SSN Institutions
Department of Biomedical Engineering

XRPANDA CANADA

VR Workshop Series

Empowering minds to design immersive worlds

This workshop series is designed to empower you to design complete VR
VR experiences from ground up. Whether you're a complete beginner or have
have some experience, we'll make virtual reality hands-on, and exciting. Together,
Together, we'll move beyond imagination and start building the future.

XRPANDA
CANADA

About XRpanda

A Canadian Startup revolutionizing training and simulations through VR

What We Do

We create custom VR solutions for manufacturing, healthcare, and real estate, helping teams train smarter, faster, and safer through immersive simulations and virtual onboarding.

Our Vision

Founded by passionate VR graduates, we believe immersive tech is the present solution to outdated training. We're growing fast and open to collaborations that share our mission.

The Three-Part Learning Journey

01

Workshop 1: Pre-production

Learn the fundamentals of building VR environments using shapes and pre-made assets. This lays for what follows.

02

Workshop 2: Modelling, Animation, XR Integration

Level up your skills by creating custom 3D models, animating objects, and integrating extended reality features into your scenes.

03

Workshop 3: Physics, Interaction, Testing

Bring your world to life with realistic physics, interactive elements, and thorough user testing to testing to polish your final build.

In this first workshop, we'll focus on the essentials: how to build environments using simple shapes and assets. It's all about getting comfortable with the tools and with the tools and laying a solid foundation.

Understanding Different Realities

Virtual Reality (VR)

Fully immersive digital environment that replaces the real world entirely

Augmented Reality (AR)

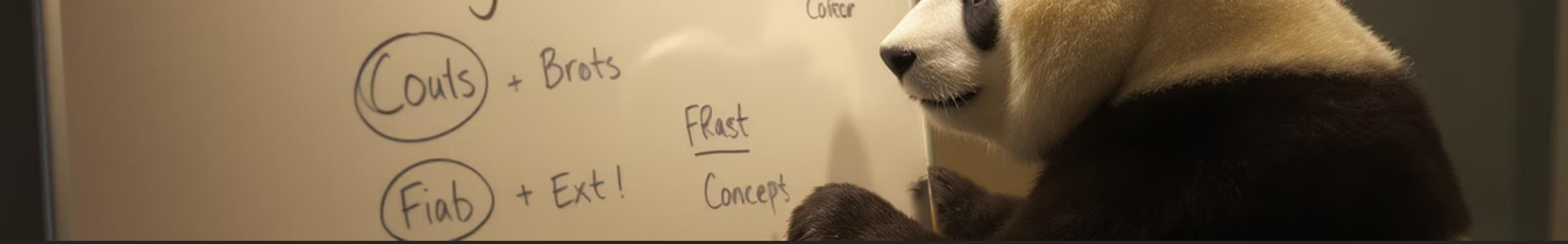
Real world enhanced with digital UI overlays and information layers

Mixed Reality (MR)

Real and virtual objects coexist and interact in real time

Extended Reality (XR)

Umbrella term combining all VR, AR, and MR technologies



The Future of Realities

As technology advances, the boundaries between real and virtual continue to blur. Researchers and developers are exploring entirely new categories of reality experiences that push beyond today's XR.

Augmented Virtuality (AVR)

Virtual worlds enhanced with real-world elements, the inverse of AR, where digital environments are enriched by physical data and objects.

Hybrid Reality (HR)

Real and virtual environments actively affect and change each other in real time, creating truly interactive ecosystems.

Simulated Reality (SR)

Simulations so advanced that they become indistinguishable from physical reality, the ultimate frontier of immersion.

These concepts may sound like science fiction, but they represent the next wave of research and development in immersive technologies.

The Evolution of Virtual Reality

From Stereoscopes to Simulations

VR didn't appear overnight. It's been a journey spanning nearly two centuries, evolving from optical illusions to full sensory experiences.

1838 – Stereoscope

The first device to create 3D images from two offset photographs

1929 – Link Trainer

Early flight simulator used to train pilots

1956 – Sensorama

Multi-sensory theater experience with motion, smell, and stereo sound

1961 – Headsight

First head-mounted display with motion tracking

1965 – The Ultimate Display

Ivan Sutherland's vision of a fully immersive virtual world

1968 – Sword of Damocles

The first true VR headset, though it was ceiling-mounted and heavy

Current VR Technologies

The 2010s marked the true consumer revolution in virtual reality. After decades of research and prototypes, VR finally became accessible, affordable, and powerful enough for mass adoption.

1

2012 – Oculus Rift

Kickstarter campaign launches the modern VR era

2

2014 – Facebook Acquisition

Facebook acquires Oculus for $2 billion, signaling mainstream potential

3

2016 – VR Boom

Major headsets launch: Oculus Rift, HTC Vive, PlayStation VR

4

2020+ – Next Generation

Apple Vision Pro, Ray-Ban Meta, and standalone devices redefine immersion

Today, VR is no longer niche technology, it's becoming part of how we work, learn, play, and connect. and connect.

From Science Fiction to Reality

Some VR concepts still live in the experimental lab, but rapid advances in AI, neuroscience, and and materials science are bringing them closer to reality every day.

Neural Rendering

AI-powered systems that recreate realistic human behavior, expressions, and movement, making virtual humans feel truly alive.

Full Body Haptics

Suits and gloves that provide touch feedback across your entire body, letting you "feel" you "feel" virtual objects and textures.

Brain-Computer Interface

Direct neural connections that let you control systems with your thoughts, no controllers, just intention.

Still experimental... but closer than you think.

How VR is Changing the World

Virtual reality isn't just for gaming anymore. Across industries, organizations are using VR to solve real problems, train professionals, and create experiences that were previously impossible.

- **Gaming & Entertainment**
  Immersive storytelling and interactive gameplay experiences
- **Healthcare & Therapy**
  Surgical training, pain management, and mental health treatment
- **Education & Training**
  Hands-on learning in safe, repeatable virtual environments
- **Real Estate**
  Virtual property tours and architectural visualization
- **Manufacturing**
  Assembly line simulations and equipment training
- **Retail & E-commerce**
  Virtual showrooms and try-before-you-buy experiences.
- **Tourism & Hospitality**
  Destination previews and immersive travel experiences
- **Military & Defense**
  Combat simulations and strategic training exercises
- **Sports & Fitness**
  Performance analysis and virtual training programs
- **Art & Design**
  3D sculpting, virtual galleries, and creative collaboration

Case Studies: Healthcare & Engineering

Healthcare Applications

Johns Hopkins University (2016)

Johns Hopkins University implemented VR surgical training medical simulation labs to help students safely practice procedures and reduce real-world errors.

Cedars-Sinai Medical Center (2019)

Cedars-Sinai Medical Center introduced VR pain management therapy patient treatment rooms to reduce pain and anxiety while lowering medication use.

US Veterans Affairs (2017)

US Veterans Affairs launched VR PTSD therapy programs VA hospitals and clinics to help veterans recover in safe, immersive environments.

Engineering Applications

Boeing (2018)

Boeing adopted VR for aircraft assembly training manufacturing facilities to reduce assembly errors and speed up training.

Ford Motor Company (2019)

Ford Motor Company integrated VR into prototyping design to refine vehicle designs faster and cut development costs.

Siemens (2020)

Siemens applied VR for training industrial training centres to enhance worker understanding, safety, and efficiency.

Entry-Level Specs That Still Deliver

These entry-level specs will let you build, test, and experience VR projects projects comfortably. As your skills grow, you can upgrade components for better components for better performance and more complex scenes.

Processor

Intel Core i5 (8th gen or newer) **or** AMD Ryzen 5

Graphics Card

NVIDIA GTX 1050 **or** AMD Radeon RX 560

Memory

8GB RAM (16GB recommended for smoother performance)

Recommended Hardware: Intel i7 / AMD Ryzen 7, NVIDIA RTX 2060 or higher, 16GB RAM

End-to-End VR Development Phases

01 Concept & Ideation

Define goals, brainstorm interactions, create storyboards.

02 Pre-Production

Level design, 3D assets, audio planning, interaction mapping.

03 Production

Implement assets, animations, interactivity, audio, and effects.

04 Testing & QA

Functional tests, performance optimization, user feedback, bug fixes.

05 Deployment & Maintenance

Export to VR platforms, monitor performance, update content.

Methodologies: Waterfall: Sequential, fixed phases.
Agile: Iterative, flexible, fast prototyping.

Storytelling Frameworks

Traditional narrative structures apply in VR but must adapt for interactivity and spatial exploration, enabling non-linear stories users explore at their own pace.

01 3-Act Structure

Setup: Introduce the world and establish context

Confrontation: Present challenges and build tension

Resolution: Deliver payoff and closure

02 5-Act Structure

Exposition: Set the scene

Rising Action: Build momentum

Climax: Reach peak intensity

Falling Action: Wind down tension

Resolution: Conclude the experience

Storytelling in Virtual Reality

Every great VR experience starts with a story. But unlike traditional media, VR storytelling puts the user inside the narrative. You're not just You're not just showing them a world, you're inviting them to inhabit it.

01

Start with a Core Idea

What is the central concept or message of your experience? What feeling or insight do you want users to take away?

02

Define the Emotional Journey

What do you want your user to feel? Wonder? Fear? Curiosity? Joy? Emotion is the foundation of immersion.

03

Build the World

Where does this experience take place? Is it realistic or fantastical? Intimate or expansive? Every detail contributes to presence.

04

Give Users Agency

What can they do in this world? Even small interactions, looking around, picking up objects, make users feel like active participants.

From Watching to Experiencing

The shift from conventional media to VR represents a fundamental change in how we tell stories. Instead of passively watching, users become active participants. Instead of following a fixed path, they explore spatial narratives.

Conventional Media	Virtual Reality
Passive viewing experience	Active participation and exploration
Linear storytelling from start to finish	Non-linear, user-directed narrative paths
Fixed camera perspective	First-person, 360-degree viewpoint
Controlled polish and cinematography	Immersive, unscripted experience
Little to no user agency	Interactive and spatial decision-making

This shift requires new creative skills. As a VR designer, you're not just a storyteller, you're an experience architect, crafting worlds that respond to user presence and choice.

Hands-On Module: Greyboxing

Building Your First VR Environment

Greyboxing is the foundation of VR development. It's the process of building environments using simple geometric shapes: cubes, spheres, cylinders, before adding detailed assets and textures.

01 **Learn the Interface**

Familiarize yourself with Unity or Blender's basic UI, navigation, and tool panels

02 **Create with Primitives**

Build environments using simple shapes to establish scale, layout, and spatial relationships.

03 **Place Asset Placeholders**

Add temporary markers for where detailed models, textures, and interactive elements will elements will go later.

Next Steps in Your VR Journey

You've just completed the first step into a much larger world. This workshop introduced the foundations, but the real adventure is just beginning.

Workshop 1: Pre-Production

You've mastered the basics of spatial design and layout

Workshop 2: Modelling, Animation

Next, you'll create custom 3D models and integrate advanced XR features

Workshop 3: Physics, Interactions, XR Integration

Finally, you'll add physics, interactivity, and polish your completed VR experience