# CS130
# Computer Graphics

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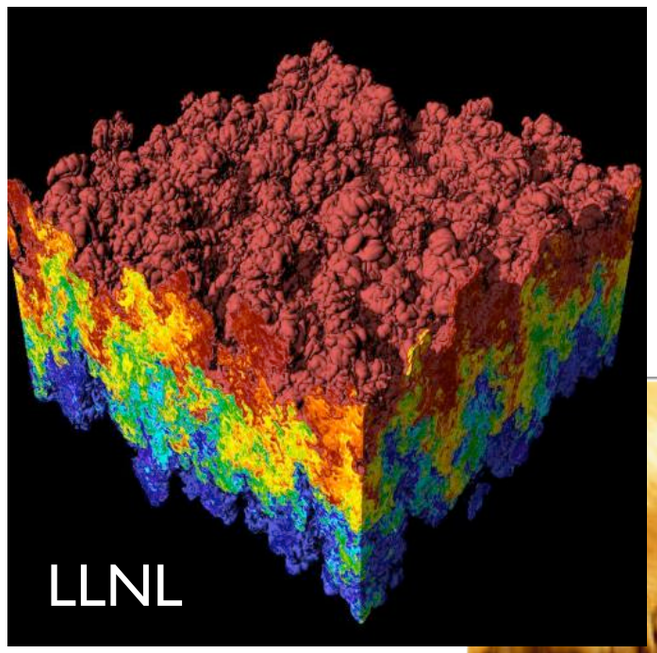
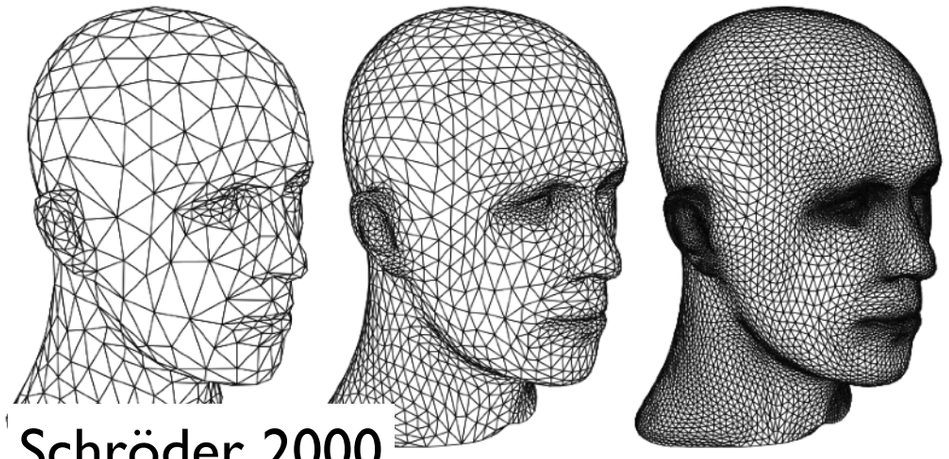
Computer Science & Engineering
UC Riverside

# Welcome to CS130!

Talton et al., 2011



LLNL

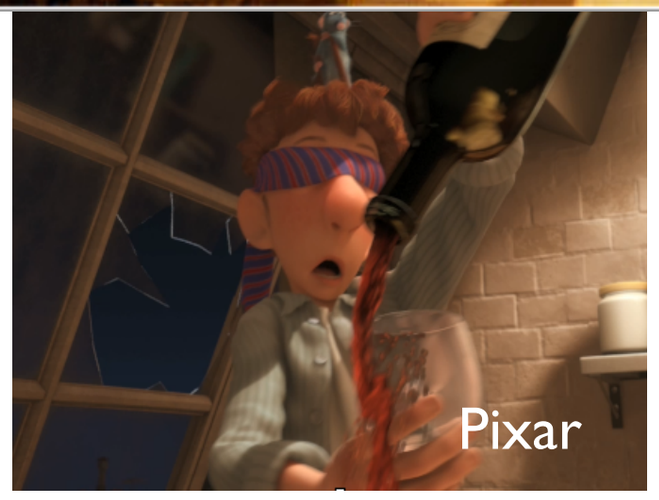


Schröder, 2000

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

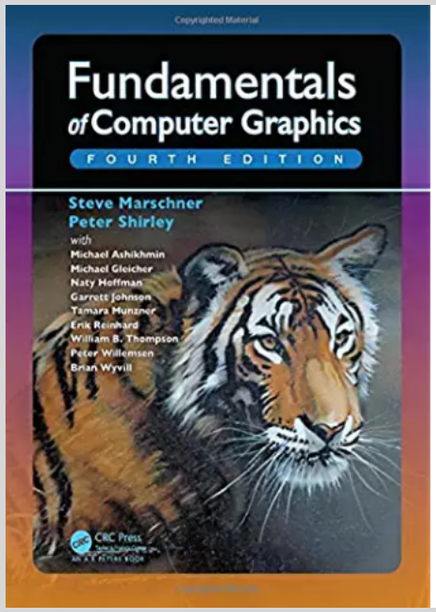
# Course Logistics

- Professor: Tamar Shinar
- TAs: Jason Goulding
- Website: http://www.cs.ucr.edu/~shinar/courses/cs130
- Lectures: MWF 1:00pm-1:50pm
- Lab: M 6, Th 11am, 2pm
- Announcements made in class and through ilearn
- Questions and discussions: Piazza

# Course Logistics

- Grading
  - 20% labs (8-10)
  - 15% project checkpoints
  - 30% projects (2 projects, 15% each)
  - 35% tests (1 midterm 15%, 1 final 20%)
- Detailed schedule on class website

# Textbook

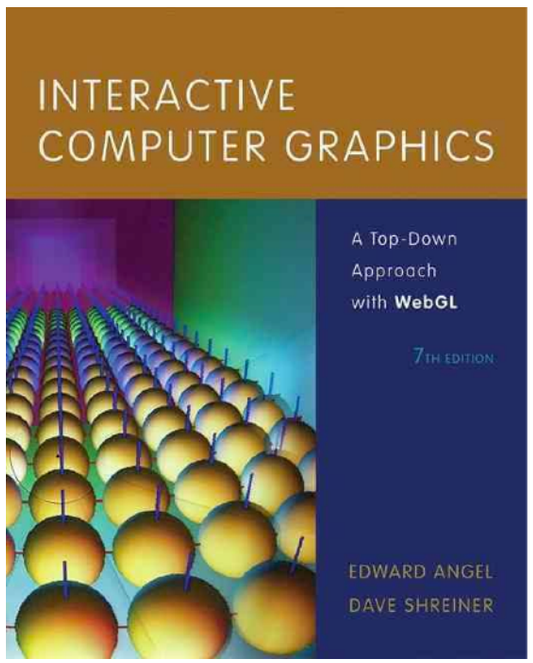


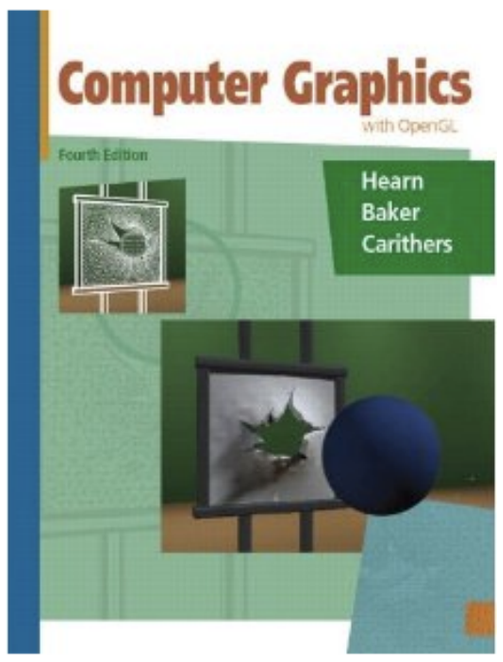

Fundamentals of Computer Graphics

Shirley and Marschner

(3rd or 4th edition)

## Additional books



# Introduction

# Graphics applications

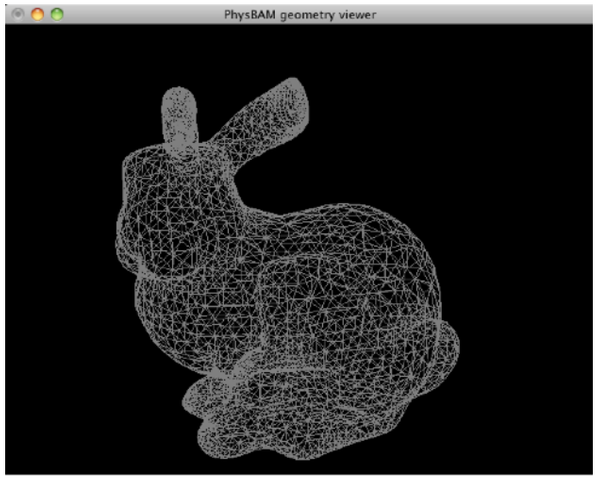
- 2D drawing
- Drafting, CAD
- Geometric modeling
- Special effects
- Animation
- Virtual Reality
- Games
- Educational tools
- Surgical simulation
- Scientific and information visualization
- Fine art

# 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



Wang and Solomon, 2019

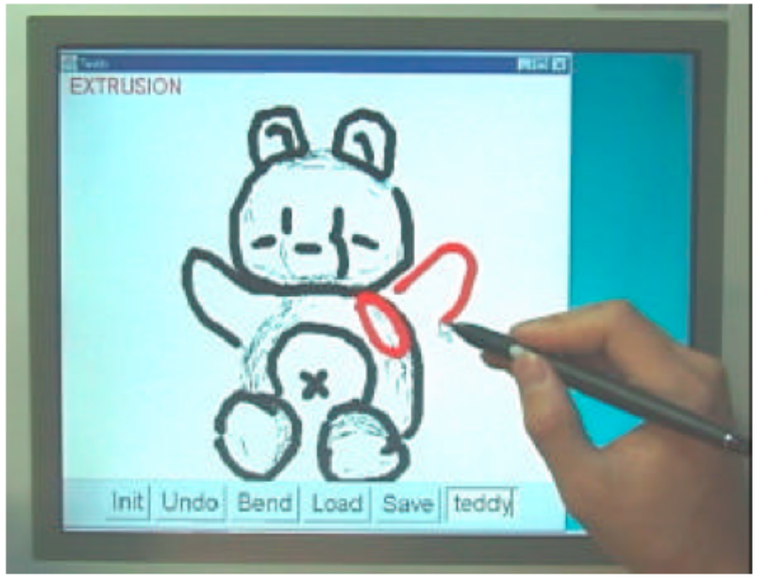
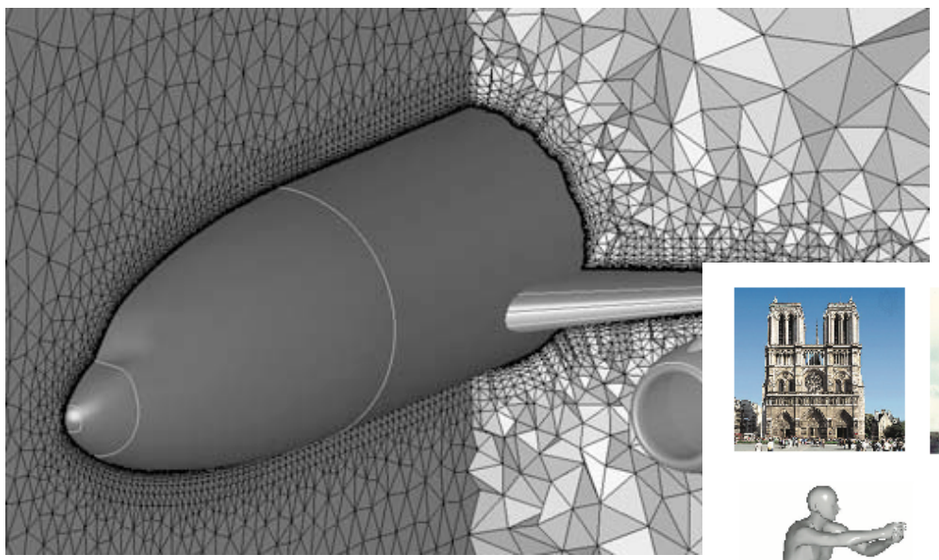


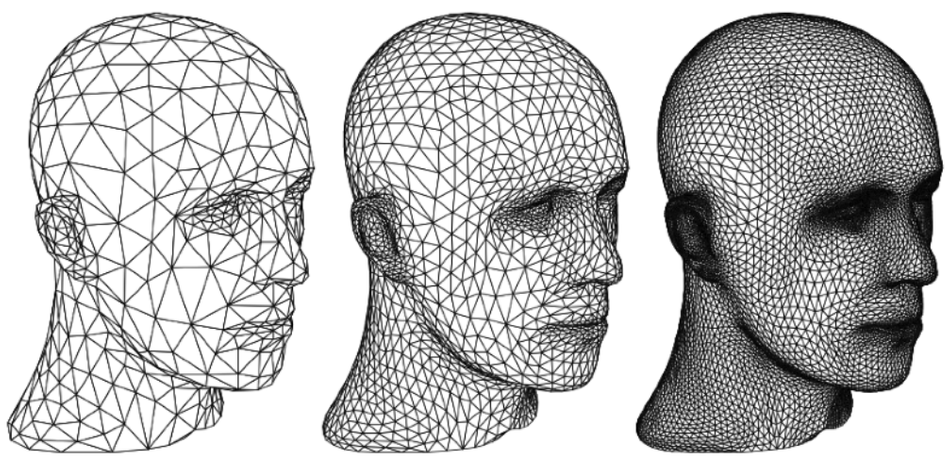

Figure1: Teddy in use on a display-integrated tablet.

Igarashi et al., 2007



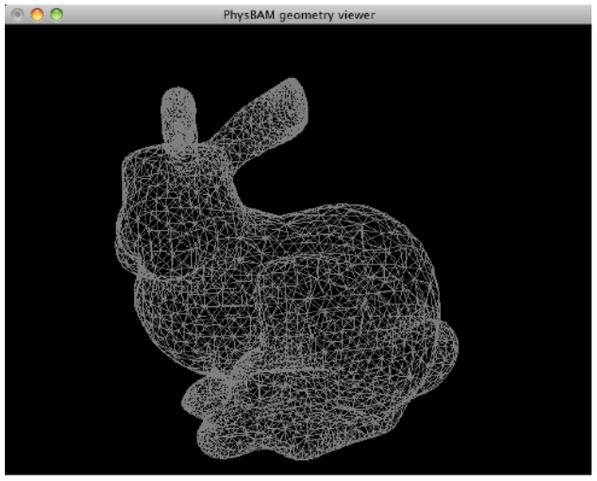
CFD Technologies

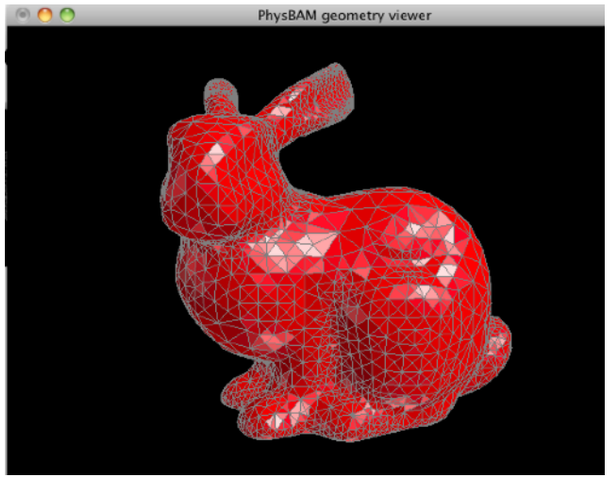
Bronstein et al., 2011



Schröder, 2000

# Rendering



Henrik Wann Jensen

Hong et al. 2007

d'Eon and Irving, 2011

# Animation

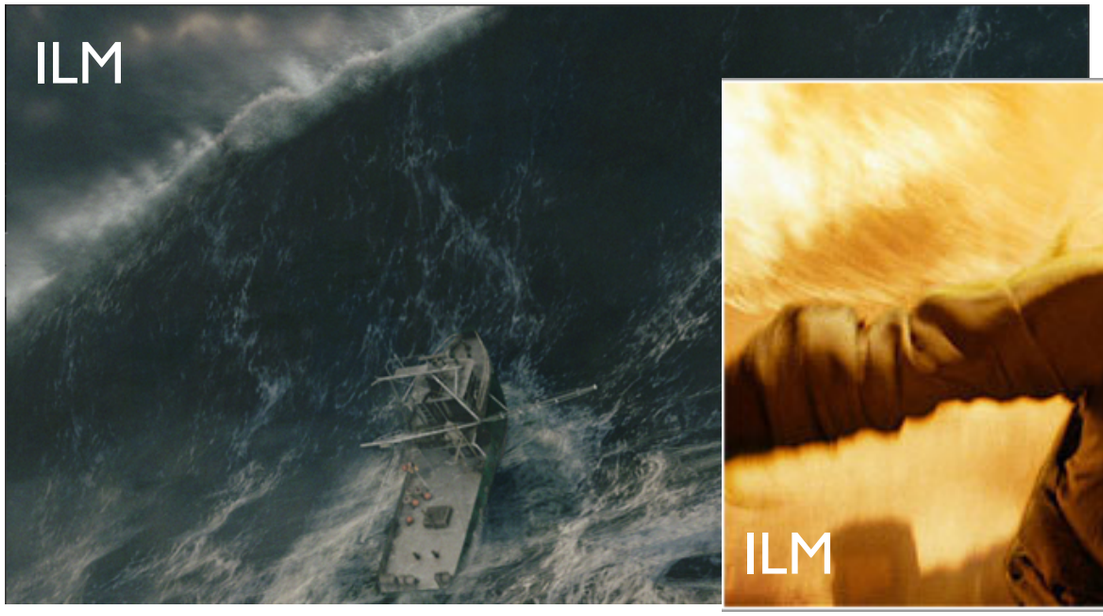
Sleeping Beauty, Disney, 1959

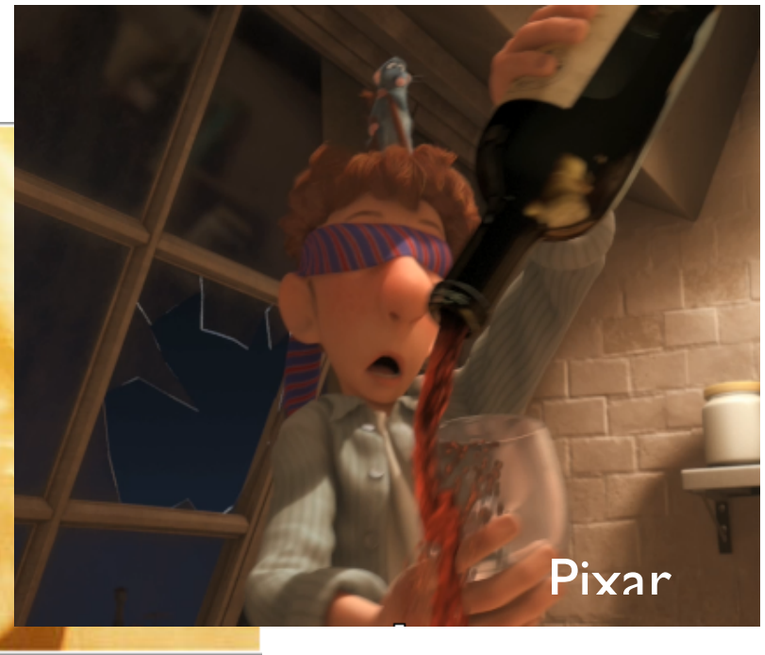
Adventures of Tintin, Weta 2011

Monsters Inc, Pixar, 2001

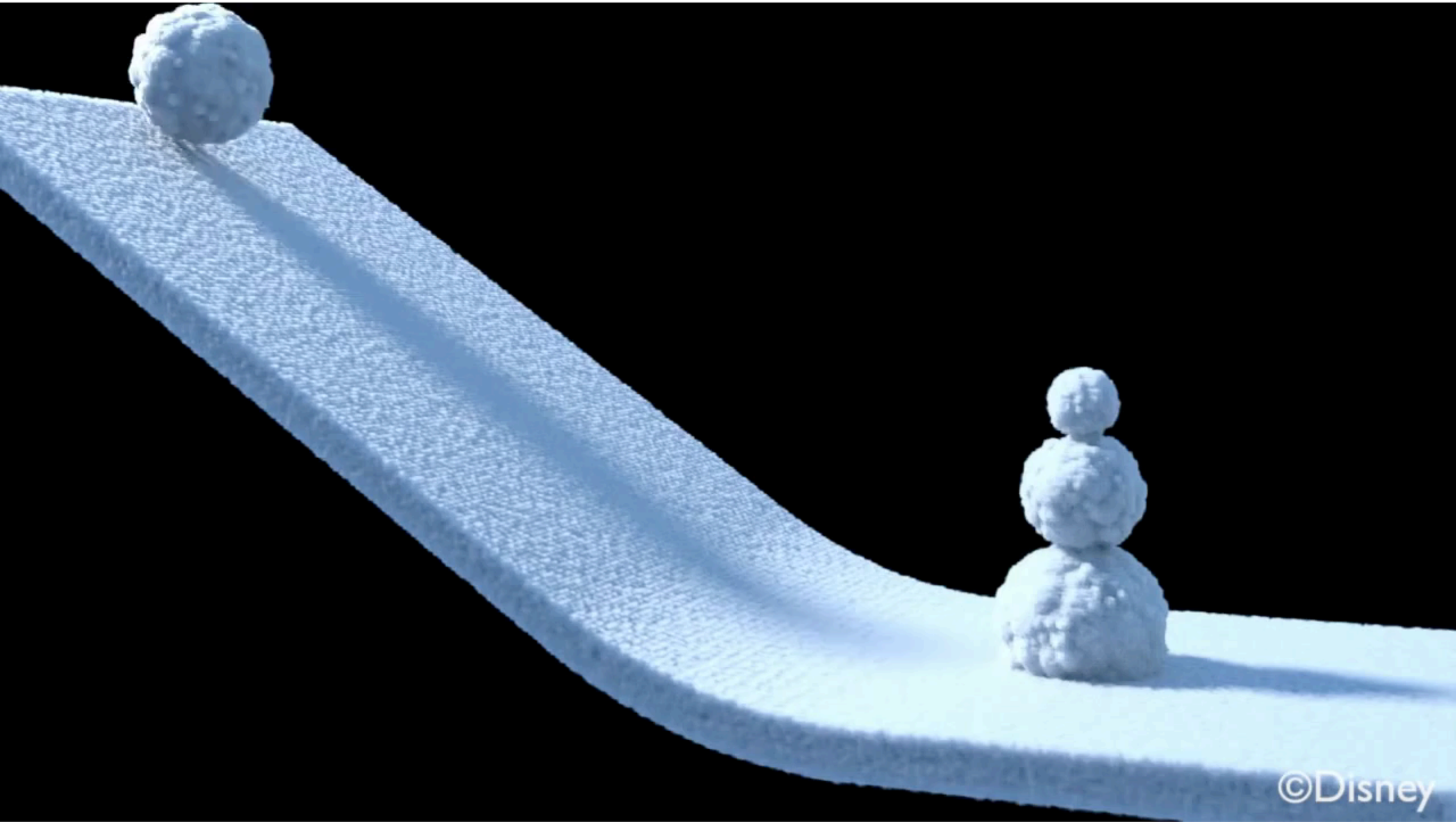
Life of Pi, 2012

# Simulation





**fluid simulation** in Pixar's *Ratatouille 2007*

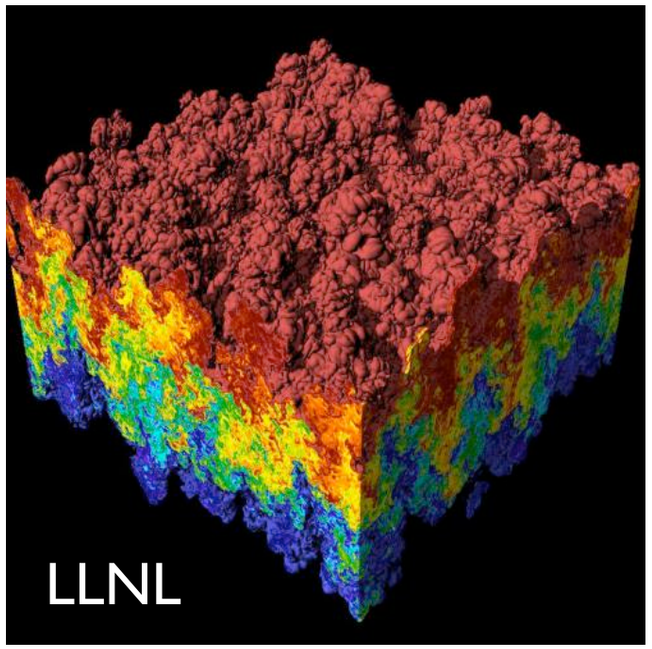



Stomakhin et al. 2013

# Other areas...

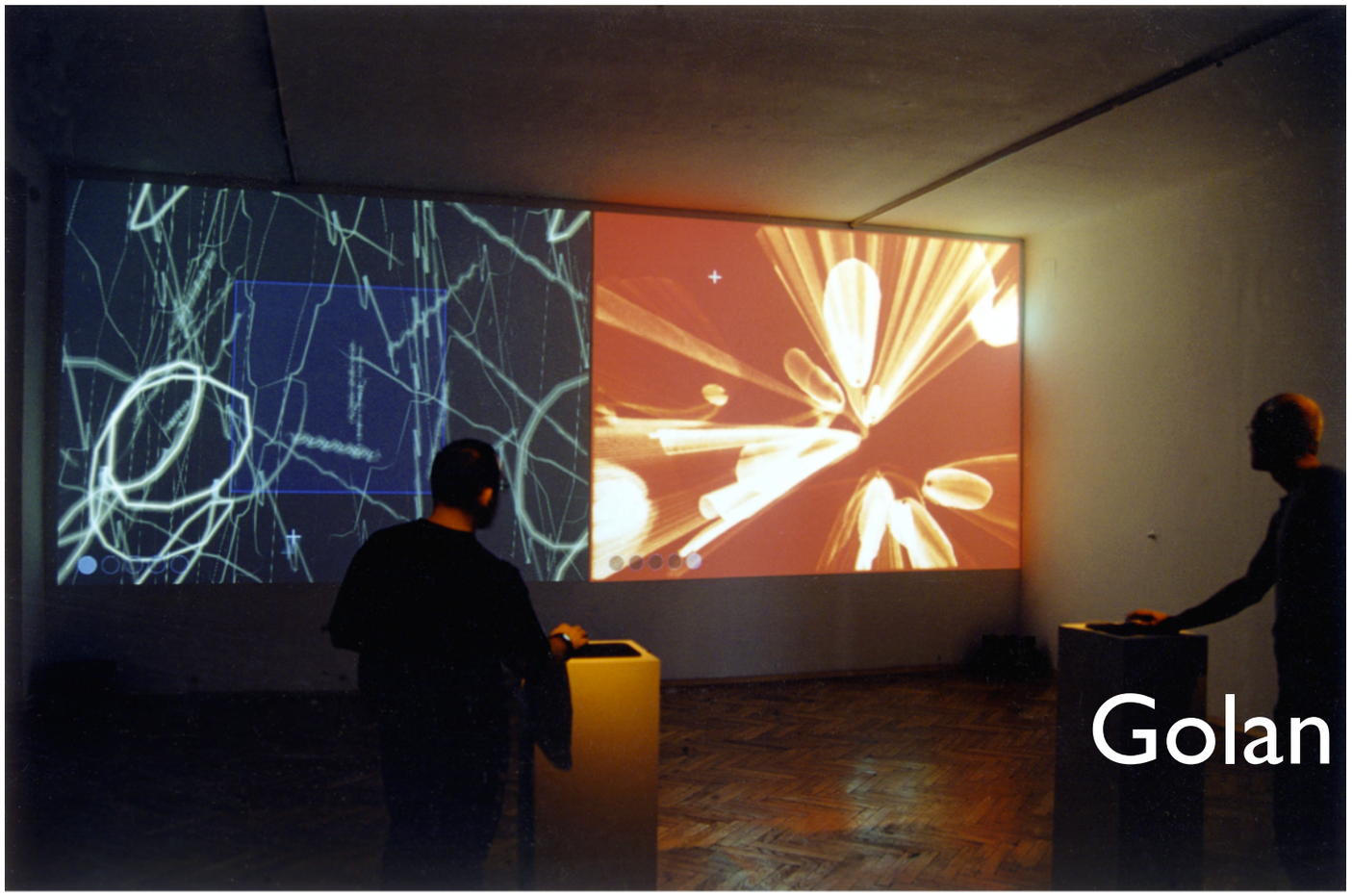
- Interactivity (HCI)
- Image processing
- Visualization
- Computational photography

L-1 Identity Solns

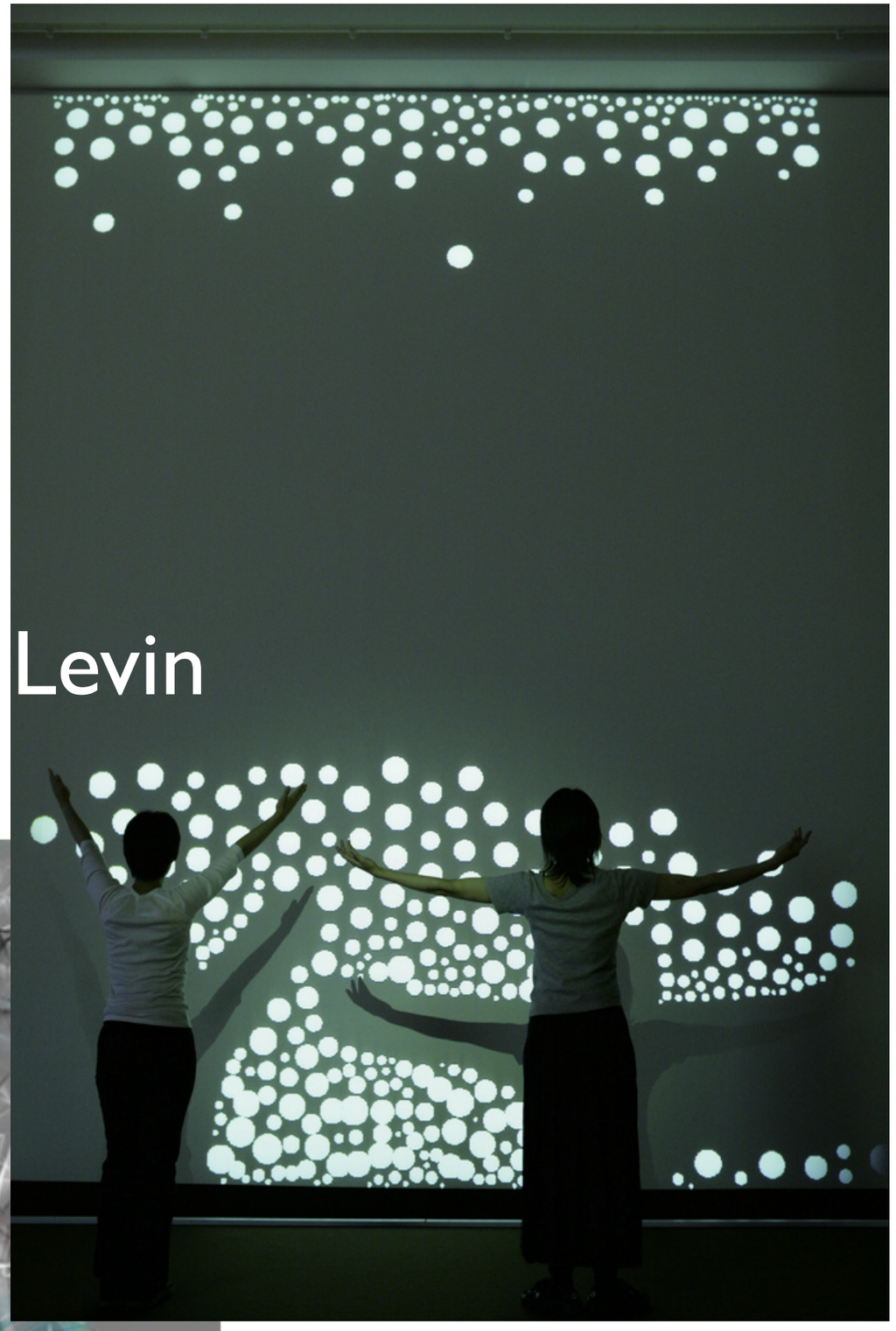


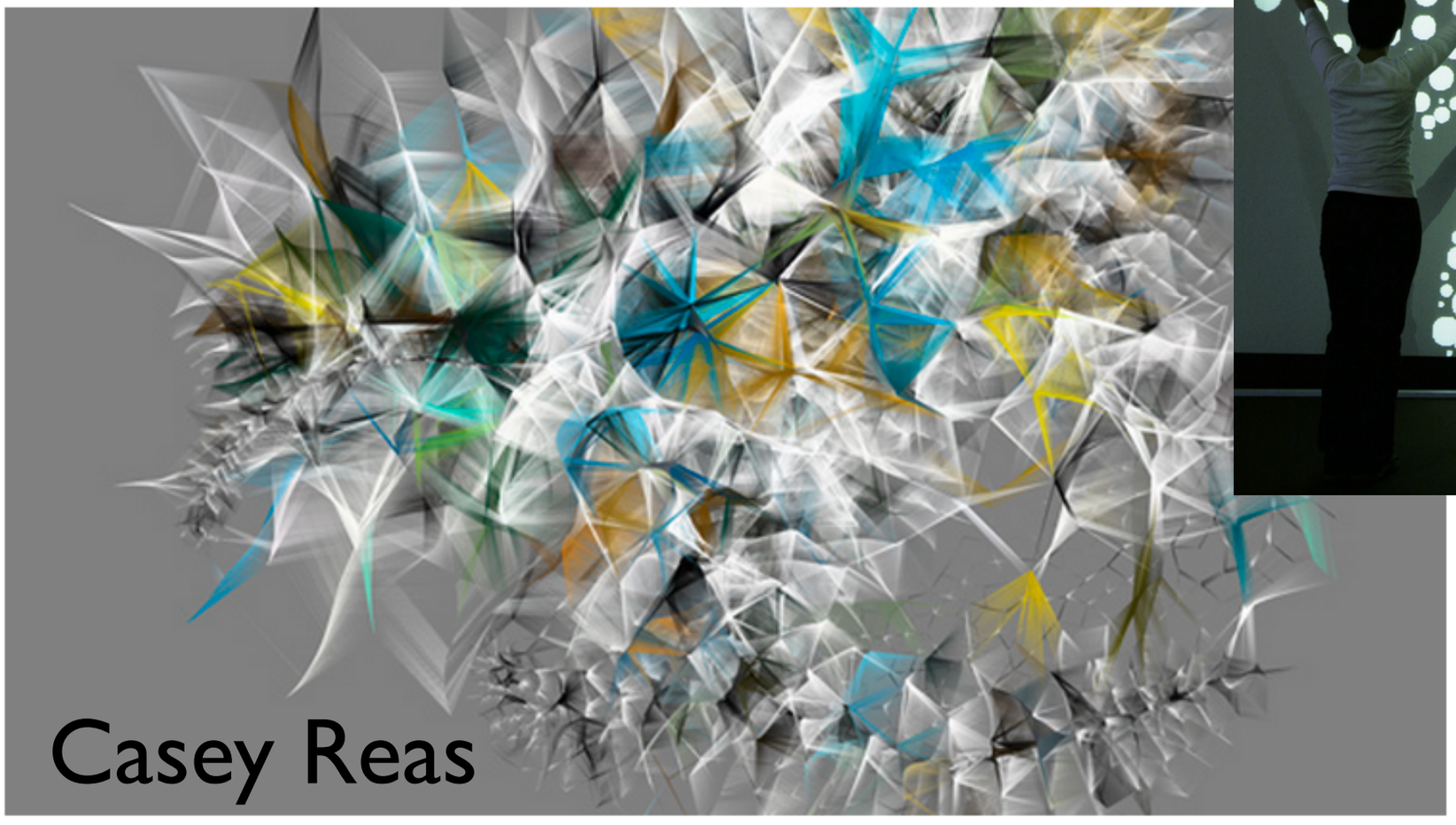
Lytro

Microsoft Kinect



Golan Levin





Casey Reas

# Math Review

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