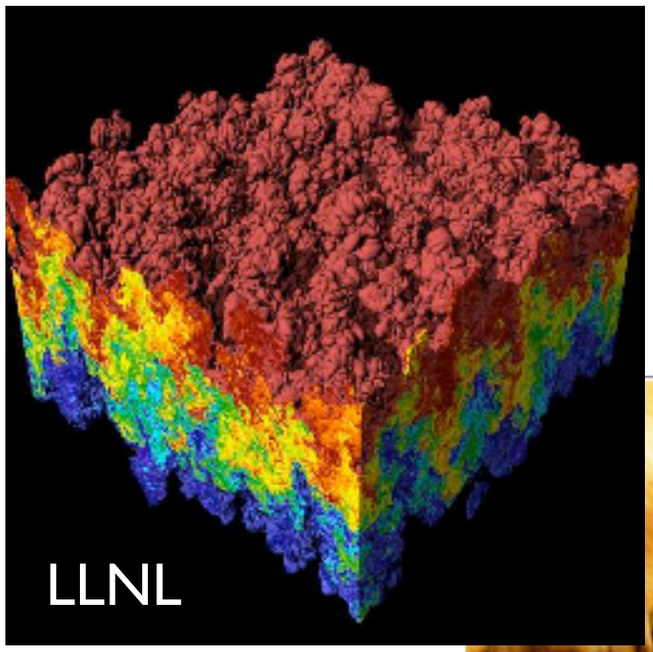
CS130
Computer Graphics

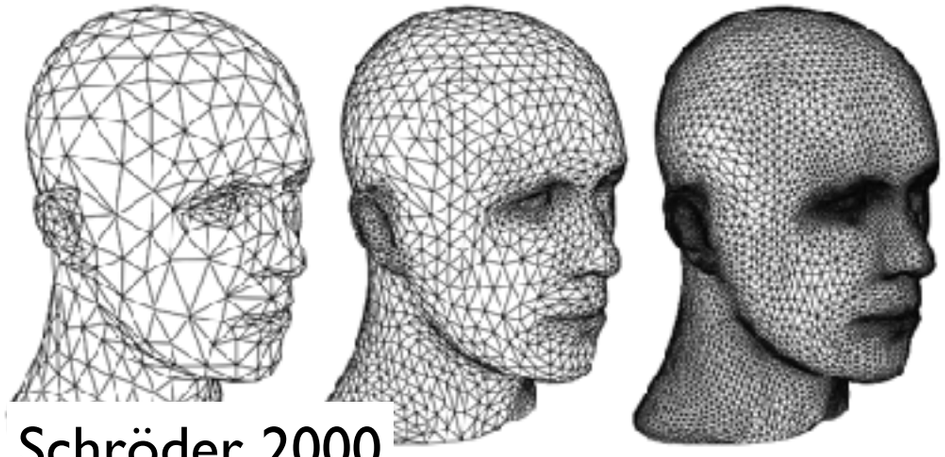
Tamar Shinar
Computer Science & Engineering
UC Riverside

Welcome to CS130!

Talton et al., 2011



LLNL

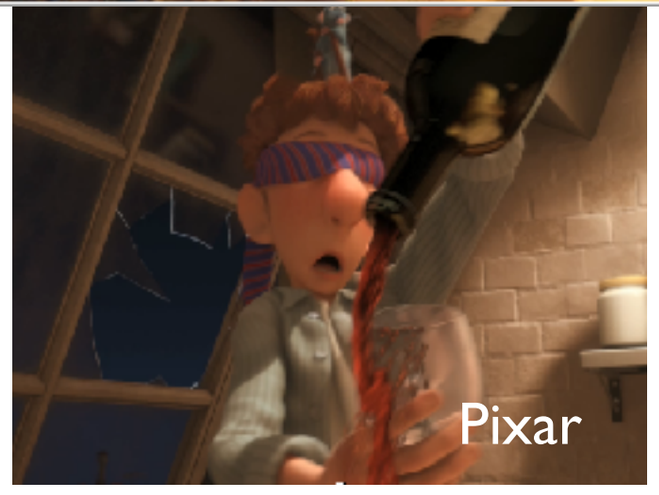


Schröder, 2000

ILM

Henrik Wann Jensen

Hong et al. 2007



Pixar

Today's agenda

- Course logistics
- Introduction: graphics areas and applications
- Course schedule
- Math review

Course Overview

- Learn fundamental 3D graphics concepts
- Implement graphics algorithms
  - make the concepts concrete
  - expand your abilities and confidence for future work

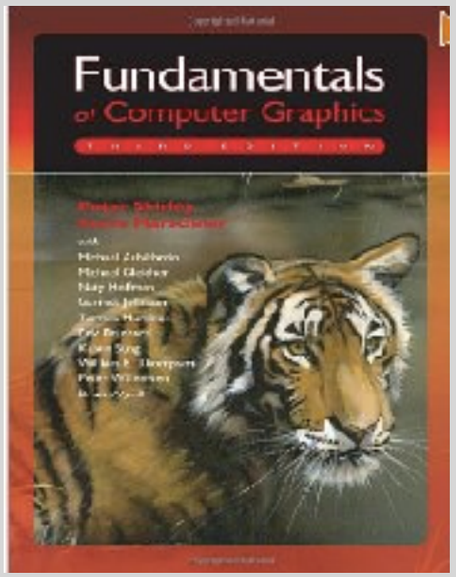
Course Logistics

- Professor: Tamar Shinar
- TAs: Muzaffer Akbay (Muzo), Cassio Elias
- Website: http://www.cs.ucr.edu/~shinar/courses/cs130
- Lectures: TuTh 12:40pm-2:00pm, Sproul 1102
- Lab: W 10:10am-1pm, 1:10-4:00pm, or 4:10-7:00pm, WCH 132
- Announcements (assignments, etc.) made in class and through ilearn

Course Logistics

- Grading
  - 20% labs
  - 15% homework
  - 30% assignments (2 assignments, 15% each)
  - 35% tests (1 midterm 15%, 1 final 20%)
- Detailed schedule on class website

Textbook

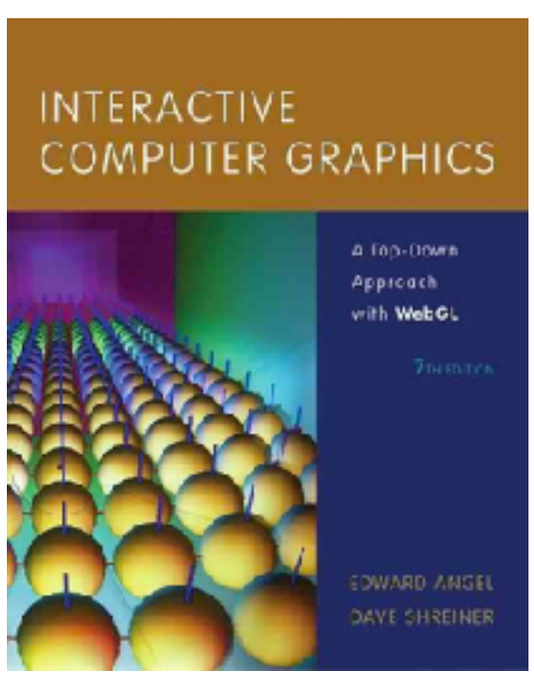


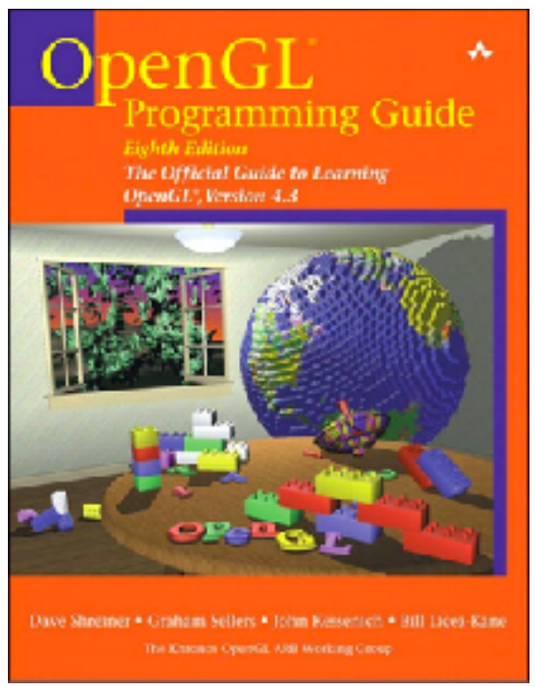
Fundamentals of Computer Graphics

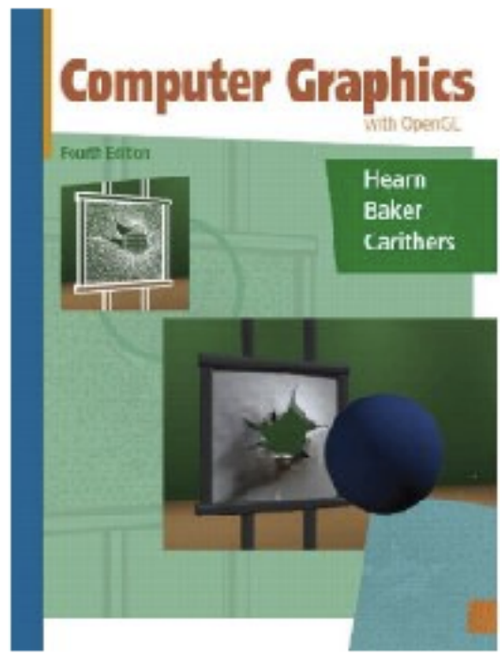
Shirley and Marschner

(3rd or 4th edition)

Additional books







About the professor

- B.S., University of Illinois in Urbana-Champaign, Mathematics, Computer Science, Fine Art
- Ph.D., 2008, Stanford University on simulation methods for computer graphics
- NYU postdoc on computational biology
- Joined UCR CS&E department in the Fall 2011
- Work in graphics simulation and biological simulation

http://www.cs.ucr.edu/~shinar

About the TAs

- Cassio Elias
- Muzaffer (Muzo) Akbay

Introduction

Graphics applications

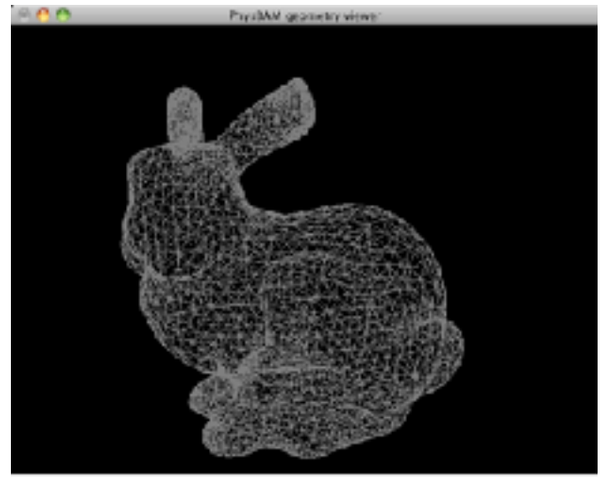
- 2D drawing
- Drafting, CAD
- Geometric modeling
- Special effects
- Animation
- Virtual Reality
- Games
- Educational tools
- Surgical simulation
- Scientific and information visualization
- Fine art

Graphics areas

- **Modeling -** mathematical *representations* of physical objects and phenomena
- **Rendering -** creating a *shaded image* from 3D models
- **Animation -** creating motion through a sequence of images
- **Simulation -** physics-based algorithms for animating dynamic environments

Modeling

Talton et al., 2011



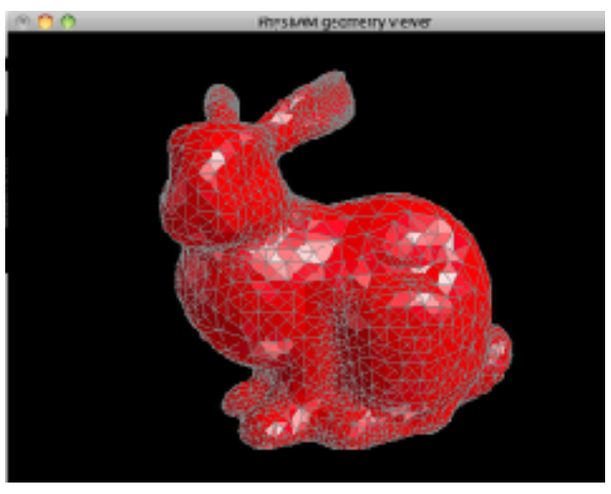
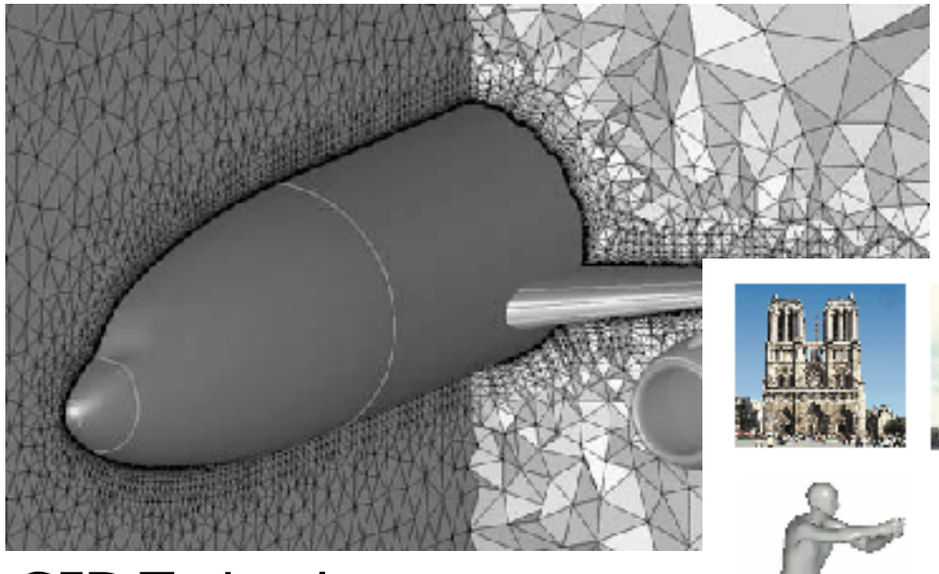


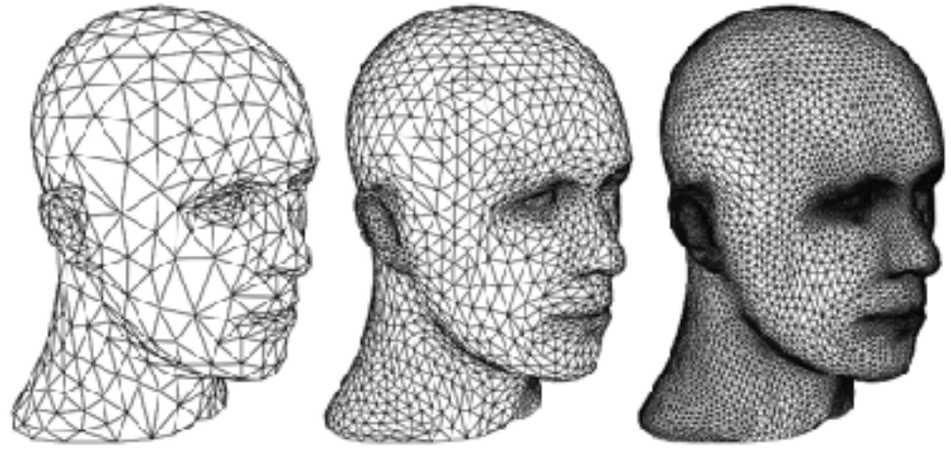
Figure1: Teddy in use on a display-integrated tablet.

Igarashi et al., 2007



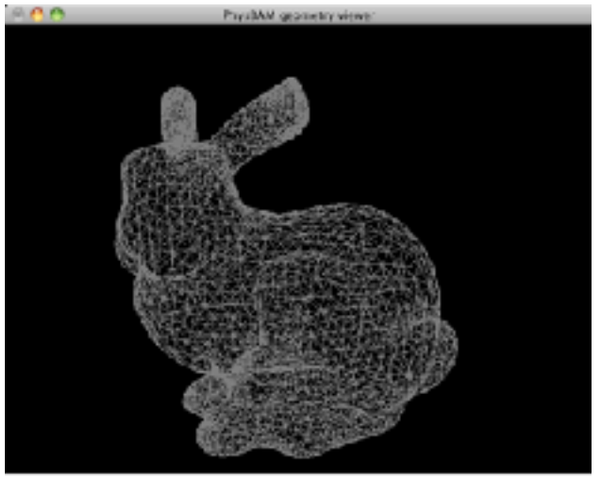
CFD Technologies

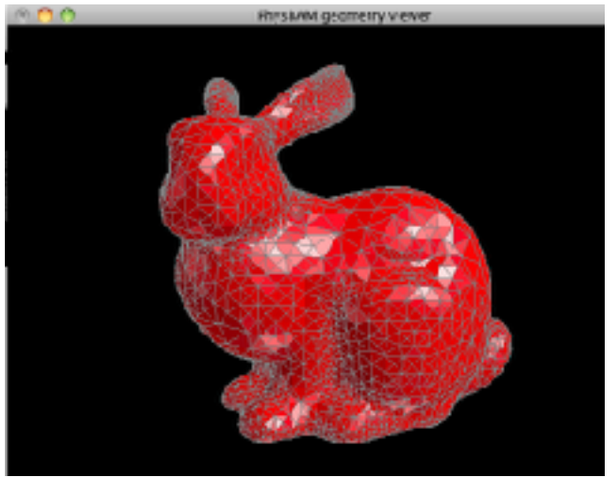
Bronstein et al., 2011



Schröder, 2000

Rendering





Henrik Wann Jensen

Hong et al. 2007

d'Eon and Irving, 2011

Animation

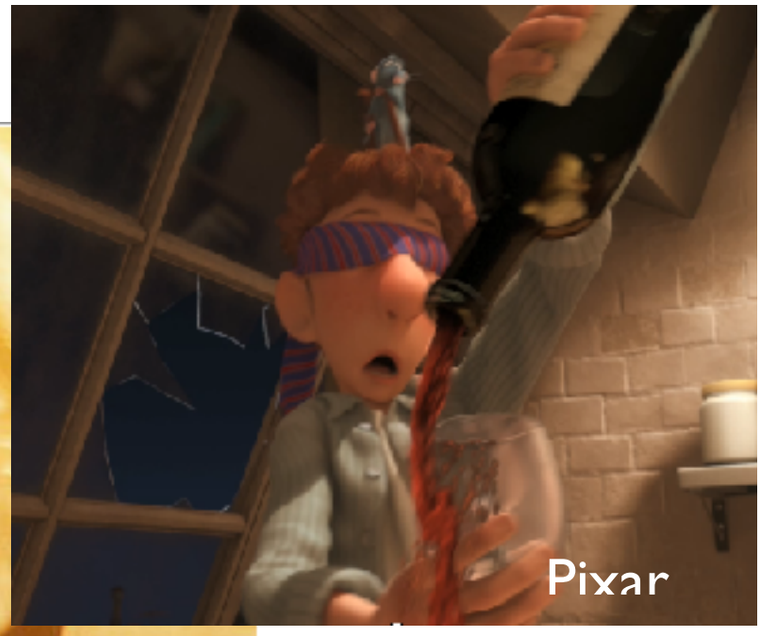
Sleeping Beauty, Disney, 1959

Adventures of Tintin, Weta 2011

Monsters Inc, Pixar, 2001

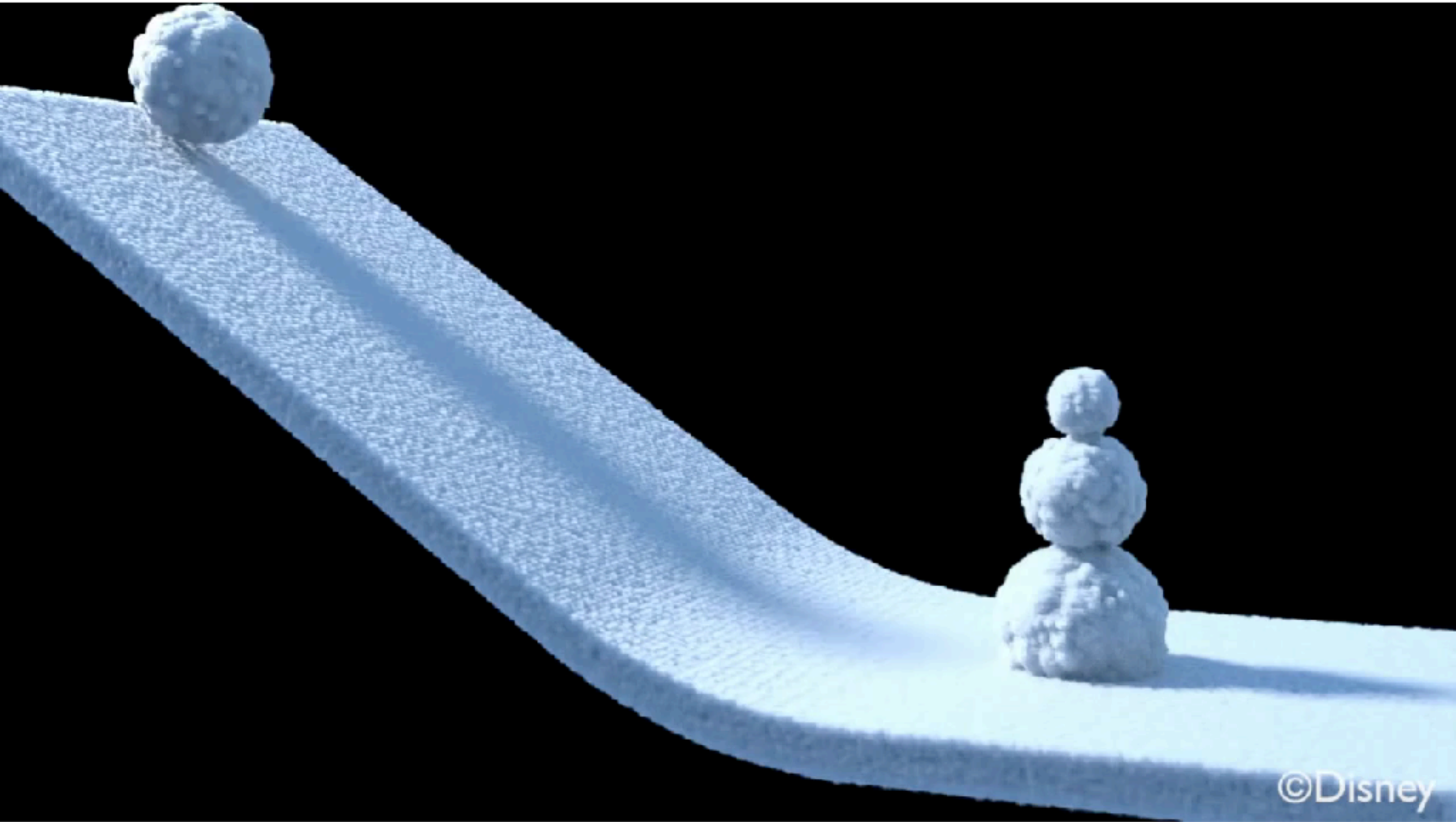
Life of Pi, 2012

Simulation

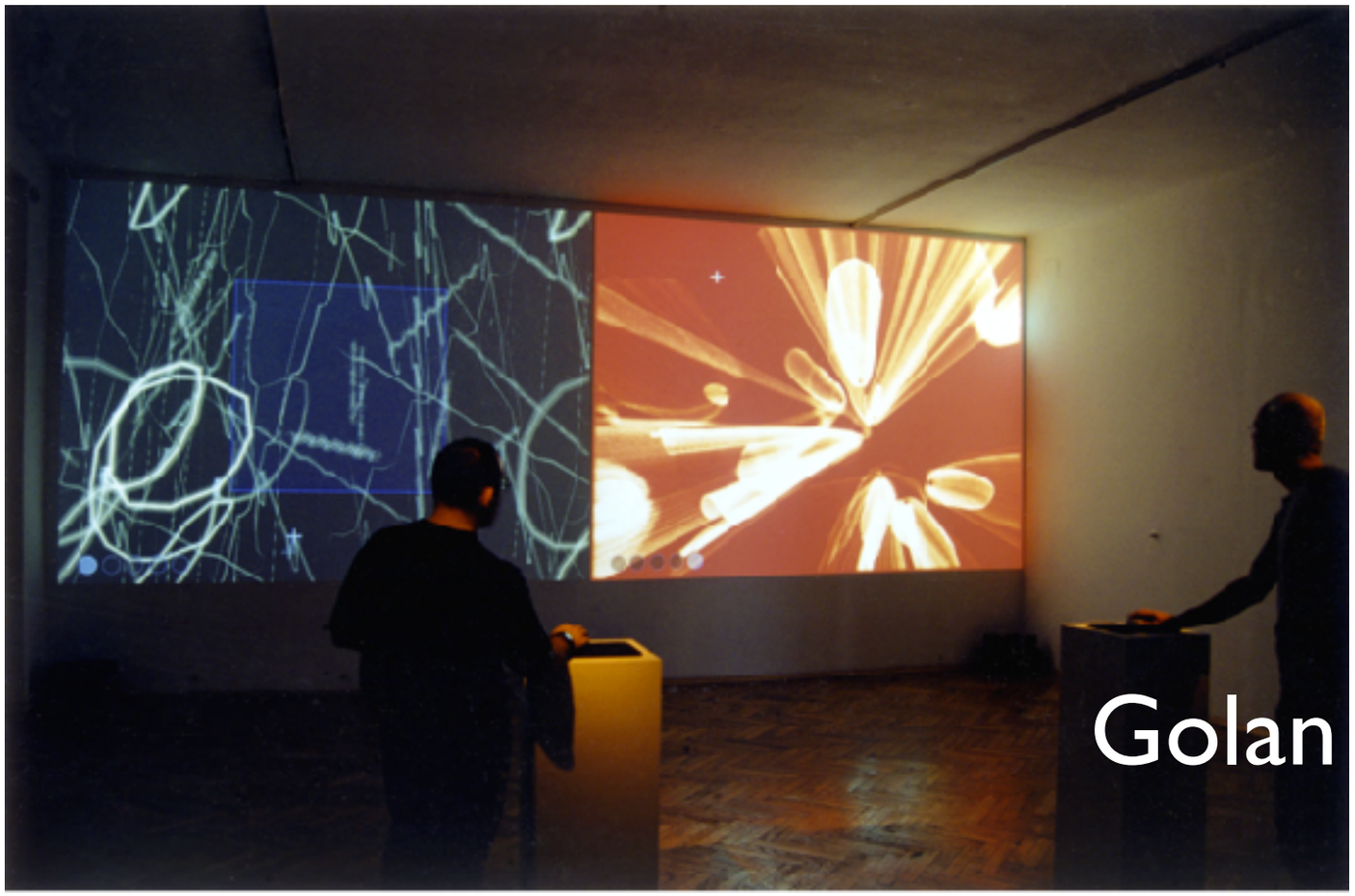


Firestorm
Harry Potter and the Half Blood Prince
Industrial Light + Magic

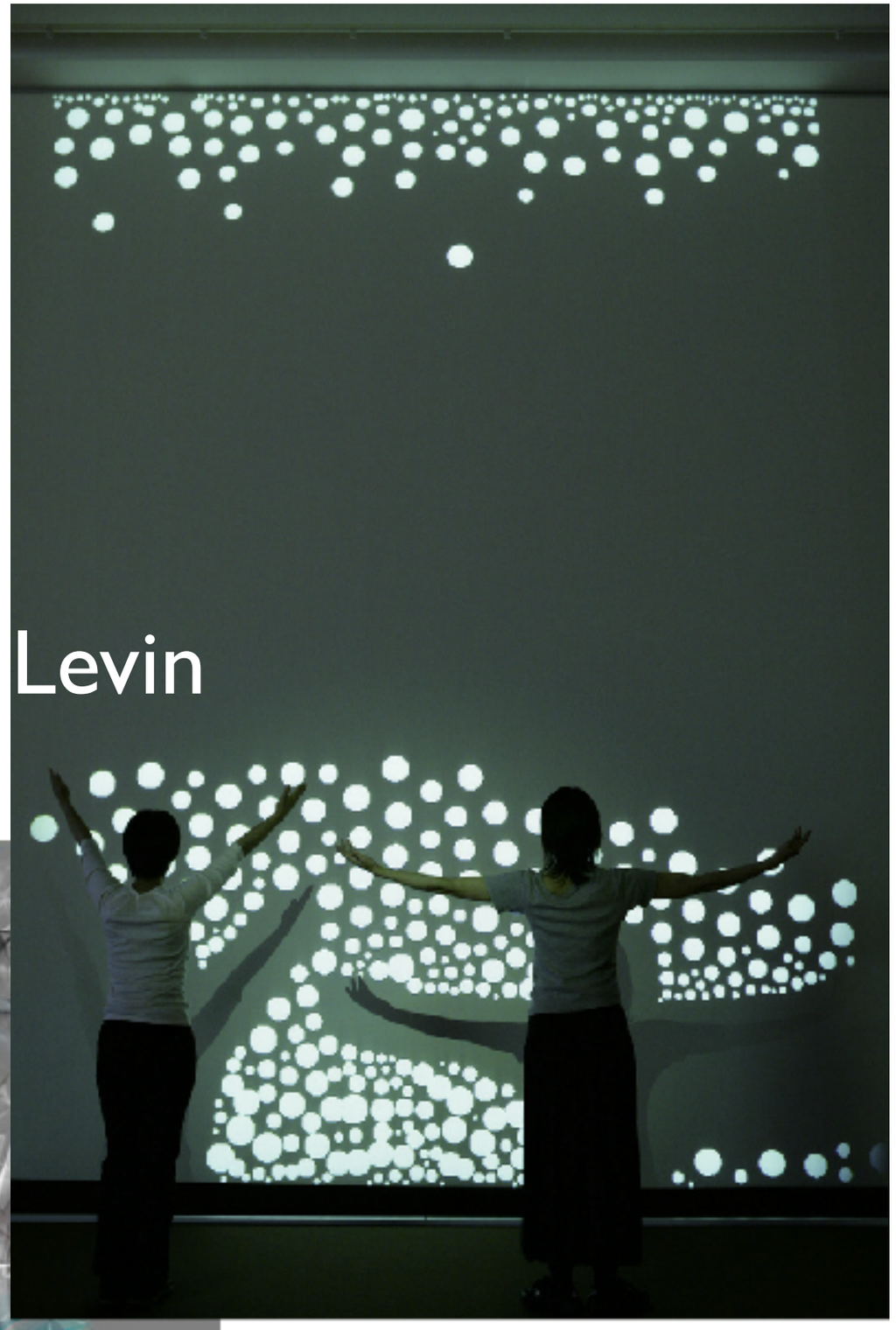
fluid simulation in Pixar's *Ratatouille 2007*

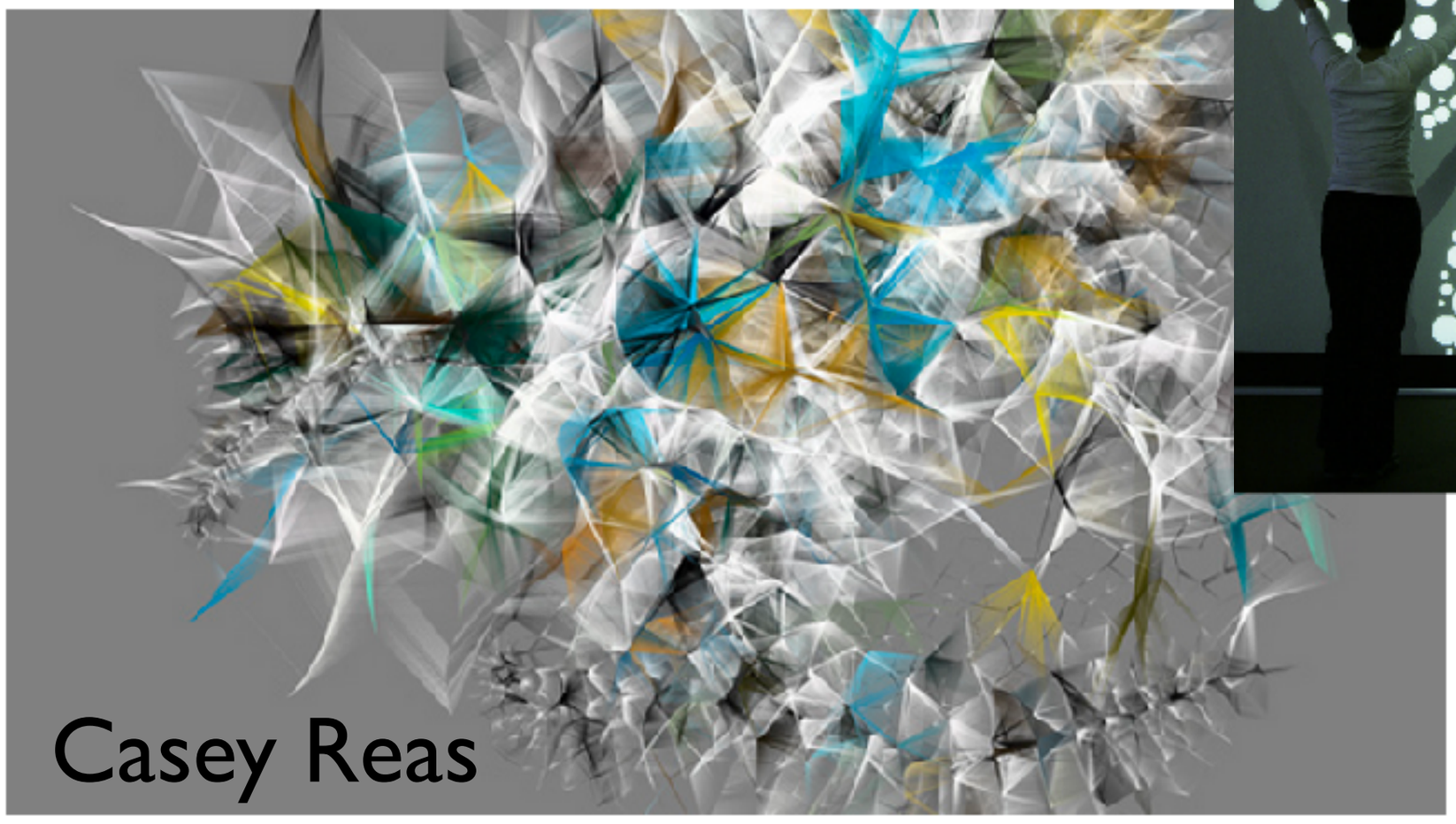


Stomakhin et al. 2013



Golan Levin



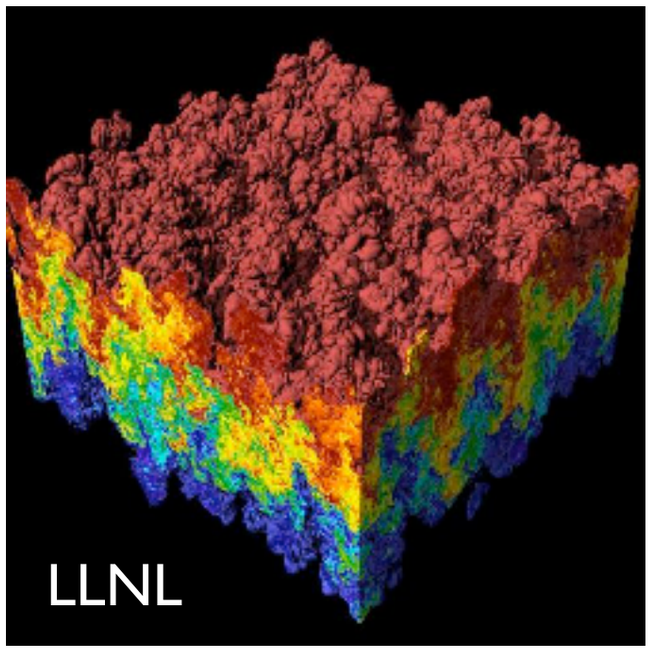


Casey Reas

Other areas...

- Interactivity (HCI)
- Image processing
- Visualization
- Computational photography

L-1 Identity Solns



Lytro

Microsoft Kinect

Math Review

<whiteboard>