Games and Simulation

2016-2017

Fernando Birra

Overview

Fernando Birra

Games and Simulation

- Teaching staff: Fernando Birra (Graphics) + Sofia Cavaco (Audio)
- First 10 weeks: Graphics
- Last 3 weeks: Audio

Goals

- Learn how to program video games
  - What are the key components of a game engine
  - How the game engine components work together
  - How to use game engines for game development
  - How to program game engine subcomponents
- Top-Down approach
  - You start by developing your own game using a game engine and later implement some features of a game engine in your own game.
- Encourage the usage of modern graphics APIs
  - Shader based rendering

Required Knowledge

- Programming languages (Java, C++)
- Data structures
- Geometry
- Linear algebra

Assessment

- 2 written tests (T1 e T2)
- 3 Projects (P1, P2 and P3) in groups of **up to 3** students
- Attend at least 50% of the classes
- Weights:
  - P1-25%, P2-20%, P3-15%, T1-20%, T2-20%

Calendar

- 1st test: 20/4
- 2nd test: 30/5

- 1st assignment: 29/4
- 2nd assignment: 20/5
- 3rd assignment: 10/6

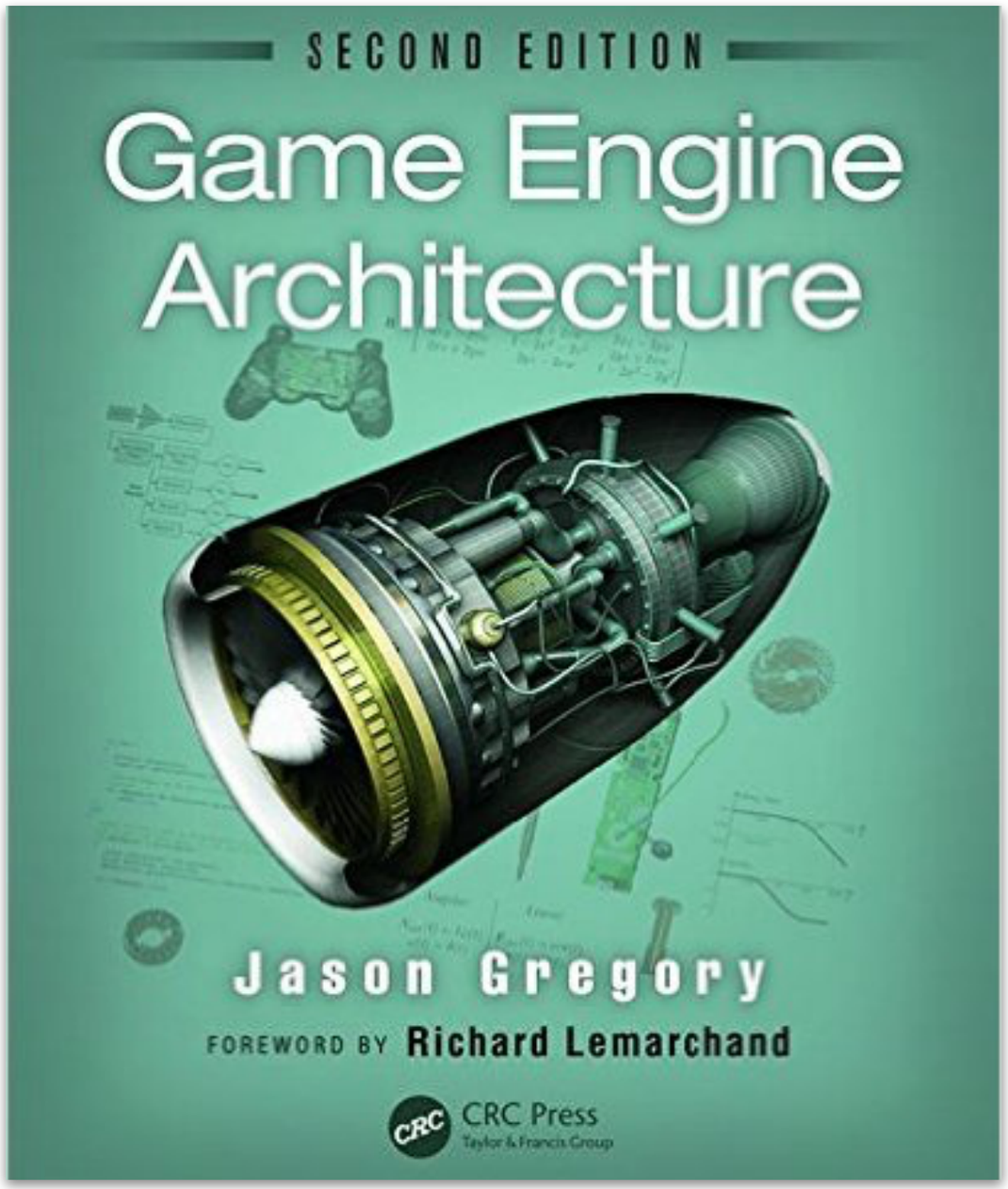
Tentative! Check
CLIP next week!

References

- **Game Engine Architecture**

  2nd Edition, 2014
  Jason Gregory

  ISBN-13:
  978-1466560017

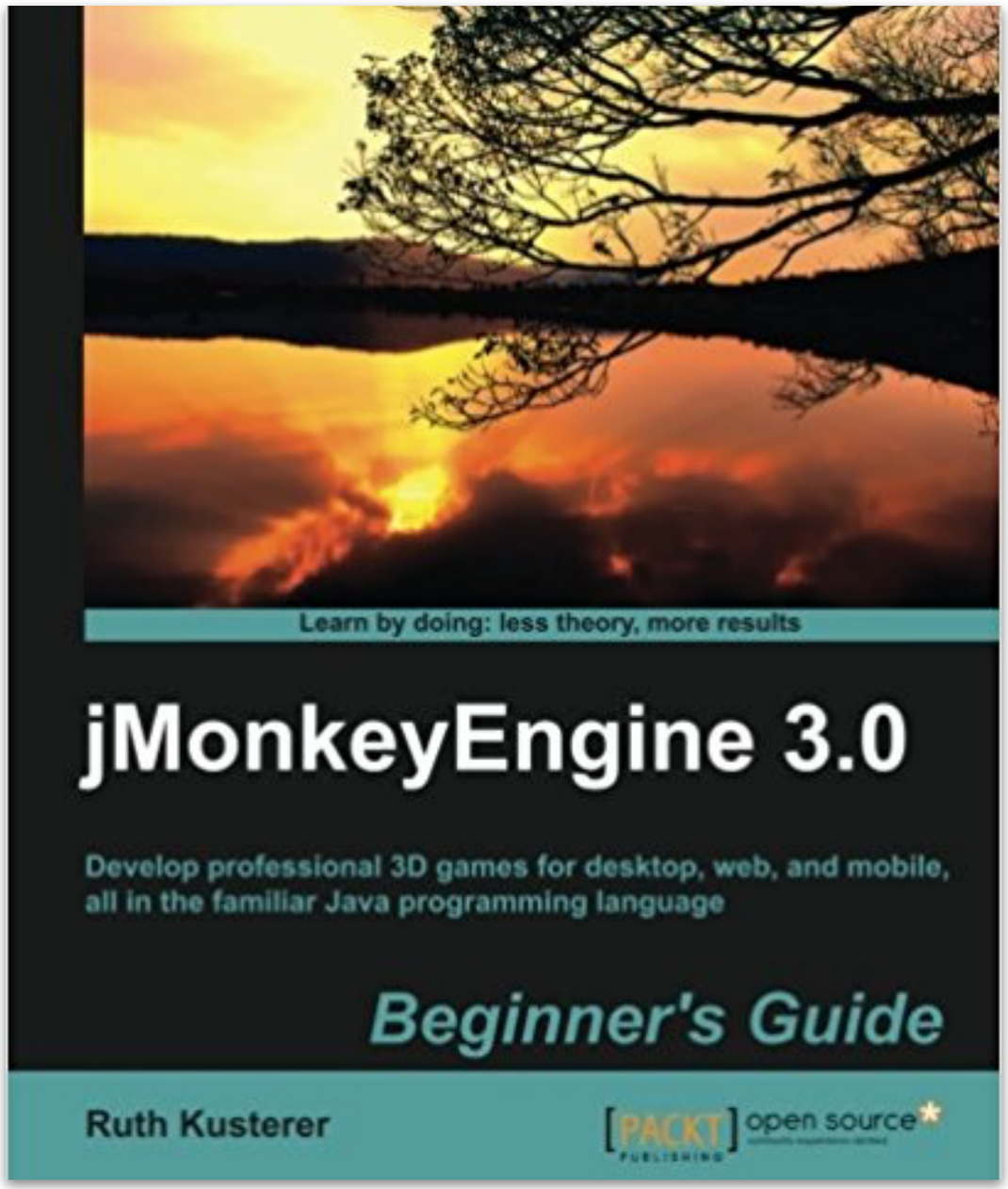


References

- **JMonkeyEngine 3.0**
  Beginner's Guide

2013
Ruth Krusterer

ISBN-13:
978-1849516464



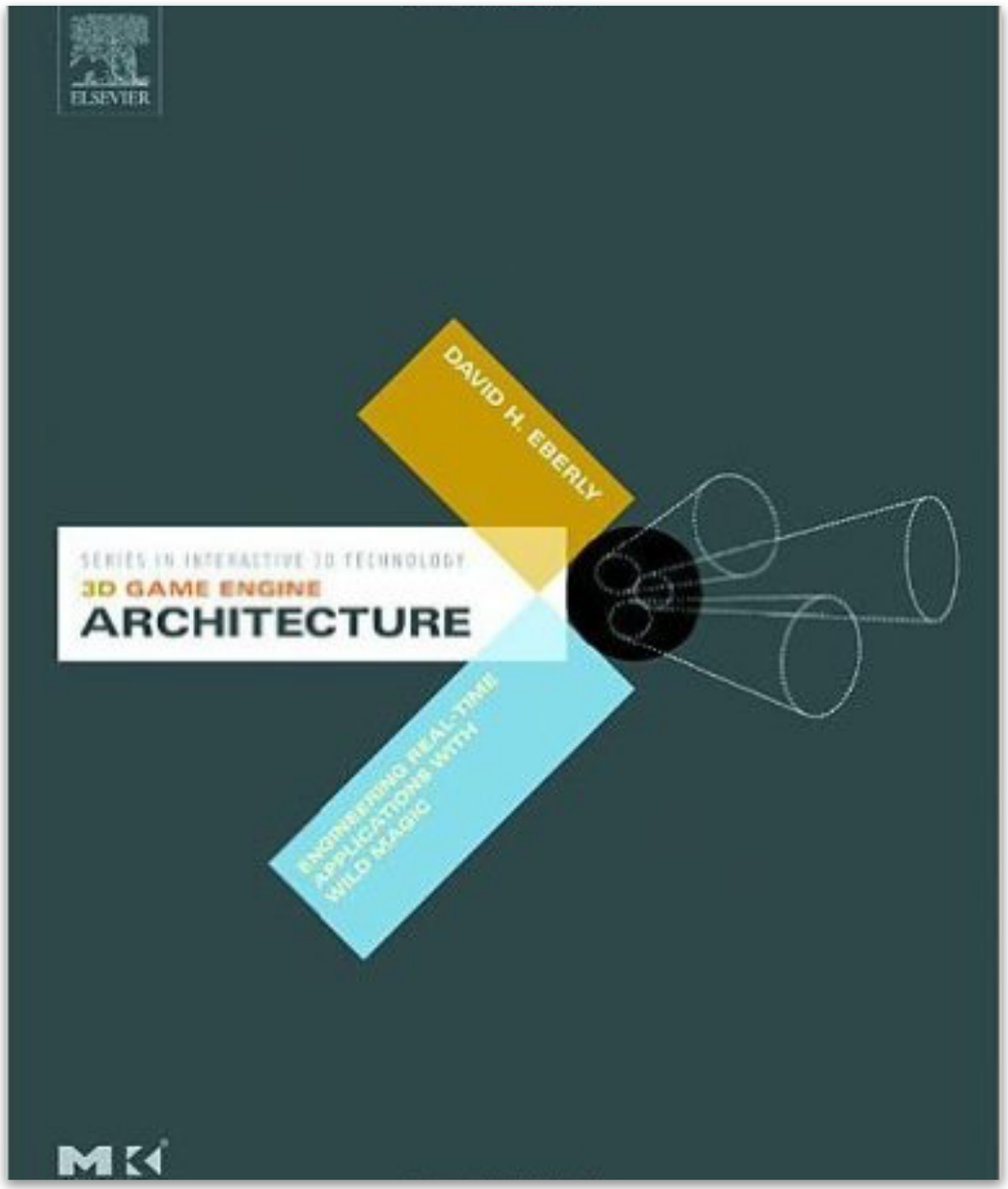
References

- **3D Game Engine Architecture**

  Engineering Real-Time Applications with Wild Magic

  David H. Eberly

  ISBN-13:
  978-0122290640



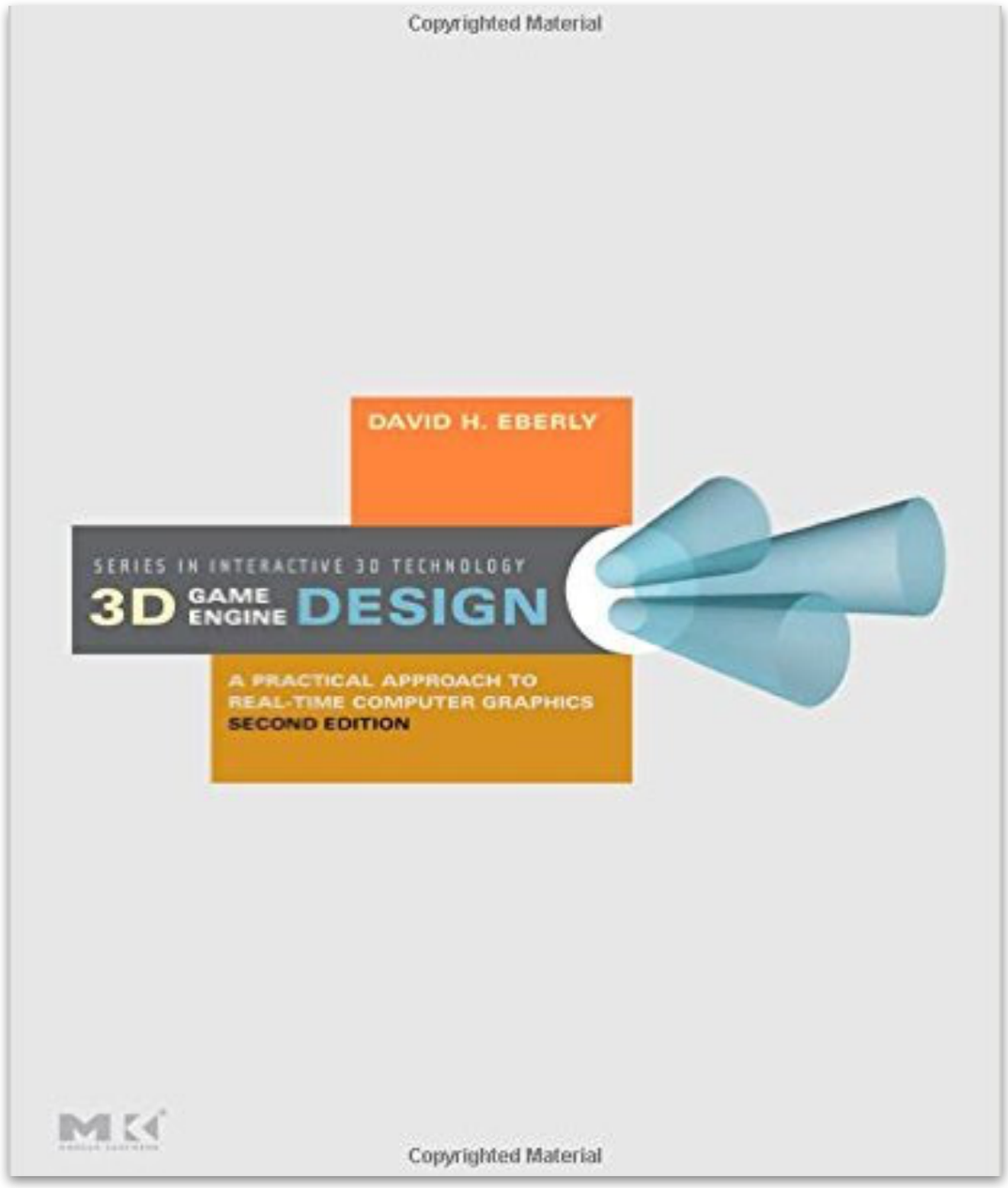
References

- **3D Game Engine Design**

  A Practical Approach to Real-Time Computer Graphics

  2nd Edition, 2006
  David H. Eberly

  ISBN-13:
  978-0122290633

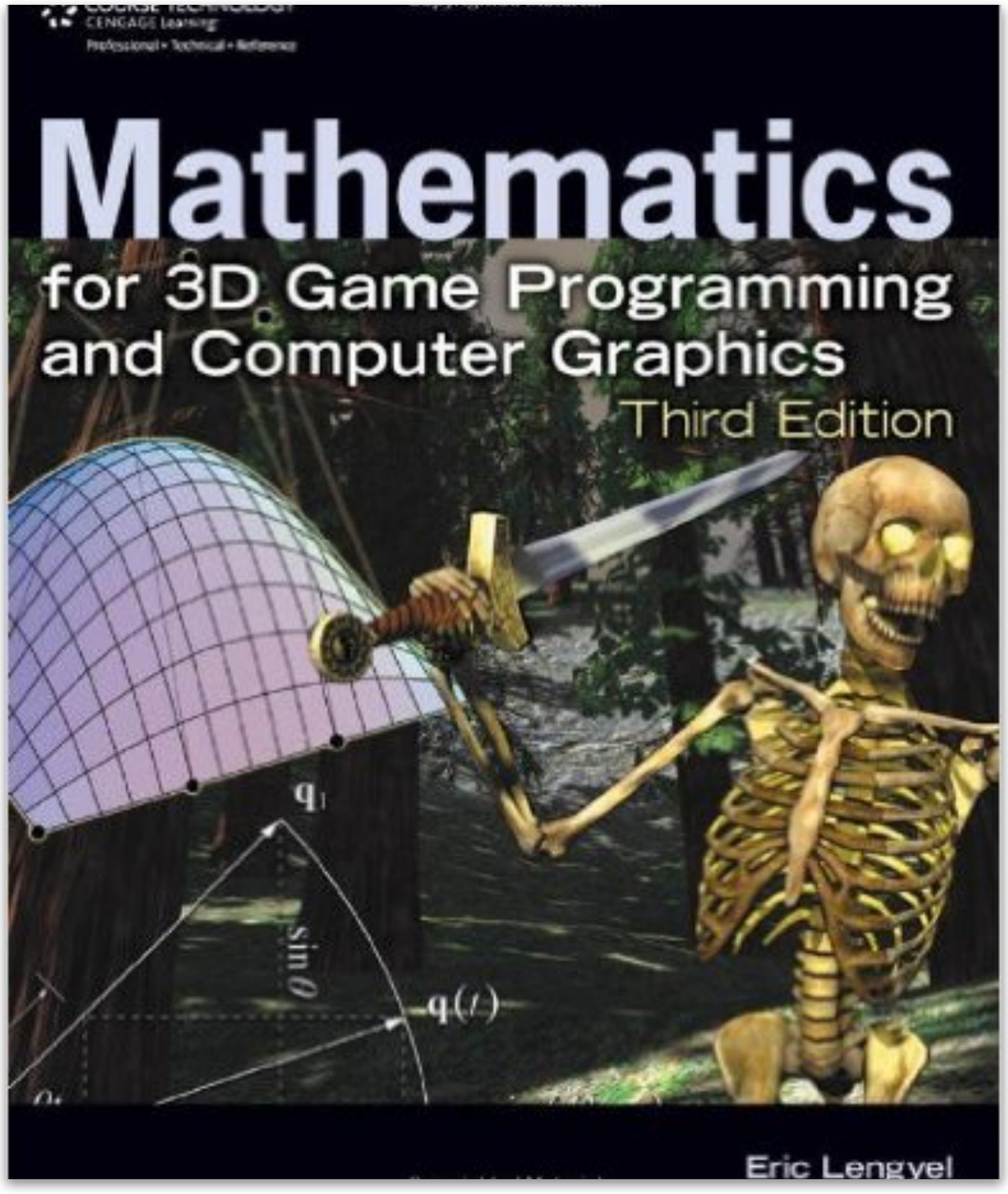


References

- **Mathematics for 3D Game Programming and Computer Graphics**

3rd Edition, 2011
Eric Lengyel

ISBN-13:
978-1435458864



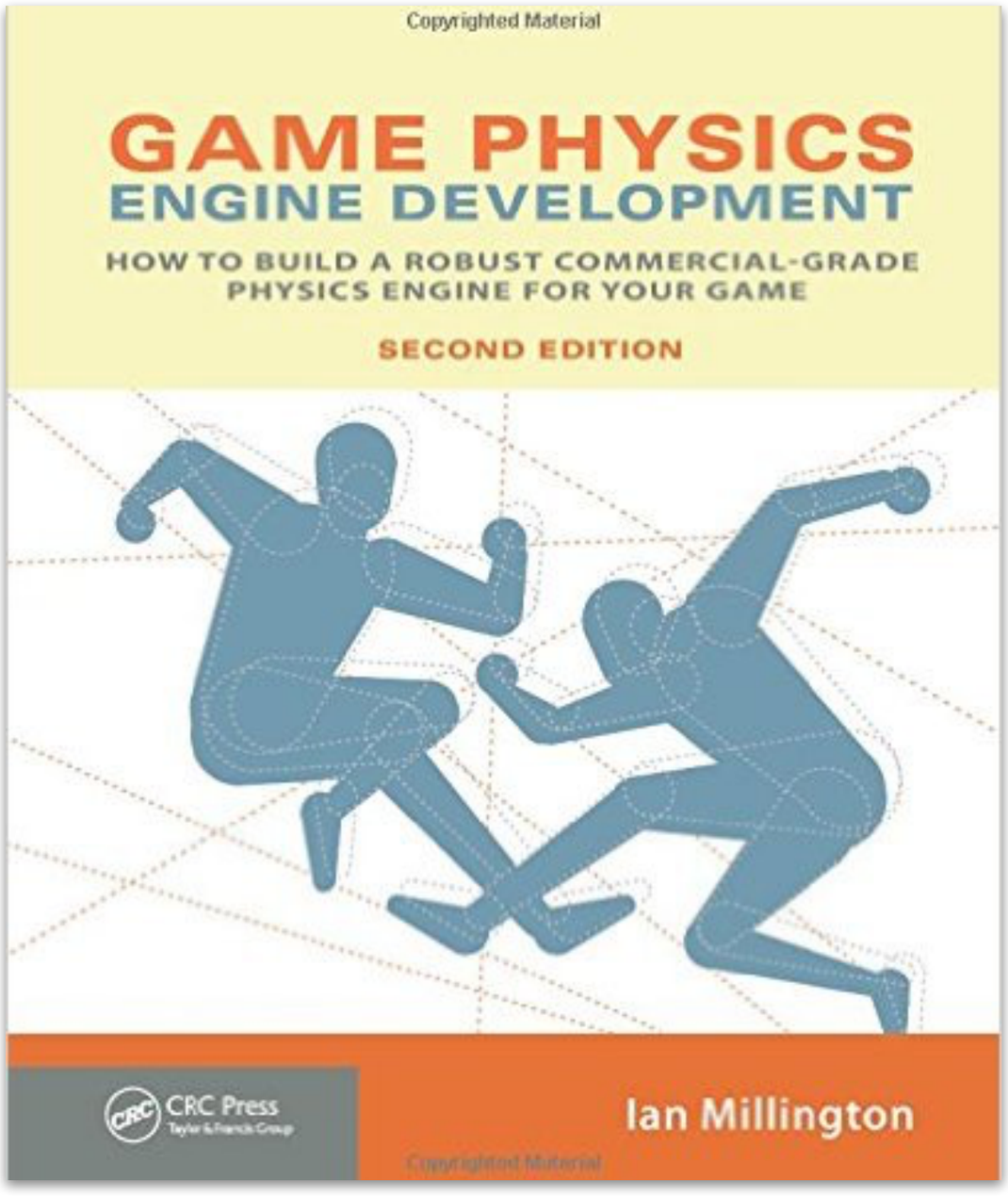
References

- **Game Physics Engine Development**

  How to Build a Robust Commercial-Grade Physics Engine for your Game

  2nd Edition
  Ian Millington

  ISBN-13:
  978-0123819765



Covered topics

- 3D graphics hardware and 3D graphics pipeline
- 3D Modelling and Animation
- Scene management
- Lighting Models, Shadows, Texture Mapping applications
- Collision Detection and Response
- Physics for 3D games and numerical methods
- Sound localisation and synthesis