Grokit Postmortem: Multiplayer with Physics & Hand Tracking & MR? Oh My!

Robin Moulder

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About Us

Robin Moulder
CEO
Audio Engineer

Cordelia Wolf
Creative Director
Generalist

3lb Games

- Cutting edge development in spatial computing
- Award winning developer with Meta & Pico partnerships
- Published XR Titles
  - Space Dragon
  - Vault of Stars
  - Grokit
- Accelerated Titles
  - XRWorkout
  - Nature Treks
  - Slime Rancher

Overview

- Background
  - What's a Grokit?
  - Origins of Grokit
  - Design Philosophy
- Implementation & Lessons Learned
  - Mixed Reality
  - Hand Tracking
  - Multiplayer

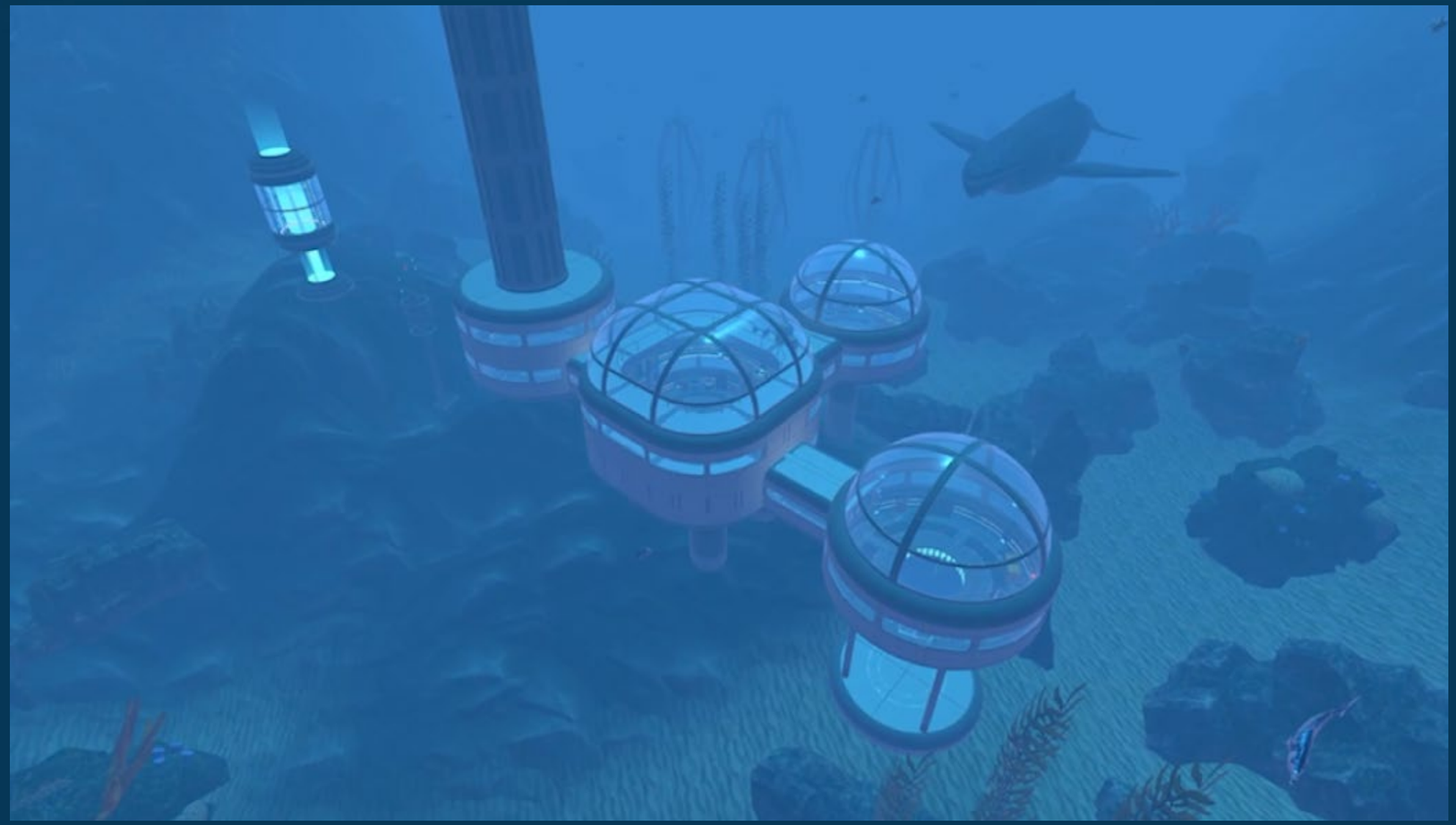
What's a Grokit?

Grok: "To understand (something) intuitively or by empathy."

- Fast Paced, Multiplayer, Mixed Reality, Hand Tracking Party Game
- Onboarding meets quick action social game
- Customization, play how you want

GDC

MARCH 18-22, 2024
SAN FRANCISCO, CA



GROKIT

Trailer

#GDC2024

Lessons already learned…

Narrative driven – too big for it’s time
Lots of mechanics and complexity

Started off super fun!

Why Grokit?

- Wario Ware and Mario Party
- Get more people in XR
- Social learning - monkey see monkey do
- Embodiment
- Experiment, with user feedback

How to Grokit?

Design Philosophy

- Keep it simple, stupid
- Focus on what's unique to XR
- Simple instructions, intuitive gameplay
- Encourage social learning
- Player Comfort

Passthrough

- Time dilation
- Comfort and Acclimation
- Be in your own space

Lesson Learned

- Don’t block the view
  - Keep the floor clear

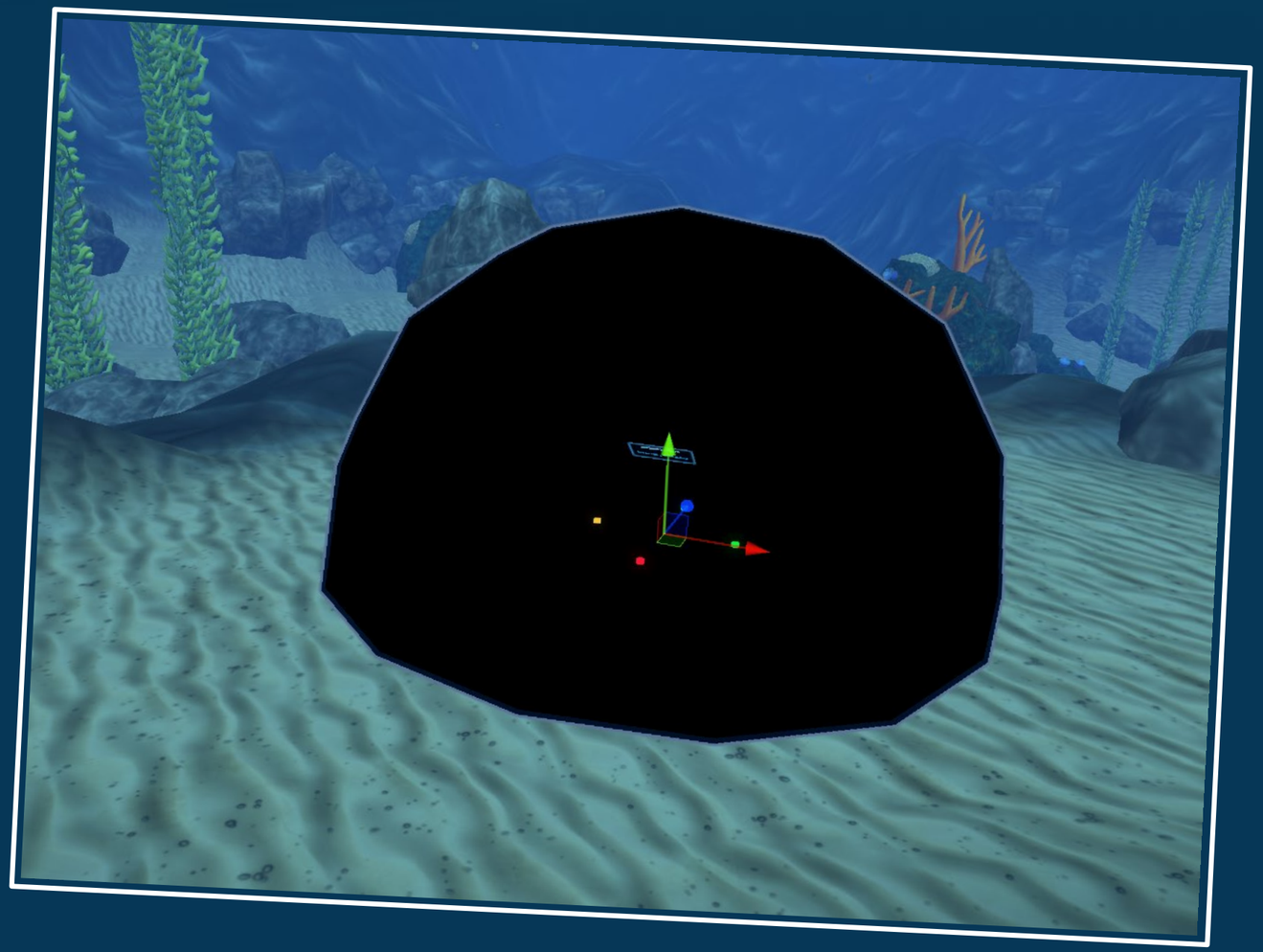
GDC 2023

Passthrough

- Passthrough inverted dome
- Double layer with black blocks additive shaders behind

Lessons Learned

- Additive particles set to Alpha is Transparency
- Passthrough optional
- When passthrough isn’t used turn it all the way off



Scene Understanding

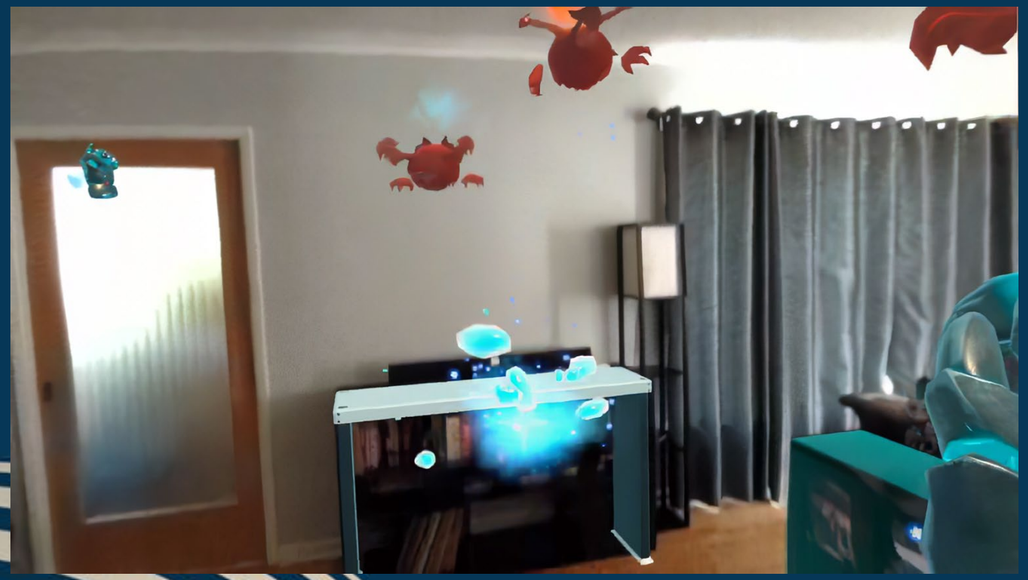
- Physical presence in game world
- Room replication

- Colliders
- Game integration

Scene Understanding

Lessons Learned

- Avoid blocking view
  - Passthrough furniture outlines only
- Reduce visual noise
  - No wall outlines

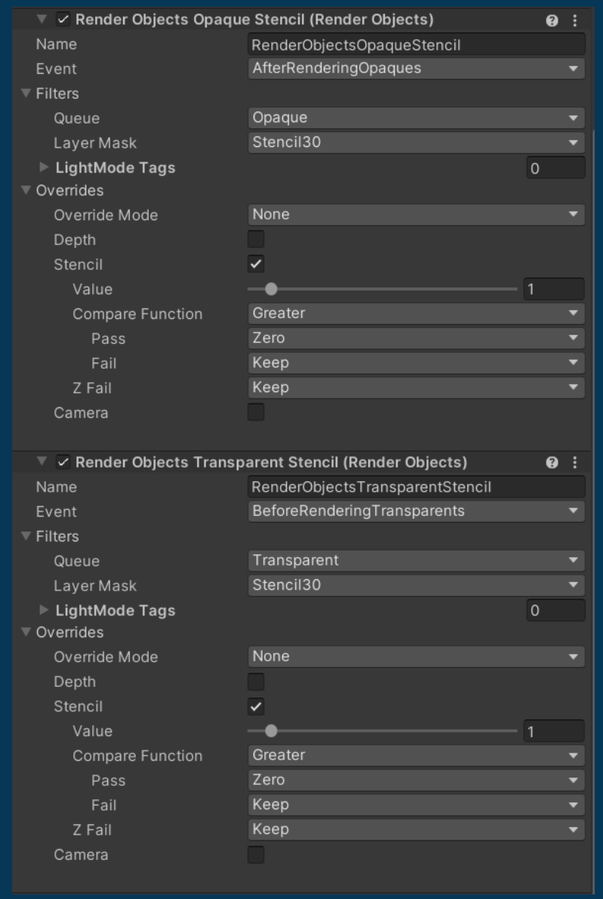


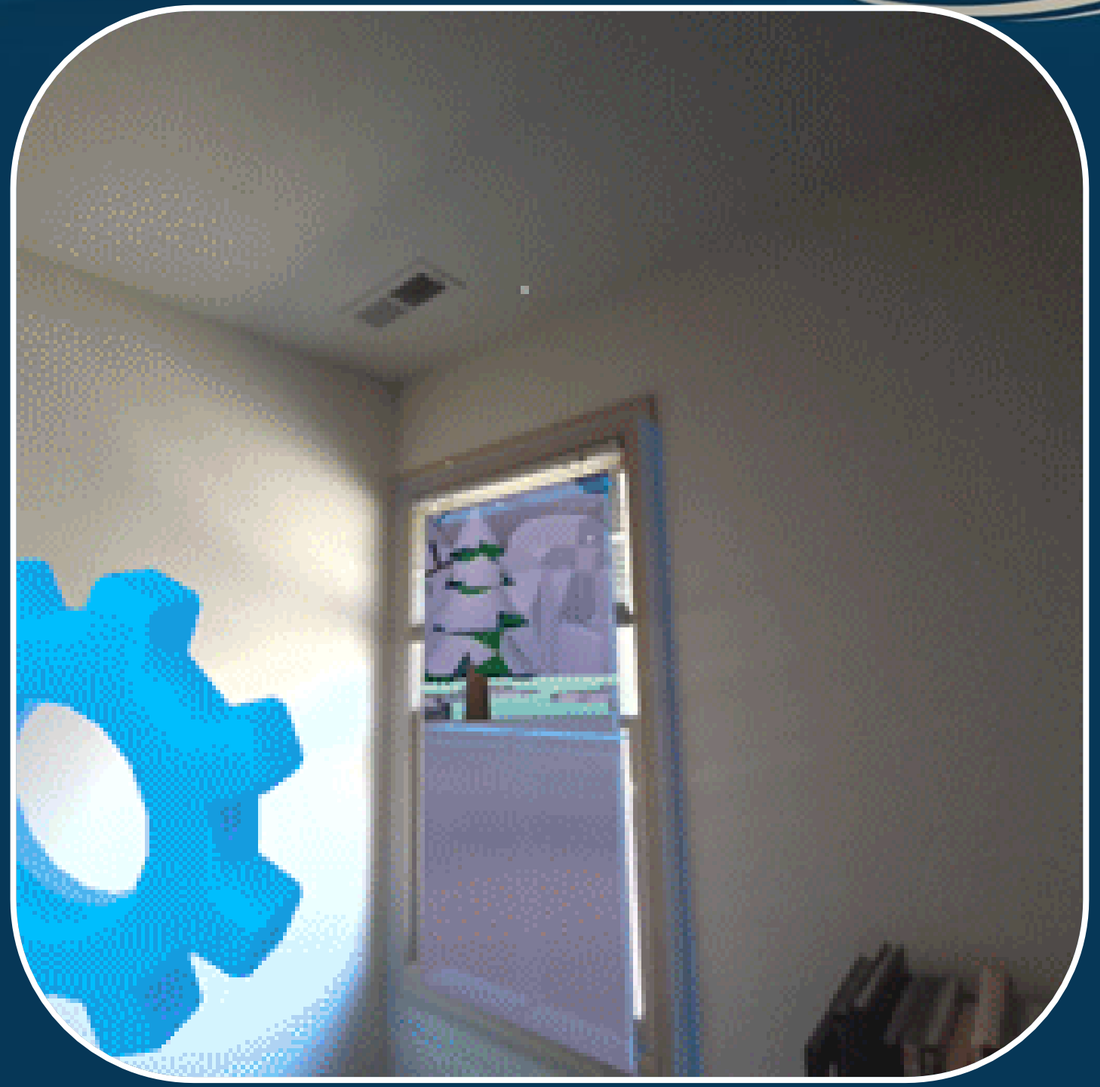
- Account for lack of room data
  - Fake room

Mixed Environment

Stencil Windows

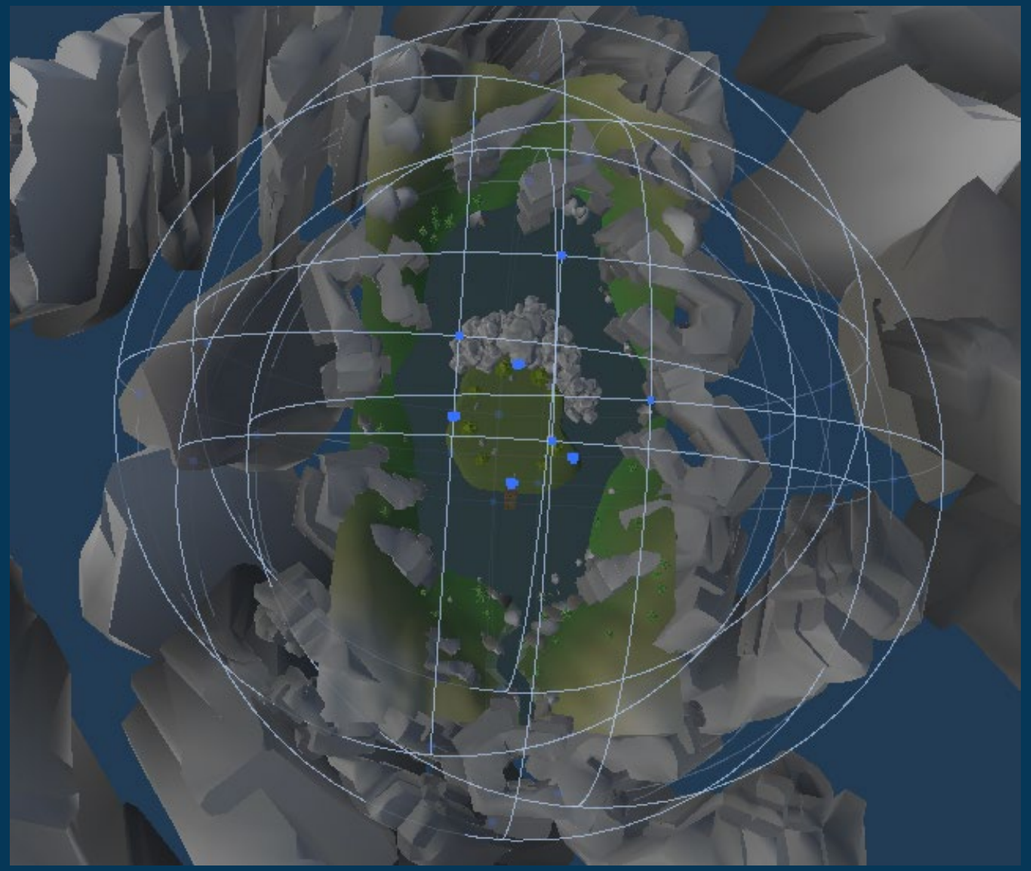
```
Shader "31bCustom/Stencil"
{
    Properties
    {
        [IntRange] _StencilID("Stencil ID", Range(0, 255)) = 0
    }
    SubShader
    {
        Tags
        {
            "RenderType" = "Opaque"
            "Queue" = "Geometry"
            "RenderPipeline" = "UniversalPipeline"
        }
        LOD 100

        Pass
        {
            Blend Zero One
            ZWrite Off

            Stencil
            {
                Ref[_StencilID]
                Comp Always
                Pass Replace
                Fail Keep
            }
        }
    }
}
```

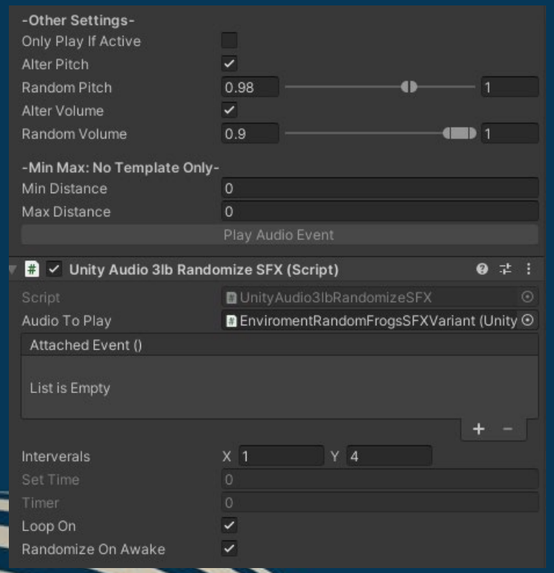


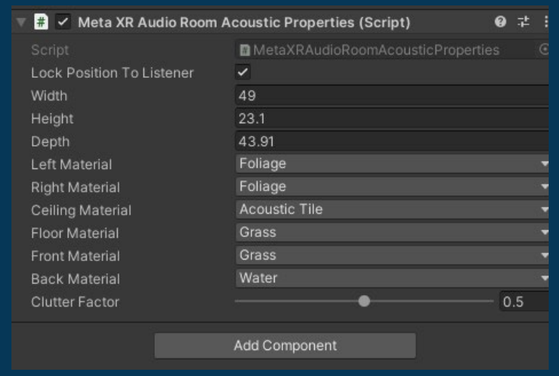


Audio in MR

- Overlapping environment sounds
- Multiple zones with variability
- Connects player to the space







Hand Tracking

Direct Interactions

Reach out and touch

Breaking “T-Rex Pose” and history of digital interaction

3D Menu

- Mini-tutorial
- Not quite diegetic
- Feel meets ease of use

Lesson Learned

- Avoid mistake interactions
- Control hand position

Limitation

No haptics!

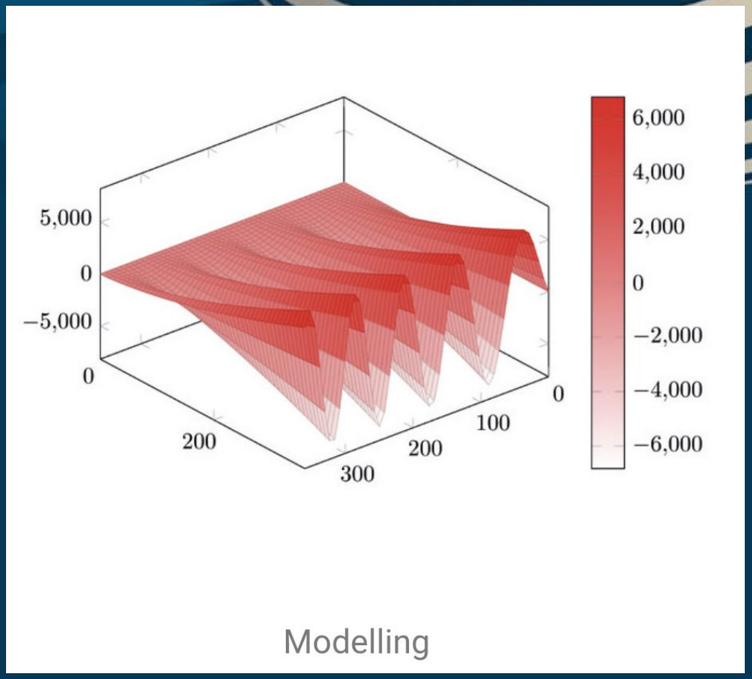
Visuals and audio only

Make reactions clear

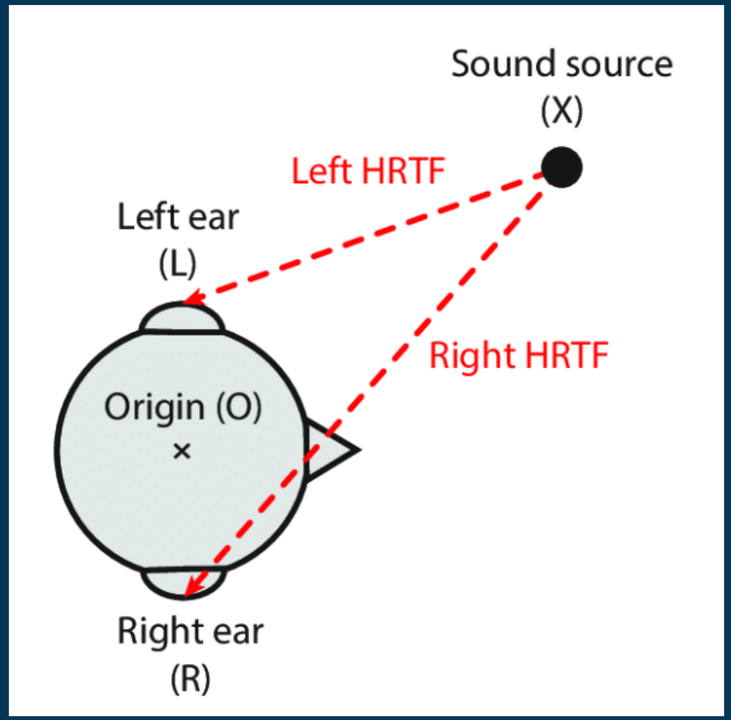
Audio

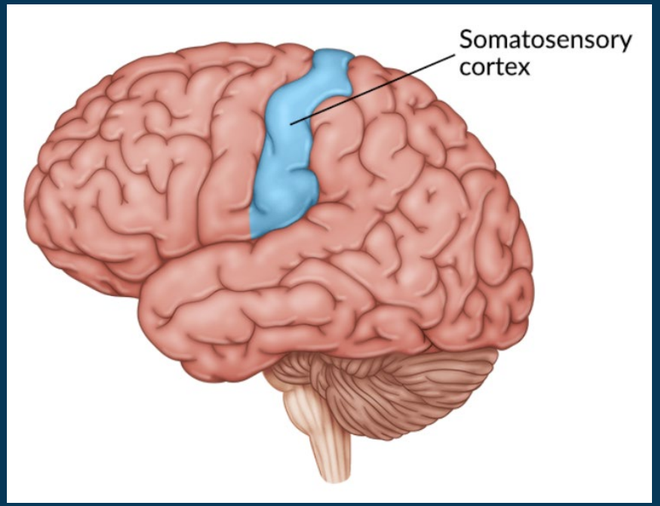
- Engage the primary somatosensory cortex
- Overlapping senses
- Our brains fill in the blanks
- Localization allows for reactions out of view

Psychophysics



Modelling





Gestures

- Indirect interaction without buttons
- Grab, shoot, chomp, mind powers
- Games focused on single gestures
- Simplified instructions

- Lessons Learned
  - Keep gestures easy
  - Intuitiveness
  - Do what feels right!
  - Account for intention

    Mis-gestures aren’t fun

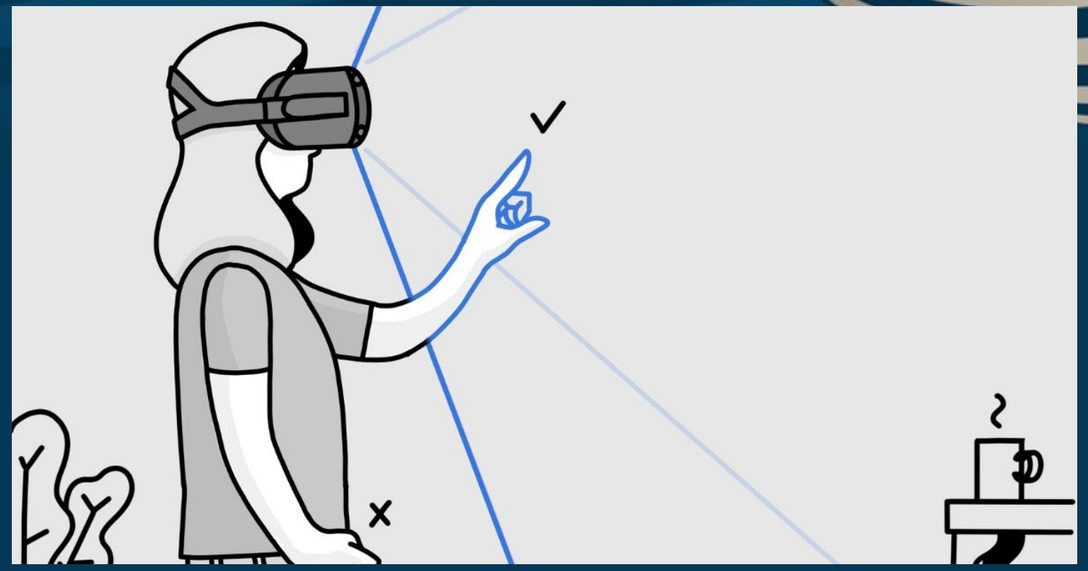
Combined Gesture

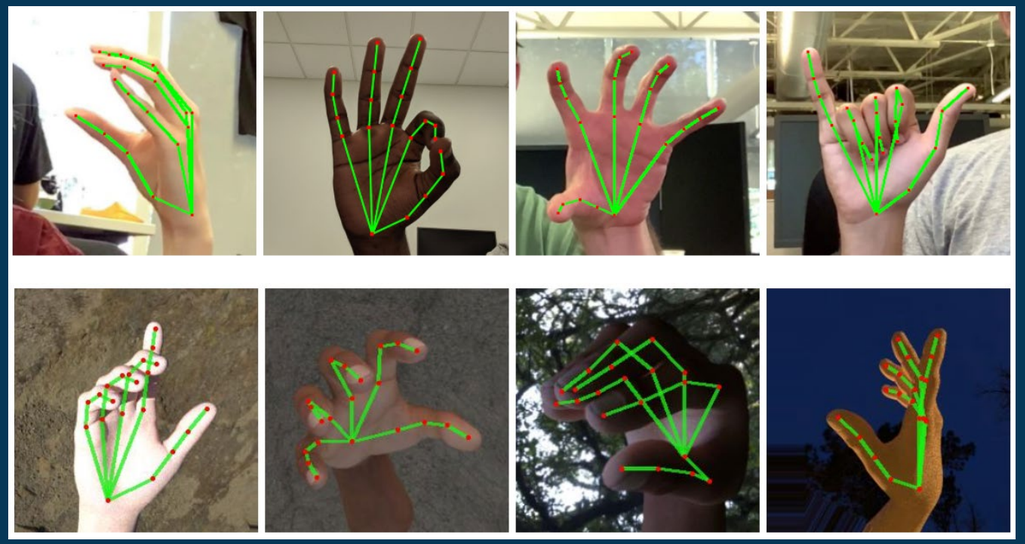
Primary gesture

Fist, Pinch, & Puppet merged

Gesture Challenges

- Gesture recognition
  - How do you make a fist?
  - Hand size variability
  - More forgiving thresholds
- Tracking speed
  - Design games to allow for hiccups
  - Remind players to check lighting
- Field of view
  - When out of view, stay in last gesture





Prototype Reel

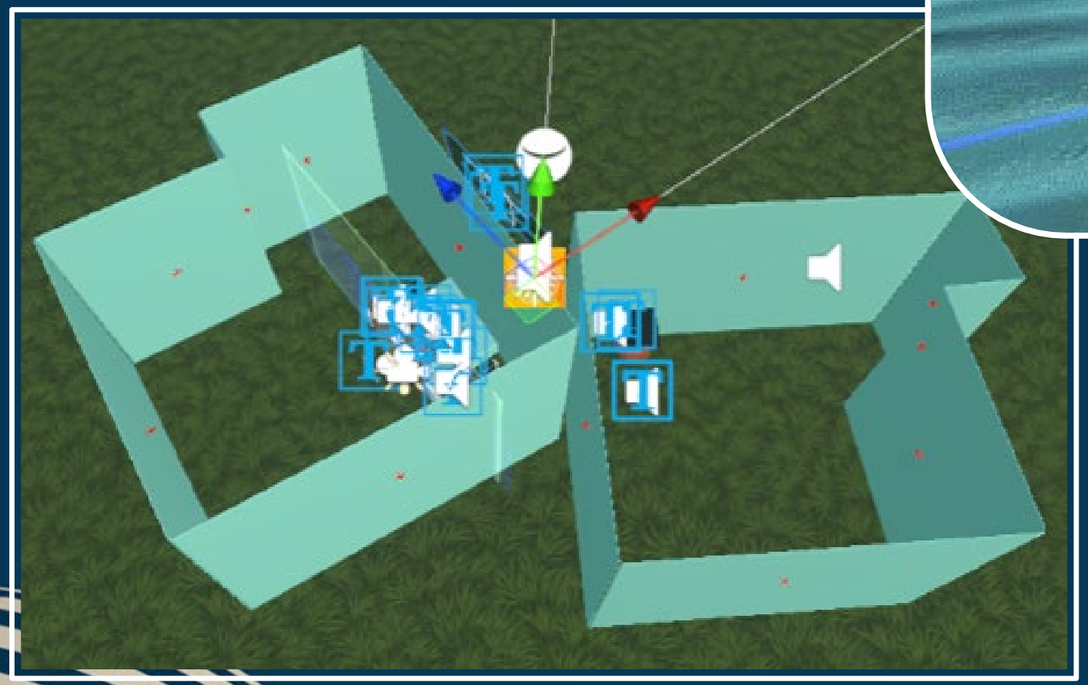
Multiplayer

- Learn by playing with friends
- Distraction from the little stuff
- Player generated entertainment
- Hand tracking & body language

- Host Server mode
- Client side prediction
- Visuals tracked separately from actions
- Gestures directly used by tools

Combined Rooms

- Walls and floors for spawning
- Solid tables and couches only
- Room variability



Physics and Rooms

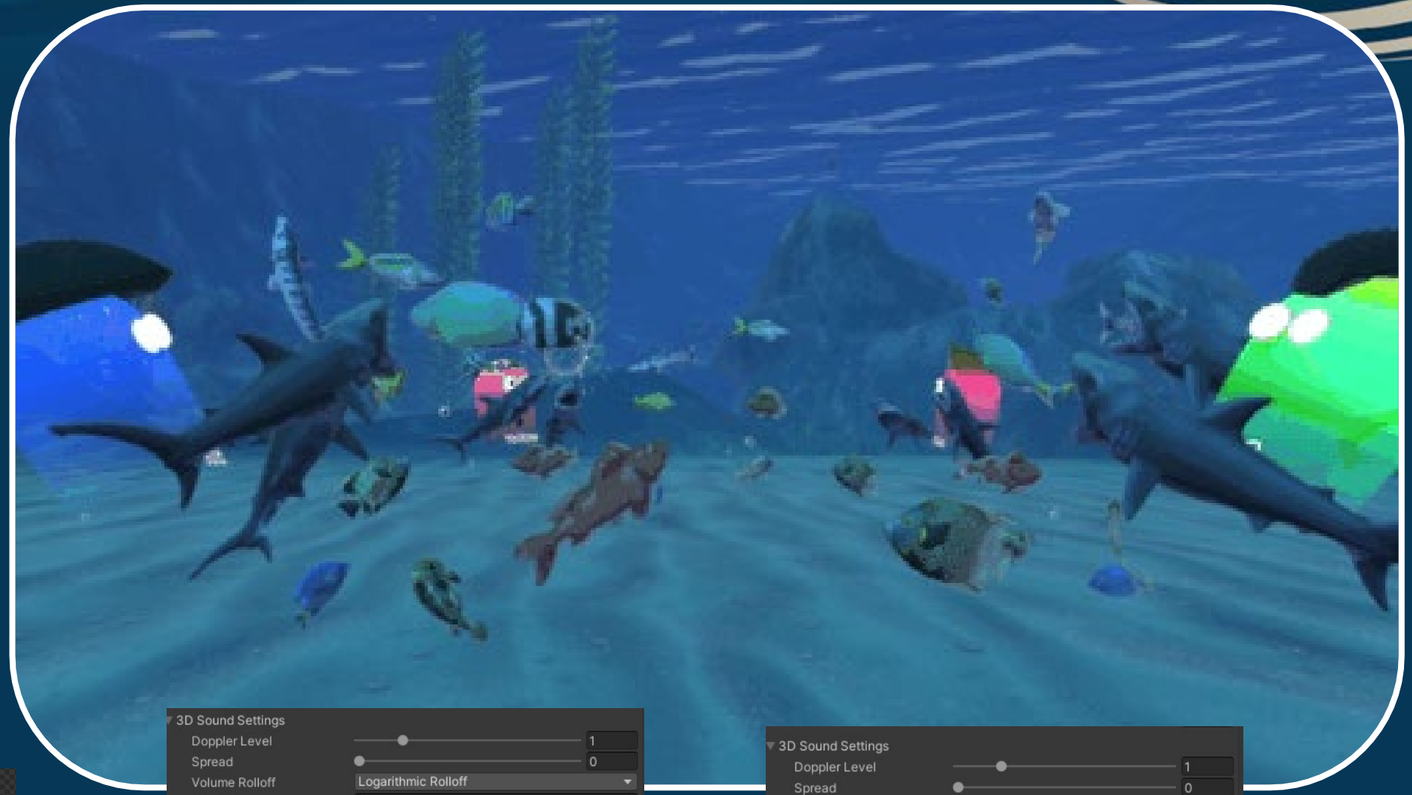
Deterministic physics with server authority

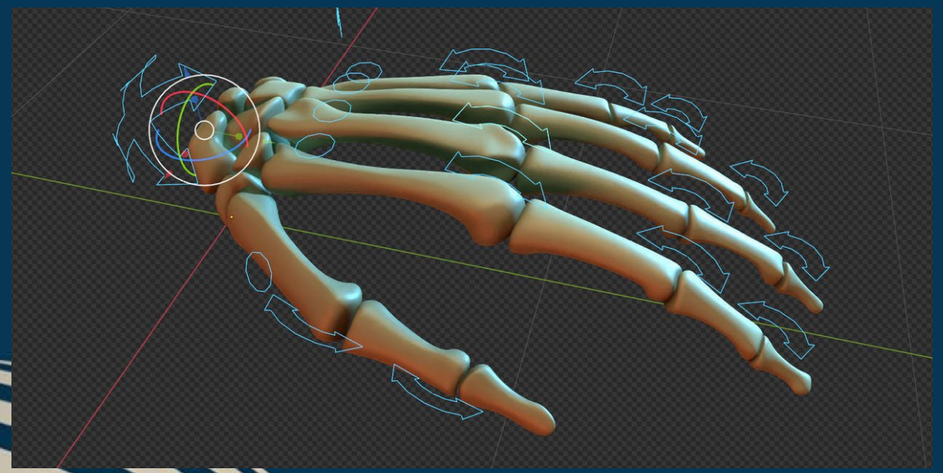
Lessons Learned

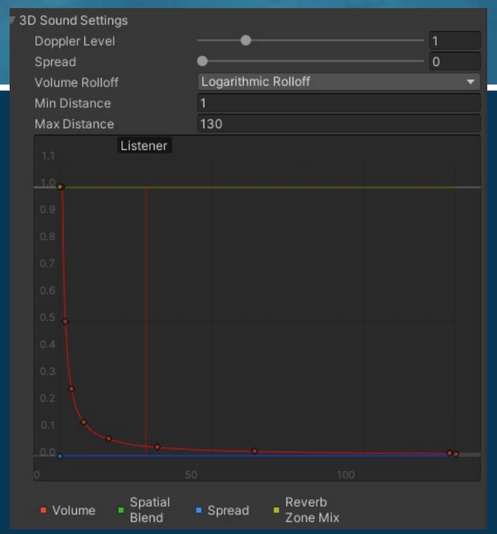
- Limit the solid colliders
- Keep the numbers in check
- Account for network variability
- Reaction FX run local and networked

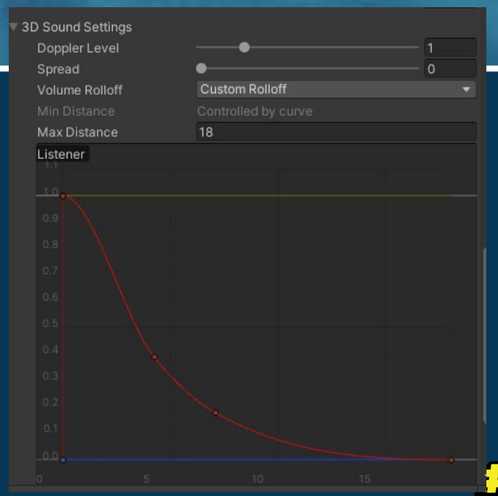
Challenges

- Test ALL the things!
- With all the people!
- Reduce the complexity
  - 10 fingers x 3 joints each
- Jitter and lag more noticeable
- SFX overload









So how did it go?

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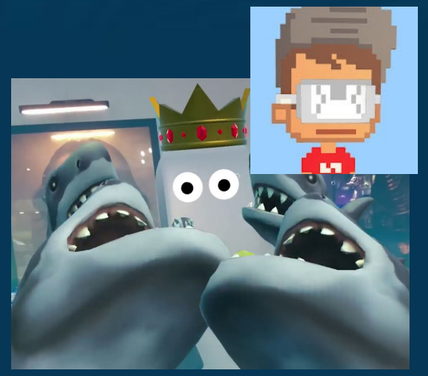
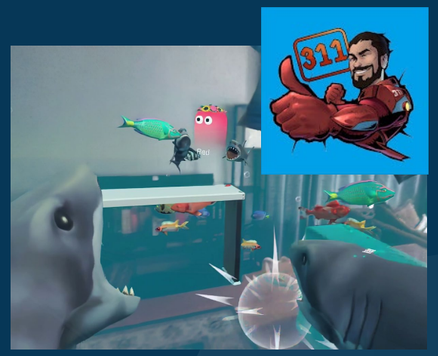
Lots of Press!

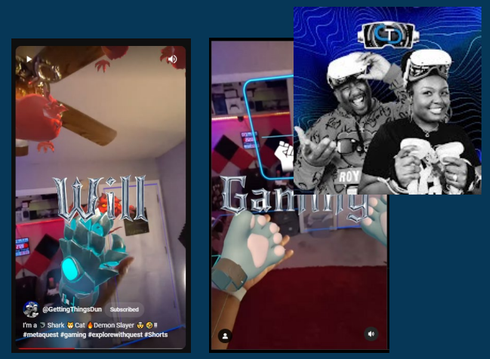


Nathie: 751K subscribers(Youtube)
‘Brutally Honest Meta Quest 3 Review | Game Changer or Overhyped?’

Rhys Da King: 41.8K subscribers (Youtube)
‘TOP 10 BEST MIXED REALITY Games On Meta Quest 3!!’



Matteo311 VR News and Reviews : 68.6K subscribers (Youtube)
BEST Mixed Reality Quest 3 Games - Top Mixed Reality Games list



Getting Things Dun:
Instagram (1,763 followers)
Youtube (3,140 subscribers)
Twitter/X (1,060 followers)
Tiktok (502 followers)

Tetiana Disco: Disco-VR 47.7K subscribers (Youtube)
‘Best Mixed Reality Games On Quest 3 Part 1’

Atom Bomb Body
‘The Best VR Games Spreading Virtual Festive Cheer’ article on **VR Wave**

#GDC2024

Grokit

★★★★★ 23 Ratings

ESRB
Everyone
Mild Fantasy Violence

SomeArtsyGirl
Nov 12 at 1:07 PM

★★★★★

A super fun game!

They had me at shark hands!!

This game is perfect for the entire family.

Peter Nagy
2 days ago

★★★★★

Good usage of Mixed reality

The game is taking advance of the mixed reality and show what is really possible with this new approach. The 6 mini games are easy, but it takes a bit to master them. So far there are 6 mini games, from all 6 the Chomp, where you have to eat fishes with your hands around your room is my favorite. The game is already good, I am curious, what else will bring the developer. The potential is huge. Good job!

Mea
3 days ago

★★★★★

Cuteness overload

Love this adorable game. There are six quick mini games that you can play solo or with up to 4 people. My favorite mini game was Chomp where your arms become sharks that eat the fish swimming around you. Outside of the cute appearance of the game I also love that it has hand tracking.

Dscruffles - Ruff Talk VR
Nov 15 at 11:12 AM

★★★★★

A fun and cute experience

Grokit is a great example of the potential of mixed reality and social VR experience. It's a fun and cute experience that's great with friends

DeadKnuckles
2 days ago

★★★★★

Gotta love VR!!

This game is awesome and any person who has a VR headset needs this game!!! Quest 3 runs it amazingly!!

Brad Korunes
11 days ago

★★★★★

Amazing game and great for kids!!

This game is super fun for the entire family! Lots of great scenarios and challenges. The hand motion control is also fantastic!!

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the developer. The potential is huge.

DMaxx
Feb 7 at 7:27 PM
★★★★★

Actual laugh out loud controlled chaos

Sometimes you run into a game where fun seems to be at its core. Grokit takes a big chomp at that. Pun intended. Chomp *is* one of the best mini games in Grokit, and the other games are crazy chaos, too. It is a welcome change when the competition element is as fierce as it is playful. Good on ya for kinda building that into this one. With planned updates like the holiday bit and hopefully lots of others, things should freshen up nicely in Grokit from time to time. We need more mixed reality efforts like this. Good fun with friends.

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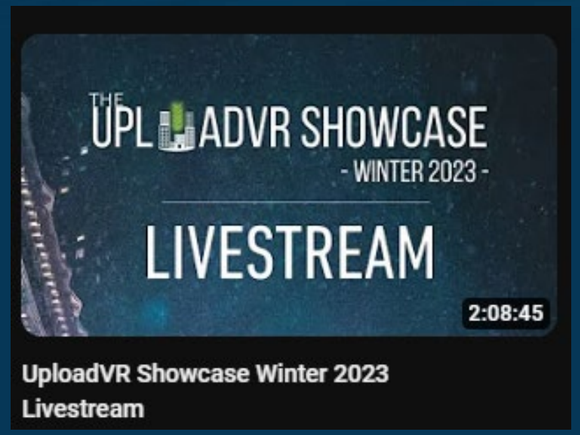
Features & Interviews



UploadVR Showcase Winter 2023 Livestream

VR Game Spotlight '23 | EGX 2023

UploadVR 2023 Winter VR Showcase

: 90k subscribers (Youtube)

IGN's livestream This showcase was simulcast on IGN (17.9mil subscribers) and multiple VR content creators' channels

EGX London VR Game Spotlight '23

: 6.8k followers (Twitch)
: 17.8k subscribers (Youtube)
'VR Game Spotlight 2023'

Let's Talk Oculus podcast with Robin Moulder

~ 1k downloads/views/listens per episode

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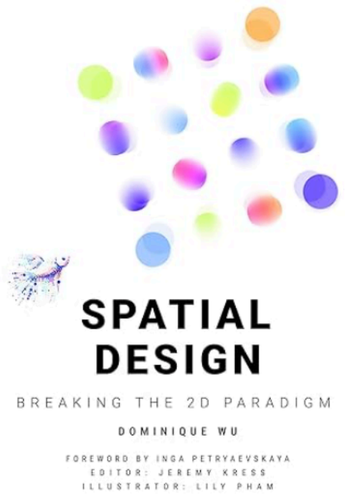
Got in a book!



Spatial Design: Breaking the 2D Paradigm Kindle Edition

by Dominique Wu (Author), Lily Pham (Illustrator), Jeremy Kress (Editor), Inga Petryaevskaya (Foreword) | Format: Kindle Edition

See all formats and editions

This book serves as a comprehensive guide through the shift from traditional 2D interfaces to the immersive realm of spatial design, capturing the collective wisdom of 38 visionaries in the field. It lays down essential principles for designing engaging 3D spaces that seamlessly integrate virtual and physical worlds, making it an indispensable manual for designers venturing into spatial computing. Dominique Wu, a veteran in crafting user-centric spatial interfaces, draws upon her extensive experience in user research and testing in 3D environments. Her expertise has garnered her consultancy roles with industry giants like Meta and Walmart (Store no 8), and she leads the charge at Hummingbirdsday Design Studio and XReality Pro, delivering innovative spatial design solutions across diverse sectors.

Dominique's dedication to exploring the vast potential of spatial design and motivating others to embrace this technology is evident in her efforts to share her insights at renowned conferences such as AWE and various academic settings. She further enriches the community by hosting weekly virtual sessions with leading figures in spatial design, providing a platform for insightful discussions, interactive Q&A, and networking opportunities.

Featuring interviews with more than 38 respected individuals in the XR domain, including Ori Inbar, Charlie Fink, Inga Petryaevskaya, Lorelle Vanfossen, Amy LaMeyer, David Coleen, Deirdre V. Lyons, Ruth Diaz, Sam Hessenauer, Paul Hoover, John Hanacek, among others, the book offers a wealth of knowledge from some of the most knowledgeable and experienced professionals in the industry.

Interview & Game Highlight with focus on Hand Gestures

#GDC2024

Wrap Up

Cautions

- Designing around a moving target
- Compatibility and cutting edge

Recommendations

- Keep it simple!
- Don’t make assumptions
- Build on foundations

Thank you!

Robin Moulder

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GROKIT Spring Sting

Spring update!