CTAN504L Creative Production in Virtual Reality

Explore the intersection of cinematic and realtime VR storytelling utilizing the new Canon VR stereoscopic camera, Quest2 headsets, 3D animation, and realtime interactive techniques.

USC Cinematic Arts
John C. Hench Division of Animation & Digital Arts

2 Units, Instructor: Eric Hanson, hanson@usc.edu
Open to non-majors and undergrads.
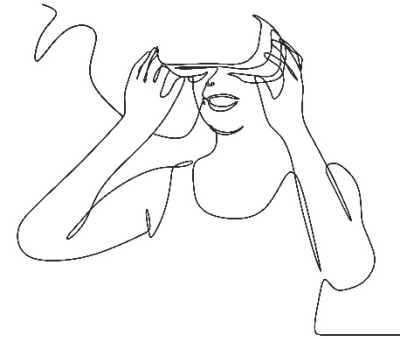
CTAN504L Creative Production in Virtual Reality

17922D Fall 2023, 2 units

Time: Lecture Tuesdays 1:00-3:50p PST, Optional Lab Fridays 10:00-12:50a PST

Location: RZC117

Instructor: Eric Hanson, hanson@usc.edu , www.blueplanetvr.com

A visual effects designer specializing in the creation of digital environments and effects for feature films, Eric Hanson has worked with noted visual effects houses such as Digital Domain, Sony Imageworks, Dream Quest Images, and Walt Disney Feature Animation. His credits include *The Fifth Element* (1997)*, Bicentennial Man* (1999), *Cast Away* (2000), *Hollow Man* (2000), *Mission to Mars* (2000), *Spider-Man* (2002) and *Atlantis* as well as many special-venue films. Hanson is currently CEO of Blueplanet VR, a VR practice specializing in 360 capture technology, cultural heritage, and science visualization content. With a background in design, architecture, photography, and visual effects, Eric finds enormous potential in volumetric VR for creating important and meaningful experiences. Eric has also been on faculty at the USC School of Cinematic Arts since 2001, having developed curriculum in visual effects and virtual reality. Above all, Hanson wishes he could sleep more.

Office Hours: Online, schedule at calendly.com/hansonusc

Teaching Assistant: TBD

Equipment Check-out: Rachel Levine, rlevine@cinema.usc.edu

IT Help: Creative Tech Help Desk, creativetech@sca.usc.edu or 213-821-4571

THIS IS AN IN-PERSON CLASS
In accordance with university recommendations, all meetings of this class will be held in person. Students who become ill and need to self-isolate will be supported in their efforts to stay current with classwork and assignments, to the extent possible. Please contact Professor Hanson and your SA Nate Fairchild, at least one hour prior to class start time if you become ill and need to self-isolate. Do not come to class if you are experiencing any symptoms of COVID-19 or other illnesses. Requests for longer term exemptions will be considered on a case-by-case basis, and must be supported by a written from the USC Office of Student Accessibility Services (OSAS)

Course Description:

A creative VR studio course exploring the intersection of linear cinematic film and realtime immersive experience. Techniques employed will cover live-action capture with 180/360 cameras, animated 3d animation utilizing Autodesk Maya, realtime using Unity/Unreal, or Canon R5C VR cameras, all with a Meta Quest2 headset. Intent of the class is to build one's maker skills and to advance the art and creative expression in the maturing field of virtual reality. Prior knowledge of Adobe After Effects, Autodesk Maya, and Unity/Unreal helpful.

Course Requirements and Grades:

- Completion of **3 PROJECTS** (90%):

1. Brief 3D art study using either Tilt Brush, Gravity Sketch, or Multibrush (15%)

2. Brief mixed-media study using AfterEffects (15%)

3. Fully completed short linear cinematic 3DOF VR film and/or interactive realtime 6DOF media experience, (60%)

Unfinished works-in-progress will be considered incomplete. Originality, creativity, and quality of project expected.

- Final exam, multiple-choice, from lecture notes: (10%)

Attendance:

ATTENDANCE WILL BE TAKEN 10 MINUTES AFTER THE START OF CLASS. Attendance and participation are vital as many weekly assignments will be both introduced and started during the class. You will be marked tardy after ten minutes and absent after 60 minutes. Three or more absences are ground for failing the class. Three tardies equals an absence. If a student is to be absent from a class (barring an emergency) the instructor must be notified prior to the absence via phone or email.

Course Length:

15 weeks, meeting once a week, three hours each class meeting and three hours optional lab.

Lab Access:
For weekdays, Monday - Friday, SCB102 is open from 8 am - 10 pm only and RZC is open all week from 8:00 am - 10 pm – Monday to Friday and 8:30 am – 10pm on weekends. There is no card access for non-majors. They can be given limited weekend access for SCB – noon – 8pm. A request has to be made by faculty to Operations operations@cinema.usc.edu with the first and last name of the student and their 10 digit USC ID#.
Everyone is encouraged to use RZC117 on weekends. Alternatively, Teradici can be used to access the same machines.

Schedule:

Week 1 Aug 22 **CLASS INTRO**
Lecture: Intro to class, discussion of project structure and approaches, USC production protocol. Introduction to current state of virtual reality field.
Lab Assignment: Familiarize yourself w/ the Quest, view sample VR content.

- Review of class and projects structure
- Current state and expansion of VR field
- History of immersion and virtual reality
- Storytelling types via 3DOF, 6DOF
- Introduction to VR ecosystems, content portals
- Introduction to Quest headset

Week 2 Aug 29 FUNDAMENTALS OF IMMERSIVE MEDIA
Lecture: Key concepts of immersion.
Lab Assignment: Create 3D art project w/ VR app.

- Physiology of immersion
- Importance of stereoscopy
- Differences/relation to cinema
- Story ideation
- Quest functions and settings
- Tilt Brush, Gravity Sketch demo

Week 3   Sept 5 NARRATIVE IN CINEMATIC VIRTUAL REALITY
***3D ART PROJECT DUE**, review work.*
Lecture: Review of cinematic storytelling.
Lab Assignment: Create VR project pitch stack.

- Traditional linear storytelling structures
- Branching story
- Agency versus passivity
- Participant or observer
- 3DOF vs 6DOF production techniques
- Working with latlong spherical image format
- Omni vs forward facing

Week 4   Sept 12 SHOOTING FOR CINEMATIC VIRTUAL REALITY
***VR PROJECT PITCH DUE**, review pitches.*
Lecture: Review of digital tools, technique, pipelines.
Lab Assignment: Create storyboard for final project.

- 360 mono, 360 stereo, 180 stereo
- Cameras for VR
- Ambisonic audio capture
- Digital file formats
- Stereo previewing
- Lightfield futures
- AfterEffects demo

Week 5   Sept 19 ANIMATION AND CGI FOR VIRTUAL REALITY
Lecture: Review of CGI, animation methods.
Lab Assignment: Create mixed media art project w/ AfterEffects.

- Methods of assembled shot construction

- Autodesk Maya and 3d animation
- Redshift stereo spherical camerawork
- Use of panoramic imagery
- Pre-built model options
- Use of photogrammetry
- Use of AfterEffects for 360 layout

Week 6   Sept 26   FUNDAMENTALS OF REALTIME MEDIA
Lecture: Review of digital tools, technique, pipelines.
Lab Assignment: Continue work on final project.

- Realtime versus cinematic VR
- Realtime engine tech review
- Roomscale experiences
- Review of user interaction

Week 7   Oct 3 REALTIME PRODUCTION
Lecture: Review of digital tools, technique, pipelines.
Lab Assignment: Continue work on final project.

- Review of modeling options for realtime engines
- Marketplace for UE, Unity asset store.
- Export from Maya, Blender
- Optimization technique
- Authoring issues

Week 8   Oct 10IMMERSIVE FUTURES
 Lecture: Future projection and tangents for VR.
Lab Assignment: Continue work on final project.

- Virtual Production use of VR
- Relation to fulldome
- Metaverse Implications
- NFT's
-

Week 9 Oct 17 PRODUCTION OF FINAL PROJECT
Lecture: Review progress, assist students.
Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 10   Oct 24 PRODUCTION OF FINAL PROJECT
Lecture: Review progress, assist students.
Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 11   Oct 31 PRODUCTION OF FINAL PROJECT
Lecture: Review progress, assist students.

Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 12 Nov 7 **PRODUCTION OF FINAL PROJECT**
Lecture: Review progress, assist students.
Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 13 Nov 14 **PRODUCTION OF FINAL PROJECT**
Lecture: Review progress, assist students.
Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 14 Nov 21 **PRODUCTION OF FINAL PROJECT**
Lecture: Review progress, assist students.
Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 15 Nov 28 **LAST CLASS MEETING, REVIEW**
Lecture: Wrap up.
Lab Assignment: Finalize digital production of project.

- Review, critique of finished VR content
- Future directions for immersive media

Study Days: Dec 2-5

Finals Week: **FINAL EXAM Tuesday Dec 12, 11:00a-1:00p PST**, **FINAL PROJECT DUE**

Statement on Academic Conduct and Support Systems

Academic Integrity:
The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - *(213) 740-9355 – 24/7 on call*
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - *988 for both calls and text messages – 24/7 on call*
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - *(213) 740-9355(WELL) – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - *(213) 740-5086*
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - *(213) 740-5086 or (213) 821-8298*
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - *(213) 740-0776*
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - *(213) 740-0411*
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - *(213) 740-2101*
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - *UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call
Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-2850 or otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.

PLEASE NOTE:
FOOD AND DRINKS (OTHER THAN WATER) ARE NOT PERMITTED IN ANY INSTRUCTIONAL SPACE IN THE SCHOOL OF CINEMATIC ARTS COMPLEX