USC Iovine and
Young Academy
*Arts, Technology and the Business
of Innovation*

PRIN 526 Virtual Maker Lab
Designing for and within Extended Realities
Units: 2
Spring 2023
Mondays - 7 to 8.50pm Pacific Time

Location: Iovine & Young Hall, Room 111

Instructor: Carsten Becker
Office: Zoom
Office Hours: As announced or per individual request
Contact Info: Preferred communication channel is Slack
DM me in the **iya-becker.slack.com** workspace
For grades-related questions: carstenb@usc.edu
Allow up to 24 hours for replies to emails and messages.

Grader and/or Classroom Assistant/s: n/a
Office Hours (if applicable):
Contact Info:

IT Help:
https://uscedu.sharepoint.com/sites/IYAStudent/SitePages/IT-Resources.aspx
Hours of Service: 9 a.m. – 6 p.m.
Contact Info: iyahelp@usc.edu

USC Technology Support Links
Zoom information for students
Blackboard help for students
Software available to USC Campus

*Extending products and interactions into our extended
perception of the world gives us opportunity to prototype
new forms of participation and co-creation.*

**

Course Description

Extended Reality (XR) is a fast-growing field powered by technology and behavioral trends alike. This lab combines a view into the cognitive dynamics behind successful augmented and virtual reality experiences with opportunities for students to innovate novel applications and prototype them. We will explore visual- and user experience design practices specific to XR products and utilize virtual maker tools (such as but not limited to Gravity Sketch, Unity, and Playbook).

Focus is on products and experiences that create meaningful connections, or empower, while also innovating on narrative concepts. Secondly, students will be given space and guidance to prototype such products or experiences themselves, utilizing narrative and design concepts and focus on usability and innovation.

Learning Objectives and Outcomes

The mindset and resourcefulness to develop work in a lab environment. Be a proactive force to deepen your relationship and mastery of creating with extended reality (XR) technologies using research, foresight, experimentation, skill-training, time management and execution strategies.

A deep dive into interactive and immersive temporal media and experiences, specifically in the form of simulations and captured imagery aimed at discovery and co-creation. Some of these mediums may be augmented reality, virtual reality, interactive film, live experiences, and role play.

Explore the landscape of extended reality, immersive media, and live experiences from their uses in the creation of knowledge, empathy and play, to entertainment, productivity, health, and journalism.

Deepen your creative thinking and maker skills in media. Through exposure to the most innovative forms of media and hands-on learning, practice infusing user-centric benefits such as interactivity and perspective-taking into media narratives and experiences.

Study the importance of desirability and viability in existing XR products and conceive future virtual experiences that provide the qualities to become sustainable platforms.

Understand the relation between engine and design tools. Acquire the technical skills it takes to express your ideas in AR, VR or a hardware design to communicate its values.

Use time management and adopt work methods that let you be effective and iterate frequently.

Prerequisites

None. The completion of ACAD 217 or otherwise acquired familiarity with a real-time engine (Unity or Unreal) will be helpful (but not required at the beginning of the course).

What I expect of students

Note: A 2-unit class is defined as 2 hours of lecture, and students can be expected to spend <u>up to</u> an additional 4 hours per week on the course outside of the classroom. These max. 6 hours include course meetings, office hours, preparation, assignments, and project work.

To get the most out of this course, a student will…
1. Engage with newly gained insights beyond the classroom. Be curious in a wide range of aspects, then act on that curiosity by experimenting.
2. Follow-up on skill training during class with personal study. Finish work started in the classroom async and share with the instructor even if not prompted.
3. Bring a personal standpoint to your work in the lab.

Required Reading

**
"UX for XR"
by Cornel Hillmann (Apress, 2019)
ISBN 978-1-4842-7019-6 (Paperback, $36 on Amazon)
ISBN 978-1-4842-7020-2 (ebook, $30)

Recommended Reading

"Experience on Demand" (Research on VR)
by Jeremy Bailenson (2018)

"How to Future: Leading and Sense-Making in an Age of Hyperchange"
by Scott Smith (2020)

"The World Beyond Your Head: On Becoming an Individual in an Age of Distraction"
by Matthew B. Crawford (2022)

"Game Thinking: Innovate Smarter & Drive Deep Engagement"
By Amy Jo Kim (2018)

"The Immersive Enclosure: Virtual Reality In Japan"
by Paul Roquet (2022)

Unique Lab Structure

This course consists of a lecture & tools segment (Part 1), and a term project (Part 2) segment.

Part 1 Components:

Lecture, Discussion & Tools

In Weeks 1 thru 9, we'll cover topics ranging from conceptual to tech basics, with a lecture/discussion or demonstration part, and a weekly student output in the form of a design challenge or reflection. -> See *Weekly Course Schedule* on pages 7 and 8 below.

Personal Skill Development

By Week 4 (or sooner) each student must pick two artistic-technical areas in which to deepen her/his maker skills. At least one of these must be a medium that is new to the individual student. He/she then devises a plan for acquiring the new skills in coordination with the professor.

Part 2 Components:

Course Project

Weeks 10 thru 15 are dedicated to ideation and MVP production of a self-initiated course project for your portfolio.

Final

Your final for the course needs to include thorough documentation of your maker journey in creating your course project. A short essay may be required as well.

What Equipment to bring and Software to install

- **Laptop Computer** with minimum of 200GB of free space on the internal disk

**

- Authorized installs of the **following software**:

    Software of student's choice to create visual assets (such as a **Shapr** or similar **3D program**,

    and/or **Adobe Creative Cloud**)

    One of these two build platforms: **Unity or Xcode** per student preference.

    GravitySketch will be installed on IYA-owned Oculus Quest headsets for students.

    Additional (free) software installs may be required as the course progresses.

    iTunes or Google Play account to download free AR Creation software

- **3-Button Mouse with Scroll Wheel** (professor can provide purchase suggestions)

- **Cloud Storage** account (Google Drive, Dropbox, Microsoft OneDrive et.) for safely storing your project files

- Instructors recommend keeping up-to-date backups on an **external hard drive** as well

Academy Equipment

We may utilize the Academy's Mixed Reality Lab, sound, video and lighting equipment to create media content, and VR headsets to research, audition and publish VR work. Ask your instructor or the Systems personnel for proper training in the setup and use of the equipment so you can utilize these tools confidently in exercises and projects. <u>Not having spent the proper time to figure out their full use will not be accepted as a valid reason for delays in submitting your assignments.</u>
To check out valuable equipment you may need to acquire certification.
Equipment that is returned late or broken may lead to delays or restrictions in your subsequent check-out.

USC Technology Rental Program

The university realizes that attending classes online and completing coursework remotely requires access to technology that not all students possess. If you need resources to successfully participate in your classes, such as a laptop or internet hotspot, you may be eligible for the university's equipment rental program. To apply, please submit an [USC Technology Rental Program Application](.) .

HOW TO PURCHASE OPTIONAL SOFTWARE AT THE DISCOUNTED ACADEMY:

The following first year software are now available for purchase **online** through the USC Bookstore at the Academy discounted rate.

To purchase:
- Visit: https://commerce.cashnet.com/IOVINE
- Select the software license(s) you would like to purchase by clicking "View Details" or the software title, and make your purchase
- You will receive an order confirmation receipt at the email address you provided
- You will be notified by email when the software license has been activated

If you have any questions about this process, please do not hesitate to contact Academy IT Support at iyahelp@usc.edu.

**

Grading Breakdown

	Points	% of Grade
Participation[1]	80	10
Design Challenges	240	30
Read/View & Reflect	80	10
Course Project	300	37.5
Final Paper & Exhibit	100	12.5
TOTAL	800	100

[1] Participation grade is not just attendance. To receive an 'A' in participation, you will participate at your fullest attention <u>across all channels</u> of the course: in the classroom, in team collaborations, and on Slack.

Grading Scale
Course final grades will be determined using the following scale
A   94-100
A-   90-93
B+   87-89
B   83-86
B-   80-82
C+   77-79
C   73-76
C-   70-72
D+   67-69
D   63-66
D-   60-62
F   59 and below

Assignment Submission Policy
All labs, projects and assignments are due at the date and time specified in the syllabus. Projects that are more than 24 hours late will receive a 50% deduction in points. Projects that are more than 7 days late will receive 0 points. Be sure to check Blackboard if you need to miss a class. You are responsible for any materials presented and assignments made even if you are not in class that day.

Extensions
Students will be given adequate time to complete assignments. Stick to the scope laid out for the assignment! Each student may ask for an extension on **one** of their assignments during the term. Above Assignment Submission Policy strictly applies to the extension date given.

Grading Timeline
You will receive grades for weekly assignments and project components, as graded, within two weeks of submission.

**

Academy Attendance Policy

The Academy maintains rigorous academic standards for its students and on-time attendance at all class meetings is expected. Each student will be allowed two excused absences over the course of the semester for which no explanation is required. Students are admonished to not waste excused absences on non-critical issues, and to use them carefully for illness or other issues that may arise unexpectedly. Except in the case of prolonged illness or other serious issue (see below), no additional absences will be excused. Each unexcused absence will result in the lowering of the final grade by ⅓ of a grade (e.g., an A will be lowered to A-, and A- will be lowered to a B+, etc.). In addition, being tardy to class will count as one-third of an absence. Three tardies will equal a full course absence.

Students remain responsible for any missed work from excused or unexcused absences. Immediately following an absence, students should contact the instructor to obtain missed assignments or lecture notes and to confirm new deadlines or due dates. Extensions or other accommodations are at the discretion of the instructor.

Automatically excused absences normally may not be used for quiz, exam or presentation days. Using an excused absence for a quiz, exam or presentation, such as in the case of sudden illness or other emergency, is at the discretion of the instructor.

In the case of prolonged illness, family emergencies, or other unforeseen serious issues, the student should contact the instructor to arrange for accommodation. Accommodation may also be made for essential professional or career-related events or opportunities. Additionally, students who need accommodations for religious observations should provide advanced notice to instructors and student athletes should provide Travel Request Letters. All accommodations remain at the discretion of the instructor, and appropriate documentation may be required.

Fall 2022 addendum:

- Unless students provide an accommodation letter from USC's Office of Student Accessibility Services (OSAS) or a letter from IYA Student Services detailing visa or travel restrictions, attendance and active participation is expected in the classroom. Any student with such accommodations should submit their accommodation document to the instructor as soon as possible to discuss appropriate accommodations. Either classroom recordings or live remote access to the class via Zoom will be provided.
- Students who are experiencing illness should not attend class in person. Please inform the instructor in advance of any class sessions that you can't attend for medical reasons, and accommodations will be arranged to view recorded lectures and submit alternatives to any missed class participation. Students will not be penalized for not attending class in person under these circumstances.
- In the event that you find yourself experiencing COVID-19 related symptoms, in keeping with university recommendations, you should Stay home! This is the best way to prevent spreading COVID-19 as supported by scientific evidence; Please do not come to an in-person class if you are feeling ill, particularly if you are experiencing symptoms of COVID-19.

Iovine and Young Hall Cleanout

The Academy is unable to store student projects and materials beyond the end of the semester. Students must remove all projects and personal materials from the Creators Studio, lockers/locker room, and other classrooms by the end of each semester. **All projects and materials left in Iovine and Young Hall will be discarded two days after final exams end. No exceptions.**

**

Classroom Norms

Students are expected to actively engage with the subjects of the course outside of the classroom. Assigned papers should be informed by research beyond common knowledge. Your solutions to weekly prompts and your course project are expected to be fulfilled from a personal point of engaging your skills, possess thematic merit and relevance to your maker / portfolio goals. Furthermore, instructor expects all students to documenting your own learning process, take an active role in the success of the group through contributing to discussion in the classroom, sharing of ideas, voluntarily providing constructive feedback for your peers, and supporting each other as teammates.

To make the above possible, phones must be put away while in the classroom. Use of laptops is allowed only for tasks relating to our course.

I recommend taking notes by pen in a notebook.

Synchronous session recording notice

I'll do my best to record lecture portions of our meetings. If you have to miss a class due to illness or isolating, you should find slides in Blackboard and you will have access to watch these recordings. But remember you are not permitted to share them with anyone not enrolled in the course.

> SCampus Section 11.12(B)
> Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Course Schedule: Weekly Breakdown

Notes:

To accommodate course development and access to equipment, I reserve the right to alter the weekly topics and assignments.

Weekly Outputs are always due the following Monday.

Week 1
Introductions.
An overview of the history and latest trends in extended reality products and experiences.
Output: Get ready to interact in virtual spaces by creating your avatar on Meta's Horizon platform.

Week 2
Augmented Reality
Brief lecture on the concepts of AR, followed by a demonstration of components used in creating an AR experience. Students will download and use **Apple's Reality Composer on iPads** and go hands-on.
Output: Create a kinetic mini game in AR

Week 3
Sensory Immersion
Lecture/Discussion: Media experiences with a deliberate use of color, form, physical movement, spatial sound, cognizance of self and reciprocity evoke deeper audience engagement.
Output: Pitch a unique experience that uses sensory immersion to connect participants with a memory.

**

Week 4
AR Part 2 – Xcode
An overview of Apple's IDE which is a core companion in bringing ARkit to an app experience. Also see note in Week 6 entry.
Read/View & Reflect: tbd

Week 5
Perspective-Taking and Embodiment
Lecture/Discussion: Authoring information and creating encounters that challenge our audience to take a new perspective.
Text Reference: Excerpts from "Experience on Demand" (in Reading List), VR Games
Output: Conceive an empathy-building group experience.

Week 6
Unity
This real-time engine is at the core of a large range of XR experiences and products. Note: At the end of Week 6, each students needs to pick either Xcode or Unity as their platform for building.
Design Challenge: Assigned tutorials.

Week 7
UX/UI in Narrative Environments: Interactivity beyond Functionality
Lecture/Discussion: With user experience being a physical and mind journey in most forms of experiential media, UX and UI take a special roles
Text: Mural
Output: Conceive an experience that is collaborative, productive, and builds agency.

Week 8
Interactive Plots and Collaborative Storytelling
Lecture/Discussion: We live in a culture of dissolving boundaries between media formats,
And authorship. Physical and imagined realities intersect. New narratives emerge from this awareness.
Text: Game creators, discussions in the field of immersive theater
Output: Conceive and map a short narrative that lends itself to collaboration.

Week 9
Capturing Real Spaces for the Virtual: Creating a Dialogue between Subject and Technology
We'll explore the capabilities of LiDAR (Roomplan), Body and Object Scanning, and Volumetric Performance Capture
Design Challenge: Capture and Transpose.

TBD Special Session
VR as your Work Space: Gravity Sketch (and maybe Playbook too)
Lecture/Discussion: Product design in virtual environment.
Text: UX for XR

Weeks 10 to 15
Students work on their chosen Course Project

Important dates:
January 16 – no class, MLK day
February 20 – no class, Presidents Day
March 11 thru 19 – no class, Spring Recess
April 25 – last regular class meeting
May 8, 7pm – course final
* A separate Exhibit date of Course Projects may be set – date tbd

**

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on Research and Scholarship Misconduct.

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*
studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline *- 1 (800) 273-8255 – 24/7 on call*
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services *(RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call*
Studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) *- (213) 740-5086*
eeotix.usc.edu
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*
usc-advocate.symplicity.com/care_report
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.usc.edu
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) 821-4710*
campussupport.usc.edu
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*
diversity.usc.edu
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*
dps.usc.edu, emergency.usc.edu
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) 442-120 – 24/7 on call*
dps.usc.edu
Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
ombuds.usc.edu
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) 442-33*40 or otfp@med.usc.edu
chan.usc.edu/otfp
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.