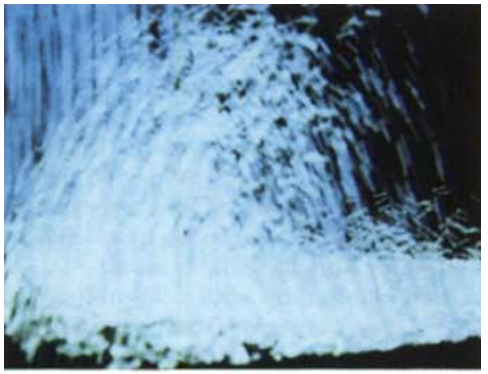
Modelowanie Fizyczne w Animacji Komputerowej

Wykład 1
Przegląd zagadnień + organizacja pracy

Maciej Matyka
http://panoramix.ift.uni.wroc.pl/~maq/



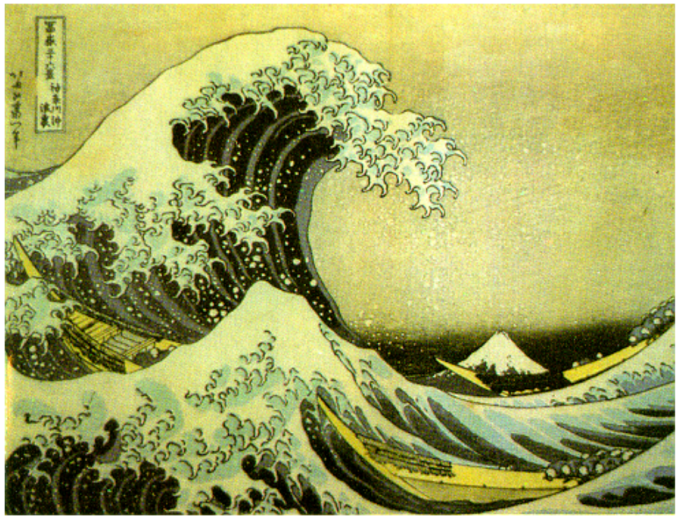
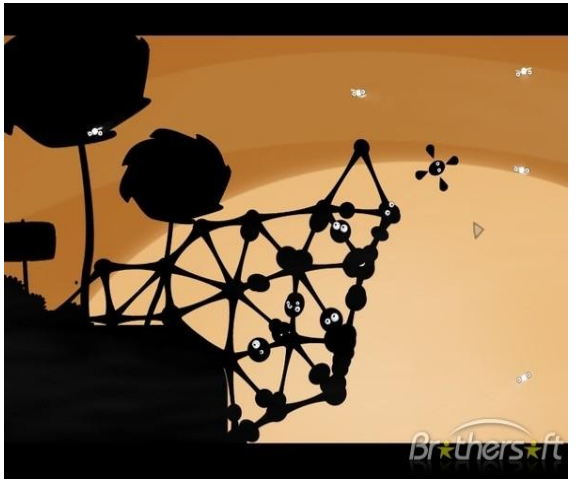


Figure 2
The surface of the sea is not a height field.

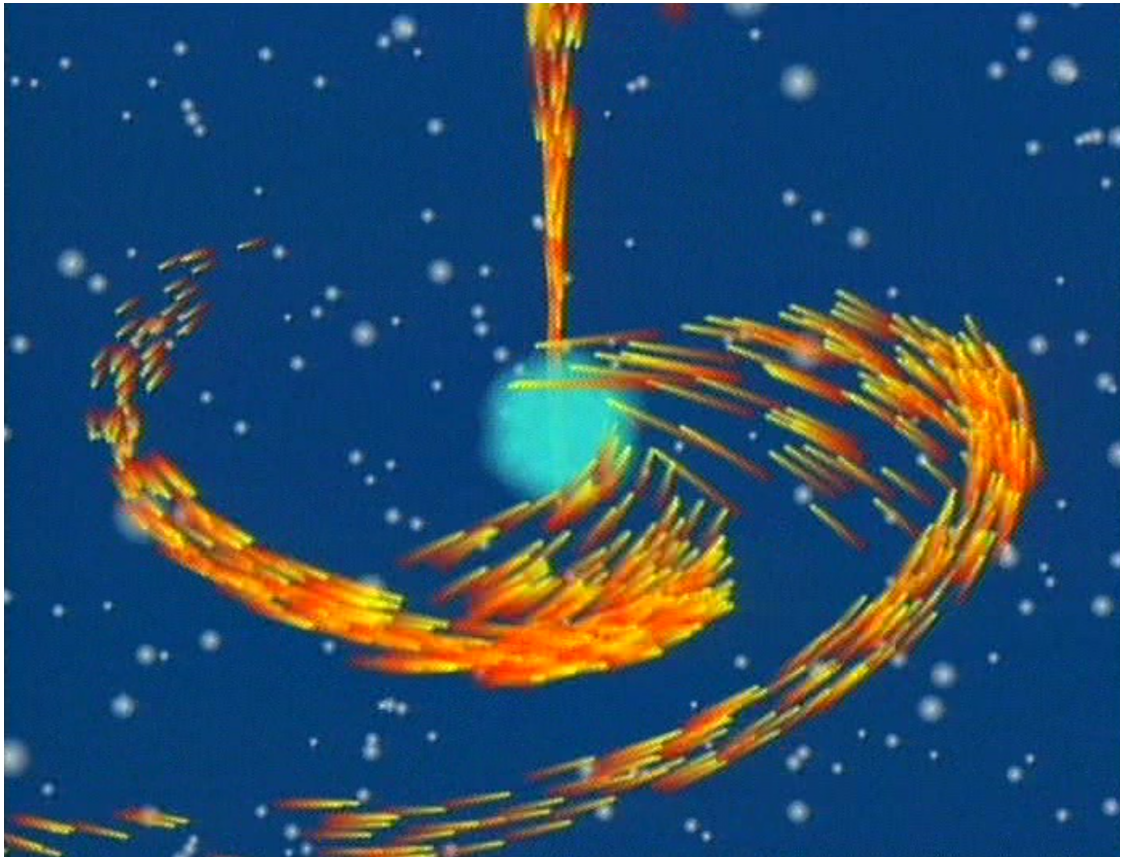


Physically Based Modelling and Animation

TNM052

- SE
- ERASMUS

Cel



Particle Dreams

Karl Sims,
MIT Media Lab,
Thinking Machines Corporation
Optomystic and Whitney/Demos
http://www.karlsims.com/

Narzędzia

- Blender
- Wiedza / numeryka / fizyka / programowanie
- C++ / JS / OpenGL

Laboratoria

- Zadania wykonujemy na pracowni i w domu

  Kurs ma zwiększoną ilość ECTS i oczekujemy, że będą państwo **wykorzystywać czas poza zajęciami** na wykonanie zadań.

Laboratorium

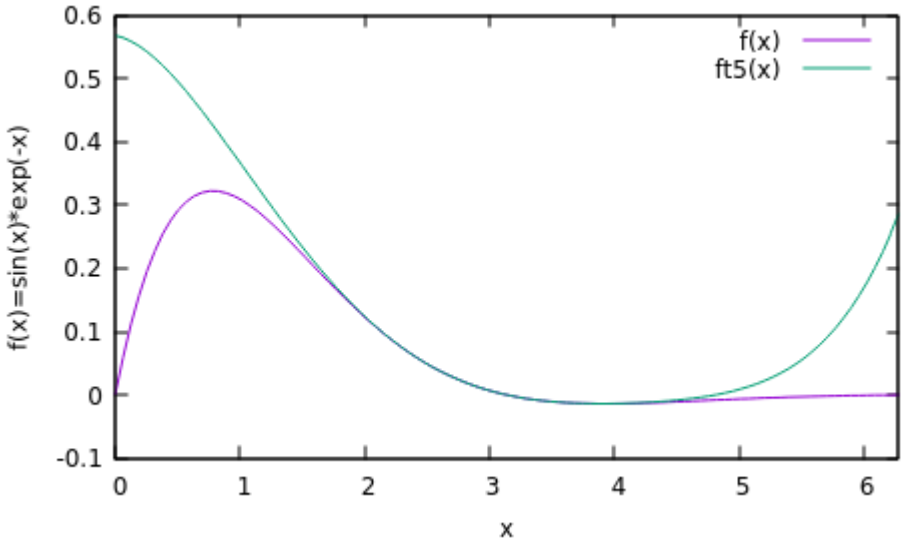
(wstępny plan - mogą być zmiany na bieżąco)

1. Animacja Blender
2. Zadanie: System cząsteczek
3. Zadanie: Lina / Tkanina / ciało miękkie
4. Zadanie: Woda (SPH), Liście, Ocean lub swój model.

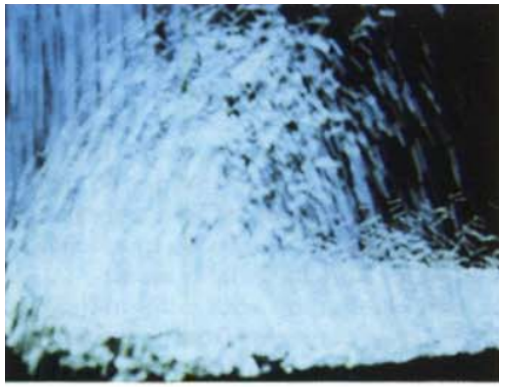
Przegląd proponowanych tematów

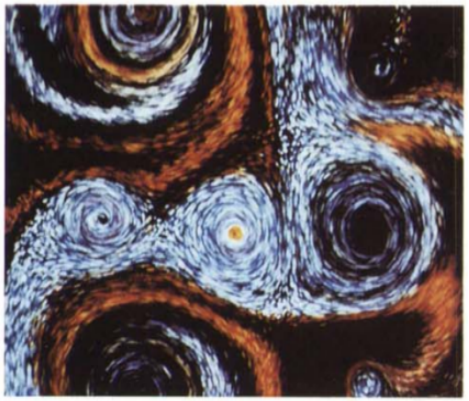
(możliwe korekty)

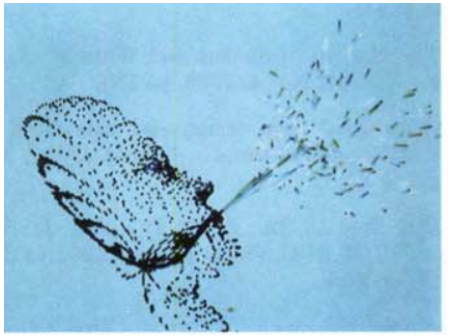
Całkowanie – Szereg Taylora, metoda Eulera

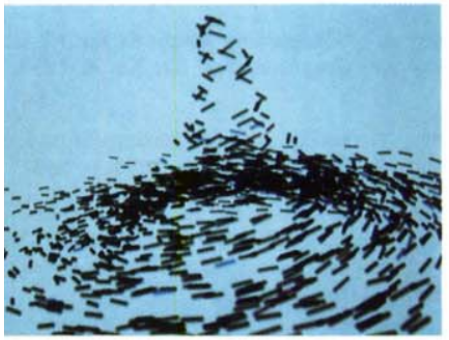


Systemy cząsteczkowe



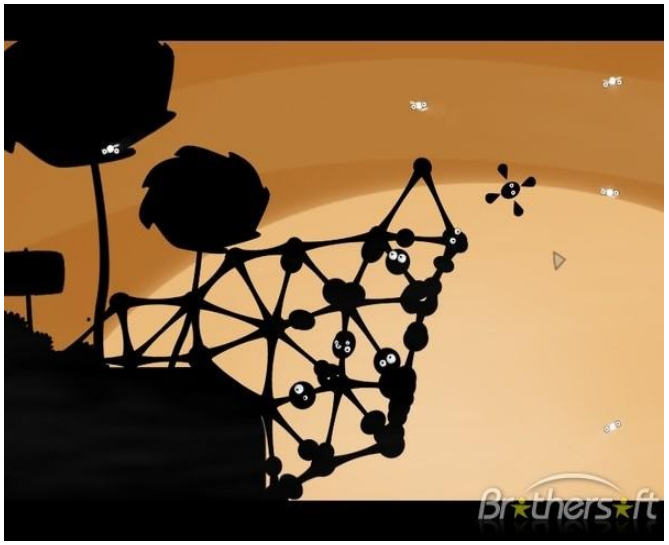






Sims, K., CG 24(4), 1990

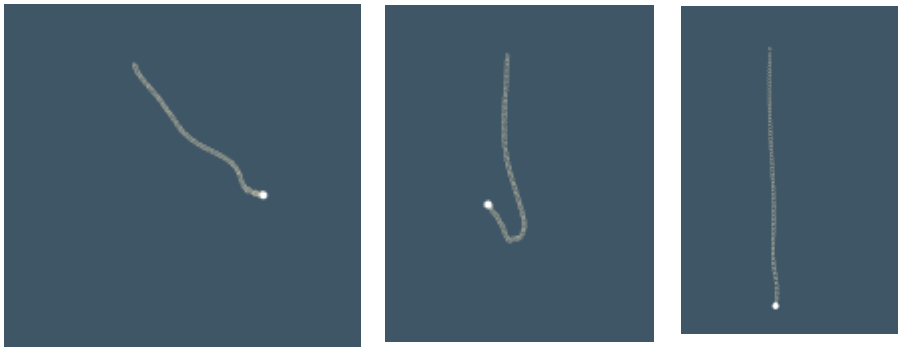
Symulacja Liny

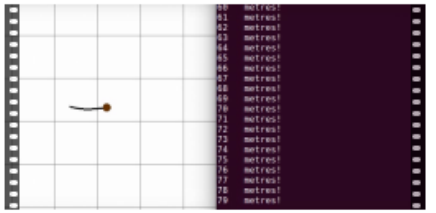


bungee.html

lina.html

bungee.html
9.1 kB
22 paź 2015

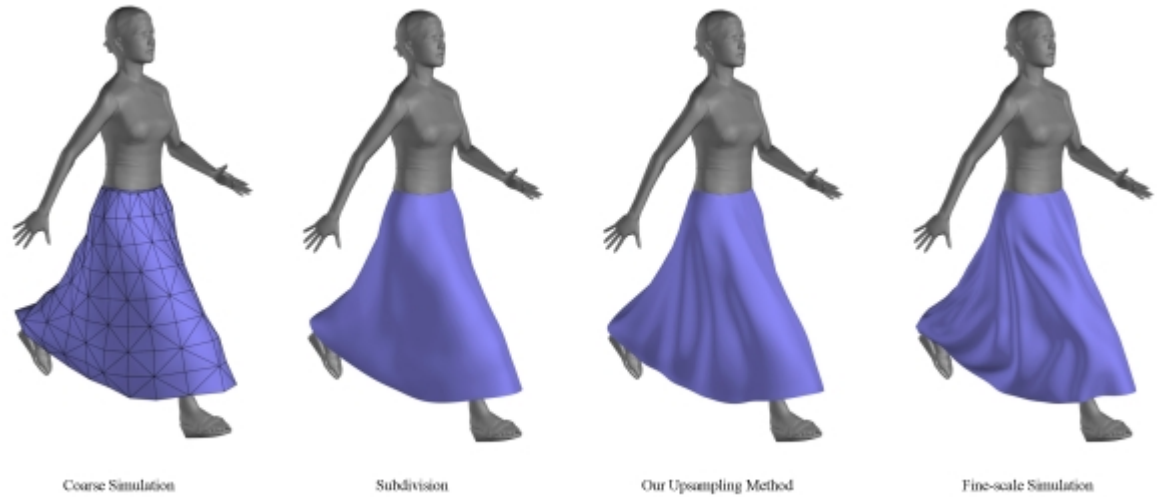




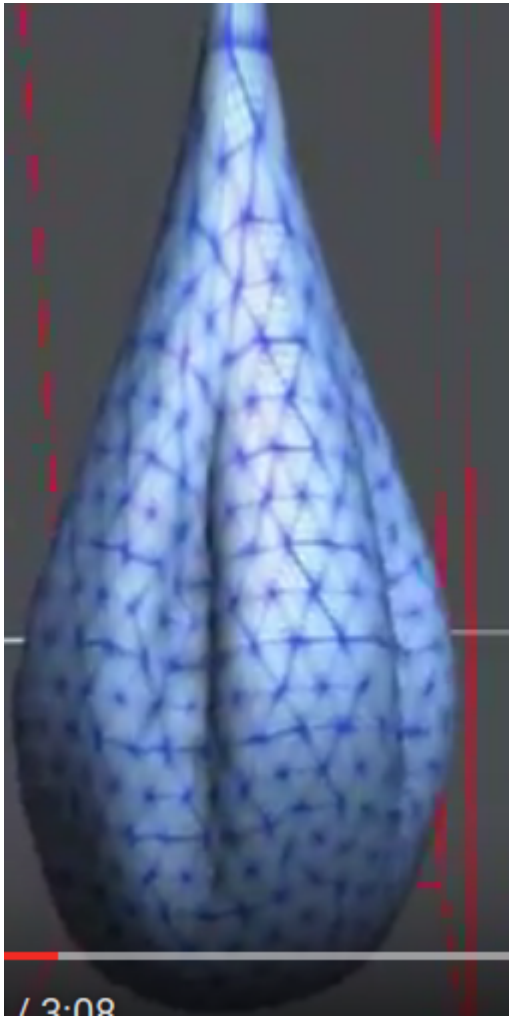
lina2.ogv
7.3 MB
6 lip

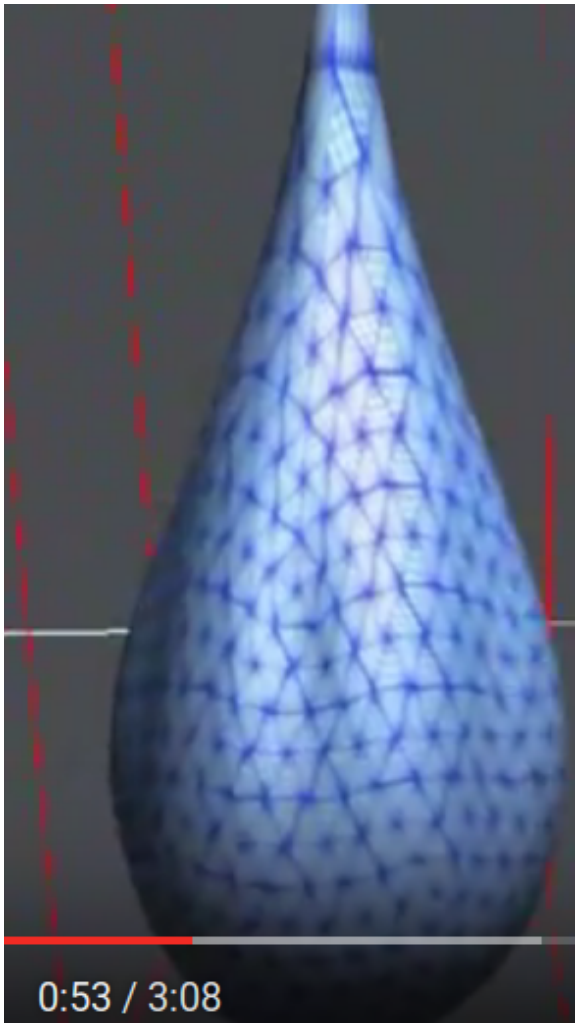
Tkaniny

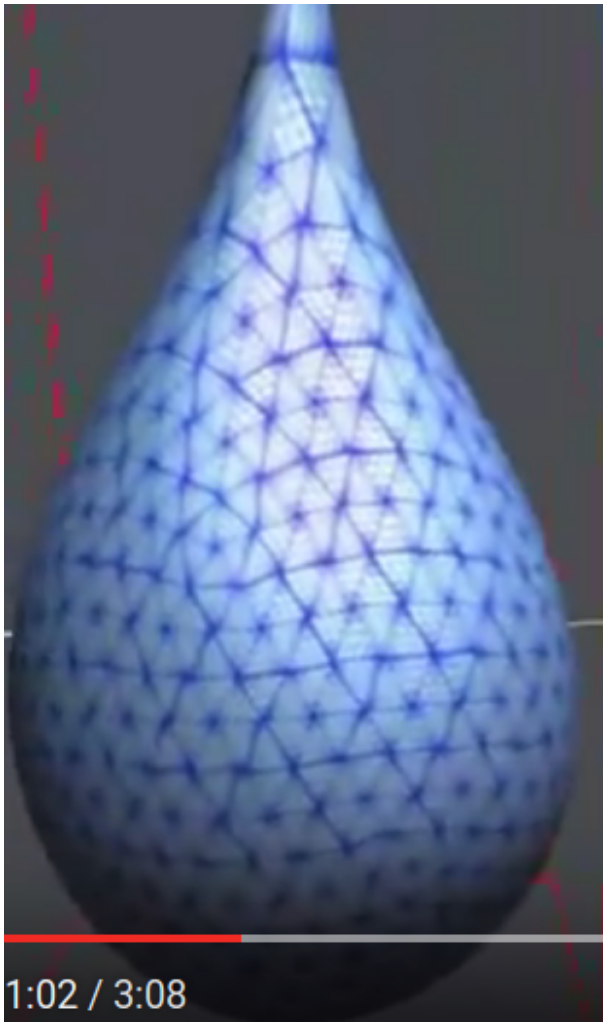
Jak animować tkaniny?



Ciała Miękkie







Granulaty

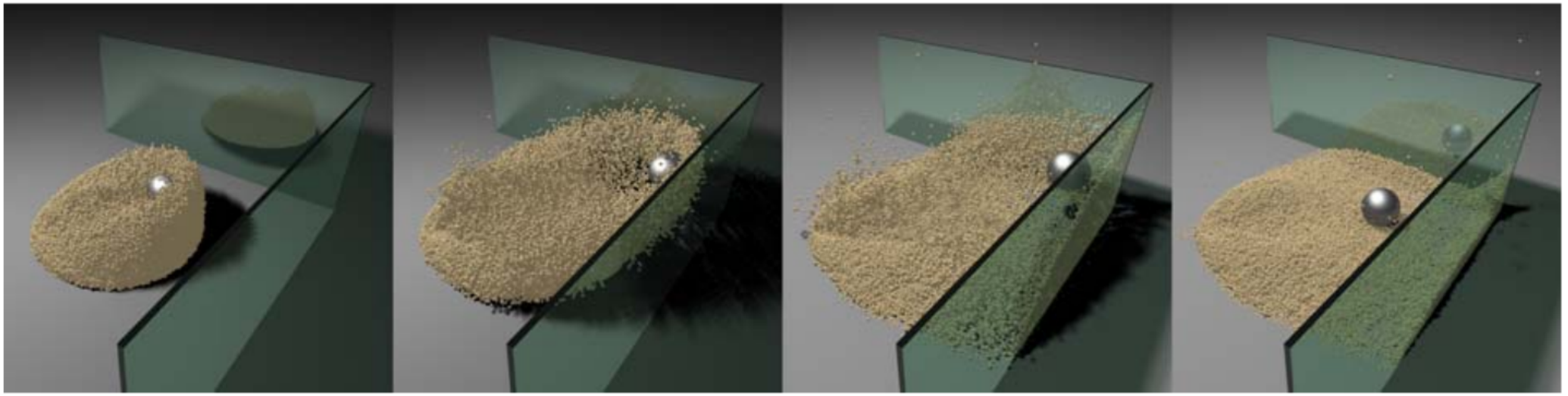
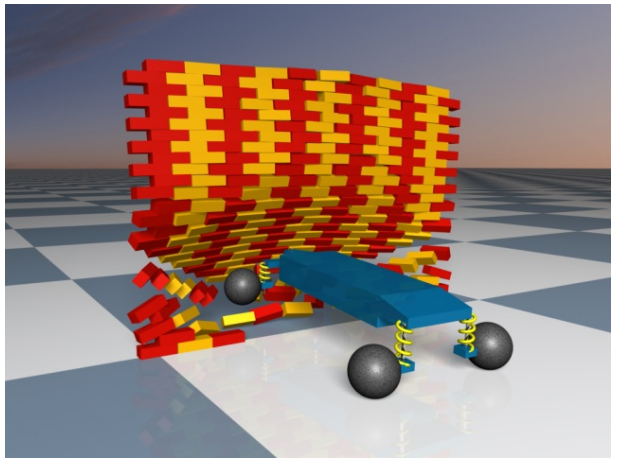


Figure 9: *A steel ball collides with a sand pile producing a large splash.*

Bell, N., Yu, Y. and Mucha, P.J. 'Particle-Based Simulation of Granular Materials', Eurographics/ACM SIGGRAPH (2005)

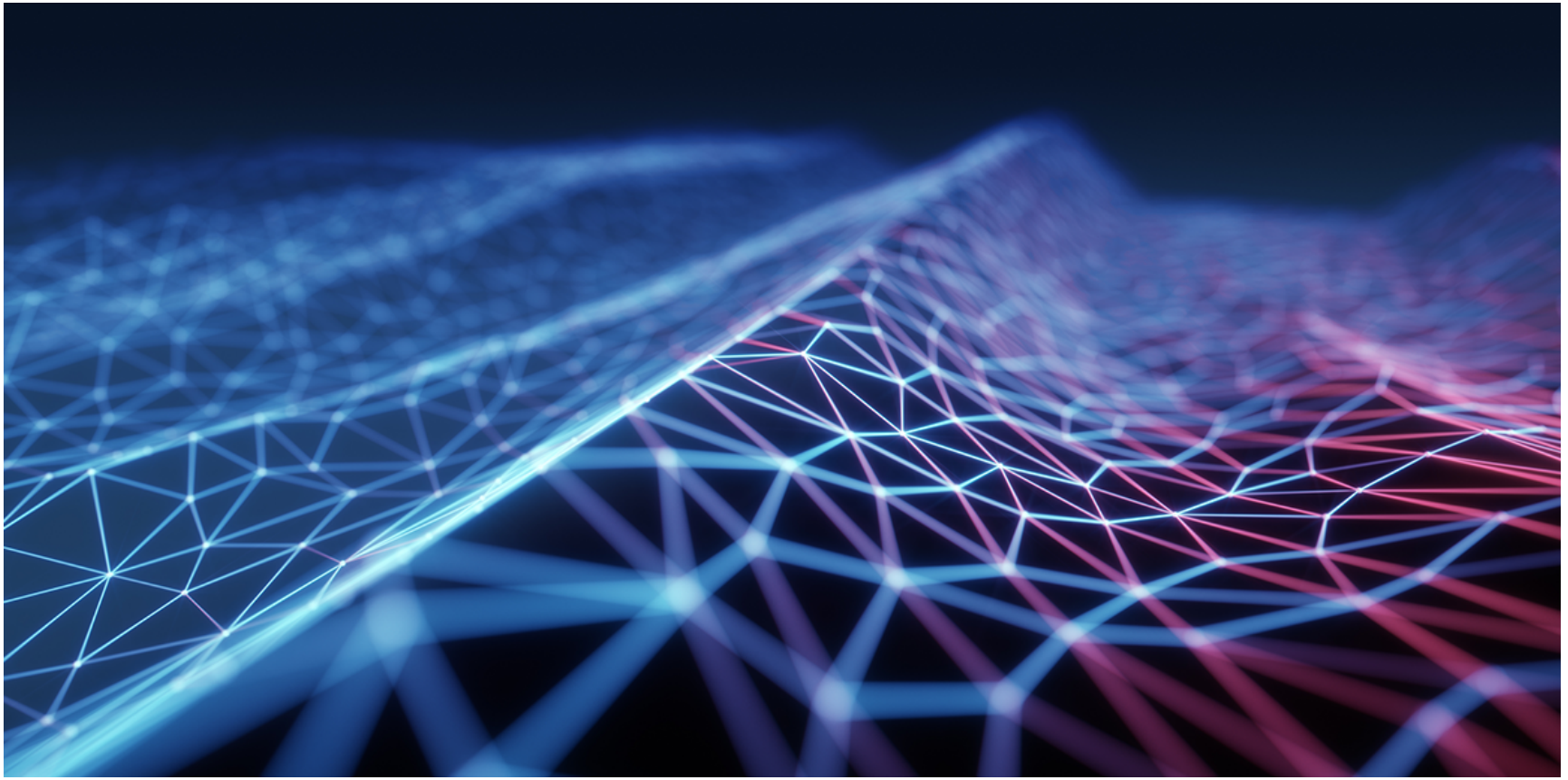
Rigid Body



http://www.interactive-graphics.de/index.php/research/58-interactive-simulation-of-rigid-body-dynamics-in-computer-graphics-all

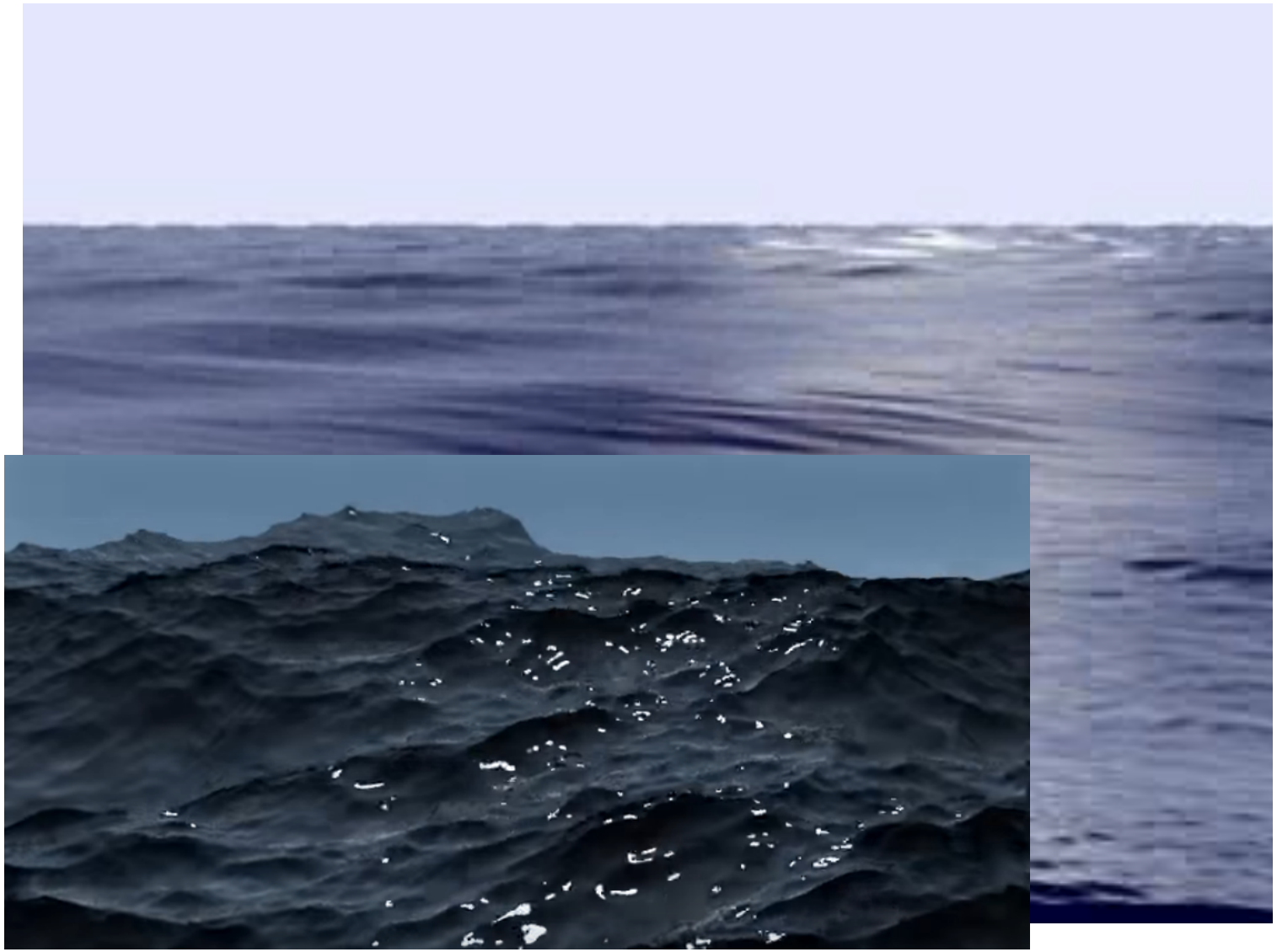
http://lesterbanks.com/2014/01/introduction-rigid-body-simulator-blender/

Powierzchnia oceanu



https://futurism.com/researchers-have-linked-a-human-brain-to-the-internet-for-the-first-time-ever/

Powierzchnia oceanu



Hissinger, D., Interactive Animation of Ocean Waves, iMAGIS-GRAVIR

https://www.youtube.com/watch?v=ltb4Q_w1N2Y

7_flyover.mpg

Płyny - Metoda cząstki w komórce

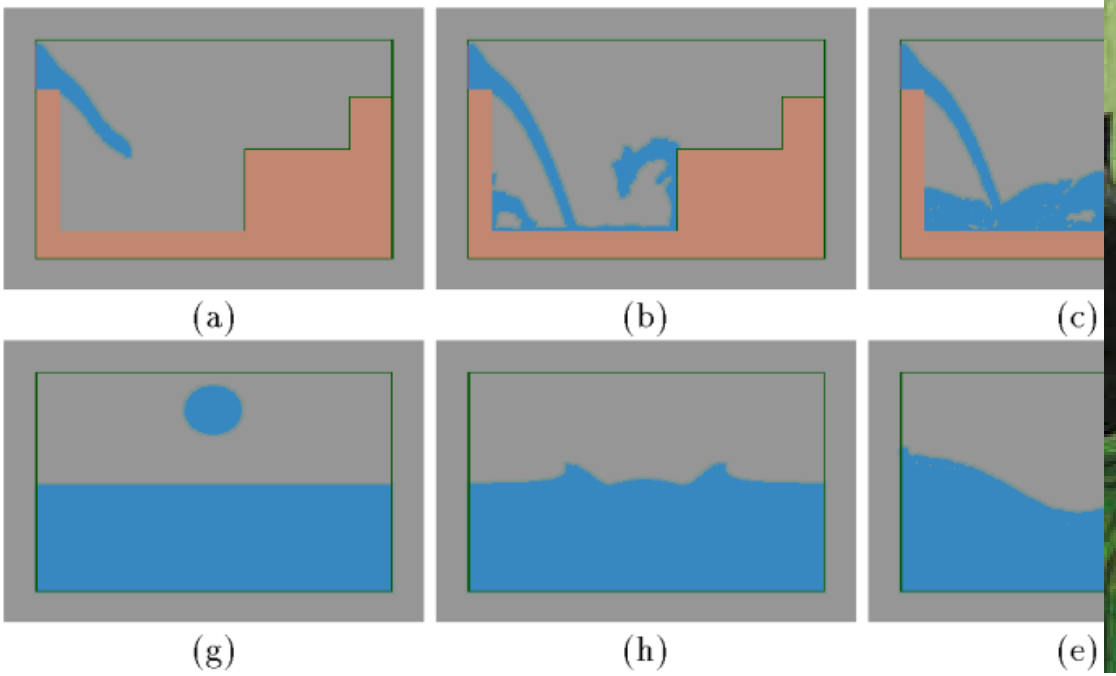


Figure 4: *Frames from two dimensional animations making use of marker particles. A jet of water splashes into a concrete tank (a-d). A drop of water splashes into a shallow pool (e-h).*

N. Foster, D. Metaxas, 1996

Academy of Motion Picture Arts and Sciences

Technical Achievement Award (1999)

Fizyka w filmach

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Computational Physics in Film

Robert Bridson[1,2,3,*] and Christopher Batty[1]

+ See all authors and affiliations

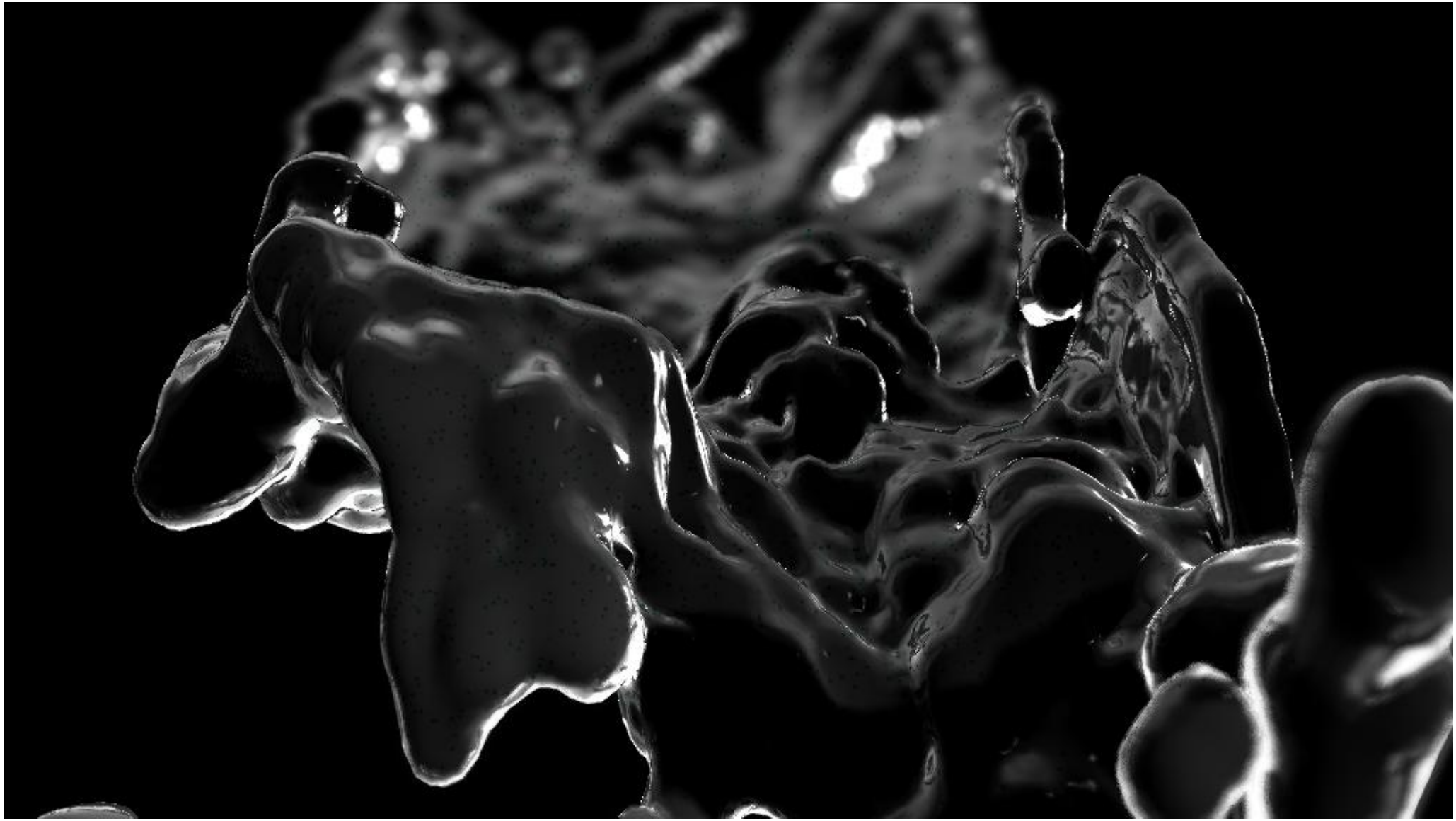
Science 24 Dec 2010:
Vol. 330, Issue 6012, pp. 1756-1757
DOI: 10.1126/science.1198769

Article | Figures & Data | Info & Metrics

You are currently viewing the summary.

Realistic simulations. A simulated ship upon a simulated ocean. Here, the film industry's Naiad software is used to evolve the incompressible Navier-Stokes equations for the water, strongly coupled with the rigid-body dynamics of the longboat, with additional phenomenological simulation of foam and spray.

Smoothed Particle Hydrodynamics



Numbres, CNCD & Fairlight

Animation Aerodynamics

Wejchert, J., Haumann, D., Animation Aerodynamics, Proceeding SIGGRAPH '91

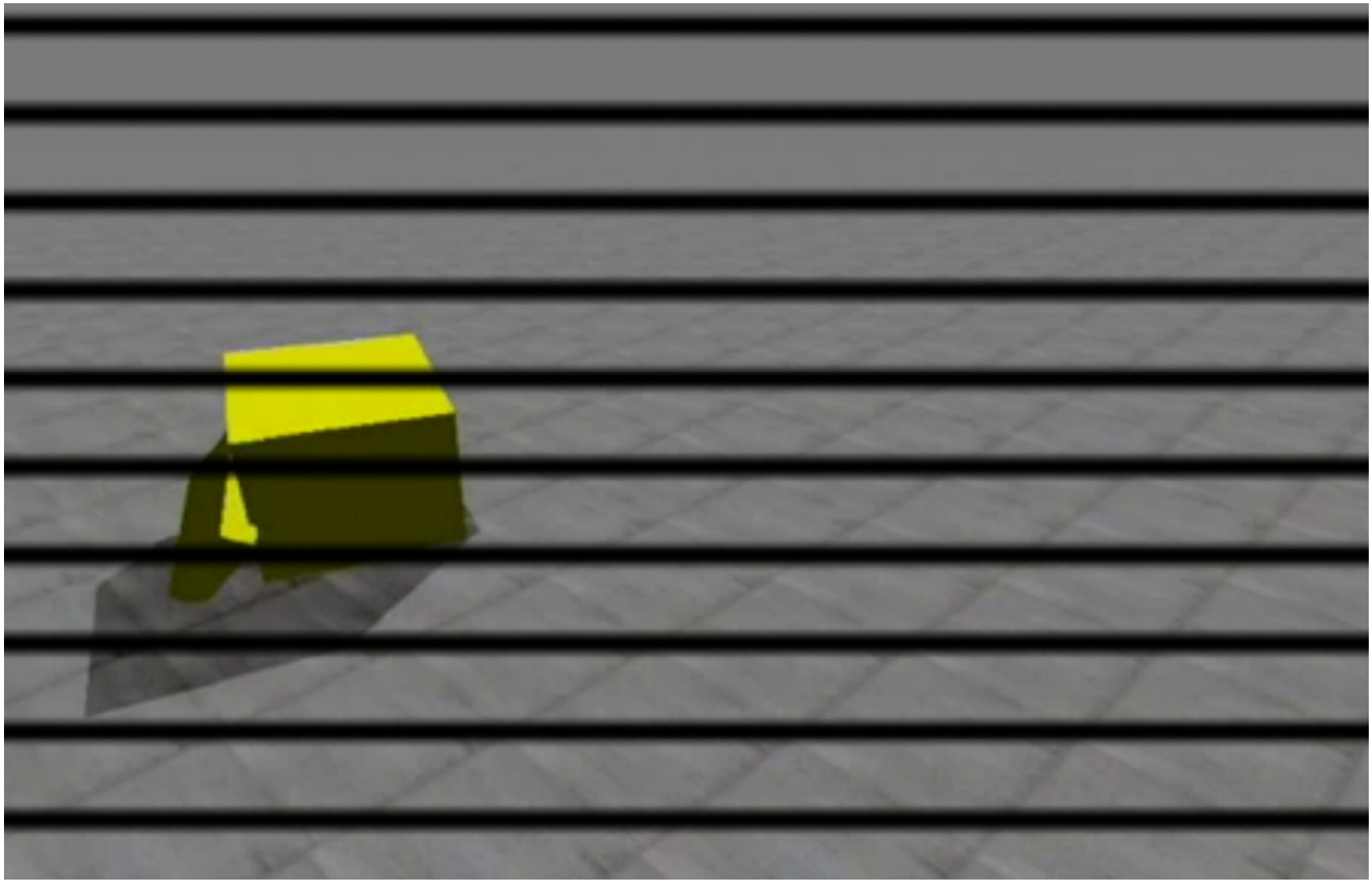
Pierwsze ćwiczenia – Kompilacja Video w temacie wykładu

Tematyka związana z wykładem, format mp4.
Na pracowni można użyć OpenShot.
Proszę używać materiałów na
licencji CC0 (muzyka dowolna, ale z tą licencją).
Do filmu dołączamy opis .txt ze
wskazaniem źródeł filmów.

Czas: **1 tydzień, minimalna długość 30 sekund.**

Pokaz na żywo (wykład)

15 minut pracy w **OpenShot**



Genetic.mp4

RIGID BODY DYNAMICS