(Optimizing) Realistic Rendering with Many-Light Methods

An ACM SIGGRAPH 2012 course presented by

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Introduction

Jaroslav Křivánek

Charles University in Prague

Global illumination

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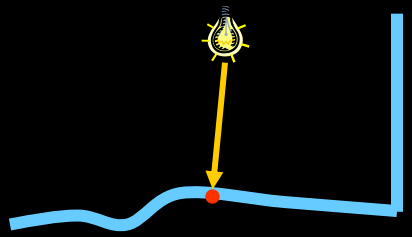
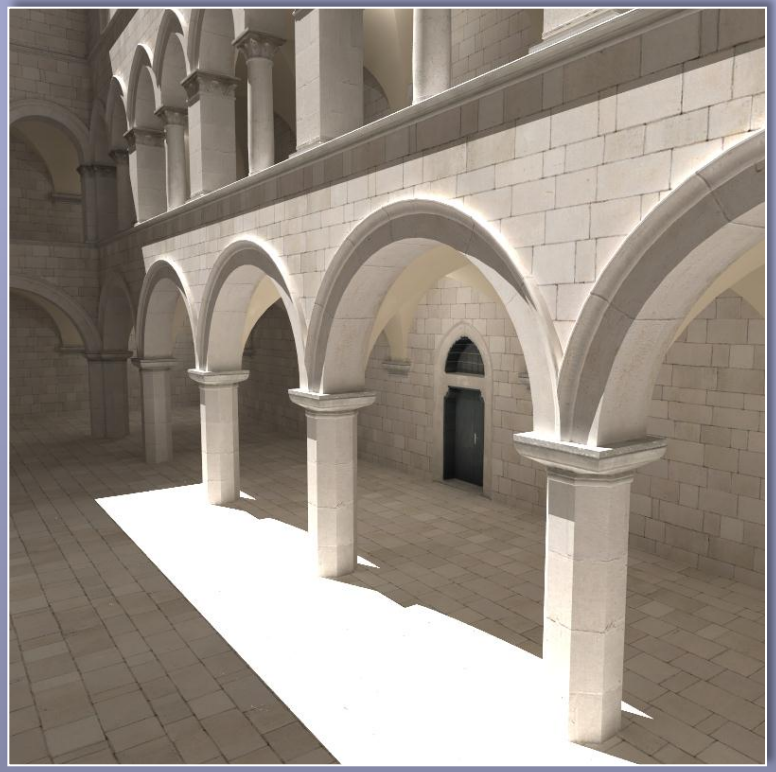
Global illumination

Direct-only





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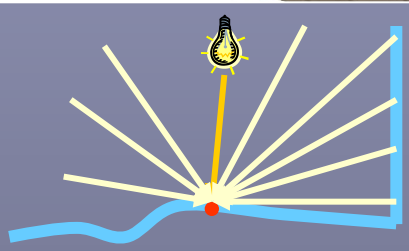
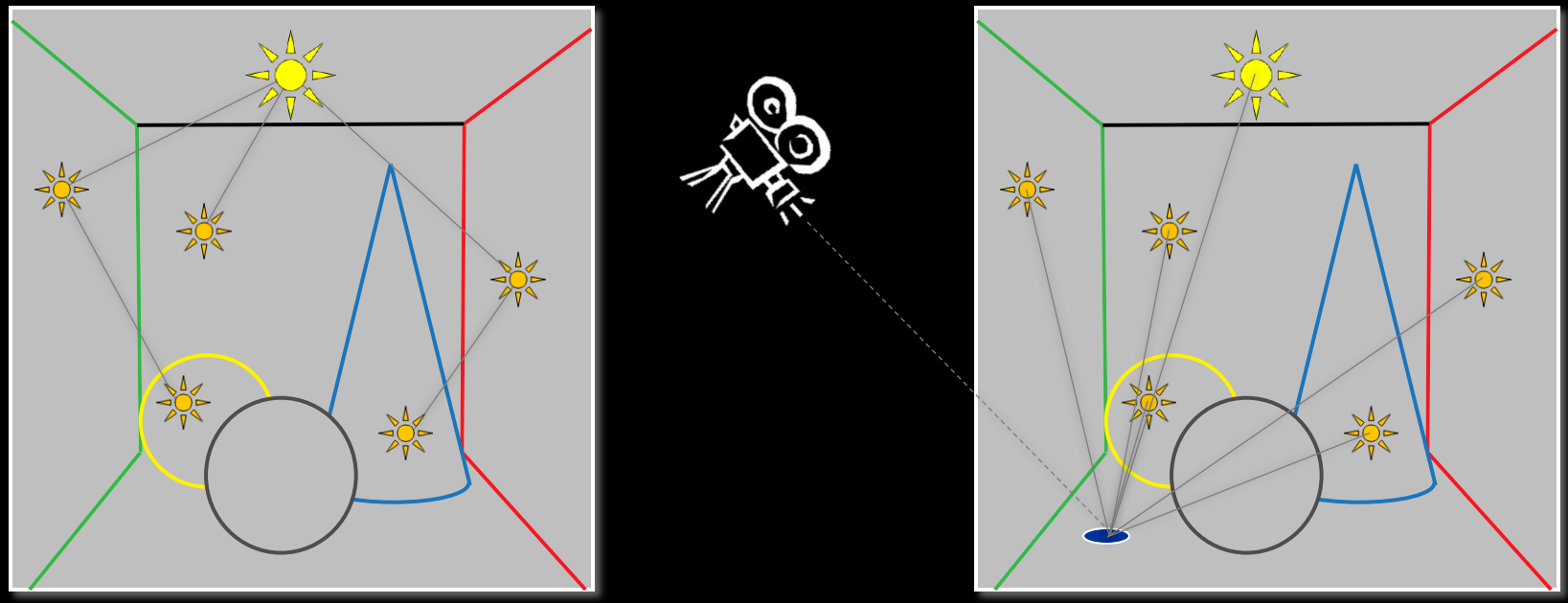


Many-light rendering

- Based on Instant Radiosity *[Keller 1997]*
- Approximate indirect illumination by

Virtual Point Lights (VPLs)

1. Generate VPLs
2. Render with VPLs



Many-lights: Advantages

- Spans a wide range of quality/cost ratios

Interactive rendering
16k VPLs, 5.5 fps

from [Ritschel et al., SIGGRAPH Asia 2008]

High-fidelity rendering
1M VPLs , 64path/pix, 30 min

from [Walter et al., SIGGRAPH 2012]

Many-lights: Limitations

- Ineffective for caustics from curved objects

Main technical issues

- Making it fast (as usual)
- Making it "asymptotically fast", i.e. scalable
- Making it accurate

Course lecturers

- (in the order of appearance)

- Jaroslav Křivánek, *Charles University in Prague*
- Alexander Keller, *NVIDIA Research*
- Miloš Hašan, *UC Berkeley*
- Bruce Walter, *Cornell University*
- Carsten Dachsbacher, *KIT*
- Adam Arbree, *Autodesk, Inc.*

Course Overview

- 2:00 (05 min) … **Introduction & Welcome** (*Křivánek*)
- 2:05 (30 min) … **Instant Radiosity** (*Keller*)
- 2:35 (30 min) … **Handling difficult light paths** (*Hašan, Křivánek)*
- 3:05 (25 min) … **Scalability with many lights I** (*Walter)*

- 3:30 (15 min) … **Break**

- 3:45 (20 min) … **Scalability with many lights II** (*Hašan)*
- 4:05 (35 min) … **Real-time many-light rendering** (*Dachsbacher)*
- 4:40 (30 min) … **ML in Autodesk® 360 Rendering** *(Arbree)*
- 5:10 (05 min) … **Conclusion - Q & A** *(All)*