IML 575 Media Arts Research Lab: “Designing Mixed Reality (MxR) Experiences” (Spring 2018, 2.0 units)

Instructors:
- Scott Fisher  email: scott.fisher@usc.edu  office: SCA 465
- Perry Hoberman  email: hoberman@bway.net  office: SCI 101G

SA:
- TBD

Class Meetings:
- Wednesdays 1-3:50pm in SCI 311 (MEML lab)

Class Description:
"Mixed reality is the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time." (Wikipedia)

This course explores the current state of Mixed Reality(MxR), it’s strengths, weaknesses, and possible trajectory in society. The class will be a combination of lecture, discussion, and hands-on experimentation, and will also compare and contrast with Virtual Reality (VR), Augmented Reality (AR), to look at a range of possible Mixed Realities. Topics to be covered:
- History of AR, VR, and MxR
- Conceptual frameworks for MxR implementation
- Narrative vs. experience
- Explore/expand the “language” of AR and MxR
- Applications and implications, e.g. issues of privacy, presence, and reality.

In parallel with the survey and discussion topics above, all members of the class will participate as a research team working on projects in collaboration with an industry partner and will explore various aspects of design, execution, and analysis of MxR applications in one of SCA’s research labs. Emphasis will be on examining current applications and imagining a future world of Mixed Reality from a design and experience standpoint. The class will experiment with Samsung Mixed Reality Display, Microsoft Hololens, Occipital Bridge, Apple’s ARKit and other technologies that become available during the class.

For this semester, the industry partner will be VR pioneer, Mark Bolas from Microsoft’s Mixed Reality team.

Scott Fisher is Professor and Founding Chair of the Interactive Media Division in the USC School of Cinematic Arts at the University of Southern California, and Director of the Mobile and Environmental Media Lab there. He is an artist and technologist who has worked extensively on virtual reality and augmented reality, including pioneering work at NASA, Atari Research Labs, MIT’s Architecture Machine Group (now the MIT Media Lab) and Keio University.

Perry Hoberman is Associate Research Professor in the Media Arts + Practice Division. He is also a media, installation and performance artist whose work has been presented widely throughout the United States and Europe. Hoberman works with a variety of technologies, ranging from the utterly obsolete to the seasonably state-of-the-art. Hoberman’s mixed reality installation “Suspensions” will open at Postmasters Gallery in New York in February.
Texts:
- Beginning Windows Mixed Reality Programming - For HoloLens and Mixed Reality Headsets
  By Sean Ong
- Augmented Reality: Principles and Practice (Usability) 1st Edition
  By Dieter Schmalstieg (Author), Tobias Hollerer (Author)

On-line Resources:
- Windows Mixed Reality Developer Forum
- holodevelopers.slack.com
- NextReality website: http://next.reality.news/

Recommended Readings/Viewings
- Rainbows End by Vernor Vinge
- Neuromancer by William Gibson
- Ready Player One: A Novel by Ernest Cline
- Sly Mongoose by Tobias S. Buckell
- Memories with Maya by Clyde Dsouza
- Hallucinations by Oliver Sacks
- Creative Control
- Dennō Coil
- Black Mirror
  - “The Entire History of You”
  - “White Christmas”
  - “Playtest”
  - “Men Against Fire”

Week 1 – 10Jan  Class and Project overview and introductions
  - Self intros
  - Setup G+ accounts
  - Setup Slack accounts
  - Setup Wiki accounts

Week 2 – 17Jan  Industry Sponsor visit
Readings:
  - “Location-Based Mixed and Augmented Reality Storytelling”, Ronald Azuma (on wiki)

Assignment:
  - Browse NextReality website: http://next.reality.news/
  - Start G+ posting & commenting (at least 2 new items)

Week 3 – 24Jan
Seminar: History of AR, VR, and MxR - A look at where we’ve been
Workshop: Tiltbrush, Blocks, and AnimVR

Readings:
- Read MxR papers on class WIKI:
  - “Introduction to Augmented Reality”, Chapt. 1 in Augmented Reality: Principles and Practice, Schmalstieg & Hollerer
  - “A Taxonomy of Mixed Reality Displays” - Milgram
  - “Recent Advances in Augmented Reality”. Azuma, et al

Assignment:
- G+ posting & commenting (at least 2 new items)
- Bring at least one example of a mixed reality experience (or documentation of one) to show in class.

Week 4 – 31Jan
Seminar: Current MxR applications - small group presentations on current MxR applications
Workshop: WebVR and Amazon Sumerian

Assignment:
- G+ posting & commenting (at least 2 new items)

Week 5 – 7Feb
Seminar: Design Fiction #1 - Brainstorming future mixed reality environments and experiences.
Workshop: Apple ARKit and Vuforia

Assignment:
- G+ posting & commenting (at least 2 new items)
Readings:
- “Displays”, Chapt. 2 in Augmented Reality: Principles and Practice, Schmalstieg & Hollerer

Week 6 – 14Feb
Seminar: Design Fiction #2 - Brainstorming future mixed reality environments and experiences.
Workshop: Scanning tools/Hololens Pipeline

Assignment:
- G+ posting & commenting (at least 2 new items)

Week 7 – 21Feb  Visiting Speaker/Fieldtrip

Week 8 – 28Feb  Initial project design
- Develop Candidate Concepts for initial projects
- Pitch and class critique

Week 9 – 7Mar  Rapid prototyping
- Paper prototyping and iteration
- Present and class critique

Week 10 – 14Mar  No Class (Spring Break)

Week 11 – 21Mar  Project presentation and critique
- Demonstration of rapid prototype
- Class critique

**Week 12 – 28Mar**  
**Final project design**  
- Brainstorm final project ideas  
- Pitch and class critique

**Week 13 – 4Apr**  
**Rapid prototyping**  
- Paper prototyping and iteration  
- Presentation and class critique

**Week 14 – 11Apr**  
**Project presentations and critique**  
- Demonstration of rapid prototype  
- Class critique

**Week 15 – 18Apr**  
**Final project iterations**  
- Experiences live and tuning  
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**Week 16 – 25Apr**  
**Final project presentations for Industry Partner and guests**  
- Final demo(s)

**Grading Breakdown**

15% - Class participation (showing up, participating in discussions, contribution to the class websites, etc.)

35% - Small group presentations and prototypes (group members will rotate throughout the semester).

50% - Final group project

The final assignment will be a small group project that clearly demonstrates a novel application or implication for MxR. The deliverables will include a design document and some form of functional/ playable prototype.

**Policies**

**Absence Policy**

Students are expected to attend every class. Unexcused absences will affect your participation grade. The only excused absences are for illness, family emergencies, and (with advance notice) commitments related to a scholarship you are receiving, e.g. for a varsity sport. You must contact instructor or SA as soon as possible regarding any absence. The only acceptable reasons for taking an incomplete in the course are personal illness or a family emergency. Students who wish to take incompletes must present documentation of the problem to the instructor before final grades are due. Incompletes are not available before the Week 12 withdrawal deadline.

**Fair Use and Citation Guidelines**

We assert that all of our course work is covered under the Doctrine of Fair Use. In order to make this claim, however, all projects will need to include academically appropriate citations in the form of a
Works Cited section, which covers all sources, in order to receive a passing grade. The Works Cited is either included in the project or as a separate document, as appropriate to your project. The style we use is MLA and you may refer to these guidelines: https://owl.english.purdue.edu/owl/resource/747/05/

Statement on Academic Integrity
USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: http://www.usc.edu/dept/publications/SCAMPUS/gov/. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.

Statement for Students with Disabilities
Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday.

Emergency Plan
In the event that classes cannot convene at the university, all MA+P courses will continue via distance education.

Syllabus Updates
This syllabus is liable to change up to the beginning of class and possibly over the semester. Please check the posted syllabus regularly, and note all changes that are shared by the instructors in class.

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