

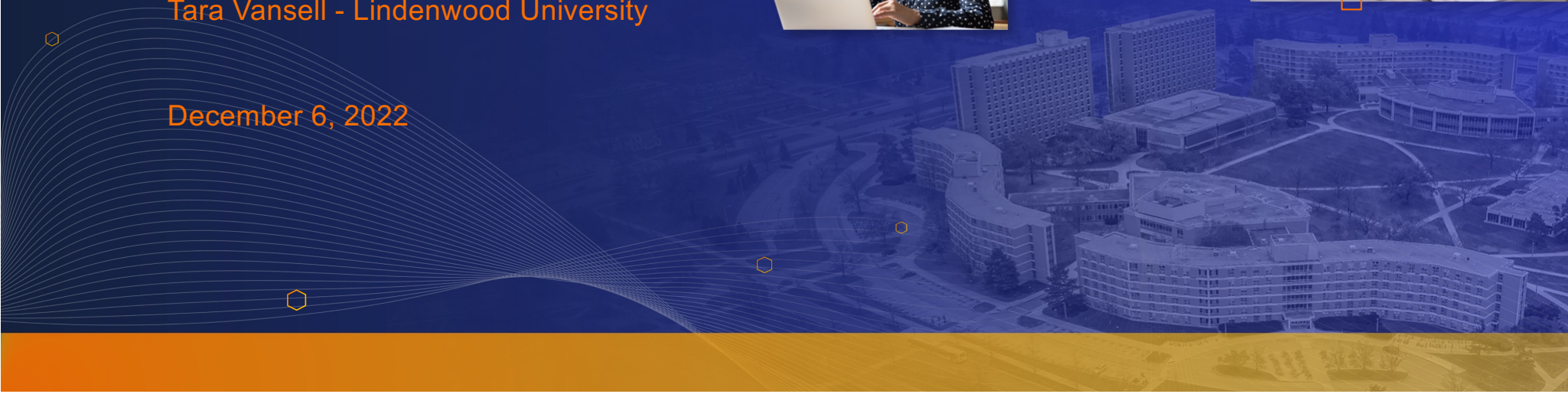


# Virtual Reality in GIS Classrooms

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<https://esri.com/education>

Tara Vansell - Lindenwood University

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## Goals

- Share an interconnection of GIS and VR in education.
- Describe “use” and “create” in the context of VR content.
- Provide examples.

### Assumptions about attendees

- You teach at any level and/or in any setting.
- You have some knowledge of ArcGIS Online.
- We don't assume prior knowledge of VR.

# Inside Virtual Reality

VR today is equivalent to dial-up Internet.



<https://www.youtube.com/watch?v=3Yc1ah160TI>

# Why Virtual Reality (VR) in GIS Education?

- VR is an *immersive* experience.
- VR is usually experienced with a headset – visual, auditory, and hand-held interface devices.

## Why use VR?

- Immersion is said to facilitate a greater sense of presence, understanding, and potentially empathy.
- Go to places, students normally cannot go, due to cost, time, or liability/risk.
- Study “what if” scenarios.
- “Make-up” experience for learners who miss a field trip
- VR is touted as the “next version” of the Internet. Students today will likely work in VR in the near future.



# Virtual Reality Hardware

- “Headsets” provide visual and auditory output.
- “Headsets” include hand-held controller(s) for input and tactile feedback.
- Some headsets are tethered to a computer.
  
- Common headsets in classrooms:
  - ClassVR/Avantis
  - Meta/Oculus Quest 1 (*Esri supported*)
  - Meta/Oculus Quest 2 (\$399/\$499) (*Esri supported*)
  - Google Cardboard (free)
  - HTC Vive (\$750 +)
  
- Home (“26% of teens own a VR device”, Piper-Sandler):
  - Oculus Quest 1 or 2
  - Play Station 4 VR (\$350 +)
  - Nintendo Switch VR add-on



# GIS VR Tools and Data

## Basic (web) GIS tools

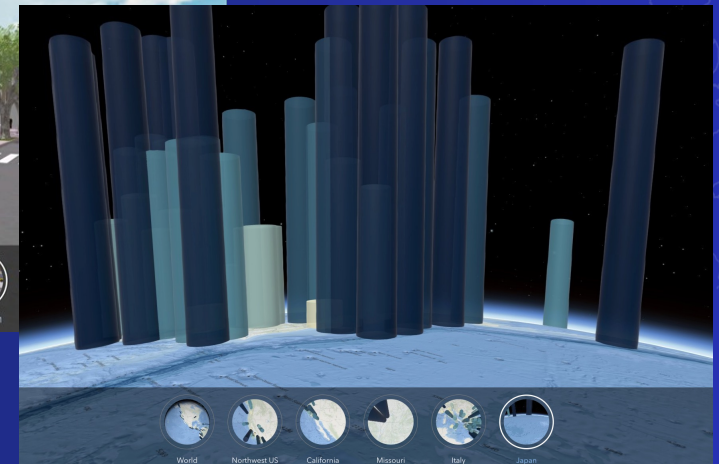
- ArcGIS 360 VR Experiences (web app)
- 360 VR Experience data file (\*.3VR)
- ArcGIS Online “Scene” viewer

## Advanced GIS tools

- CityEngine (Urban Suite)
- ArcGIS Pro + 3D Analyst
- ArcGIS Maps SDK for Unity
- ArcGIS Maps SDK for Unreal Engine

## Common VR data

- 360° photos
- 360° videos
- 3D models
- audio





## Poll 1

**Have you ever used the ArcGIS Online Scene Viewer in the classroom?**

# Intro to Scene viewer

Jason Sawle



<https://www.youtube.com/watch?v=YihaXveYOP4>



## ArcGIS 360 VR Experiences

- 360 VR Experiences are immersive in VR headsets.
- Includes Slides – camera angles on your Scene.
- Slides should be labeled.



### Create 360 VR Experience

63.8%

Publishing the 360 VR Experience may take a while. Do not close the browser tab, or change to another tab to ensure the publishing process is not interrupted.

- 360 VR Experiences are processed once.
- 360 VR Experiences are “disconnected” from the original scene, after they are created.

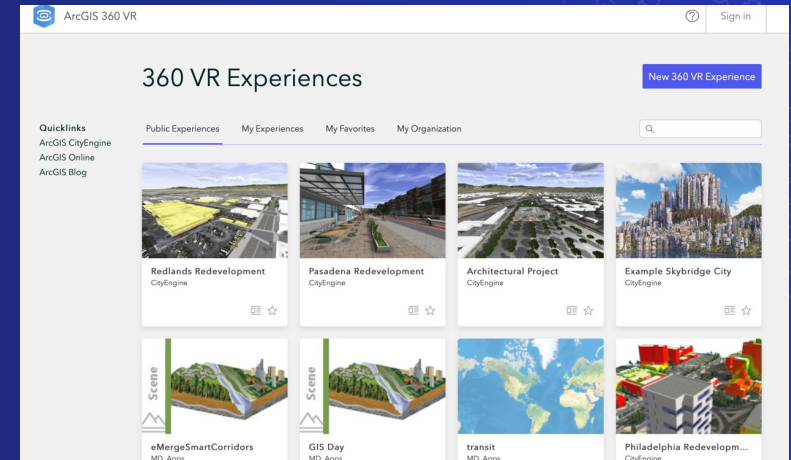
# ArcGIS 360 VR Experiences vs 3D Scenes

	360 VR Experience	Scene viewer (3D)
Bookmarks/Slides	X	X
Clickable points		X
Modifiable maps		X
Pan/Zoom anywhere	Panning from fixed positions	X
User Interface	Minimal	Professional
Connected to data services		X
Immersive	X	



# ArcGIS 360 VR Gallery

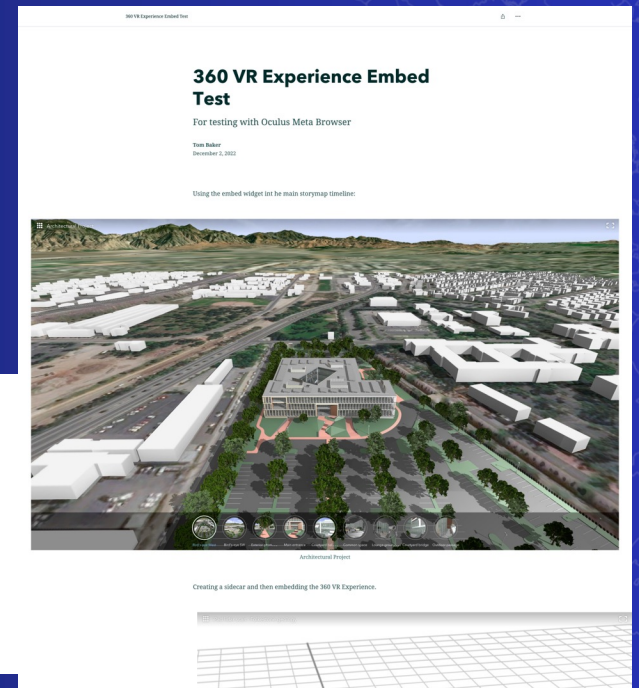
- Gallery: <https://www.arcgis.com/apps/360vr>
- Over 1,000 360 VR Experiences
  - Hurricanes, city planning, landscapes, objects



<https://www.youtube.com/watch?v=BevkbFrl4Mc>

# ArcGIS 360 VR Experiences in Learning

- Create an ArcGIS StoryMap with links or buttons directly to specific 360VR Experiences. Samples: <https://arcg.is/HXXbD0>
- Link or embed directly to the content from your LMS.
- Link from third-party apps like Wakelet, Google Slides, etc.





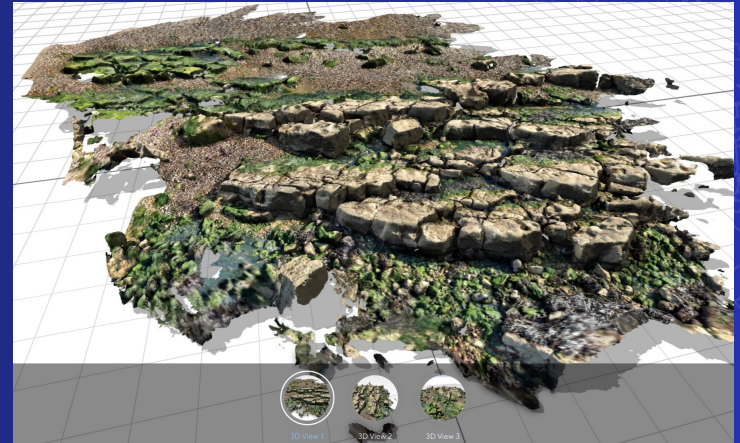
## Poll 2

**Where have you used a VR headset?**



## Advanced topic: Models

- 3D models can be captured, created, or downloaded from the web.
- Add model to ArcGIS Pro or City Engine.
- Export to ArcGIS Online.
- Add the layer to your 3D Scene.
- Export the Scene to 360 VR Experience.



# Lidar-based models

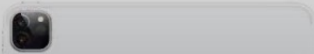


PRESS RELEASE  
March 18, 2020

## Apple unveils new iPad Pro with breakthrough LiDAR Scanner and brings trackpad support to iPadOS



New Magic Keyboard Designed for iPad Pro Features Floating Design, Backlit Keyboard and Trackpad, Delivering the Best Typing Experience Ever on iPad



<https://www.youtube.com/watch?v=zn5asSoCs3k>

# Example: StoryMap Expeditions (in VR)

• <https://esriurl.com/expeditions>





**StoryMap Expeditions**

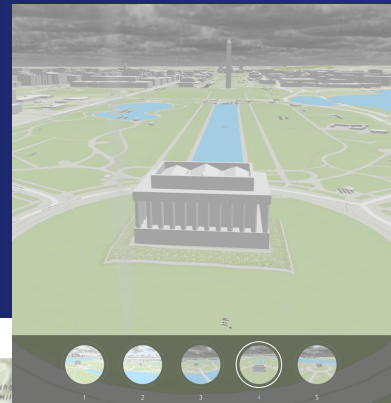
Map-based virtual reality (360°) image sets with place-based information and touring for classrooms. Grab your VR headset. <https://esriurl.com/expeditions>

Want to share your expeditions below?

Enter search terms

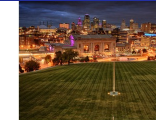
Items: 8 [Share gallery](#)

 <p><b>StoryMap Expeditions: A Farm</b> by tbaker12 Created: Aug 1, 2022 a virtual tour</p> <p><a href="#">View item details</a></p>	 <p><b>StoryMap Expeditions: The Lincoln Memorial</b> by tbaker12 Created: Jul 10, 2022 a virtual tour</p> <p><a href="#">View item details</a></p>	 <p><b>StoryMap Expeditions: Yosemite</b> by tbaker12 Created: Jun 23, 2022 a virtual tour</p> <p><a href="#">View item details</a></p>	 <p><b>StoryMap Expeditions: USS Midway</b> by tbaker12 Created: Jun 23, 2022 a virtual tour</p> <p><a href="#">View item details</a></p>
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## From a Distance

The map marker below indicates Union Station. Downtown is in the distance, directly behind the train station. If you zoom in, you may see part of the train yard just behind and to the left of the station. This image was taken from the WWI Liberty Memorial.



Union Station at night by the at

The station is a critical and vibrant part of Kansas City Missouri. It is the connection between the new and old lightrail tracks, helping to move people efficiently and modernize the city.



## Welcome!

Yosemite Valley may be one of the most beautiful places in North America. Explore the topography and quick a sense of the five Yosemite destinations we'll explore in VR.





# Example: Lindenwood University

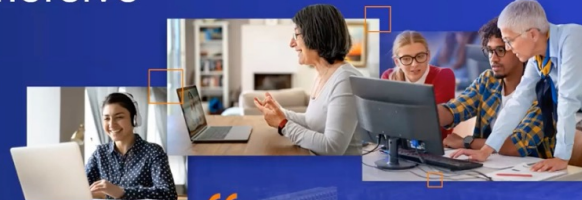
## GEOZOO: Promoting Community Science through GIS and Immersive Technologies

Tara Vansell, GIS Instructor, Lindenwood University

Keegan Favors, Research Assistant, Lindenwood University

Joseph Weber, Assistant Professor Art and Design, Lindenwood University

Michael Dawson, Education Liaison, St. Louis Zoo



“The willingness to experiment with innovative approaches to GIS has yielded benefits for numerous field-based teaching and research activities across the university.”

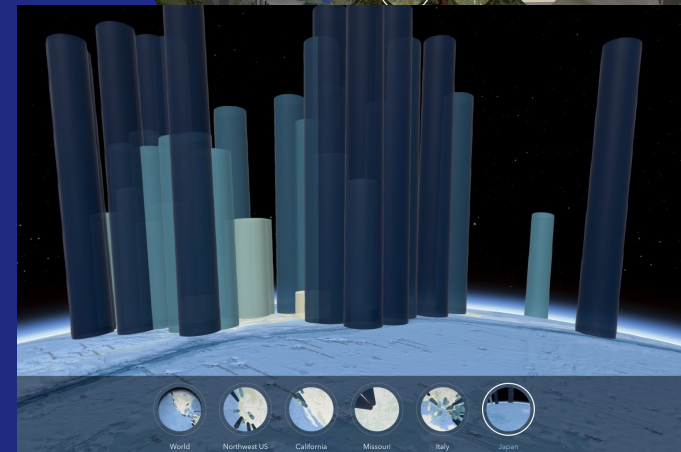
— Peter Knapp | University of Michigan



<https://www.youtube.com/watch?v=pXbfu1mMDbU>

# Thank you!

- Questions or comments?
  - Chat window in GoToWebinar
  - Email Tom at [tbaker@esri.com](mailto:tbaker@esri.com)
- Post-webinar email.
- Post-webinar survey





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