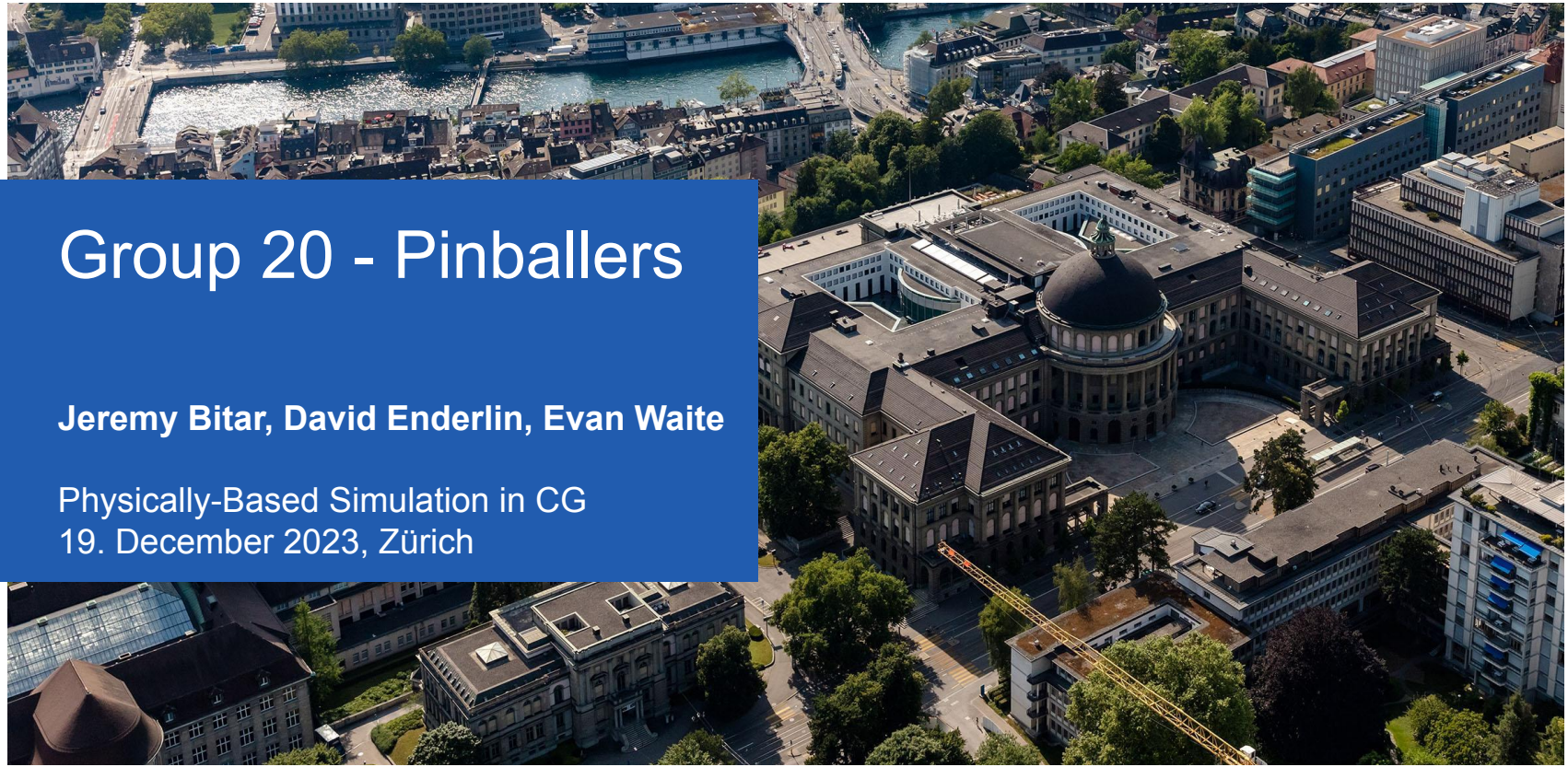
ETH zürich



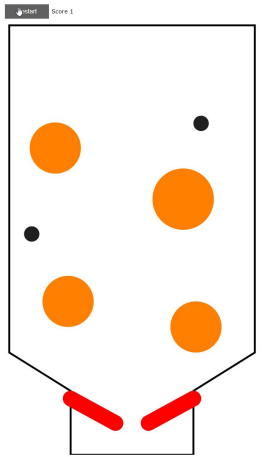
Group 20 - Pinballers

Jeremy Bitar, David Enderlin, Evan Waite

Physically-Based Simulation in CG
19. December 2023, Zürich

The Simulation

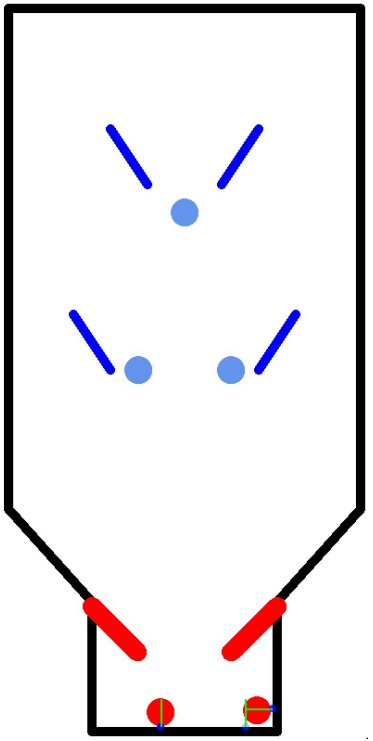
- Pinball simulation (Rigid-body simulation)
  - Ten Minute Physics
- Collisions between balls and other objects
- Control flippers to launch ball
- Monogame



Progress since milestone

Progress since milestone

- More solid walls / robust out-of-bounds check
- Generalized drawing of shapes
- Multiple balls
- “Bouncy” Obstacles
- More consistent rotation angles
    - Flipper collision considers angular velocity
- Collision indicator



Our goals

Minimal target

- Ball can be hit back up by the flippers ✅
- Walls which bounce the ball ✅
- The flippers rotate continuously and strike ball ✅

Desired target

- Game is enclosed by rigid walls
  - Ball will reflect off of walls and flippers ✅
- Flippers are controlled by the user ✅
- Rigid obstacles ✅
- Multiple balls ✅

Bonus target

- More complex interactions:
  - Make ball less rigid (Soft-body dynamics) ❌
  - Obstacles that apply force, bouncing away ✅
- Simple scoring system ✅

Problems

Problems

- XNA’s coordinate system
  - y-Axis inverted
- Stepping past walls
- Forces amplified on collision even with restitution
- Ball is not really rolling

The simulation in action