
SIGGRAPH2004
Real-Time Shadowing Techniques
Course #26, Tuesday, Full Day

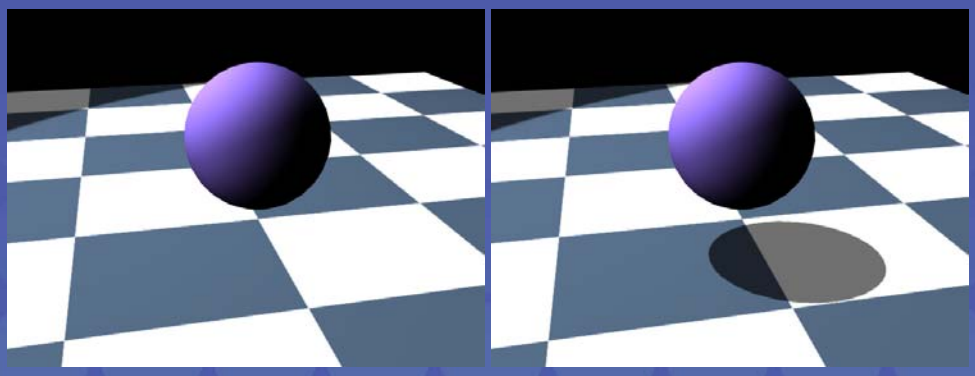
Speakers

- Tomas Akenine-Moeller
  - Lund Institute of Technology, Sweden
- Eric Chan
  - Massachusetts Institute of Technology, USA
- Wolfgang Heidrich
  - University of British Columbia, Canada
- Mark J. Kilgard
  - NVIDIA Corporation, USA
- Marc Stamminger
  - University of Erlangen-Nürnberg, Germany
- Jan Kautz
  - Massachusetts Institute of Technology, USA

Why Shadowing?

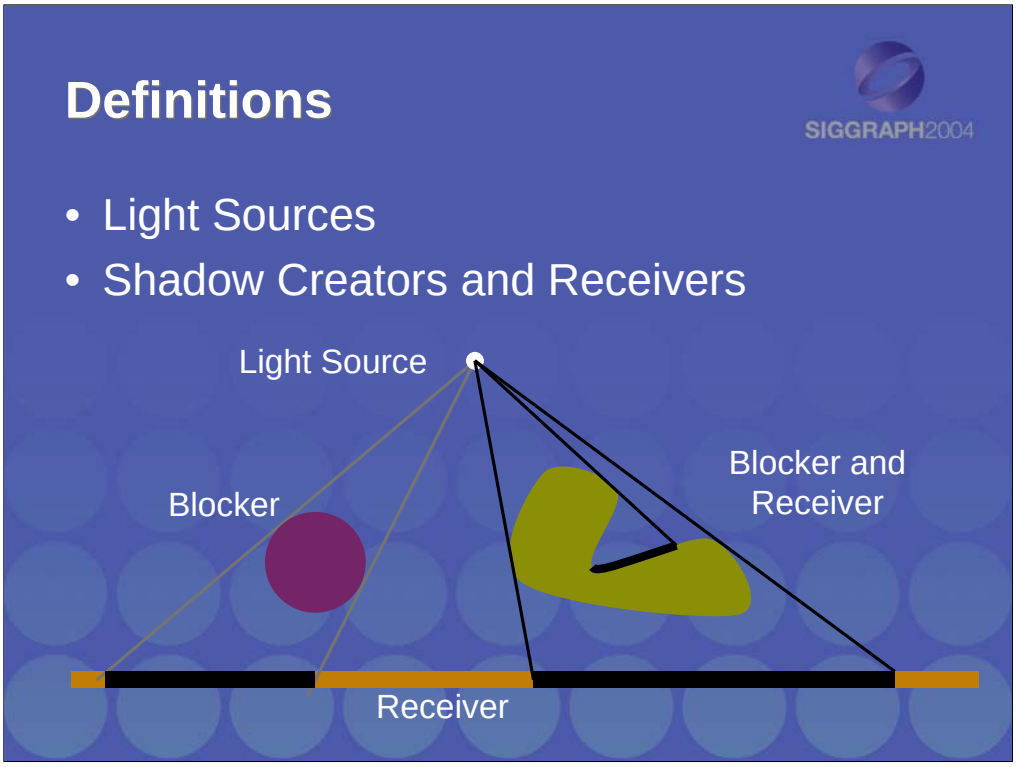
Screenshot from Max Payne 2

Why Shadowing?



Why Shadows?

- Intuition about lighting / objects
  - Position of the light (e.g. sundial)
  - Depth cue
  - Spatial relationship between objects
    - Contact points
  - Realism



Note back facing primitives (as seen from the light source) are always in shadow
So the sphere is self shadowing too (not shown)

Definitions

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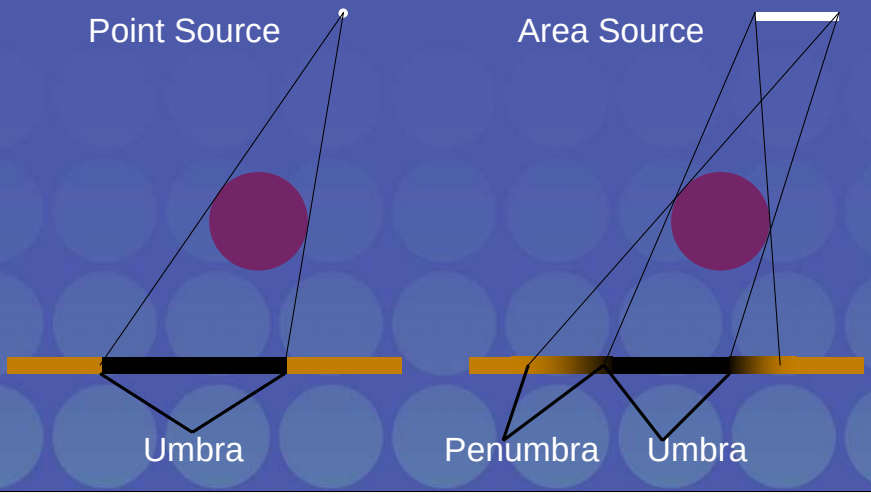
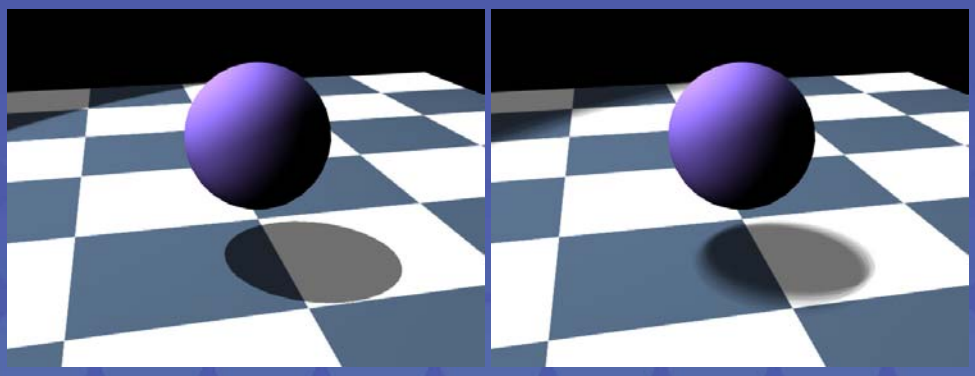
- Light Source Types



Hard vs. Soft Shadows

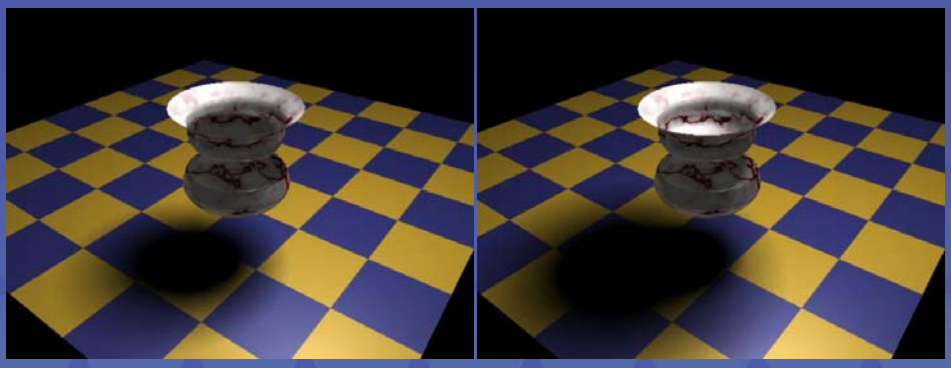


Classification of Shadowing Techniques

- Hacks
  - No Shadows, projected blobs, projective shadows
- Shadow Maps
  - Using texture maps
- Shadow Volumes
  - Using geometry to represent shadows
- Shadows with Radiance Transfer
  - Precompute light-object interaction

Hacks

- Projected Blobs

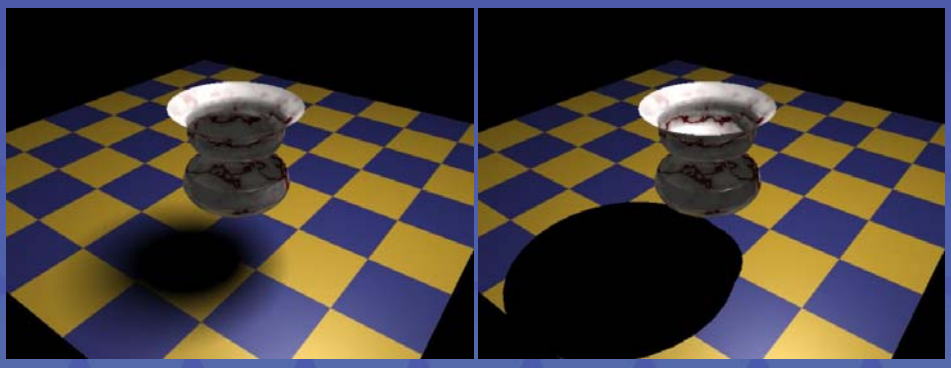


Blob

Accurate Soft Shadow

Hacks

- Projected Blobs



Blob | Hard Shadow

Hacks

- Projective Shadows
  - distinct shadow caster / receiver
  - no self-shadowing
  - store shadow in texture
  - project onto receiver
  - possible to blur shadow texture


Max Payne 2
© Rockstar Games and Remedy Entertainment

Schedule

- ***Introduction***
  - 8:30 Introduction (Kautz)
- ***Shadow Mapping***
  - 8:45 Introduction to Shadow Maps (Stamminger)
  - 9:15 Perspective Shadow Maps (Stamminger)
  - 10:00 Silhouette Maps (Chan)
  - 10:15 – 10:30 Break
  - 10:55 Linear Light Sources (Heidrich)
  - 11:35 Smoothies (Chan)
  - 12:15 – 13:45 Break
- ***Shadow Volumes***
  - 13:45 Shadow Volumes (Kilgard)
  - 14:45 Soft Shadow Volumes (Akenine-Moeller)
  - 15:30 – 15:45 Break
- ***Radiance Transfer***
  - 16:00 Radiance Transfer with Shadows (Kautz)
- ***Conclusions***
  - 17:00 Conclusions (Kautz)