

Launch your career in virtual production

Your guide to getting started in
the entertainment industry

cgspectrum.com



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REAL-TIME IS OPENING DOORS TO NEW JOB OPPORTUNITIES AND **NEW WORLDS!**

Virtual production is one of the most important innovations in the entertainment industry. It offers exciting and accessible new ways for digital creators to tell stories and is transforming the way video games, films, TV, and digital content are made. It's also used across an array of sectors: architecture, engineering, medical, TV broadcast, events, fashion, and beyond.

It's unsurprising that global demand for real-time 3D artists is expanding 10 percent faster than the overall job market, and demand for real-time skills has outpaced information technology skills by 50 percent!*

This guide is to help you get started in virtual production. Learn more about this field, discover different industry jobs, get career tips, and more!

* Burning Glass Technologies



“There is a huge demand for real-time artists. Now’s the time to get as big of a head start as possible.”

**William Faucher, Real-time 3D Artist and CG Spectrum Virtual Production Mentor
(*Black Panther, Watchmen*)**

ABOUT CG SPECTRUM

**TRAINING THE NEXT WAVE
OF PRODUCTION-READY
FILM AND GAME ARTISTS**

CG Spectrum is a global top-ranked training provider offering specialized programs in animation, virtual production, game development, VFX, and digital painting since 2011.

We inspire and train creators through personalized mentorship from industry professionals, small class sizes, and a unique online learning model that supports different learning styles.

We're an Unreal Authorized Training Center, Unreal Academic Partner, Unreal Connector, SideFX Certified Training Provider, and Toon Boom Authorized Training Center delivering programs worldwide.



SOME OF THE STUDIOS THAT HAVE HIRED OUR GRADS:



WHAT IS VIRTUAL PRODUCTION?

Virtual production allows real-world and digital platforms to converge. Real-time engines have been commonplace in the video game industry for some time, but its recent democratization has meant real-time is now embraced by filmmakers, content creators, and more commercial industries. Virtual production techniques help to visualize what we used to only to be able to view in post-production at the pre-production and production stages.

Some examples of virtual production include world capture (location/set scanning and digitization), visualization (previs, techvis, postvis), performance capture (mocap, volumetric capture), simulcam (on-set visualization), and in-camera visual effects (ICVFX).

The LED volume is possibly the most recognized use of virtual production methods. A wall of LEDs (light-emitting diodes) display a real-time rendered 3D virtual environment that curves around physical sets, actors, and props. Through live camera tracking, the virtual camera within the game engine moves to match the physical on-set camera, shifting what's displayed on the LED wall, like a shift in perspective. This synchrony between camera and imagery creates parallax, helping to create the illusion that the real and virtual elements reside in the same space. Lucasfilm's *The Mandalorian* is a well-known example that used virtual production on set.

CONTENTS

- The Virtual Production Pipeline **5**
- Get a Job in Virtual Production **7**
- Demo Reel Tips **11**
- 6 Skills a Real-Time Artist Needs **12**
- Free Resources **13**
- Glossary **14**
- Ready to Start Your Career? **16**
- Virtual Production Courses **17**



THE VIRTUAL PRODUCTION PIPELINE

The main difference between virtual and traditional production workflows is that virtual production encourages more nonlinear and collaborative processes, primarily due to its capacity to render in real-time.

These new workflows offer creators more flexibility, opening up more possibilities, for example:

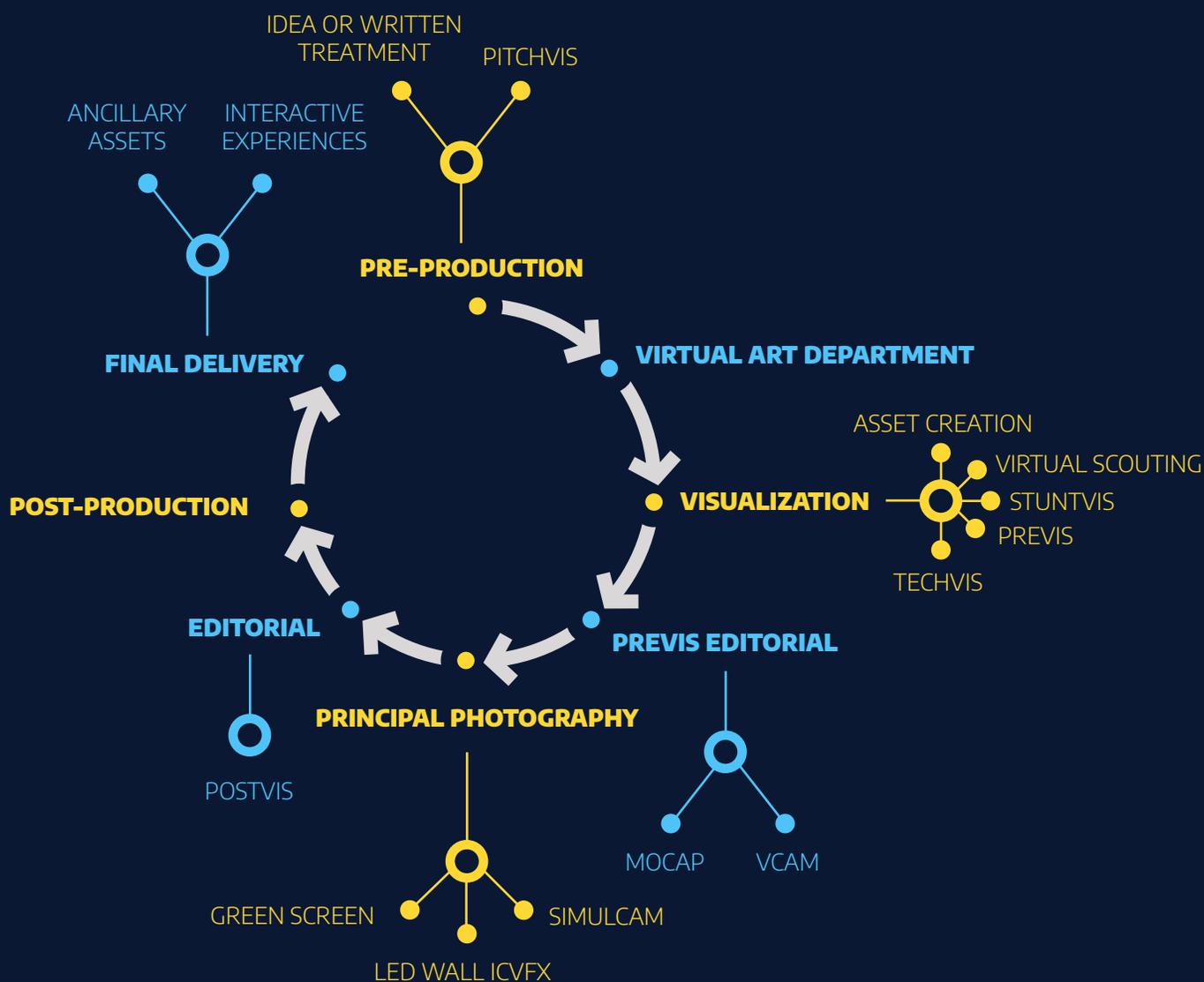
- Artists can mock up a concept in a few hours and see changes in real-time.
- The iteration process (e.g., experimenting with VFX in film) begins much earlier in the production schedule.
- Content creators can generate high-quality imagery from the outset of production rather than further down the line (traditionally in post-production).
- Assets such as 3D models are cross-compatible and may be implemented from previsualization to final outputs.

“The discipline of filmmaking translates a lot into this realm. To me, it’s finding the common ground between these two different ways of doing things ... and utilizing the strengths and the familiarities of each to create content in the virtual production realm.”

Deepak Chetty, Filmmaker and CG Spectrum Virtual Production mentor

THE VIRTUAL PRODUCTION PIPELINE

Virtual production processes shift and evolve with technology, creating new and improved workflows regularly; this is just one example of a virtual production pipeline.



Based on workflow from *The Virtual Production Field Guide Vol. 2* by Epic Games.

JOBS IN VIRTUAL PRODUCTION

Below are some of the diverse and rewarding career paths in virtual production, with new jobs being created all the time!

REAL-TIME 3D ARTIST—FILM

Real-time artists create interactive 3D content and assets that are rendered in real-time. They often work on a project from concept to completion, collaborating with filmmakers to realize a broader vision. Real-time artists are also responsible for maintaining visuals in both quality and optimization—from entire environments down to small 3D props, known as assets. Real-time artists also add lighting, and create textures.

REAL-TIME 3D ARTIST—GAMES

A real-time 3D artist in games harnesses the skills found in one or more areas of the traditional game development pipeline. Tasks assisting with cinematics and various aspects of gameplay are executed in a game engine. Real-time 3D artists are often generalists who collaborate with other game artists, game designers, and programmers to realize a broader vision.

REAL-TIME 3D ARTIST—COMMERCIAL INDUSTRIES

Outside of film and games, real-time is applied across a range of commercial sectors. Examples of industries and applications include:

- Immersive and interactive installations/projections for events, exhibitions, and concerts
- Marketing and commercial purposes
- Broadcasting
- Engineering
- Architectural visualization and building design
- Product design
- Environment and theater design
- Automotive

Skills and responsibilities depend on the industry and the role.



HOW TO BECOME A REAL-TIME 3D ARTIST

Watch our webinar about how to get started in this exciting field with insights from industry pros

VISUALIZATION ARTIST

—FILM

Visualization artists create and block out 3D digital content that helps illustrate the outline of a story or production. They help visualize what a scene, set, or certain actions will look like before it's created or finalized, often experimenting with different camera staging (angles, lenses, moves, etc.) and rough animation using proxy and production-ready assets. Visualization artists can contribute to every stage of production: pre-production (pitchvis, previs), production (techvis, stuntvis), and post-production (postvis).

REAL-TIME 3D ANIMATOR

Real-time animators manipulate digital characters, props, and machines to move through and interact with their 3D environment inside a game engine. These actions can be controlled procedurally through an input device, keyframed, or performance-captured. Real-time 3D animation can be filmed on a live-action set using a traditional camera crew shooting on a stage volume. Disney's *The Lion King* (2019) used this animation method.

VIRTUAL PRODUCTION SUPERVISOR

A virtual production (VP) supervisor acts as a go-between for the real-world, visual effects, and virtual production teams. They ensure camera-ready assets are delivered as needed and manage virtual production technologies

such as tracking, performance capture, and virtual scouting. On set, a VP supervisor oversees the deployment of virtual assets for in-camera visual effects and ensures the production crew has access to the content on the LED wall.

LIVE COMPOSITING ARTIST

Live compositing artists ensure virtual sets and props blend seamlessly with their live-action counterparts through color correction and lighting adjustments. They are also responsible for layering additional components into a scene, as required. Using Nuke, a live compositing artist can also quickly combine CG backgrounds with their corresponding live-action shots, called plates, which are used in the cut (until a more polished version can replace it) as a form of postvis to assist the editorial process and post-production.

LED WALL CINEMATOGRAPHER

An LED wall cinematographer is in charge of the virtual lighting and framing displayed on the LED volume. Their role combines traditional live-action and real-time virtual production techniques, including camera tracking, real-time virtual scene output, physical set dressing, and traditional on-set lighting (although the LED walls produce significant lighting, practical lights are still required for additional lighting or for hard sources like direct sunlight).

REAL-TIME TECHNICAL ARTIST

Real-time technical artists (TA) are highly sought after. They help solve complex rigging and/or material issues, and assist with general debugging and troubleshooting within a game engine. TAs work closely with the virtual production team to understand their ongoing and future technical needs. They may be required to customize existing software or write new tools to help with workflows, automation, and optimization. Although quite a technical role, TAs must also have a good understanding of what the more creative real-time jobs entail.

VIRTUAL PRODUCTION FX ARTIST

A virtual production FX artist creates digital simulations and procedural workflows based on real-world elements or supernatural concepts that move or react under the basic laws of physics. Composition, scale, form, speed, and viscosity are taken into account

to help determine how an effect looks and reacts to its surroundings. Artists are usually required to research real-life phenomena, watch reference videos (when possible), and generate multiple concepts.

THE BRAIN BAR

The Brain Bar is a nickname for the control center of the on-set LED volume. It consists of real-time artists, camera tracking experts, video display I/O (incoming/outgoing) experts, content loaders, live compositors, IT experts, network specialists, and LED screen technicians. This control center can be set up on-site or offstage nearby, within an OB (outside broadcasting) van, or entirely remotely.



WORLD BUILDING IN UNREAL ENGINE

Read about CG Spectrum student Marc C's inspiring journey and how he built an epic virtual world

“Technical animation is one of the most overlooked skillsets when it comes to almost any real-time production. The opportunities within this space are still largely untapped.”

Simon Warwick, Animator and Virtual Production Department Head at CG Spectrum

GET A JOB IN VIRTUAL PRODUCTION

Increase your chances of getting hired as a real-time 3D artist with these strategies for success.

DOWNLOAD A GAME ENGINE

Download and familiarize yourself with a free game engine like [Unreal Engine](#).

BUILD SKILLS

Build skills companies are listing on job sites. For additional support, enroll in a reputable course. CG Spectrum's courses include mentorship from real-time pros and an industry-led curriculum.

STAY AHEAD OF TRENDS

Online tutorials, webinars, and publications can help you stay up-to-date on trends and keep your skills fresh. See resources on p 13.

CREATE REAL-TIME CONTENT

Creating content in a game engine will teach you relevant tools while building your portfolio. Upload finished work to a visual platform, like ArtStation, to showcase to potential recruiters and to view your progress.

SELL ASSETS ONLINE

Create and sell assets on Unreal Engine Marketplace, or similar, to gain exposure, get constructive feedback from real-life users, demonstrate skills to potential employers and collaborators, and make money!

JOIN COMPETITIONS AND GAME JAMS

Practice your skills and create content for your portfolio by participating in game jams (e.g. [Epic MegaJam](#), [itch.io/jams](#)), or starting one with friends. The Rookies also host contests.

ENGAGE WITH COMMUNITIES

Networking is vital. Interact with industry pros who might offer advice, insights, or job opportunities. Join the [Epic Developer Community](#) and see our resources section for more.

COLLABORATE WITH PEERS

Know an animator who'd love to add their character performance to a 3D environment? Perhaps a friend wants to help you build a virtual world! Collaborating with peers is fun and can produce more polished portfolio pieces.

INTERNSHIP

Internships at studios specializing in real-time, can help you break into the industry. It's not viable for everyone but can be a way to gain hands-on experience while networking and experiencing studio life.

DEMO REEL TIPS

Your demo reel should show you understand the mechanics of film-making and how to create a unique scene using a real-time engine. Focus on making your work polished. Here are some other tips:



Students, keep your reel <1 min. If you have 1-2 years experience, <2 mins



Include any production experience



Use Vimeo—the video quality is better than YouTube, and you can update your video



Embed your reel on a platform (like ArtStation) with high-res stills of your best shots



Everything should be 10/10—don't include mediocre work. Work in progress is fine, but make sure it's your best



Renders, FX, and lighting can enhance your shot



Ensure your music doesn't distract from your work



Watch your reel repeatedly and look for errors (edits, framing, spelling, etc.)



Get feedback from at least 3 mentors or industry pros before publishing



Show reference footage and breakdowns when applicable and include relevant credits



Share your reel and stills on your website, ArtStation, LinkedIn, and other social platforms

6 SKILLS A REAL-TIME ARTIST NEEDS

Outside of learning real-time production techniques, the mentors of CG Spectrum's [virtual production courses](#) suggest building the following skills and knowledge to become a successful real-time 3D artist.



Work on your problem-solving skills (possibly the most critical)



Gain a good foundation in art, like those of a Director of Photography (DOP)



Maintain at least a basic understanding of animation and animation rigs



Learn camera fundamentals and how changing their values will contribute to how you might block, light, and shoot a scene



Get to know traditional film production processes (e.g., scripts, concepts, sets, storyboards)



Familiarize yourself with the traditional production pipeline (it can act as a reference point because virtual production is non-linear)

“Showcasing specialized skills is the best way to get the attention of a recruiter or hiring manager, and the ability to share concrete examples of how you’ve put these skills to work in your portfolio is key.”

Maxine Schnepf, CG Spectrum Career Development Manager

FREE RESOURCES

Here are some additional resources to help you get ahead as a real-time 3D artist working in virtual production.

- Read [What is Virtual Production?](#)
- Watch [How to become a real-time 3D artist](#)
- Subscribe to William Faucher's [YouTube channel](#)
- Explore [Unreal Engine's free courses](#)
- Build 3D worlds using free assets from [Unreal Engine Marketplace](#)
- Explore [Virtual Production Career Pathways](#)
- Join the [Epic Games Dev Community](#)
- Join the [Virtual Production](#) and the [Unreal Engine: Virtual Production](#) Facebook groups
- Watch the 'Unreal Build: Virtual Production' replay
- Explore ArtStation's [Unreal Engine channel](#)
- Review the [Visual Effects Society's virtual production resources](#)
- Check out [Game Jam Tips and Tricks](#) from Epic Games' developers
- Learn how to use Houdini with [Unreal Engine](#) and with [Unity](#)
- Epic Games' Virtual Production Field Guides: [Volume 1](#) and [Volume 2](#)
- No Film School article [The Differences Between Virtual Production and Traditional Production](#)

***“Using Unreal Engine is a perfect way to onboard people into virtual production as the ability to be physically accurate with settings and values is built-in to many parts of the software and allows for a natural transition into the virtual world.*”**

Deepak Chetty, Filmmaker and CG Spectrum Virtual Production mentor

GLOSSARY

Since virtual production is a fairly recent and highly technical (and creative!) field, some of its terms might be new to you. Here's a short glossary to help.

ASSET

A digital 3D model used in content creation (that can be placed, lit, animated, etc.) such as a prop, character, set dressing, environment, etc.

CINEMATIC

A non-interactive animation sequence in an otherwise interactive experience, like a video game, commonly used to tell a story. Also known as a cutscene.

CONTENT CREATION (DCC)

Also known as digital content creation, it's a category of applications used to achieve different forms of content required for real-time production, such as Maya, Houdini, or Substance Painter.

CONTENT LOADING

The processing, or loading, of real-time scenes from Unreal Engine onto the LED screen wall, in the correct orientation and scale. The scene content projected into the LED volume is often referred to as a load.

LED PANEL

A modular fixture of LED lights used to display video content from a game engine. Initially intended for indoor/outdoor advertising, entertainment venues, and broadcast use, LED panels are now employed on film sets to create volumes (backdrops) for motion picture cinematography.

PARALLAX

When an object is viewed from various vantage points (including through a different lens), its position or direction is perceived differently.

ON-SET VIRTUAL PRODUCTION

Use of virtual production techniques to capture final imagery in-camera.

PREVISUALIZATION

Also known as previs, it is the creation of preliminary versions of shots or sequences in a 3D environment. It is usually based on a script or storyboard. It allows filmmakers to visualize creative concepts, explore technical solutions, and communicate a shared vision to production and post-production teams.



**FOR MORE TERMS, CHECK
OUT [VPGLOSSARY.COM](https://www.vpglossary.com)**

PROXY ASSET / PROXY GEOMETRY

A scaled-down version of a 3D model (character, prop, environment, set dressing) that is lower resolution/has fewer polygons used to quickly and efficiently block out a virtual scene. It's a lighter substitute for the final higher-resolution version.

REAL-TIME ENGINE

Also known as a game engine. A software development environment designed to create and display real-time interactive content.

REAL-TIME RENDERING

The process of converting a scene into display pixels at real-time rates such as 24, 30, 60, and 90 frames per second for immediate playback. On the other hand, traditional offline rendering might take minutes or even hours to finish each frame.

RENDER

The process of digitally generating an image or video based on 2D, 3D, and lighting information.

SET EXTENSION

A digital/virtual continuation of a live-action physical set that gives the illusion of a much larger area to the camera.

STAGE VOLUME

The physical stage space for recording performance capture. It also refers to a partially enclosed stage made of LEDs in which a volume of light is emitted or a display surface for projected content.

TRACKING

The process of determining the position and orientation of a camera or other object relative to the scene via various optical/digital methods; used for integration between the virtual and physical worlds.

VIRTUAL PRODUCTION

Virtual production integrates the digital and physical worlds using real-time technology, allowing filmmakers to incorporate post-production techniques with live-action production.

VOLUME OPERATOR

A crew member who operates an LED stage volume and its content, such as a key volume operator, assistant volume operator, etc.

WORLD BUILDING

World building is a form of visual storytelling in film and games to develop a coherent virtual world, created in a game engine or 3D software such as Maya. It's also known as 3D environment art, digital set building, or landscape creation and can be worked on by a 3D modeler, real-time 3D artist, environment artist, or layout artist. Elements a 3D artist may need to consider include history, geography, and ecology.

READY TO START YOUR CAREER?

There are lots of resources available to help you learn to navigate a game engine and become a great real-time 3D artist. However, it can often be hard to find the most up-to-date and relevant information or get professional feedback on your work.

Fast track your career with personalized high-end training from industry professionals. CG Spectrum offers specialized career training and mentorship from 170+ film and game industry experts to get you job-ready sooner

LEARN FROM INDUSTRY PROS LIKE THESE:



SIMON WARWICK
Dept Head of Real-Time 3D
Batman: Arkham Knight,
X-Men: Destiny



WILLIAM FAUCHER
Mentor of Real-Time 3D
Black Panther, Watchmen



CARL SHEDD
Mentor of Virtual Production
Brothers In Arms, Borderlands,
Rage



DEEPAK CHETTY
Mentor of Virtual Production
Gen:Lock, Mr. Roosevelt,
Discreet



TAMIR DIAB
Mentor of Real-Time 3D
Avatar, Halo, Monster Hunter,
The Hobbit, Iron Man 3



ERICA PENK
Mentor of Real-Time 3D
Clients include Epic Games, Trick
3D, and Profile Studios

OUR VIRTUAL PRODUCTION COURSES

Get on track to finding your dream job with CG Spectrum's career-focused training and industry mentorship. Students receive a Certificate of Completion at the end of each course.

PATHWAY 1

Train to become a real-time 3D technical artist and create your own film quality cinematic shots. Learn world building to develop incredible environments; lighting and camera techniques to enhance your story; and see how to apply these skills in the real world for job roles on a volume. Commitment: 20 hours per week. Prior experience in Unreal Engine not required.



PATHWAY 2

Have some production experience already? Unreal Connectors is a 12-week real-time intensive for established media professionals and studios looking to up-skill their teams to expand their real-time services. Commitment: 40 hours per week. Prior experience in Unreal Engine not required.



WATCH OUR COURSE INFO SESSION REPLAY

Learn more about our Real-time 3D and Virtual Production Courses at cgspectrum.com

BENEFITS OF STUDYING AT **CG SPECTRUM**



INDUSTRY MENTORS

Learn from experts who have worked on major films and games.



FLEXIBLE SCHEDULING

Plan your studies around your work and family commitments.



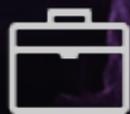
JOB-READY SKILLS

Build practical and relevant job skills that studios are looking for.



PAYMENT PLANS

Pursue your passion and start working sooner with flexible payments.



CAREER DEVELOPMENT

Personalized support, portfolio/CV reviews, and interview prep.



VIBRANT ONLINE COMMUNITY

Join our supportive community of students, alumni and mentors from all over the world.

STUDENT TESTIMONIALS

MARC C



“I enrolled looking for a career change, and I wasn’t expecting this quality of education in an online school.

I didn’t have any knowledge about digital arts, and now I can accomplish my dream of creating cinematics within fantasy worlds with all the new tools under my belt. The mentors are always willing to help and encourage self-development.”

ANTONINO C

“I can’t stress enough how much I’m enjoying studying here!

I started the course out of curiosity; I was brand new to this world, but I feel like I got all the answers that I needed and even more, and your mentors surely help you get the most out of it!”

MATT C

“Currently halfway through real-time world building with William Faucher, and I cannot recommend it enough.

The ability to have your level gauged and directed as to where it needs to be by someone within the industry in real-time is priceless. The personal feedback is also second to none.”

CHRIS F



“I can’t speak highly enough about the school.

When I came to CG Spectrum, I had 20 years of live entertainment experience, and they seamlessly transferred me from physical to virtual production.”



YOUR FUTURE IN VIRTUAL PRODUCTION AWAITS!

➤ Explore courses and apply at
cgspectrum.com

“I know architects and designers who have switched over to gaming or film in their 30s and 40s! The shared characteristic of these people is that they are relentless in their pursuit of knowledge and creatively applying that knowledge. Success may not come quickly, or easily—it has to be earned.”

Deepak Chetty, Filmmaker and CG Spectrum Virtual Production mentor



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