



# WebGL Working Group Updates

WebGL Meetup, March 2021

# Agenda

Cool WebGL Stuff

WebGL 2.0 in Safari Updates

Color Space & HDR Support

Parallel Shader Compilation

KTX2 Updates

Web Texture Tool

Updates on PBR Next glTF Extensions

WebGPU Status

# Cool WebGL Stuff

- Lots of great web sites and products using WebGL are released every day!
- Khronos' WebGL working group tries to find and highlight these to the community
- They're sent via email every couple of weeks to the [WebGL Dev List](#)
  - Also archived on [this blog](#)
- Please join the community, and share your own creations and findings!

# WebGL 2.0 In Safari Updates

- As discussed - WebGL 2.0 is coming to Safari!
- The latest code can be tested on both macOS and iOS
  - macOS: download [Safari Technology Preview](#)
  - iOS: available in iOS 14.5 betas, can [turn on WebGL 2.0 in Safari Settings](#)
- Unfortunately, not yet turned on by default, but continuing to encourage Apple to do so :)
- Great collaborations still ongoing
  - Apple's making major improvements to [ANGLE's Metal backend](#)
- [Follow progress](#) of the project
- You can soon rely on availability of WebGL 2.0 everywhere!
- Invest the time to upgrade your applications to WebGL 2.0 now!
- Test WebGL 2.0 in Safari, file bugs seen in [WebKit's Issue Tracker](#)

# Color Space & HDR Support

- Support for extended gamut color spaces and high dynamic range for 2D Canvas, WebGL and WebGPU is well underway
- If you have interest in this topic, please join the [W3C ColorWeb CG](#) and [conversation in the WICG](#)
- A specific proposal to control WebGL's drawing buffer formats is [under discussion](#) as well
- Should be a small API addition, easily queryable for support, and provide good speedups for advanced applications

# Parallel Shader Compilation

- The [KHR\\_parallel\\_shader\\_compile extension](#) allows shader compilation and program linking to occur fully in parallel
  - A major complaint from WebGL users and devs for years
  - Huge thanks to Intel and Jie Chen specifically for implementing it
- Shadertoy is [now using this extension](#) where available to avoid large UI hangs
  - Having an effect on Chrome on Windows & Linux right now, other platforms coming shortly
- Recommend you add support for this extension to your WebGL applications - can significantly improve smoothness!
- Note: if your app absolutely needs to compile & run a shader program this frame, may not help - but adding support won't hurt.
  - Best approach: defer rendering the geometry that needs this program until it's done linking. Not feasible in all engines.

# KTX 2.0 Updates

- [KTX 2.0](#) – standardized image container format for GPU textures
  - Supports all pixel formats and texture types: arrays, cubemaps, etc
- Built-in support for [Basis Universal](#) codecs
  - ETC1S and UASTC, including optional Zstandard pass
- [KHR\\_texture\\_basisu](#) adds portable GPU-compressed textures to glTF 2.0
  - Implemented in three.js, Babylon.js, <model-viewer>, more engines to come soon
- [KTX-Parse](#) – TypeScript parser library
  - Could be used with Binomial's container-independent transcoders or with [Khronos' transcoders](#) (WIP) optimized for the Web.
- [KTX-Software](#) – Reference C/C++ implementation
  - [Precompiled cmd-line tools, including WebAssembly \(emscripten\) builds](#)
- Best practices and usage guidelines
  - [For artists](#)
  - [For developers](#)

# Web Texture Tool

- [Brandon Jones](#) is developing a new library making it easy to optimally load all kinds of texture formats into both WebGL and WebGPU
  - <https://github.com/toji/web-texture-tool>
  - Live Demo: <https://toji.github.io/web-texture-tool/demo/>
- Supported formats:
  - Web native formats (JPG, PNG, WebP, etc.)
  - Basis Universal
  - Khronos KTX2
  - DXT (Partial)
- Supports 2D textures, cubemaps, texture arrays, compressed textures
- Decodes/transcodes images off main thread
- Generates mipmaps for WebGPU



# Updates on PBR Next glTF Extensions

- Ratified [Extensions](#)
  - KHR\_materials\_sheen
  - KHR\_materials\_transmission
  - KHR\_materials\_clearcoat
- Partial support already in Babylon.js, Three.js, Filament
  - Working on render convergence
  - ClearCoat is already supported in Three.js; rest in progress
  - New Khronos sample [models](#) for testing
- More extensions in discussion
  - Volume, index of refraction
  - Subsurface scattering
  - Anisotropy

# WebGPU Status

- Spec and implementations are moving forward well
- Discussions are converging on version 1 of the API
- Now's a great time to try out the [specification](#), [shading language](#) and [various implementations](#)
  - They're all behind flags in web browsers right now
  - Don't browse the open web with these flags turned on yet
- WebGPU is the spec where compute shaders will be delivered to the web
  - WebGL 2.0 Compute spec is no longer being developed
- Check out Brandon Jones' [WebGPU Clustered Shading](#) as a great example of combined compute shaders and rendering on the web!

# Presentations

Great group of presenters today!

- Anders Leino, NVIDIA - Driver bugs encountered starting from WebGL test suites
- Ib Green, Unfolded.ai - Structure and features of vis.gl framework
- Philip Taylor, Zea Live - High performance WebGL engine for CAD and professional graphics
- Ivan Popelyshev, The Household - Moving Flash to WebGL
- Will Eastcott, Snap - [PlayCanvas](#) status updates (run-time lightmapper, shader creation...)

We'll answer your Q&A live at the end of the session!