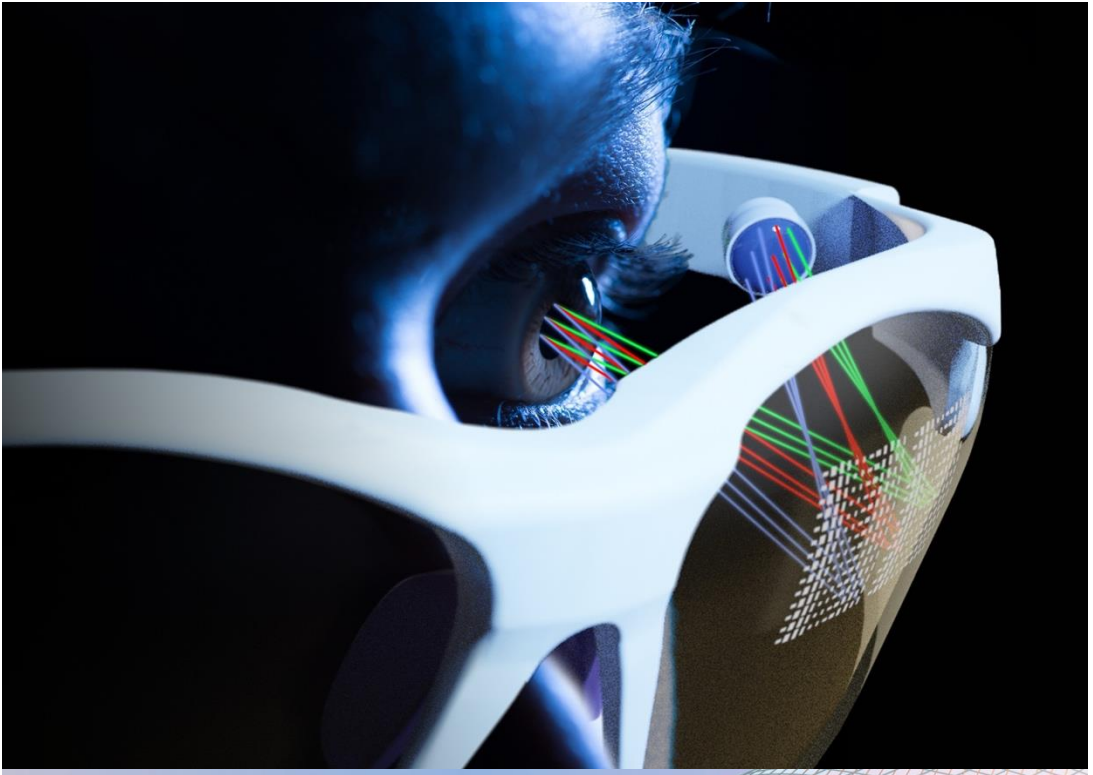
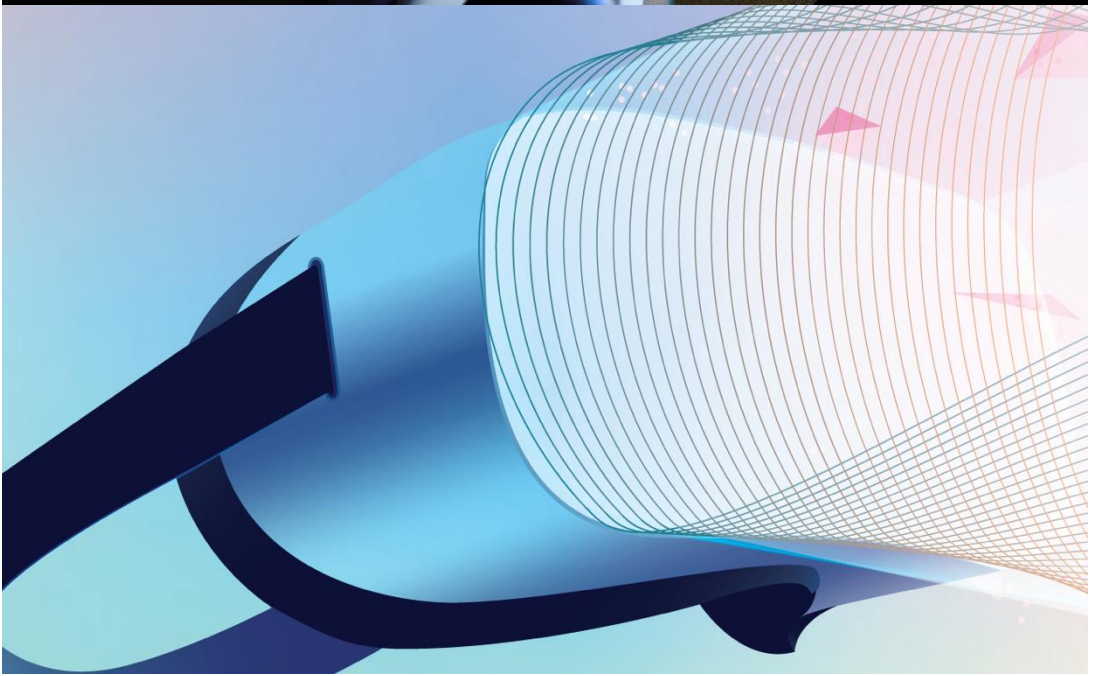




Transdisciplinary Center for **EXT**ended **R**eality **R**esearch and **A**pplication (**EXTRRA**)

Nick Vamivakas

Marie C. Wilson and Joseph C. Wilson Professor of Optical Physics,
The Institute of Optics, Physics and Materials Science
Dean of Graduate Education and Postdoctoral Affairs
University of Rochester

BOUNDLESS POSSIBILITY

2030 Strategic Plan

MOTTO

Meliora [ever better]

VISION

The University of Rochester will continue to frame and solve the greatest challenges of the future.

MISSION

Learn, Discover, Heal, Create—and make the world ever better.

VALUES

Equity | Leadership | Integrity
Openness | Respect | Accountability

Boundless Possibility Goals

Research excellence and global reputation

Increase our reputation as a leading global research institution by investing in innovation and growth in our areas of distinction.

Exceptional undergraduate and graduate education

Reimagine undergraduate and graduate education at a research-intensive institution.

Health care of the highest order

Reinforce and further enhance our position as a leading national academic medical center.

Faculty and staff success

Cultivate an inclusive culture that prioritizes the well-being, development, engagement, success, and diversity of our people.

Sustainable growth

Implement a new university finance and operational model that will enable future and sustainable growth and success.

Boundless Possibility Highlights

Transdisciplinary Centers: 4 Awardees

Master Plan Stakeholder Engagement

Creating Academic Excellence

Research Grant Protection

Experiential Learning Data Collection

Positive Budget Margin

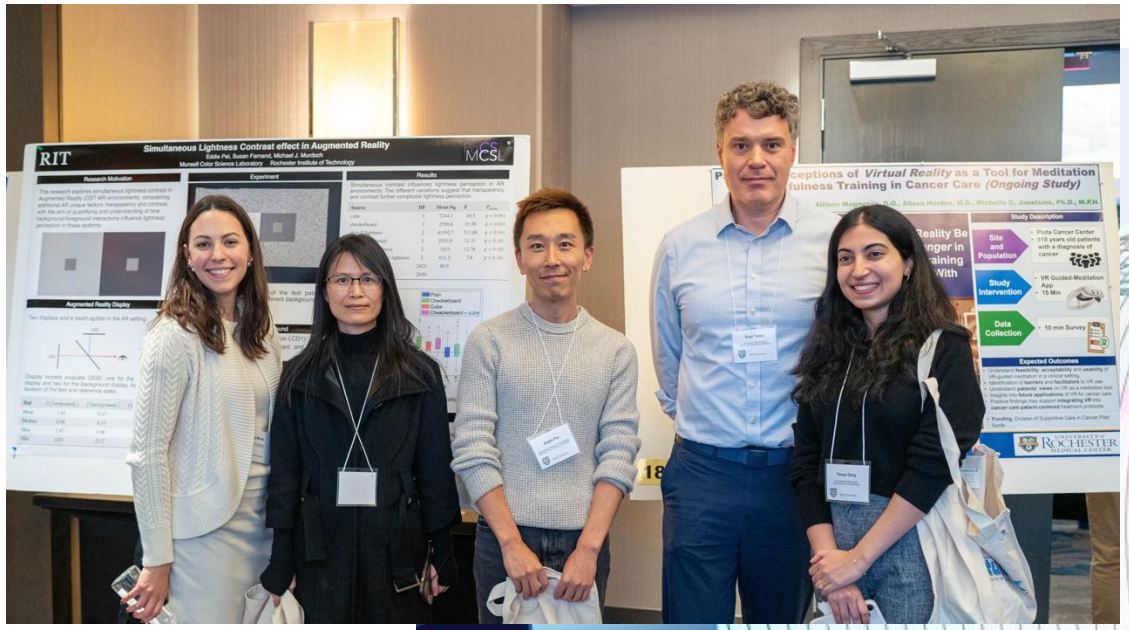
myURHR Launch

NCI Designation

Fundraising Record [4th consecutive year]

The planning phase…..1st engagement with StudioX

building a campus wide XR ecosystem



oUR opportunity for a TDC

UR is a leader in the science and engineering underlying the human-information interface as well as the application of XR tech

> 50 labs & faculty across all UR units including Eastman & Warner working in XR

Core personnel: Hajim, SAS, SMD, Library-Studio X

Unique partnership between research and libraries


Nick Vamivakas


Duje Tadin


Meaghan Moody


Jannick Rolland


Darren Lipomi


Susana Marcos

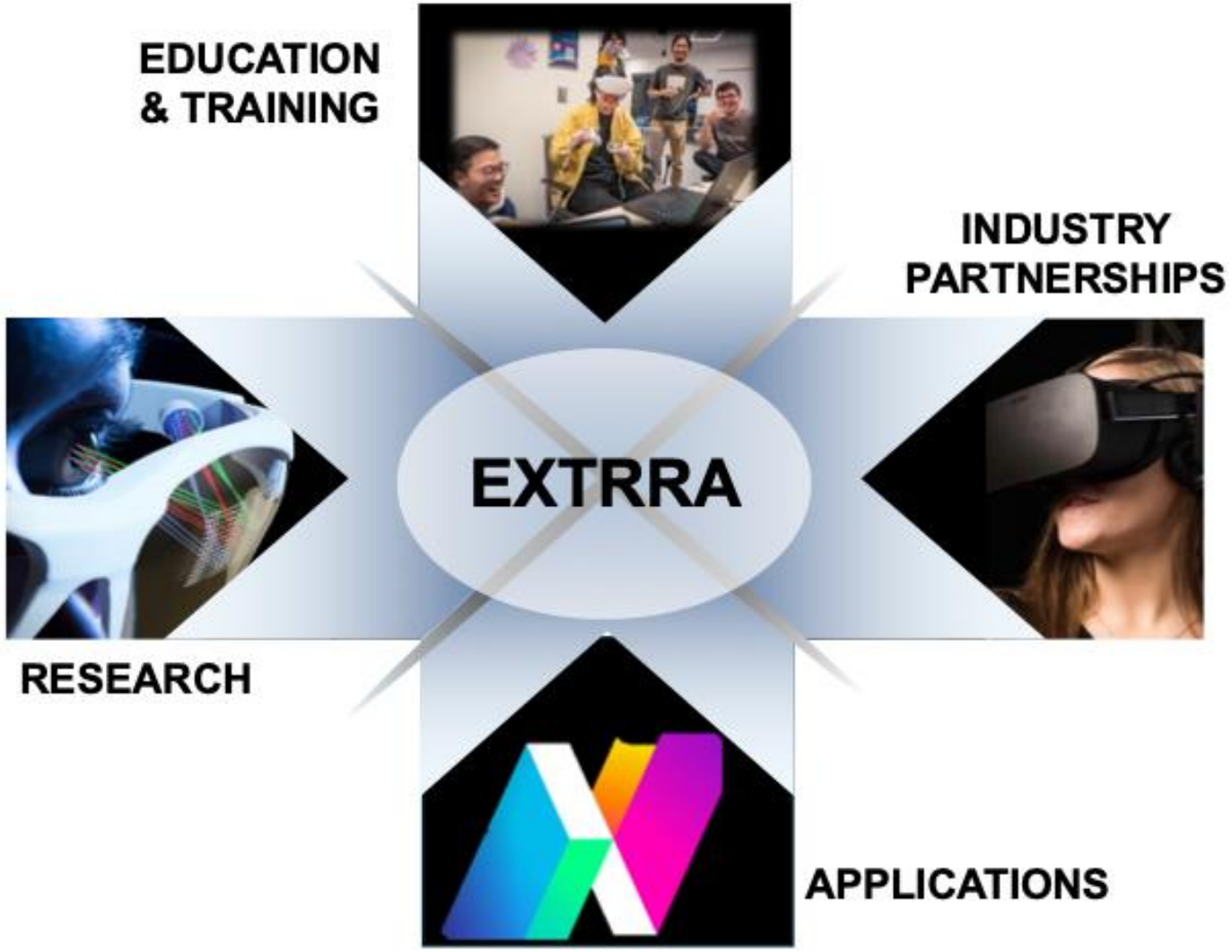

Michele Rucci


Mike Jarvis


Benjamin Suarez-Jimenez


Mujdat Cetin

EXTended **R**eality **R**esearch and **A**pplication (**EXTRRA**)

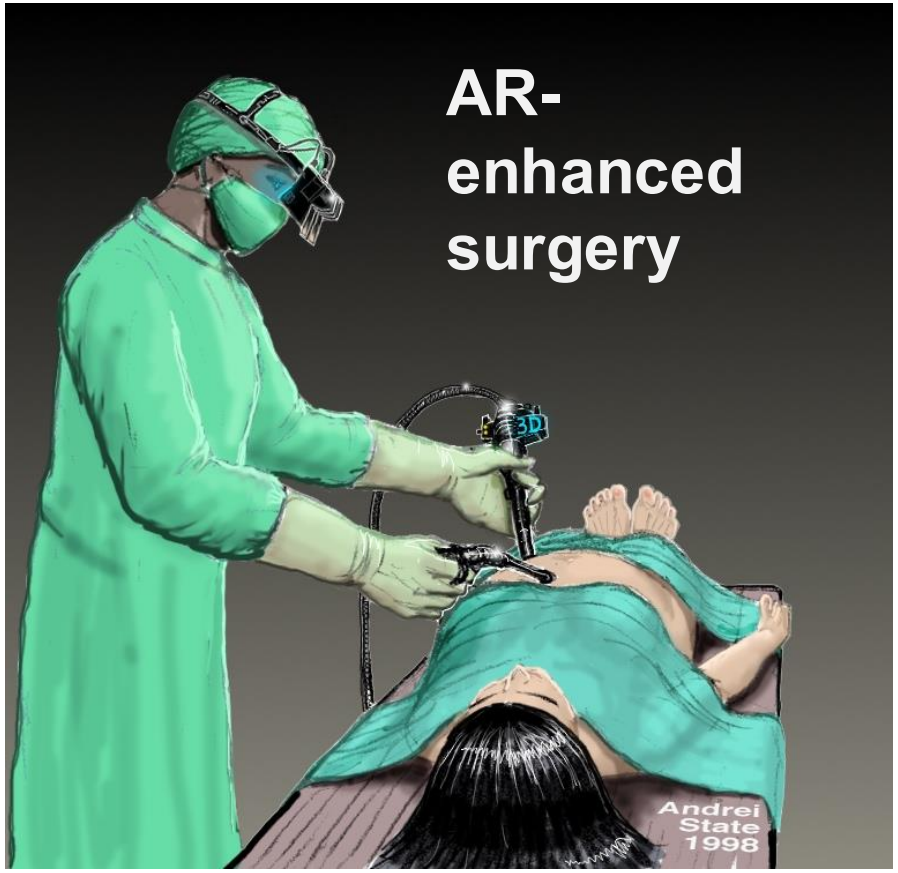


Vision: UR will be the global leader in extended reality — where cutting-edge transdisciplinary science and engineering research, applications, talent development and deep industry engagement converge to create extended reality innovation that is a force for society's benefit.

The XR promise…..

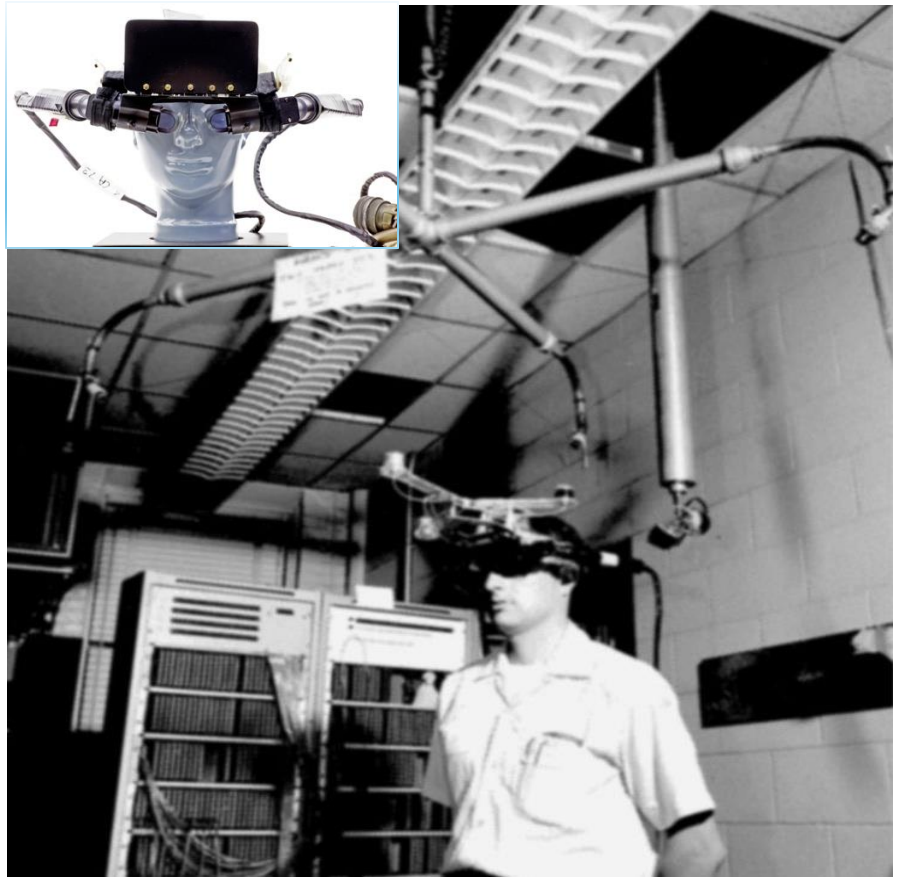
VR - education

AR - healthcare

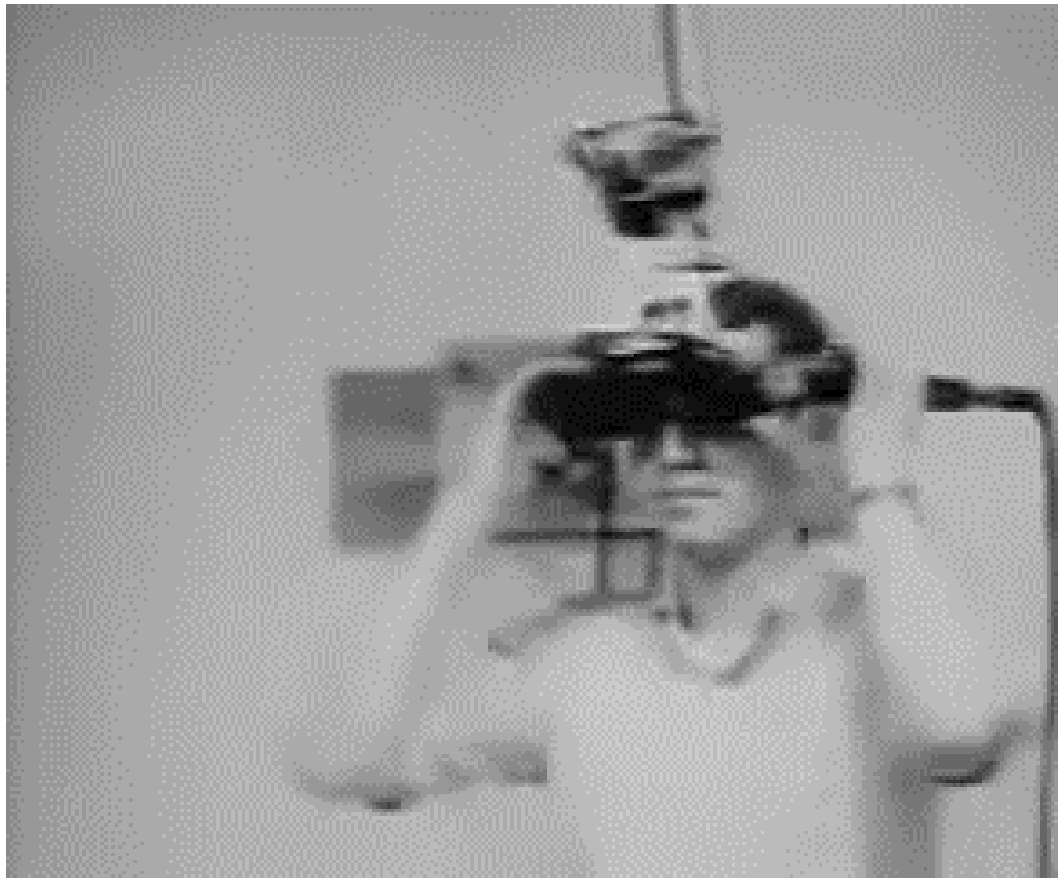


Then…..

Head mounted display, 1968



In action….



Now…..

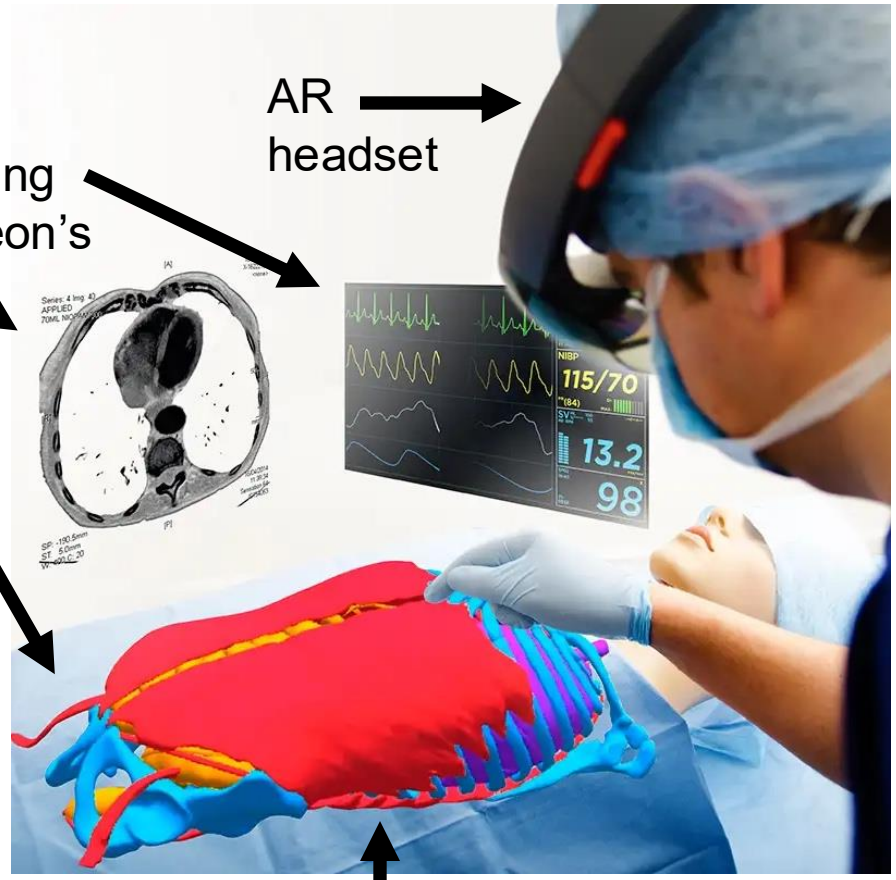
Current state-of-the-art

AR
Meta

VR
Apple

What is the major challenge?

Healthcare - surgery



Application

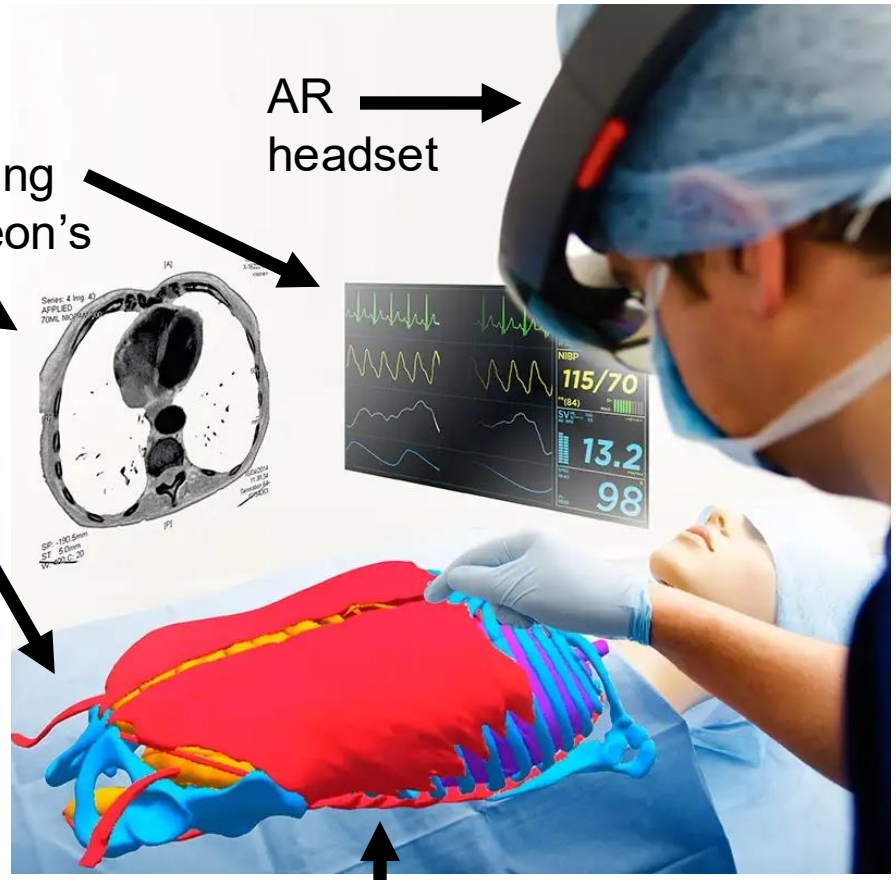
surgeon

the AR

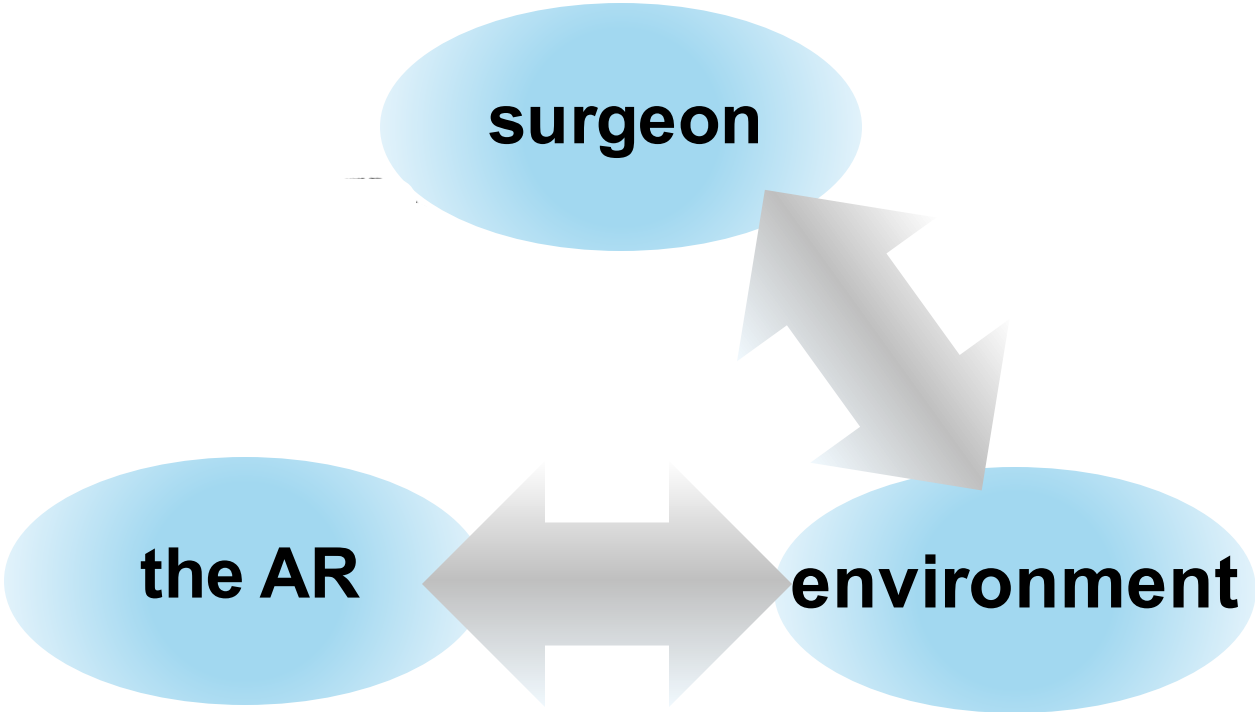
environment

What is the major challenge?

Healthcare - surgery

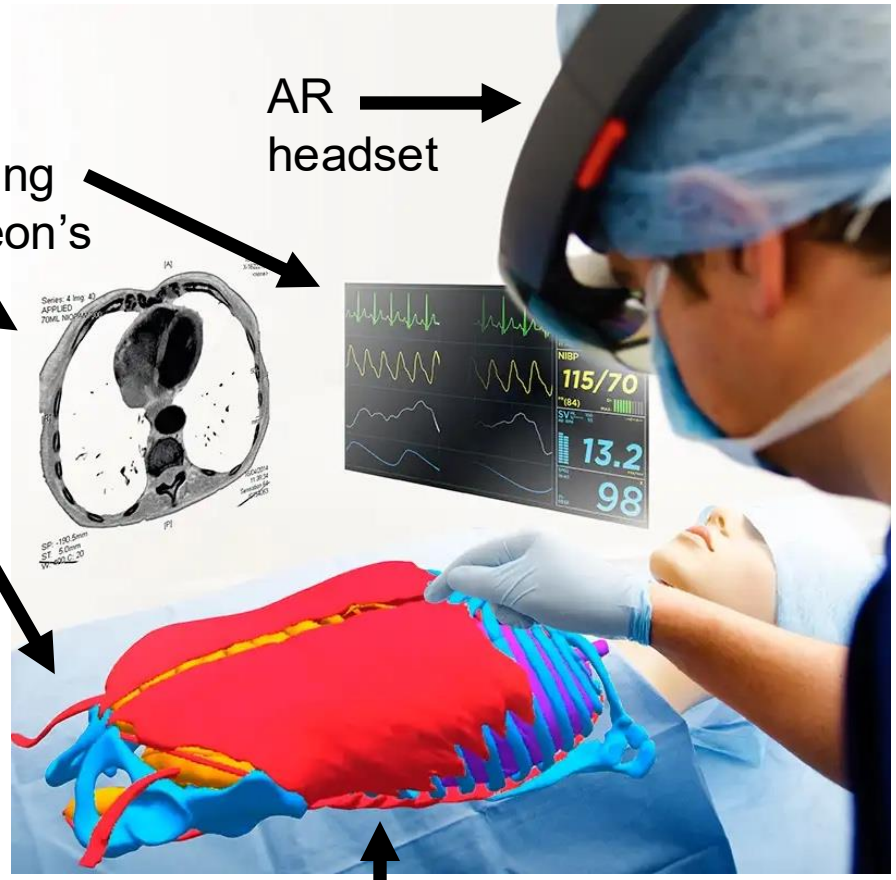


Application



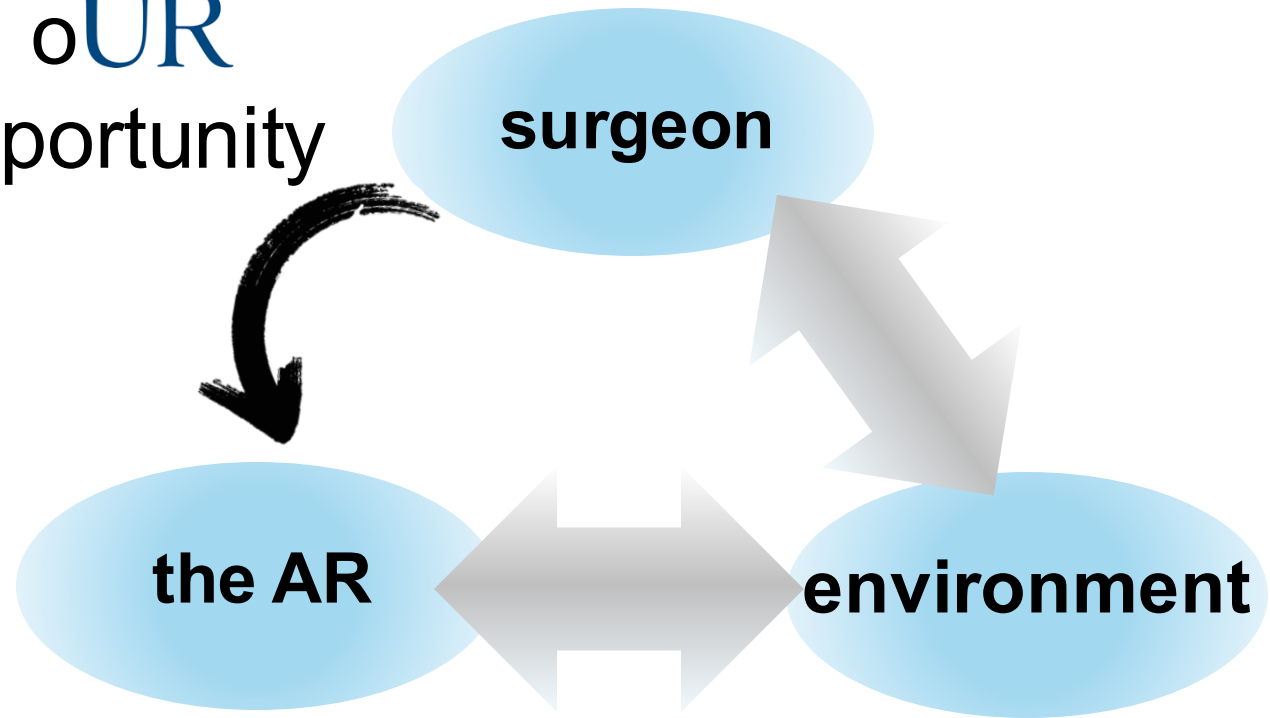
What is the major challenge?

Healthcare - surgery



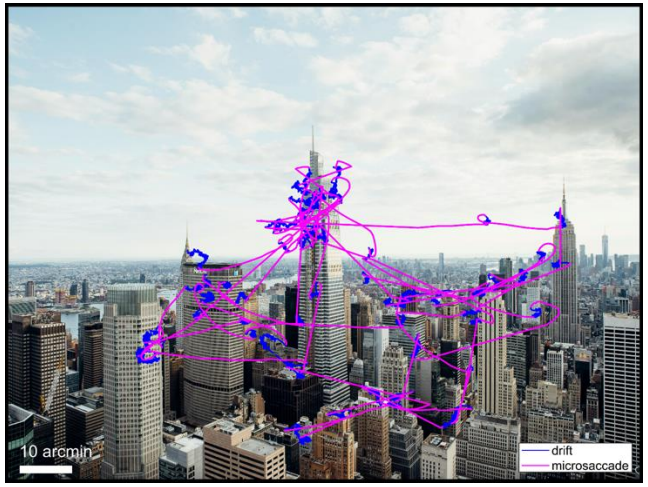
Application

oUR
opportunity



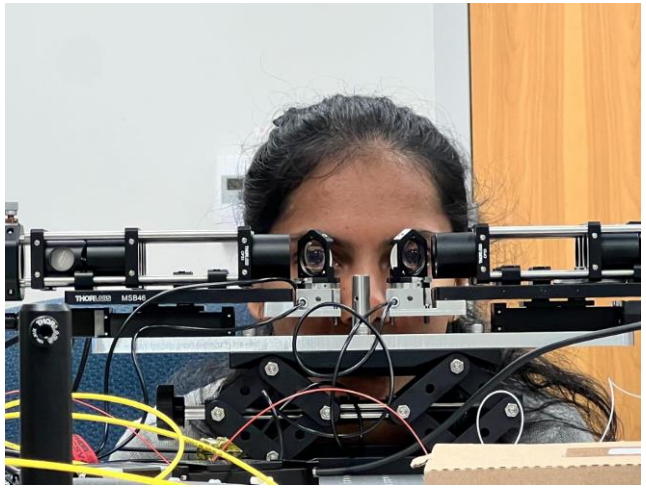
A sample of XR research at UR

Eyetracking & Perception



2024 Cozzarelli Prize

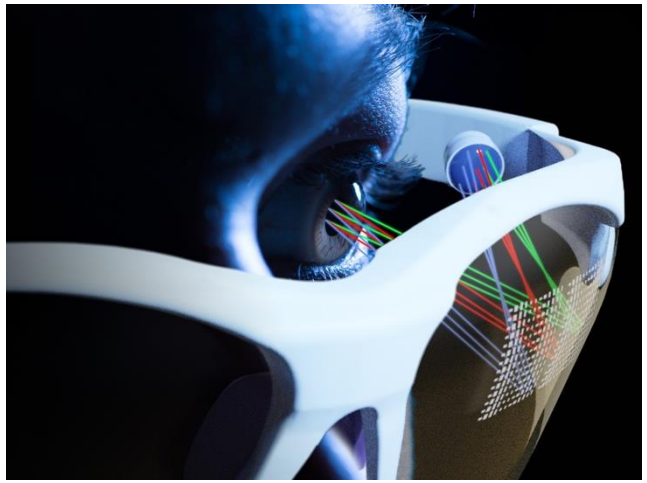
Vision Science



2023 Optica Edwin Land Medal

2025 Optica Edgar D. Tillyer Awardee

Near-eye displays



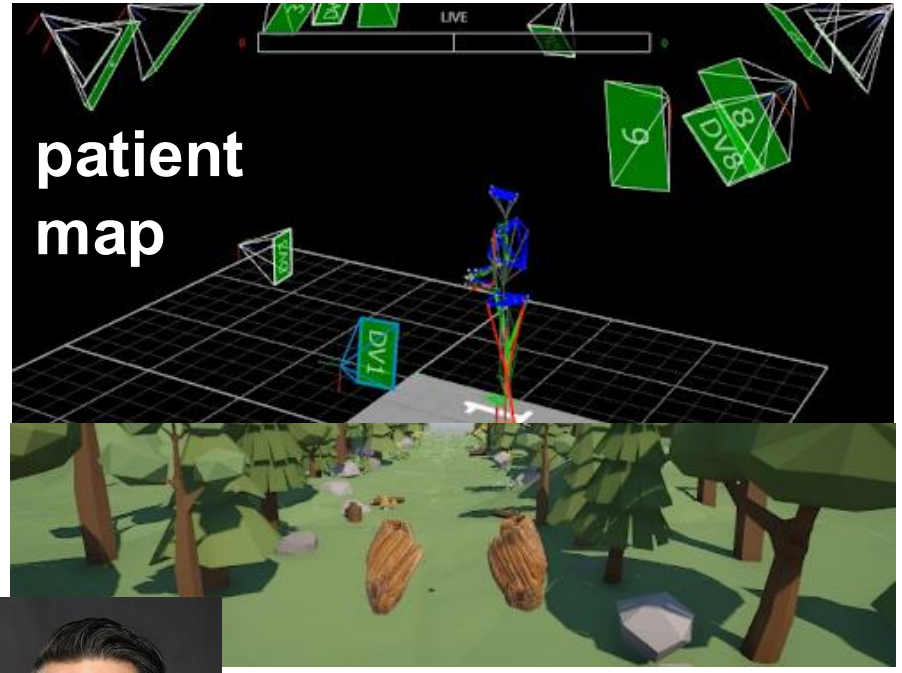
optics breakthrough of the year in 2021

In parallel…how to partner with Studio X?

Multisensory Perception

In parallel…how to partner with Studio X?

Physical therapy

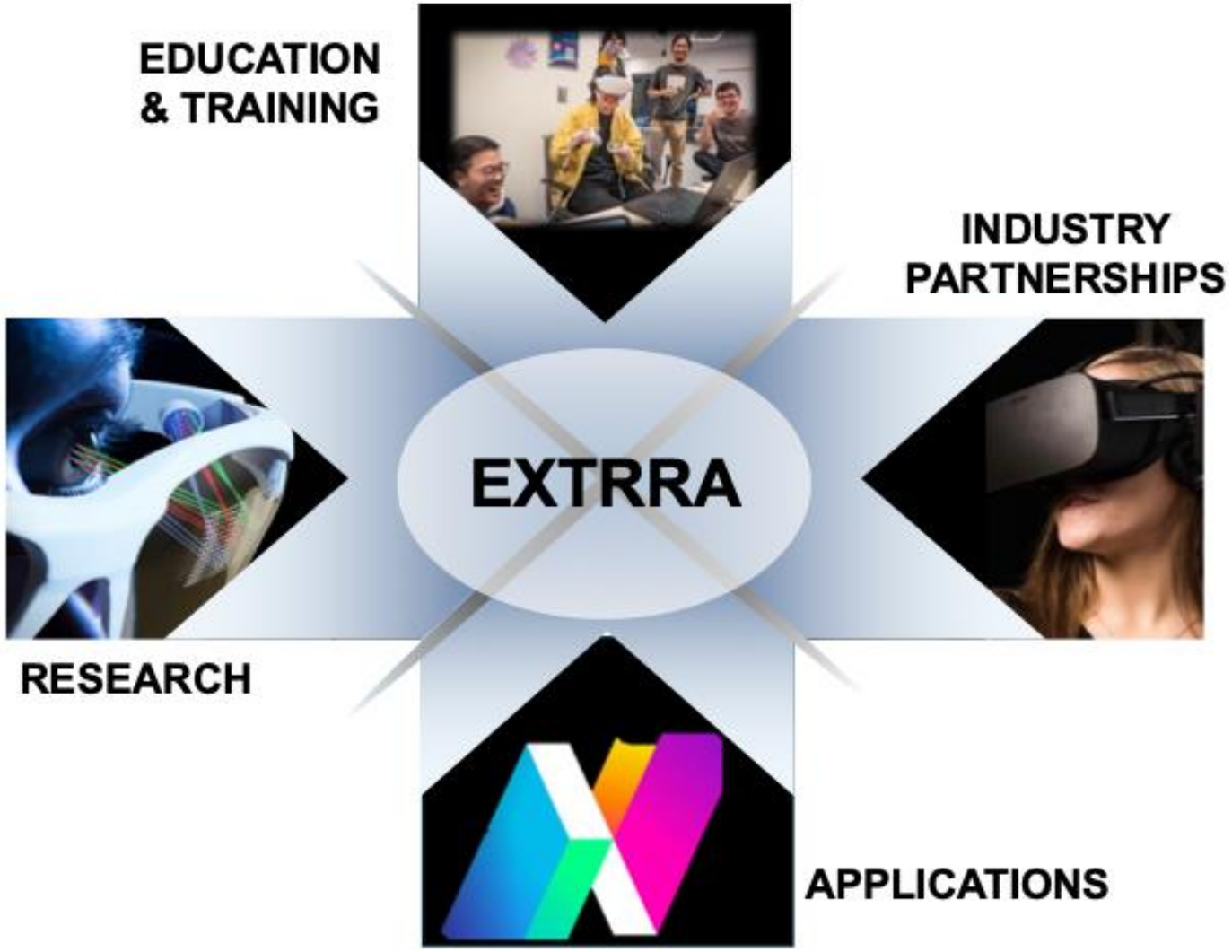


Studio X &
SMD Motion
Labs

UR Health Lab

Solving URMC
healthcare challenges
with technical innovation

EXTended **R**eality **R**esearch and **A**pplication (**EXTRRA**)



Vision: UR will be the global leader in extended reality — where cutting-edge transdisciplinary science and engineering research, applications, talent development and deep industry engagement converge to create extended reality innovation that is a force for society's benefit.

EXTRRA mission

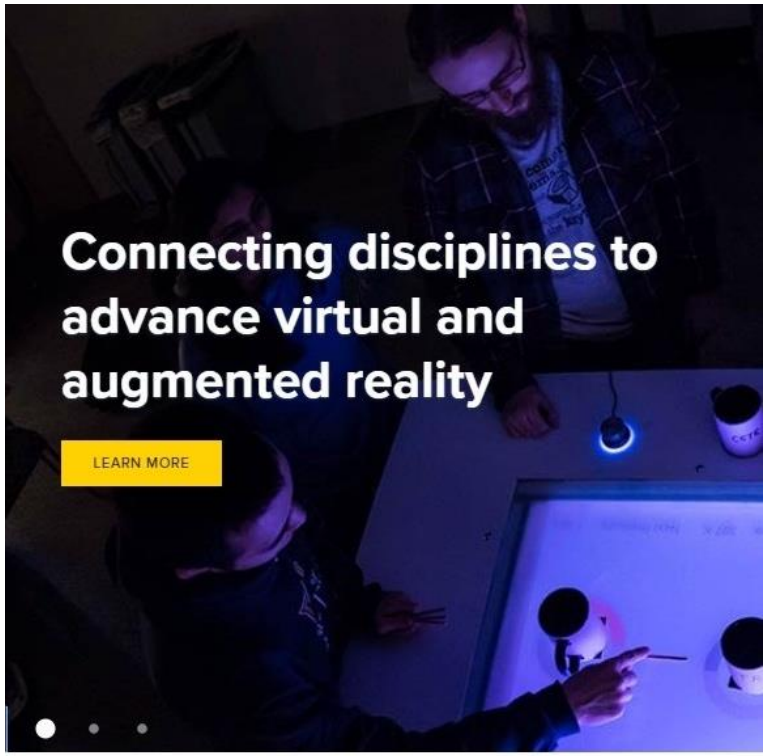
Accelerating transdisciplinary research: EXTRRA will enhance UR's international reputation through:

- Two core transdisciplinary research thrusts (top down)
- Pilot research program open to all UR faculty (bottom up)

EXTRRA mission

Increase XR users: In partnership with **Studio X** lower the entry barrier for using XR across campus with an initial focus on novel approaches to virtual experiential learning and research

EXTRRA mission



Education: Define UR as the global destination for education in immersive technology built off the existing NSF Research Traineeship (NRT) program:

- Create an immersive technologies MS with entrepreneurship focus
- A new undergraduate XR cluster
- A digital heritage humanities graduate degree
- Ethics and social impacts of XR
- Partner with Warner, Center for Learning in the Digital Age

EXTRRA's partnership with Studio X

Goal: Lower the barrier for the creative deployment of XR across UR and within Rochester

Partial Outcomes:

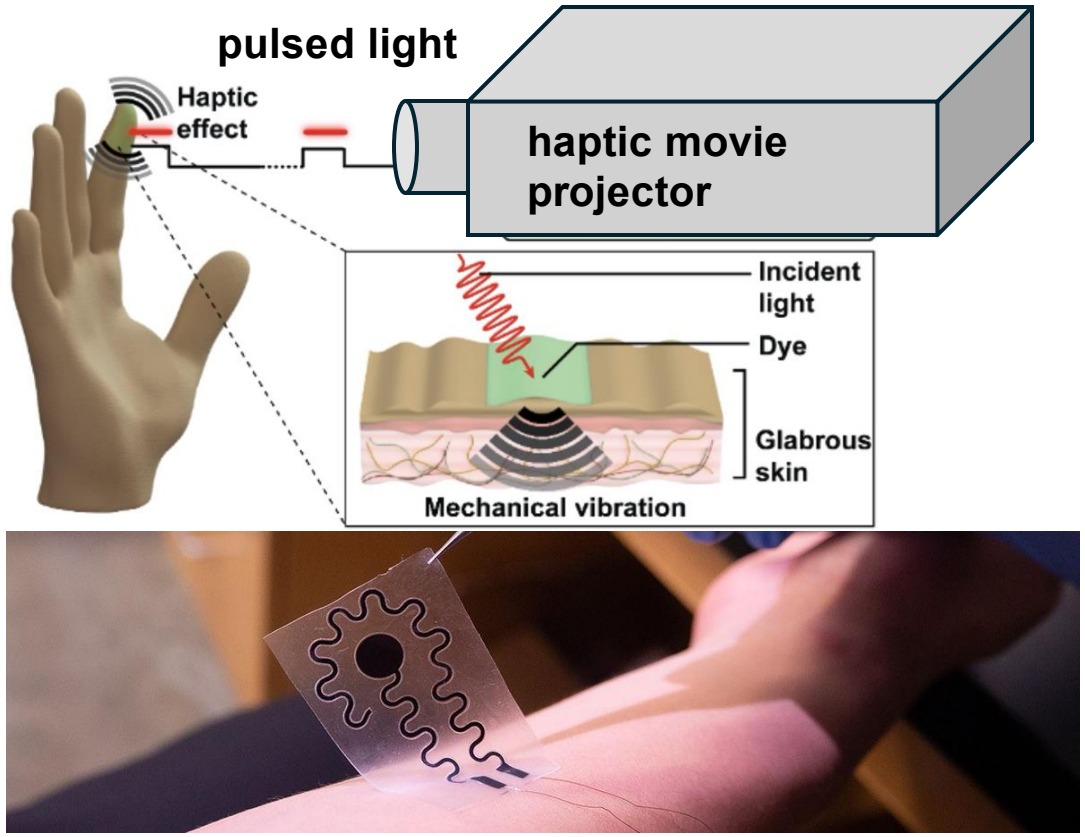
- Nano- and micro-fabrication VR training
- Neuroscience research & education
- Digital Docent, a heritage VR curation toolkit

Impact:

- Affordable entry to clean rooms
- Pathway into BCS
- Access virtual historical sites

Contributors*:* Studio X, Data Science, CS, ECE, History, Neuroscience, UR Nano

EXTRRA's VR transdisciplinary research



Goal: create virtual reality that is:

- Multimodal (engages multiple senses)
- Uses novel photoacoustic haptics

Science & Engineering Outcomes:

- Novel electrotactile nerve stimulation
- Photoacoustic "holography"
- Novel optical display that you touch
- Vestibular matched sound and touch

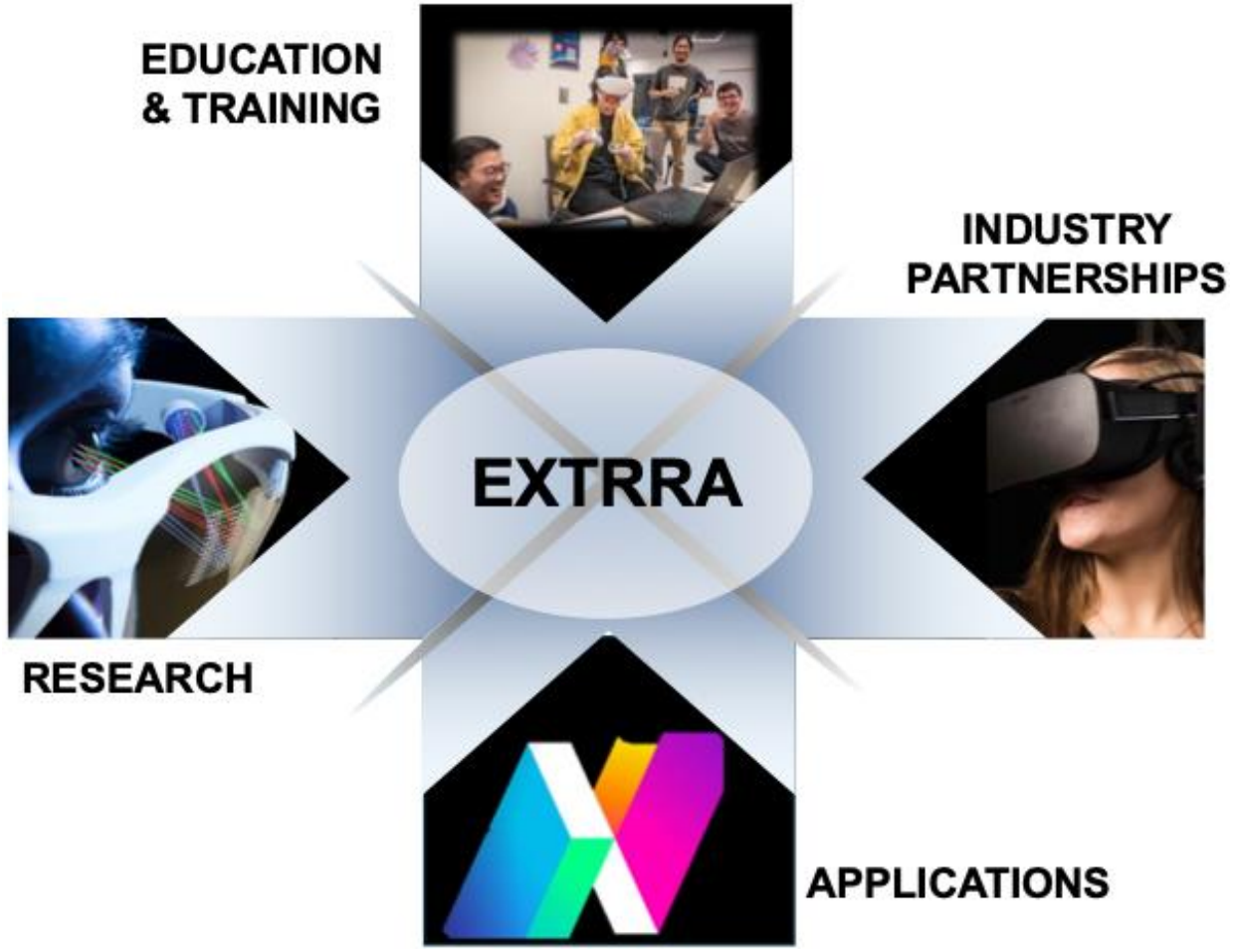
Impact:

- Explore remote/inhospitable environments
- Advanced manufacturing training
- Rational drug development

Contributors*:* Chemical Eng, Optics, Brain and Cognitive Science, Computer Science, Data Science, Electrical Engineering, Materials Science, ***Studio X***

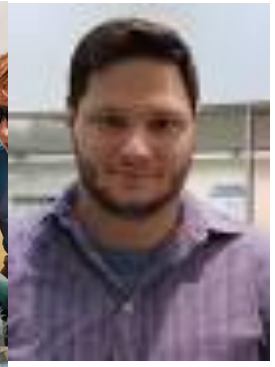
EXTRRA will…

The Transdisciplinary Center for **EXT**ended **R**eality **R**esearch and **A**pplication (**EXTRRA**)



- make UR the global XR leader
- solve key transdisciplinary XR science and engineering research challenges at the human-information interface
- unlock and expand creative XR applications across UR
- create transdisciplinary XR education programs
- cultivate deep industry relationships
- enhance the UR's reputation
- identify differentiated revenue generation pathways

EXTRRA already has…



Daniel Nikolov

Ethan Hundley

- helped recruit a new optics faculty member Barry Silverstein
- a collaboration with Spectacles AR for existing AR/VR courses (ECE/OPT410, CSC211, CSC211); (Daniel Nikolov & Studio X)
- 3 FTE graduate students
- 1 undergraduate (Ethan Hundley) researching eye-tracking
- started supporting a Studio X XR Developer
- joined AR Alliance
- targeting NSF “growing convergent research” grant, 2/2026