

<b>Course number</b>	U-LAS70 10002 SE50				
<b>Course title (and course title in English)</b>	ILAS Seminar-E2 :Let's simulate human movement ( コンピューターで人を動かしてみよう ) ILAS Seminar-E2 :Let's simulate human movement		<b>Instructor's name, job title, and department of affiliation</b>	Graduate School of Medicine Associate Professor,PATAKY , Todd	
<b>Group</b>	Seminars in Liberal Arts and Sciences		<b>Number of credits</b>	2	<b>Number of weekly time blocks</b> 1
<b>Class style</b>	seminar (Face-to-face course)	<b>Year/semesters</b>	2025 ・ Second semester		<b>Quota (Freshman)</b> 8 (8)
<b>Target year</b>	Mainly 1st year students	<b>Eligible students</b>	For all majors		<b>Days and periods</b> Fri.5
<b>Classroom</b>	Lecture room 3, 1F, School of Human Health Sciences, Faculty of Medicine (Faculty of Medicine/Pharmaceutical Science Campus/ University Hospital Campus)			<b>Language of instruction</b>	English
<b>Keyword</b>	3D modeling / computer animation / biomechanics				

#### [Overview and purpose of the course]

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.

#### [Course objectives]

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 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.

#### [Course schedule and contents)]

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

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- 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

### **[Course requirements]**

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.

### **[Evaluation methods and policy]**

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%

### **[Textbooks]**

Not used

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

### **[References, etc.]**

#### **( References, etc. )**

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

#### **( Related URL )**

<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.)

### **[Study outside of class (preparation and review)]**

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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### **[Other information (office hours, etc.)]**

#### **REASONS FOR CLASS SIZE RESTRICTION:**

This class extensively uses Blender ([blender.org](http://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](mailto:pataky.todd.2m@kyoto-u.ac.jp))

### **[Essential courses]**