

# **CSC 4356 / ME 4573**

# **Interactive Computer Graphics**

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Louisiana State University  
Fall 2010

# **Interactive Computer Graphics**

An introduction to 3D computer graphics, emphasizing real-time graphics programming using OpenGL and the C or C++ programming language. Topics include the fixed function and programmable 3D pipelines, transformation, interaction, texturing, lighting, performance analysis, optimization, and a variety of intermediate and advanced topics.

# Prerequisites

- C / C++ (csc 1253-1254 *or eq.*)
- Data structures (csc 3102 *or eq.*)
- *No prior experience with 3D graphics or OpenGL*

# Website

<http://csc.lsu.edu/~kooima/csc4356/index.html>

- Administrivia
- Course schedule
- Assignment details
- Grade sheets

# OpenGL

OpenGL is the industry-standard cross-platform real-time 3D API. First released in 1992, OpenGL is a constantly-evolving interface that adapts to the changing capability of modern 3D graphics hardware.

OpenGL is in its fourth major revision, and we will emphasize the usage of the modern, high-performance API, ignoring a great deal of obsolete functionality that remains for backward-compatibility.

1.0	...	1992	2.1	...	2006	4.2	...	2011
1.1	...	1997	3.0	...	2008	ES 1.0	...	2004
1.2	...	1998	3.1	...	2009	ES 1.1	...	2005
1.3	...	2001	3.2	...	2009	ES 2.0	...	2007
1.4	...	2002	3.3	...	2010	ES 2.1	...	2011?
1.5	...	2003	4.0	...	2010			
2.0	...	2004	4.1	...	2010			

## **OpenGL supported platforms**

*MS Windows 7/Vista/XP*

*Mac OS X*

*Linux*

iOS

Android

Symbian

Nintendo Wii & DS

Sony PS3 & PSP

Blackberry

# DirectX

DirectX is the Microsoft real-time 3D API, first released in 1995 as Direct3D. Through 11 major revisions, DirectX has evolved into an excellent API, equivalent in capability to (and perhaps better-designed than) OpenGL.

But... supported platforms:

Windows      Xbox

*DirectX 10+ supports Windows 7/Vista and Xbox 360 only.*



# Course software requirements

Most any OS:

- Windows 7/Vista/XP
- Mac OS X
- Linux

“Native” languages:

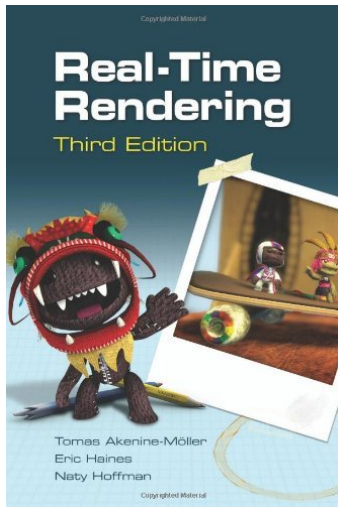
- C
- C++
- *no Java*

## Course hardware requirements

*Any machine with hardware accelerated 3D graphics...*

- Your laptop
- Your desktop
- A lab workstation
- Your instructor's lab workstations

*You will make in-class demonstrations. Be ready. Be certain to **test** before class.*



# **Real-Time Rendering**

Tomas Akenine-Möller

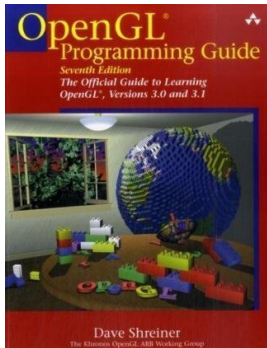
Eric Haines

Naty Hoffman

ISBN 978-1568814247

**\$57.70 at Amazon**

**<http://realtimerendering.com/>**



# OpenGL Programming Guide

Dave Shreiner

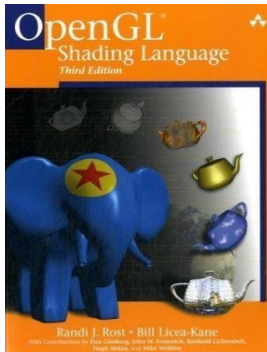
Khronos OpenGL ARB Working  
Group

ISBN 978-0321552624

**\$40.43 at Amazon**

Version 1.1 (old) at <http://www.glprogramming.com/red/>

Standard spec at <http://www.opengl.org/documentation/specs/>



# OpenGL Shading Language

Randi J. Rost

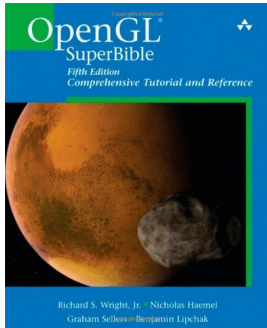
Bill Licea-Kane

*et al*

ISBN 978-0321637635

**\$38.67 at Amazon**

Standard spec at <http://www.opengl.org/documentation/glsl/>



# OpenGL SuperBible

Richard S. Wright

Nicholas Haemel

Graham Sellers

Benjamin Lipchak

ISBN 978-0321712615

**\$37.96 at Amazon**

(You really won't need this.)

# Course Assignments

Three individual programming projects

- Instructor assigns topic
- Brief informal in-class demonstration

One individual final programming project

- Student chooses topic
- Ten-minute formal in-class presentation
- Grad students will write an additional paper

The schedule is on the web site.

# Project Grading

Each project is worth a total of 80 points.

+40	...	Implementation	A	...	> 70
+20	...	Documentation	B	...	> 60
+10	...	Demonstration	C	...	> 50
+10	...	Lagniappe	D	...	> 40



# Final Project Grading

The final project is worth a total of 160 points.

+60	...	Implementation	A	...	> 140
+40	...	Documentation	B	...	> 120
+60	...	Presentation	C	...	> 100
			D	...	> 80

## **Piled higher & Deeper**

The University demands that added requirements be placed upon *graduate students*. Thus, an additional 4-page paper will be required as a part of the presentation of the final project.

On the bright side, the schedule permits

- two extra weeks to finish it,
- and more time to present it.

# Semester Grading

The semester total is 400 points.

A ... > 350

B ... > 300

C ... > 250

D ... > 200

Grades will be posted to a spreadsheet on the **course web site**, anonymized using the last three digits of your LSUID.