

CT4201/EC4215: Computer Graphics

# Introduction

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BOCHANG MOON

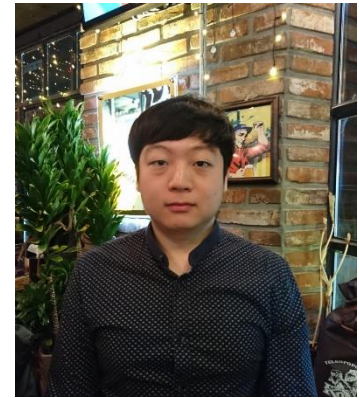
# About Me

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- Assistant professor in Institute of Integrated Technology at GIST
  - Graduate Program of Culture Technology
  - Joined GIST in Sep. 2016
- Post-Doctoral researcher at Disney Research (Nov. 2014 – July 2016)
- Ph.D from KAIST (Feb. 2008 – Aug. 2014)
- Main research topics:
  - Computer graphics
  - Photorealistic rendering

# About TA

- WonJun Lee
- TA email: [ta.cg.gist@gmail.com](mailto:ta.cg.gist@gmail.com)



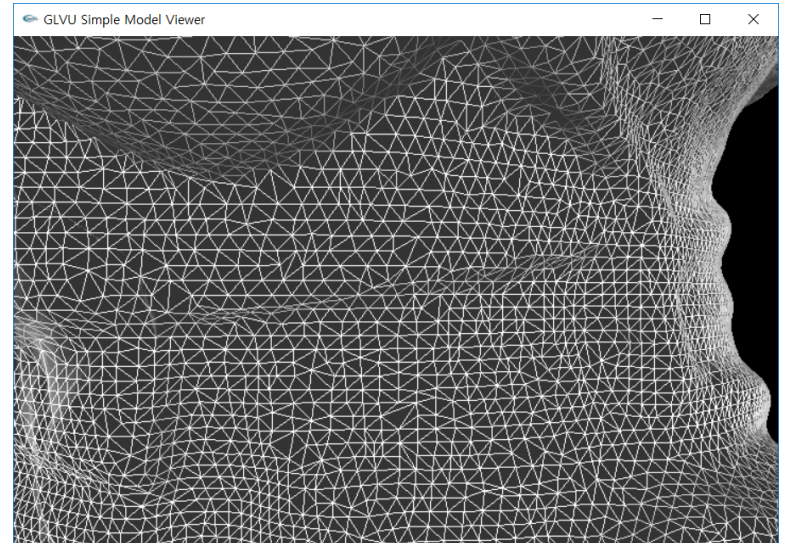
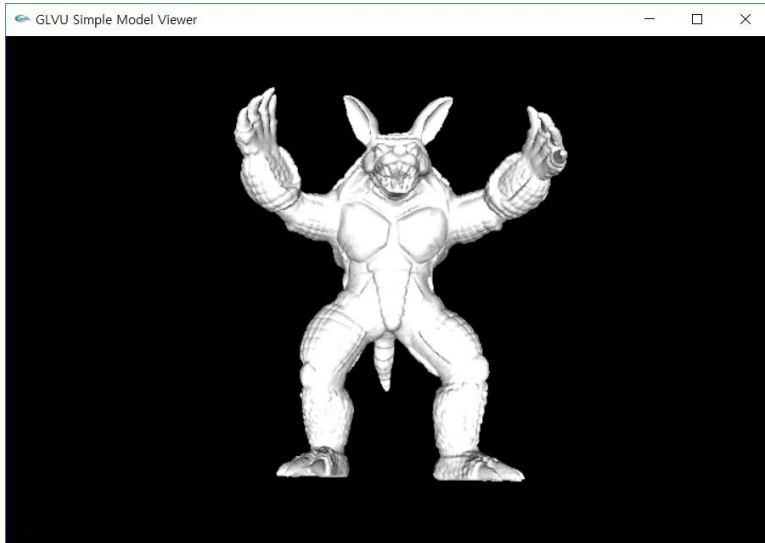
# Information

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- Instructor: Bochang Moon
- Email: [bmoon@gist.ac.kr](mailto:bmoon@gist.ac.kr)
- Office: 106 Dasan Building
  
- Office hours
  - 1:00 – 3:00pm on Mon. or by appointment (via email)
  
- Class time
  - 10:30 – 12:00pm on Mon. and Wed.

# Graphics Areas

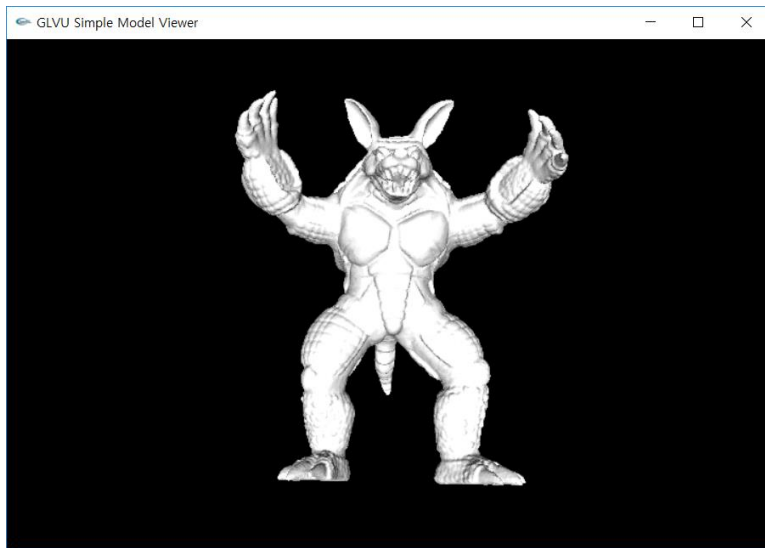
- Modeling
  - A technique to deal with mathematical specification of shape and appearance that can be stored in computers



e.g., triangle mesh

# Graphics Areas

- Rendering
  - A algorithm to generate digital images from 3D models



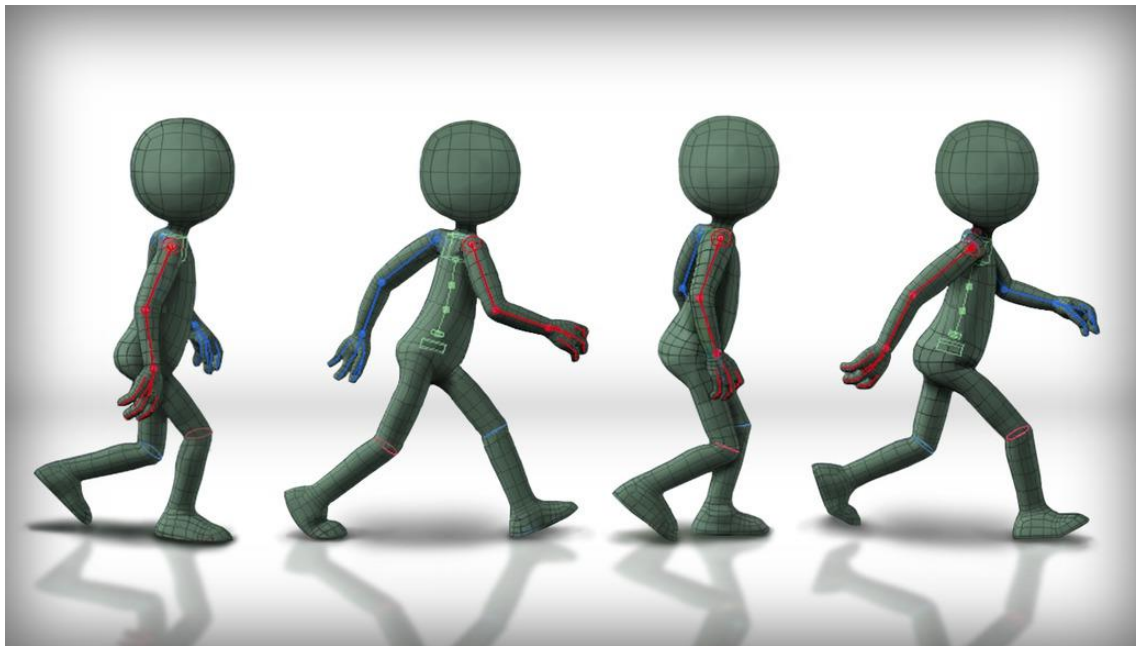
3D model



Rendered image

# Graphics Areas

- Animation
  - Address how to create motion of virtual models over time



Images from <http://www.digitaltutors.com>

# Graphics Areas

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- Core areas
  - Modeling
  - Rendering
  - Animation
- Other areas
  - User Interface
  - Virtual Reality
  - Visualization
  - Image Processing
  - 3D scanning
  - Computational photography
  - etc.

# Application of Computer Graphics

- 3D Animation



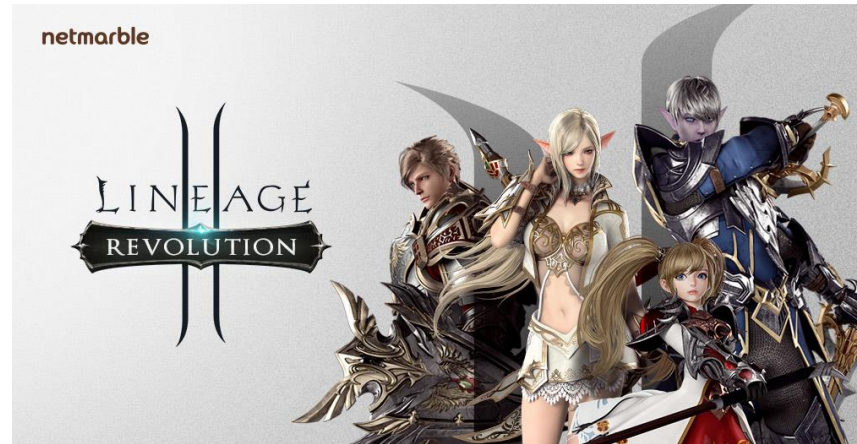
# Application of Computer Graphics

- Visual Effects in Movies



# Application of Computer Graphics

- Games



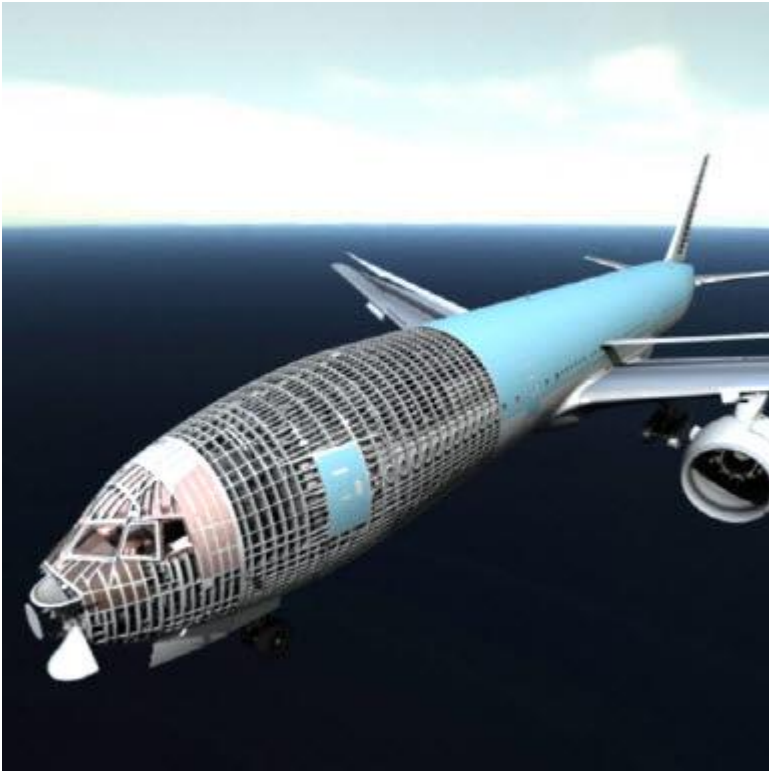
# Application of Computer Graphics

- Augmented and virtual reality



# Application of Computer Graphics

- Visualization



# Some Recent Images



from pbrt.org

# Some Recent Images



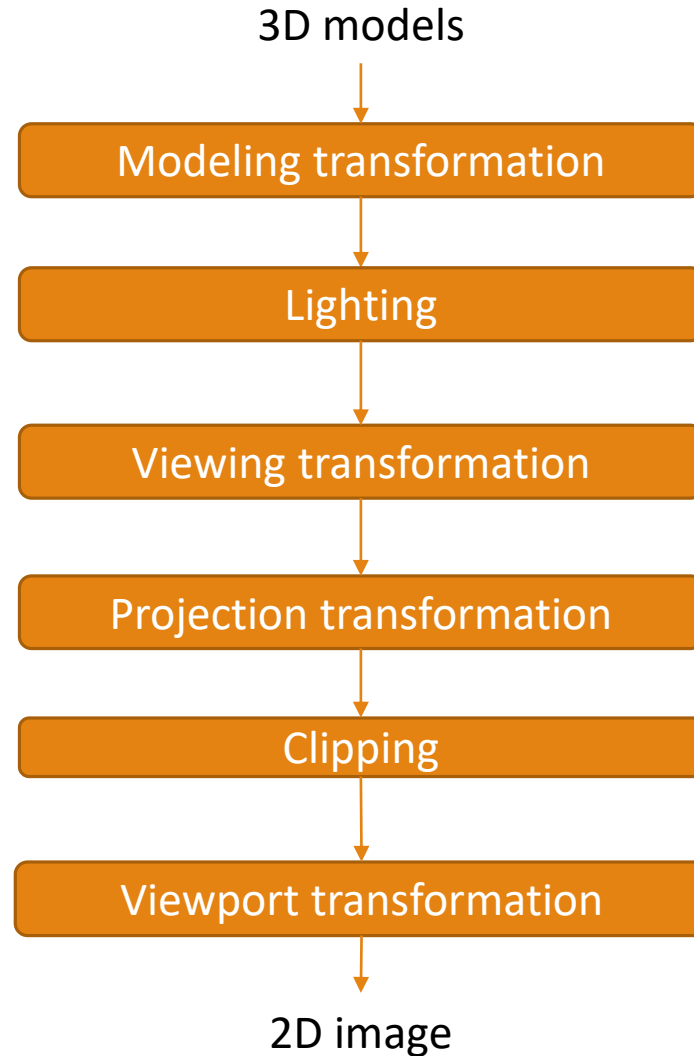
from [pbrt.org](http://pbrt.org)

# Course Overview

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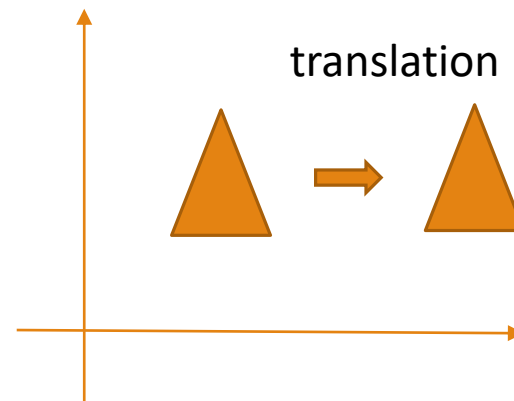
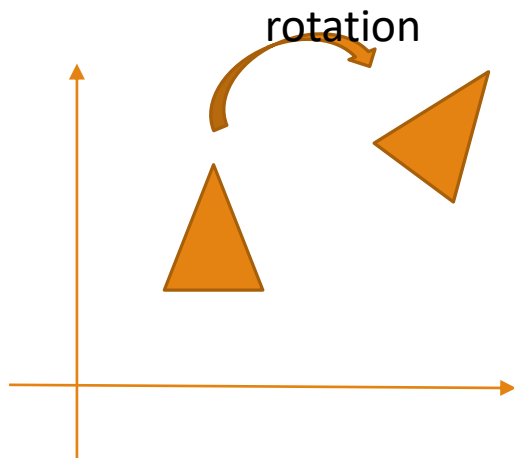
- Provide fundamental concepts of compute graphics such as graphics
  - Graphics pipeline & rasterization
  - Transformation
  - Local illumination and shading
  - Texture mapping
  - Ray casting
  - Ray tracing
  - Global illumination
- Learn how to generate digital images from virtual objects, lights, etc.

# Graphics Pipeline and Rasterization



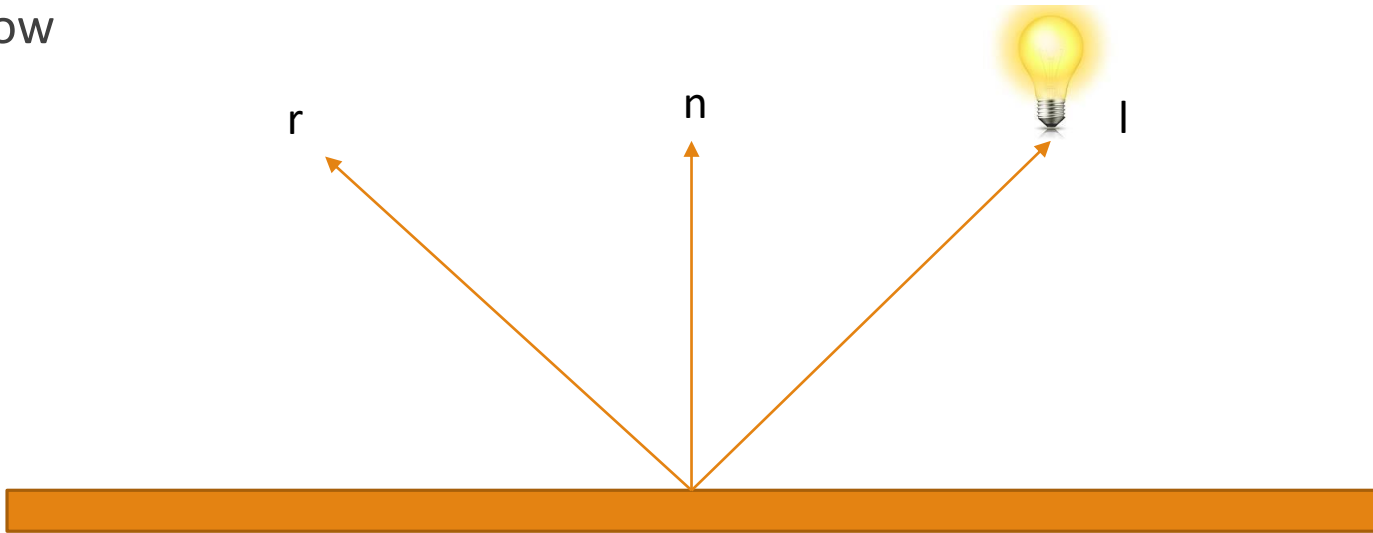
# Transformations

- Affine transformations
- Viewing transformation
- ...

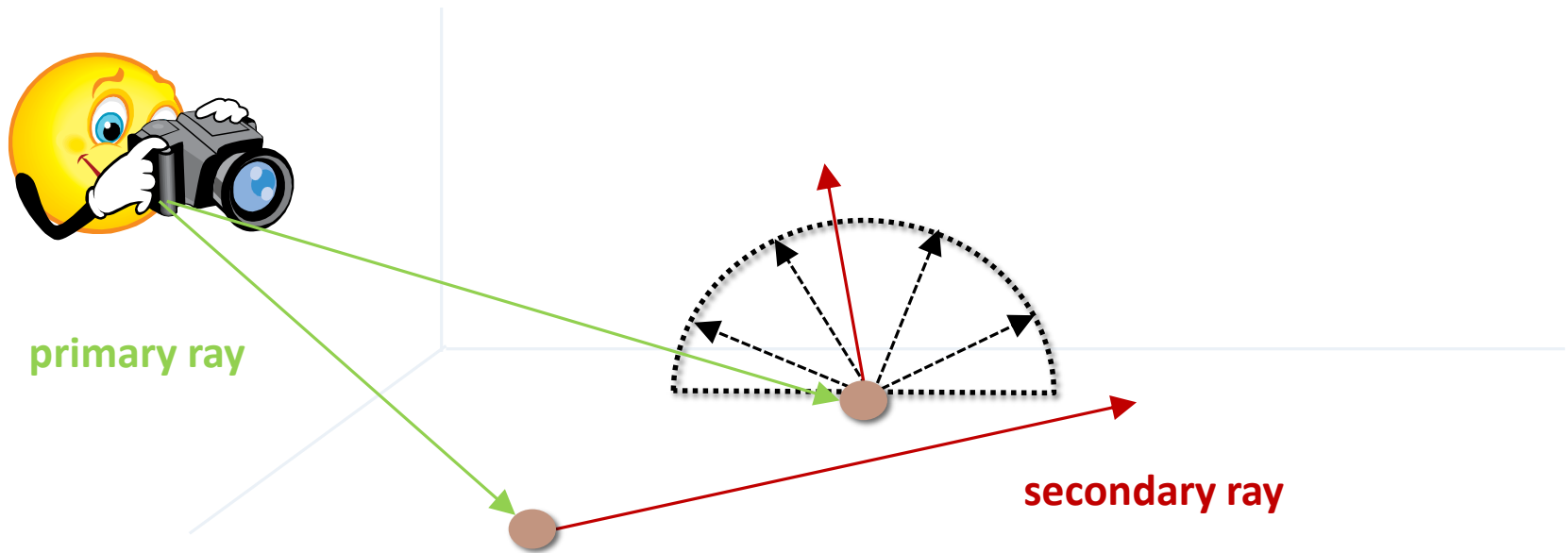


# Local Illumination and Shading

- Shading
  - Flat
  - Gouraud
  - Phong
- Shadow



# Ray Casting and Tracing



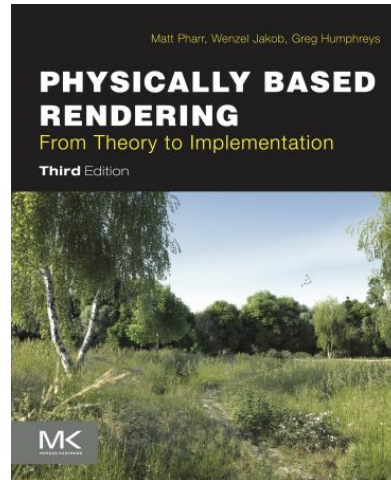
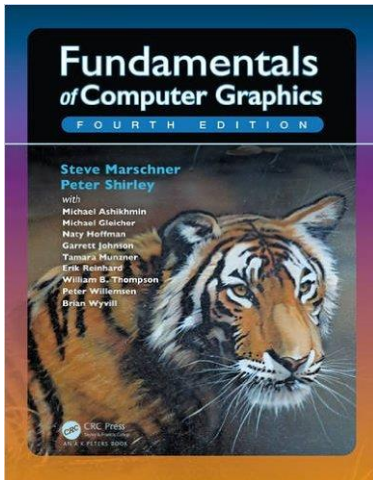
# Global Illumination

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- Simulate realistic lighting
  - Reflections
  - Refractions
  - Shadows
  - Diffuse inter-reflections
  - Caustics
  
- Global illumination methods
  - Path tracing
  - Photon mapping

# Textbook and References

- Book



- Papers

- <http://kesen.realtimerendering.com/>
- SIGGRAPH, SIGGRAPH Asia, etc.

# Grading

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- Mid-term exam: 30%
- Final-term exam: 40%
- Programming assignment: 20%
- Attendance: 10%
  - No absences: 10, One absences: 9, Two absences: 7, Three absences: 4
  - Four or more absences: 0
  - Late two times: one absence
    - I will call your name at the beginning of the class

# Prerequisite for This Course

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- Basic C/C++ programming knowledge
  - e.g., if you can implement a simple program, you will be okay.

# Introduce Yourself

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