CPSC 314
Computer Graphics
Dinesh K. Pai
Lecture 1: Introduction

Course website:
People

- Instructor: Dinesh K. Pai, pai@cs.ubc.ca
  Office X853. Office hours TBD.
- For fastest response to general course-related questions, use the discussion board.
  - You can also meet with TAs during scheduled lab times.
  - The instructor is also available by appointment for questions not suitable for the discussion board.
About me…

- Professor and Canada Research Chair

- Neurosci.
- Robotics
- Graphics
- Sensorimotor Computation

Applications…
Sensorimotor Computation in Graphics

- (2000s-present)

Applications...

Neurosci.  Robotics  Graphics

Sensorimotor Computation

- Siggraph 1999
- Siggraph 2001
- Siggraph 2002
- Siggraph 2004
- Siggraph 2005
- Siggraph 2006
Course Communication

- Lectures: MWF 1-2pm Dempster 301
- Labs: In ICICS 005. Labs start next week. Attendance is not mandatory but highly recommended.
- Course website: Assignments and materials will be posted here http://www.ugrad.cs.ubc.ca/~cs314/Vjan2014
- Discussions: We will use Piazza. Please join the course discussion group: https://piazza.com/ubc.ca/spring2014/cpsc314.
Required Textbook

- Available online from UBC library, free to UBC students.
Prerequisites

- All of MATH 200, MATH 221 and either (a) CPSC 221 or (b) all of CPSC 260, EECE 320.
- The following are essential for success:
  - good grasp of linear algebra
  - exposure to calculus; “mathematical maturity”
  - programming experience in C++
- This is not an easy course!
### Grading

<table>
<thead>
<tr>
<th>marks %</th>
<th>work</th>
</tr>
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<tbody>
<tr>
<td>40</td>
<td>programming assignments (4)</td>
</tr>
<tr>
<td>26</td>
<td>final exam</td>
</tr>
<tr>
<td>24</td>
<td>midterms (2)</td>
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<tr>
<td>10</td>
<td>concept consolidation w clickers</td>
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First assignment will be available next week
C³
(Concept Consolidation with Clickers)

- Clickers are required. Please obtain one, register with Connect, and bring to next class.
- Each gets one participation mark + 0-3 marks for right answer
- Four types of questions:
  - Survey (1) : A simple poll, no "correct" answer.
  - Review (2) : material covered in class or reading.
  - Exercise (3) : In-class exercises, taking 5-10mins.
  - Homework (4) : A homework problem, with most of the work done outside class.
CPSC 314
Computer Graphics

Dinesh K. Pai

What is Computer Graphics?

Many slides courtesy of Min Hyuk Kim, KAIST
What is Computer Graphics?

- **Imaging** = representing 2D images
- **Modeling** = representing 3D objects
- **Rendering** = constructing 2D images from 3D models
- **Animation** = simulating changes over time
Examples of Computer Graphics

See slides 3-6 of
http://vclab.kaist.ac.kr/cs492b/day01-hello.pdf
Thin Skin Elastodynamics

Duo Li, Shinjiro Sueda*, Debanga R. Neog, and Dinesh K. Pai

University of British Columbia

*Now at Disney Research Boston / MIT
Human Head Movements
Normal map is used to represent wrinkles and veins

Note: mesh vertices do not move
BD-Tree
Output-Sensitive Collision Detection for Reduced Deformable Models
Doug L. James
Dinesh K. Pai
SIGGRAPH 2004
Output-Sensitive Collision Processing for Reduced-Coordinate Deformable Models
In this course you will learn how to

- Represent 3D shapes
- Transform 3D shapes
- Synthesize 2D images from 3D shapes
- Model shading and lighting
- Model details of appearance using textures
- Program all of the above using the OpenGL API and OpenGL Shading Language
For next class

- Bring your clicker
- Review Chapter 1 of textbook
- Review Math 200 and Math 221. We’ll start off by reviewing some essential mathematics for 3D graphics