| | U-LAS70 10002 SE50 | | | | | | |
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| | ILAS Seminar-E2 :Let's simulate human movement<br><br>ILAS Seminar-E2 :Let's simulate human movement | | | | PATAKY   Todd | | |
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| | 3D modeling / computer animation / biomechanics | | | | | | |

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Computer animations of human movement help (a) clinicians understand movement disorders, (b) doctors make corrective surgery decisions, and (c) engineers design artificial limbs. This course will introduce you to human movement simulation from the perspectives of animation and motion capture. A variety of movements will be considered, ranging from simple single-segment motion to complex, natural 3D motion. We will use the free-and-open-source software "Blender" to create animations of human movement. As a final project, students will generate a short animated movie, using animated movement to tell a story. Programming experience is useful but not required.

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Students will learn about human modeling, animation and simulation. Students will also learn the fundamentals of motion capture, and how motion capture data can be used to drive the motion of 3D human models. In two classes students will work hands-on with expensive, Hollywood-grade motion capture equipment to support animation work. You will gain experience using open-source software, working in 3D software environments, and in planning and managing a relatively complex software project.

After some initial general assignments, focus will shift to Final Projects, which students will work on for most of the semester. The goal of Final Project is to create a short animation of human movement. The animation theme and specific  techniques are free, to be be chosen by each student based on your interests. The instructor will help students to choose a Final Project that is challenging, but also achievable. The instructor will also help you solve Final Project modeling and animation problems as you encounter them.

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The following weekly topics will be covered:

1)  Modeling I: Introduction
2)  Animation I: Basics
3)  Modeling II: Armatures & Character Meshes
4)  Animation II: Poses & Pose Libraries
5)  Modeling III: Full Character Models
6)  Presentations I:  Final Project Proposal
7)  Animation III: Actions & Nonlinear Animation
8)  Motion Capture I:  Pilot Experiment
9)  Motion Capture II:  Using Motion Capture Data

10) Motion Capture III:  Main Experiment
11) Presentations II:  Final Project Progress
12) Animation IV:  Fine Tuning
13) Animation V:  Advanced Animation Topics
14) Presentations III:  Final Projects
15) Feedback

Total: 14 seminars + 1 feedback week

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There are no specific requirements for this class. However, students must be willing to work with open-source software, which is relatively poorly documented compared to commercial software. The class instructor will help with problems, but students are also encouraged to find solutions to their problems through internet searches.

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Students are expected to actively participate in class, to reproduce all examples discussed in class, and also to complete regular assignments.

Evaluation will be based on the following criteria:

- Assignments (70%) [10 @ 7% each]
- Final Project (30%)

TOTAL: 100%

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No specific textbook will be used.  All necessary materials will be distributed electronically and will be discussed in class.

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A number of useful books and internet resources will be discussed for student self-learning.


 http://www.blender.org(Blender is a free-and-open-source 3D modeling and animation software suite that will be used extensively in all lectures and all assignments.)

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This course has a variety of out-of-class assignments (and no exam). Students who do not pay attention to the lecture content during class will likely have difficulties completing the assignments.

Additionally, there will be a Final Project that students are expected to complete outside of class, with in-class support.

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REASONS FOR CLASS SIZE RESTRICTION:
This class extensively uses Blender (blender.org), which is a very powerful, and very complex software

package. Every class requires one-on-one student support to understand and handle software problems that arise. A larger class size is not feasible.

IN-CLASS ENVIRONMENT
This is a small seminar class, and active discussion is encouraged. Students are also encouraged to ask questions, both of the instructor and of fellow students. We are all here to learn, so let's work together to create the best results we can!


OFFICE HOURS:
   Immediately before / after class or by appointment  (pataky.todd.2m @ kyoto-u.ac.jp)

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