

# COMP175 - COMPUTER GRAPHICS

Course number: **COMP 175-01**, Fall 2010  
 Meetings: TR 10:30-11:45am (D+ block), in **Anderson 101**

Instructor: **Sara Su** (sarasu@cs.tufts.edu)  
 TA: **Connor Gramazio** (connor.gramazio@tufts.edu)  
 Office hours: T 2:00-3:00pm, W 4:15-5:15pm, and by appointment, in **Halligan 118**  
 Mailing list: **comp175@cs.tufts.edu**

This course explores the fundamentals of computer graphics, including representing digital images, 2D rasterization and anti-aliasing, 3D rendering via ray casting, ray tracing and radiosity, viewing transformations, 3D shape representation, and an introduction to modeling and computer animation. See the bottom of this page for course polices.

Prerequisites: **COMP 15** (Data Structures), **MATH 13** (Calculus III), and **MATH 46** (Linear Algebra), or permission of instructor. Programming assignments require a good working knowledge of C or C++.

All final project links have been posted. Well done all! 196 days ago

If you are new to HTML, here's a template to get started:  
<http://www.cs.tufts.edu/~sarasu/courses/comp175-2009fa/project/template.html> 216 days ago

Project reports should be posted online. To set up your CS web space, see <https://www.eecs.tufts.edu/userguide/?doc=account-webpage>. 216 days ago

follow comp175 announcements on Twitter

## FINAL PROJECTS



**How Timmy Got to The Front of The Line: A Lesson in Merge Sorting**  
 Andrea Levine ('12)



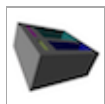
**pycompmgr: A Compositing Manager**  
 Written in Python Using xpyb  
 Andrew Gallant (G)



**MobileSynth**  
 Chris Latina ('11)  
 Ethan Setnik ('12)



**Free-Look Camera and 3D Fractals**  
 David Kiger (G)



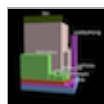
**Procedurally Generated Architecture: From the Interior Out**  
 Douglas Dunlap (G)



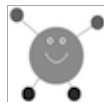
**File System Visualization**  
 Ian Altgilbers (G)



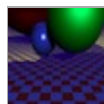
**Interactive Game**  
 Janey Chen (G)



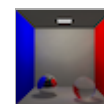
**Call Stack Viz**  
 Jonathan Pan (G)



**Mole-Lint: An Integration of More Pixels, More Protein**  
 Megan Strait (G)



**Ray Tracer**  
 Raoul Veroy (G)



**Photon Mapping**  
 Sean Kelley ('12)



**3D Maze**  
 Takao Tanizawa (G)



**A Scale Model of the Solar System**  
 Tejas Shah ('11)



**Clean Cities**  
 Walker Holahan ('12)

## SCHEDULE

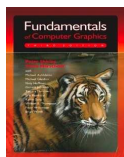
date	topics	readings (optional in gray)	assignments
07 Sep	Introduction and Displays	pp. 53-62	
09 Sep	Images and Color	pp. 62-67, 561-565	L1 out: OpenGL and Images
14 Sep	Rasterization: Lines and Circles	pp. 161-165	

16 Sep	Rasterization: Region Filling	pp. 166-169	L1 due	L2 out: Rasterization
21 Sep	Coloring and Texturing Polygons	pp. 243-259, [Pineda 1988]		
23 Sep	Math Review and Transformations	pp. 111-125, pp. 16-29, 91-103	L2 due	
28 Sep	Direct3D and XNA ( <i>Edwin Guarin, Michael Cummings</i> )			
30 Sep	No lecture (Connor holding extra office hours)			L3 out: Texture & Transforms
05 Oct	3D Transformations and Polygonal Models	pp. 125-140		
07 Oct	Camera Transforms	pp. 141-158	L3 due	
12 Oct	The Graphics Pipeline and Introduction to Ray Tracing	pp. 161-184		L4 out: Models & Cameras
14 Oct	Review and Project Introduction			
19 Oct	Midterm Exam			
21 Oct	Image Processing and Anti-Aliasing	pp. 185-211, pp. 212-232		
26 Oct	Saliency: Learning to Predict Where People Look ( <i>Tilke Judd</i> )		L4 due	L5 out: Lighting
28 Oct	Resources and Search Techniques for Computer Graphics ( <i>Karen Vagts</i> )			
02 Nov	Project Pitches			
04 Nov	Distribution Ray Tracing	pp. 69-88, 303-316		
09 Nov	Illumination and GPUs	pp. 233-242, [Fatahalian 08], pp. 445-466	L5 due	
11 Nov	No class (Veterans' Day)			
16 Nov	Parametric Curves and Surfaces	pp. 339-365		
18 Nov	Parametric Curves and Surfaces (continued)			
23 Nov	Subdivision Surfaces, Implicit Surfaces, Volumes	pp. 365-384		
25 Nov	No class (Thanksgiving)			
30 Nov	Animation and Games	pp. 413-433		
02 Dec	Physics-Based Animation	pp. 433-443, [Witkin and Baraff 2001]		
07 Dec	Special Topics			
09 Dec	Project Presentations			

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## COURSE POLICIES

### textbooks



Required:  
***Fundamentals of Computer Graphics***  
 by Peter Shirley and Steve Marschner  
 3rd edition, A K Peters, 2009



Recommended:  
***OpenGL SuperBible: Comprehensive Tutorial and Reference***  
 by Richard S. Wright, Jr., Benjamin Lipchak, and Nicholas Haemel  
 4th edition, Addison-Wesley Professional, 2007

Course reserves:  
 The Shirley and Wright books and other recommended texts are **on reserve at Tisch Library**.

### grading

Programming assignments will be evaluated on code functionality, quality of resulting images, and documentation. Assignments will typically be due on Thursdays. Each student will have five "late days" to use over the term; these may be applied to assignments but not to projects or exams. This course follows the **Tufts policies on academic integrity**. Final grades in the course will be determined as follows:

- 60% Programming and written assignments
- 20% Final project
- 10% Midterm exam
- 10% Class participation

## attendance and accommodations

Attendance and participation in class discussion are encouraged and expected. If you will need to miss a class due to religious reasons, please let the instructor know in advance. To be excused for an absence due to illness or family emergency, notify the course staff as soon as possible.

Tufts is committed to providing support services and reasonable accommodations to all students with documented disabilities. To request an accommodation, you must register with the **Disability Services Office** at the beginning of the semester. To do so, call the Student Services Desk at (617) 627-2000 to arrange an appointment with Sandra Baer, Program Director of Disability Services.

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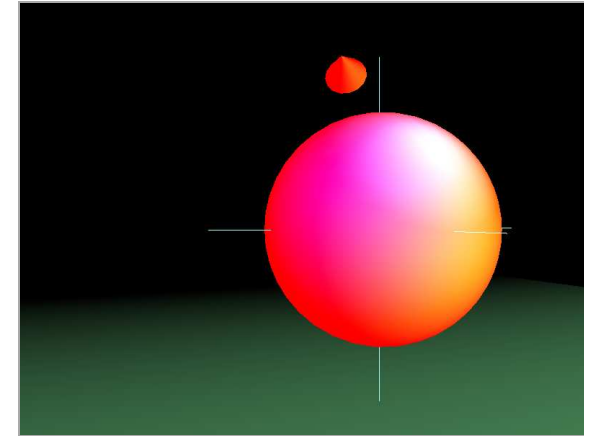
## RESOURCES

### programming

- [Getting Started with OpenGL](#)
- [The OpenGL Programming Guide](#) ("The Red Book")
- [The OpenGL Reference Manual](#) ("The Blue Book")
- [OpenGL Wiki](#)
- [GLUT: The OpenGL Utility Toolkit](#)
- [Tufts Computer Graphics Group resources](#)

### math

- J. Bloomenthal and J. Rokne, [Homogeneous coordinates](#). In *The Visual Computer*, 11(1), 1994.



### acknowledgments

This course makes use of some material developed by Profs. [Sarah Frisken](#) and [Alexandre François](#). We thank instructors at [MIT](#), [UW](#), and [Cornell](#) for providing excellent examples of graphics courses upon which to build this syllabus. We also thank this semester's guest speakers: [Edwin Guarin](#), [Michael Cummings](#), [Tilke Judd](#), [Karen Vagts](#).