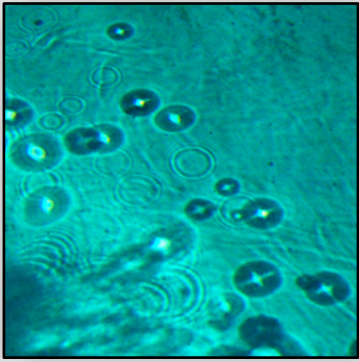
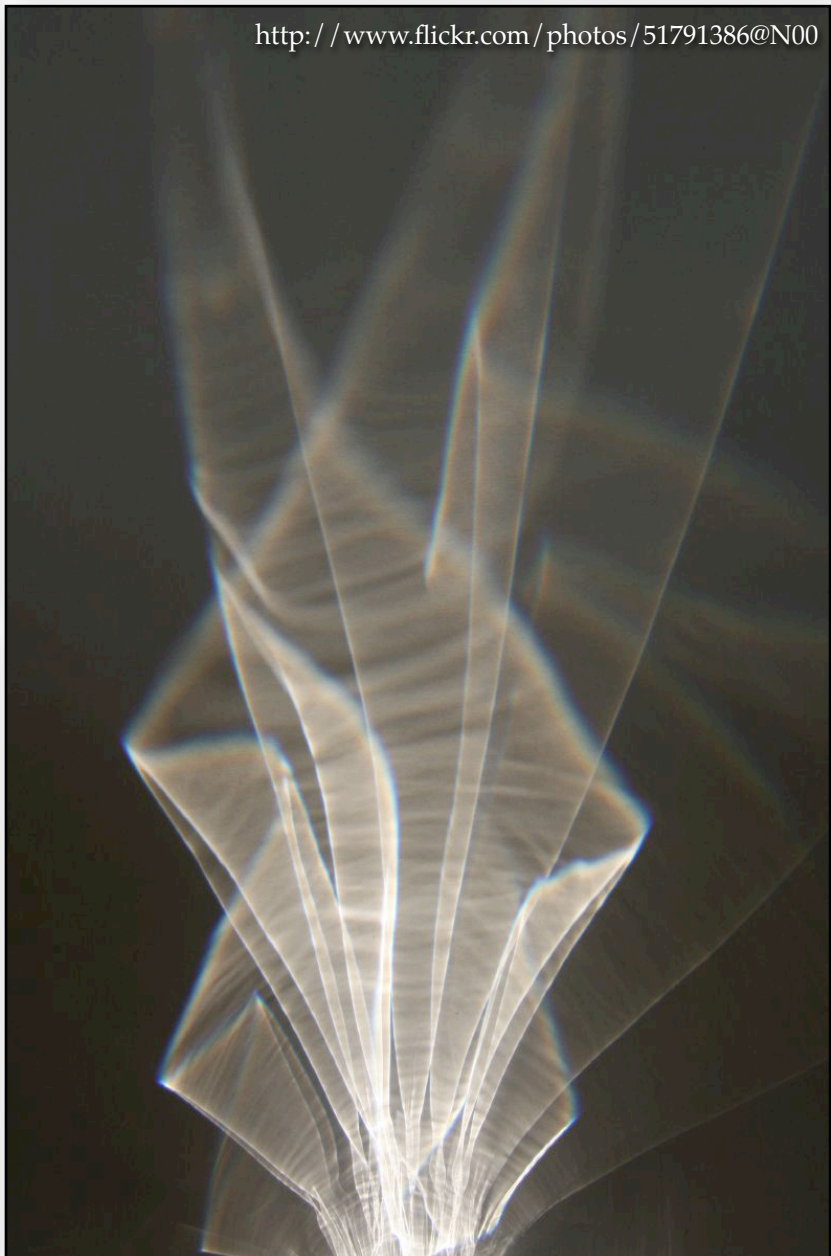


State of the Art in Photon Density Estimation

Introduction

SIGGRAPH Asia 2013 Courses

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



Why Photon Density Estimation?

▶ Versatile

- ▶ Lots of illumination effects by one algorithm

▶ Customizable

- ▶ Artist-friendly and adaptable to production pipelines

▶ Active research area

- ▶ Difficult to keep up with advances

What you get out of this course

- ▶ Trends in photon density estimation
- ▶ Core ideas of recent technical developments
- ▶ Advanced course
- ▶ Covers both theory and practice

What you should already know

- ▶ Basics of rendering, ray tracing, path tracing
- ▶ Only cover photon mapping basics briefly



Toshiya Hachisuka
Aarhus University



Wojciech Jarosz
Disney Research Zürich



Iliyan Georgiev
Saarland University



Derek Nowrouzezahrai
Université de Montréal



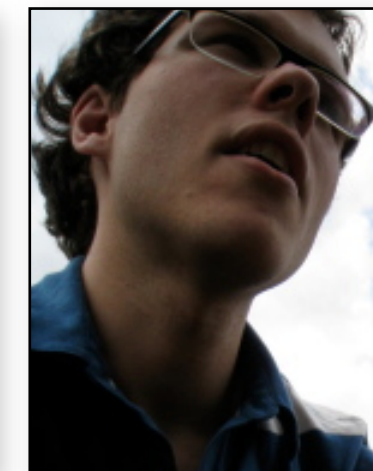
Anton S. Kaplanyan
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► Authors of the original research:

- Andrew Selle
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- Carsten Dachsbacher
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- Claud Knaus
- Dylan Lacewell
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- Per Christensen
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- Shinji Ogaki
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- Wenzel Jakob

► Slide credits:

- Henrik Wann Jensen
- Matthias Zwicker
- Wenzel Jakob
- Ben Spencer



1) Regular Photon Density Estimation

▶ **Photon Mapping Basics [15 minutes]**

- ▶ Wojciech Jarosz (Disney Research Zürich)

2) Progressive Photon Density Estimation

▶ **Progressive Photon Mapping Basics [15 min]**

▶ *Toshiya Hachisuka (Aarhus University)*

▶ **Probabilistic Formulation of PPM [15 minutes]**

▶ *Toshiya Hachisuka (Aarhus University)*

▶ **Progressive Photon Mapping Extensions [20 min]**

▶ *Toshiya Hachisuka (Aarhus University)*

▶ **Adaptive PPM [15 minutes]**

▶ *Anton S. Kaplanyan (KIT)*

3) Density Estimation in Participating Media

▶ **Participating Media Basics [15 min]**

▶ *Wojciech Jarosz (Disney Research Zürich)*

▶ **From Photons to Beams [20 min]**

▶ *Wojciech Jarosz (Disney Research Zürich)*

▶ **Photon Beams in *Tangled* [15 min]**

▶ *Derek Nowrouzezahrai (Université de Montréal)*

4) Beyond Density Estimation

▶ **Photon Relaxation + Extensions [15 min]**

▶ *Toshiya Hachisuka (Aarhus University)*

▶ **Progressive EM [15 minutes]**

▶ *Wojciech Jarosz (Disney Research Zürich)*

▶ **UPS/VCM and Regularization [30 min]**

▶ *Iliyan Georgiev (Saarland University)*

▶ *Anton S. Kaplanyan (KIT)*

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

Enjoy!
