Radiance 4.1
New Features and Capabilities

Greg Ward, Anyhere Software

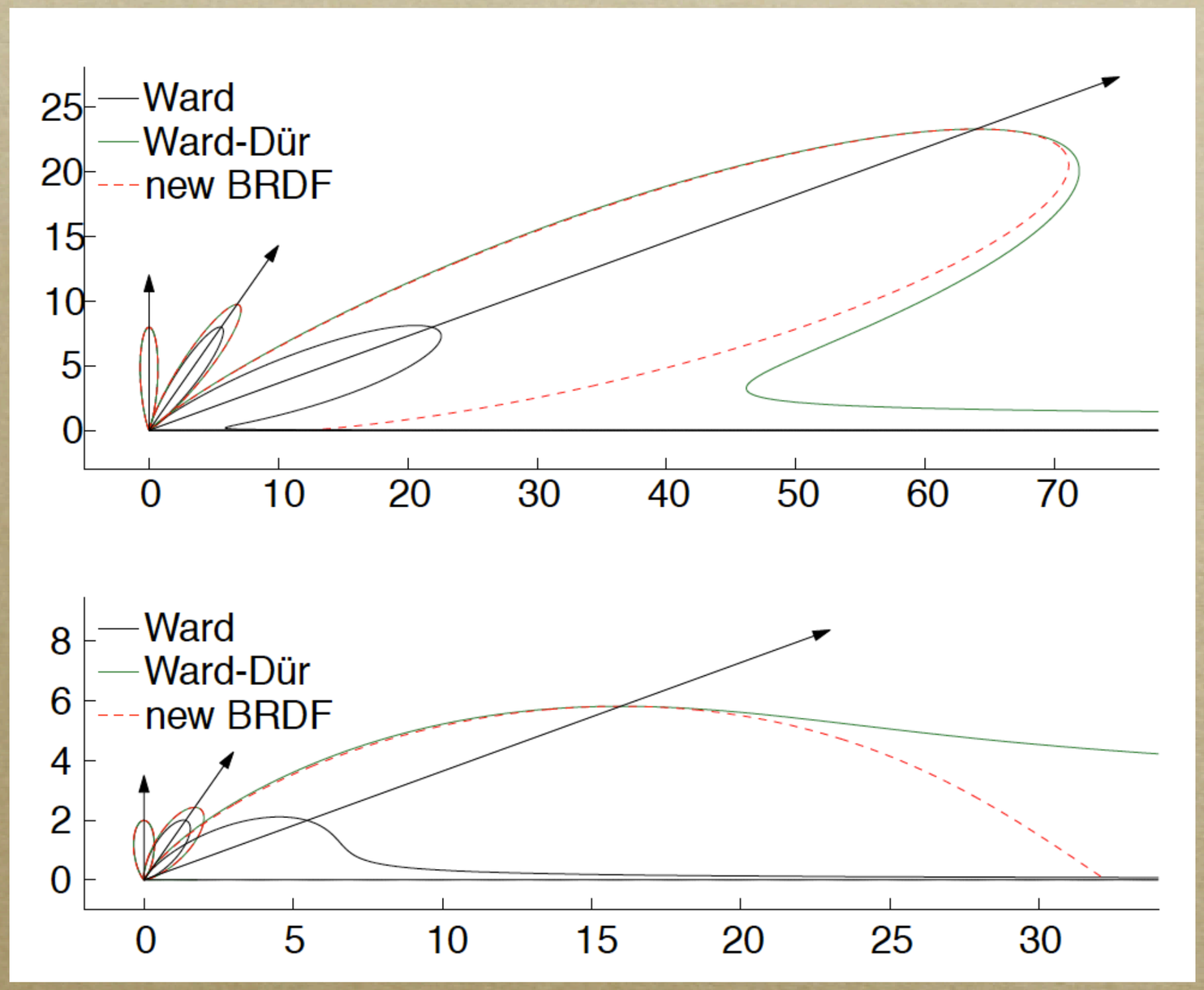
Overview of New Features

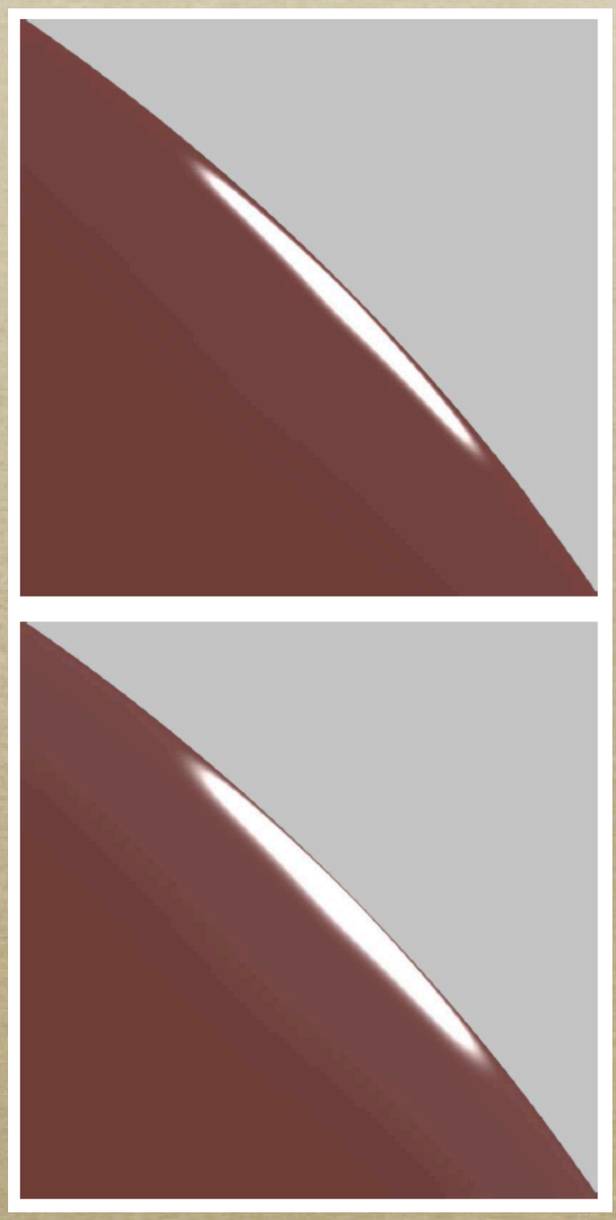
- Better material accuracy, **-ss** option
- Added option for **rsensor** to feed **rtcontrib** rather than calling **rtrace**
- Added first-class *BSDF* material type
- Added reflection & variable resolution to **genBSDF** program, created **pkgBSDF**

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 ≥ 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** ≥ 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?