

## 15-464 / 15-664: Reference List for April 17, 2017

We started by talking about real time rendering for games.

There are many many tricks in rendering for games. You can see the long running SIGGRAPH course “Advances in Real-Time Rendering” for a collection of examples, which changes every year.

<http://advances.realtimerendering.com/s2016/>

All of the talks are available online through CMU’s access to the ACM digital library. For example, here are the links to the 2016 version of the course:

<http://dl.acm.org/citation.cfm?id=2940291>

<http://dl.acm.org/citation.cfm?id=2940292>

There is too much ground to cover here, so I decided to have a look at one specific example. We spoke about the following paper:

Heitz E, Dupuy J, Hill S, Neubelt D. Real-time polygonal-light shading with linearly transformed cosines. ACM Transactions on Graphics (TOG). 2016 Jul 11;35(4):41.

<https://eheitzresearch.wordpress.com/415-2/>

<https://www.youtube.com/watch?v=ZLRgEN7AQgM>

We also saw a little bit of the efforts of the team at Ubisoft to transform this idea into a reliable and useful production tool.

We then switched to production rendering for movies. Movies have a greater computational budget, but it still is not infinite. As a specific example, we spoke about the rendering technology that was used in Big Hero 6. It is based on the following paper:

Eisenacher C, Nichols G, Selle A, Burley B. Sorted deferred shading for production path tracing. In Computer Graphics Forum 2013 Jul 1 (Vol. 32, No. 4, pp. 125-132). Blackwell Publishing Ltd.

<http://www.andyselle.com/papers/20/>

As an introduction, we watched this video, starting from 3 minutes in:

<https://www.youtube.com/watch?v=y6yrHkZVGF8>

Results show that 100X speedup can be obtained by sorting rays and ray hits.

We then took a look at recent research related to rendering specific phenomena: rendering scratches, downsampling cloth, and rendering granular materials such as sand:

Raymond B, Guennebaud G, Barla P. Multi-scale rendering of scratched materials using a structured SV-BRDF model. *ACM Transactions on Graphics (TOG)*. 2016 Jul 11;35(4):57.

<http://dl.acm.org/citation.cfm?id=2925945>

Zhao S, Wu L, Durand F, Ramamoorthi R. Downsampling scattering parameters for rendering anisotropic media. *ACM Transactions on Graphics (TOG)*. 2016 Nov 11;35(6):166.

<https://shuangz.com/projects/multires-sa16/>

Müller T, Papas M, Gross M, Jarosz W, Novák J. Efficient rendering of heterogeneous polydisperse granular media. *ACM Transactions on Graphics (TOG)*. 2016 Nov 11;35(6):168.

<https://www.cs.dartmouth.edu/~wjarosz/publications/muller16efficient.html>

And we can't talk about rendering without bringing in the idea of non-photorealistic rendering. This paper is interesting because it considers the variety of paths light can take when interpreting an artist's sample painting of a sphere to apply to arbitrary scenes and geometries:

Fišer J, Jamriška O, Lukáč M, Shechtman E, Asente P, Lu J, Sýkora D. StyLit: illumination-guided example-based stylization of 3D renderings. *ACM Transactions on Graphics (TOG)*. 2016 Jul 11;35(4):92.

<http://dcgi.fel.cvut.cz/home/sykorad/stylit>