CSE682 - Computer Animation

Rick Parent
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Tentative office hours:
T 1:30-2:30; F 1:30-3:30
Animation

**Animating** – Making something appear to move that doesn’t move itself

**Procedural Animation** is Emphasized

**Motion Control** Techniques and Algorithms

**Producing animation:**
Aesthetics
Animation Production
Digital Post-Processing
Class

14 UG (all rank 4); 2 Grad

Majors
CPTR/INF, CS&E, ECE., Ind Eng, Civil Eng
BioPhysics
Math, Art
Some Alumni

Beth Hofer, M.S. – PDI
Kirk Bowers, B.S. – Disney
Mark Fontana, B.S. – Pixar
Kevin Rogers, M.S. – PDI
Saty Ragavachara, M.S. – Imageworks
Brad Winemiller, B.S. – Pixar
Steve Anderson, M.S. – Electronic Arts
Doug Roble, Ph.D. – Digital Domain
Dave Haumann, Ph.D. – Pixar
Ferdi Scheepers, Ph.D. – Pixar
Rob Rosenblum, M.S. – PDI
Nathan Loofbourrow, M.S. – PDI
Steve May, Ph.D. – Pixar
Brent Watkins, M.S. – Pixar
The Class

**In-Class**
- Lectures
- Videos
- Project reports

**Grading**
- Homeworks – MEL exercises
- Midterm – lightweight
- Final – lightweight
- Project documentation
- Project

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Computer Animation
Lectures

Background
Perception
Conventional Animation, History,
Video Production
Background Math

Low-Level Control
Interolation
Speed control along a path
path following

High-Level Algorithms
Forward/inverse kinematics
Physical simulation
Flocking
Particle Systems

Natural Phenomena
Plants
Water
Clouds
Fire

The Human Form
Reaching
Walking
Hair

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Computer Animation
Videos

Previous Animations from Class

Conventional Animation (e.g. Disney)

Historic Computer Animation

Recent Computer Animations
Student Animation Project

Vignette

Short action sequence

Part of a story

Use a procedural model

Composition

Camera control

Lighting

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Computer Animation
Project Groups

Groups: 3–4, mix backgrounds

Design and present storyboard

Give progress reports

Present final project
Student Presentations

Rough Storyboard

Storyboard (revised)

Detailed Storyboard and sample stills

Sample stills and low-quality rendering of sequences

Finished sequence (finals week)
Storyboard

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Computer Animation
Class Software

Maya

scripting (MEL)

C++ API
Hardware Facilities

CL112D
10 Maya licenses
Hope to have 5–6 Premier licenses
Motion Specification and Control

Techniques: Aids to user
- Interpolation
- Path following
- Keyframing
- Languages
- Morphing

Algorithms: Procedures
- Inverse kinematics
- Physics of rigid bodies
- Flexible bodies
- Particle systems
- Flocking
- Autonomous Behavior

Figure animation
- Reaching, Walking
- Facial animation
- Clothes
- Hair
- Skin

Natural phenomena
- Plants
- Water
- Clouds
- Fire

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Computer Animation
Technical Groups

Technical group – learn one major facet of software

Each technical group
At least one person from each project group

Technical groups

- **Modeling**: polygons, NURBS, subdivision surfaces
- **Animation**: Forward kinematics, IK, particle systems
- **Rendering**: playblast, rendering qualities, recording frames, video editing, post-processing
Immediate Tasks

Form into groups

Start thinking of animation project

Consider software tasks
By End of Week

Form groups
4–5 CSE students

At the end of Wednesday’s class, anyone not in a group will be put into one

Have an idea of technical group assignment