

Motion Capture Production and Experimentation – SPRING 2018

Course Number: ARTS COL 7102, 3 credits
Prerequisites: graduate standing or permission of instructor
Meeting Times: Wed, Fri 9:35-10:55 am
Class Location: Sullivant Hall, room 349-a and Motion Lab
Instructor: Vita Berezina-Blackburn

Course Description:

This course provides a survey of motion capture and virtual production concepts and technologies. It focuses on the optical motion capture pipeline for recording, real-time retargeting and post-processing of full body human motion and props. In addition, students are encouraged to develop their own methods and processes for experimenting with capturing and visualizing motion as well as write about their work.

Course Objectives:

Students will be expected to:

- understand the history of motion capture and current contexts of application
- understand the technology and process of optical motion capture
- develop understanding of virtual production paradigm
- develop the skills to direct an effective motion capture session
- acquire working knowledge of software used in capturing and processing data
- acquire working knowledge of motion editing
- be able to apply motion capture data in a way relevant to their field

Course Methodology:

Students will learn through lectures, demonstrations, hands on work sessions in the capture lab, online video materials, assigned readings, through capturing and processing their own data. Examples will be presented in lectures and demonstrations. Students must demonstrate satisfactory achievement of course objectives through fulfillment of course projects and by contributing to class discussions. Course projects will require students to use a variety of software and equipment at ACCAD. Primary focus will be on Vicon optical T40s system, Vicon Shogun Live, Post and Blade, Autodesk Motionbuilder 2018. Data treatment in Autodesk Maya and Unity is supported but not covered in class. Collaboration between students in the course and other faculty, staff and students at ACCAD is highly encouraged. Course evaluation will be based on the following:

Project 1:	20%
Project 2:	20%
Project 3	20%

Project 4:	20%
Final Project	20%

Class Participation is expected. Failure to contribute to class discussions and work collaboratively may result in grade reduction.

Grading Policy:

All students are required to be on time and in attendance for each and every class. If not involved in a lab session, a student is expected to do software based work: tutorials or projects. Students arriving to class more than 15 minutes late may be counted as absent. Two unexcused absences will lower a final grade by 1/2 a letter, three unexcused absences will lower a final grade by one letter and four unexcused absences will result in failure of the course.

Adherence to deadlines is expected. It is the individual student's responsibility to keep track of deadlines and to present the work during class presentation to other students and instructor on the specified dates. The projects are due by the end of a class session on the day of the deadline. 10% of the grade per day will be subtracted from late assignments.

Technical problems may occur during the semester. Students must make their own arrangements for overcoming these difficulties and submitting their work on time. Unless there is a complete system failure at ACCAD, technical difficulties are never an acceptable excuse for not meeting a deadline. Students should plan their time and work so as to anticipate the technical hurdles that is a part of the computer based practice.

A = 95 - 100 A- = 90 - 94
 B+ = 87 - 89 B = 84 - 86 B- = 80 - 85
 C+ = 77 - 79 C = 74 - 76 C- = 70 - 75
 D+ = 67 - 69 D = 64 - 66 E = 0 - 65

Academic Misconduct (rule 3335-31-02) is defined as “any activity which tends to compromise the academic integrity of the institution, or subvert the educational process.” Please refer to rule 3335-31-02 in the student code of conduct for examples of academic misconduct.

Topics by week (subject to change, please follow notes at <http://accad.osu.edu/~vberezin/classes/mocap>)

1. 01/10-12
Discussion of ways to observe and study movement.
History of Motion Capture Technologies.

Assignment: study resources on <http://accad.osu.edu/~vberezin/classes/mocap/notes1.html> and bring inspiring examples of mocap for sharing during class
Read UNDERSTANDING_HUMAN_MOTION_HISTORY.pdf in Y:\Courses\2017-2017\AC7102_Vita_SP_2018\READING MATERIALS

2. 01/17-19
SPECIAL EVENT, ATTENDANCE REQUIRED: [ARTIST TALK BY CHRIS LANDRETH](#)
01/18, 7pm* Wexner Center for the Arts

Motion capture projects at ACCAD.
Realtime projects and lab demo.

**Additional Opportunity: Lecture on “[Making Faces](#)” by Chris Landreth on 01/18
2pm, 220 Sullivant Hall**

[Motionbuilder course](#) on Lynda.com (access through [Columbus Public Library website](#))

3. 01/24-26
Introduction to Autodesk Motionbuilder elements, cameras and animation.
Vicon system setup, calibration and prop capture.
Introducing Project 1: Capturing Simple Props and Cameras.

Project 1 assignment: prepare proposal, discuss in class on 01/26.

4. 01/31-02/01-----Project 1 capture sessions.

5. 02/07-09
Building motion complexity: setting up for multisegment props and digital puppets in Vicon Blade and Autodesk Motionbuilder.

Assigned Reading: Perception of Human Motion.pdf in the Resources folder and explore the [Embodied Digital Creativity project and publications](#).

6. 02/14-16
Building motion complexity (continued).
Using Motionbuilder Constraint and Physics assets for digital puppet and multi-segment prop rigging.

Embodied digital interaction discussion.
Introducing Project 2: Complex Props.

[Motionbuilder course](#) on Lynda.com (access through [Columbus Public Library website](#))

Project 1, Simple Props and Cameras due: class presentation on 2/16.

7. 02/21-23
Introduction to Human Motion: marking scheme, file templates, capture pipeline, data quality (Vicon Blade).
Designing human characters with Adobe Fuse.
Rigging human characters in Mixamo.
Project 2 proposal discussion on 02/23.
8. 02/28-03/02 -----Project 2 capture sessions.
9. 03/07-09
SPECIAL EVENT: HUMANE TECHNOLOGIES DISCOVERY THEME POPUP WEEK**
Introducing Project 3: Human Motion Editing.
Introducing Project 4: Sequence Editing.
Postprocessing human motion for skeletal remapping, retargeting and contact in Motionbuilder.

Project 2, Complex Props, is due: class presentation on 3/09

----- SPRING BREAK -----

10. 03/21-23 -----Project 3 and 4 capture sessions.

[Motionbuilder course](#) on Lynda.com (access through [Columbus Public Library website](#))

Assigned reading: MocapMotionEditing.pdf

11. 03/28-30
Post-processing human motion: motion accuracy and expressiveness.
Motion sequence editing: blending and looping clips.

Project 3, Human Motion Editing is due: class presentation on 4/02.

12. 04/04-06
Facial Motion Capture with Faceware Live and Motionbuilder.

Project 4, Sequence Editing, is due: class presentation on 4/09.

13. 04/11-13
Realtime motion tracking for virtual reality applications.
Motion, perception and VR.
Final Proposal due.
Final project development in lab and classroom.
14. 04/18-20
Final project development in lab and classroom.

FINAL PRESENTATION: 10 am, 4/25 in MOCAP LAB and CLASSROOM.

Other References:

- Vicon Blade Documentation
- Motion Builder 2018 User Guide. Autodesk, 2018.
- Kitagawa, Midori, Windsor, Brian. Mocap for Artists. Workflow and Techniques for Motion Capture. Elsevier, 2008.
- Pluralsight: [Introduction to Motionbuilder](#)
- Pluralsight: [Hybrid Animation](#): Mocap in Maya and Motionbuilder
- Pluralsight: [Animating with Props in Motionbuilder](#)
- Klette, R. et al. [Human Motion: Understanding, Modelling, Capture, and Animation](#). Springer, 2008.
- [Embodied Digital Creativity Project at Syntec Lab, Georgia Tech](#)

*** - details provided during class**

Academic Dishonesty

Any and all suspected cases of academic dishonesty will be dealt with according to university procedures. Students are referred to the student handbook for further information on academic dishonesty and the accompanying procedures and penalties.

Students can read the code of student conduct at:
[<http://studentaffairs.osu.edu/resource_csc.asp>](http://studentaffairs.osu.edu/resource_csc.asp)

Personal Safety

The University Escort Service operates until 3am when classes are in session (i.e. not during quarter breaks and University holidays), and will assist OSU students who live off campus as well as on campus. The University Escort Service can be contacted at 614-292-3322, and scheduled pick-ups are taken in advance.

Accommodations for Students with Disabilities

It is the intent of the University and its instructors to provide access to support services and programs that enable students with disabilities to succeed in this course. Students with disabilities are responsible for making their needs known to the instructor and seeking available assistance in a timely manner. Students will be referred to the Office for Disability Services (ODS), located in Pomerene Hall, for further assistance (call 614-292-3307 or visit 150 Pomerene Hall).

Students who are enrolled in ACCAD classes should have the following **24/7** (all the time) door access.

This is especially important **after 5:30 PM** when building doors start locking:

1. **NORTH EXTERIOR** door (near Cartoon Research Library entrance)
2. **ELEVATOR Card Swipe** access to 3rd floor: via SW Freight & NW Elevator
3. **3rd Floor CORRIDOR** (doors outside ACCAD main office). These doors lock at 6:00 PM.
4. **3rd Floor CORRIDOR entrance to CLASSROOM** area (Lenel swipe into 345 area).
5. **ACCAD Research area** (computer lab area 347) - now open all the time.

***** For Visitors who do not have BUCK-ID access *****

EXTERIOR DOORS:

North: Cartoon Research Library: 7:00a – then open after 5:30p for Classroom Pool use.

East: High Street: 7:00am-5:30pm

West (south): dumpster area: 7:00am-5:30pm

West (north): always locked

Loading Dock: Locked all the time (Dept contact list with phone#s will be listed)

***Note*: all exterior doors will have signs directing visitors to the NORTH entrance after 5:30pm**

CORRIDOR DOORS:

1st Floor (corridor):

South: Loading Dock: 7:00am-5:30pm

South: Barnett: M/T/W/F: 7:00am-5:30pm, Th 7:00am-7:15pm

2nd Floor (corridor):

South: Arts Administration & Education: 7:00am-7:15pm

North: Schultz Classroom area: 7:00am-7:15pm (provides access to Schultz Classroom)

North: Dance Studios: 7:00am-7:15pm

3rd Floor (corridor):

South: ACCAD: 8:00am-6:00 pm

North: Dance: 7:00am-7:15pm