

Introduction to Virtual Reality



Peter Gyory

ATLAS PhD Student & Game Designer

B.S. Game Design and Development

M.S. Creative Technologies and Design

Interests

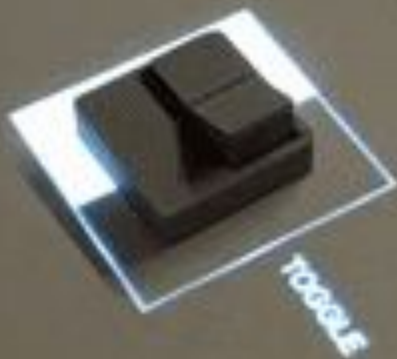
Game Design

Tangible Interfaces

Alternative Game Controllers

AR / VR





What is this course about?

Topics

History of VR

Modern VR Technologies

Computer Graphics

VR and Games

Designing for VR Experiences

Research in VR

Technical Skills

C#

Google Cardboard

Unity

Oculus

Git / Github

Motion Capture

To The Syllabus

Expected Background

Interest in VR

Prototyping

CS Foundations

Modeling

- Basic programming
- Networking
- Systems

Sound

Presentation and written skills

Reading Discussions

Readings will be assigned over the course of the semester. You will be required to read them and write a short response in a discussion post on canvas. We will also take time to reflect on the readings as a class.

Required Materials

A Google Cardboard

Phone Controller

Smartphone

(Links on the syllabus)

Course Sections



Section 1

The first few weeks of the course will focus on building a knowledge of VR history, and the basic skills required to develop and deploy VR applications.



Section 2

The second section will focus on more advanced technical topics and will culminate in your midterm project, which will require you to create a VR experience using the Motion Capture system on ATLS-2B



Section 3

The final section will mostly be group project work, accompanied by advanced topics that will be relevant to the kinds of projects being developed in the class.

Course Expectations

This is a project heavy course which will require a lot of out of class work time

This is NOT a computer graphics course

This course will require you to adapt to new technologies rapidly

Grading

10% Consistent attendance and active participation

30% Assignments and Presentations

20% Midterm project

40% Final Project

Attendance Policy

Absences without prior notification will downgrade a student's final grade as follows:

- 3 absences: -5 points
- 4 absences: -10 points
- 5 absences: automatic failure

Communication

Use Canvas for Discussion

A slack channel has been created in the ATLAS Slack

Email me at: peter.gyory@colorado.edu

Questions So Far?

Introduction to Virtual Reality



What does Virtual Reality mean?

“...an interactive immersive 3D computer generated simulation, designed to make the user **believe**, to the greatest extent possible, that they are actually **experiencing** a real environment”

- John T. Bell, University of Illinois, Chicago

How do you feel about this definition?











Introduce yourselves

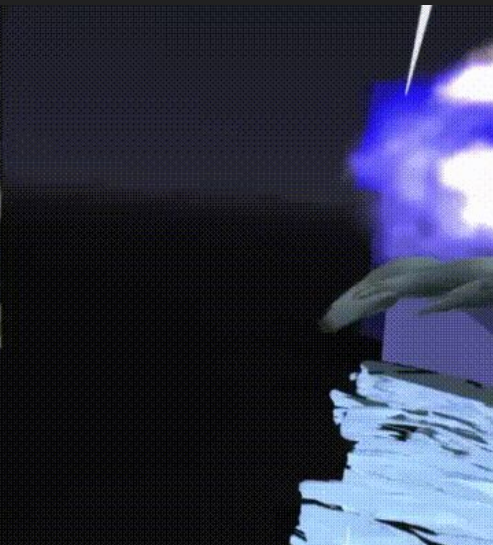
Name

Preferred Pronoun

What's your degree? (CS, TAM, etc..)

What VR experience is your favorite and why?

Entertainment



Remember

Nintendo
Virtual Boy
(1995–2015)



Simulation



Head Mounted Displays (HMDs)

Stereoscopic

Tracking

Vergence-Accommodation
Conflict (VAC)

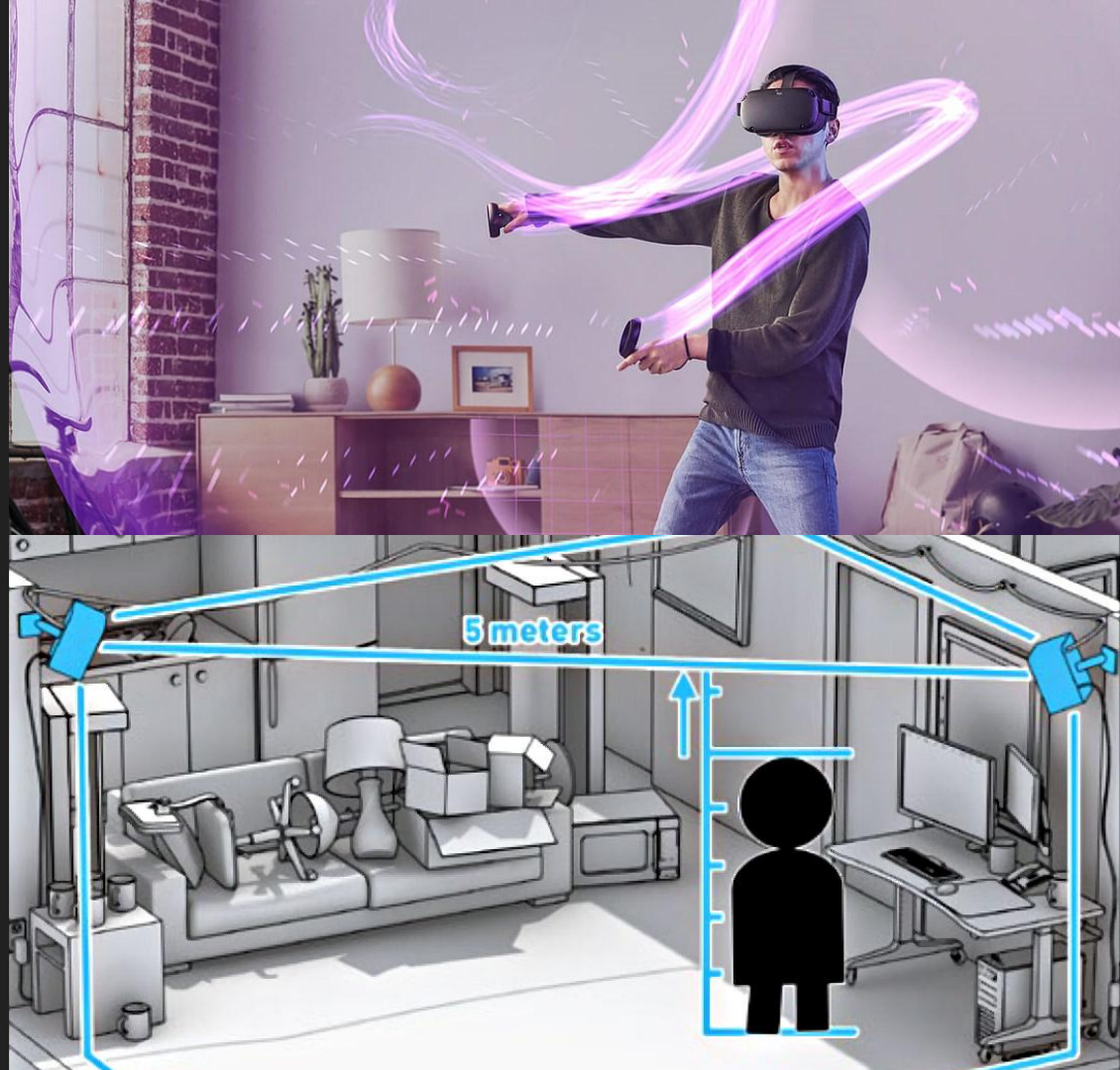


Tracking

Inside-Out (Oculus Quest)

Outside-In (HTC Vive)

Inertial (Google Cardboard)



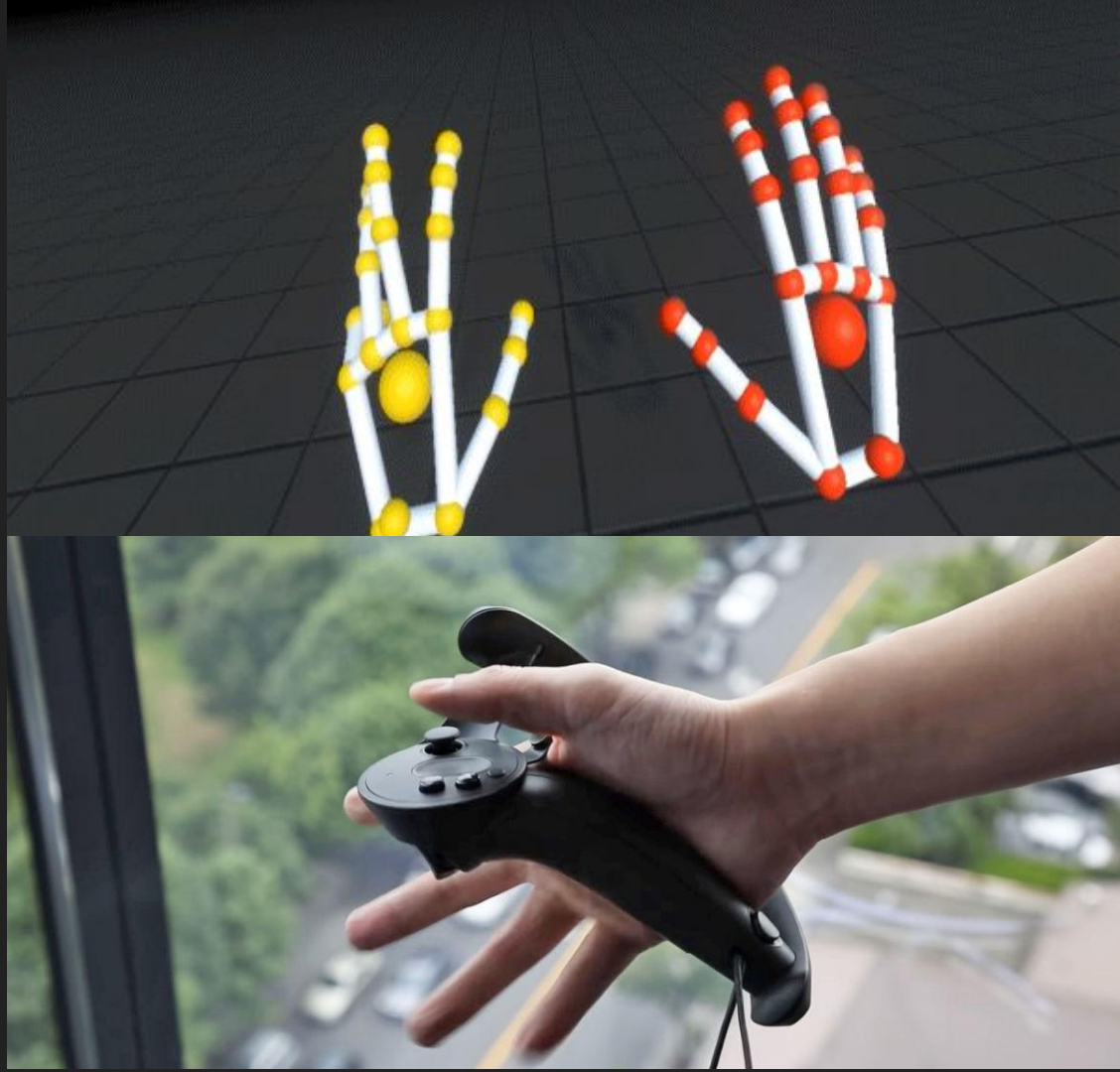
Input

Physical Inputs

- Buttons
- Joysticks

Motion Tracking

- Sonic
- IMU
- IR



Output

Visual

Audio

Haptic

- Vibration
- Force Feedback



What other kinds of input/output are there for VR?

Reading 1: The Ultimate Display

Ivan Sutherland Created *The Sword of Damocles* in 1968

[Here's a video demo!](#)

Generally considered the first HMD

Check Canvas for the Reading Assignment

Questions?