Radiance 4.1

New Features and Capabilities

Greg Ward, Anyhere Software
Overview of New Features

- Better material accuracy, -ss option
- Added option for rsensor to feed rtcontrib rather than calling rtrace
- Added first-class BSDF material type
- Added reflection & variable resolution to genBSDF program, created pkgBSDF
Improvements to Standard BRDF

- In 2010, David Geisler-Moroder and Arne Dür published improved Gaussian model
  - Fixed normalization and sampling near grazing
  - Tested extensively on modified Radiance
- Re-implemented and optimized for 4.1
Improved Model

From David’s 2010 Workshop presentation
New -ss Rendering Option

- Obviates -sj (specular jitter) option
  - Same behavior in 0-1 range
  - Increases number of samples if $\geq 2$
- Suggested by David G-M. in 2010
New Option in rsensor

- Original rsensor required an octree and computed each sensor’s signal with rtrace.
- If ‘.’ given in place of octree, rsensor will output ray origins and directions.
- These may be passed to rtcontrib for annual simulations.
- Suggested by Anne Iverson last year.
Example for Annual Simulation

```
rsensor -h -rd 1000 -vf posC.vf mysens.dat . \
   | rtcontrib -c 1000 @rtc.opt -o %m_%03d.dat \ 
   -m wg1 -m wg2 scene.oct

foreach sky ("`cat skies.txt`")
gensky $sky | genskyvec > skyvec.dat
set wg1=`dctimestep wg1_%03d.dat win1bsdf.xml\ext1.dat skyvec.dat`
set wg2=`dctimestep wg2_%03d.dat win2bsdf.xml\ext2.dat skyvec.dat`
echo "Sensor signal at $sky is:" `ev $wg1+$wg2`
end
```
Added **BSDF Material**

- Loads WINDOW 6 XML file
- Supports new variable-resolution data type
- First-class citizen does proper sampling
- Shows CFS geometry in “proxy” mode
- Eliminates need for XML files in `mkillum`
- BSDF library shared with other developers
Improvements to genBSDF

- Fixed a number of inaccuracies (thanks to Andy, Jacob, and David A. for testing)
- Added calculation of BRDFs
- Added support for variable-resolution data
Created pkgBSDF Utility

- With BSDF that supports proxy mode, need a new mechanism to load geometry
- mkillum’s use of XML files is going away
- pkgBSDF converts MGF description of CFS detail geometry into Radiance model
- Simple syntax (e.g., “pkgBSDF dist.xml”)
- Works on individual XML files or libraries
Other Changes

- Added support for gcc --fast-math
- Eliminated unnecessary flushing in rtrace
- Fixed bugs pointed out by David G-M. and Randolph F. (rsensor and ambient cache)
- Eliminated “no light sources found” when \(-ab \geq 1\) & glow object present
Radiance Version 4.1 Overdue

- Traditional to announce overdue release at every workshop
- Found 4 major bugs in new BSDF material while preparing my talks, so good I didn’t release anything earlier
- Need to incorporate additions for Dashboard (today’s talk by Rob G.)
Questions?