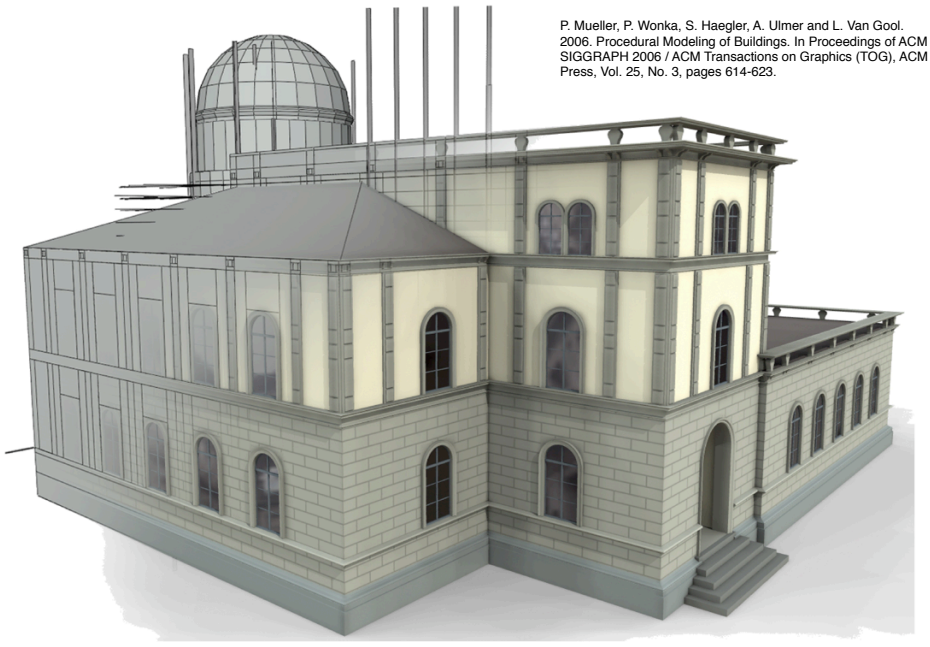
some recent graphics research to inspire final projects

bryan klingner (klingner@cs)

Procedural Modeling of Buildings - SIGGRAPH ‘06

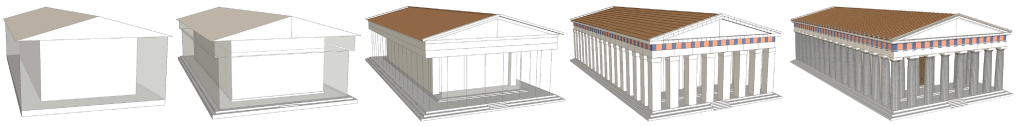


P. Mueller, P. Wonka, S. Haegler, A. Ulmer and L. Van Gool. 2006. Procedural Modeling of Buildings. In Proceedings of ACM SIGGRAPH 2006 / ACM Transactions on Graphics (TOG), ACM Press, Vol. 25, No. 3, pages 614-623.

Procedural Modeling of Buildings - SIGGRAPH ‘06

Production process:

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

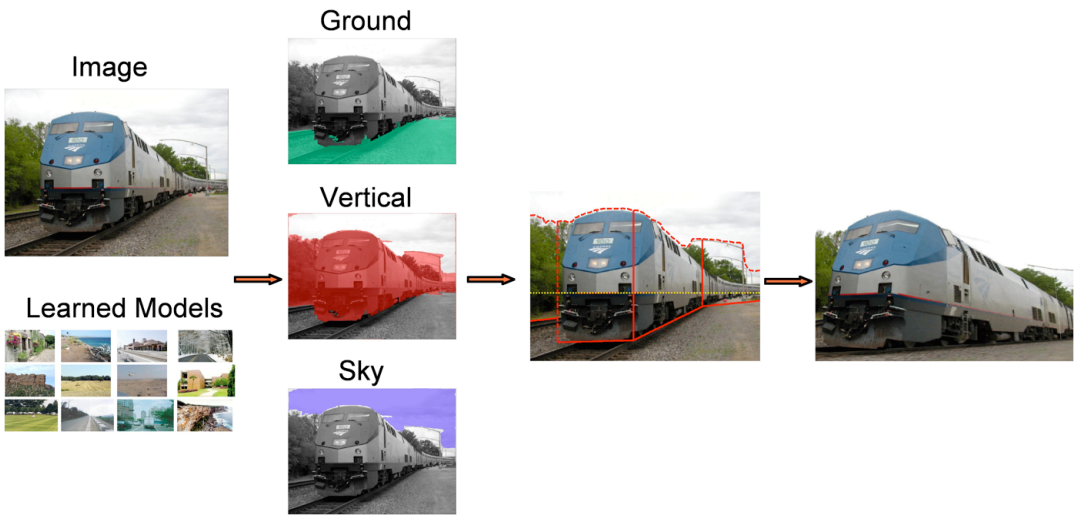


Procedural Modeling of Buildings

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

Salience-Preserving Color Removal - SIGGRAPH ‘05

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

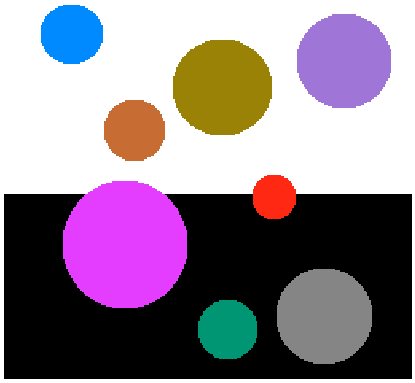
color image

new algorithm

grayscale

Salience-Preserving Color Removal - SIGGRAPH ‘05

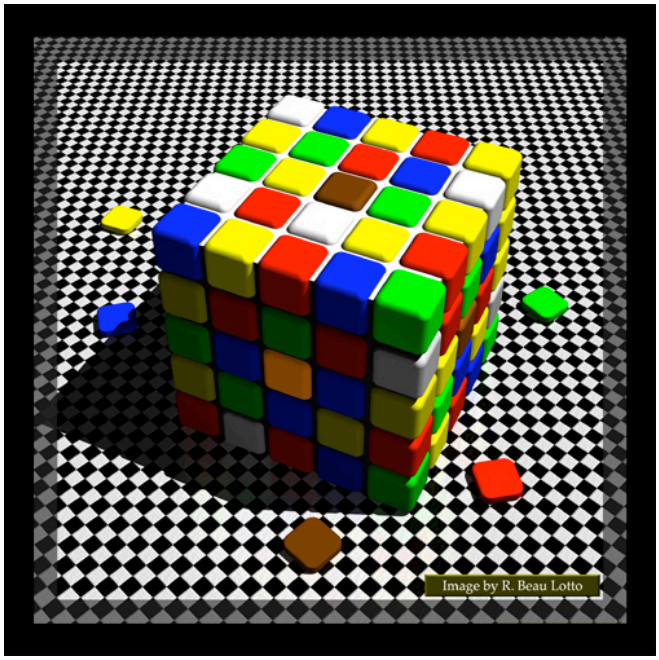
Problem: Isoluminant Colors



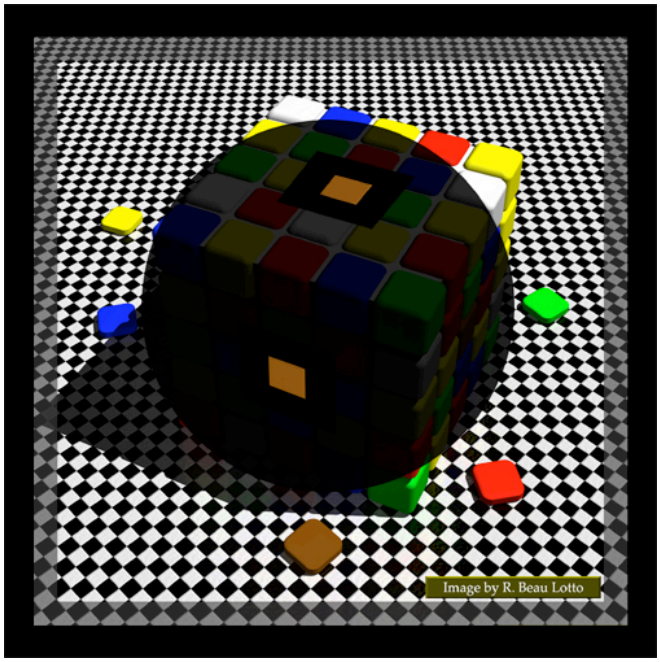
color

grayscale

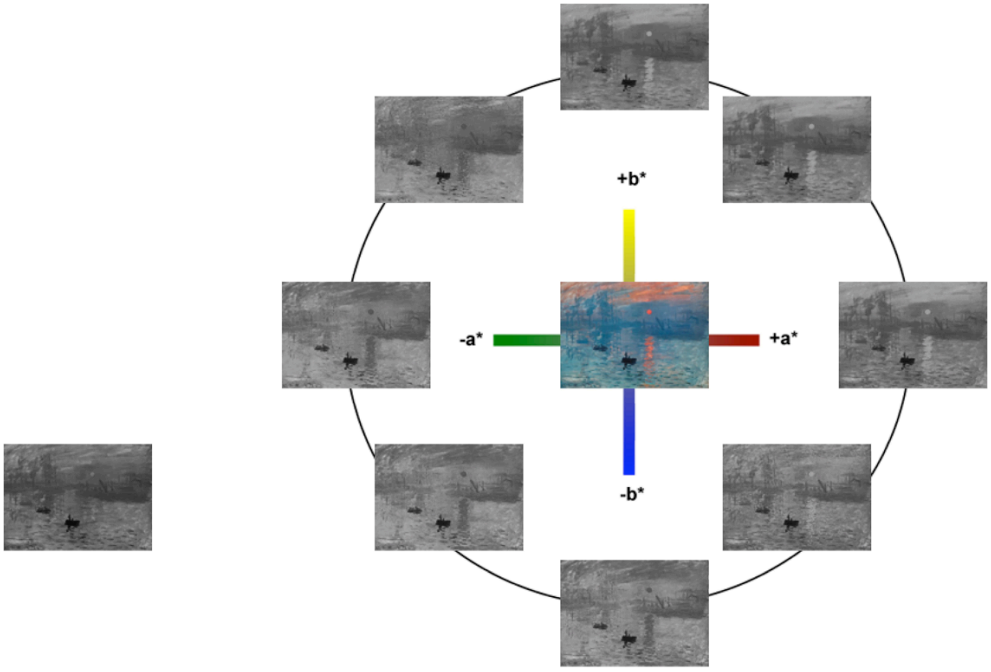
Salience-Preserving Color Removal - SIGGRAPH ‘05



Salience-Preserving Color Removal - SIGGRAPH ‘05



Salience-Preserving Color Removal - SIGGRAPH ‘05



Salience-Preserving Color Removal - SIGGRAPH ‘05

color

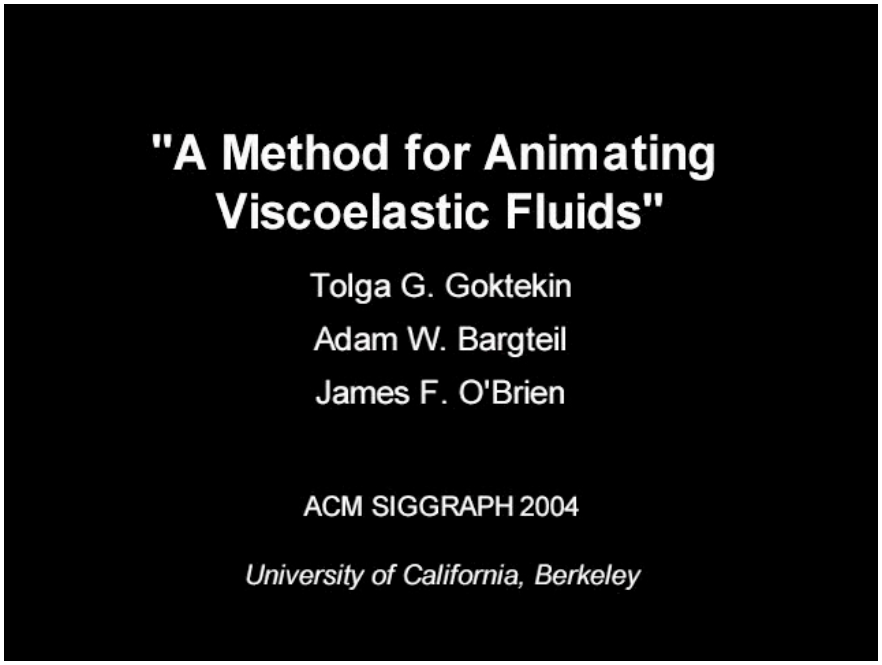
Photoshop Gray

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.

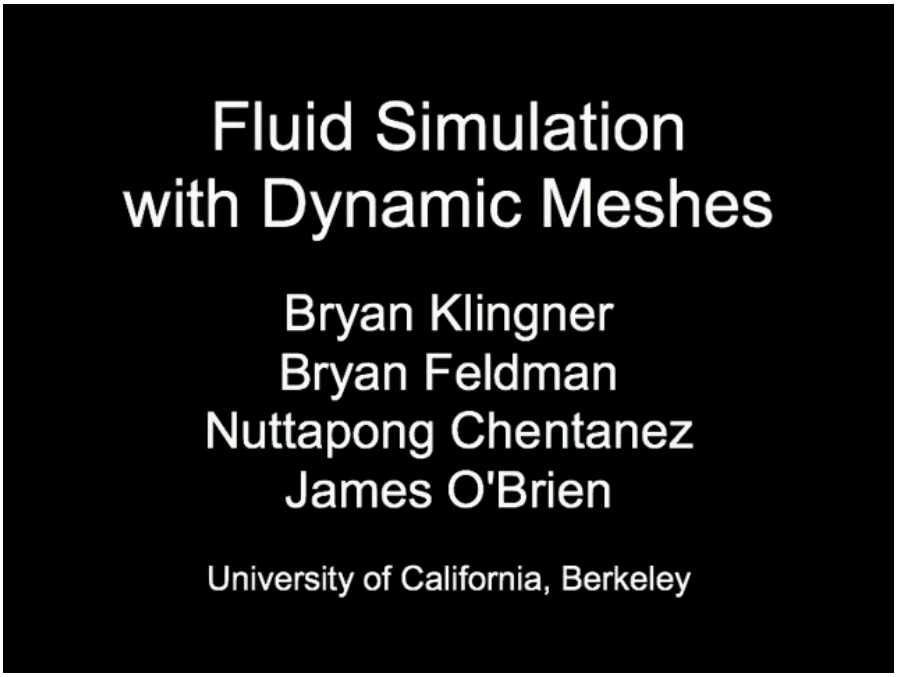
A Method for Animating Viscoelastic Fluids - SIGGRAPH ‘05



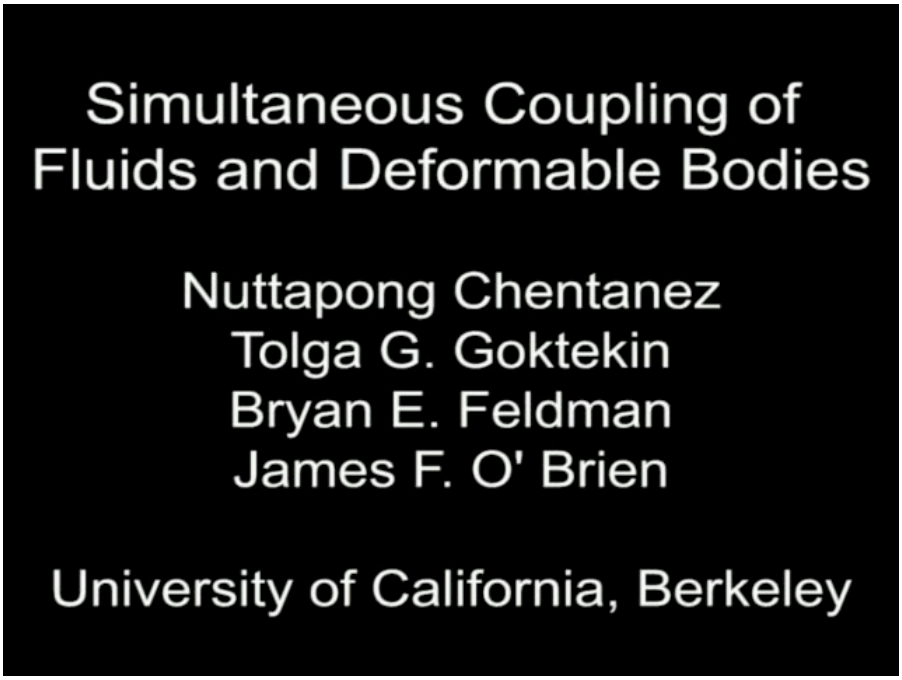
Animating Gases with Hybrid Meshes - SIGGRAPH ‘05

Fluids in Deforming Meshes - SCA ‘05

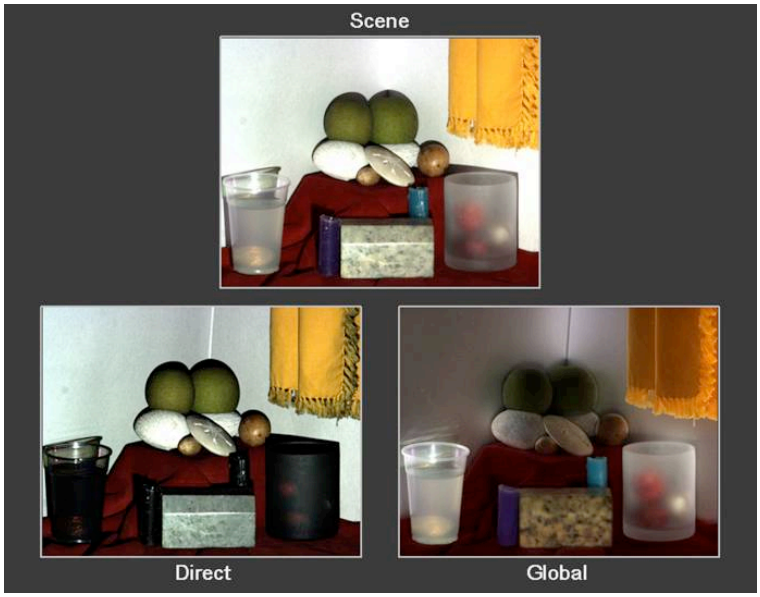
Fluid Animation with Dynamic Meshes - SIGGRAPH ‘06



Simultaneous Coupling of Fluids and Deformable Bodies - SCA ‘06

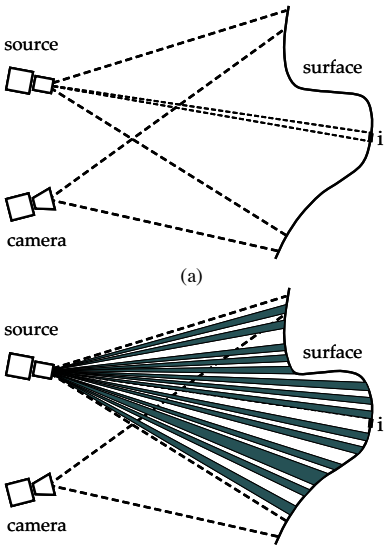


Fast Separation of Direct and Global Components of a Scene Using High Frequency Illumination - SIGGRAPH ‘06



"Fast Separation of Direct and Global Components of a Scene using High Frequency Illumination,"
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



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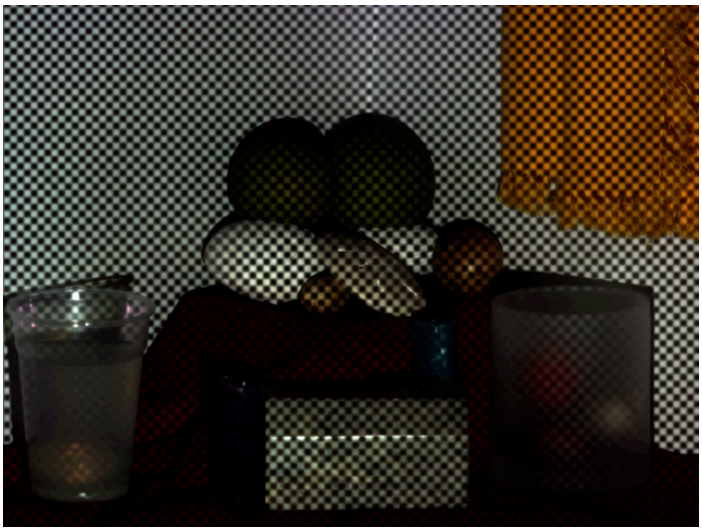

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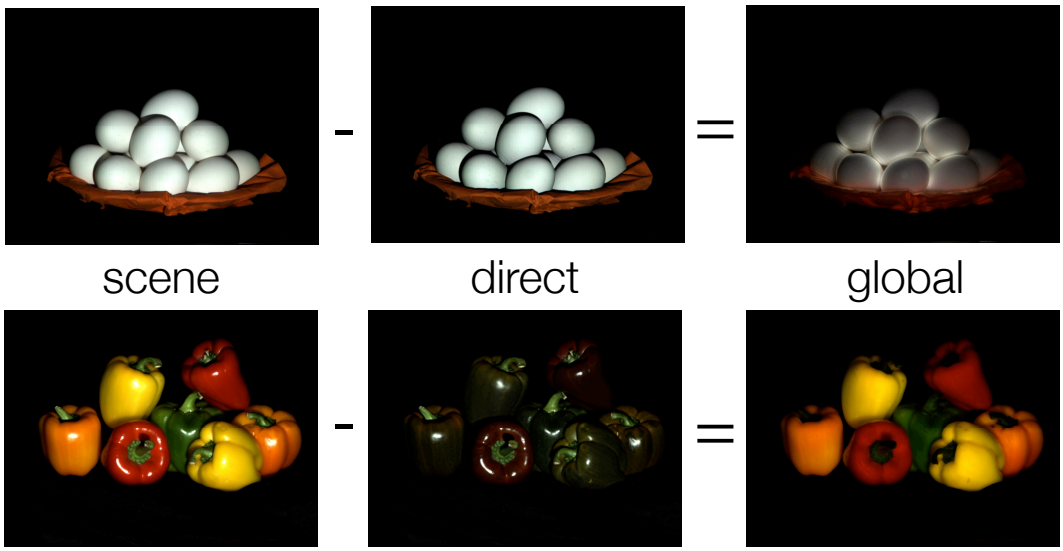

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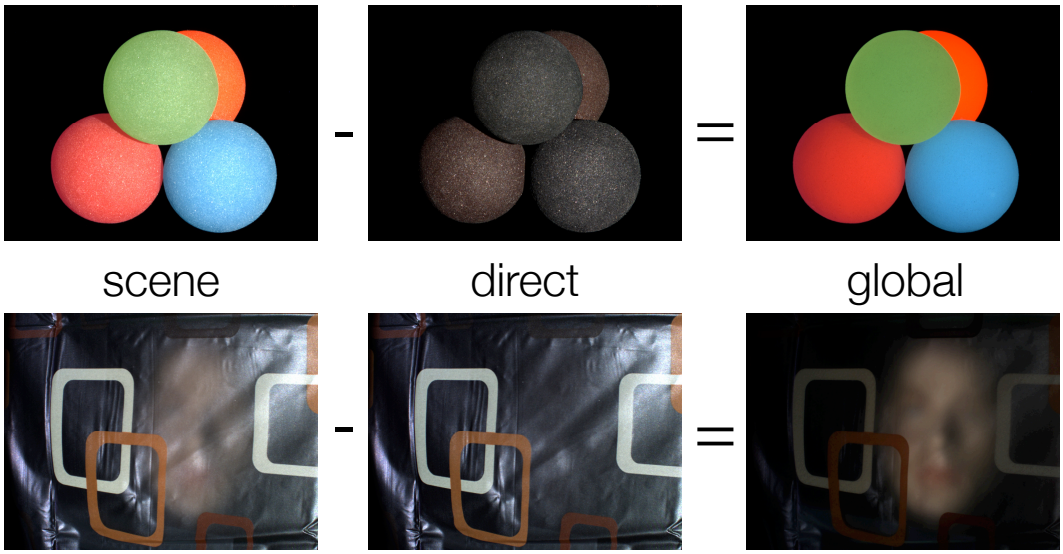


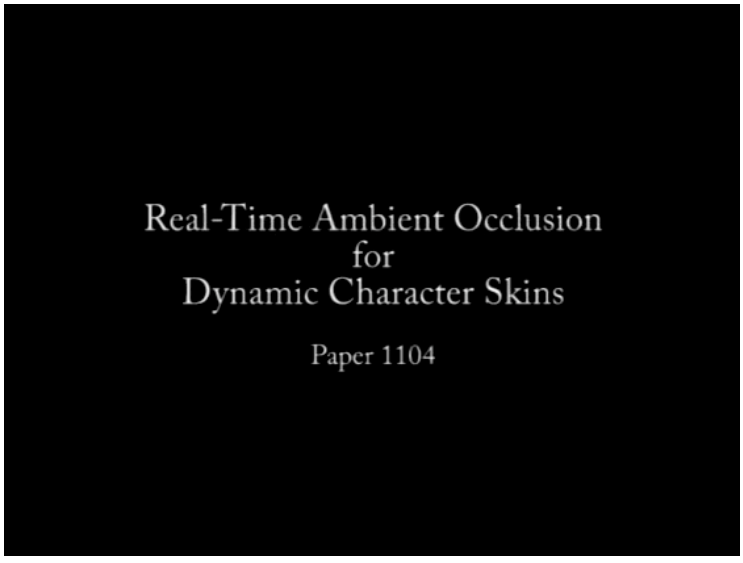
Real-time Fun

- 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

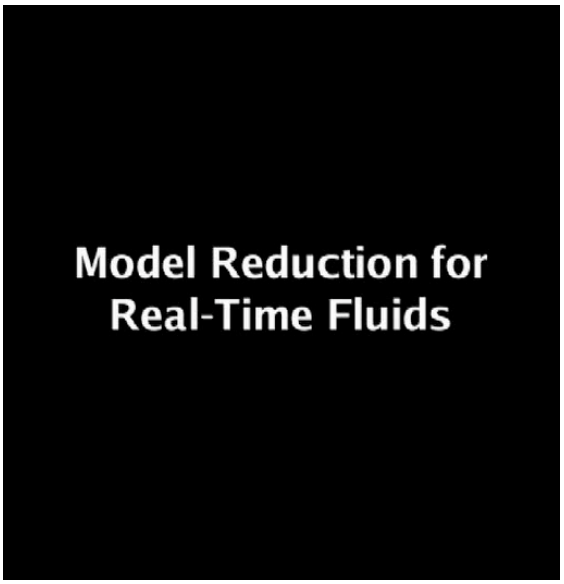


Kirk, A. G., Arikan, O., "Precomputed Ambient Occlusion for Character Skins" To appear in ACM SIGGRAPH 2006. Technical Sketch.

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.

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)