Production-quality, final-frame rendering on the GPU
Redshift 2.6 Recap (part 1)

- New features since GTC 2018
  - Area light spread
    - Fake barn-door effect
    - Had to be as efficient as regular area lights
    - Had to conserve energy
  - Shader-driven global volume scattering
    - Allows greater lighting detail
    - Limited to scattering, not transmission
  - Specular light bending through refractions
    - Important for realistic-looking specular reflections
  - Direct Lighting
    - Samples lights by shooting rays directly towards light sources
    - Very efficient for sampling area lights (when using MIS)
    - But no ray bending through refractive shadow casters
  - Indirect Lighting
    - Samples the scene indirectly by shooting rays based on the surface BRDF
    - Allows ray bending through refractive objects
    - Not as efficient for sampling area lights... so we don't bother!
  - Let's marry the two techniques for the best of both worlds!
    - Direct Lighting for lights that we know are not refracted
    - Indirect Lighting for lights that we know are refracted
    - A mixture of the two for rough surfaces
- Cryptomatte
  - Solves the matte coverage problem
Redshift 2.6 Recap (part 2)

- Redshift Renderview Improvements (Post-FX)
  - Photographic Exposure and vignetting
  - Color Control / LUTs
    - Great for applying a final color grade to make the image more dramatic
  - Bloom
    - That dreamy effect, popular with glamour shots in the 1960s!
  - Streaks
    - Make those hot-spots pop!
    - Fully directional, with tweakable tails
  - Flare
    - Cool lens effect based on bokeh hexagonal shapes, with tweakable chromatic aberration
    - Physically-based version coming soon
  - Intuitive controls but tons of flexibility
  - Real-time in the RS RV, but available in batch too
  - Post-FX AOV
General Core Improvements

• Volume color channels
  – Color ramps
  – Color transmission
• Direct Lighting cut-offs sampling improvements
  – Faster rendering with fewer samples
• Better importance sampling for single scattering
• Multi-step deformation blur
• Custom AOV visibility through reflections/refractions
  – More to come in 3.0
Redshift 3.0 (part 1)

- Our next major release, with big changes!
  - ‘Alpha’ scheduled for April 2019
  - Designed to be faster and easier to use
  - Major refactor of the core...
- Refactor: Ray tracing facelift
  - Smarter ray management for huge performance boost
    - GPUs really shine when they’re given a lot of work to do
    - New technique requires less memory than RRM/AMM, with better performance
    - Big win for multi-sampled rough rays with many bounces
      - up to 4x faster!
    - Benefit for simple scenes too!
  - Increased the trace-depth limits
    - Up to 64 indirect bounces
    - Up to 256 transparency depth
Redshift 3.0 (part 1)
Redshift 3.0 (OptiX)

- (3840 x 2160)
  - CUDA: 6m:18s
  - RTX: 3m:2s
  - 2x faster!

- Shared GPU caches for geo and textures
- Better performance for heavy scenes
Redshift 3.0 (part 2)

• Refactor: Shading system overhaul
  – Required for the Shader SDK (yes, it’s finally happening!)
  – Automatic Sampling
    • Like unified sampling, but at a shading level
    • Two goals: simpler and faster
    • Uses smart noise metrics to determine how many samples the shaders actually need
    • More accurate cut-offs
Redshift 3.0 (Shader SDK)

• Let me write shaders already!
• Major shader system re-factor and clean-up
  – Goal: remove any notion of ‘inner workings’ for the shader writer
  – Happy side effects...
    • Better blended materials
    • Automatic energy conservation?
    • Better performance!
• What should our SDK look like?
  – Should we re-invent the wheel?
  – OSL support... with extensions!
• MDL to follow
• Maybe MaterialX, if it catches on?
Redshift 3.0 (part 3)

• More tricks up our sleeves
  – Optimization coming for deep transparencies
  – Optimizations coming for many lights
  – New features become feasible...
    • ‘Unbiased’ rendering quality?
    • Ray traced caustics!
Coming Soon

- USD / Hydra support
- Intel Denoiser
- Light blockers
- Random Walk SSS
- Volumetric multiple scattering
- LPEs
- Toon shading
- Distributed rendering
The Future

- Blender integration
- Redshift ‘RT’
  - All new renderer
  - Actually real-time, DXR accelerated!
  - Fully dcc integrated
Thanks!

• For more information, please contact us at info@redshift3d.com
• Or meet us right after this presentation!