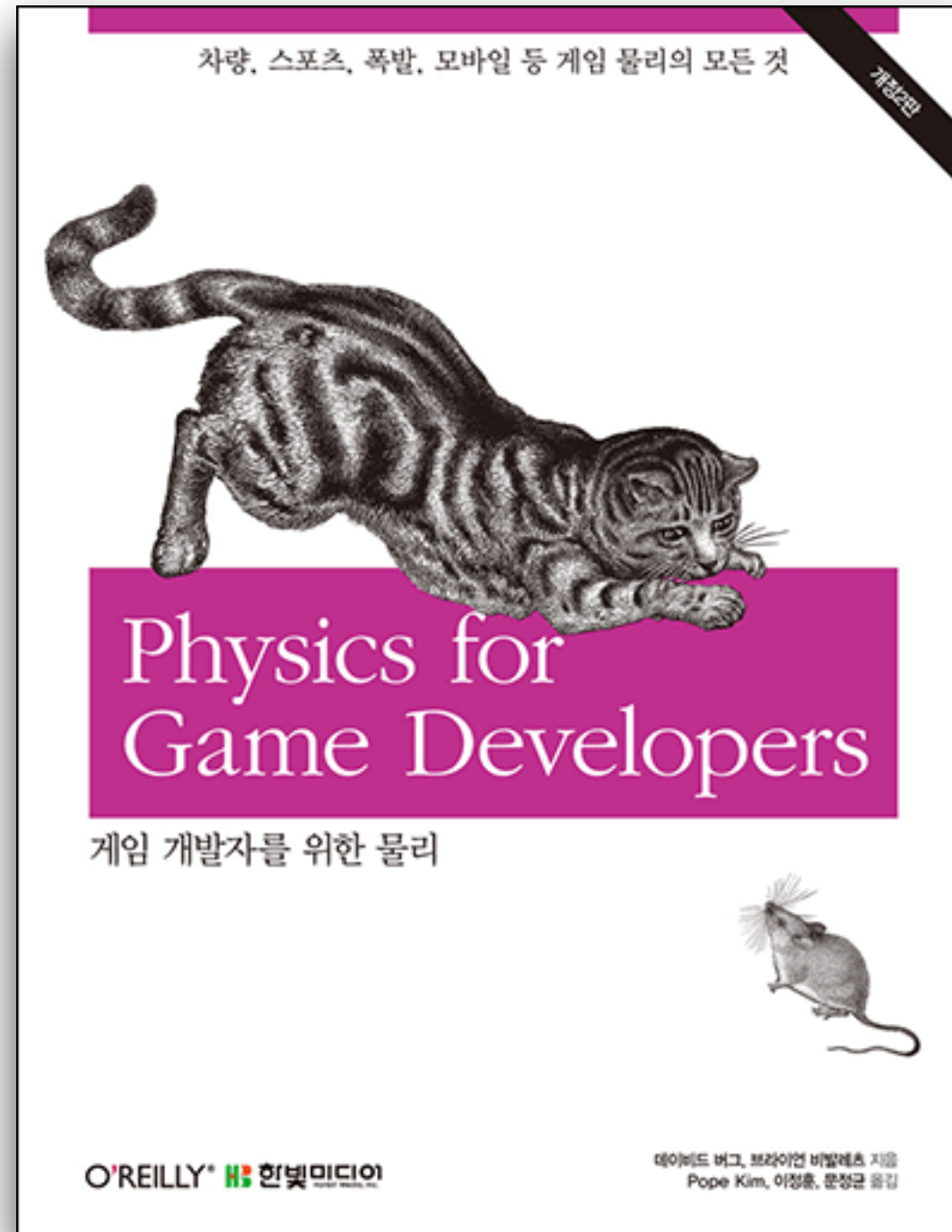


# Physics for Game Developers

Young-Min Kang  
Tongmyong University

# Required Text



# Lecture Info


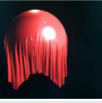
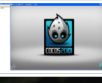


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- Lecture Materials are available at
  - Lecture homepage: <http://210.110.195.15>
  - GitHub: [https://github.com/dknife/Lecture\\_GamePhysics](https://github.com/dknife/Lecture_GamePhysics)

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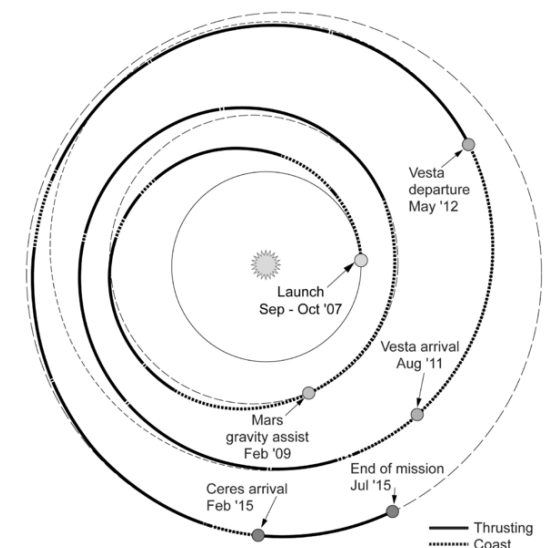
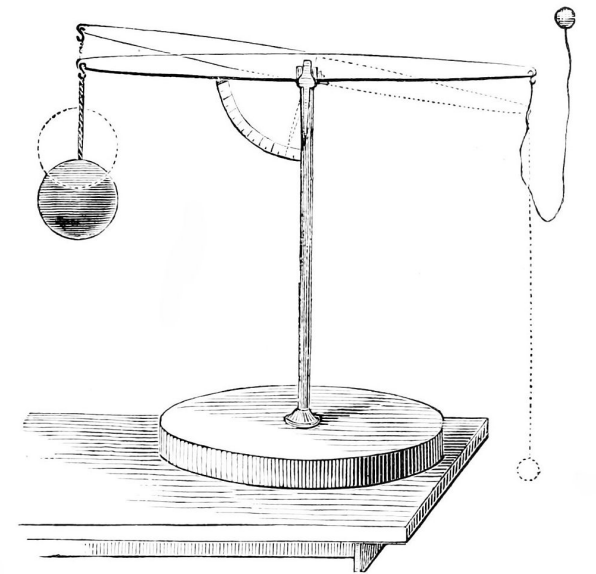
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# Why is Physics needed?

- Game
  - based on Computer Graphics
    - Modelling, Animation, and Rendering
- Plausible (realistic) Animation
  - requires “physically correct” motion



# Animation

- Animation
  - consecutive images
  - illusion of motion
  - change over time
- What can be changed
  - position, scale, colour, and any other *visual* properties
  - quantities of changing properties
    - functions of “time”



# Computer animation

- Computer-aided animation
  - what will actually computer help?
    - computing...
      - the motion based on dynamics: simulation
      - the motion based on kinematics
      - interpolated values between keys: keyframe animation

# Physics basics

- Newton
  - a super hero in physics
    - “*Philosophiae Naturalis Principia Mathematica*”
- Newton's laws
  - 1: Every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it
  - 2: The relationship between an object's mass  $m$ , its acceleration  $\mathbf{a}$ , and the applied force  $\mathbf{F}$  is  $\mathbf{F}=m\mathbf{a}$ .
  - 3: for every action there is an equal and opposite reaction.

# units

- International System of Units (SI)
  - Why called SI?
  - mass:  $kg$
  - length:  $m$
  - time :  $s$
  - velocity:  $m/s$
  - acceleration:  $m/s^2$
  - force:  $kg\ m/s^2 = N$