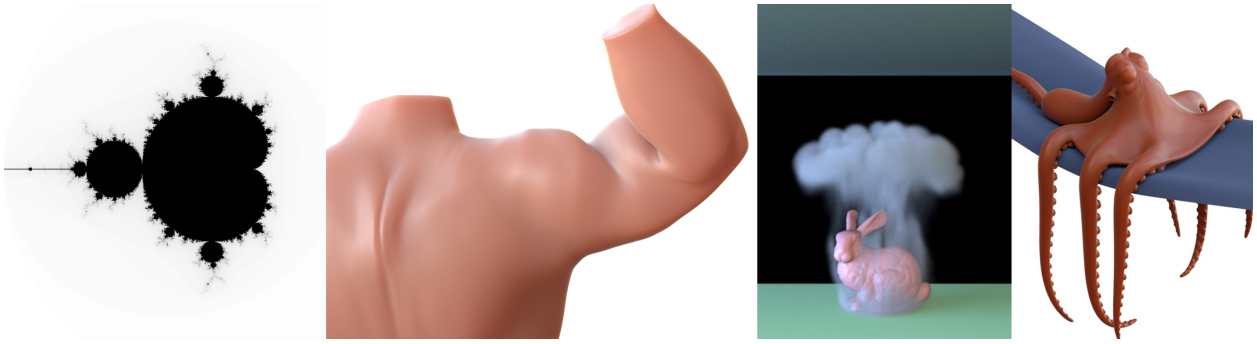
CPSC 478: Introduction to Computer Graphics
Spring 2020 **Syllabus**



Course Description

This course introduces the basic concepts of two- and three-dimensional computer graphics. Topics may include affine and projective transformations, clipping and windowing, visual perception, scene modeling and animation, algorithms for visible surface determination, reflection models, illumination algorithms, and color theory.

Prerequisites

CPSC 202 and CPSC 223 are required, but these prerequisites are not formally enforced. We assume programming proficiency equivalent to 223, because there is a significant C/C++ and JavaScript programming portion to this course. Familiarity with calculus and linear algebra equivalent to 202 is assumed, because concepts such as partial derivatives and eigenvalues will be used.

Instructor

Theodore Kim, theodore.kim@yale.edu
AKW 412

Teaching Assistant

Zeyu (Zach) Wang, zeyu.wang@yale.edu

Instruction Times

Lecture: Mondays and Wednesdays, 11:35-12:50, WLH 211
Office Hours: TBD

Textbooks

Fundamentals of Computer Graphics, 4rd Edition, Shirley and Marschner
Introduction to Computer Graphics, Ganovelli, Corsini, Pattanaik, and Di Benedetto

Lecture Schedule (preliminary and subject to change)

- Week 1: Introduction, Geometric Transforms
- Week 2: Projection and Viewing Transforms, the Z-buffer Algorithm
- Week 3: Rasterization and Clipping, Lighting Models and Bump Mapping
- Week 4: Interpolation and Texture Coordinates
- Week 5: Ray Tracing and eye ray generation, shadow algorithms
- Week 6: Reflection and refraction, distributed ray tracing
- Week 7: Acceleration structures, Keyframing and skinning
- Week 8: Surface Representations, Mandelbrot and Julia Sets
- Week 9: Water Waves, Heat Flow, Leopard Spots
- Week 10: Color and Appearance
- Week 11: Noise and Procedural Texturing
- Week 12: Advanced Topics

Grading

There will be homework assignments consisting of written and/or programming problems. You will be given either a week or two weeks for completion, depending on the scope of the assignment. Additionally, there will be two in-class exams, and a final project. There is no comprehensive final.

- Assignments **(20%)**
- Two In-Class Exams, **(25%) each**
- Final Project **(30%)**

Collaboration Policy and Academic Integrity

Homework and programming assignments should be completed individually and are *not group assignments*. While you can discuss general issues with programming languages, APIs, and high-level concepts, if you find yourself looking at another student's code, or another student's writeup, you are in violation of the collaboration policy. If you have doubts, clear things with the instructor first.

It is your responsibility to neither copy the work of another, nor allow your own work to be copied. If you believe your work has been stolen, report it to the instructor or TA immediately. Turning in code you found on the Internet will be considered theft. Plagiarism and theft are a violation of University Policies, and I have successfully had students expelled in the past. Don't be next.

Late Policy

Late assignments will only be accepted with a note from your Dean (undergraduate) or academic advisor (graduate). Otherwise, the assignment receives a zero, even if you email it to me one minute after the deadline. Partial credit will be given, so always turn in whatever you have before the deadline.