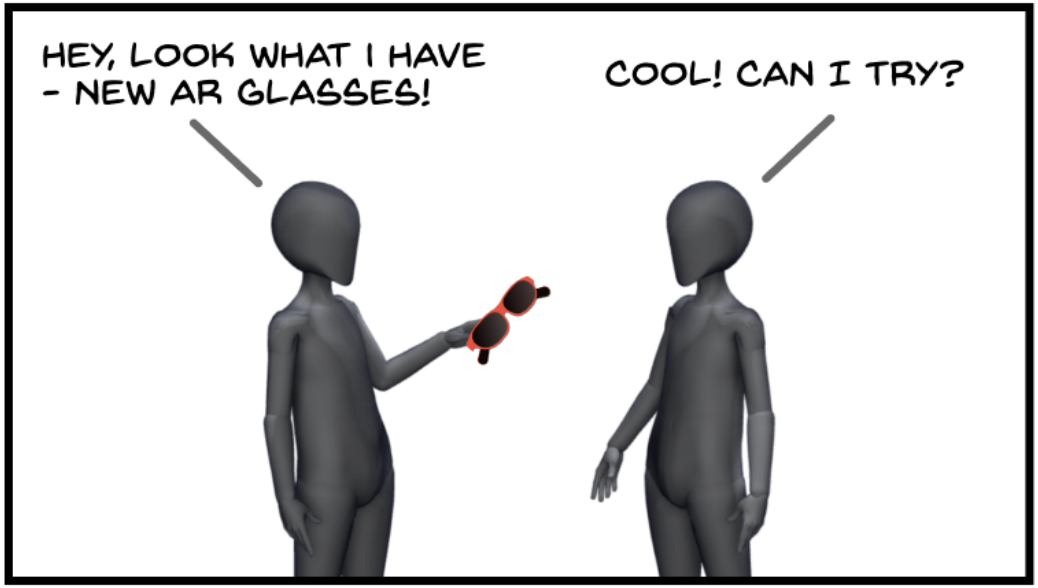
1st Joint Workshop on Cross Reality, ISMAR 2023

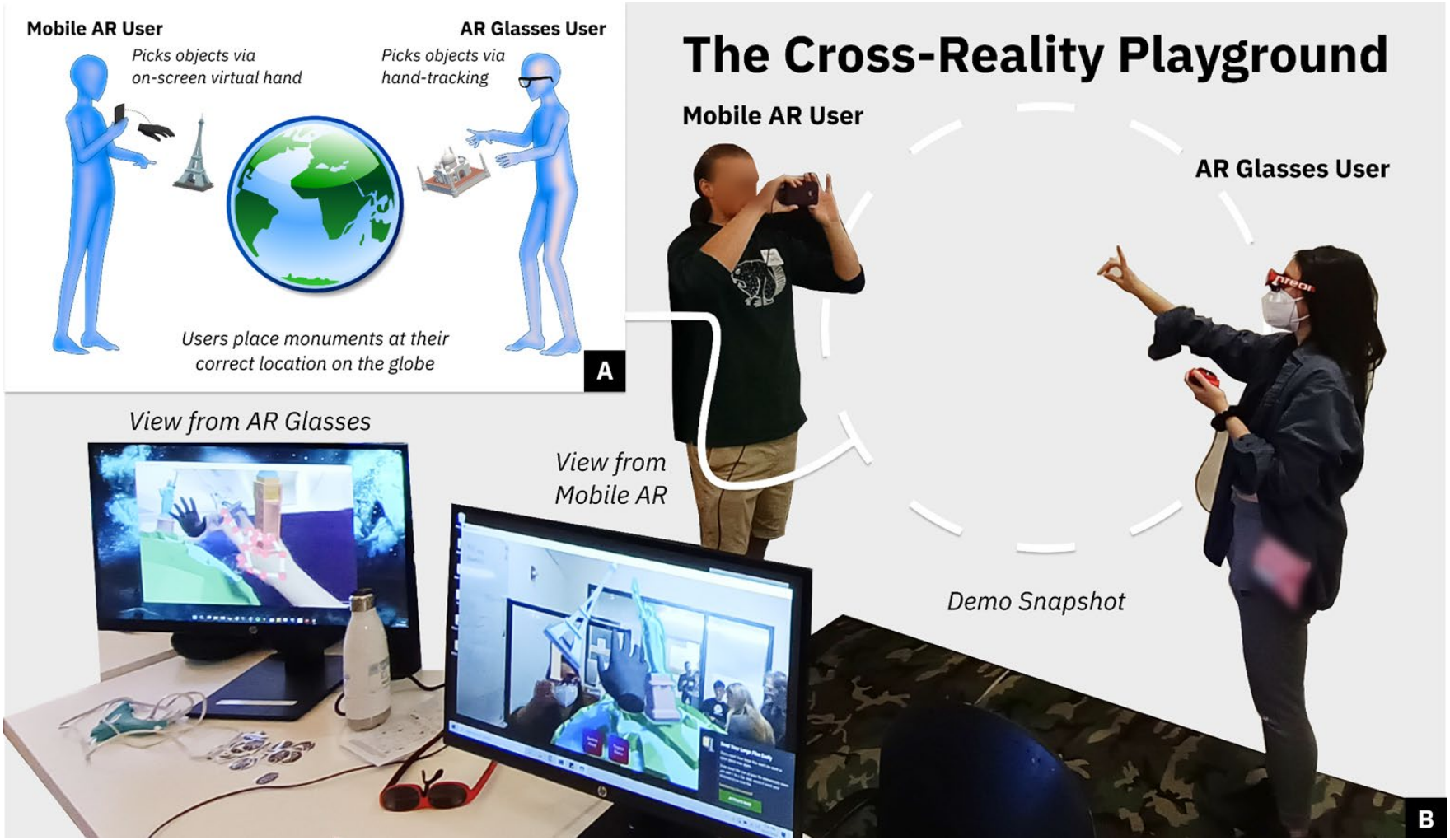
Exploring the use of **Mobile Devices** as a **Bridge for Cross-Reality Collaboration**

Rishi Vanukuru & Ellen Yi-Luen Do
ATLAS Institute, University of Colorado Boulder, USA

ATLAS


HEY, LOOK WHAT I HAVE - NEW AR GLASSES!
COOL! CAN I TRY?

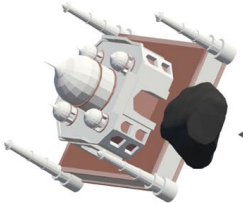
SURE, IN AN HOUR MAYBE, I WANT TO USE THEM FIRST.
OH, OKAY.

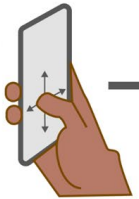

Mobile AR User
Picks objects via on-screen virtual hand
AR Glasses User
Picks objects via hand-tracking
Users place monuments at their correct location on the globe
A
The Cross-Reality Playground
Mobile AR User
AR Glasses User
View from AR Glasses
View from Mobile AR
Demo Snapshot
B

Mobile Picking Interaction

Move thumb up/down to rotate about X axis

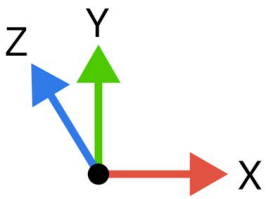
Virtual Hand and Object

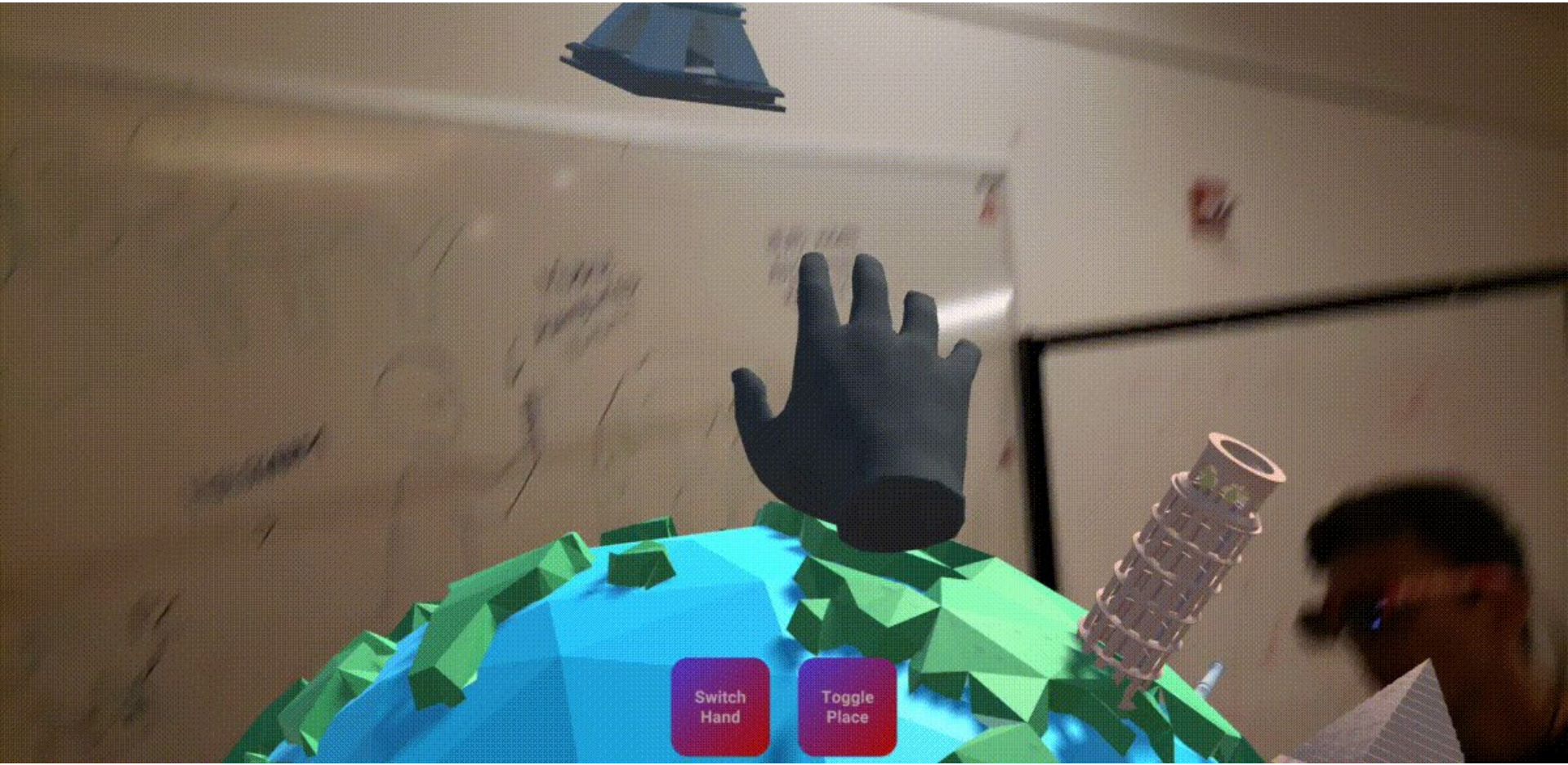




User hand and phone

Move thumb left/right to rotate about Z axis




Switch
Hand
Toggle
Place

50+ people
Two major demo days
Multiple in-lab sessions

Introduction to AR

Ground HMDs in the present,
elevate the opinion of Mobile AR.

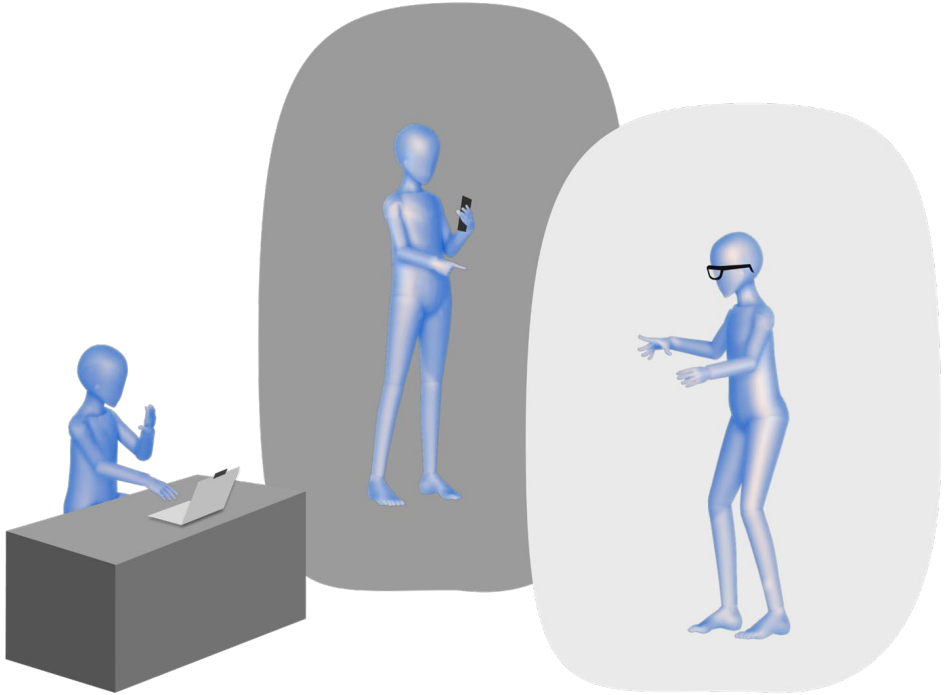
New configurations for social interaction

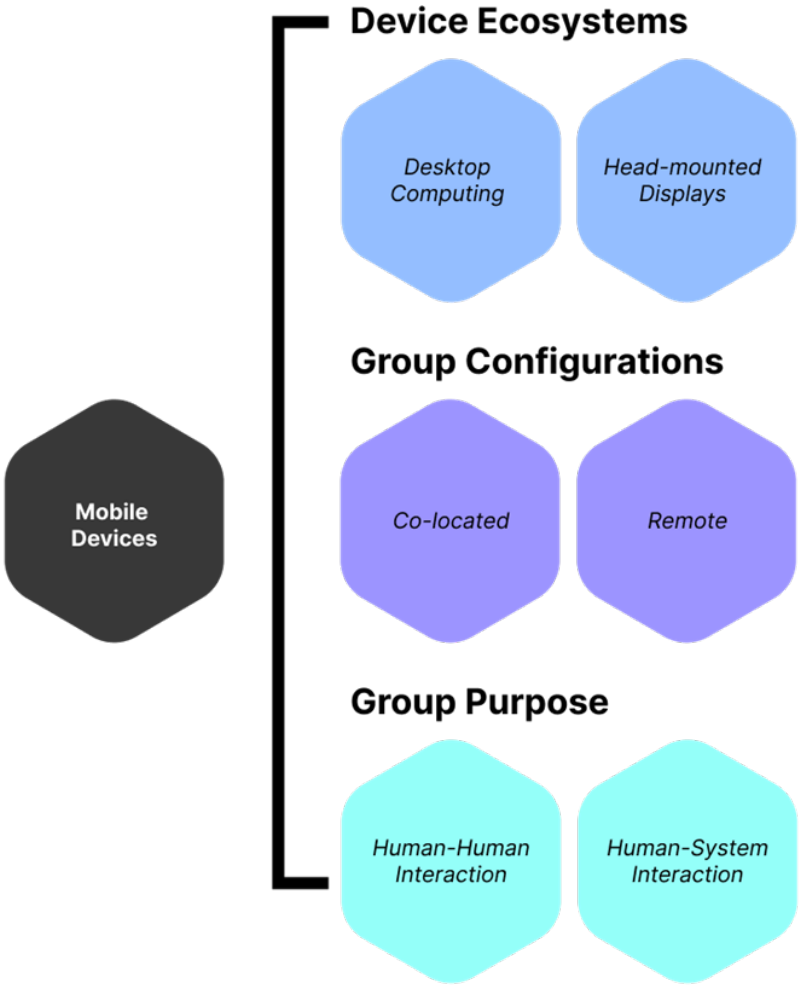
Families, children, grandparents …

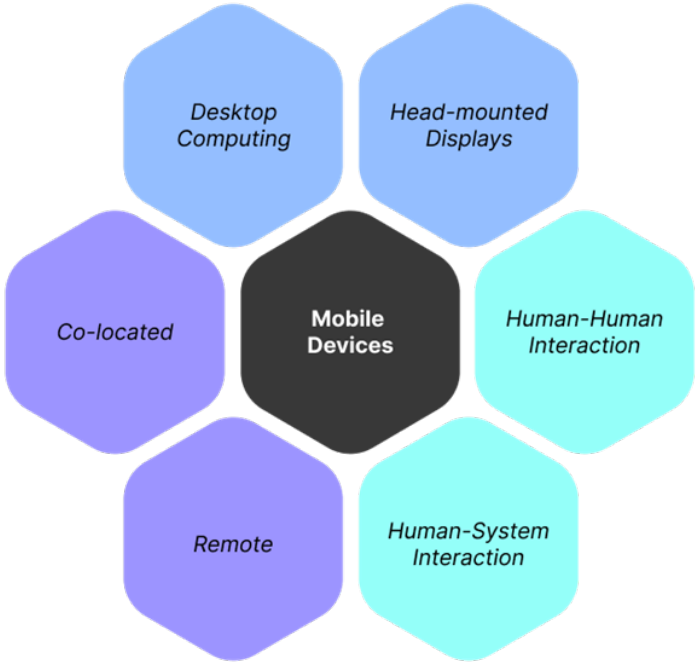
Enable a wider range of users to imagine a future where spatial computing is more integrated into everyday life.

Mobile AR as a bridge

For Cross - Reality systems




Mobile Devices
Device Ecosystems
Desktop Computing
Head-mounted Displays
Group Configurations
Co-located
Remote
Group Purpose
Human-Human Interaction
Human-System Interaction


Desktop Computing
Head-mounted Displays
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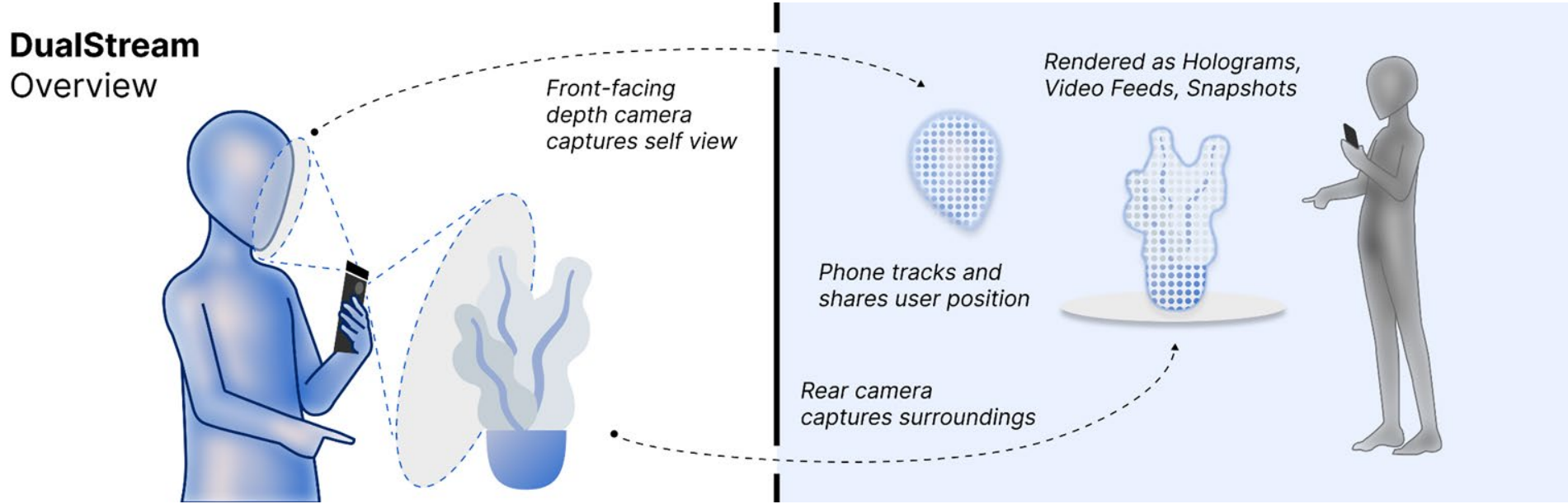
Human-Human Interaction
Remote
Human-System Interaction



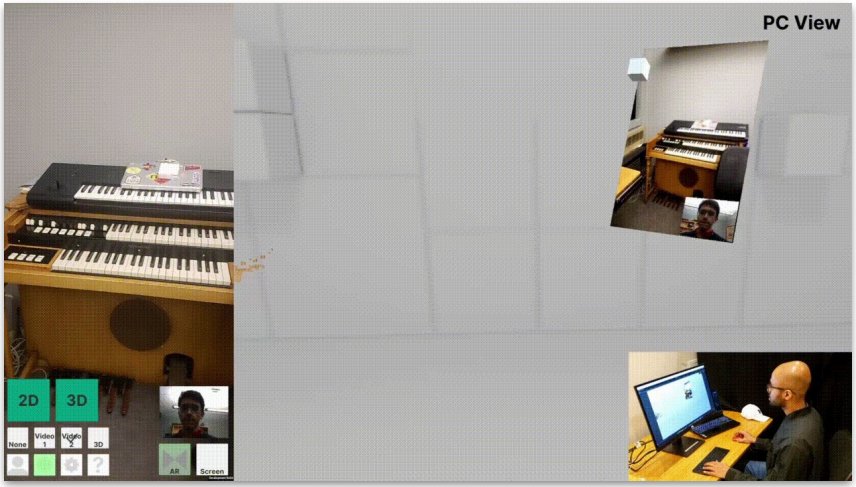
DualStream: Spatially Sharing Selves and Surroundings using Mobile Devices and Augmented Reality

PS10 Remote Collaboration, Telepresence and Teleoperation
Wednesday Morning, Leigthton Hall

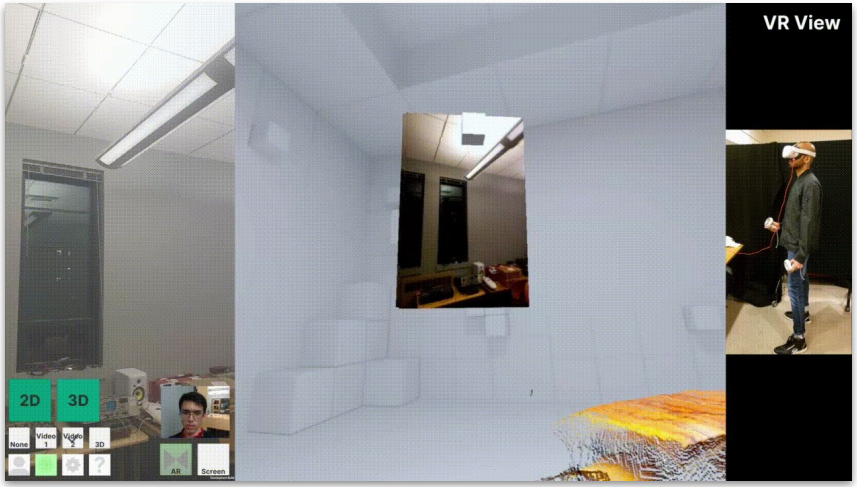
Mobile AR as a bridge

For Cross - Reality systems ->

Mobile AR - PC

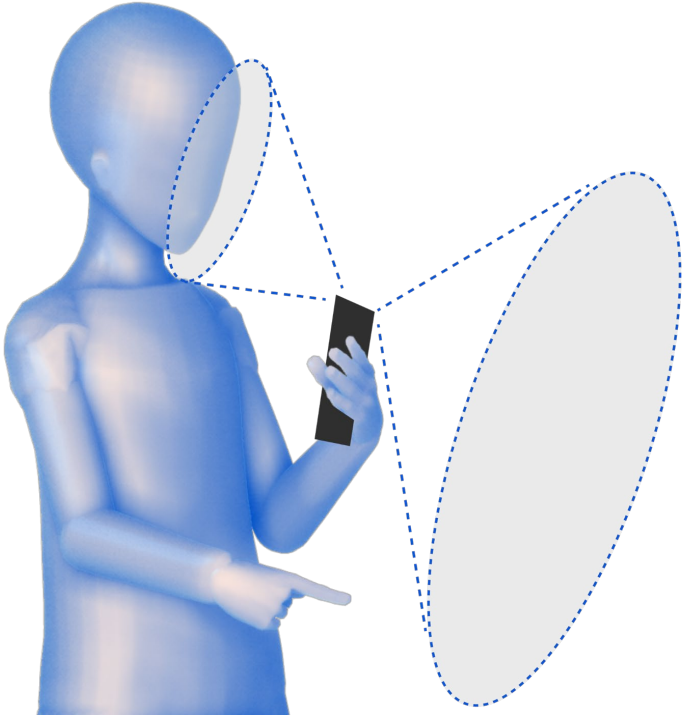


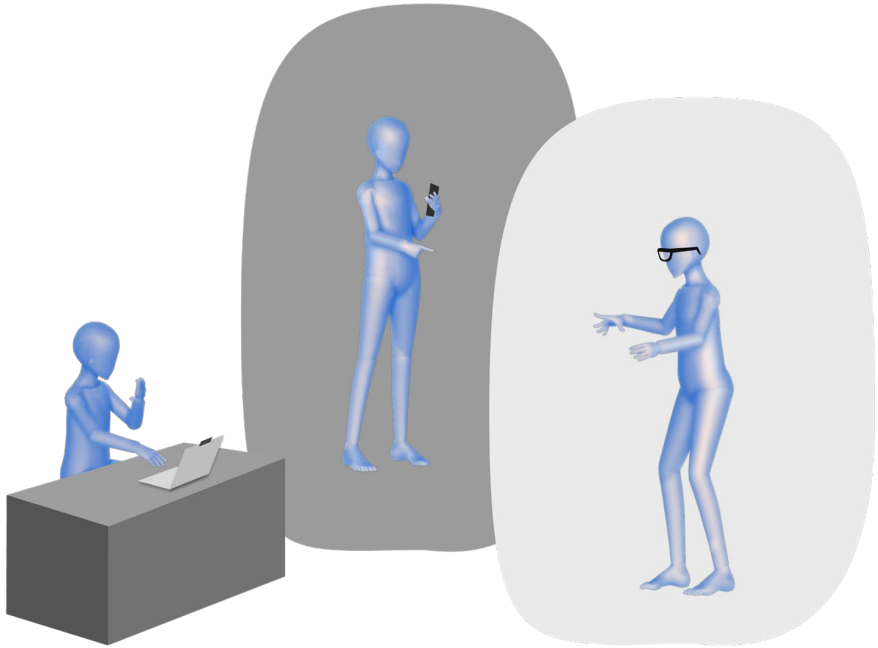
Mobile AR - VR



Mobile AR as a bridge

Maximize the potential of mobile spatial computing …





Mobile AR as a bridge between modalities, computing paradigms.

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Thank you!

rishivanukuru.com/cross-reality-23

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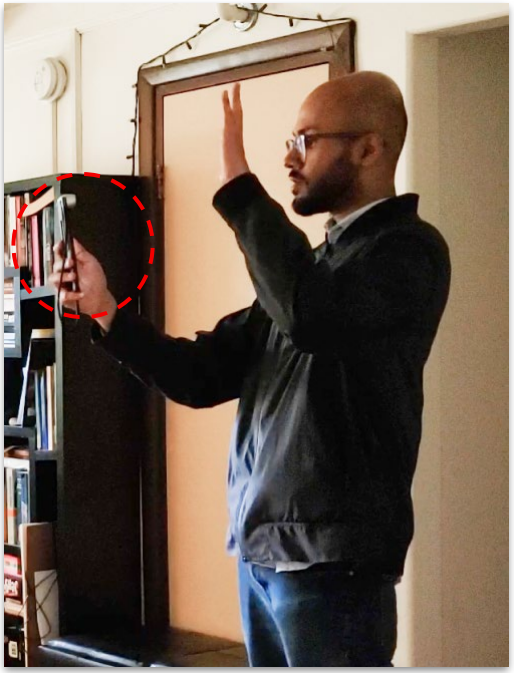
Bonus Slides

Torin
Outdoors, engine issues



Rishi
At home, engine expert*

Sharing remote objects via 3D holograms

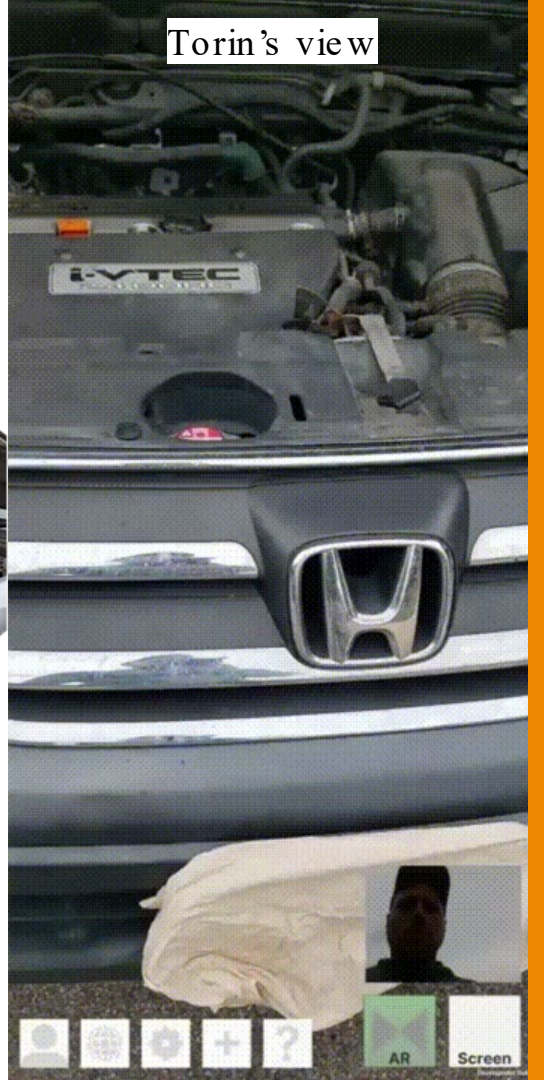
Torin - Outdoors

Rishi - Home

Sharing remote objects via 3D holograms

Torin - Outdoors

Torin's view

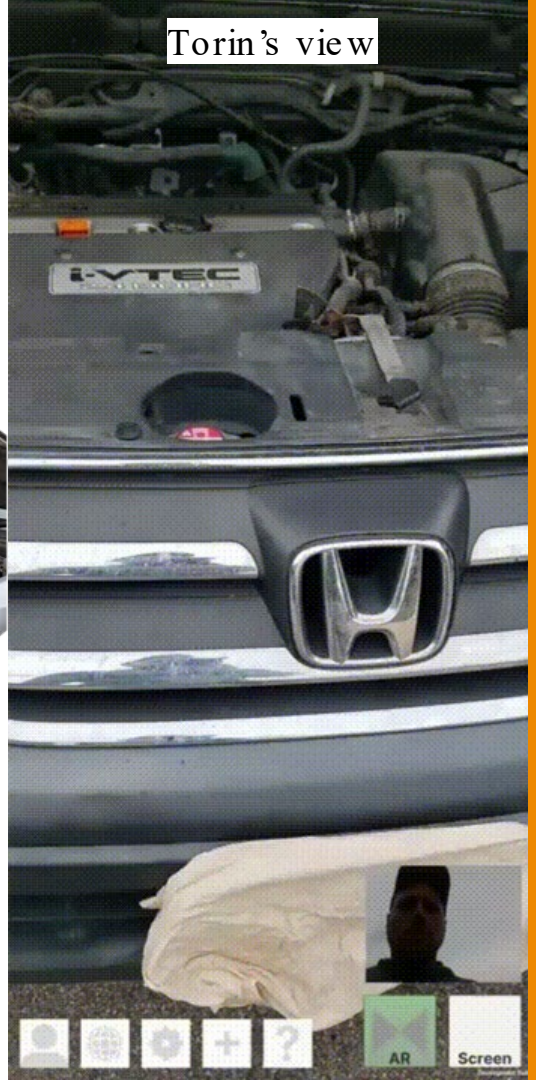


Rishi - Home

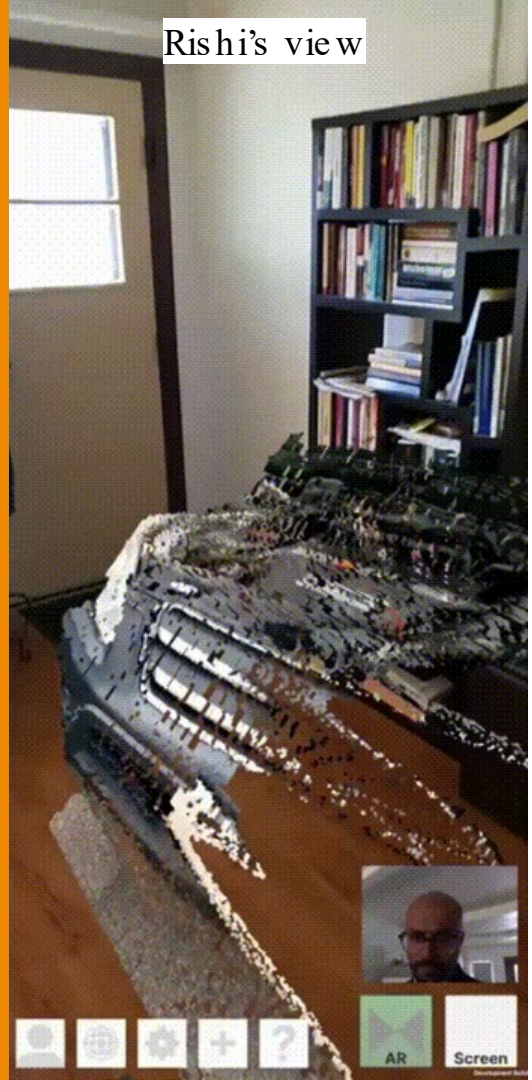
Sharing remote objects via 3D holograms

Torin - Outdoors

Torin's view



Rishi's view



Rishi - Home

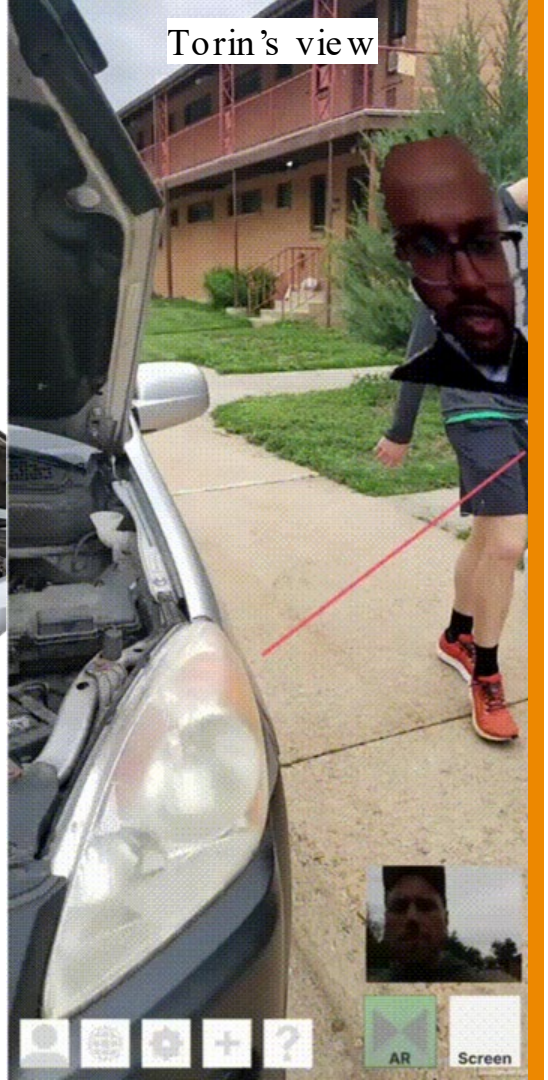
Remote assistance
via holograms,
snapshots, pointing

Torin - Outdoors

Rishi - Home

Remote assistance via holograms, snapshots, pointing

Torin - Outdoors

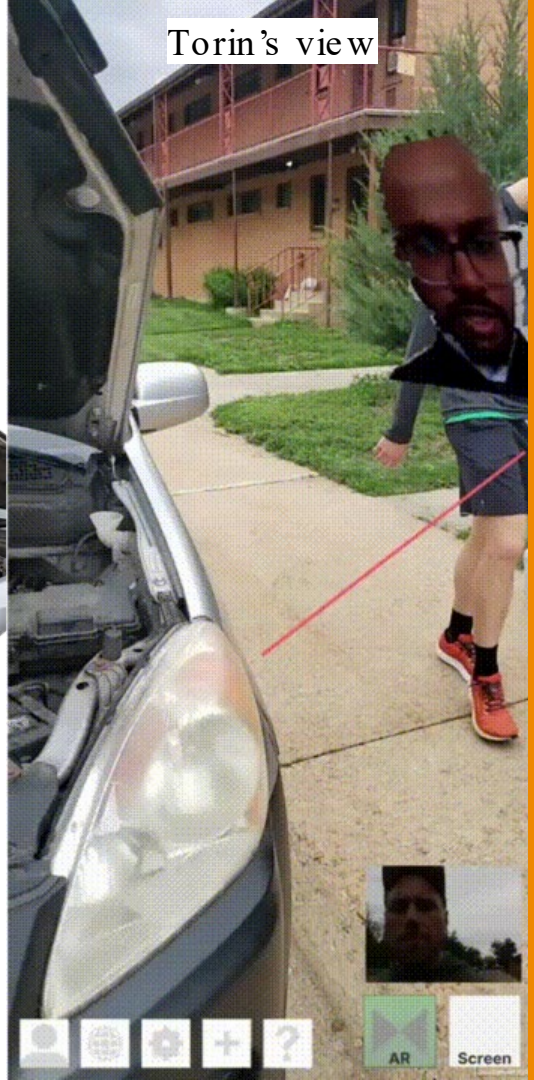


Rishi - Home

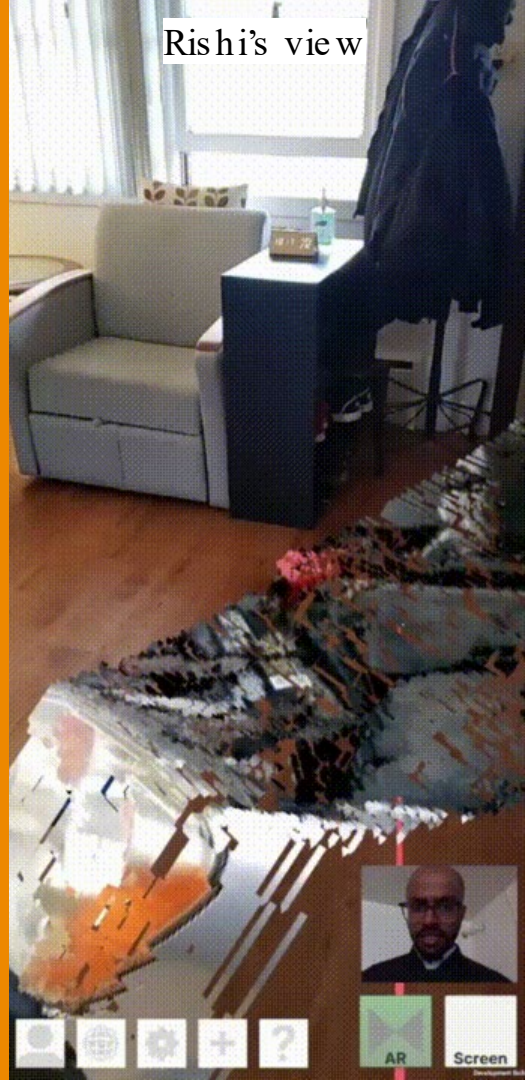
Remote assistance via holograms, snapshots, pointing

Torin - Outdoors

Torin's view



Rishi's view

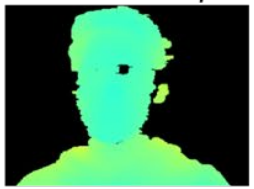


Rishi - Home

Self *from RealSense*

Color

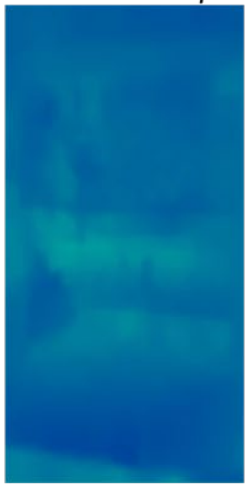
Colorized Depth



Surroundings *from AR Core*

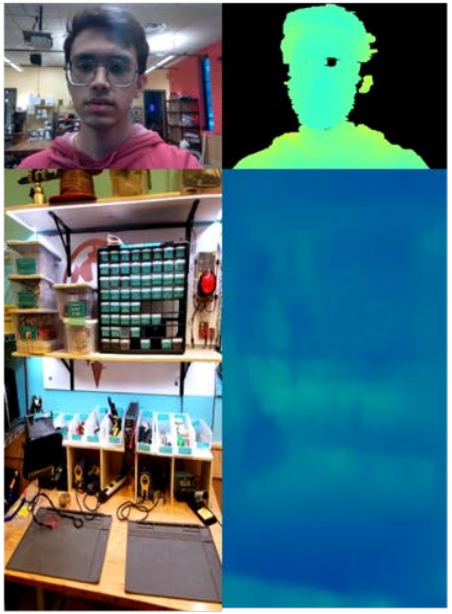
Color

Colorized Depth



Spatial Interactions
AR Core & Unity

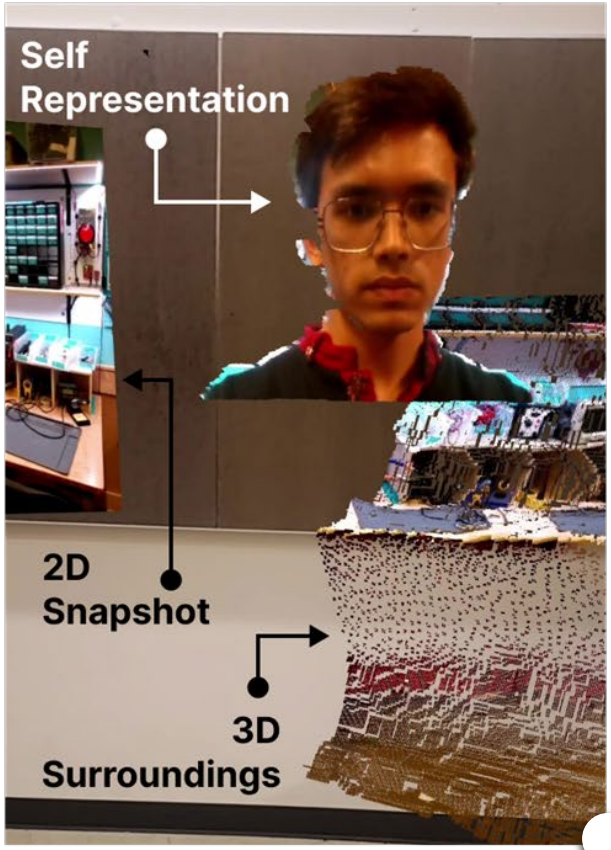
Composite Audiovisual Frame Streamed via Agora



Networked Pose & Messages sent via Photon Fusion

Combined Data Processing + Rendering

DualStream



AMAR
RICHA
NOOPUR
PRATITI

hello
2 people
HAND
PICK
RAY