XPU Highlights

Pixar's next-generation technology, XPU, is evolving to become a full production renderer, and with every version delivers significant new milestones to increase its role in production VFX pipelines.

With support for volumes and points, XPU can be used for look development beyond hard surfaces. With XPU's added support for LPEs and arbitrary AOVs compositing workflows are now enabled, which are essential for feature animation and VFX. Finally, many additional enhancements signal a giant leap forward in Pixar's GPU-accelerated renderer.

Highlights:

- **Volumes** — The introduction of volume aggregates in XPU is a major achievement, allowing for faster iteration times during the look development phase, as well as quicker final renders. Now render pyrotechnics and more with XPU!

- **LPEs & AOVs** — Full support for LPEs and arbitrary AOVs in XPU empowers artists with the flexibility and control they need to produce a high-quality output for compositing and a variety of production scenarios.

- **Look Development Improvements** — The advancements in Look Development in XPU, including support for thin glass and trace subsets, provide better control for artists and help achieve even greater consistency between XPU renders and RIS.

- **Deformation Motion Blur** — XPU supports full deformation motion blur, and in combination with XPU's speed, animation caches can now be played back with GPU acceleration. With efficient integrators such as Pixar Occlusion and Pixar Visualizer, the playback speed can be further increased.

- **Camera Controls** — XPU supports all camera controls except bokeh. These controls include additional features such as depth of field, vignetting, and other camera effects like chromatic aberration, and split diopter, which can be quickly adjusted during interactive rendering.

- **Interactivity** — Interactivity is a key feature of XPU in RenderMan, which prioritizes interactive performance by improving the responsiveness of XPU to camera movements and shader parameter changes, through features such as Progressive Pixels, allowing artists to make quicker and more informed decisions while providing faster image feedback for refining their choices.

- **Rendering Controls** — The rendering controls in XPU provide a more granular level of control over the rendering process, allowing artists to enable or disable caustics, and set trace depths for both diffuse and specular rays on a per-object basis.
  These controls help to achieve faster convergence speeds and produce renders that more closely match those produced by RenderMan's previous version, RIS.

- **Improved Low-memory GPU Support** — The texture cache has been improved to perform better on GPUs that are memory constrained. You will get faster renders from the GPU if the texture cache needs to do out-of-core texture lookups.

- **Progressive Pixels** - In XPU, the interactive refinement mode is called Progressive Pixels (PP).

  The visual impact in an IPR setting is similar to RIS and primarily aimed at providing artists with a fluid interactive experience at the cost of integrating a fraction of screen pixels at a time. When PP is enabled, the results of pixels within a screen bucket are splatted progressively starting from a large screen region all the way down to a single pixel. When no edits are received after resolving at the single pixel, XPU continues working with pixels at the finest level. Only when new edits are received does XPU revert back to using large progressive splats.