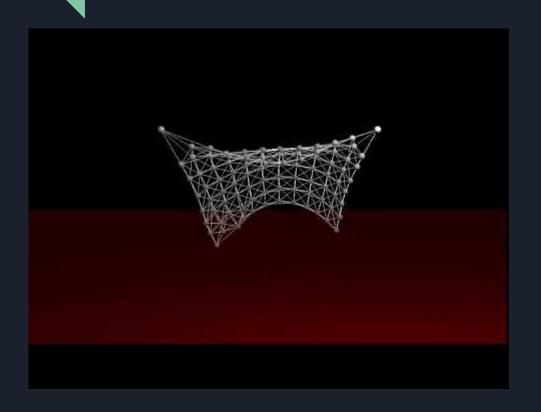# Physically-Based Simulation Cloth in the Wind

Group 26: Shashank Singh

Recap - Inspiration

Recap - Overview

- Soft-body Cloth Simulation with Variable Wind

- Mass-Spring System

Recap - Variability

- Flexibility in constraints of fixed points in cloth
  - 2 points as in a flag
  - 3 points as in a sailboat
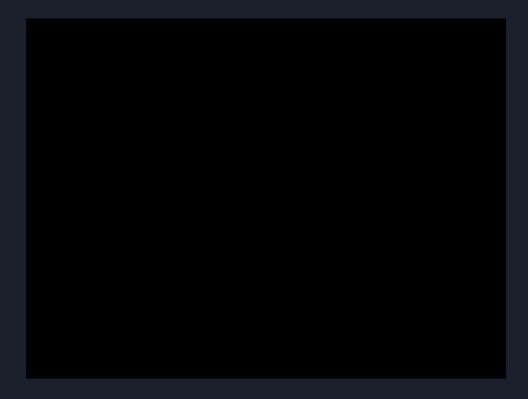

- Material type of cloth

Milestone Results

Milestone Progress

- Successfully implemented 2-D cloth simulation with
  - Gravity
  - Direct-neighbor constraints
  - 2-D World

- Still remaining
  - Variable Wind Forces
  - 2-distance and 3-distance neighbor constraints
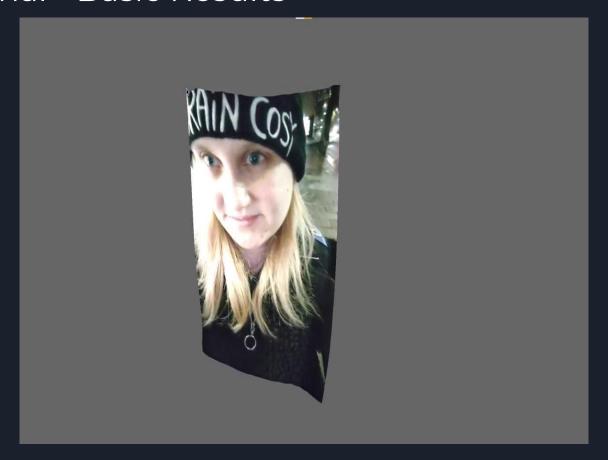 - 3-D World
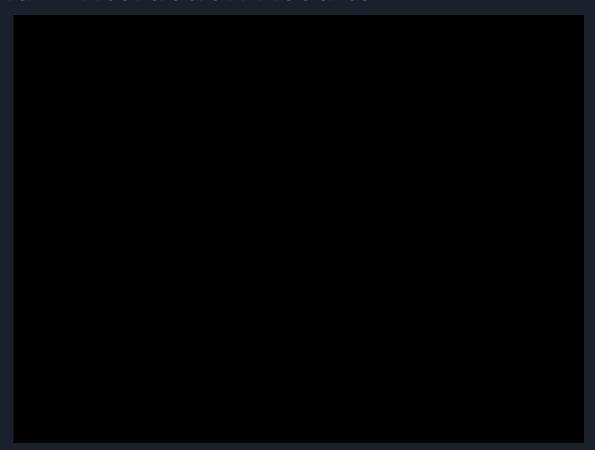 - Stability in overlap/edge-cases

Milestone Issues

Final - Features

- 3D physical simulation (Verlet integration) and constraint solving

- Dynamic point fixing / unfixing

- Cloth self-collision
  - Particle-Particle (Cheap, Inaccurate)
  - Particle-Face (Expensive, Accurate)
  - Impulse-based cloth self-collision response

- Real-time / near-real-time

- 1-neighbor and 2-neighbor constraints

- Live Rendering and Interaction

Final - Basic Results

Final - Interaction Results

Final - Issues

- Doesn't scale well for denser cloth resolution (more fine-grained particles)
  - Needs acceleration structure with support for dynamically rebuilding on changes

- Not perfectly physically accurate in terms of physical quantities

- Self collision is unstable and inefficient
  - Doesn't work perfectly for larger timesteps or very fast moving cloth
  - Have to tradeoff between cheaper particle-particle collision detection and more expensive particle-face collision detection

Final - Edge Cases