

CS130

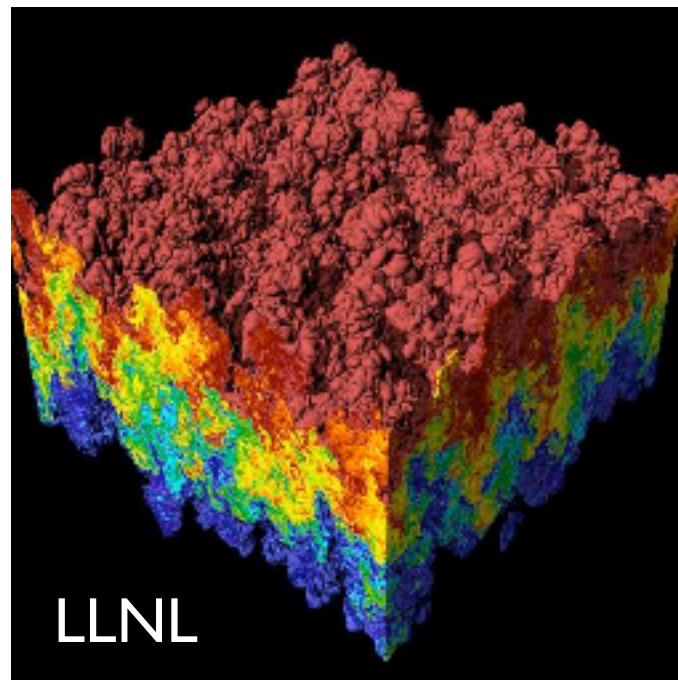
Computer Graphics

Tamar Shinar
Computer Science & Engineering
UC Riverside

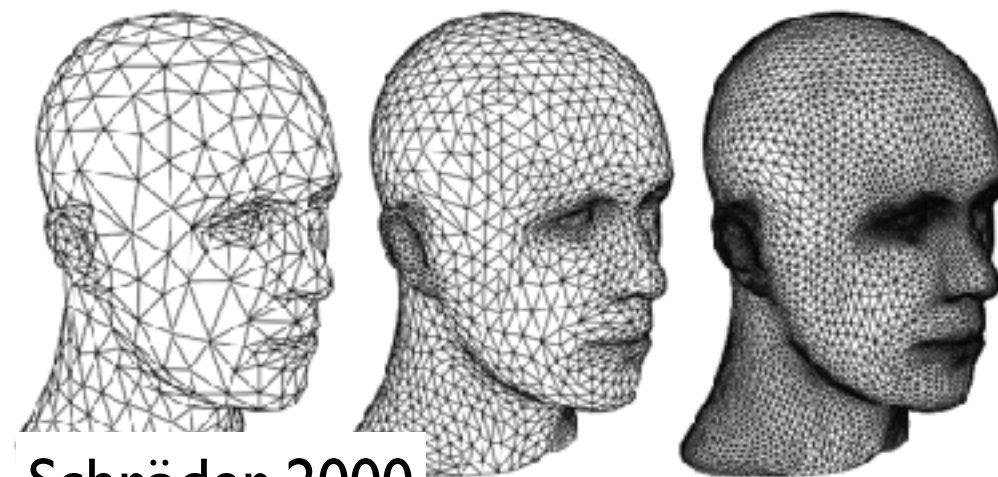
Welcome to CSI 30!



Talton et al., 2011



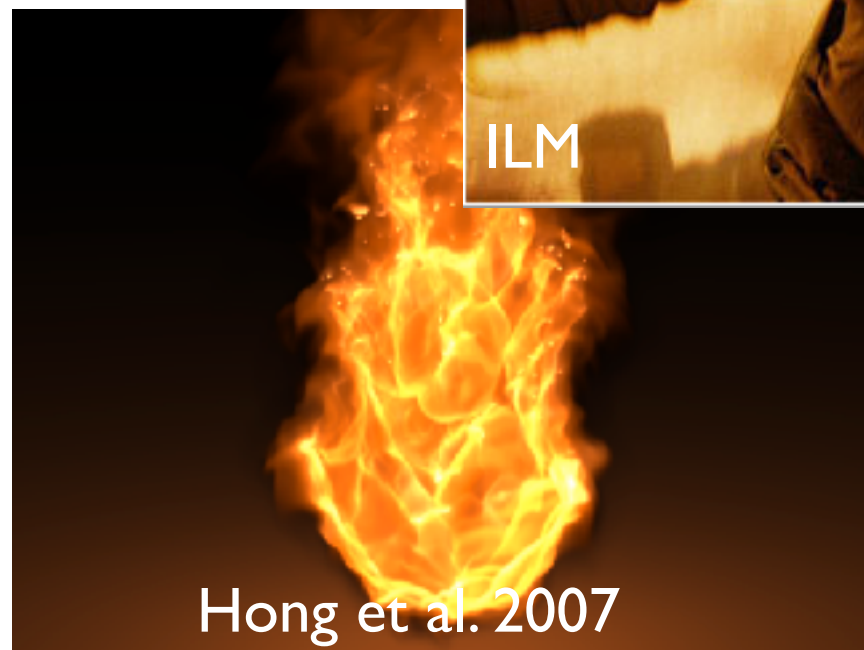
LLNL



Schröder, 2000



Henrik Wann Jensen



Hong et al. 2007



ILM



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

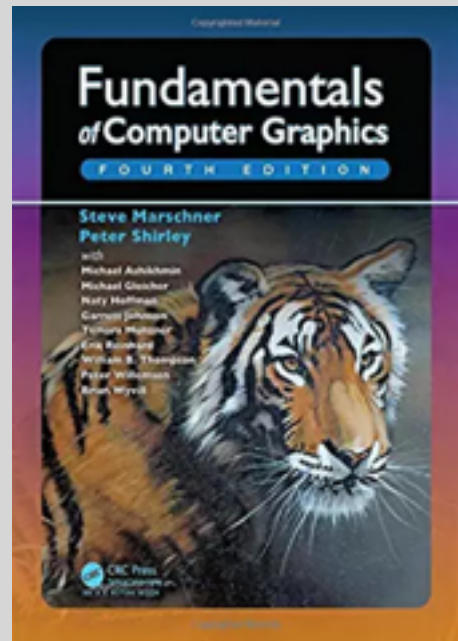
Course Logistics

- Professor: Tamar Shinar
- TAs: Jason Goulding, Kristian Tram
- 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

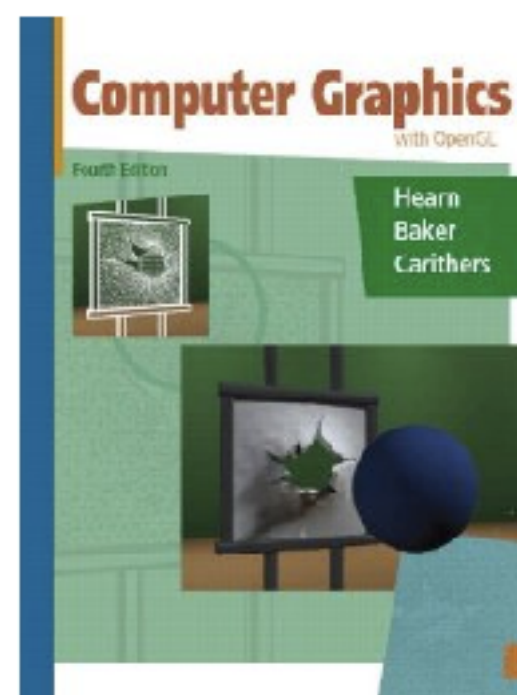
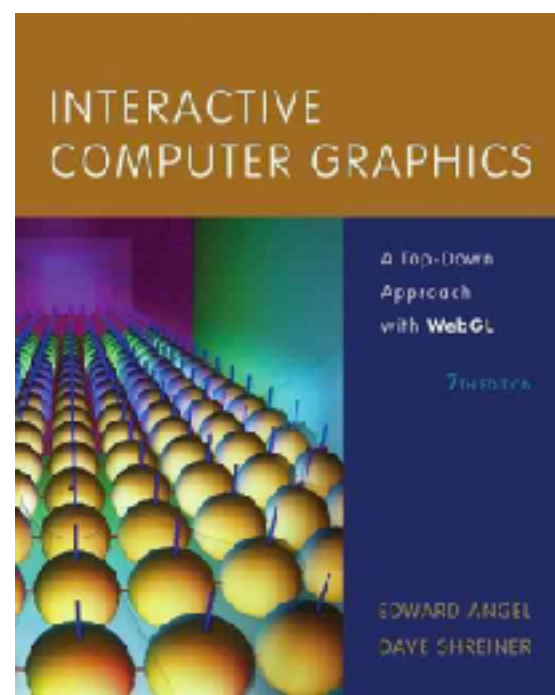
- Grading
 - 20% labs (8-10)
 - 15% project checkpoints
 - 30% projects (2 projects, 15% each)
 - 35% tests (1 midterm 15%, 1 final 20%)
- Detailed schedule on class website

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

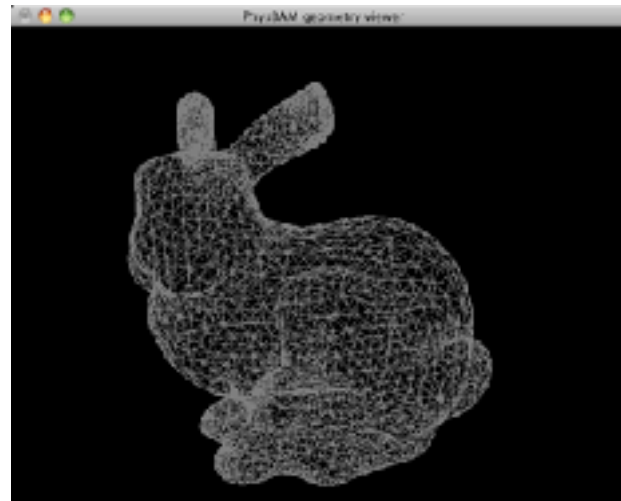
Graphics areas

- **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



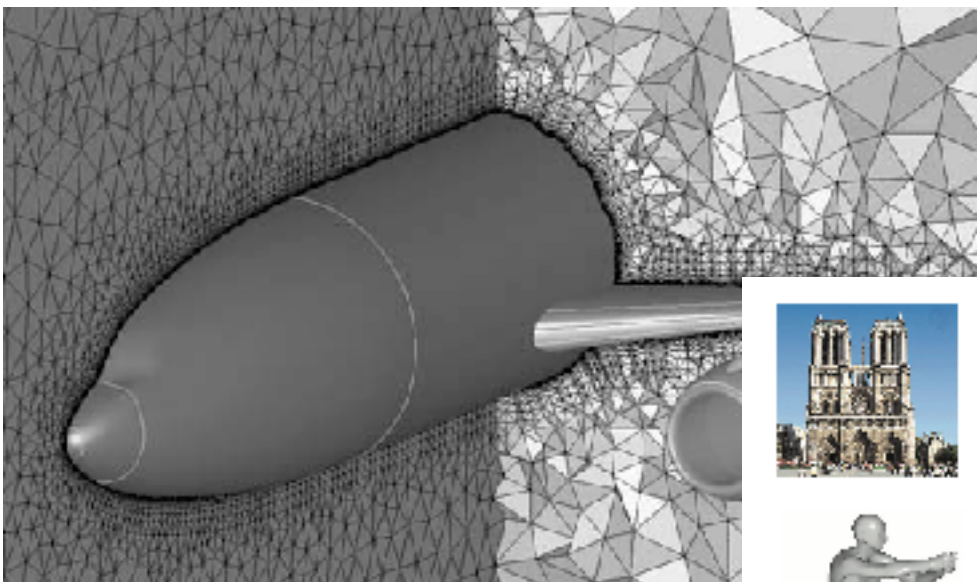
Wang and Solomon, 2019



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



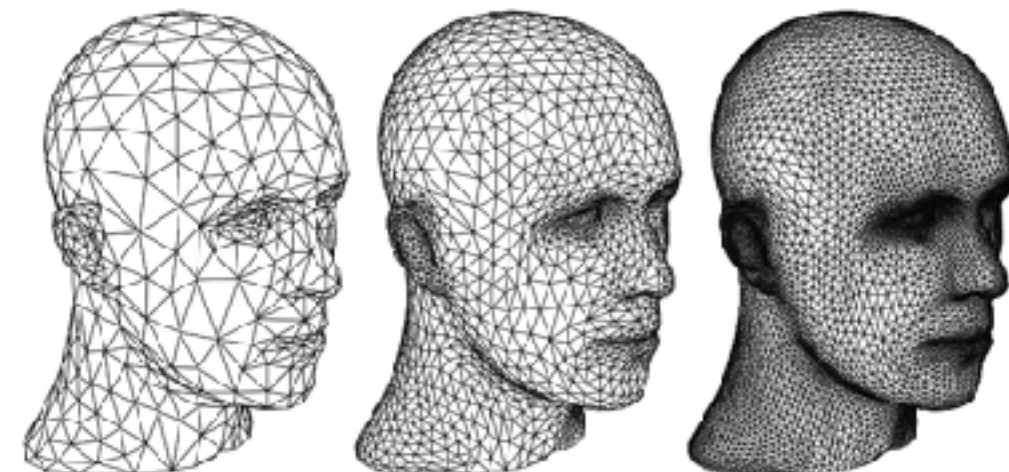
Igarashi et al., 2007



CFD Technologies

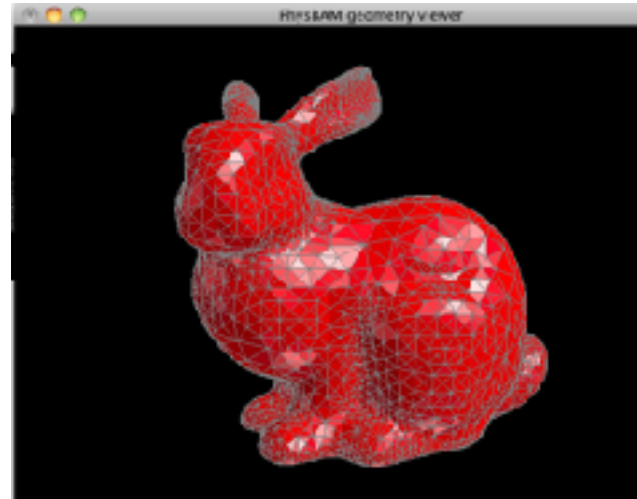
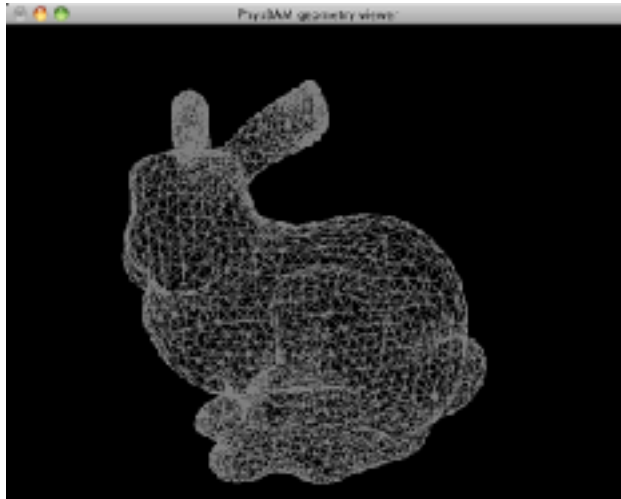


Bronstein et al., 2011



Schröder, 2000

Rendering



Henrik Wann Jensen



Animation



Sleeping Beauty, Disney, 1959



Adventures of Tintin, Weta 2011



Monsters Inc, Pixar, 2001



Life of Pi, 2012

Simulation





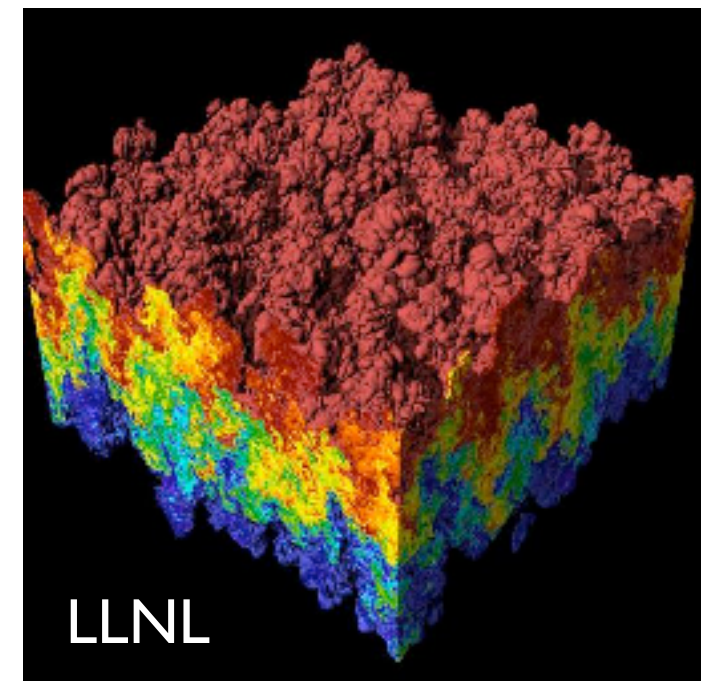
fluid simulation in Pixar's *Ratatouille* 2007

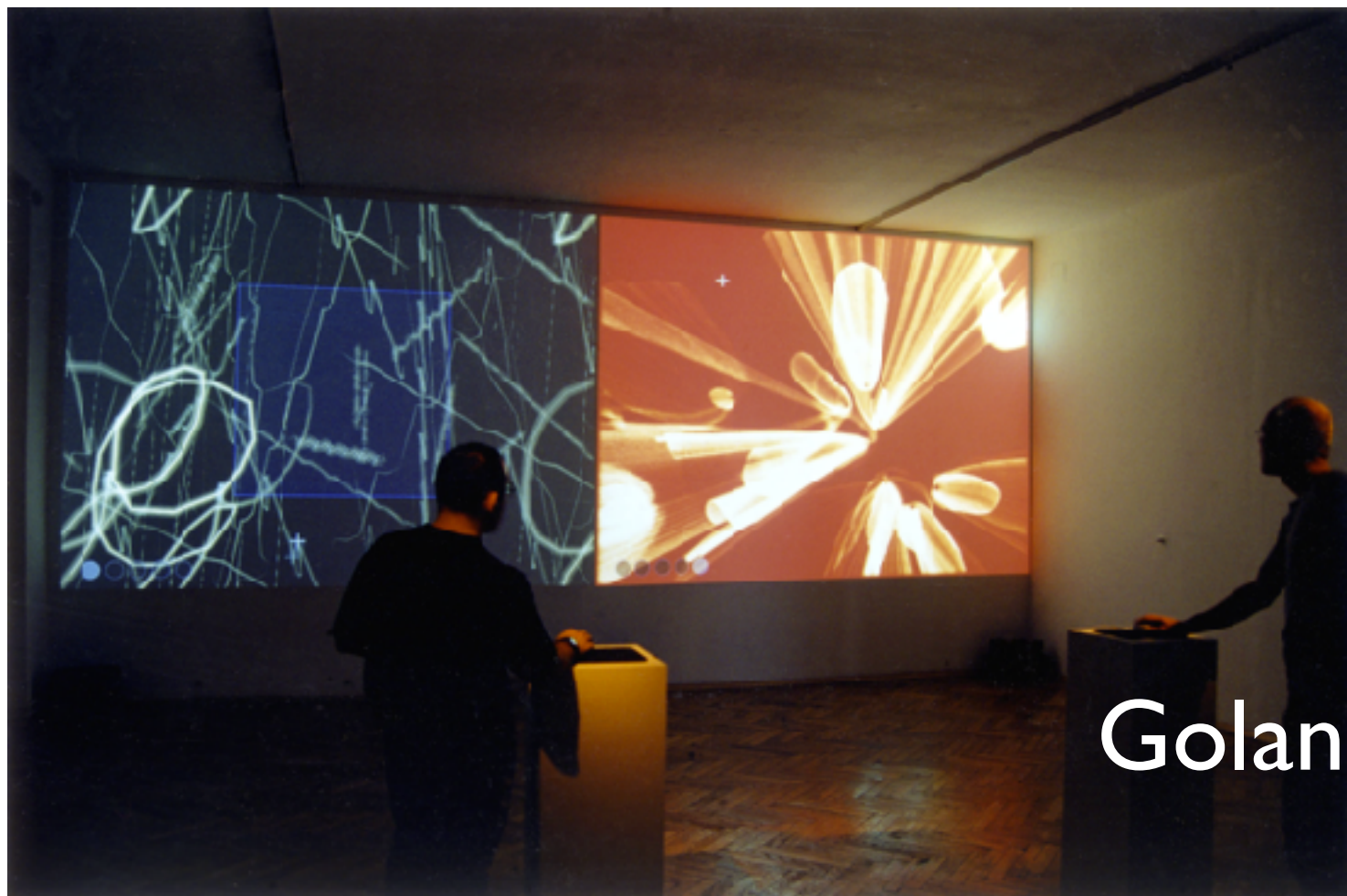


Stomakhin et al. 2013

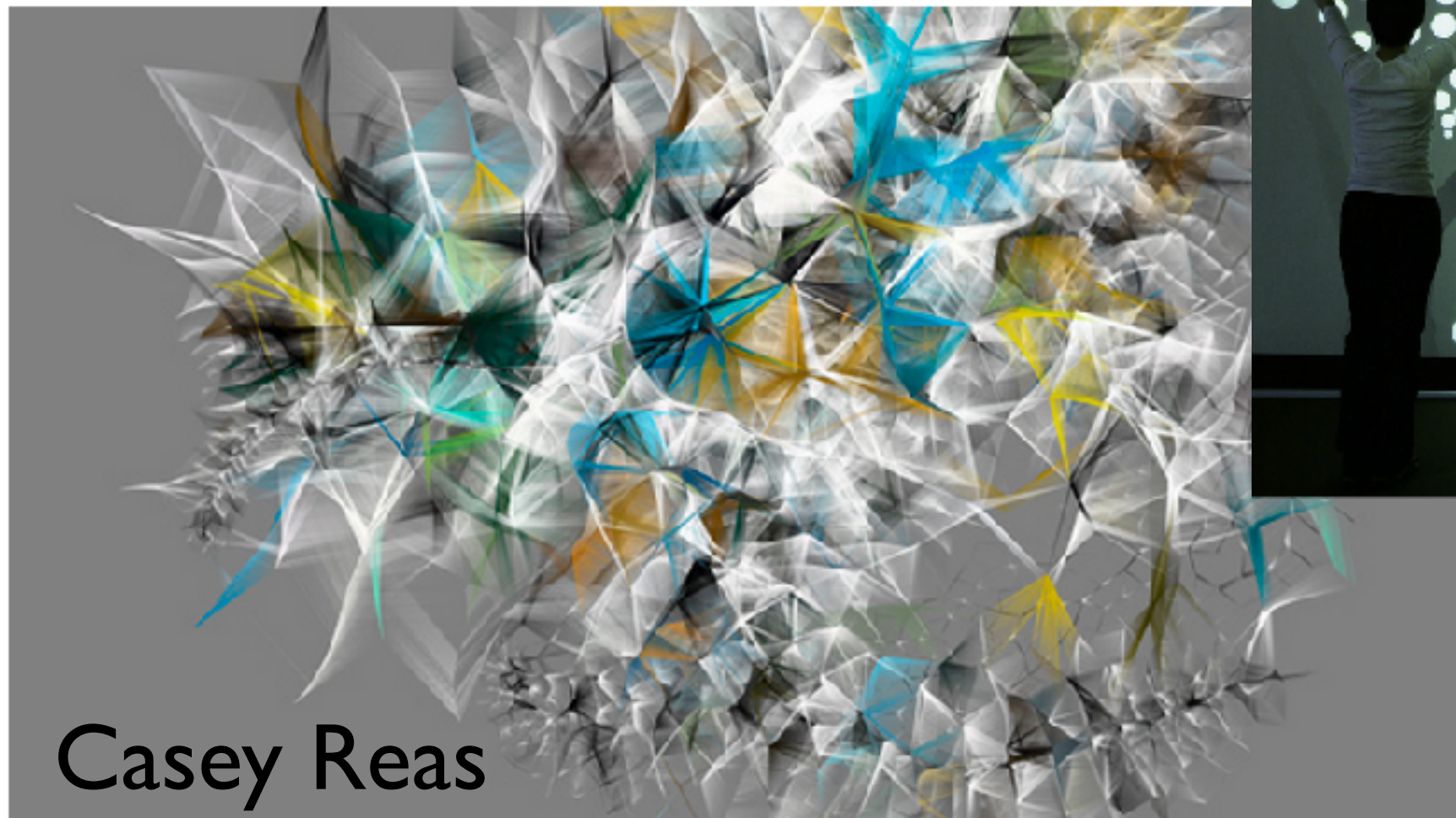
Other areas...

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





Golan Levin



Casey Reas

Math Review

<whiteboard>