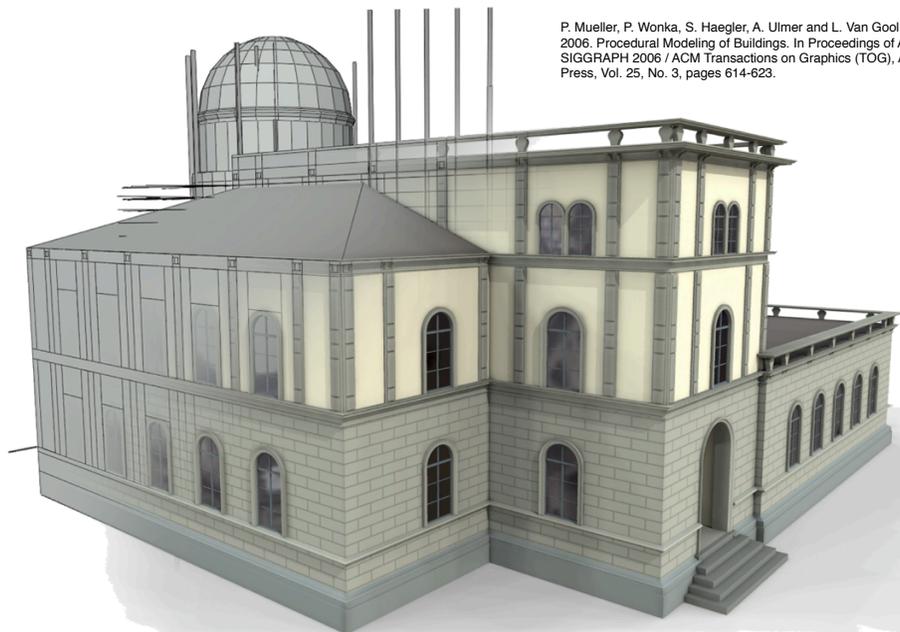


some recent graphics research
to inspire final projects

bryan klingner (klingner@cs)

Procedural Modeling of Buildings - SIGGRAPH '06



P. Mueller, P. Wonka, S. Haegler, A. Ulmer and L. Van Gool.
2006. Procedural Modeling of Buildings. In Proceedings of ACM
SIGGRAPH 2006 / ACM Transactions on Graphics (TOG), ACM
Press, Vol. 25, No. 3, pages 614-623.

Procedural Modeling of Buildings - SIGGRAPH '06

Production process:

- β Rule-driven modification & replacement of shapes
- β Iteratively evolve a design by creating more and more details
- β Sequential application (like Chomsky grammars)



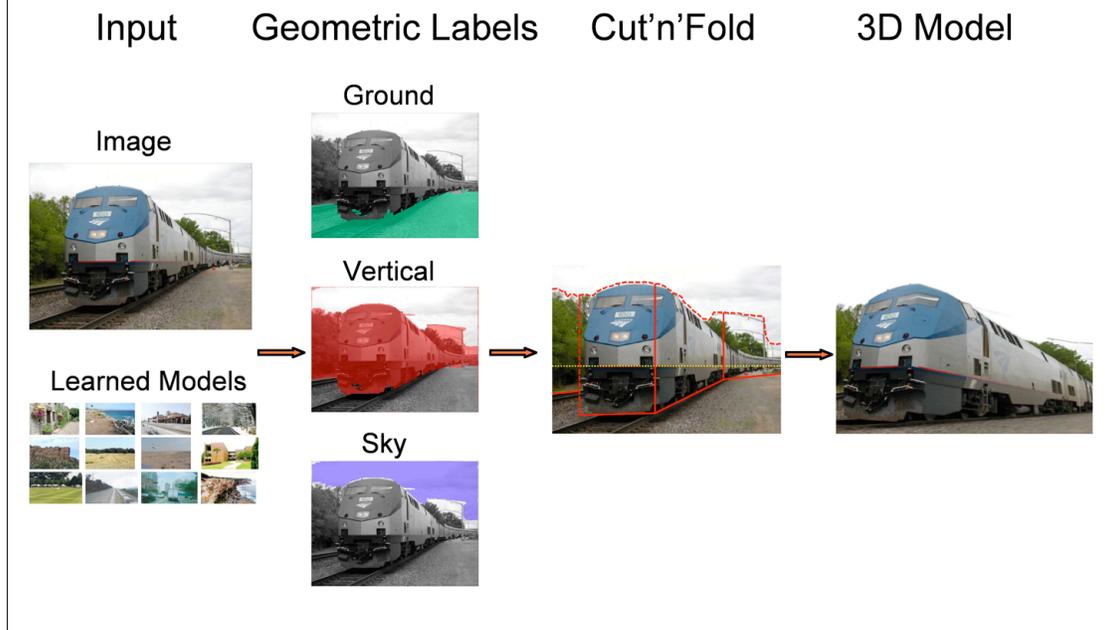
Procedural Modeling of Buildings

Automatic Photo Pop-up - SIGGRAPH '05

D. Hoiem, A.A. Efros, and M.
Hebert, "Automatic Photo Pop-up",
ACM SIGGRAPH 2005.



Automatic Photo Pop-up - SIGGRAPH '05



Automatic Photo Pop-up - SIGGRAPH '05

Automatic Photo Pop-up

D. Hoiem A.A. Efros M. Hebert
Carnegie Mellon University

Saliency-Preserving Color Removal - SIGGRAPH '05

Amy A. Gooch, Sven C. Olsen, Jack Tumblin, Bruce Gooch.
Color2Gray: Saliency-Preserving Color Removal. ACM
SIGGRAPH 2005.



color image



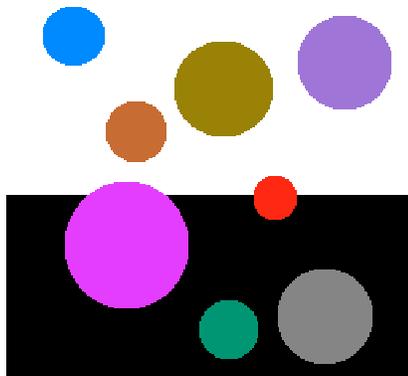
new algorithm



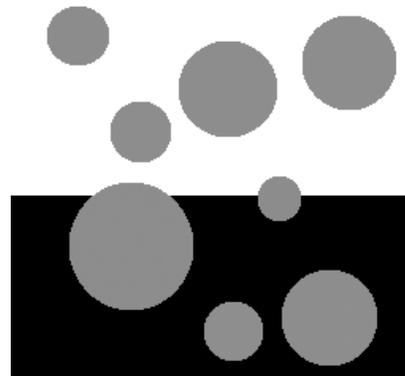
grayscale

Saliency-Preserving Color Removal - SIGGRAPH '05

Problem: Isoluminant Colors

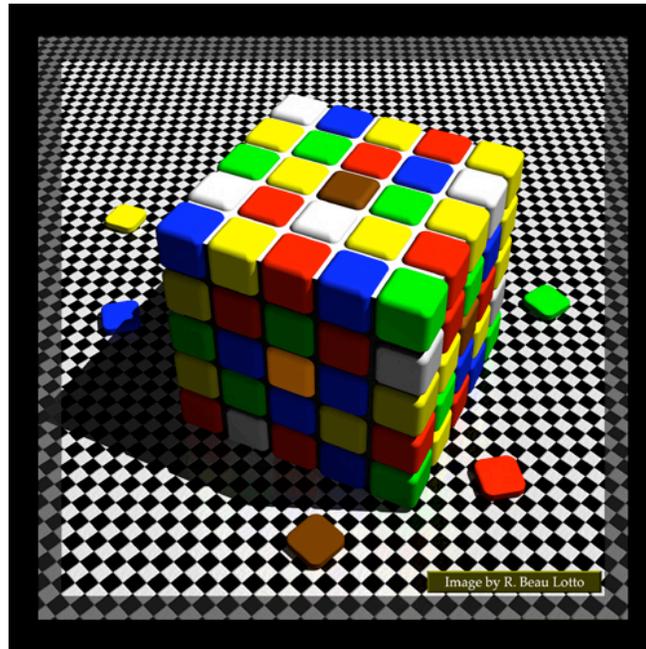


color

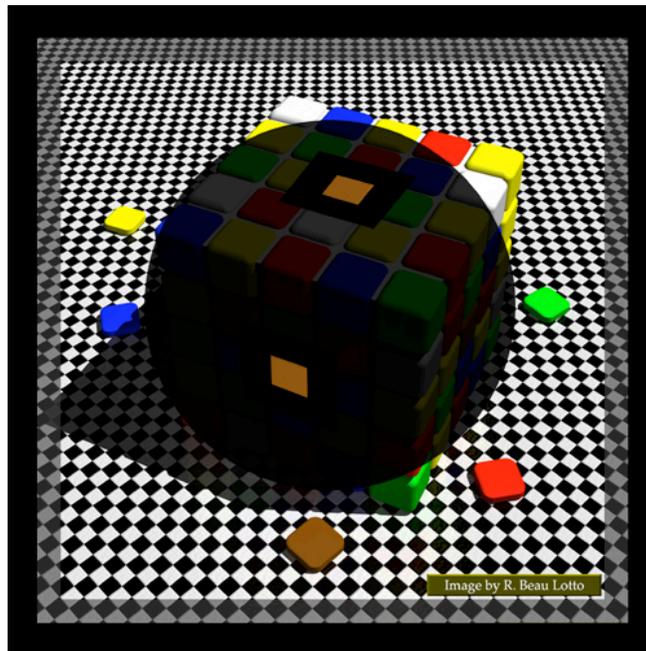


grayscale

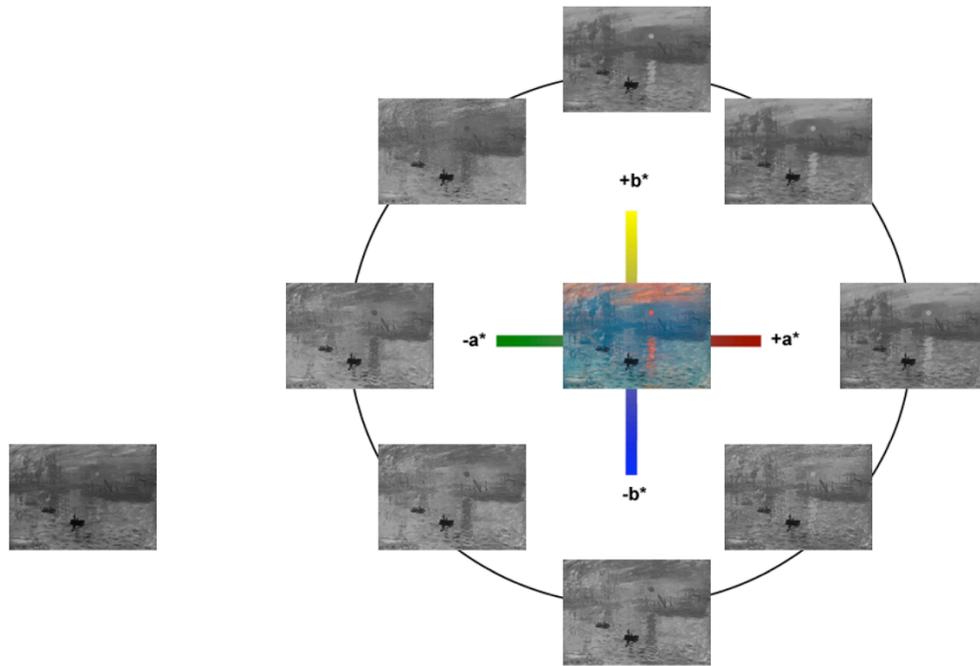
Saliency-Preserving Color Removal - SIGGRAPH '05



Saliency-Preserving Color Removal - SIGGRAPH '05



Saliency-Preserving Color Removal - SIGGRAPH '05



Saliency-Preserving Color Removal - SIGGRAPH '05



color



Photoshop Gray



Color2Gray



Physically-Based Animation and Modeling

- Most things in graphics are animated by humans
- Some things--like smoke, fire, and liquid--are too complex to feasibly animate realistically by hand
- Instead, we use physical models of fluid flow, fracture, etc, cut corners, and render the result.

A Method for Animating Viscoelastic Fluids - SIGGRAPH '05

"A Method for Animating Viscoelastic Fluids"

Tolga G. Goktekin

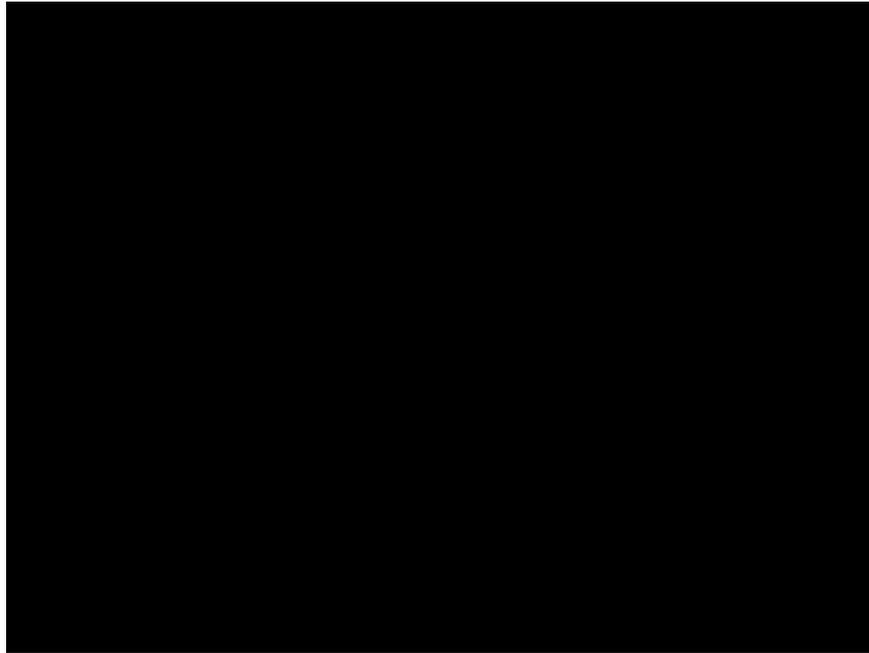
Adam W. Bargteil

James F. O'Brien

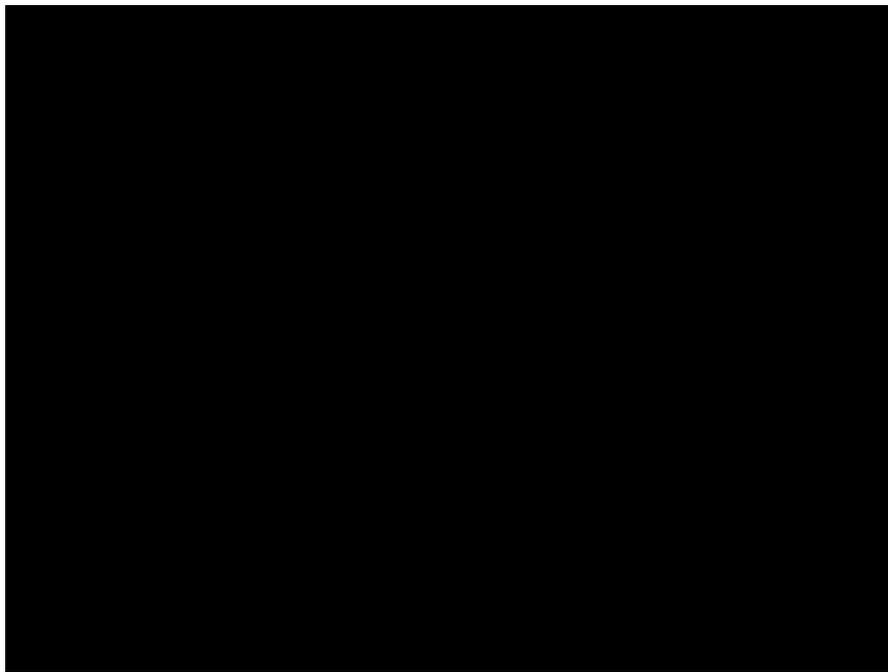
ACM SIGGRAPH 2004

University of California, Berkeley

Animating Gases with Hybrid Meshes - SIGGRAPH '05



Fluids in Deforming Meshes - SCA '05



Fluid Animation with Dynamic Meshes - SIGGRAPH '06

Fluid Simulation with Dynamic Meshes

Bryan Klingner
Bryan Feldman
Nuttapong Chentanez
James O'Brien

University of California, Berkeley

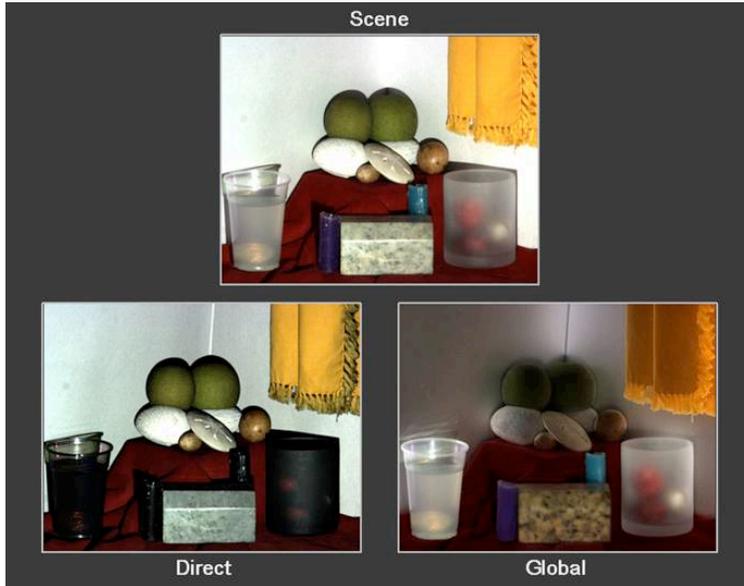
Simultaneous Coupling of Fluids and Deformable Bodies - SCA '06

Simultaneous Coupling of Fluids and Deformable Bodies

Nuttapong Chentanez
Tolga G. Goktekin
Bryan E. Feldman
James F. O' Brien

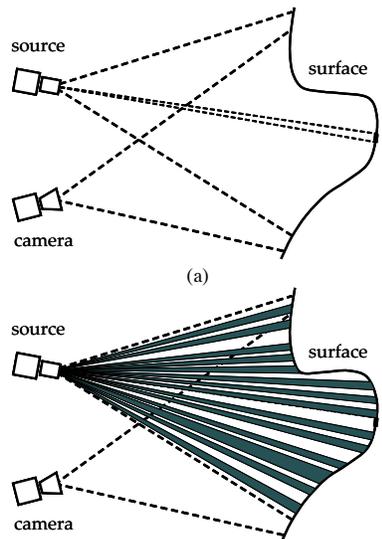
University of California, Berkeley

Fast Separation of Direct and Global Components of a Scene Using High Frequency Illumination - SIGGRAPH '06



"Fast Separation of Direct and Global Components of a Scene using High Frequency Illumination,"
S.K. Nayar, G. Krishnan, M. D. Grossberg, R. Raskar,
ACM Trans. on Graphics (also Proc. of ACM SIGGRAPH),
Jul, 2006.

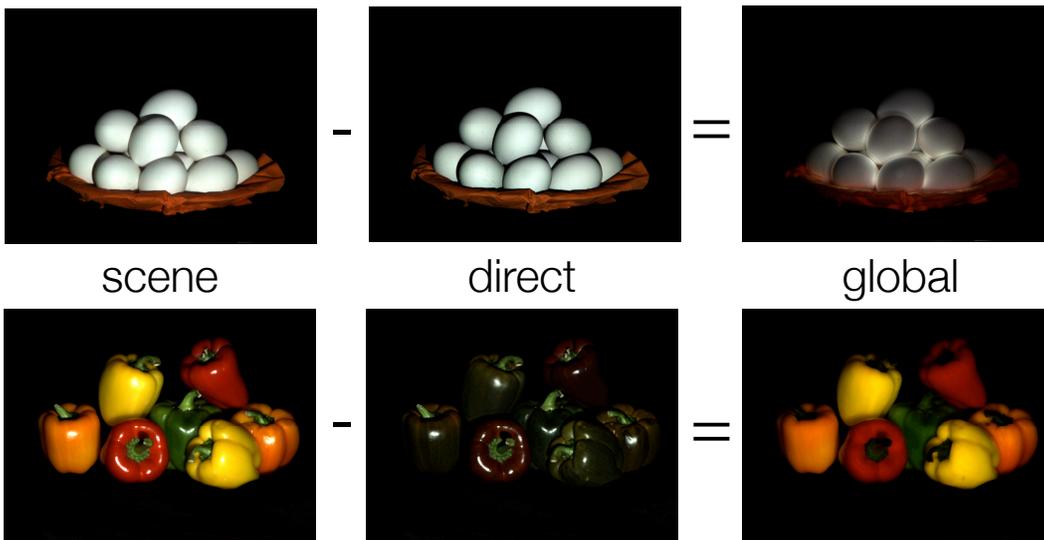
Fast Separation of Direct and Global Components of a Scene Using High Frequency Illumination - SIGGRAPH '06



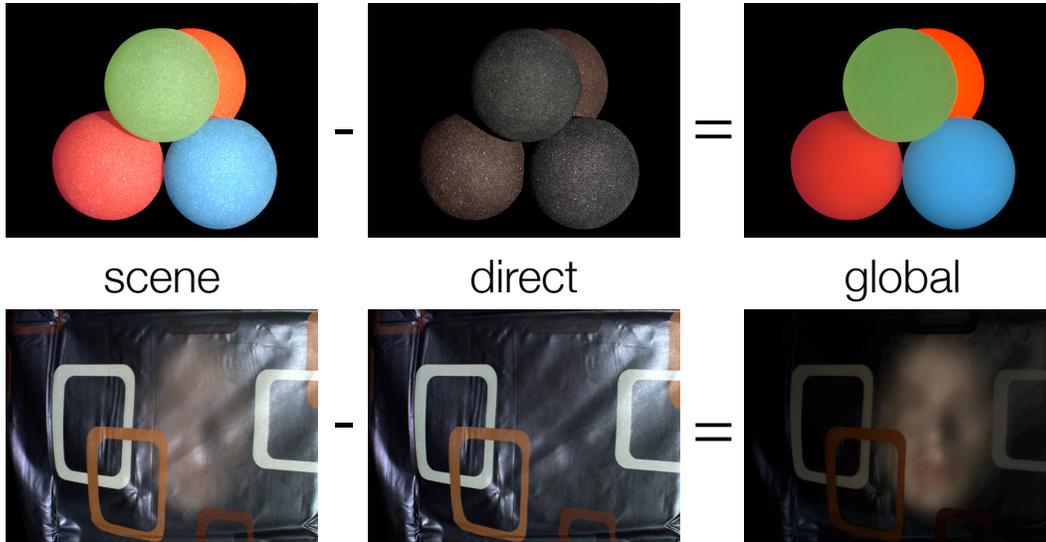
Fast Separation of Direct and Global Components of a Scene Using High Frequency Illumination - SIGGRAPH '06



Fast Separation of Direct and Global Components of a Scene Using High Frequency Illumination - SIGGRAPH '06



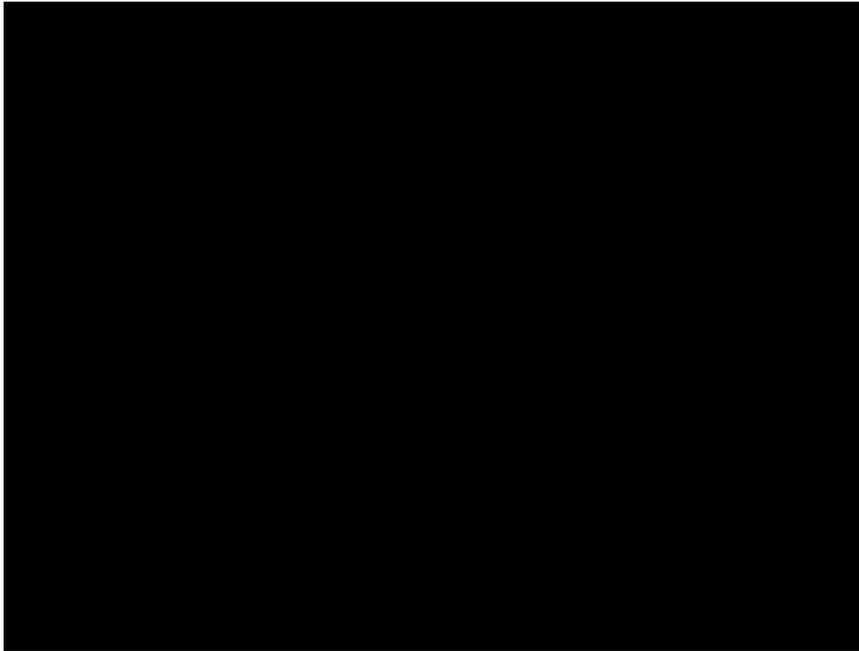
Fast Separation of Direct and Global Components of a Scene Using High Frequency Illumination - SIGGRAPH '06



Real-time Fun

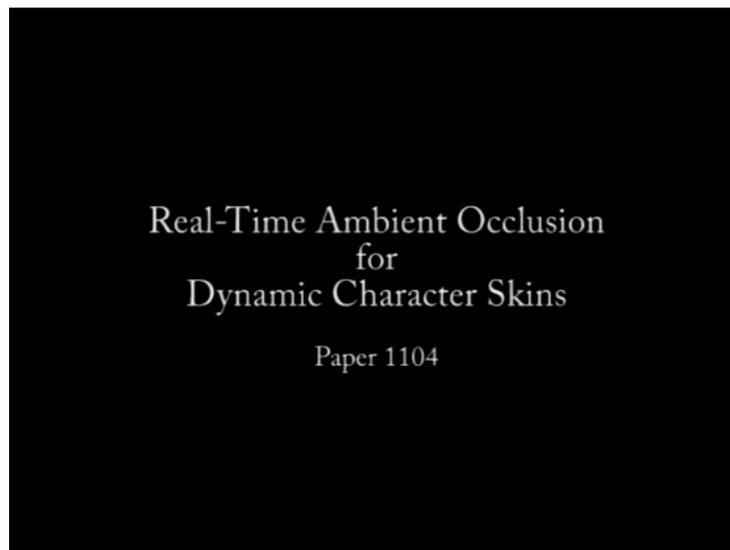
- Deformations
- Ambient Occlusion
- Soft Shadows
- Fluid Flows

Meshless Deformations Based on Shape Matching - SIGGRAPH '05



M. Mueller, B. Heidelberger,
M. Teschner, M. Gross:
Meshless Deformations
Based on Shape Matching
Proceedings of
SIGGRAPH'05, Los Angeles,
USA, July 31 - August 4, 2005

Precomputed Ambient Occlusion for Character Skins - SIGGRAPH Sketch '06



Kirk, A. G., Arkan, O.,
"Precomputed
Ambient Occlusion for
Character Skins" To
appear in ACM
SIGGRAPH 2006.
Technical Sketch.

Real-Time Soft Shadows - SIGGRAPH '06

Real-time Soft Shadows in Dynamic Scenes using Spherical Harmonic Exponentiation Zhong Ren, Rui Wang, John Snyder, Kun Zhou, Xinguo Liu, Bo Sun, Peter-Pike Sloan, Hujun Bao, Qunsheng Peng, Baining Guo. To Appear in ACM SIGGRAPH 2006.

Real-time Soft Shadows in Dynamic Scenes using Spherical Harmonic Exponentiation

Zhong Ren¹ Rui Wang¹ John Snyder² Kun Zhou³ Xinguo Liu³
Bo Sun⁴ Peter-Pike Sloan⁵ Hujun Bao¹ Qunsheng Peng¹ Baining Guo³

¹Zhejiang University ²Microsoft Research ³Microsoft Research Asia
⁴Columbia University ⁵Microsoft Corporation

Model Reduction of Complex Dynamics - SIGGRAPH '06

Model Reduction for Real-time Fluids
Treuille, A. Lewis, A. Popović, Z.
ACM Transactions on Graphics 25(3)

Model Reduction for Real-Time Fluids