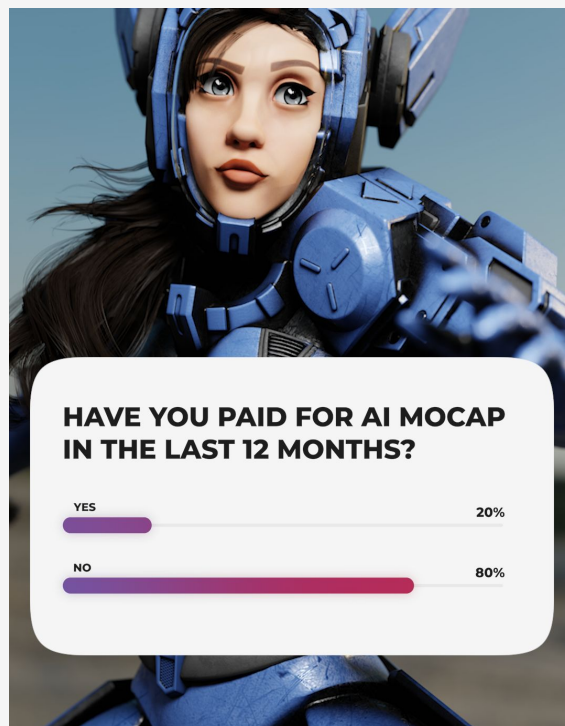
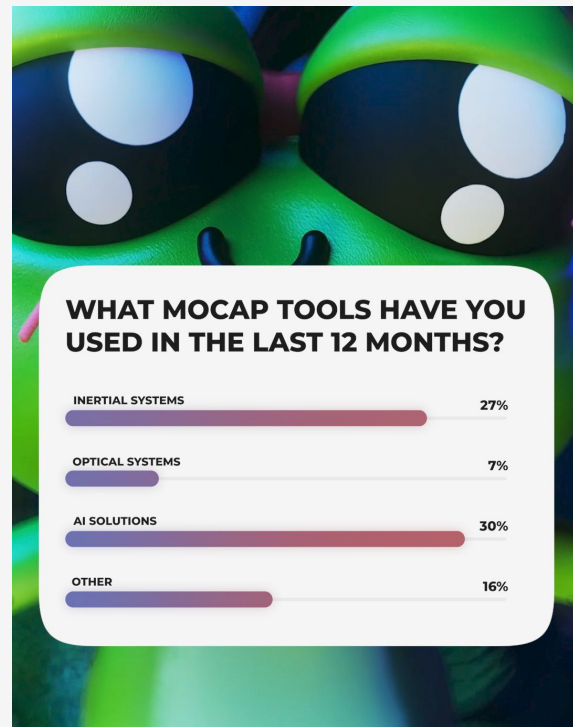
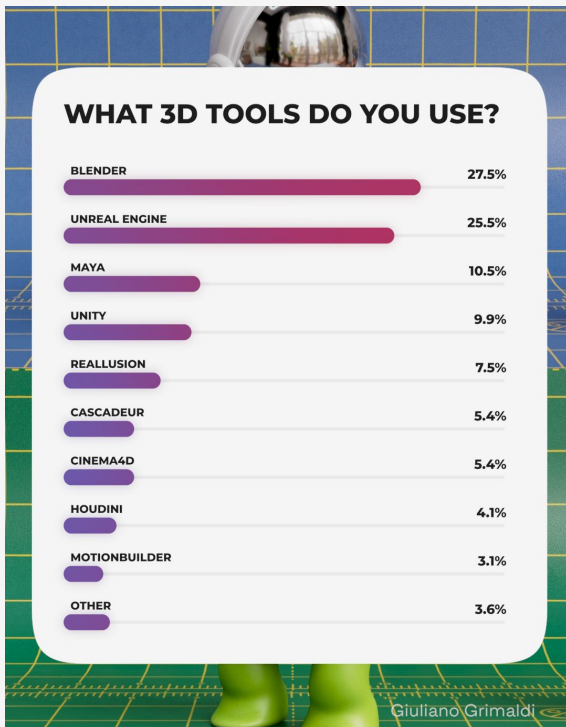
Realtime previsualization or previz is an opportunity to see and understand motion on a character before committing to a normal animation recording session. Previz also helps directors and those on site evaluate changes and instructions that they may provide the motion capture actors, for example if they wanted more exaggerated and dramaticized movement out of their talent.

Previz also presents a perfect opportunity to get more groups involved in the creative process including some with backgrounds that may exist outside of the core department.



# Motion Capture Industry Survey

Rokoko commissioned a state of motion capture and 3D survey, surveying 3,000+ people from a wide range of experience and creative backgrounds. This survey is over a year old and all of our data indicates that Unreal Engine adoption has grown significantly.



# Learning Resources Appendix

Some supplementary resources to assist in instruction and lesson planning. Some of the content may refer to Rokoko specific tutorials and others may point to other creators online.

<p>Rokoko YouTube Guides</p> <p><b>Beginner</b></p>	<p><a href="#"><u>Rokoko - YouTube</u></a></p> <p>A link to Rokoko's YouTube channel containing all of our product information, set up and usage guides, along with 3D tutorials covering all of the major 3D tools.</p>
<p>Rokoko Help Center</p> <p><b>Beginner</b></p>	<p><a href="#"><u>Rokoko Support</u></a></p> <p>A repository of support guides including product setup and requirements, and troubleshooting guides.</p> <p>Rokoko's support team is available by emailing <a href="mailto:support@rokoko.com"><u>support@rokoko.com</u></a> directly.</p>
<p>Rokoko Creator Inspiration and Past Animation Contests</p> <p><b>Watch Only</b></p>	<p>Rokoko supports the 3D community through large scale animation contests open to all creators. These are perfect examples to reference for inspiration and understanding how creative work is assessed.</p> <p><a href="#"><u>70 Rokoko Animation Submission - VFX Breakdowns</u></a>. A great example of short behind-the-scenes footage that can be referenced to see how creatives think of short renders for contests.</p> <p><a href="#"><u>100 CG Loop Render Submissions</u></a></p> <ul style="list-style-type: none"> <li>- <a href="#"><u>Judging Session with Professional Creator Judges</u></a></li> </ul>

# Unreal Engine Learning Resources

Unreal Engine has increased significantly in popularity over the past 3-years and is now much more viable for character animation with their native tools. Our survey of 3,000+ creators showed it as the 2nd most popular tool at 25.5% only 2% behind Blender.

Much of the popularity stems from professional adoption in Hollywood, cinematic quality renders, and Metahumans.

<p>Unreal Engine - 5.5 New Workflow</p> <p><b>Beginner - Intermediate</b></p>	<p><a href="#"><u>Rokoko Unreal Engine 5.5 - YouTube</u></a></p> <p>Unreal Engine 5.4 marked one of the most important new updates to animation in recent years. Unreal is now a viable tool for character animation and has simplified many core components of character animation. Rokoko has updated tutorials for 5.6 and continues to rapidly release new tutorial content as soon as new versions of Unreal Engine are released.</p>
<p>Unreal Engine - 5.6 Metahuman and Metahuman Animator</p> <p><b>Beginner - Intermediate</b></p>	<p><a href="#"><u>Rokoko UE 5.6 Metahuman Workflows - YouTube</u></a></p> <p>Metahuman with Metahuman Animator is the most accessible, highest fidelity, photorealistic character tool out there. It is completely free and highly integrated with Unreal Engine. This quick video will show you just how powerful the workflow is.</p>

# Maya Learning Resources

Maya remains the character animation leader for many of the largest studios. The tool is easy to grasp right away for basic motion capture workflows including working with HumanIK, easy control rig generation for all characters, animation layers for motion capture editing, and a motion capture smoothing filter.

<p>Maya - Rokoko Retargeting and Cleanup Tutorial</p> <p><b>Beginner</b></p>	<p><a href="#"><u>Rokoko Maya - YouTube</u></a> A 25-minute video from Rokoko that shows exporting a Maya compatible HumanIK skeleton from Rokoko Studio, importing a character into Maya and characterizing the skeleton, importing motion capture, retargeting the motion capture to the character, and performing motion capture cleanups including using Maya's IK control rig.</p>
<p>Maya - Motion Capture Tips and Tricks</p> <p><b>Intermediate - Advanced</b></p>	<p><a href="#"><u>Animation Pandemic - YouTube</u></a> A 1-hour long video containing many individual segments from an animation instructor. This video is specifically about the Maya software, however, may contain other principles for motion capture more broadly. This channel has quite a few really high quality videos on Maya animation that can connect back directly to motion capture.</p>
<p>Maya - Motion Capture Smooth Walk Cycle</p> <p><b>Intermediate - Advanced</b></p>	<p><a href="#"><u>Maya Walk Cycle with Mocap - YouTube</u></a> A 1-hour and 20-minute long video showcasing Rokoko motion capture and how to use techniques in Maya to improve the quality and smoothness of the motion capture.</p>



# Other 3D Program Learning Resources

The fundamentals of 3D, character animation, and motion capture exist in all of the major 3D programs. Learning those fundamentals will translate to any 3D program. A few important mentions are Blender, Cinema 4D, and iClone.

<p>Blender - Rokoko Retargeting and Cleanup Tutorial</p> <p><b>Beginner</b></p>	<p><a href="#"><u>Rokoko Blender - YouTube</u></a></p> <p>A 16-minute video from Rokoko that shows exporting motion capture into Blender, configuring a Mixamo character for Blender, using Blender's Auto-Rig Pro plugin, retargeting motion to the character, and use IK/FK to edit the motion capture data.</p> <p><i>**With Blender, there are many different workflows to achieve the same results. Rigify, Auto-Rig Pro, and a handful of other methods can be used for retargeting and setting up control rigs.**</i></p>
<p>Cinema 4D - Rokoko Retargeting and Cleanup Tutorial</p> <p><b>Beginner</b></p>	<p><a href="#"><u>Rokoko Cinema 4D - YouTube</u></a></p> <p>A 30-minute video from Rokoko that shows exporting motion capture into C4D, configuring a Mixamo character for C4D's retargeting system, retargeting motion to the character, setting up a control rig, and editing the motion capture.</p>
<p>iClone - Rokoko Retargeting and Cleanup Tutorial</p> <p><b>Beginner</b></p>	<p><a href="#"><u>Rokoko iClone - YouTube</u></a></p> <p>A 20-minute video from Rokoko that shows exporting an iClone and Character Creator compatible skeleton, importing animation data into iClone, retargeting the motion capture to the character, editing and adjusting the motion capture data, and adding finger and facial capture.</p>

# Other Free Online Tutorial

It is impossible to keep up with everything happening among the different 3D programs in this field. The foundations will remain the same but the tool and plugins available, and workflows within each 3D program will always be evolving. This is among many reasons why teaching and instructing is an art. Embracing some outside resources to supplement the classroom can be beneficial, particularly to students inclined to go above and beyond outside of the classroom. Here are the channels of some of our favorite online creators who produce tutorial content.

Unreal Engine - Cinematic Filmmaking	<a href="#"><u>William Faucher - YouTube</u></a> An industry professional and EPIC MegaGrants recipient who specializes in cinematic environments, visuals, and VFX. William produces very digestible tutorial content that yields inspirational results.
Unreal Engine - Game Development	<a href="#"><u>Gorka Games - YouTube</u></a> A very young game developer who produces tutorial content for Unreal Engine in very manageable, bite-sized lengths.
Maya - Character Animation	<a href="#"><u>Sir Wade Neistadt - YouTube</u></a> Sir Wade is an ex-DreamWorks animation trainer who produces tutorial content for Maya and increasingly Unreal Engine. His tutorials cover some of the more challenging aspects of hand-animation and animation aesthetics in a foundational and fundamental level.
Cinema 4D, Unreal Engine - General 3D	<a href="#"><u>Jonathan Winbush - YouTube</u></a> Winbush is an experienced motion graphics artists who creates generalized workflow tutorials.