When Virtual Reality Meets the Classroom:

What Happens Next?

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INDIANA UNIVERSITY BLOOMINGTON

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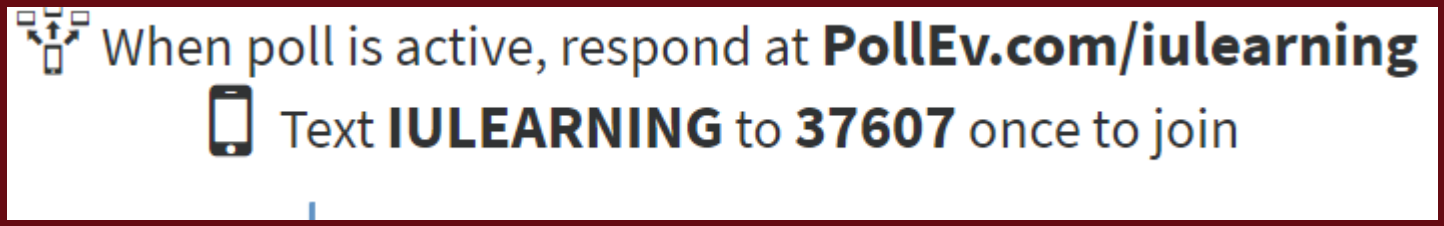
Where are you at with virtual reality?

- Curious
- Just getting started
- Implemented a variety of models
- Advanced – fully implemented



Mosaic

Indiana University's Active Learning Initiative

Mosaic classrooms represent a rich variety of learning spaces that meet widely varying instructional needs—much like the unique tiles that comprise a mosaic.

The Mosaic Initiative is IU's active learning Initiative inspired by and tied to Mosaic classrooms.

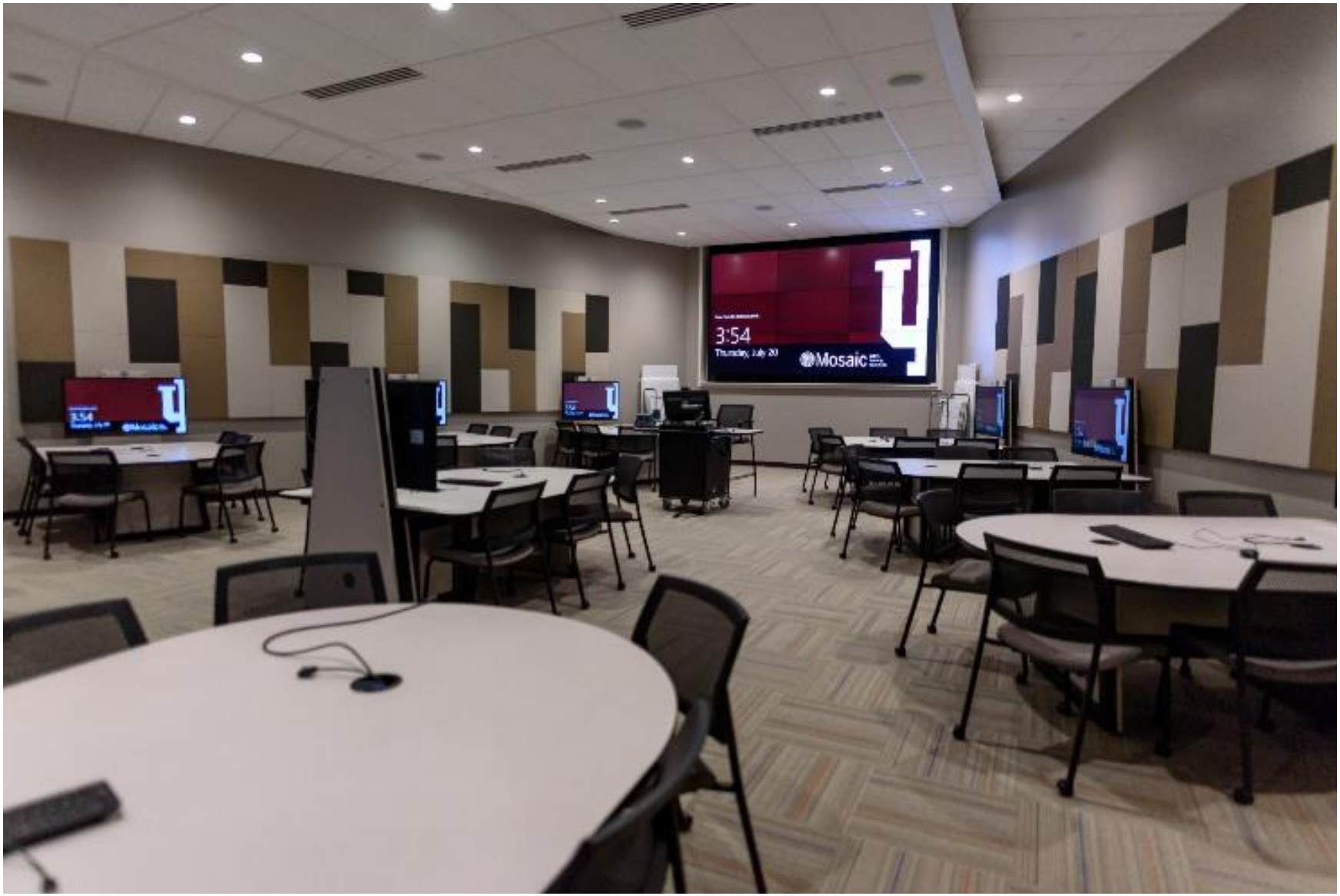
"We believe space matters. We think that the classrooms should be more than four walls and chairs. Diverse tech-rich spaces can expand the boundaries of learning and encourage new ways of thinking."

--Indiana University Learning Space Design Team

| active learning space

mosaic.iu.edu


INDIANA UNIVERSITY
UNIVERSITY INFORMATION TECHNOLOGY SERVICES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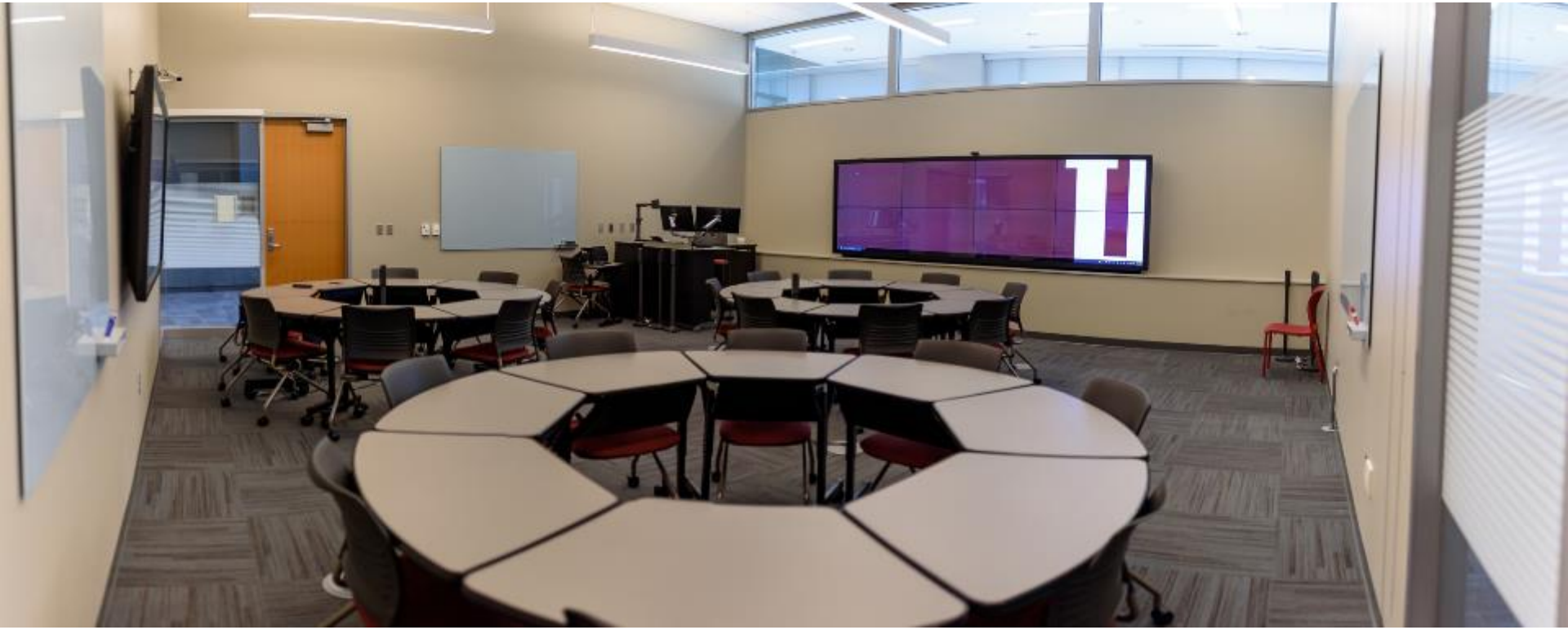
Mosaic

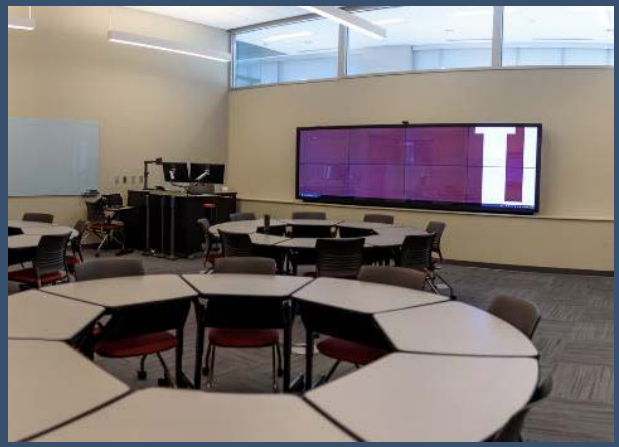



FULFILLING the PROMISE

Informal Spaces

Classroom Spaces

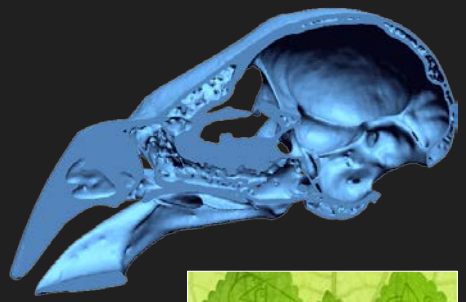
Collaboration

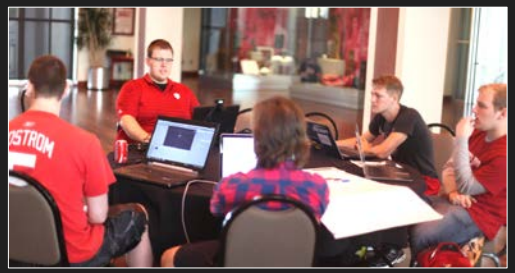


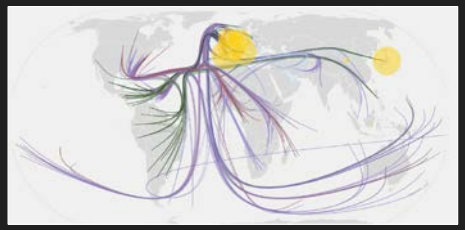
Tracking Installed

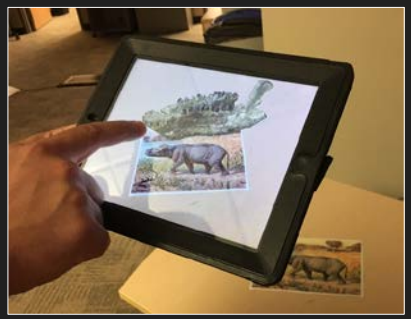
Research Technologies
Advanced Visualization Lab (AVL)

Main support unit for visualization activities and technology at IU









Research Technologies
Advanced Visualization Lab (AVL)

20 year history supporting visualization and virtual reality (founded 1997)

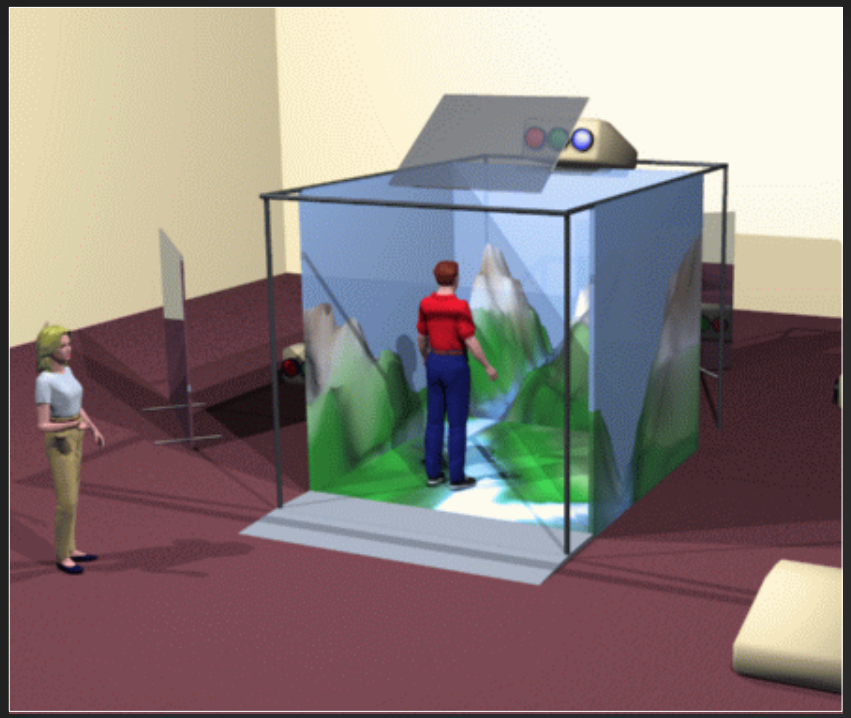
Evolving Technology Strategy

- 1997 – mid early 2000s: “Flagship” facilities only
- mid 2000s – early 2010s: Distributed visualization initiative
- mid 2010s – forward: balance of Flagship and Distributed

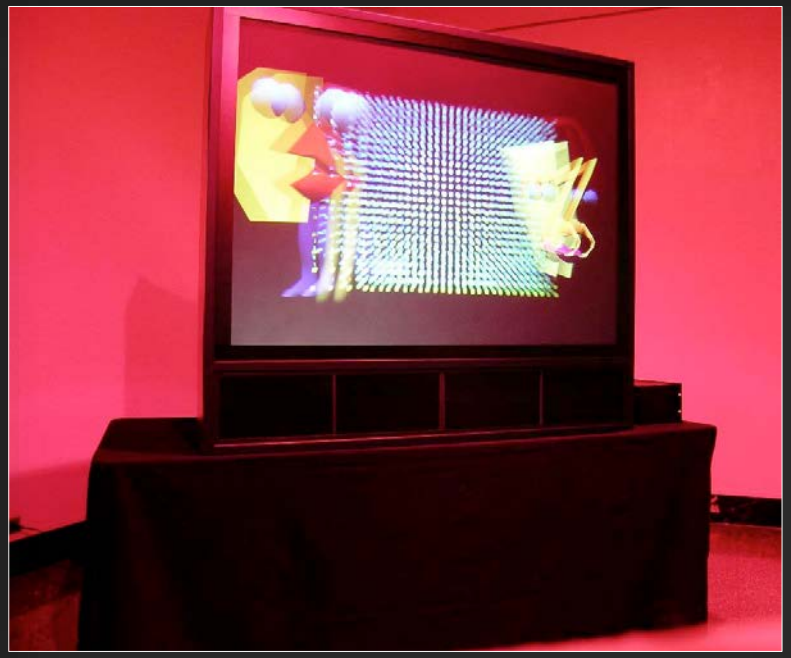
AVL - Tech Strategy Influences

- User Access
- Ease of Use
- Utility across many domains → software
- Commoditization & innovation of technology
- Costs – initial acquisition & refresh; remodeling costs
- Support model – staff, OS, software
- Space (!)
- Impact – users, decision makers, general public

AVL Flagship Facilities – c. 1997



AVL Distributed Vis – c. 2002-2008



AVL Distributed Vis – c. 2011

Currently 13 IQ-Walls on 2 IU campuses + external collaborators

Global Network Operations Center

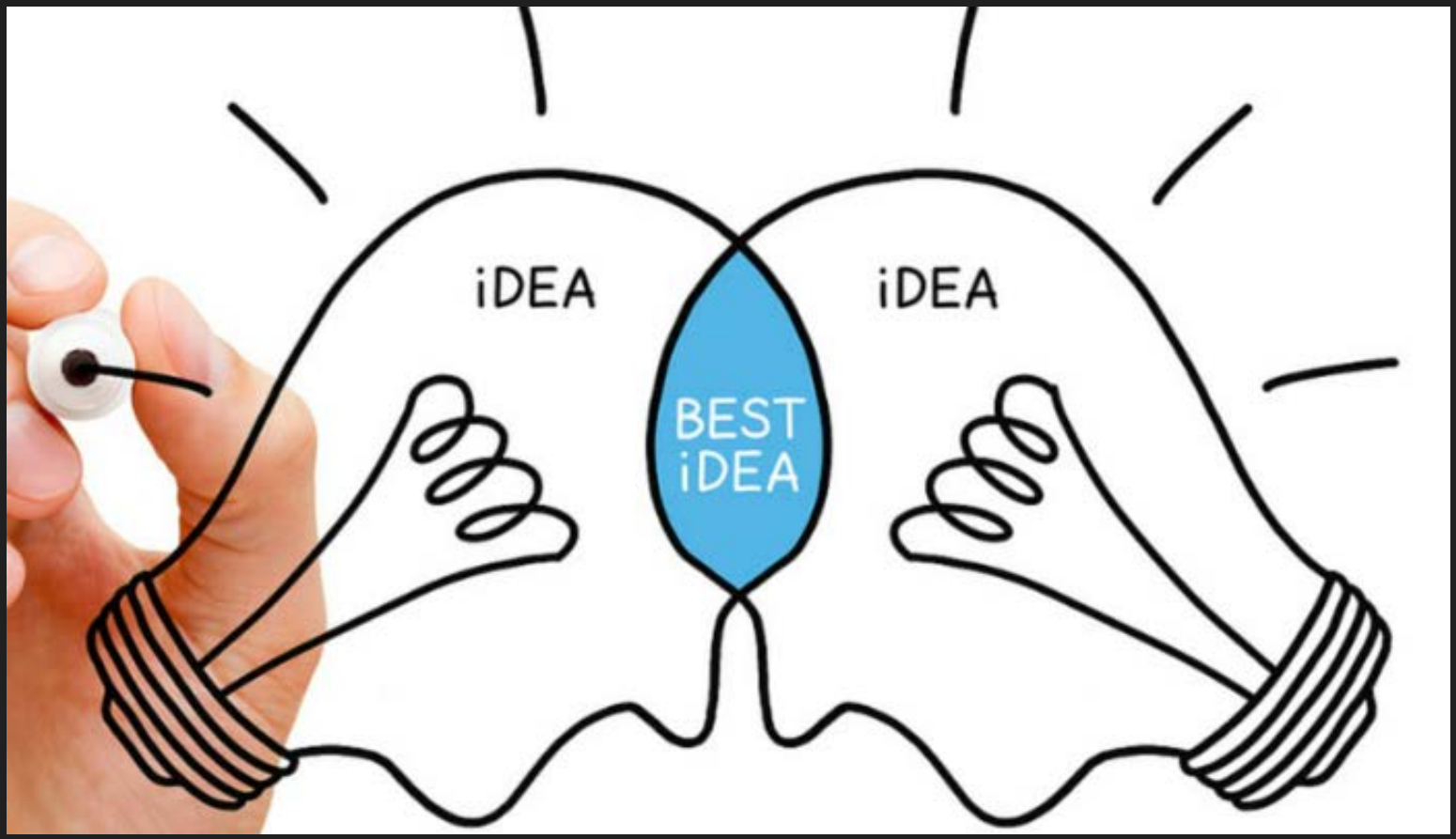
Cyberinfrastructure Building

Global & International Studies Building

Mathers Museum of World Culture

AVL Balanced Vis Strategy – present

Reality Labs – Born from Collaboration



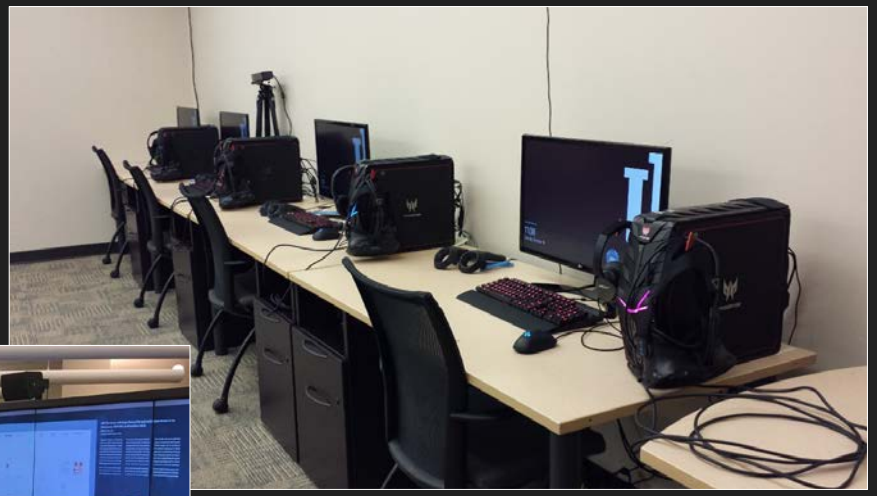
Why now?

- Inexpensive VR hardware
- Large and accessible VR software library

School of Media
FH 052 (classroom)




Advanced Visualization Lab
ICTC 414 (lab)



Advanced Visualization Lab
ICTC 403 (lab)

So what are Reality Labs?

- Classroom or lab spaces that contains some number of Reality Stations
- Hardware components of a Reality Station
  - VR equipment (tracked display + interface devices)
    - Currently prefer HTC Vive HMD, but workflows support Oculus Rift too
  - VR-capable computer
    - Acer and now MSI
  - High-quality monitor
    - High refresh, 4K, HDR

Software environment

Reality Stations are configured for VR,
but are great for non-VR uses too...

Windows software

- Unity & Unreal
- Adobe Creative Suite
- Microsoft Visual Studio
- Microsoft Office
- Web browsers
- Misc. utilities

30+ Steam VR applications

- Art & museum apps
- Simulations
- Media players
- Select games & experiences that demonstrate unique interfaces/capabilities of VR

Roles in supporting Reality Labs

- Learning Technologies
  - Student Technology Center
    - Reality Lab installation
    - Computer software builds, including Windows OS and Windows software
  - Technology Center Consulting
    - Routine check-ups (cable maintenance and cleaning)
- Research Technologies
  - Advanced Visualization Lab
    - VR tracking installation
    - Training material for installation & maintenance
    - Identify/develop/document VR software & workflows (Steam apps, Unity)
    - Advanced/custom user support on a per-project basis

Where are Reality Labs?

Location	*Type of space*	*# of Stations*	*Campus*
School of Art, Architecture + Design – 2017	Classroom	1	IUB
Media School – 2017	Classroom	10	IUB
School of Art, Architecture + Design – 2017	Classroom	10	IUB
UITS Advanced Visualization Lab – 2017	Lab	2	IUB
UITS Advanced Visualization Lab – 2017	Lab	8	IUPUI
School of Art, Architecture + Design – 2017	Lab	2	IUB
UITS 3D Print & Modeling Lab – 2017	Lab	6	IUB
UITS Idea Garden – 2018	Lab	2	IUPUI
School of Informatics & Computing – 2018	Classroom	14	IUPUI
Additional classrooms & labs – 2018	Classroom & Labs	10-25	IUPUI, regional campuses

Before we talk about us, we want to hear from you!

How to Use Reality Labs?

Use Case	*VR App*	*Data*	*Complexity*
Integrate existing VR applications and existing data into an existing curriculum	Pre-existing	Pre-existing	*Easiest* Use provided Reality Station with provided or available VR applications and sample data
Use existing VR applications for viewing and interacting with your data	Pre-existing	Your	*Moderate but interesting* Capture or create your own data and use existing VR applications to view it
Develop custom applications for viewing and interacting with your data	Your	Your	Programming required Use Unity (or similar tool) to create your VR environment or application and view your data

Digital Art

Margaret Dolinsky

IUB School of Art, Architecture + Design

“My goal is to have students bring their imagination and research interests to the virtual worlds they create. I like them to define virtual reality as its own medium, separate from the tropes used in video games or cinema, and to concentrate on how they offer an experience to their visitors.”

Interior spaces and furniture design

Jon Racek

IUB School of Art, Architecture + Design

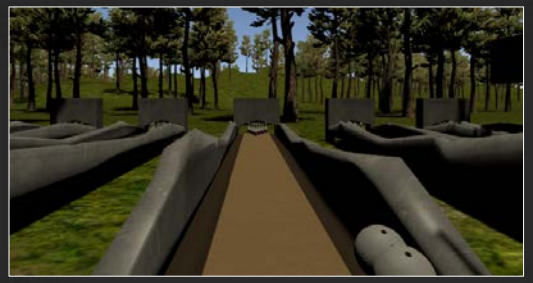
Fortune 500 company Kimball asked Racek's students to help imagine new co-working spaces. The students used VR to present their final proposals to Kimball in a much richer way than computer renderings would have allowed.

Introduction to VR

Bill Sherman

IUB School of Informatics, Computing, and Engineering

“Students can now spend hours exploring VR applications on their own. In the past, we were limited to only 5-10 minute experiences during dedicated demo sessions.”



Virtual reconstruction & preservation

Zeb Wood, Albert William, Andrea Copeland

IUPUI School of Informatics and Computing

Virtual reconstruction & preservation

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Virtual reconstruction & preservation

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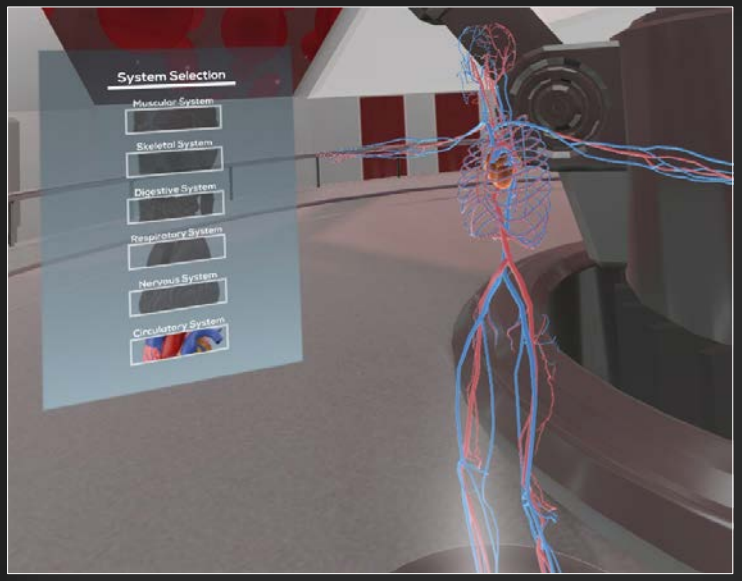
IUPUI School of Informatics and Computing

But we're just scratching the surface…
Lots of good apps for a variety of disciplines

Anatomy – *The Body VR: Journey Inside a Cell*



Interactive explode and selection modes for 6 human body systems

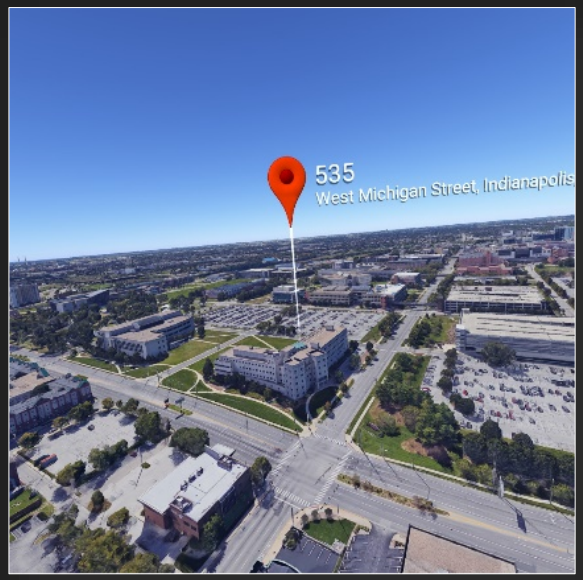
… other good apps for a variety of disciplines

VR Storytelling & Historic Recreation – *Apollo 11*

Cinematic & interactive modes

… other good apps for a variety of disciplines

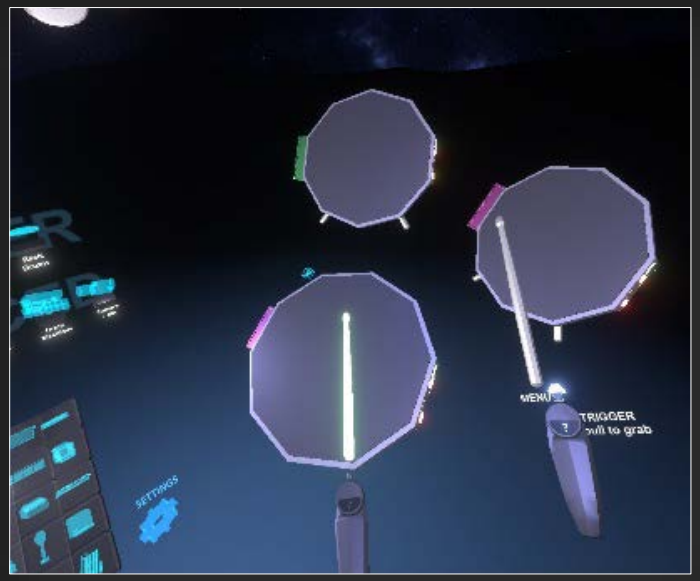
Geography – *Google Earth VR*

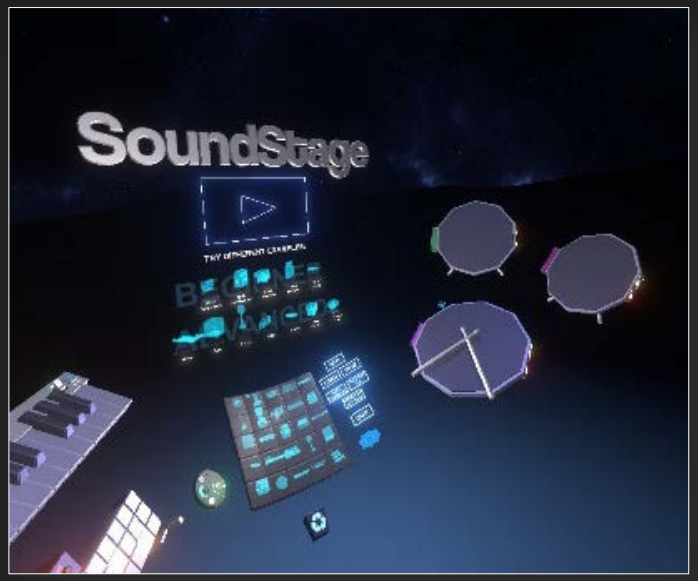


Great interface orientation & landmark tour mode

… other good apps for a variety of disciplines

Music – *SoundStage*

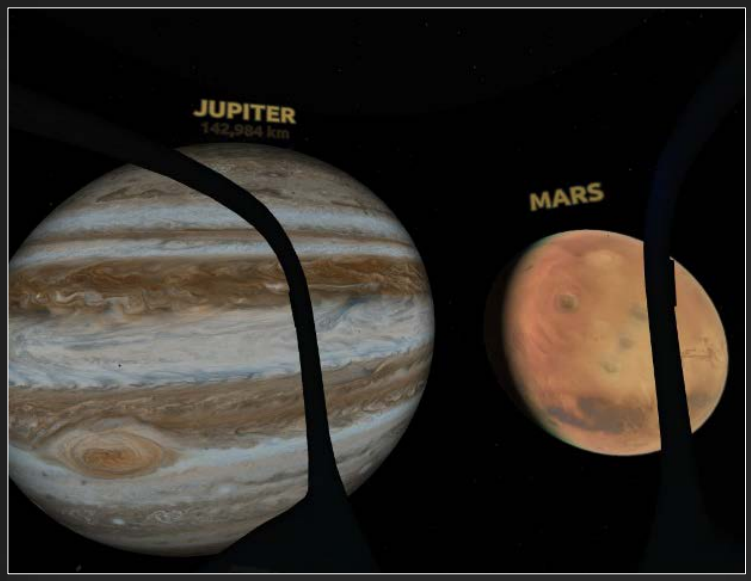




Variety of instruments

… other good apps for a variety of disciplines

Astronomy – *Titans of Space*



Comparison, interactive, and tour modes

… other good apps for a variety of disciplines

Media Playback – *Simple VR Video Player*

Support for spherical & planar media (mono & stereo)
Excellent VR file browser

What about the future of Reality Labs?

Idea Garden

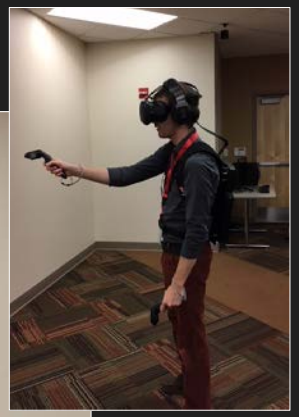
IDEA GARDEN

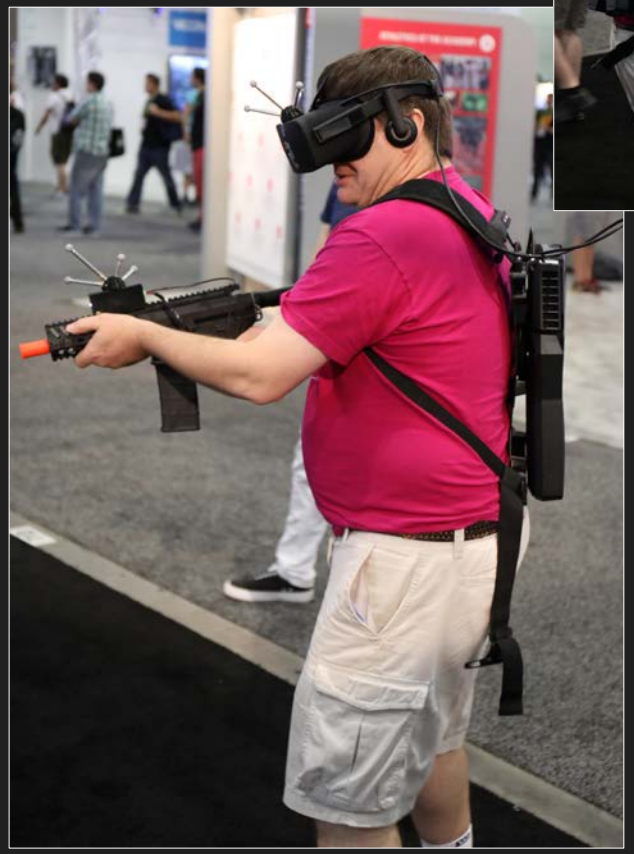
CREATIVE LAB

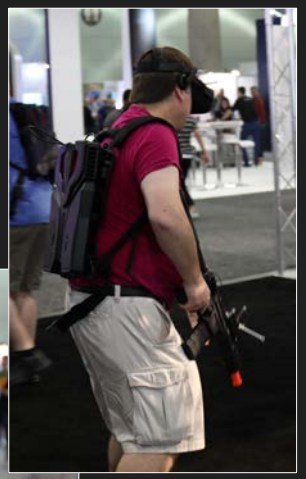
COMING SPRING 2018

IUPUI - Hine Hall

Emerging Technologies

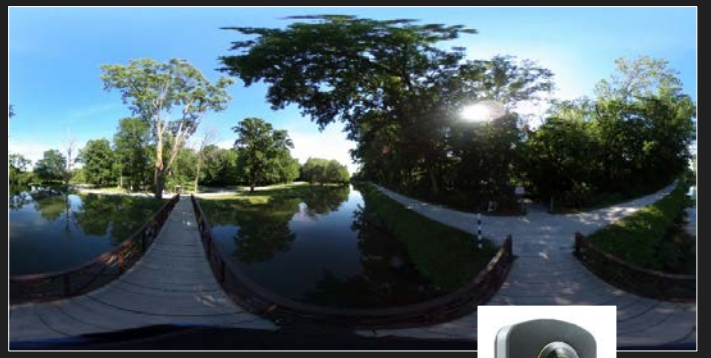




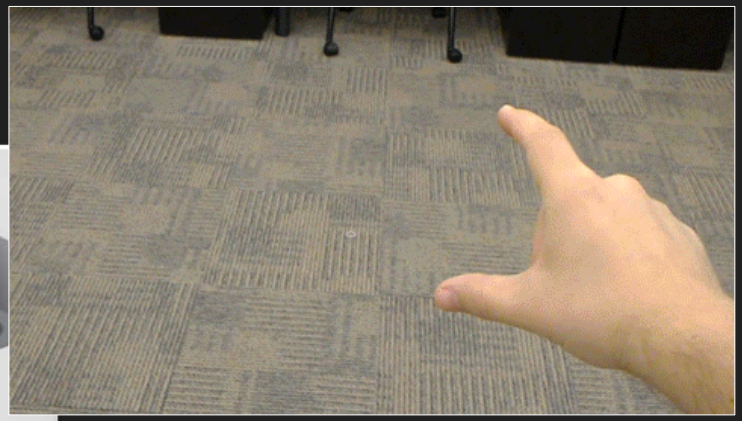


Mobile computing (HMD, ibackpack, or phone)

Emerging Technologies



- Support for other types of “Reality”
  - Augmented Reality - headsets & tablets
  - Capturing Reality - 3D printing, scanning, and media capture
- Inside-out tracking: SLAM (simultaneous localization and mapping)



Challenges supporting Reality Labs

- Ironing out the kinks
  - Windows build and deployment challenges
  - Purchasing process with Steam (VR software library)
  - Documentation for installation & training
- VR apps change quickly
- Individuals requesting other VR or AR tech
- Non-STC locations require local IT support (not affiliated directly with central IT)
- Wireless or self-contained HMDs
- New faculty development & onboarding plan (at scale)

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