

CSU44054/CS7GV4: Augmented Reality

Gareth W. Young

CSU44054/CS7GV4:

~~Augmented~~ Reality

Gareth W. Young

extended

Timetable

- Monday
 - Lecture
 - 11:00 – 12:00
- Wednesday
 - Lecture/Practical
 - Tutorials
 - 12:00 – 14:00

Timetable							
Now showing dates 23/01/23-16/04/23							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
08:00							08:00
09:00							09:00
10:00							10:00
11:00	Wks 22-27,29-33 Module: CSU44054 Size: 42 Group: Activity: Lecture Room: LB04(Lloyd Institute (INS Building)) Lecturer: Gareth Young	Wks 22-27,29-33 Module: CS7GV4 Size: 39 Group: Activity: Lecture Room: LB04(Lloyd Institute (INS Building)) Lecturer: Gareth Young					11:00
12:00			Wks 22-27,29-33 Wks 22-27,29-33 Module: CS7GV4 Size: 39 Group: Activity: Lecture Room: LB08(Lloyd Institute (INS Building)) Lecturer: Gareth Young	Wks 22-27,29-33 Module: CSU44054 Size: 42 Group: Activity: Lecture Room: LB08(Lloyd Institute (INS Building)) Lecturer: Gareth Young			12:00
13:00			Wks 22-27,29-33 Wks 22-27,29-33 Module: CS7GV4 Size: 39 Group: Activity: Lecture Room: L2.01(TRINITY CENTRAL) Room: LB04(Lloyd Institute (INS Building)) Lecturer: Gareth Young	Wks 22-27,29-33 Module: CSU44054 Size: 42 Group: Activity: Lecture Room: L2.01(TRINITY CENTRAL) Room: LB04(Lloyd Institute (INS Building)) Lecturer: Gareth Young			13:00
14:00							14:00
15:00							15:00
16:00							16:00

Timetable

- **33 Contact Hours** (scheduled hours per student over full module)
 - Lecture - 22 hours
 - Laboratory - 11 hours
- **72 Independent study hours** (outside scheduled contact hours)
 - Preparation for classes and review of material (including preparation for examination, if applicable) - 22 hours
 - Completion of assessments (including assignments) - 50 hours
- **Total Hours** - 116 hours

Learning Outcomes (Goals)

On successful completion of this module, you will be able to:

- **LO1:** Review and asses the state-of-the-art in extended reality technologies
- **LO2:** Develop an extended reality solution (project) including
 - Implementation, testing, evaluation, demonstration, and documentation
- **LO3:** Come up with your own ideas for an extended reality project

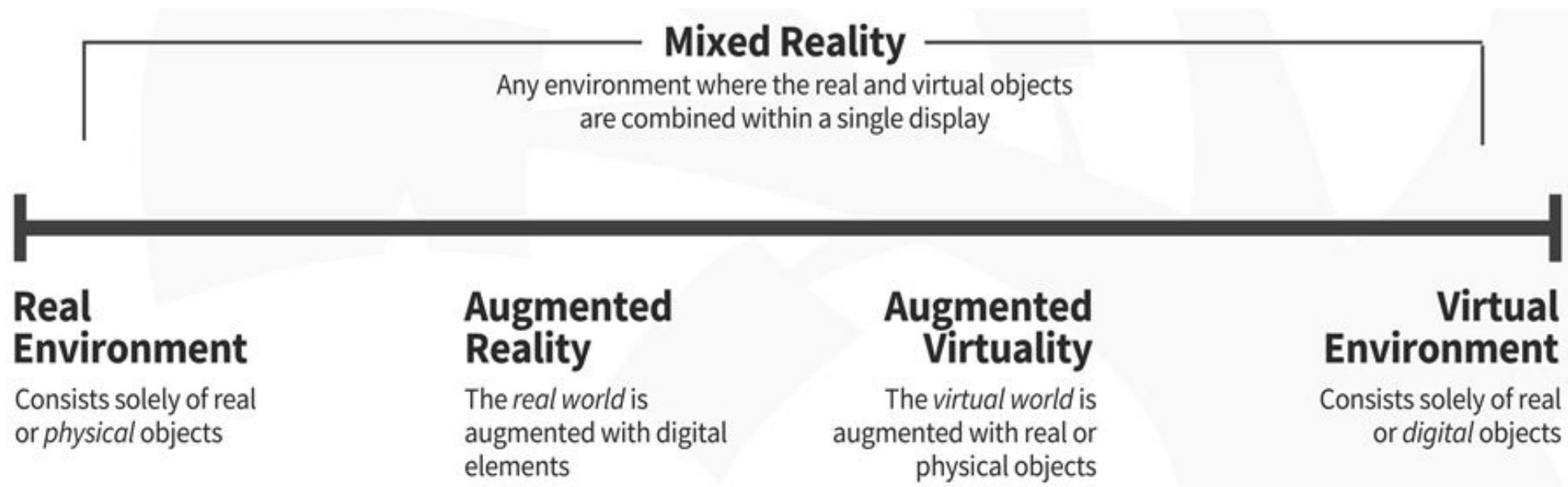
About Me: YoungGa@tcd.ie



- **Undergraduate:**
 - B.Eng (hons) – Sound & Broadcast
- **Masters:**
 - MSc – Music Technology
- **Research:** Human-Computer Interaction
 - Ph.D. – Haptic feedback for digital musical instruments
 - Research Fellow – How to build more extensive and effective city dashboards
 - Research Fellow – Extending Visual Sensation through Image-Based Visual Computing (V-SENSE)
- Website for publications: www.GarethYoung.org
- Twitter: @young_gareth

Introduction

- What is XR? – eXtended Reality (XR) isn't Mixed Reality (MR)
- A Brief History of XR
- Modern XR Experiences



What is XR? – Reality-Virtuality Continuum



Mixed Reality

Any environment where the real and virtual objects are combined within a single display

Real Environment

Consists solely of real or *physical* objects

Augmented Reality

The *real world* is augmented with digital elements

Augmented Virtuality

The *virtual world* is augmented with real or physical objects

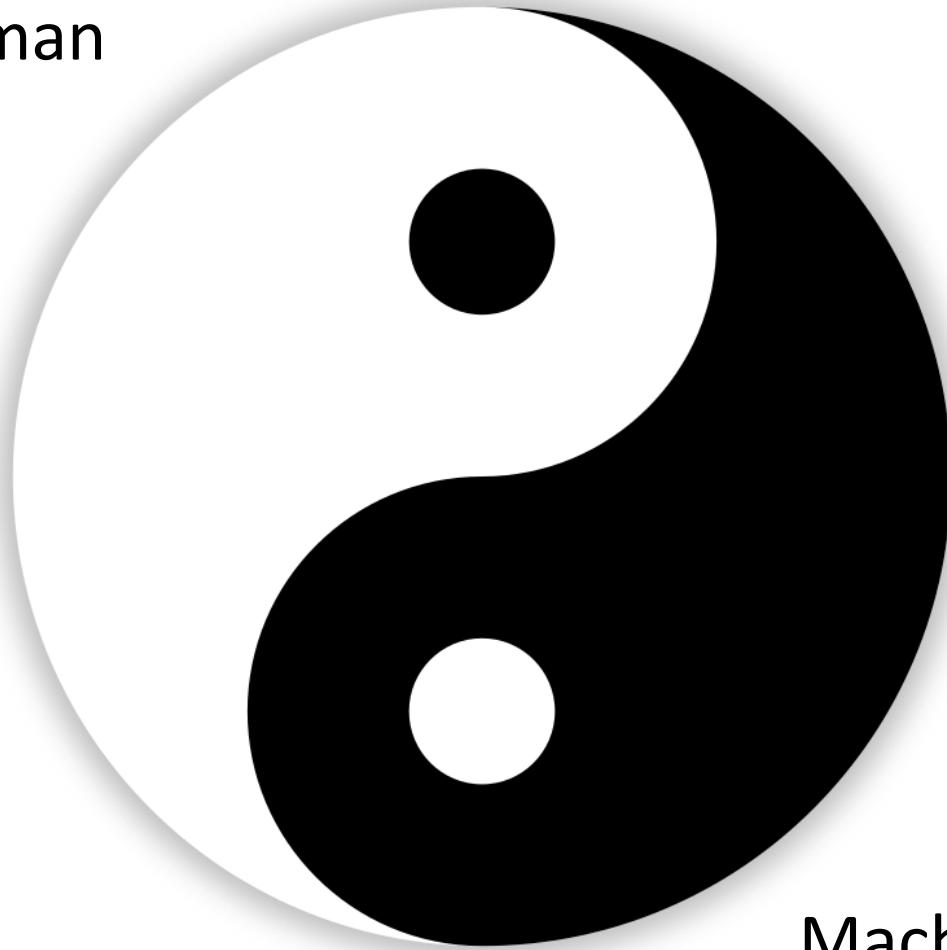
Virtual Environment

Consists solely of real or *digital* objects

What is XR?

Human-
Computer
Interaction

Human



Machine

What is XR?

- Directed Experience:
 - The user has some technology mediated “experience” that is designed by a creator, for example, flying, walking, exploring, watching a movie, socializing
- Users:
 - You, the person sat next to you, or even an animal (VR for chickens and cows)
- Artificial Sensory Stimulation:
 - The technology is used to stimulate the senses (completely or partially)
- Awareness:
 - While having the experience, the user is unaware of the technology and is “fooled” into believing they are present somewhere else.
 - This *sense of presence* is a well known phenomenon that we will dig into later.

What is XR?

The
VR Triangle

Immersion

I³

Interaction

Imagination

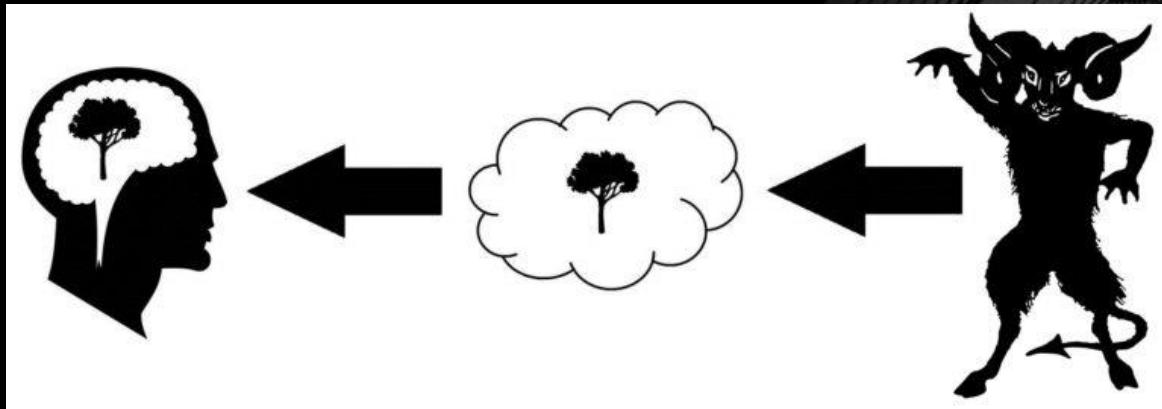
What else could be XR (or MR)?

- Some questions for you:
 - Is listening to music XR?
 - What about watching a movie?
 - A painting on the wall?
 - Reading a book?
 - Why and why not?



What is XR?

The Allegory of the Cave – Plato's Republic.



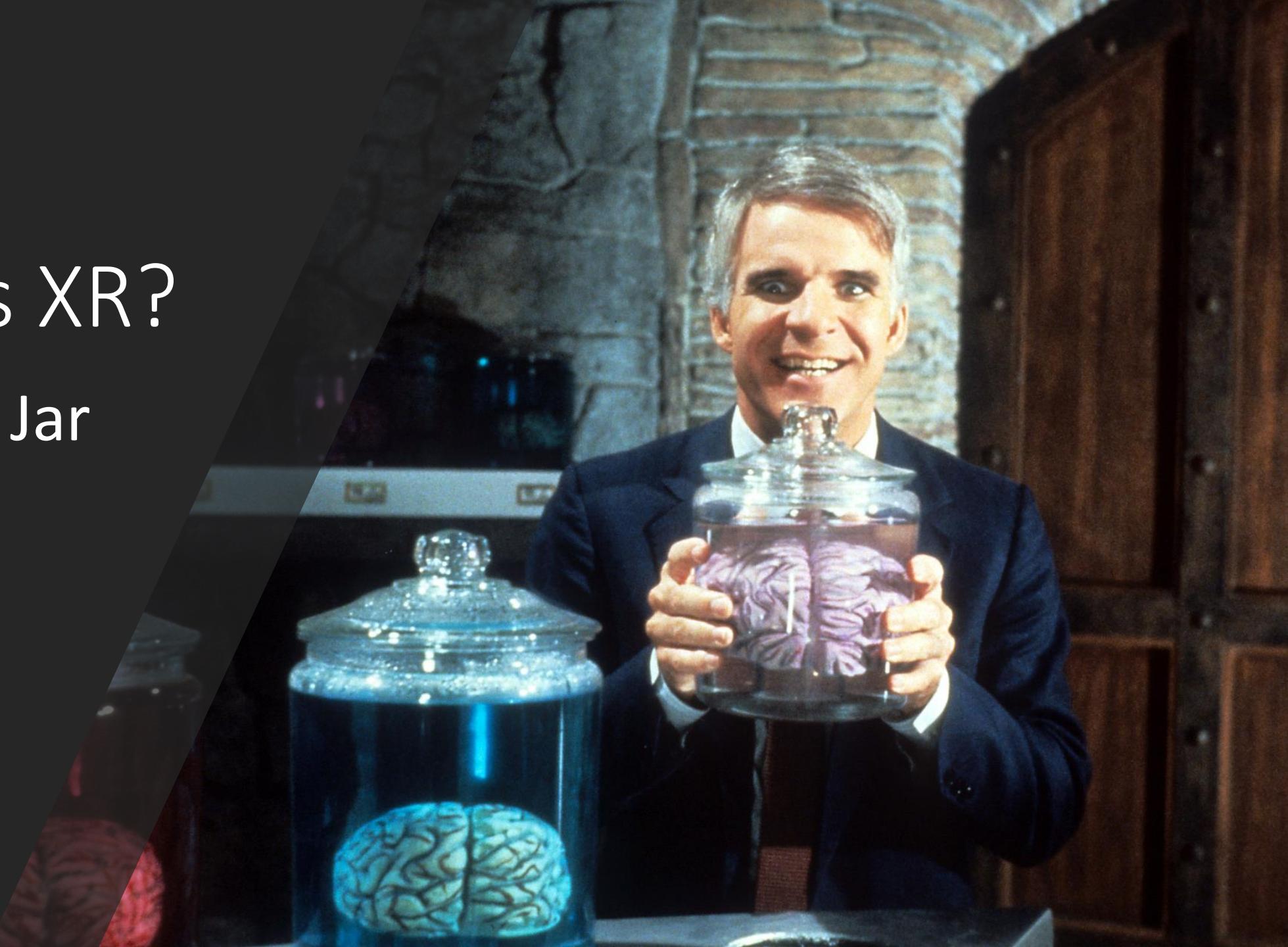
What is XR?

Descartes' demon



What is XR?

Brain in a Jar



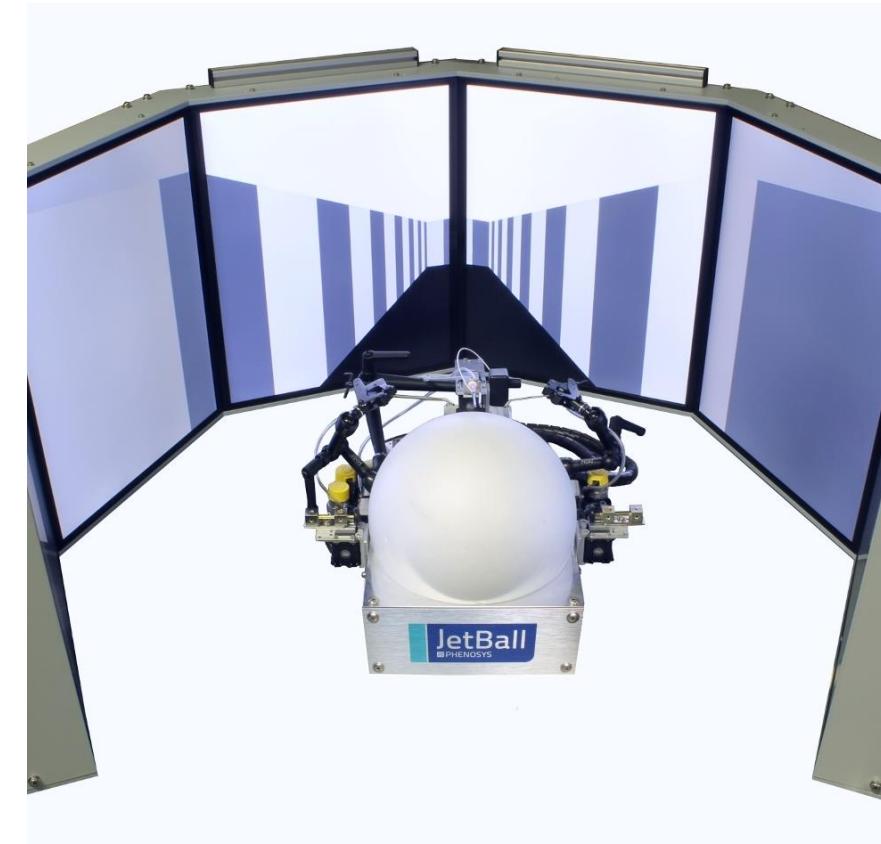
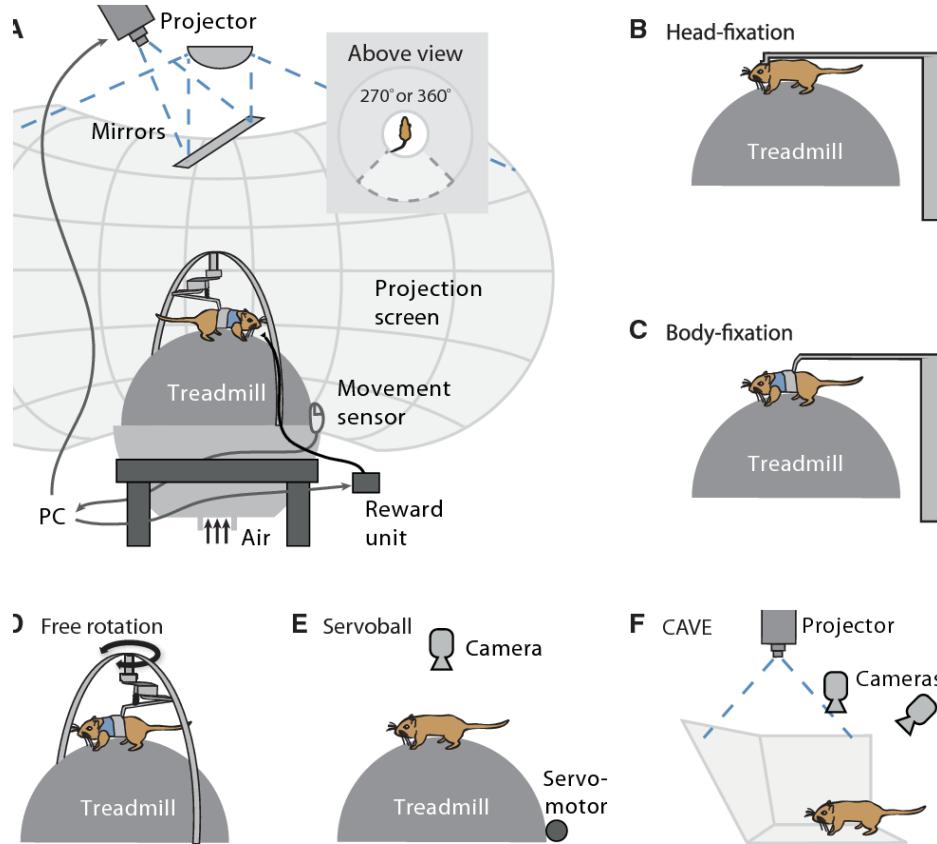


What is XR?

- <https://birdly.com/>
- VR simulator – flap wings, fly!

What is XR?

Virtual Reality Systems for Rodents





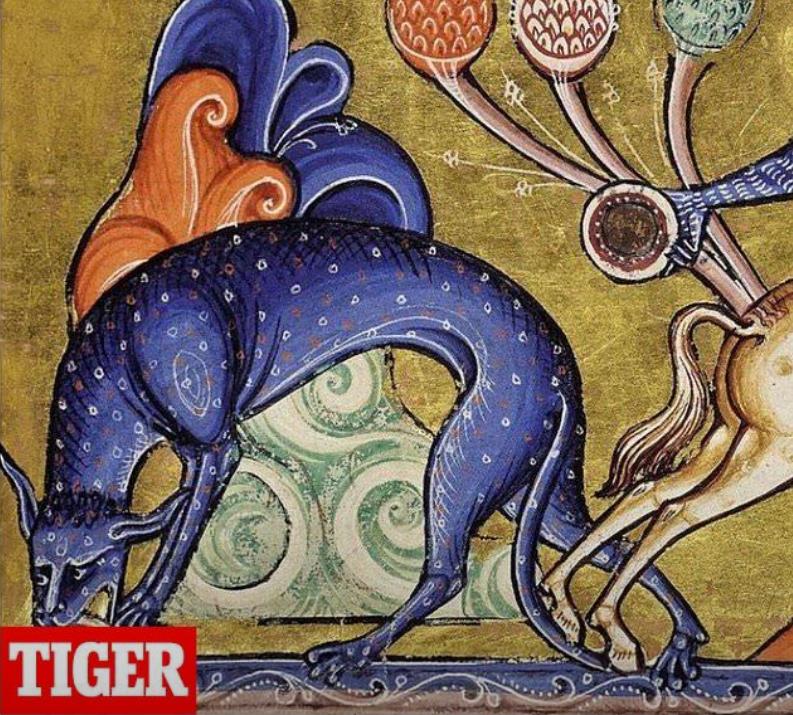
Historical XR



LEOPARD



HIPPOPOTAMUS



TIGER



OYSTER



WHALE

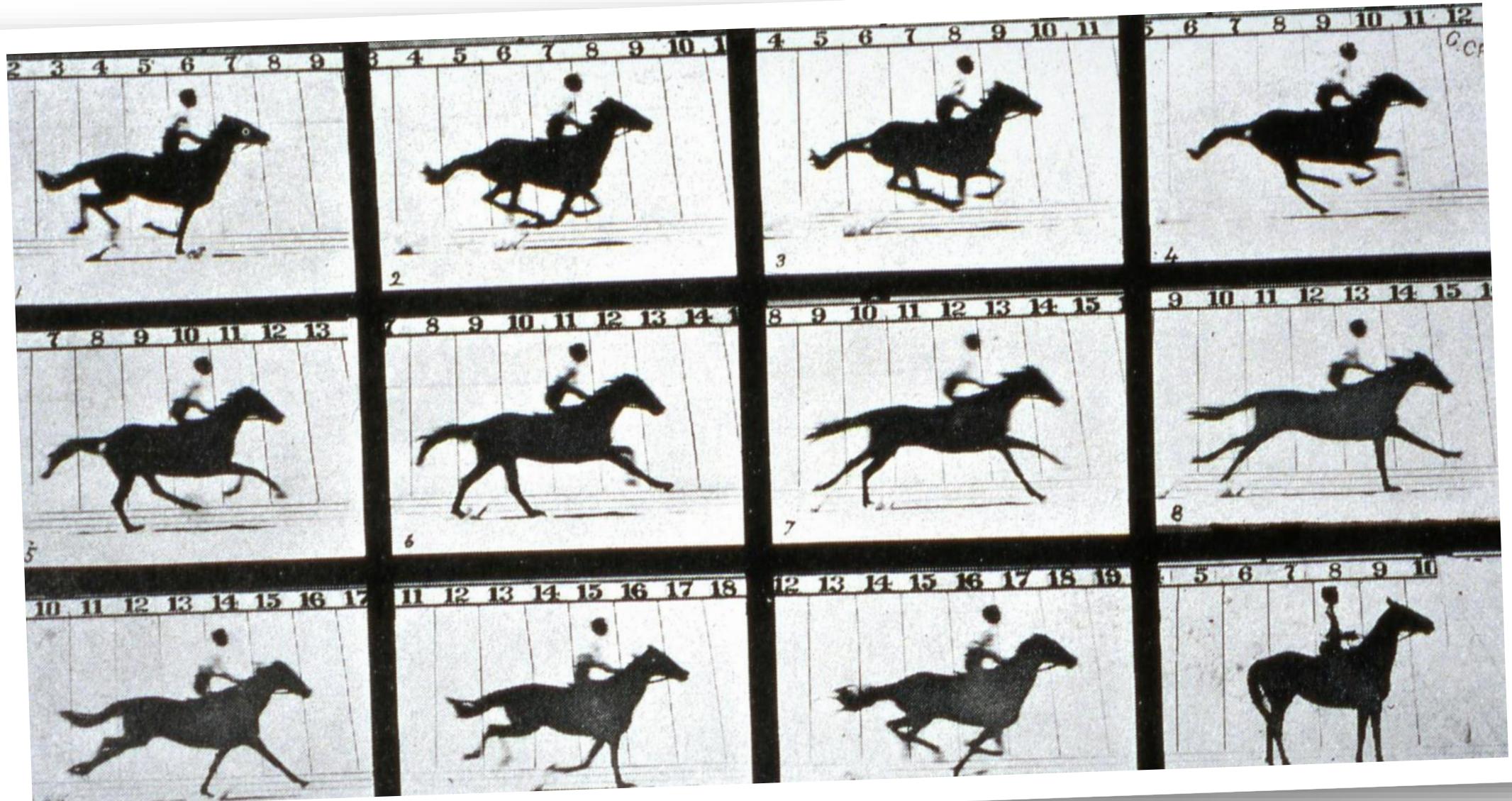


BEAVER



Okay, one last time.
These are small...

...but the ones out
there are far away.





<https://youtu.be/dJdVEgOMQPm>



<https://youtu.be/xLVChRVfZ74>

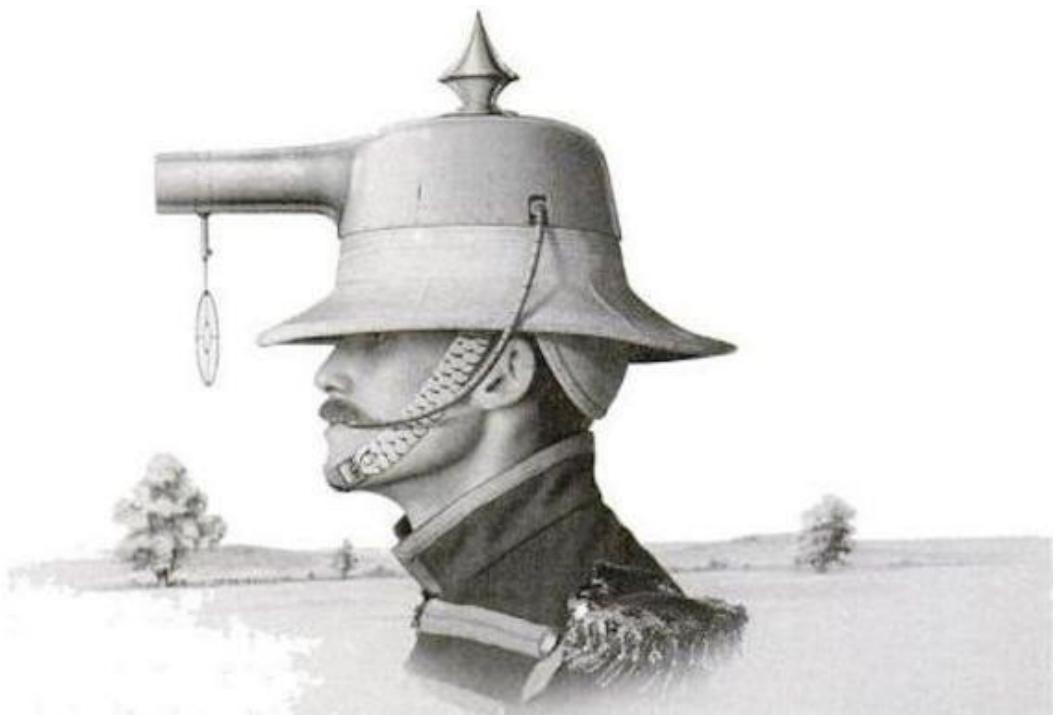
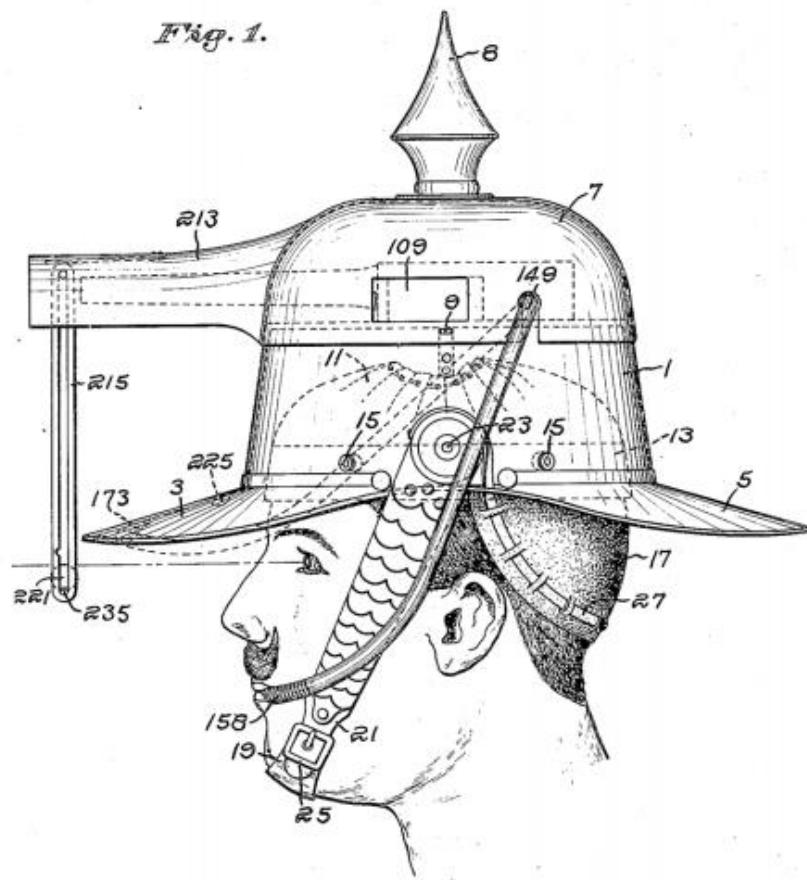


Fig. 1.



Aug. 28, 1962

M. L. HEILIG
SENSORAMA SIMULATOR

3,050,870

Filed Jan. 10, 1961

Tq. 5.

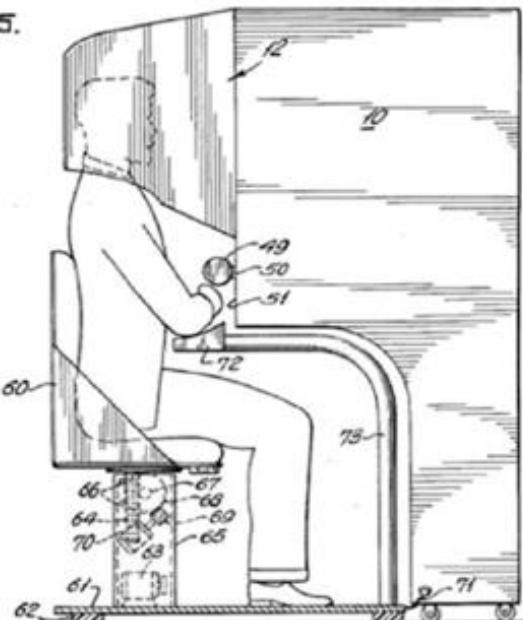
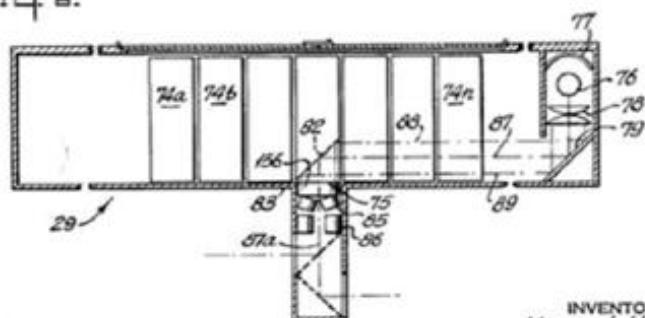


Fig. 6.



INVENTOR
MORTON L. HEILIG
BY
Douglas M. Clarkson
ATTORNEY

Introducing . . .

sensorama

The Revolutionary Motion Picture System
that takes you into another world
with

- 3-D
 - WIDE VISION
 - MOTION
 - COLOR
 - STEREO-SOUND
 - AROMAS
 - WIND
 - VIBRATIONS



© PATENTED

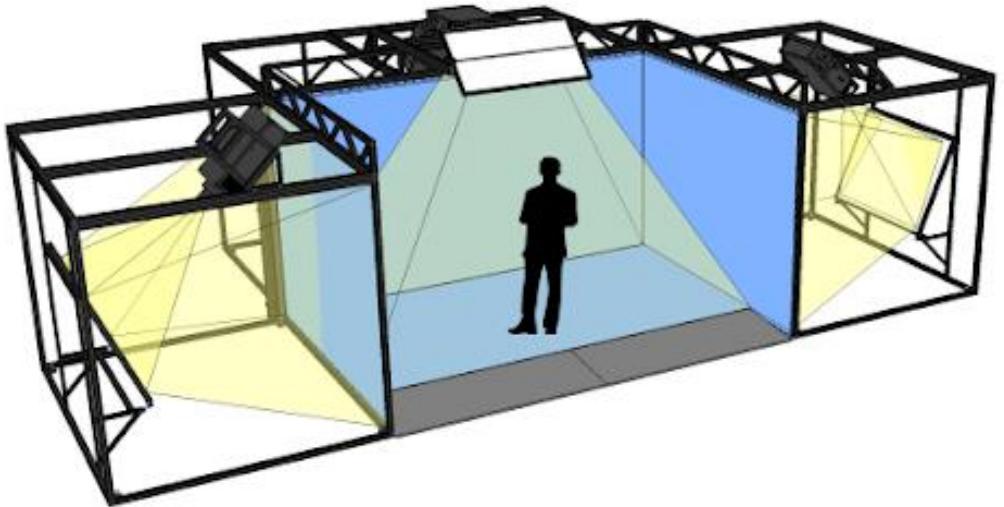
SENSORAMA, INC., 855 GALLOWAY ST., PACIFIC PALISADES, CALIF. 90272

TEL. (213) 459-2162



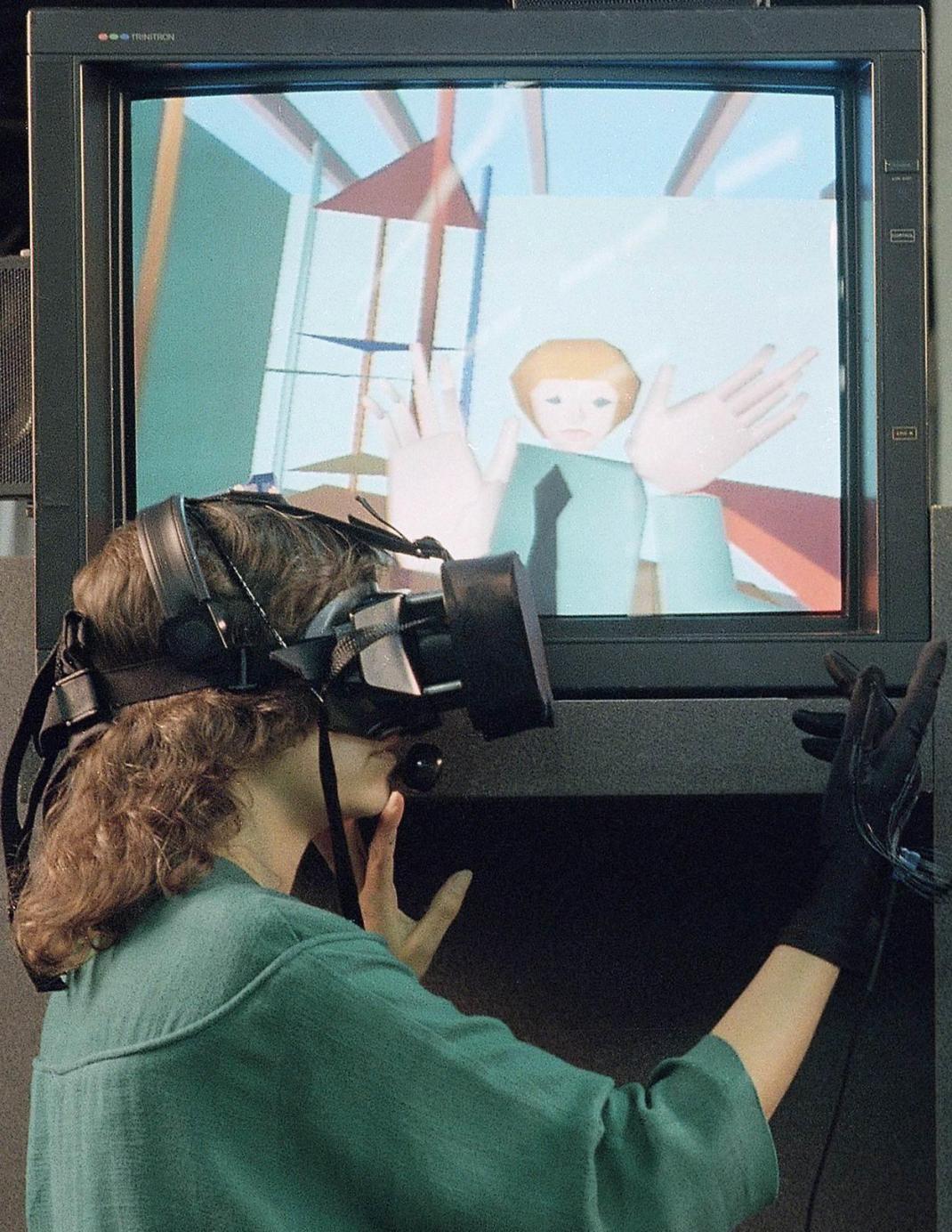
https://youtu.be/Xd1DgzPPH_Q

A cave automatic virtual environment (CAVE)





- https://youtu.be/3yGiiU8_gnE





<https://youtu.be/zzwPuJklv4w>



Modern XR Experiences

Video Games

Immersive cinema

Telepresence

Social VR

Empathy

Education

Virtual prototyping

Healthcare

Other new
technology
mediated
experiences

Classwork for this week:

- <https://forms.office.com/r/JTqqDpLD9J>

Real Time Mixed Reality Pipelines for Live Studio Broadcast into Multi-Platforms

