

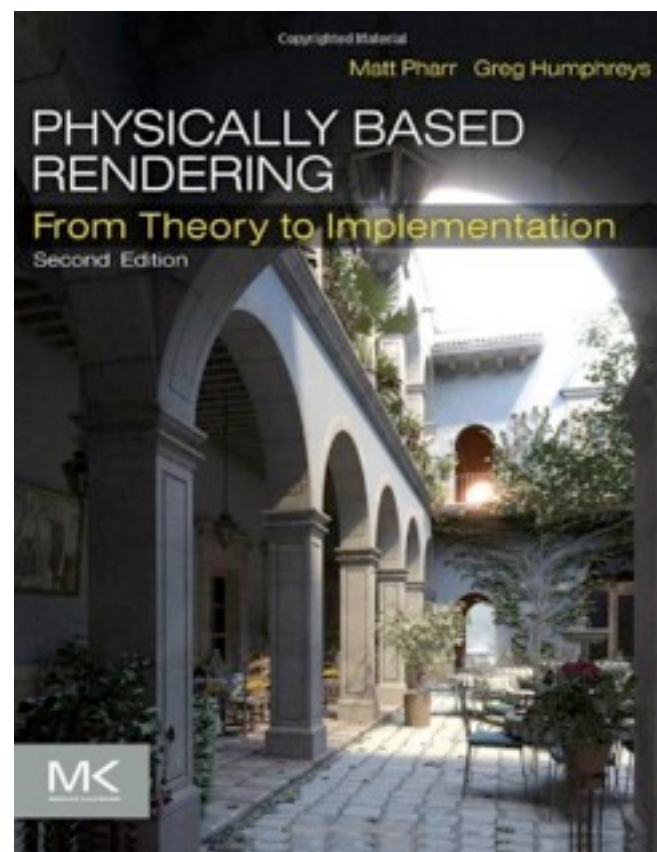
State of the Art in Photon Density Estimation

Conclusions

SIGGRAPH Asia 2013 Courses

Friday 22 November | 09:00 - 12:45 | Room S222

Real World Usages



Five Open Problems

- ▶ How many photons do I need?
- ▶ Reducing # parameters
- ▶ Highly glossy-glossy transport
- ▶ Recognize similarities within rendering
- ▶ Recognize similarities across other research fields

- ▶ How many photons do I need?
 - ▶ The error estimation framework is only one step toward this goal
 - ▶ Given the computational budget, what is the best image we can get?

▶ Reducing # parameters

- ▶ The fewer, the better
 - ▶ Radius (adaptive PPM is one good step)
 - ▶ Number of photons per pass
 - ▶ Ratio of eye rays and photon rays
 - ▶ ...

- ▶ **Highly glossy-glossy transport**
 - ▶ Fundamentally difficult to find such paths
 - ▶ Regularization and manifold exploration [Jakob and Marschner 2012] can help
 - ▶ All the existing methods are equally bad

- ▶ Recognize similarities within rendering
 - ▶ Recognize similarities between different algorithms
 - ▶ VPL = a special case of BPT = a special case of UPS/VCM
 - ▶ UPS/VCM is only one step
 - ▶ Application of one concept to another
 - ▶ Progressive EM for surfaces
 - ▶ Photon relaxation for beams

- ▶ Recognize similarities across other research fields
 - ▶ Recognize similarities between problems in rendering and other areas
 - ▶ Machine learning
 - ▶ Data mining
 - ▶ Computational statistics
 - ▶ Neutron transport

<http://cs.au.dk/~toshiya/starpm2013a>
(updated course notes and slides)

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- ▶ Ben Spencer
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- ▶ Per Christensen
- ▶ Peter-Pike Sloan
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