

EAS 620 AR/VR for Sustainability, Winter 2022

Wednesday 17:00 – 19:00 3066 Dana

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Course Description

This seminar provides students with a forum for the critical investigation, application and evaluation of novel digital tools, methods and workflows in the area of Augmented, Extended and Virtual Reality (AR/VR). The aim of the seminar is to provide new insight into some aspect of a student's work through critical and innovative investigation of AR/VR. The content is largely directed by student curiosity and as such there are no predetermined topics, though it is anticipated that most students will explore the visualization/simulation of environments, data and/or socio-ecological processes (or some combination thereof). The course requires no programming or existing AR/VR experience. Some potential tools for these explorations include but are not limited to:

JanusVR: JanusVR is a suite of software that makes it simple to create, share and experience spatially rich internet content.^[9]

Archilogic has successfully used WebVR to produce 3D models that can be visited in virtual reality.

Blend4Web is used for authoring WebVR-based applications such as heritage reconstruction and games.^[11]

Kokowa: Kokowa is a webVR publishing platform aimed at non-programmers. It provides a drag and drop editor to build and share webVR experiences on the web and on social media.^[12]

Goocreate: Goo Create is a cloud based 3D WebGL content creation editor. It can be used to create games, ads, campaign websites product showcases and scientific visualizations that run in a web browser.

PlayCanvas: PlayCanvas is an open source 3D game engine/interactive 3D application engine.

Vizor: Vizor is a platform for creating and sharing VR content on the web.

Sketchfab: allows people to display and share 3D content online. It provides a 3D model viewer that allows the display of 3D models on any mobile, desktop webpage or VRheadset.

X3DOM: is an open-source framework and runtime for 3D graphics on the Web including WebVR. It leverages X3D, the current ISO open standard for web3D

<https://threejs.org/>

<https://aframe.io/>

<https://www.babylonjs.com/>

[Unity/Unreal engine](#)

[Uptale.io](#)

[Virti](#)

[Viar360](#)

And many more.....

Interesting project examples

<https://vr4impact.com/>

<https://news.stanford.edu/2016/10/18/virtual-reality-simulation-transport-users-ocean-future/>

<https://www.legalfutures.co.uk/latest-news/students-play-virtual-reality-game-learn-criminal-law>

<https://www.scmp.com/lifestyle/health-wellness/article/2169092/virtual-reality-helps-chinese-medicine-students-learn>

<https://www.youtube.com/watch?v=17jAn4cB1SY>

<https://www.gla.ac.uk/research/az/cspe/projects/vrar/projectmobius/>

<https://www.oculus.com/experiences/quest/2094303753986147/>

<https://annefrankhousevr.com/>

<https://www.oculus.com/experiences/quest/2046607608728563/>

<https://www.oculus.com/experiences/quest/2926036530794417/>

<https://apps.apple.com/us/app/cleanopolis-vr/id1045463085>

Prerequisites and previous skillsets

The only prerequisite is that students have a design and/or research project to explore AR/VR tools and techniques. It is acknowledged that students may come from a variety of disciplinary backgrounds therefore *prior* knowledge of specific software or digital tools is not required. What is required is willingness to acquire knowledge of the tools/workflows needed to achieve your project goals through a relatively self-directed learning process.

Learning objectives

After completing this seminar participants will be able to:

- Use precedent study and literature review to catalog novel AR/VR tools and techniques, and to critically evaluate their potential to inform/advance their design/research process in the context of their field of study
- Explore and test the efficacy of one novel digital tool or technique by incorporating it into their design/research process – can be in the context of an existing project
- Demonstrate proficiency of the chosen tool/technique
- Evaluate the contribution of the tool or technique to their design/research process and identify strengths, weaknesses and challenges for future use

Outputs/deliverables

Students will set their own deliverables based on project scope. Outputs could include:

Academic conference poster/abstract

Animation/video

Design studio presentation

Portfolio

Website

Working paper

AR/VR experience

Evaluation

1. Presentation of relevant precedents/literature/ and/or AR/VR tool/experience, followed by leading a discussion on the selected topic (individual or teams of 2-3) 20%
2. Project outline of how they will incorporate the novel digital tool/technique into their design/research project and process (individual or teams of 2-3) 20%
3. Delivery & presentation of the project (individual or teams of 2-3) 50%
4. Class participation (individual) 10%

Schedule

Precedent presentations: January 19, 26, February 2 (if needed)

Project outline due: February 16

Final project due: April 6 (presentations April 6 & 13)

Student Well-Being

Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, mental health, alcohol or other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help is a courageous thing to do for yourself and those who care about you. If the source of your stressors is academic, please contact me so that we can find solutions together. For personal concerns, U-M offers many resources, some of which are listed at Resources for Student Well-being on the Well-being for U-M Students website. You can also search for additional resources on that website.

COVID-19 Statement

For the safety of all students, faculty, and staff on campus, it is important for each of us to be mindful of safety measures that have been required for our protection. By returning to campus, you have acknowledged your responsibility for protecting the collective health of our community. Your participation in this course on an in-person basis is conditional upon your adherence to all safety measures mandated by the State of Michigan and the University, including maintaining physical distancing of six feet from others, and properly wearing a face covering in class. Other applicable safety measures may be described in the [Wolverine Culture of Care](#), the [University's Face Covering Policy for COVID-19](#) and SEAS [Questions & Concerns document](#). Your ability to participate in this course in-person as well as your grade may be impacted by failure to comply with campus safety measures. Individuals seeking to request an accommodation related to the face covering requirement under the Americans with Disabilities Act should contact the [Office for Institutional Equity](#). If you are unable or unwilling to adhere to these safety measures while in a face-to-face class setting, you will be required to participate on a remote basis (if available) or to disenroll from the class. I also encourage you to review the [Statement of Students Rights and Responsibilities](#) and check-in with the Office of Academic Affairs Director to navigate support and resources for you.

COVID-19 requires a flexible and dynamic response - keep in mind that elements of the syllabus, assignments and course structure may change based on potential public health developments.