

# Web3D 2026

**13-15 October 2026**

**Doha, Qatar**

# From Viewing to Playing:

## Bring-Your-Own-Scene Interaction for 3D Gaussian Splatting on the Web

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# Not a scene to look at. A scene to play with.

1

## One interaction grammar

Mouse and hands share one set of rules, so reaching in is as natural as looking around.

2

## Bring your own scene

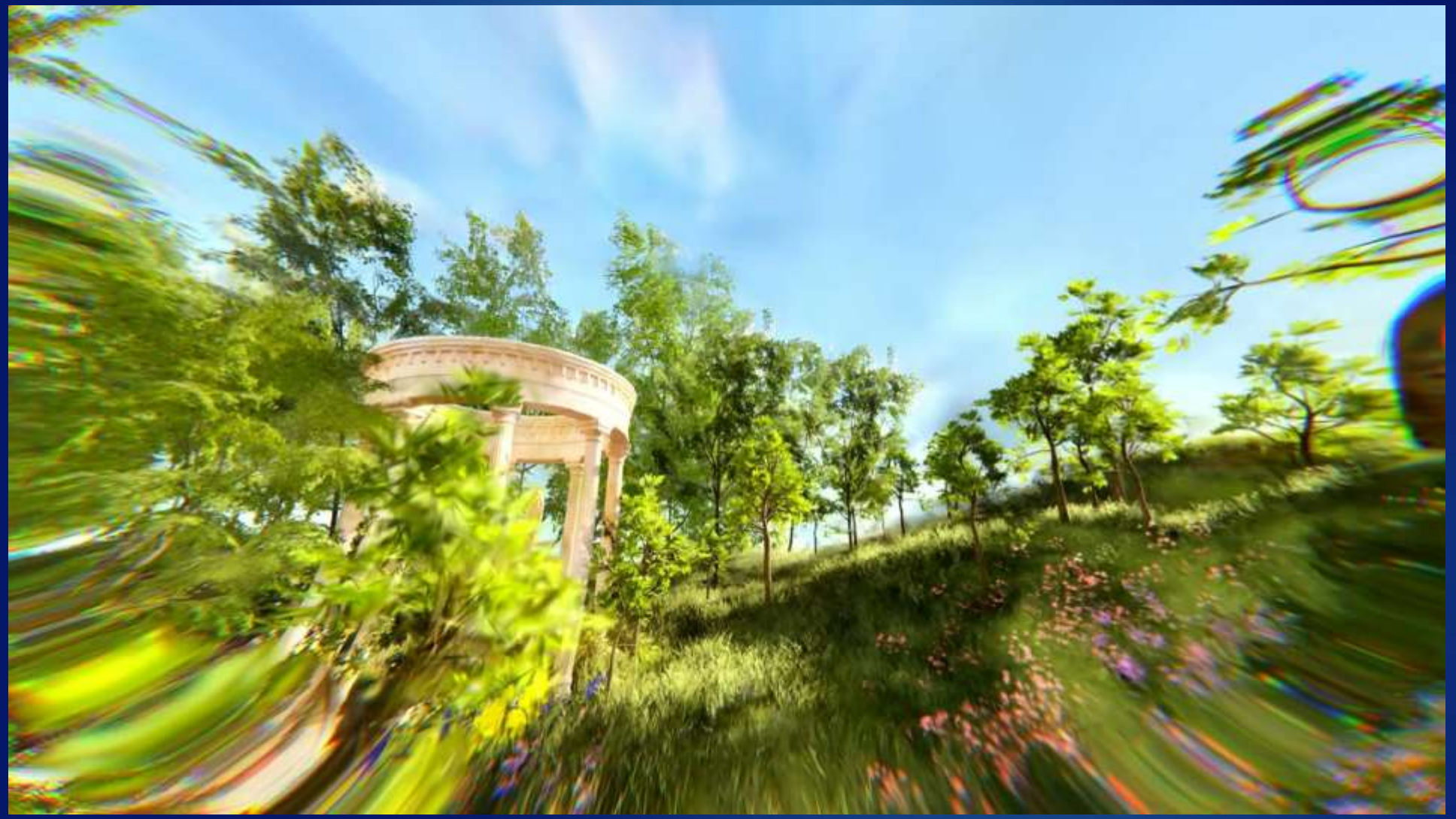
Any capture dropped into the page is immediately playable.

3

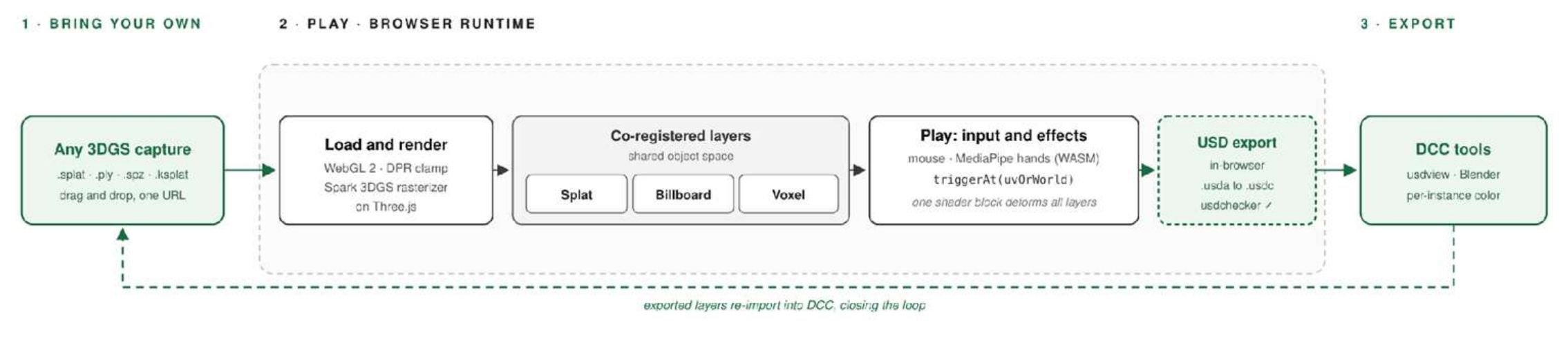
## Three representations in one object space

Deformed together, then exported to OpenUSD.

# Introducing SplatGarden



# Bring it in. Play with it. Take it back out.




A capture enters on the left, the browser runtime keeps three co-registered layers, and validated OpenUSD leaves on the right.

CONTRIBUTION 1

# One grammar for moving and for touching

→ A press that travels moves the camera.

● A press that stays put raycasts the scene and fires triggerAt.

2× A pinch follows the same rule. Two hands zoom and pan.



MediaPipe hand tracking, client-side in WebAssembly. Nothing leaves the browser.

# Bring your own scene

Drop any **.splat** **.ply** **.spz** **.ksplat** onto the page.

It is playable, re-representable and exportable at once, with no per-scene authoring.

Every figure and number in the paper uses this public capture: the antimatter15 train, **1.03 M splats**.



DEMO

# Playing in the browser




**Mouse**

**Hand tracking**

**Splat · Billboard · Voxel**

**Click to deform**

**Post-processing**

**Asset labels**

**Training cameras**

3:47, silent, plays automatically

# Three representations, one object space



GAUSSIAN SPLAT



BILLBOARD



VOXEL

The billboard and voxel layers are built by one pass over the splat buffer, so every derived instance sits in the same object space as the splat that made it.

# One click deforms all three layers



AT REST



AFTER A TRIGGERED EFFECT

The same **fxEval(center)** runs in all three shaders. No reprojection, no extra authoring: billboards and voxels ripple in lockstep with the splats.

TAKE IT BACK OUT

# Browser-side export to validated OpenUSD

The derived layers already match **UsdGeomPointInstancer**, so writing USD is a direct mapping, done in the page with no USD runtime.

**561,692**

voxel instances from the train scene

**7.5 → 3.4 MB**

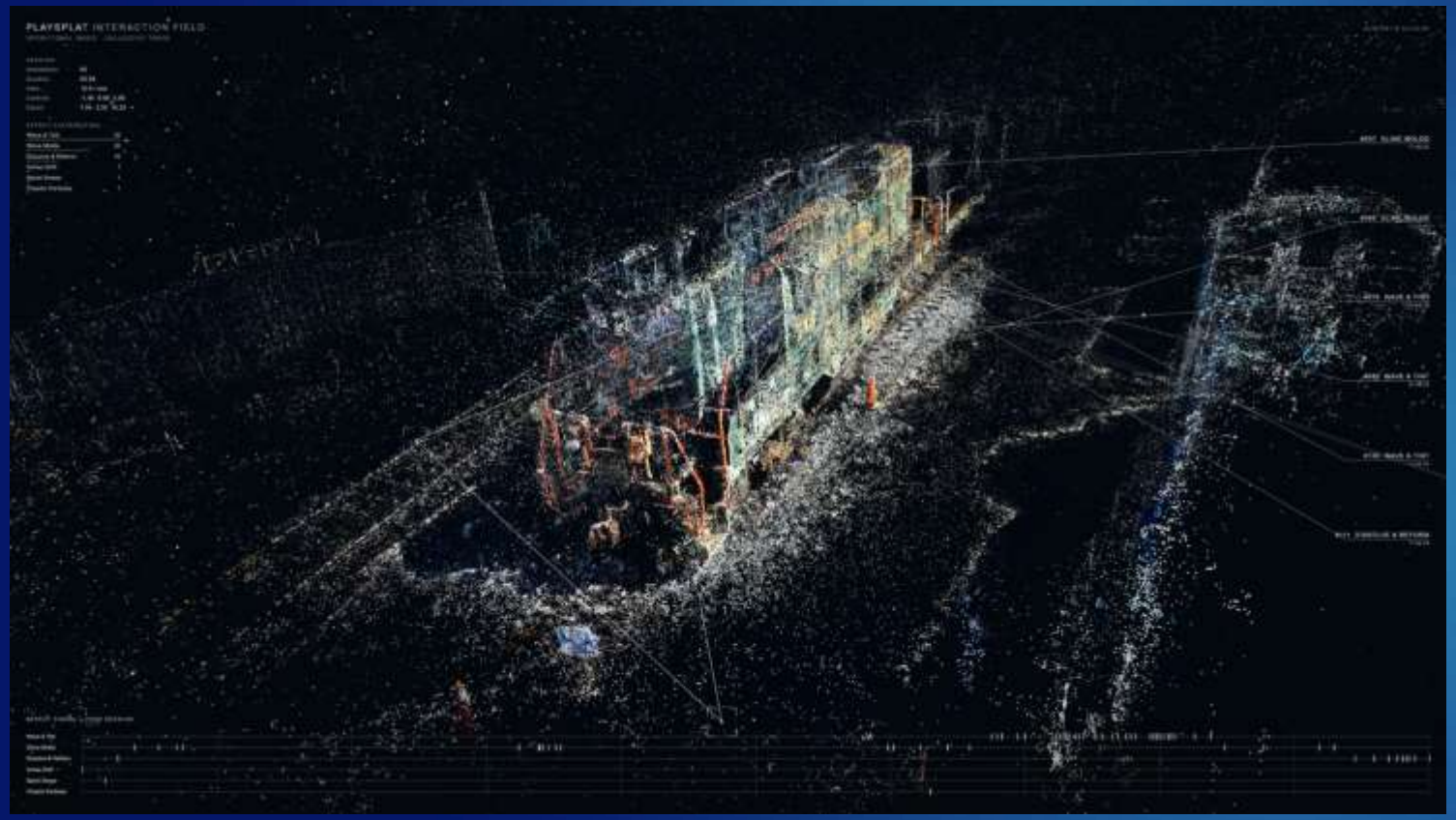
.usda to .usdc, lossless, 2.22×

**✓ usdchecker**

passes validation, OpenUSD 25.08



# Every session can be exported as a trace



Each trigger is logged in object space with its effect type and time.

A session can be replayed, compared or handed to another tool as data.

# The framework adds no measurable frame cost

| Configuration | 2.0 MPx | 6.0 MPx | 10.6 MPx | 24 MPx |
|---|---|---|---|---|
| Spark baseline | 60 | 60 | 59.9 | 60 |
| Splat (Gaussian) | 60 | 60 | 59.9 | 59.9 |
| Splat + Billboard | 60 | 60 | 59.9 | 59.9 |
| Splat + Voxel | 60 | 60 | 60.0 | 59.9 |
| Tri-layer composite | 60 | 60 | 59.9 | **41 to 58** |

Frames per second. JS cost per frame: about 0.1 ms bare, under 1.5 ms with PlaySplat. Billboard build 243 ms, voxel build 867 ms.

# What it does not do yet

**TODAY**

Voxel rebuild runs on the main thread.

Structural edits reach derived layers only after a rebuild.

No formal user study yet.

**NEXT**

WebGPU backend

WebXR session for stereo, embodied play

Worker-based rebuilds

TRY IT NOW

# playsplats.com

Drop in your own capture.

github.com/omolism/PlaySplat

doi.org/10.1145/3822516.3834873

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# Thank You!

## Questions? Reach me here

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