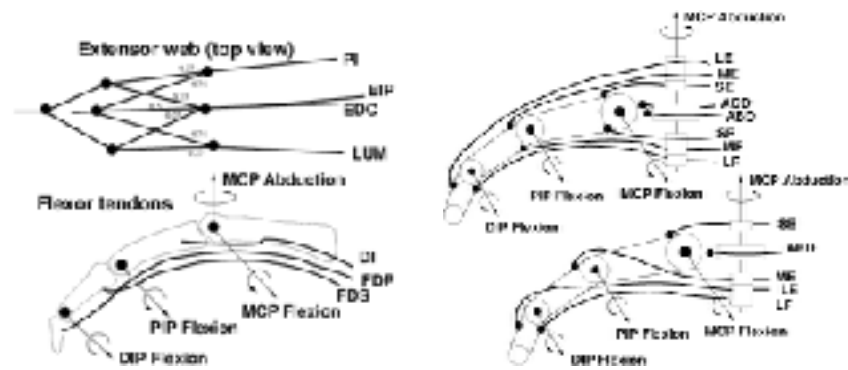
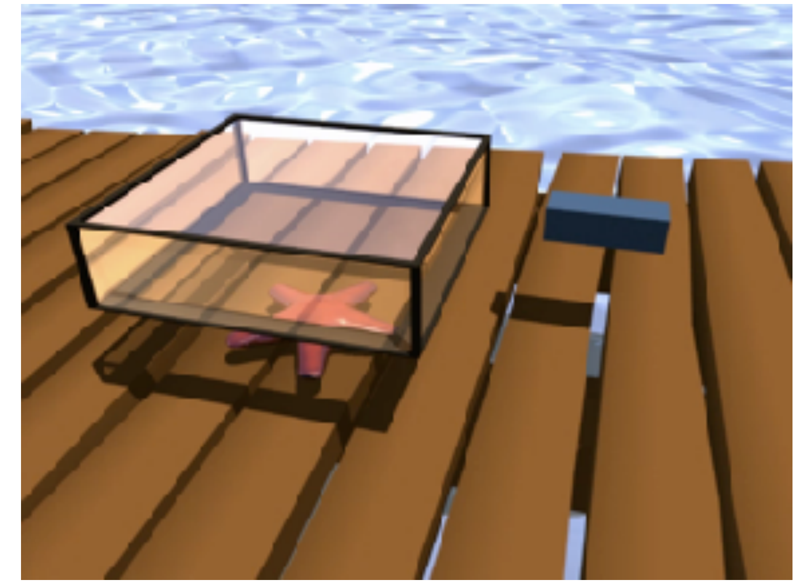
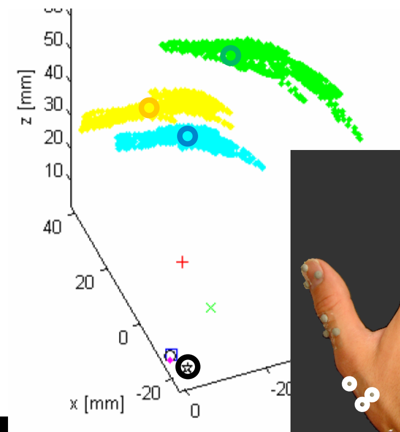
Course Intro:
Welcome to Technical Animation!

15-464/15-664 Technical Animation, Spring 2017

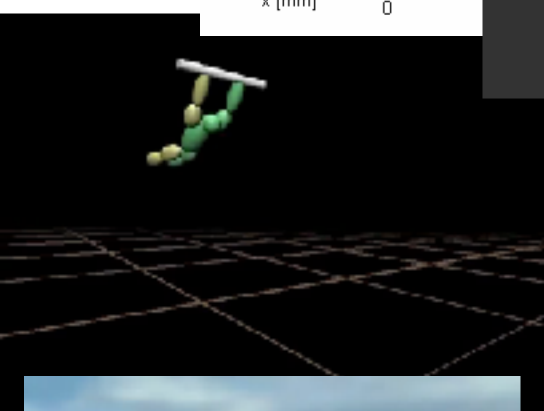
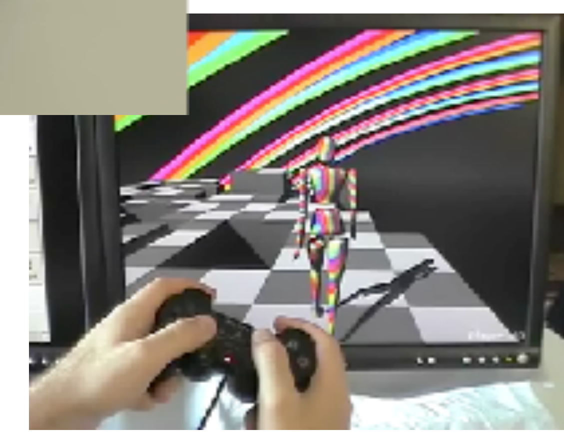
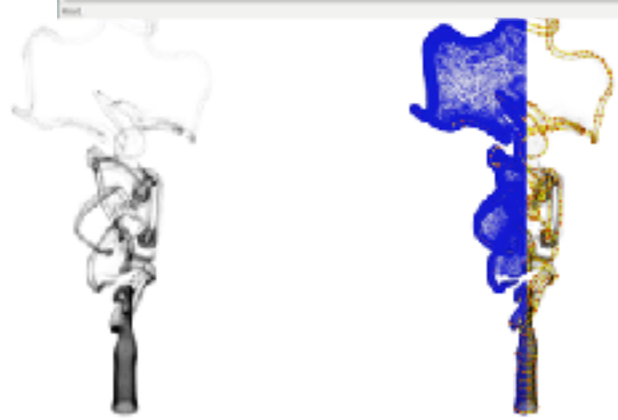
Introductions

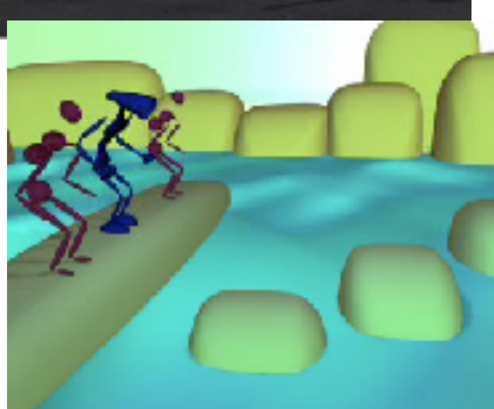
Some things I work on

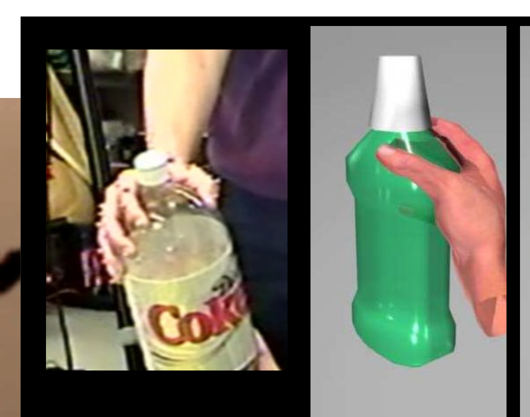
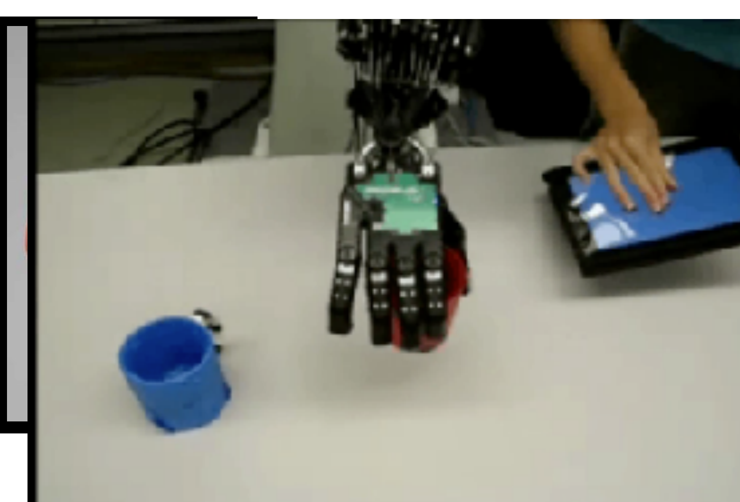





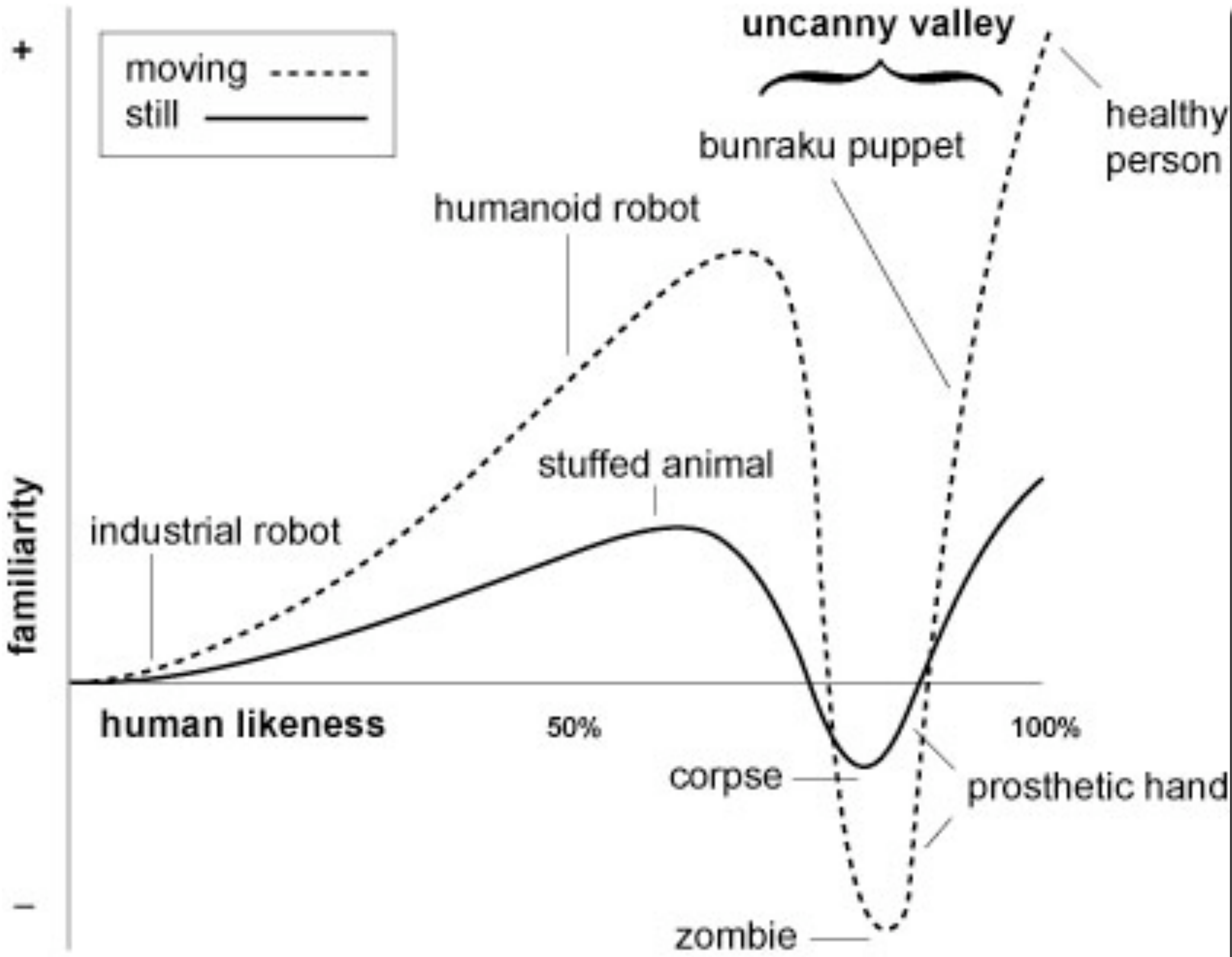



Topics

Grand Challenges in Technical Animation

Things to think about!

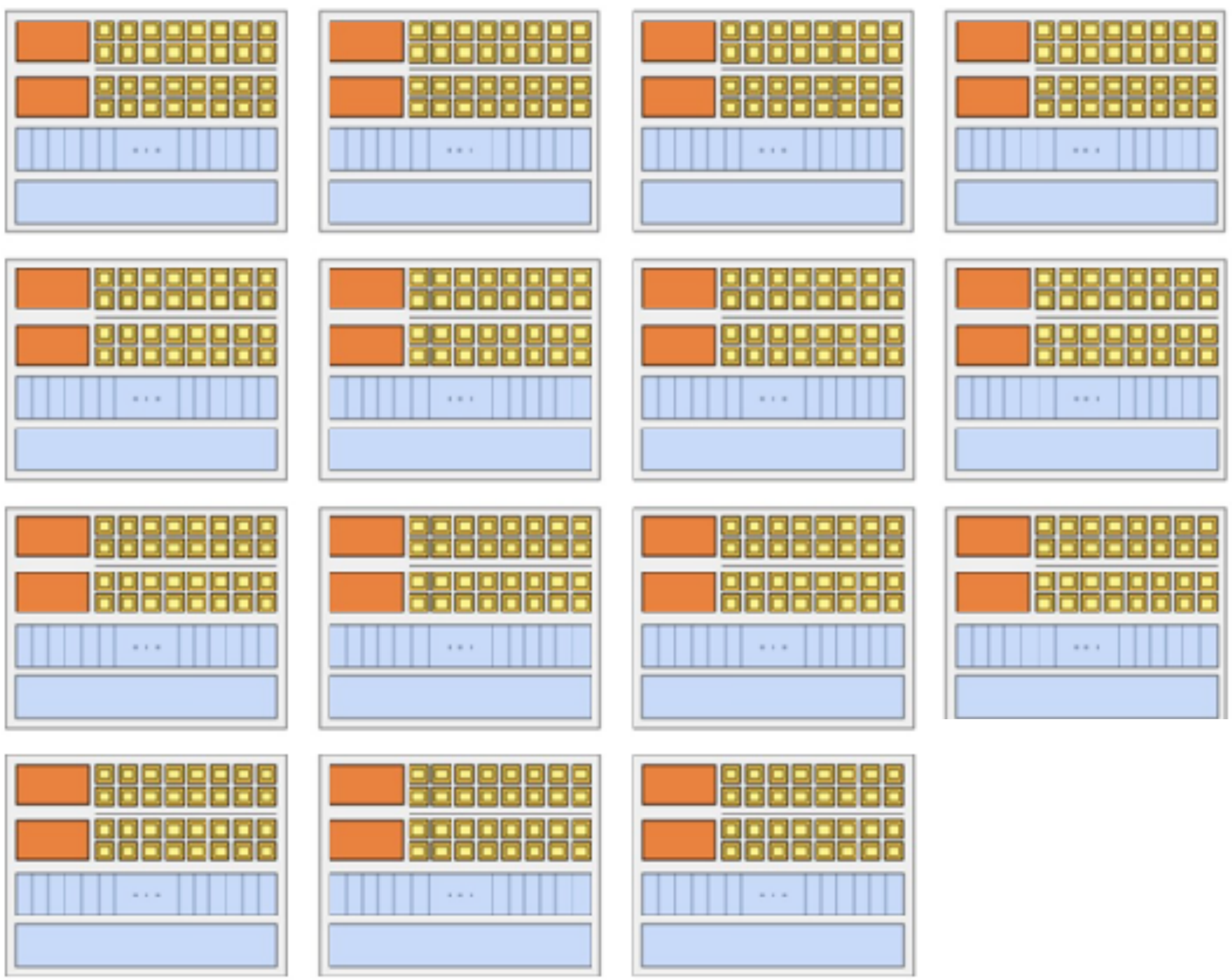
Uncanny Valley



Masahiro Mori, 1970

Parallelism: A Modern GPU may process tens of thousands of pieces of data concurrently

NVIDIA GTX 480



32 ALUs
48 interleaved contexts
15 cores

To keep this graphics card completely busy, we need to be processing **23,000** pieces of data concurrently

potentially 720 separate instruction streams

slide excerpted from Kayvon Fatahalian CMU course 15-418

Course Organization

15-464 / 15-664 Administrative Information for Spring 2017

Time: Monday and Wednesday from noon-1:20pm
Place: GHC 4211

Online Resources

The class web page is at
http://graphics.cs.cmu.edu/nsp/course/15464-s17/www/

This is the primary online source for information about the course, including assignments, lecture notes, and administrative details.

Prerequisite

- 15-462: Computer Graphics or equivalent

Recommended Text

- **Computer Animation: Algorithms and Techniques**. Rick Parent, Morgan Kaufmann, Third edition 2012

Grading Information

Grading for the class will be as follows:

- Programming Assignments:
  - Mini Project 1 - Traditional Anim (15%)
  - Mini Project 2 - Simulation (15%)
- Final Project 40%
- In-class paper presentation 10%
- Web page / blog 10%
- Class Participation 10%

Assignment 0

- Email me 5 paper choices (nsp@cs.cmu.edu)
- Due Tuesday, Jan 24th
- Guidelines:
    - published in 2016 (with some exceptions!)
    - relevant to Technical Animation
- You will present one of these papers in class
- First come, first served, so get me your choices early!
- Detailed guidelines will be posted on piazza later today

Monday, Jan 23

- We are going to dive in head first!
- Meet here for short class: prep for Eftychios Sifakis seminar
- Adjourn to attend the seminar at 1pm, NSH 1507

VASC The Vision and Autonomous Systems Center

1507 Newell Simon Hall, Time: 1:00 - 2:00pm

Monday, January 23, 2017

Seminar Ser

Eftychios D. Sifakis
Assistant Professor
University of Wisconsin - Madison

Digital humans, virtual surgery and fast fluids; do they have more in common than their hunger for performance?

Abstract: Physics-based modeling research in graphics has been consistently conscious of advances in modern parallel hardware, leveraging new performance capabilities to improve the scope and scale of simulation techniques. An exciting consequence of such developments is that a number of performance-hungry emerging applications, including computer-aided healthcare and medical training, can now hope to be accommodated in interactive systems. Nevertheless, while large-scale simulation for production-grade visual effects always had the option of clustering compute resources to keep up with growing needs, realtime or near-interactive applications face a more complex set of challenges. In fact, extracting competitive levels of efficiency out of modern parallel platforms is more often than not the result of cross-cutting interventions across the spectrum of theory, modeling, numerics and software engineering.

In this talk I will present a number of examples, mostly drawn from biomechanical modeling, virtual surgery and anatomical simulation tasks, where fresh perspectives on discretization, geometrical modeling, data-parallel programming or even the formulation of the governing PDEs for a physical system were instrumental in boosting parallel efficiency. Finally, I will discuss important lessons learned from simulations of human anatomy, and how those pertain to the design of solvers for computational physics at large, and particularly how they can boost the scale and efficiency of highly detailed fluid dynamics simulations.