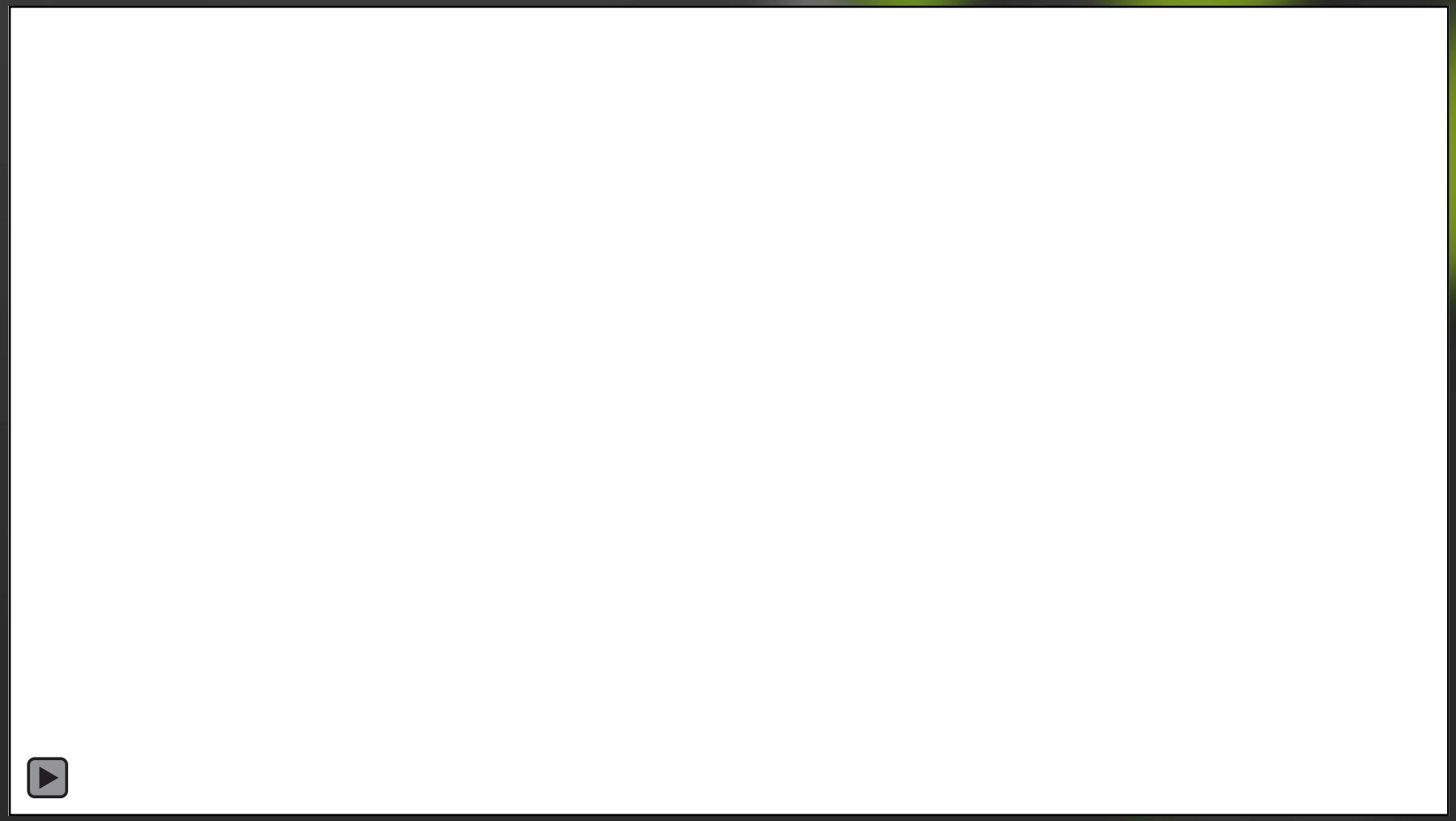
Soft Bodies

using Nvidia FleX

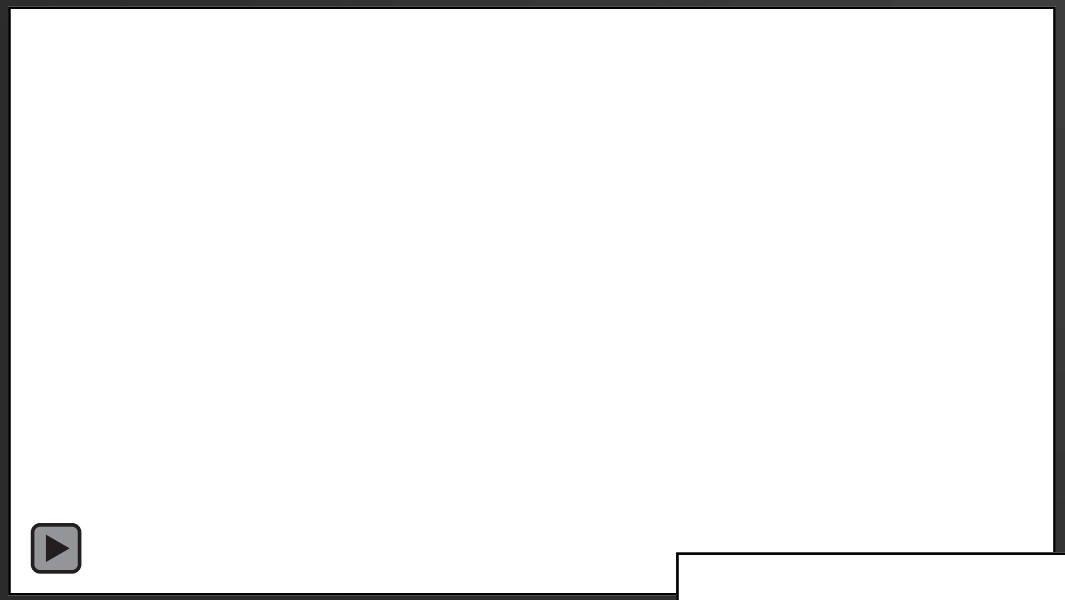
Simon Coenen

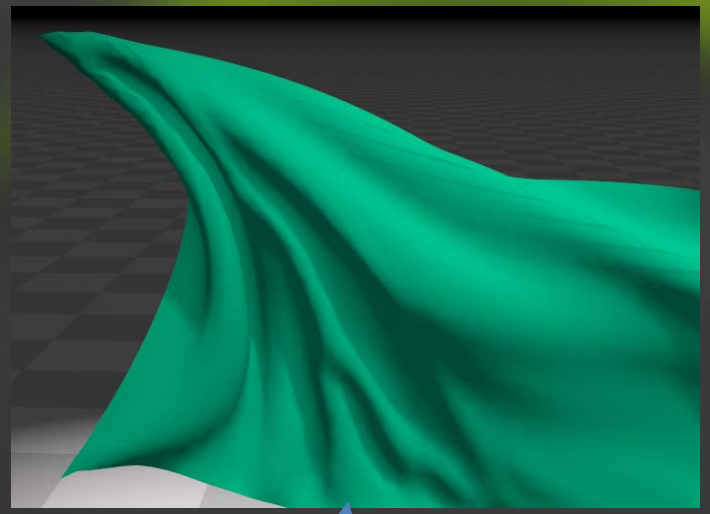
Demo video



Nvidia FleX

Particle-based simulation library





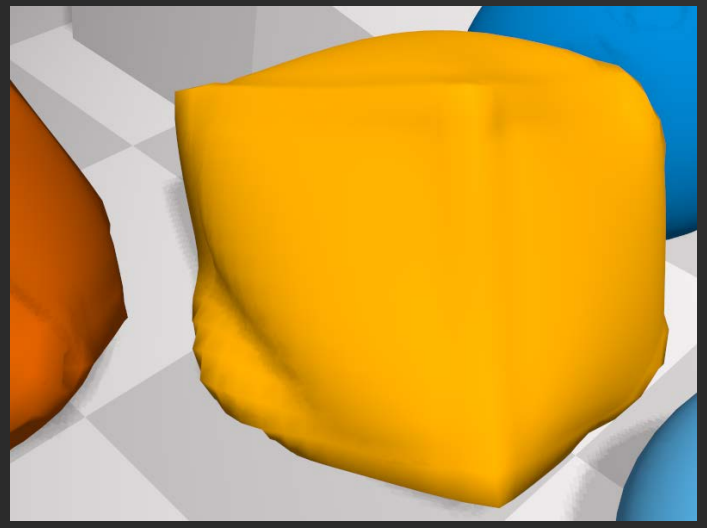
Cloth

Gases

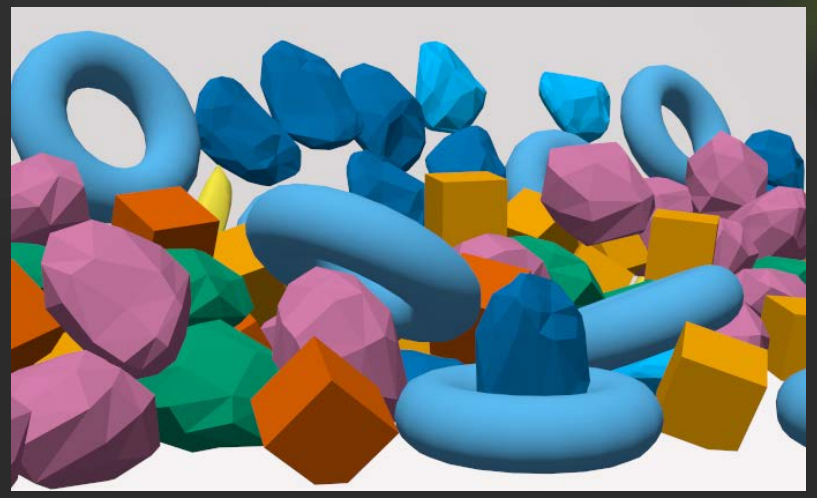
Fluids

NVIDIA FLEX

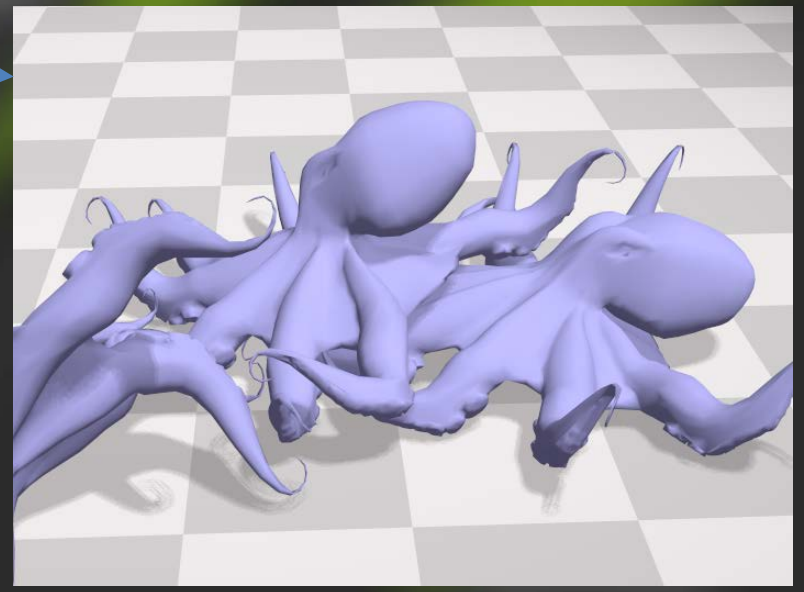
Inflatables



Rigidbodies



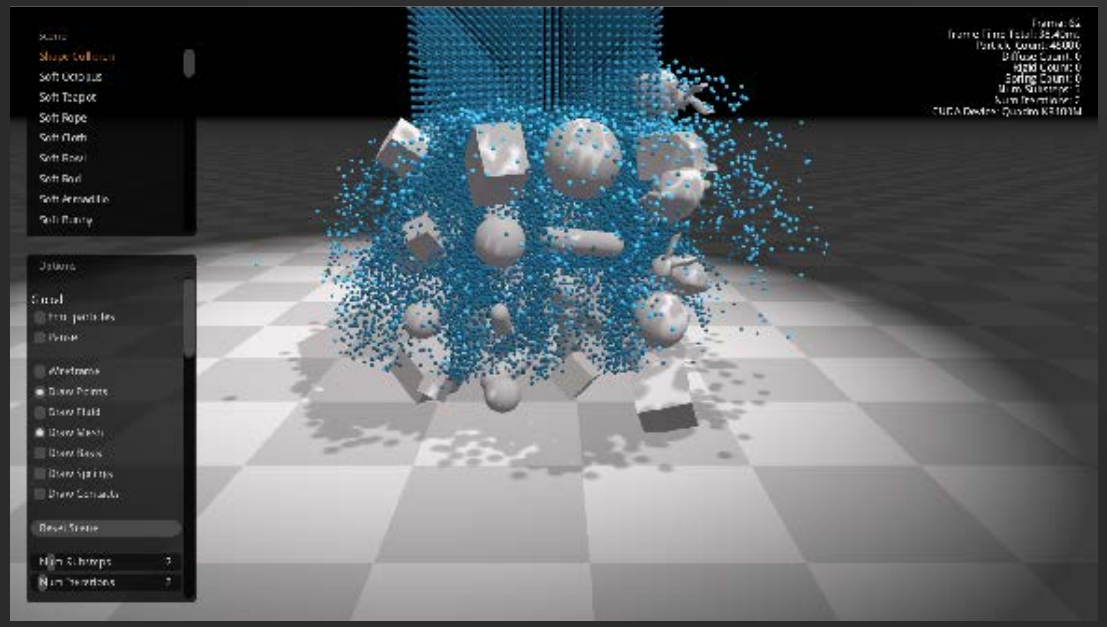
Softbodies



The SDK

- bin
- core
- data
- demo
- doc
- extensions
- external
- include
- lib
- readme.txt
- release_notes.txt

DEMO +
SOURCE CODE



MANUAL +
CODE REFERENCE

Research: Soft bodies in Nvidia FleX

Starring…

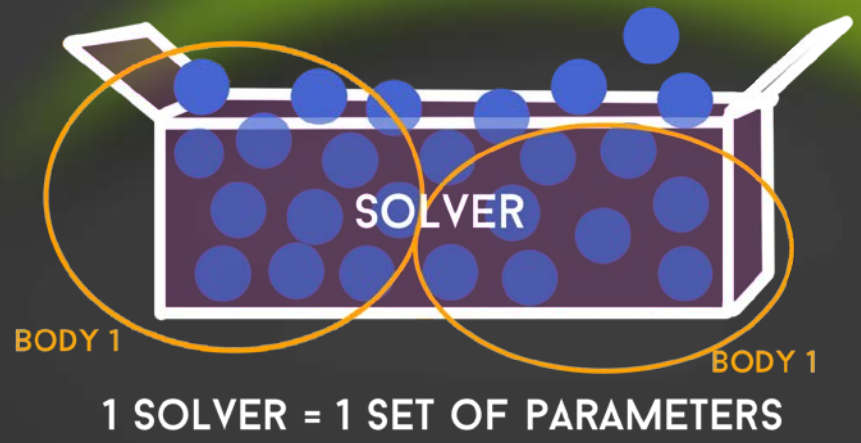
Patrick "Star"

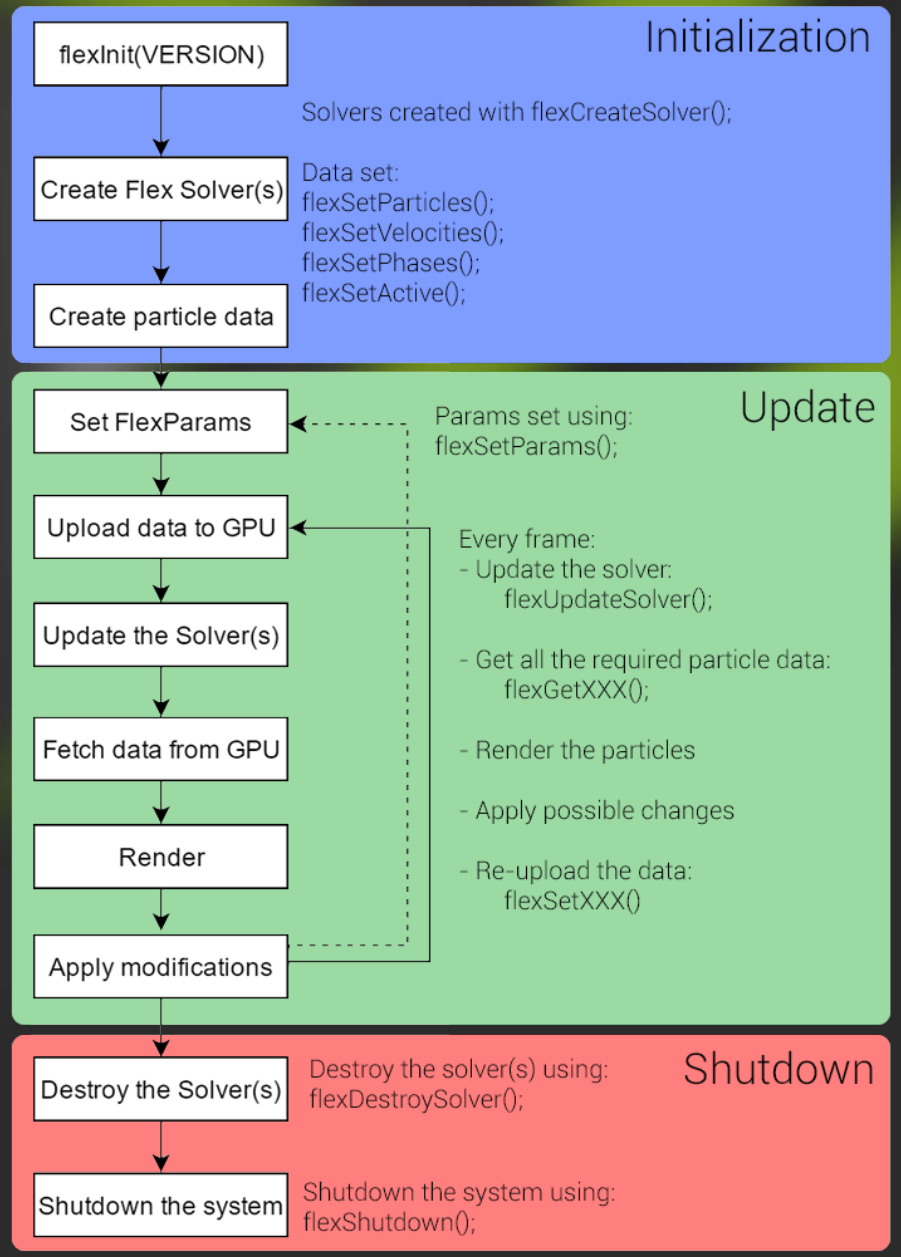
Main question:

How do I get from any regular mesh to a fully dynamic soft body?

Flex Solver

Solver =
Container that
does physics calculations



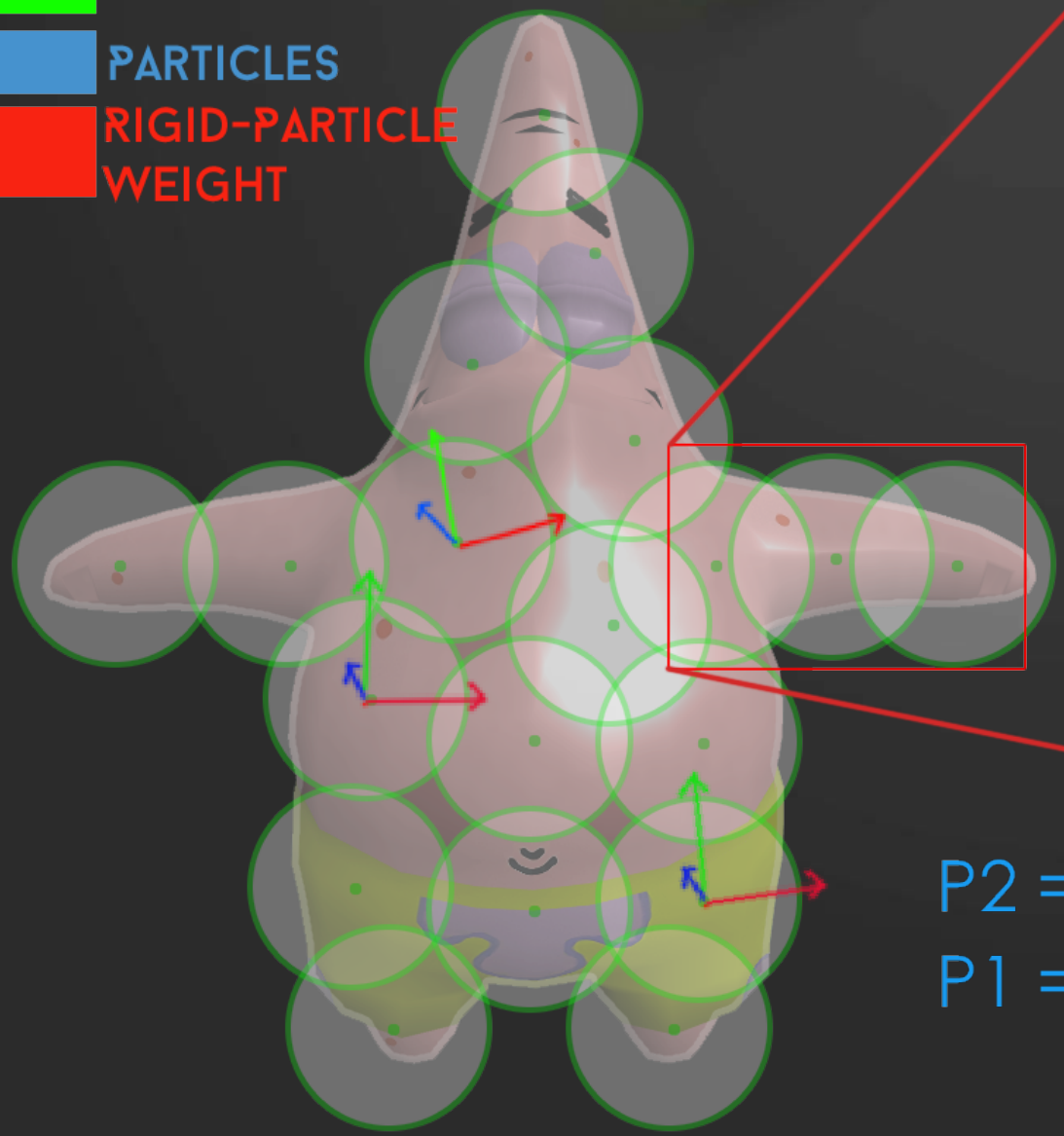


Particle → Cluster → Body

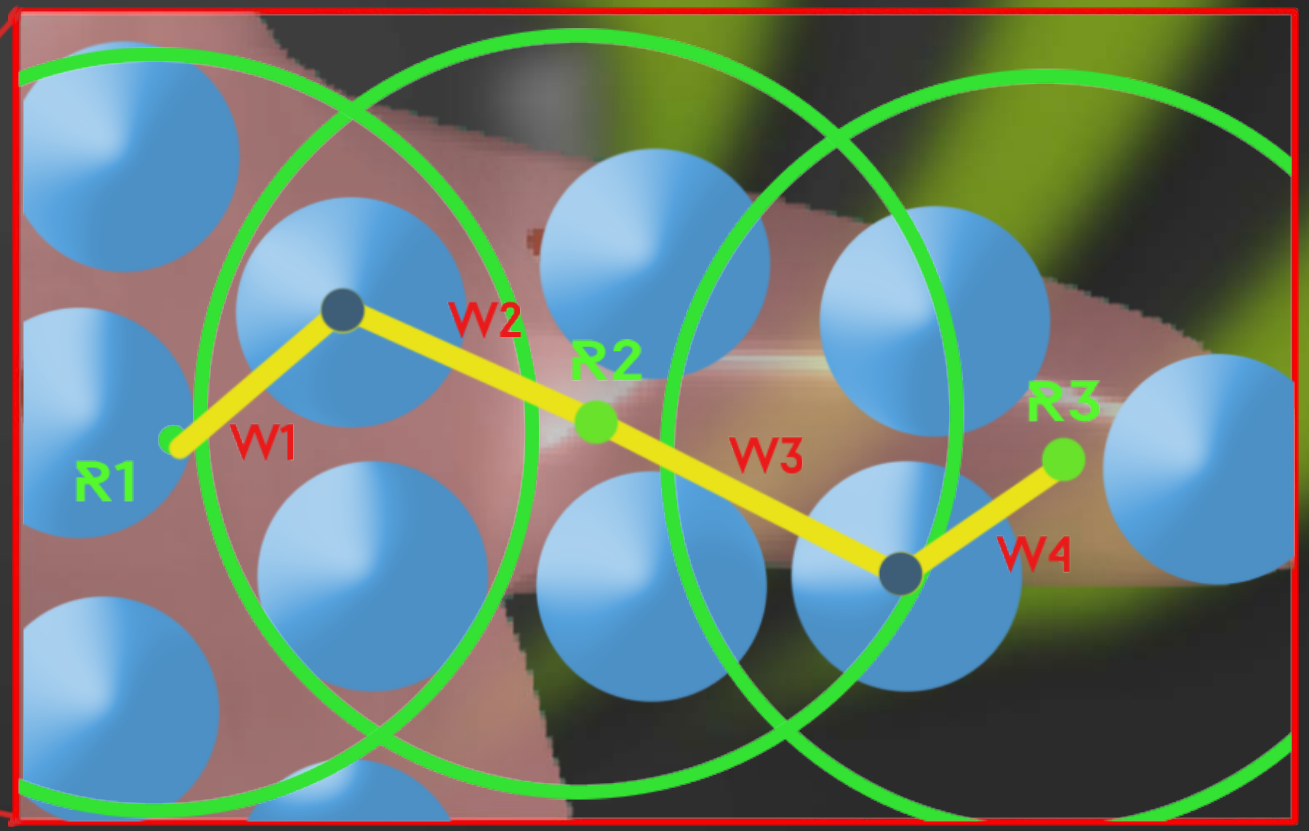
RIGIDS

PARTICLES

RIGID-PARTICLE WEIGHT



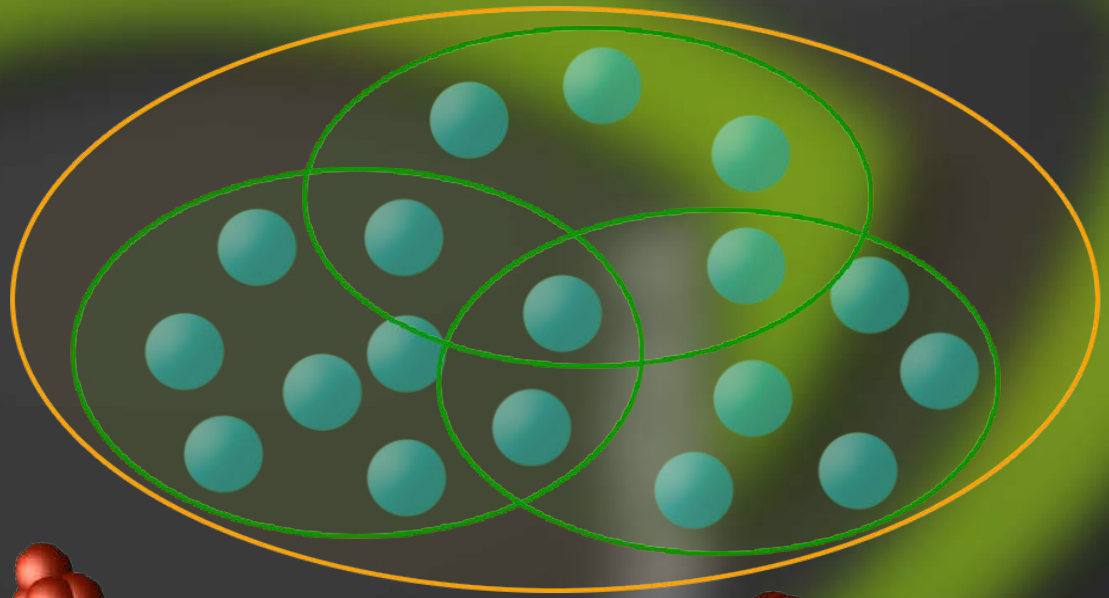
1 particle → 4 clusters

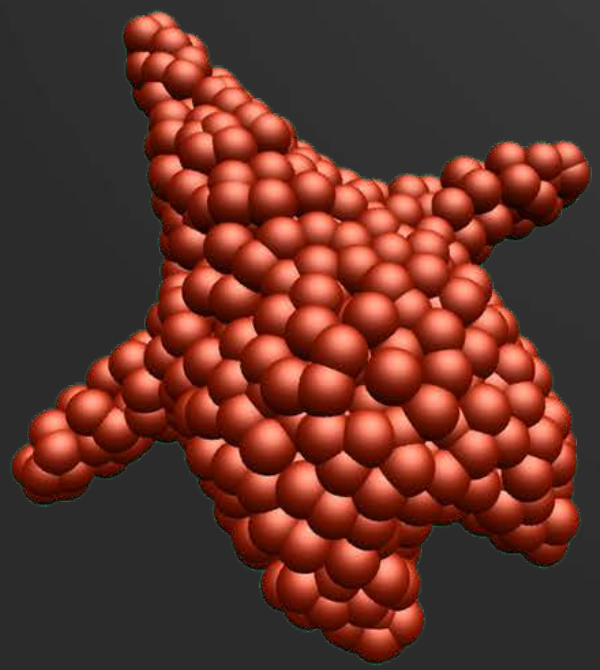


P2 = weight1 * Rigid1 + weight2 * Rigid2

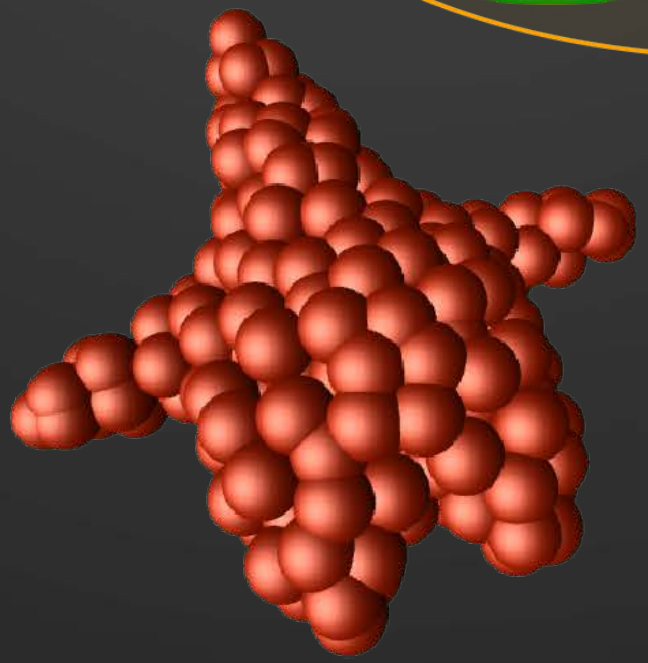
P1 = weight3 * Rigid2 + weight4 * Rigid3

Soft bodies

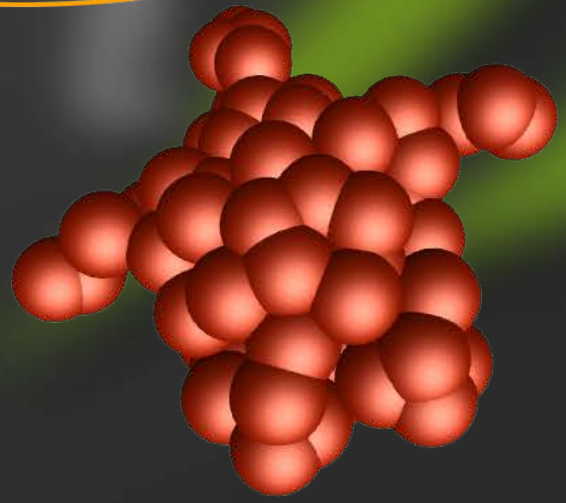




-- Radius
-- ClusterRadius

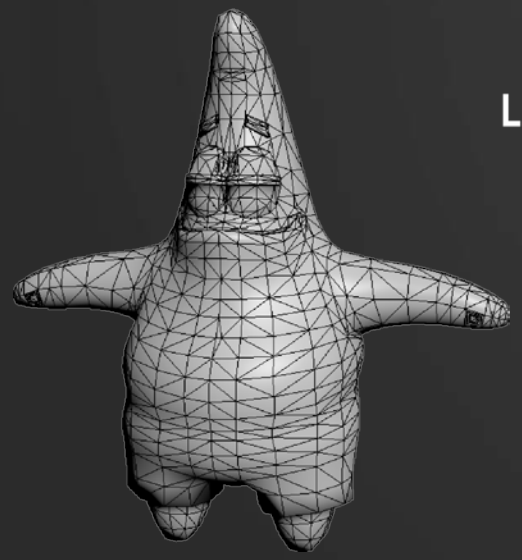


+ Radius
+ ClusterRadius



++Radius
++ClusterRadius

Creation

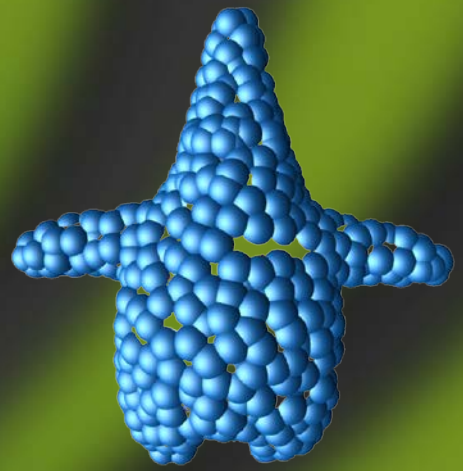


LOAD MESH

VertexBuffer:	v0	v1	v2	v3
Index:	0	1	2	3

IndexBuffer:	0	1	3	1	2	3
Index:	0	1	2	3	4	5

VOXELIZE MESH



CALCULATE SKINNING

VERTEX

WEIGHT WEIGHT WEIGHT WEIGHT

RIGID 1 + RIGID 2 + RIGID 3 + RIGID 4

UPLOAD ALL DATA TO SOLVER

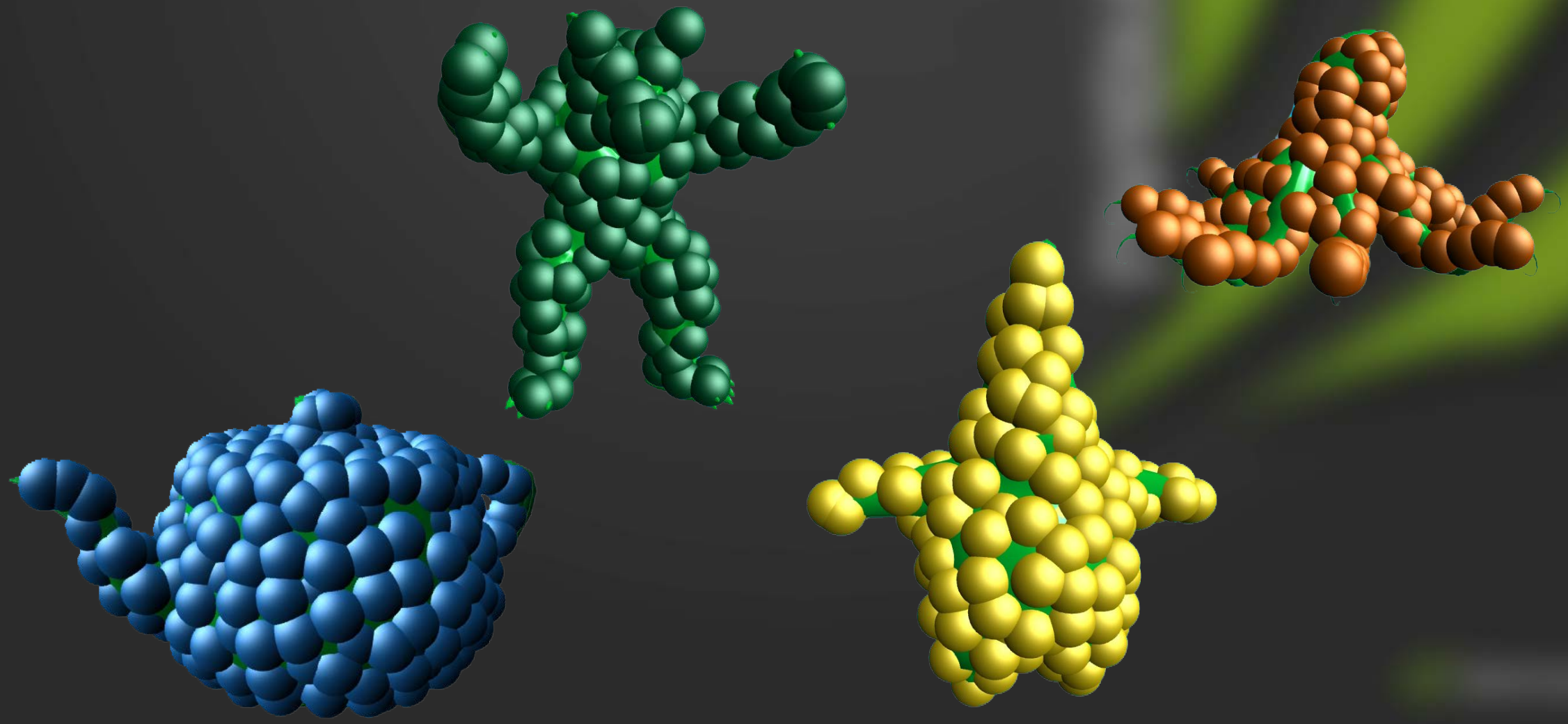
POSITIONS VELOCITIES RIGIDS PHASES ...

SOLVER

GPU SKINNING

Quality vs. Quantity

↓ Radius == ↑ Quality == ↓ Performance

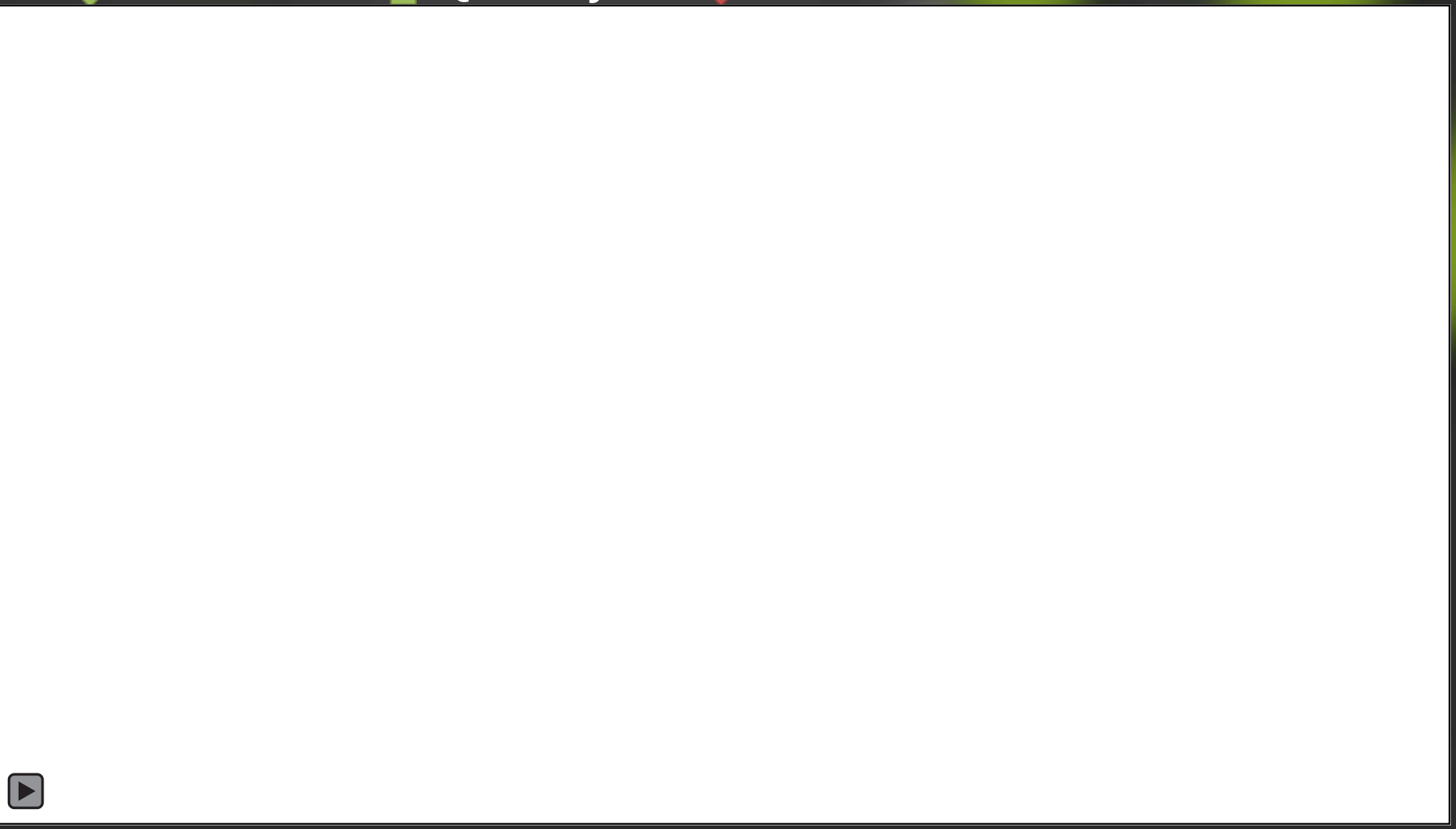


Quality vs. Quantity

Radius == Quality == Performance

Stress testing

50 soft bodies
Radius = 0,15



Questions?

A more technical explanation can be read in the paper

Source

https://bitbucket.org/simco50/d3dengine/src

Portfolio

http://www.simoncoenen.com