
Computer Graphics

1 - Course Intro

Yoonsang Lee
Spring 2021

Course Information

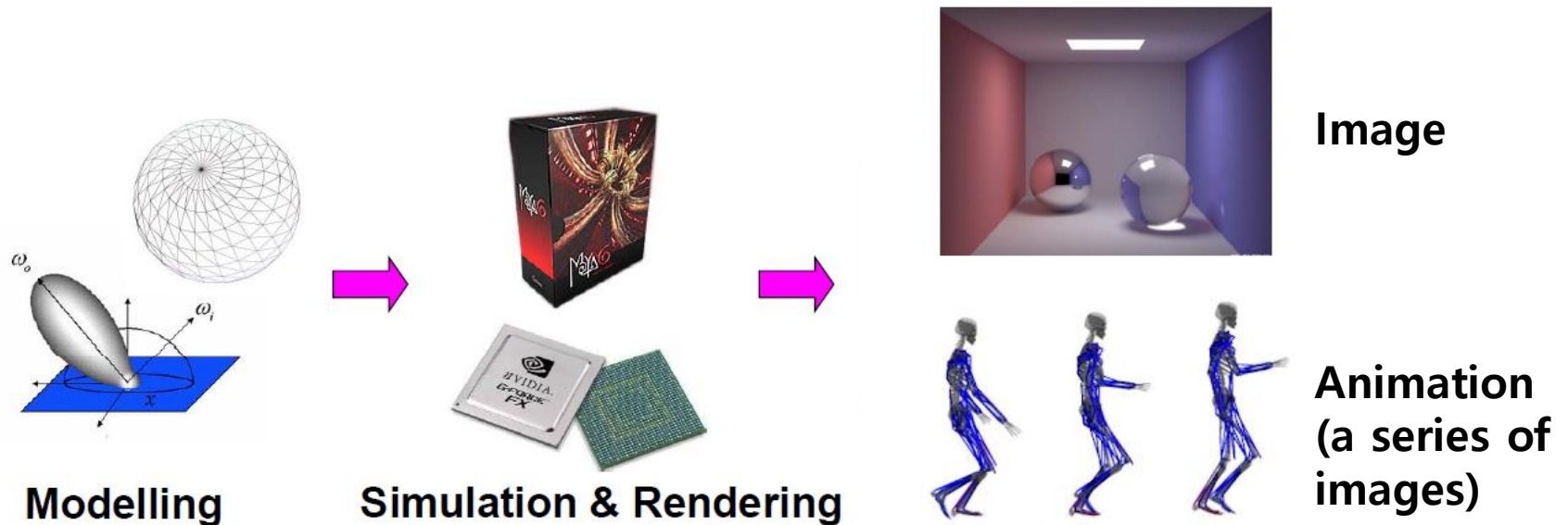
- Instructor: Yoonsang Lee (이윤상)
 - yoonsanglee@hanyang.ac.kr
- Teaching Assistant: 김민관
 - palkan21@naver.com
- Course Homepage
 - The LMS course homepage at portal.hanyang.ac.kr (or learning.hanyang.ac.kr)
 - Slides will be uploaded to Lecture Contents(강의콘텐츠), probably *just before the lecture*. So, **download lecture slides at the beginning of each lecture**.
 - If you want to study the lecture slides **in advance**, please refer to last year's lecture slides (They won't change much): <https://cgrhyu.github.io/courses/2020-spring-cg.html>

Live Online Lecture Policy

- This semester's lectures and labs will be given in “live online lectures” until further announcement.
- All students are required to join lecture and lab sessions for each week on time.
- Questions:
 - In lecture sessions, you can ask questions using slido.com (will be explained later).
 - In lab session, TA will guide you on how to ask questions.
- Attendance check - Lecture session
 - Online quiz submission (will be explained later)
 - Session participation records
- Attendance check - Lab session
 - Minimum session participating time for attendance: **20%** of session duration

What is Computer Graphics?

- The study of creating, manipulating, and using visual images in the computer.



Computer vision inverts the process
Image processing deals with images

Movies & Games

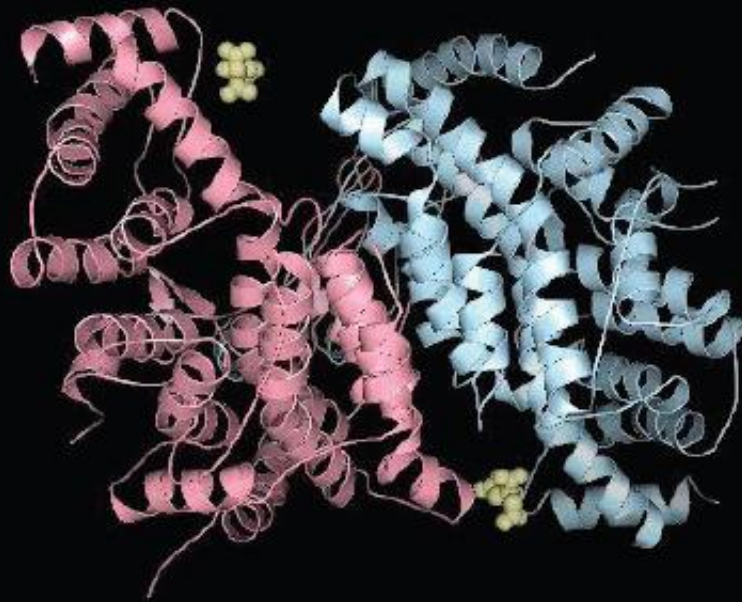


Star Wars: The Last Jedi



Assassin's Creed Odyssey

Science and Engineering



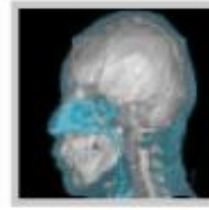
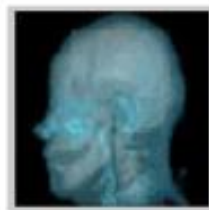
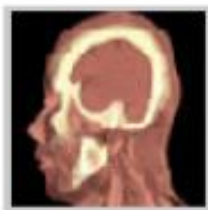
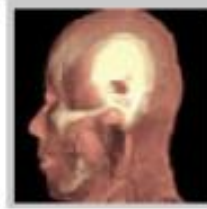
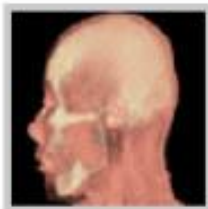
Simulated
deformation of
citrate synthase
during substrate
binding

Kalju Kahn, UCSB

Computer-Aided Design



Medical Applications



[Rapidia homepage](#)

Course Overview

- Computer Graphics: Mathematics made visible
- In this course, you will
 - Explore fundamental computer graphics & mathematics ideas
 - Write cool programs (using Python and legacy OpenGL)
- You will not
 - Learn sophisticated computer graphics techniques
 - Learn about modern OpenGL APIs
 - Write large programs

Course Overview

- As “implementation examples” of the fundamental computer graphics ideas, we’ll use:
- Legacy OpenGL (mainly)
- On-line WebGL demos (sometimes)
- Blender: An open-source 3D graphics tool (sometimes)

Prerequisites

- Basic knowledge of linear algebra
 - Vectors, matrices, and related operations (dot product, cross product, determinants...) are the most common tools in computer graphics.
 - But don't worry. I think that if you know how to calculate matrix multiplication, it is enough to take this course.
- Basic knowledge of programming skill
 - We'll use Python in this class.
- You don't need artistic sense!

Textbook

- **Textbook : Lecture slides**

Schedule (subject to change)

Week	Topic	Mon	Tue
1	1 - Course Intro		3/2
2	2 - Introduction to NumPy & OpenGL / Lab1 - Environment Setting	3/8	3/9
3	3 - Transformation 1	3/15	3/16
4	4 - Transformation 2	3/22	3/23
5	5 - Affine Geometry, Rendering Pipeline	3/29	3/30
6	6 - Viewing, Projection	4/5	4/6
7	7 - Hierarchical Modeling, Mesh	4/12	4/13
8	Midterm Exam	4/19	4/20
9	8 - Lighting & Shading	4/26	4/27
10	9 - Orientation & Rotation	5/3	5/4
11	10 - Animation	5/10	5/11
12	11 - Curves	5/17	5/18
13	12 - More Lighting, Texture	5/24	5/25
14	13 - Rasterization & Visibility	5/31	6/1
15	Final Exam	6/7	6/8

Lectures & Labs

- Lecture (Mon) + Lab (Tue)
- Lecture (by instructor)
 - Traditional classroom-based learning.
- Lab (by TA)
 - Time for solving lab assignment problems by yourselves.
 - TA and an undergraduate mentor will help you.

Lab assignments

- 1 lab assignment per each lab session.
 - with 1~2 problems
- The goal is to let you understand what you've just learned in lectures every week.
 - The problems would not be too difficult.
 - TA and the undergraduate mentor will help you to solve the problems as much as possible.
- Due: 23:59 on the day of the lab session.

Class assignments

- 3 class assignments during the semester.
- More challenging programming assignments.
- The due date will be two to three weeks after the assignment is given.

Policy for Assignments

- **NO SCORE** for late submissions
 - Submit before the deadline!
- **NO SCORE** for copying
 - If A copies B's code, A and B will get 0 point.
 - If A, B, C copies the same code from the internet, they will all get 0 point.
 - Collaboration encouraged, **but assignments must be your own work.**

Midterm / Final Exams

- By default, "monitored" online exam.
 - You MUST
 - Share 2 screens to prevent cheating
 - Display screen: Share the screen you're taking the exam
 - Phone camera: A side view of you, your hands, and the display
 - Find a place to be alone
 - You cannot leave your seat until the exam is over.
 - Details may change later.
- We hope that the covid-19 pandemic situation improves so we can take the offline test.

Grading

Midterm exam	30%
Final exam	30%
Lab assignments	15%
Class assignments	15%
Attendance	5%
Class attitude	5%

- You will get "F" for more than 5 absences in lectures or 5 absences in the labs.
- Absences from the midterm or final exam -> F

Grading Policy

- Basic principle: Separating the grades where there is a big gap between points.
- Guideline:

A	25%~30%
B	30%~35%
C	40%

About Laptop

- Lecture
 - The lecture slides contains many Python code.
 - During lectures, you can run and test the code on your laptop.
- ~~Lab~~
 - ~~– The lab is held in a laptop-only training room.~~
 - ~~– If you want to borrow a laptop, contact the TA by email until the lab in this week.~~
 - ~~– But, I strongly recommend you to bring your laptop at lab sessions.~~

Questions – Slido.com

- After lecture, if you have questions, ask on the "Q&A Board" ("문의게시판") of the LMS course home.
 - TA will check and respond at least once a day.
- In lecture, we'll use an online, anonymous Q&A platform – slido.com to encourage questions.

Just Try Asking a Question!

- Go to <https://www.slido.com/>
- Join #cg-ys
- **Do not bookmark a slido event page** because new events will be created every week!
- Ask any questions ~~in English!~~

Questions – Slido.com

- In slido.com, you can
 - **Ask** your own questions anonymously
 - **Upvote** other questions
- We'll use the slido Q&A **only during lecture time.**
 - Not after lecture time
 - Not in the lab sessions
 - No written answers
- Please ask questions **anonymously.**
 - Just leave your name blank when post a question.

Quiz & Attendance – Slido.com

- 3 quiz problems per each lecture (using slido.com polls).
- Very simple questions – you have to submit in two minutes.
- **I'll check attendance using quiz submission.**

Quiz & Attendance – Slido.com

- You **MUST** submit your answer in the following format:
 - **Student ID: Your answer**
 - e.g. **2017123456: 4)**
- Attendance checking:

Attendance	Number of submissions in the format - 3 times && You are in the classroom (session)
Late	Number of submissions in the format – 1~2 times && You are in the classroom (session)
Absence	Number of submissions in the format – 0 times You are NOT in the classroom (session)

- **3 lates are regarded as 1 absence.**

Quiz & Attendance – Slido.com

- If submitting a quiz answer without attending the class (session) is detected,
- I think he or she has been also absent from the previous lecture.
- → Check as “Absence” for these two lectures

Just Try a Quiz!

- Go to <https://www.slido.com/>
- Join #cg-ys
- Click “Polls”
- Submit your answer in the following format:
 - **Student ID: Your answer**
 - e.g. 2017123456: 4)
- Note that you must submit all quiz answers **in this format** to be checked for “attendance”.

My Recommendation for This Class

- DO NOT recommend to those who...
 - want to easily earn good credits.
 - ~~expect lectures in fluent English.~~
- Recommend to those who...
 - wonder how movies/games render scenes.
 - are interested in the movement of objects/characters.
 - like to visualize something by coding.
 - have passion for computer graphics!

Lastly...

- If you agree on all these policies, see you next time!
- If not, please consider taking other classes instead.

Next Time

- Lab in this week:
 - No lab in this week
- Next lecture:
 - 2 - Introduction to NumPy / OpenGL
- Preparations:
 - Install Python 3 and Numpy before the next lecture
- Acknowledgement: Some materials come from the lecture slides of
 - Prof. Taesoo Kwon, Hanyang Univ., <http://calab.hanyang.ac.kr/cgi-bin/cg.cgi>
 - Prof. Steve Marschner, Cornell Univ., <http://www.cs.cornell.edu/courses/cs4620/2014fa/index.shtml>