

Explorations in XR Creation Tools

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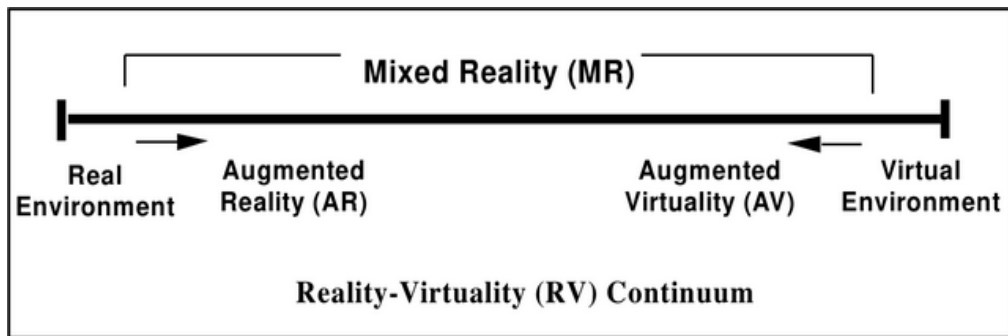
Agatha Yu

Lead Product Designer, Oculus



XR

- "X" is a variable



Reality-virtuality continuum proposed by Milgram et al. in "Augmented reality: a class of displays on the reality-virtuality continuum"



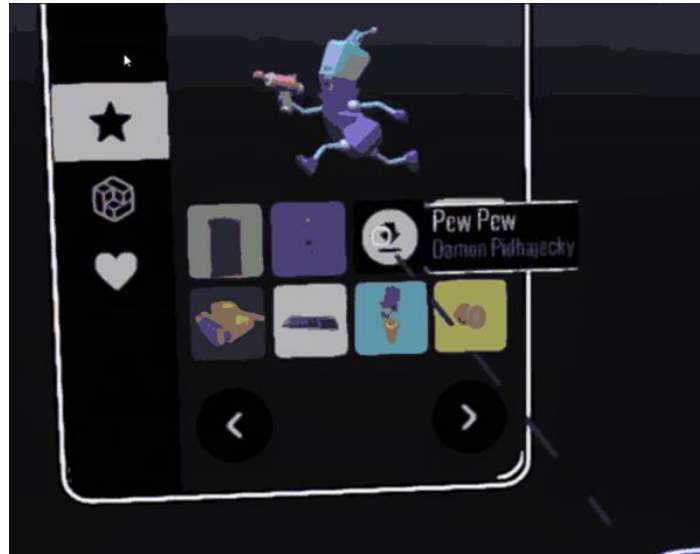
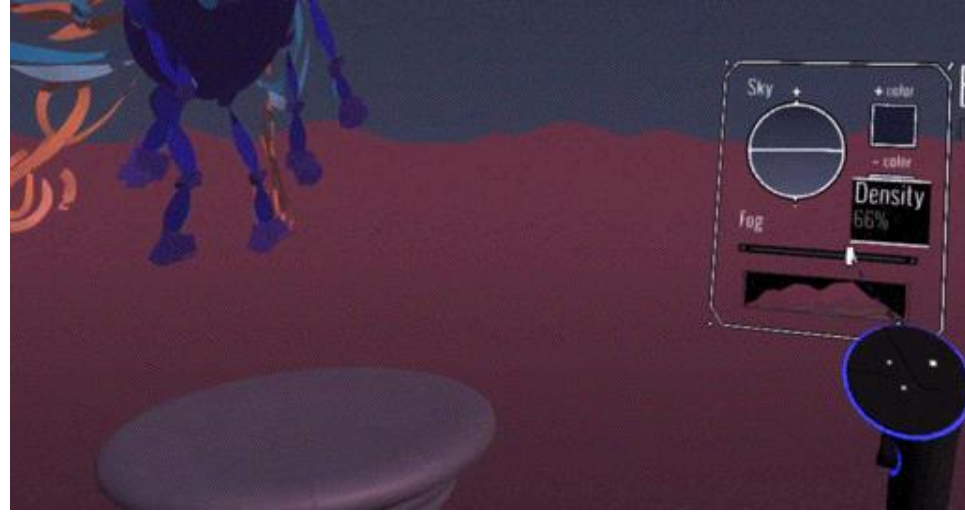
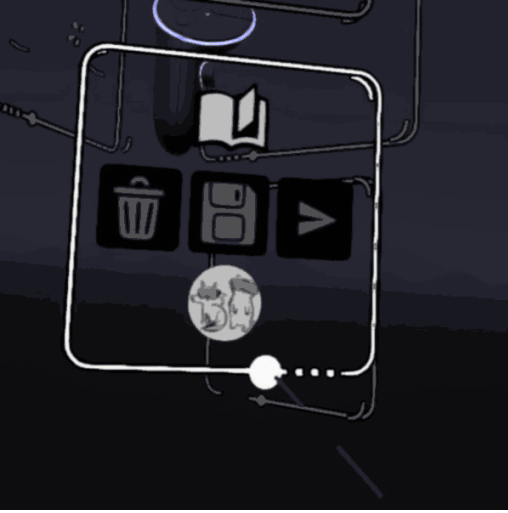
Nice to meet you!

I'm Ashley Pinnick.

Technical Artist on the Tilt Brush team @ Google



Tilt Brush
by Google



IDEATION

PROTOTYPING

USER TESTING

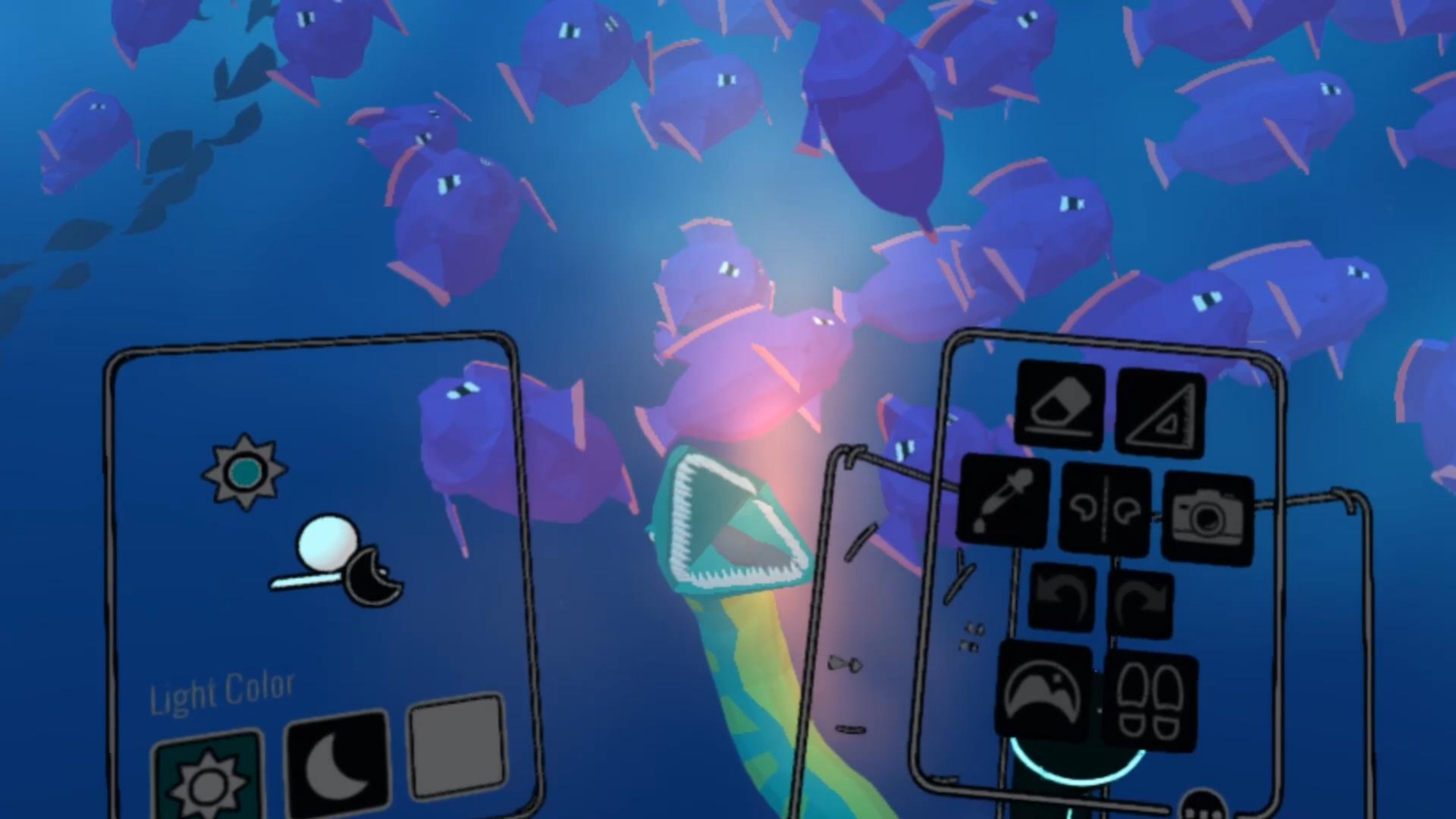
RINSE N' REPEAT

POLISH

SHIP

■ Postmortem

Lights Panel

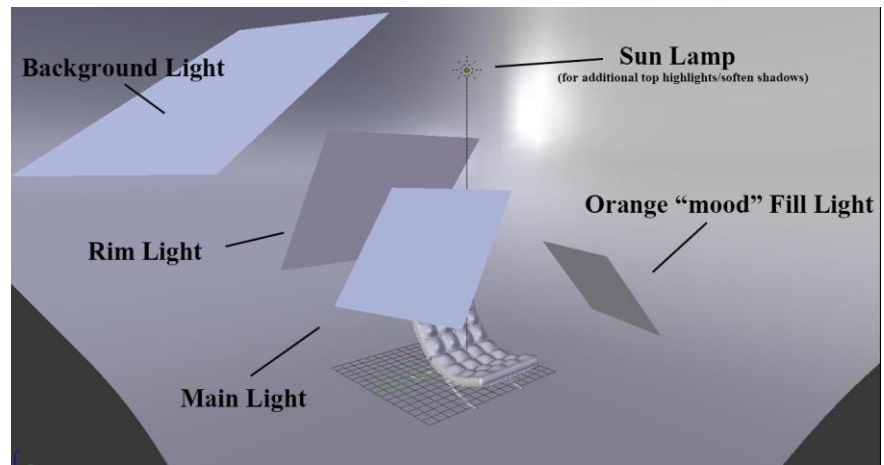
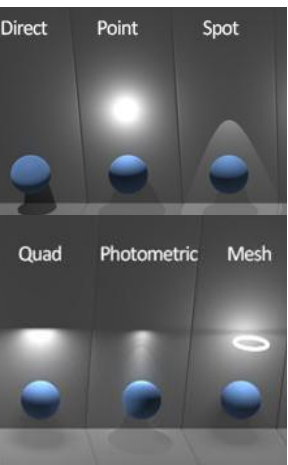
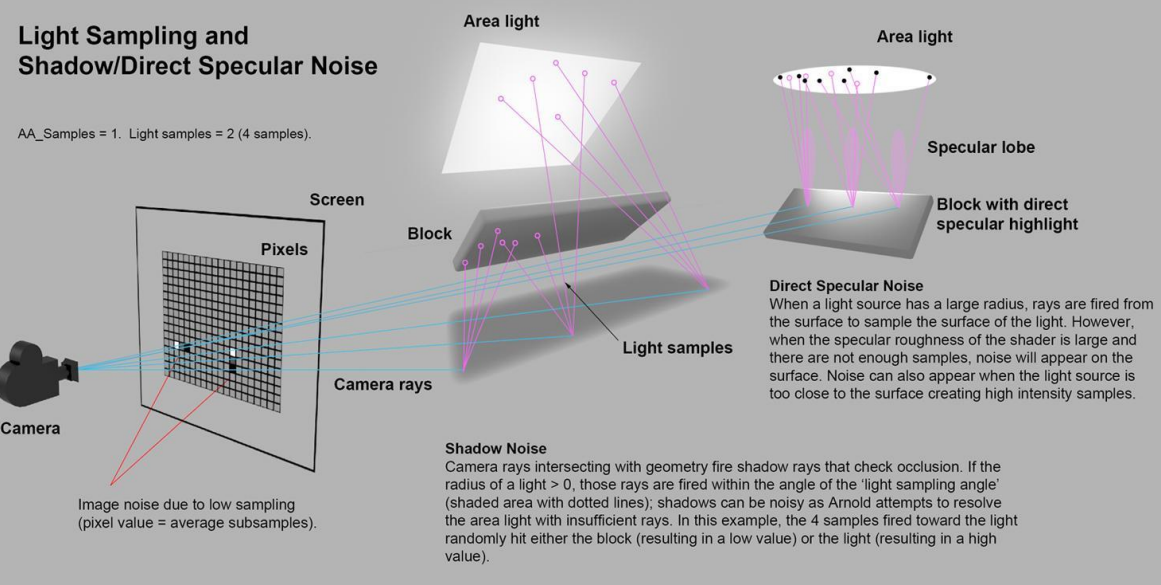


The problem

How do we create an intuitive abstraction for adjusting realtime lighting in VR?

Light Sampling and Shadow/Direct Specular Noise

AA_Samples = 1. Light samples = 2 (4 samples).



Panel constraints

- 2 directional lights
- 1 ambient light
- 3 color pickers
- Indications of: each light's direction, intensity, color, and more...



IDEATION

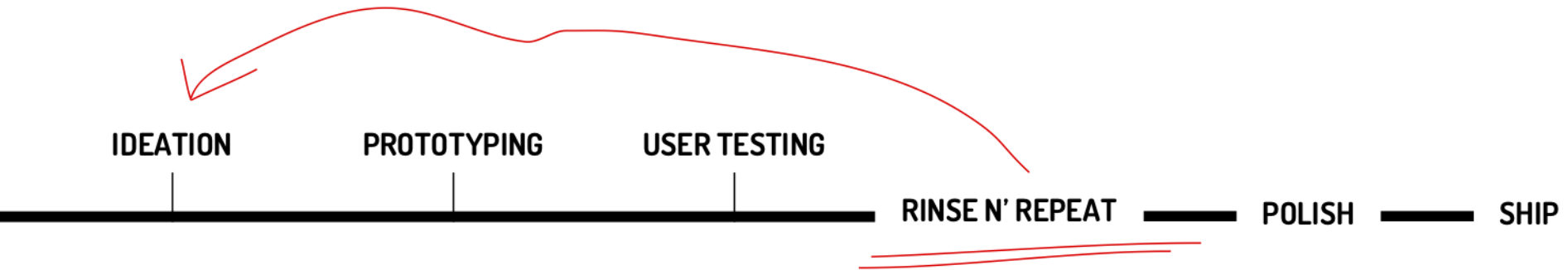
PROTOTYPING

USER TESTING

RINSE N' REPEAT

POLISH

SHIP



V.02 Sketches

Inspired by holograms & 2D preview windows in traditional DCC tools, I explored concepts for creating a 3D preview users could directly manipulate in realtime.

* LIGHTING VOLUME *



- * thicker outline behind, thinner in front (volume shouldn't occlude view)
- * grey? ghost in front
- * thicker, anchored corners

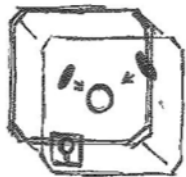
← do panel pieces w/ UI sit in front or behind?



INACTIVE (but still working on the same panel state)

- should the volume...
 - darken? - 2D iso view?
 - flatten? - switch into button?

try it!



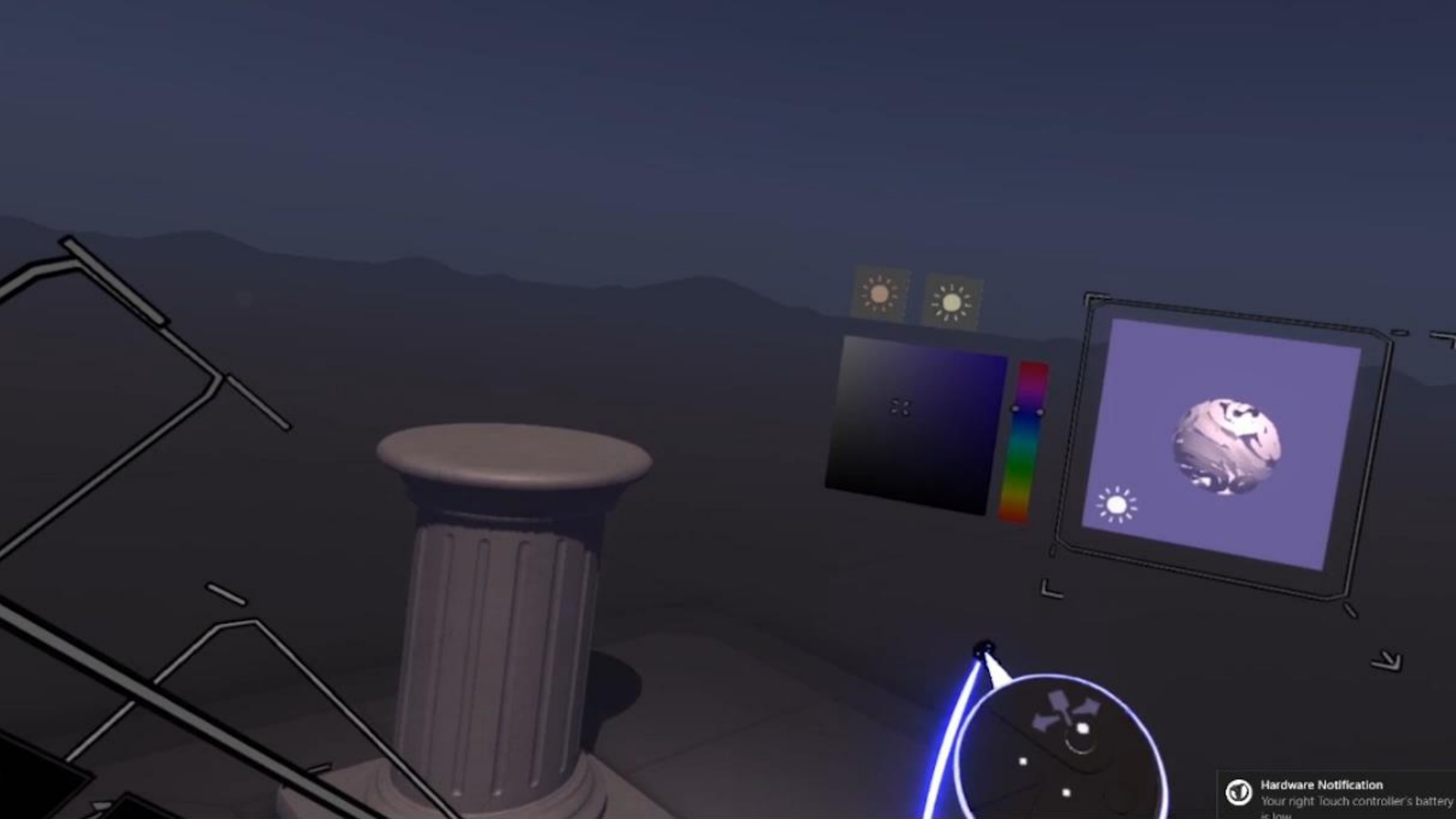
holograms

AR in VR



panel
* smashes down into 2D when selected

* widgets too



Hardware Notification

Your right Touch controller's battery is low.

IDEATION

PROTOTYPING

USER TESTING

RINSE N' REPEAT

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V.03 Sketches

I explored ways to hide color pickers, representations of light intensity & different interactions for light widgets.



DIORAMA

- Gives lights a shadow casting object to affect.

- OCCULDES CURRENT BUTTON POS
- DOESN'T SMASH WELL
- MAY NEED TO BE SMALLER?

could need panel layout redesign



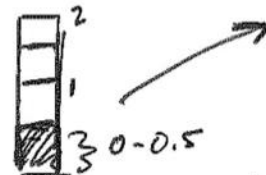
lights



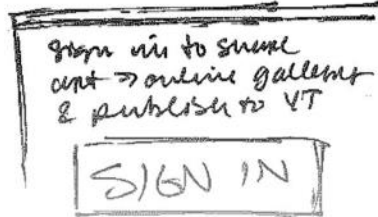
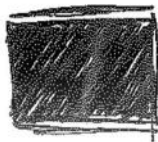
longer / taller panel?

* upload math looks wrong > moves too fast

* RAMP



slider should be perceptually linear



sign in to share
art -> online gallery
& publish to VT

SIGN IN



> PAUSE



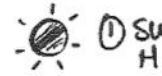
Light

WIDGET HO



* should

TUTORIAL



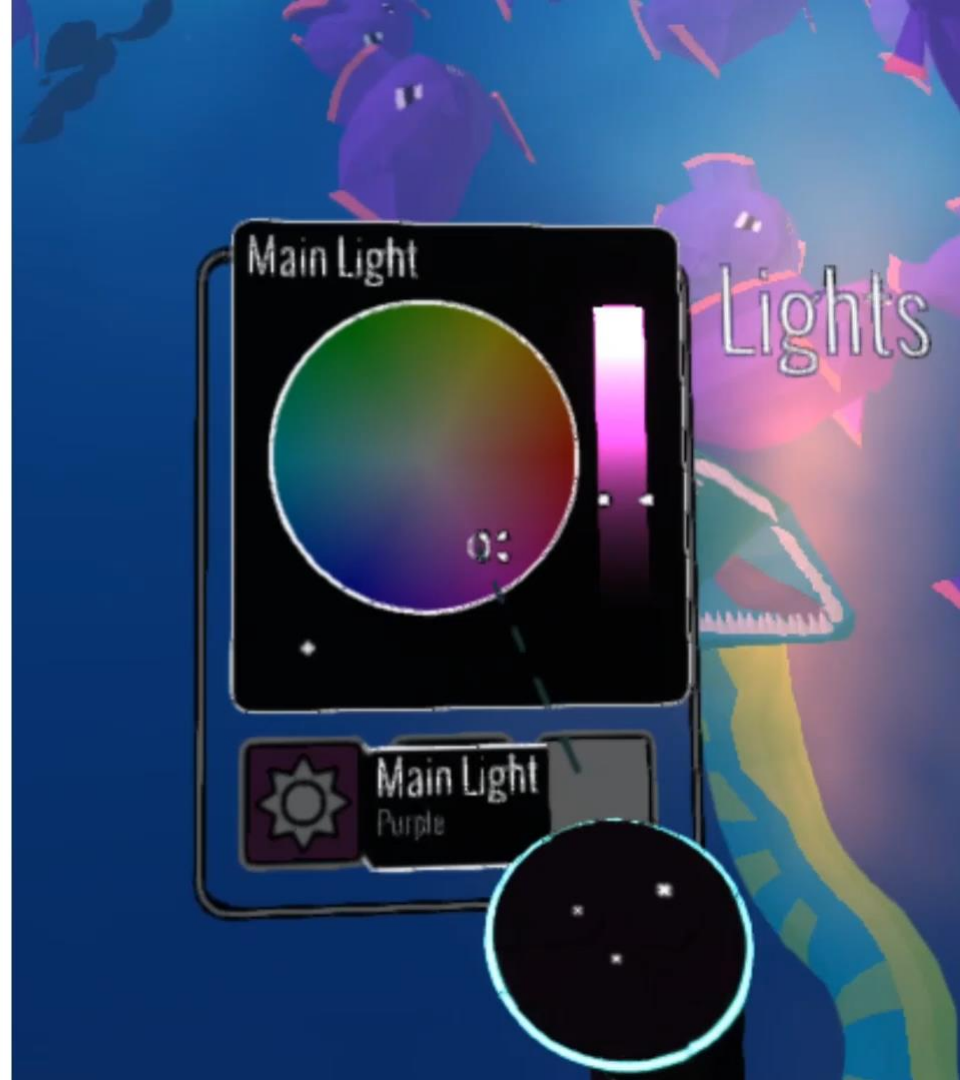
LIGHT WIDE

① #####
WHH SH

② LIGHT
#####

* Are we
right?





IDEATION

PROTOTYPING

USER TESTING

RINSE N' REPEAT

POLISH

SHIP



Takeaways

- The best solution != the first solution
- Multidimensional thinking
- Abstract concepts & physical objects









Thank you!

Twitter | @pinnick_ashley
Instagram | @ashleypinnick



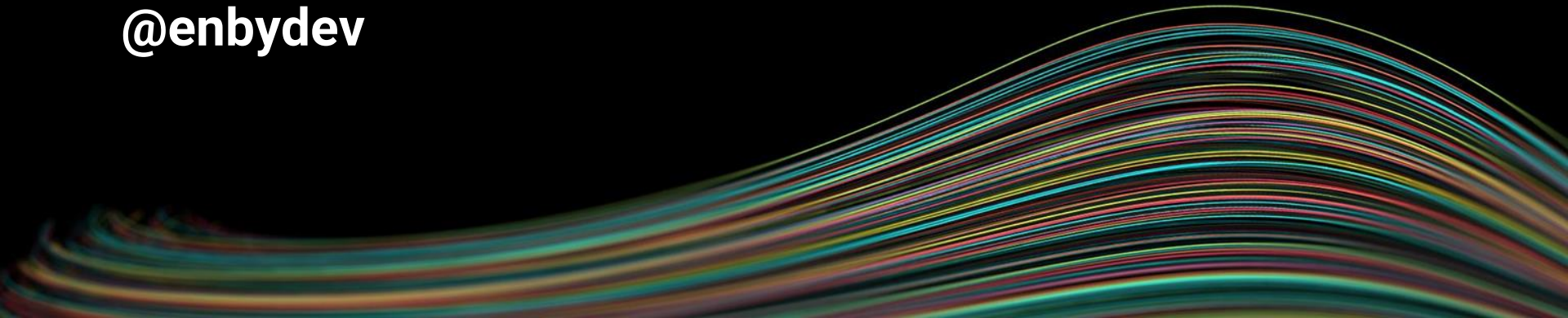
Amy DiGiovanni

she/her

Software Engineer at Unity Labs

amyd@unity3d.com

[@enbydev](#)



XR in Unity Labs

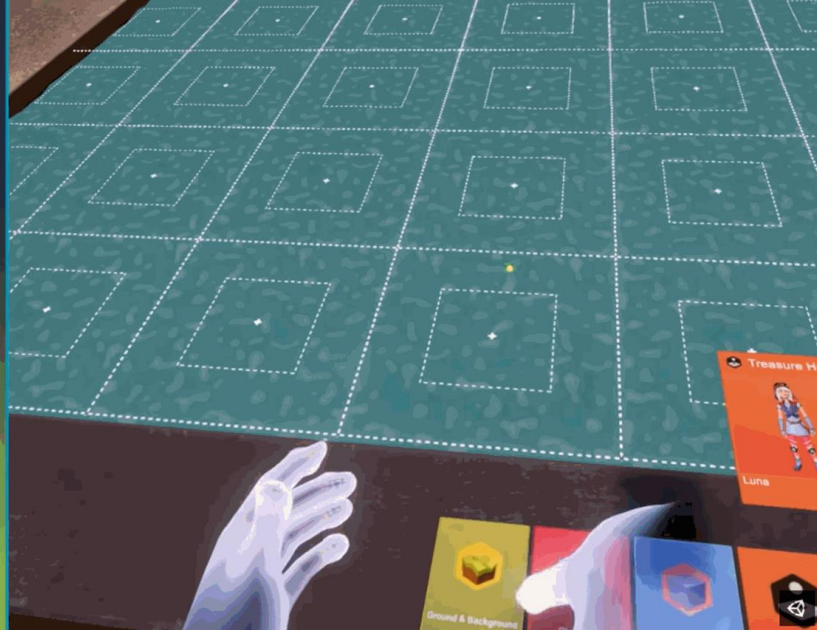
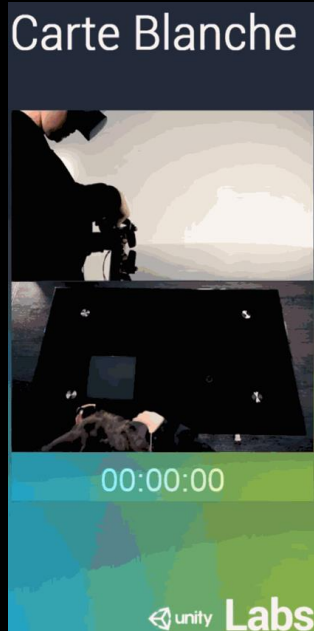


EditorXR ("EXR")



Unity
at GDC

Carte Blanche



unity

Unity
at GDC

Mixed Reality Research



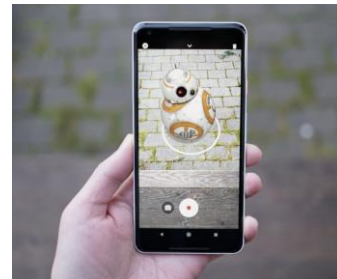
Unity
at GDC



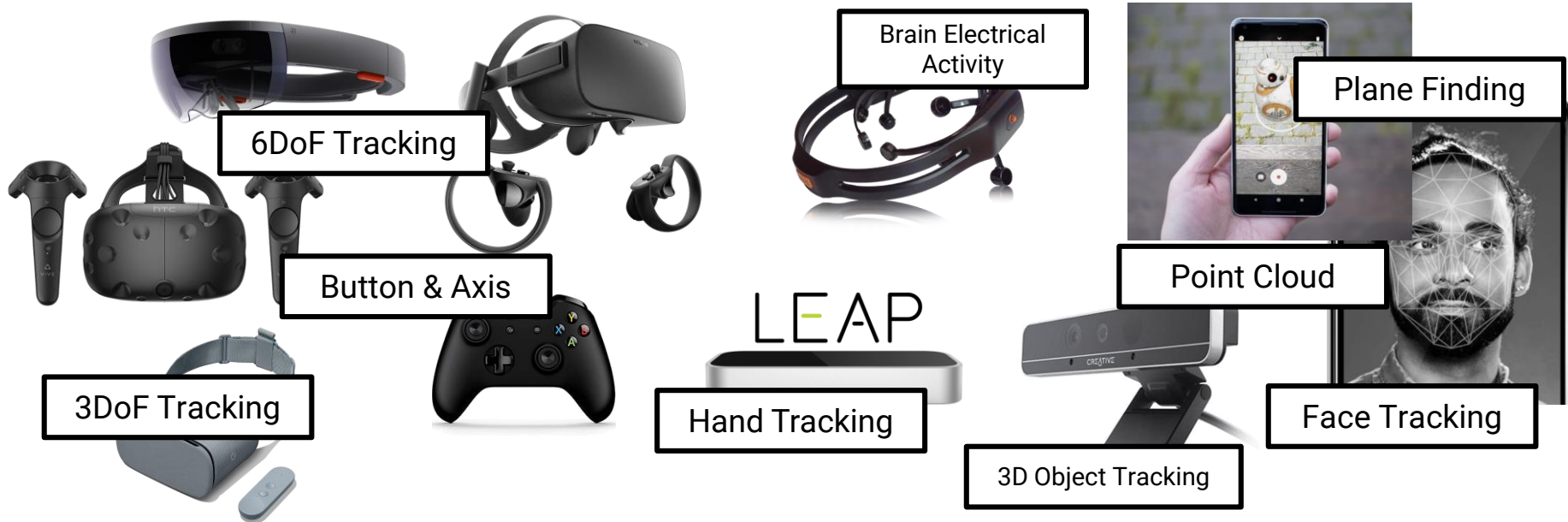
Platform-agnostic XR creation tools



So many devices



So many capabilities

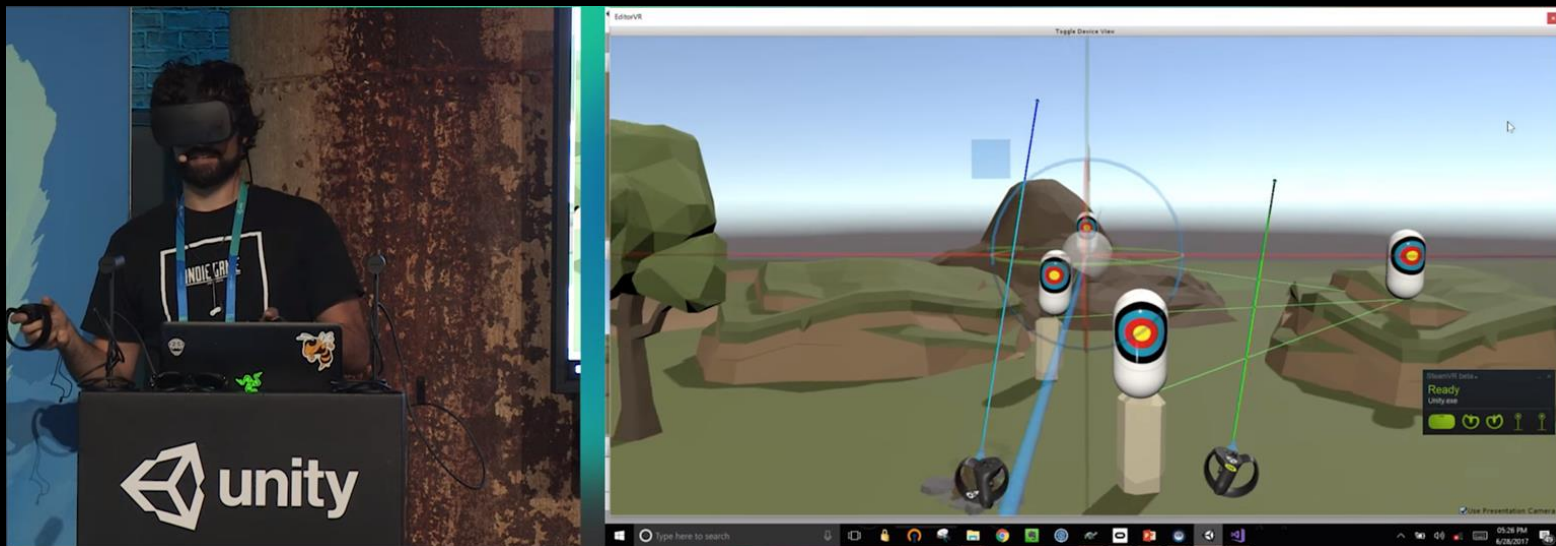


Functionality injection

- Adaptability and swappability
- Complete decoupling of systems
 - Interfaces that declare what functionality they *use*
 - Interfaces that declare what functionality they *provide*
 - Top-level system hooks up everything
- Nothing relies on specific hardware
- Facilitates rapid iteration



Functionality injection



“Unite Europe 2017 - Let’s build an EditorVR tool together!”

<https://youtu.be/TmutlUK3ERI>



Unity
at GDC

Accessibility and personalization

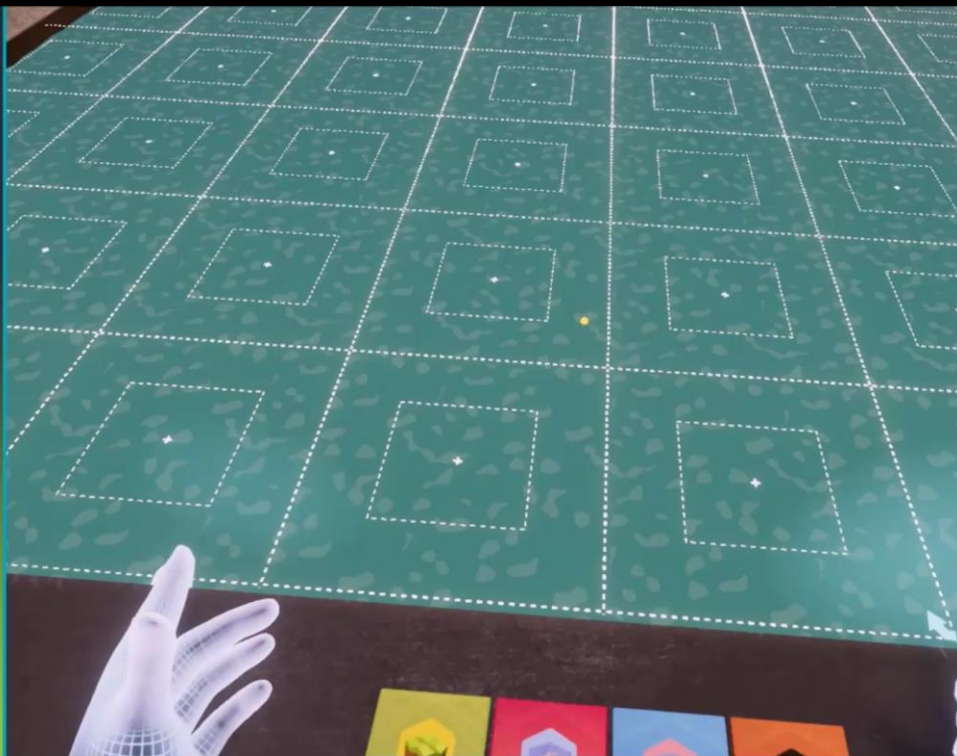


Carte Blanche



00:00:00

unity Labs



unity

Unity
at GDC

Controllers in EditorXR



Locomotion options in EditorXR

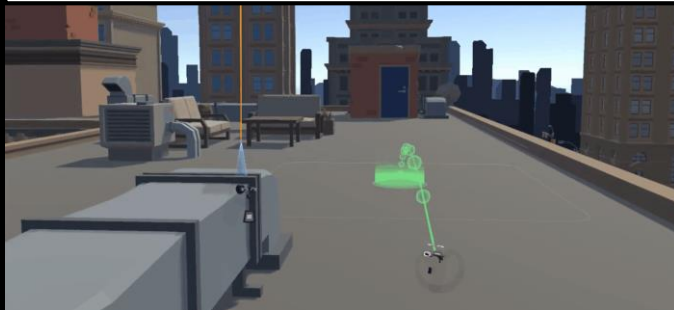
Crawl



Fly



Blink



unity

Unity
at GDC

“Why not both?”

- No one “right” way to be intuitive
- Provide multiple ways to do the same thing
- Accessibility and personalization should not be an afterthought
- Growth and idea generation can only happen with a diversity of minds



Mixed Reality explorations in Unity Labs



Mixed Reality

Virtual and physical
realities

Semantic awareness
of the environment



unity

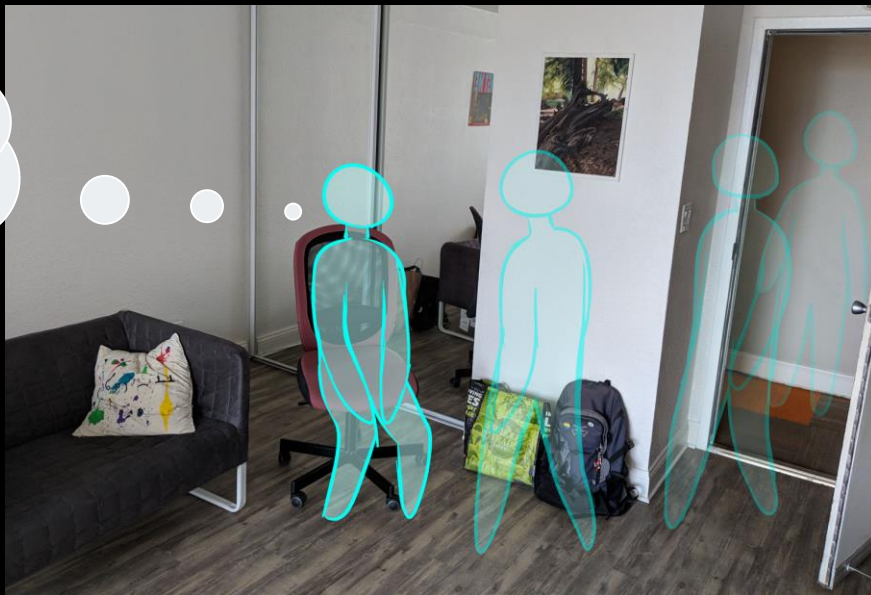
**Unity
at GDC**



Semantic authoring for MR

You don't know what environment a user is in

I only know how
to sit on chairs.



unity

Unity
at GDC

Semantic authoring for MR

- Semantic traits (“A chair is sittable”)
- Conditions (“Play animation when something sittable is found”)
- Fallback functionality (“No chair, but I can sit on a couch”)



In conclusion: **XR necessitates adaptability**

- Adaptable to hardware
- Adaptable to users
- Adaptable to environments





Thank you!

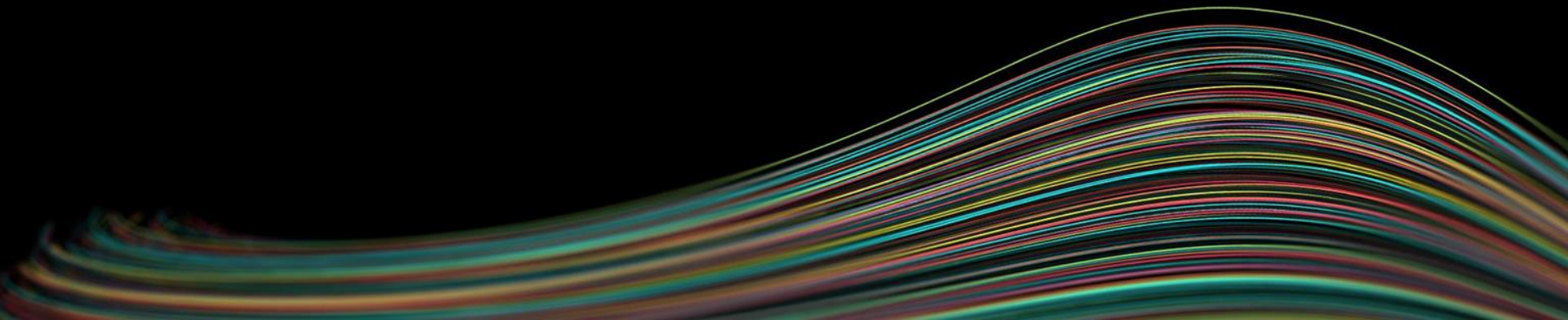
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@Unity3DLabs



“Noumenal” Design In XR



Noumenon ('noōməˌnän)

- *A thing in itself, as distinguished from a phenomenon or thing as it appears
- *The object, itself inaccessible to experience
- *The waves that make the song, the quarks that make up matter, etc



Design for blended multi-XR sessions

(Transition from VR, to AR/MR, and beyond)



- Noumenal design is meant to cover the XR spectrum
 - VR, MR+AR, BCI, gesture, voice, etc.
 - HMD's, glasses, phones, radar(Soli), touch(Jacquard)
 - VR to MR blended transition support
 - Sustain user input continuity as XR states transition from one to the other (including opacity+UI changes)
 - Architecture handling realtime input type changes
 - Future-proof your systems architecture
 - Support persons with disabilities
 - Support cultural, social, ergonomic customization



**Facilitating continuous synthesis of
context, input, style, culture, ergonomics**



Phenomenal UX Design + Engineering

Industrial Design
Architecture
Fashion
UI
& more



**Support different & multiple
UI & input means
for each XR subset (VR/AR/MR)**



**Unity
at GDC**



Support blending between opaque(VR) & transparent(MR) states



Unity
at GDC



UX handoffs/changes on a per-user & per-app basis



**Now just sprinkle on a little
Machine learning magic ;-)**



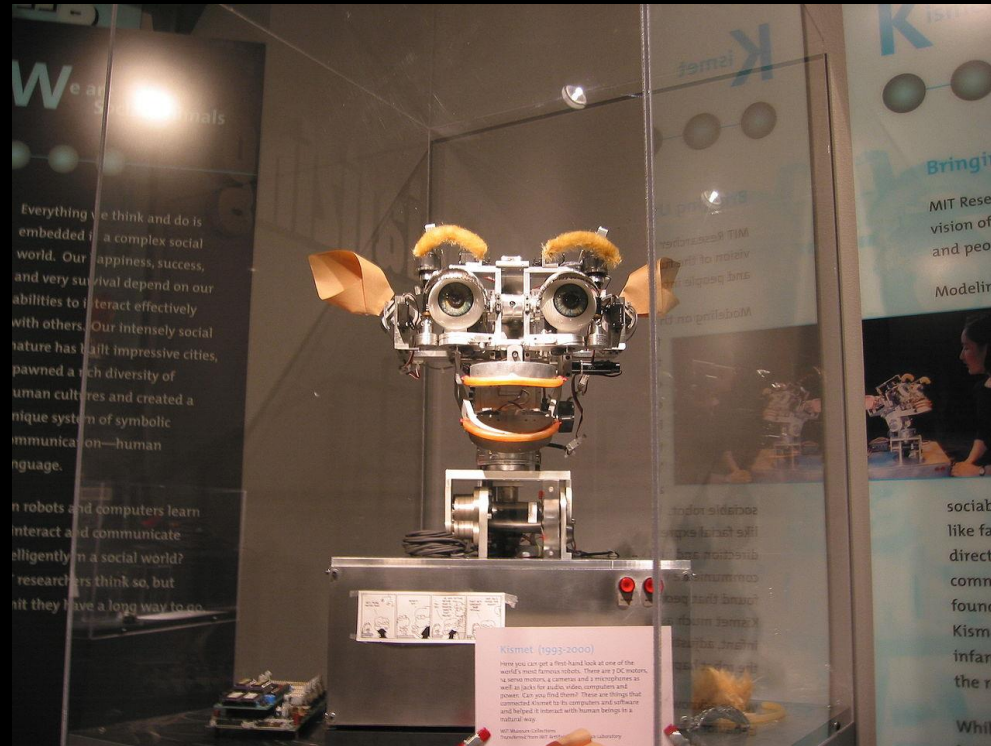
Machine Learning: Design ML informed system architecture



Utilize ML to optimize for the most ergonomically ideal flow, for a given session duration, disability, etc.



Embrace the AI (or else ;-)



(TODO: add totally not creepy pic of our (near)future robot overlords on this slide)

Potential outcomes

- Designer's transition into role of curator
- Allow for ML to be trained on individual design/UX styles/flows
- Architecture that empowers machine learning to inform entire user-flows, while dynamically swapping input types
- Benefit from UX optimizations that ML identifies/suggests
- Handle for input+UX flows as contexts blend
- Better support for dynamically generated narratives





labs.unity.com / @Unity3DLabs



Dylan Urquidi / @3Duaun / dylanu@unity3d.com / DU3D.org



Unity
at GDC





Hello, my name is Agatha @eggbadger

I'm a lead product designer at Oculus

Come on in,

and make yourself at home.





Deconstruct & reassemble

Welcome to Oculus Home inspection



#1 Accessibility

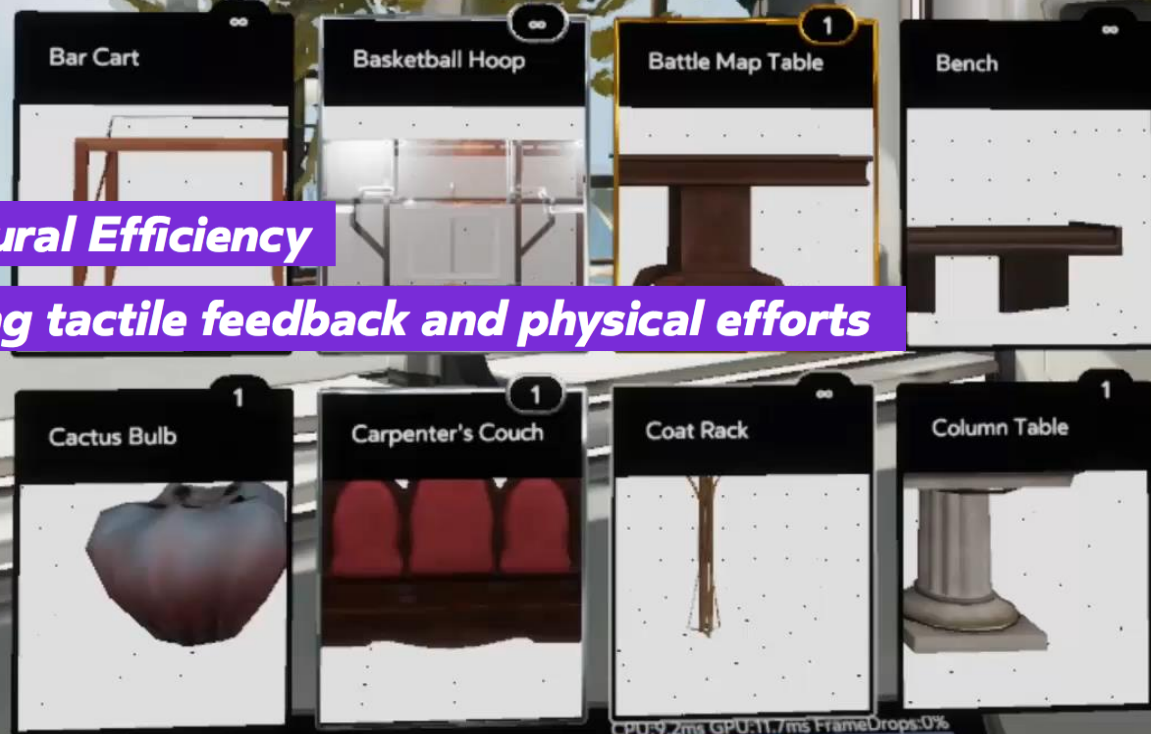
Ambidextrous and single hand operable





#2 Gestural Efficiency

Balancing tactile feedback and physical efforts



Your Home: Home #1

CPU:9.2ms GPU:11.7ms FrameDrops:0%

undo

redo

Oculus





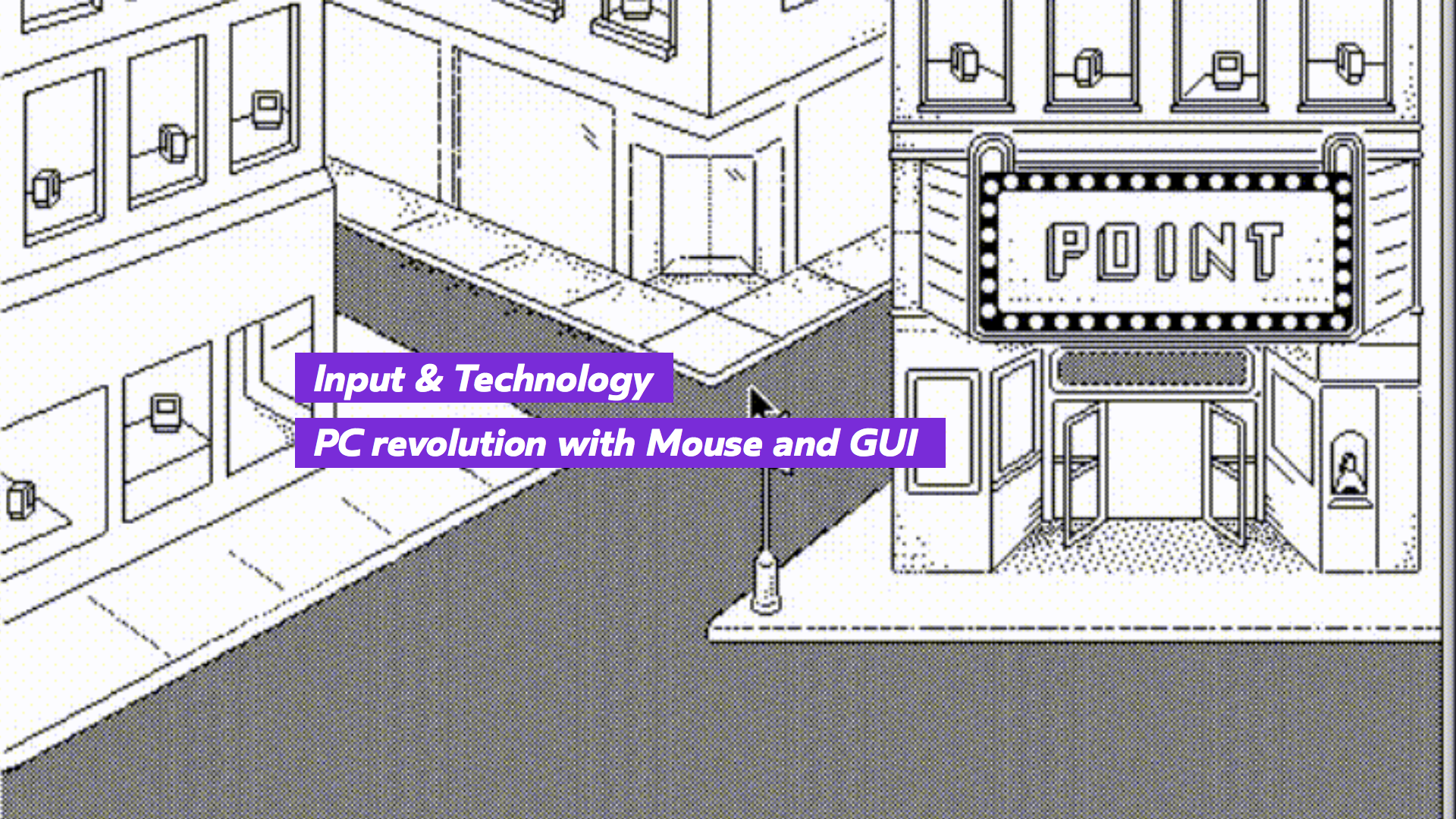
A surreal digital landscape. On the left, a large, dark, reflective sphere sits on a tiered base. Inside the sphere, a dark, jagged rock formation is visible, with several glowing red, tentacle-like creatures emerging from it. Above the sphere, a large, dark, irregular rock floats in the sky. In the center, a tall, narrow column of black cubes rises, with a small, white, humanoid figure standing on top. To the right, a larger structure made of black cubes and white panels is visible, with another small, white, humanoid figure standing on a platform. The ground is a light gray surface with some white lines and a glowing blue, stylized arrow pointing towards the right. The sky is a clear blue with some white clouds.

#3 Modeless Reality?

Memory, Fluid Intent and Quasimode

Input & Technology





Input & Technology

PC revolution with Mouse and GUI

A close-up photograph of a person's hand holding an early iPhone. The phone's screen is lit up and displays a photograph of a large, ornate building with a dome, possibly a cathedral or a government building. The phone has a silver bezel and a black front face. The background is dark and out of focus.

Input & Technology

Mobile with Touchscreens & Fingers

A close-up photograph of a person's hand holding a black VR controller. The hand is positioned on the left side of the frame, with the thumb resting on the top button and the index finger on the trigger. A black strap is attached to the bottom of the controller and loops around the wrist. The background is a blurred, light-colored interior space.

Input & Technology

VR with Body in Space



Thank you

Agatha @eggbadger

Explorations in XR Creation Tools

Q&A