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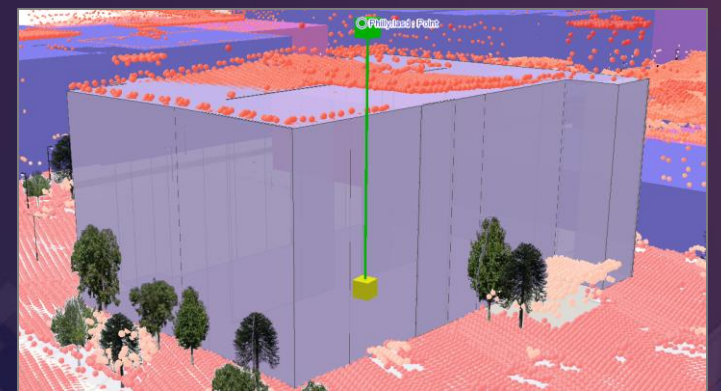
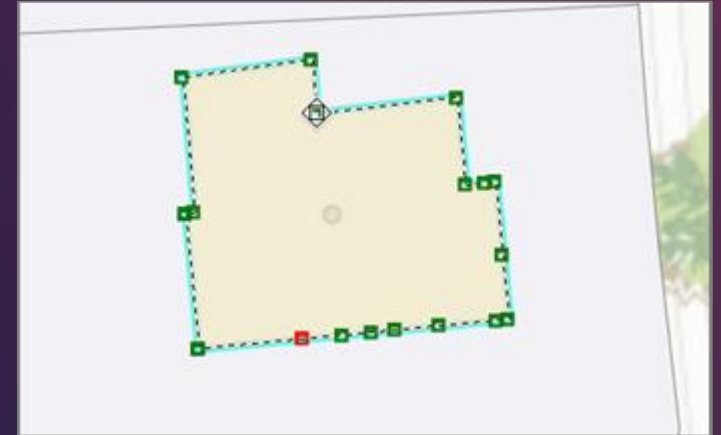
# ArcGIS Pro: 3D Editing

Michael Contreras & Phil Sanchez

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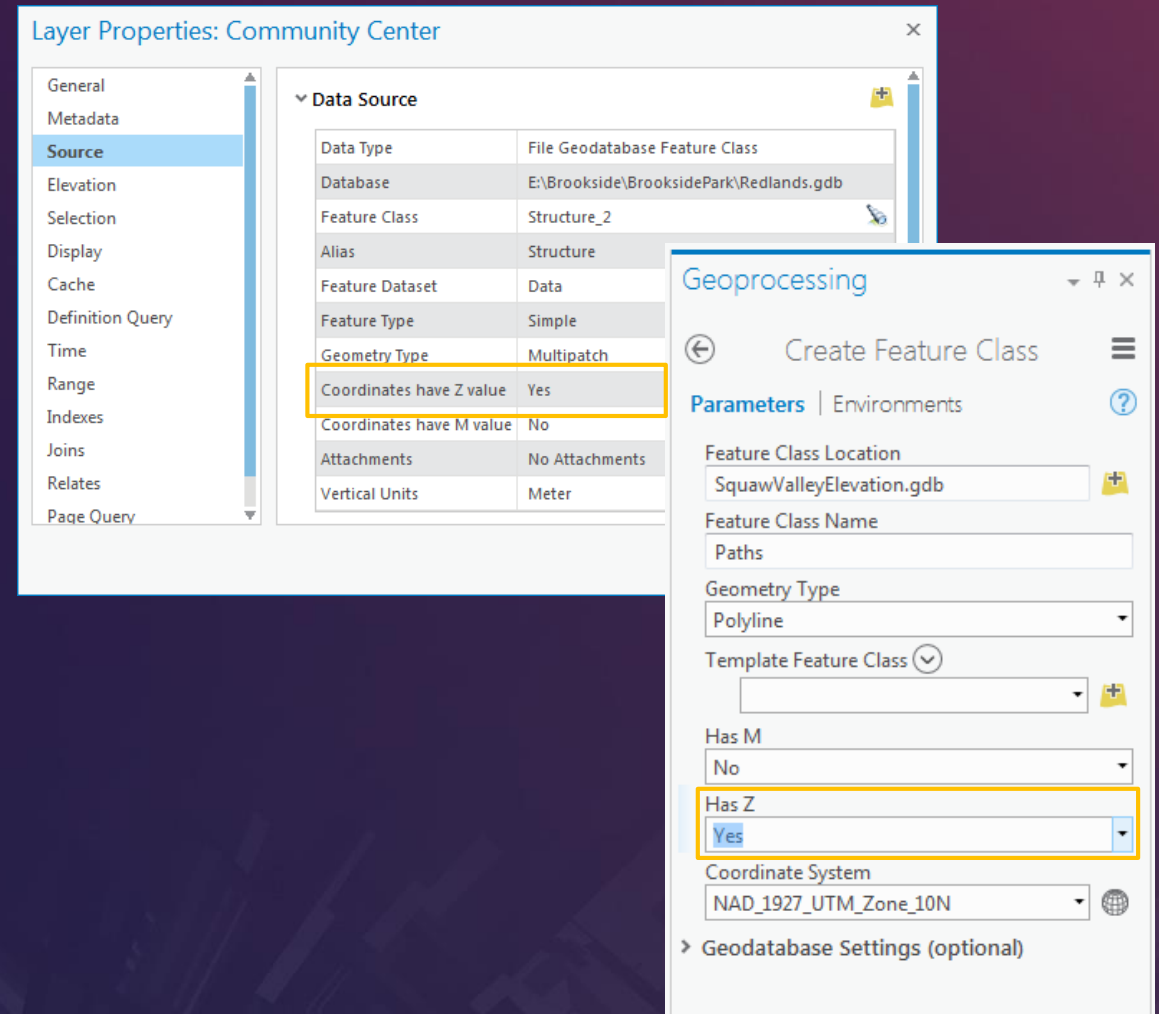
# ArcGIS Pro Editing – Overview

- Provides tools that allow you to maintain, update, and create new data
  - Modifying geometry, drawing new features
  - Entering and updating feature attributes
- Supports editing features in 2D maps and 3D scenes
  - View and edit features at their real-world elevation
  - Construct features on surfaces and at a constant elevation
- Edit multiple workspaces simultaneously
  - File GDBs, Enterprise GDBs, Feature Services, Shapefiles
  - Set layer editability, configure autosave



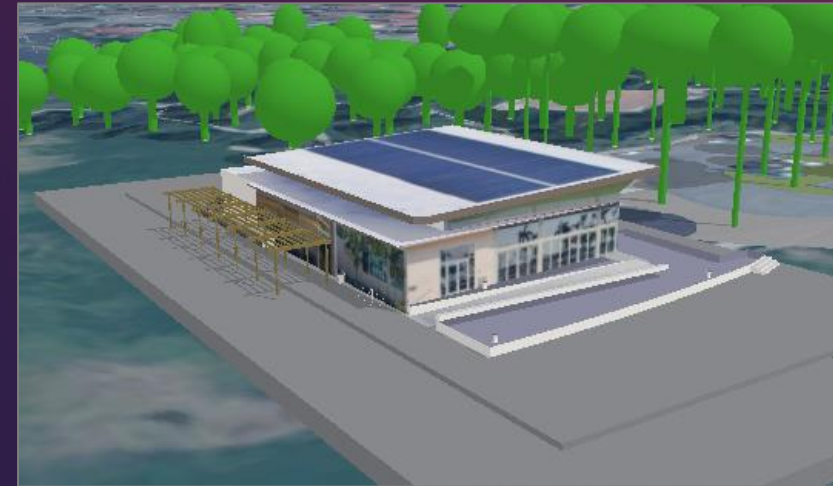
# Working with Z-enabled Layers

- Z enabled property reported in Layer Properties window
  - Sometimes referred to as a '3D Layer'
- You can Z enable a layer when creating new feature classes
  - Set Has Z = Yes
- Z enabled layers allow:
  - Editing of Z coordinate values
  - Setting layers at an absolute height



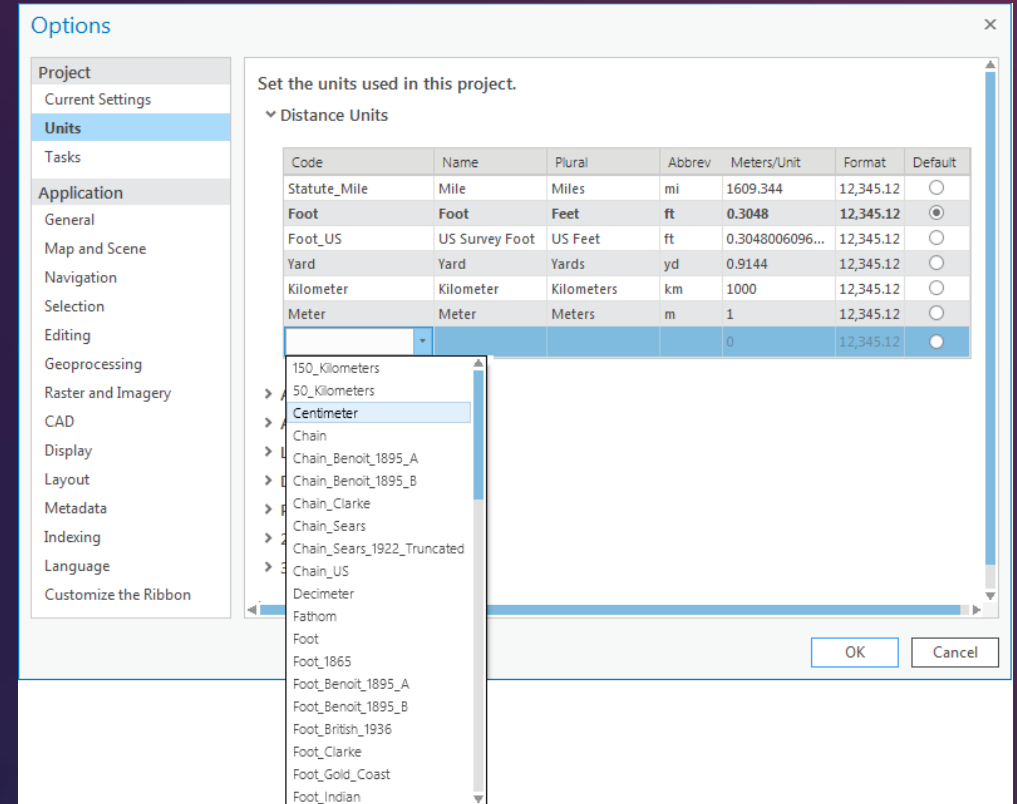
# 3D Editing Overview

- Create new features in 3D
  - On the surface or at a constant elevation
  - Draw vertical lines or lines with pitch (at any angle)
  - Duplicate features vertically
- Modify features in 3D
  - Reposition features along XYZ axis or freely in 3D space
  - Edit the Z coordinates of individual vertices or all vertices (batch)
  - Use editing tools to divide, reshape, and construct features



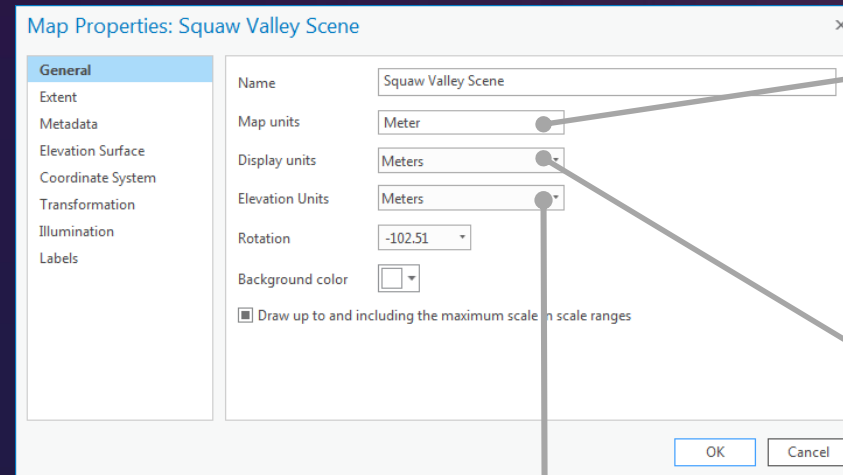
# Working with Units

- Units are set at the project level (made available to maps and scenes)
  - In the Options window in the backstage
- Several types of units are available for working with distances, location, direction, etc
- By default, a map's map units are the primary unit



# Units and Editing

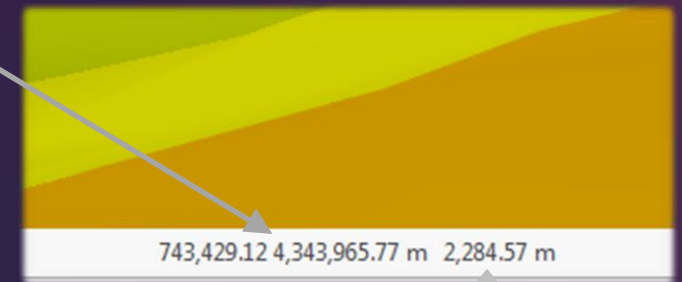
- Coordinate values are reported in the map's 'Map unit'
- Distance constraints are displayed in the project's Distance unit



Vertex Coordinates

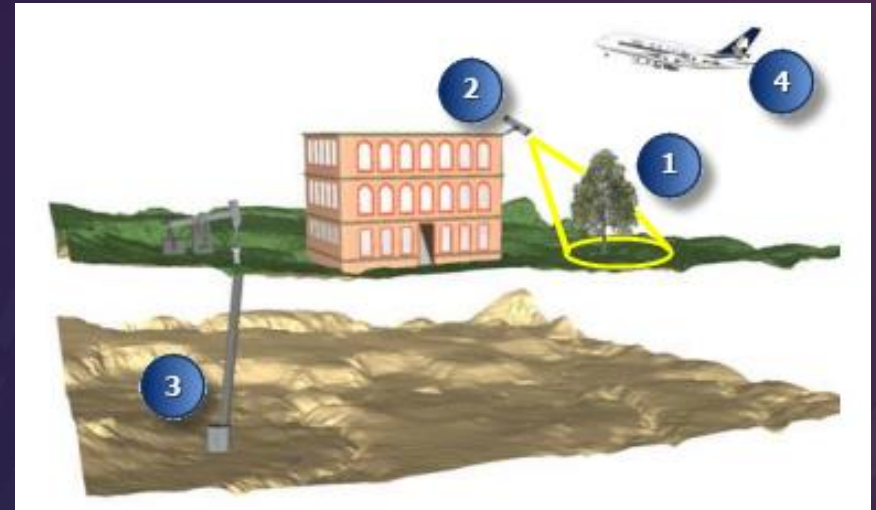
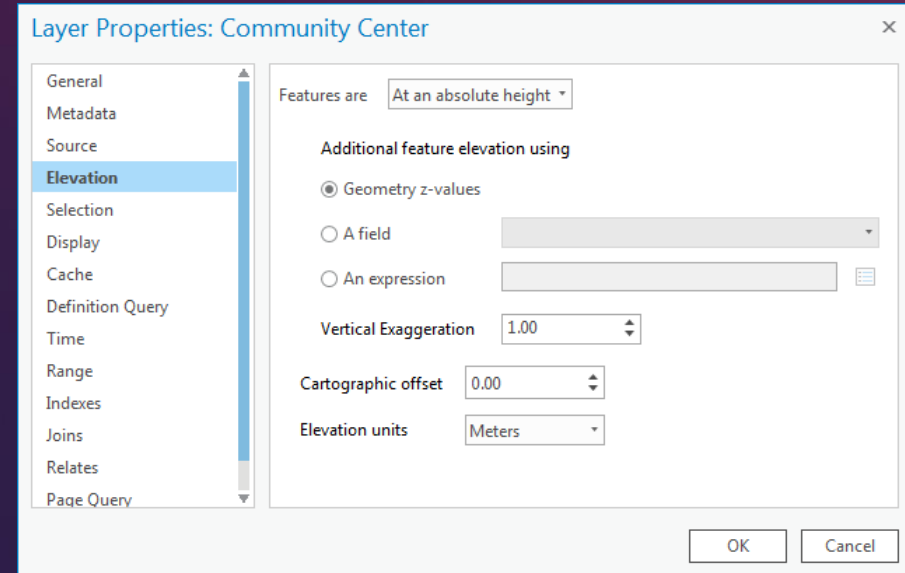
#	X (Meters)	Y (Meters)	Z (Meters)
1	741906.55	4343208.56	1862
2	741906.55	4343227.05	1863.14
3	741924.06	4343227.05	1862.09
4	741924.06	4343208.56	1860.96

Map Coordinate Display



# Layer Elevation – Base Heights

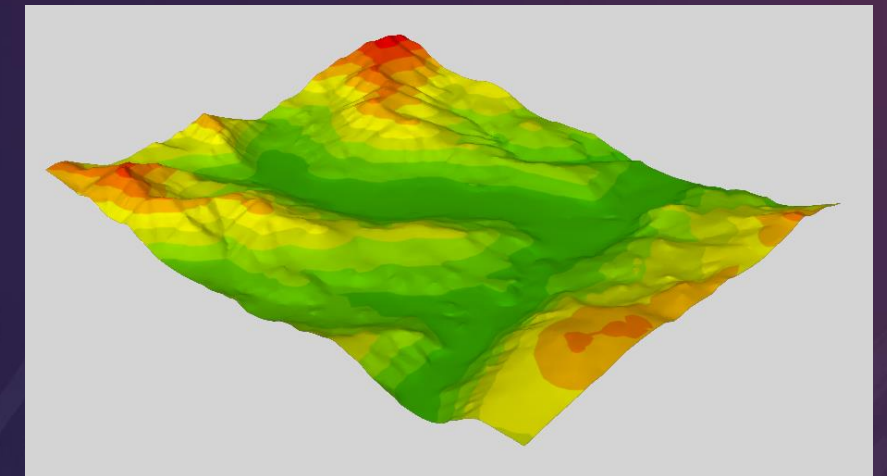
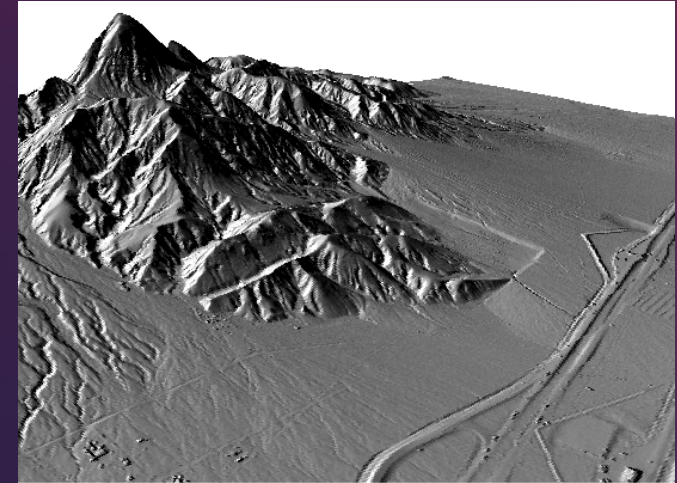
- 3D layers display at different elevations each with unique behavior/capabilities:
  - On the ground
  - Relative to the ground
  - At an absolute height
  
- Elevation surfaces enable you to view layers on, above, or below them





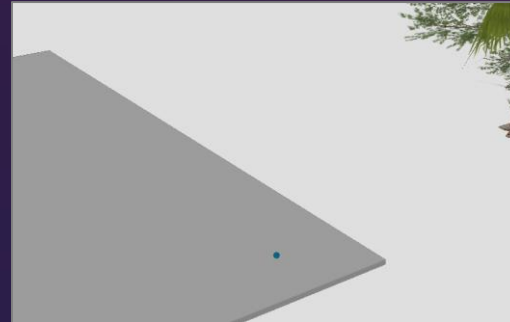
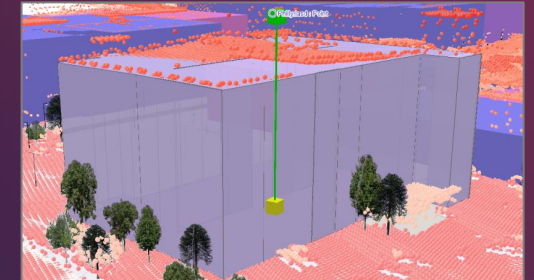
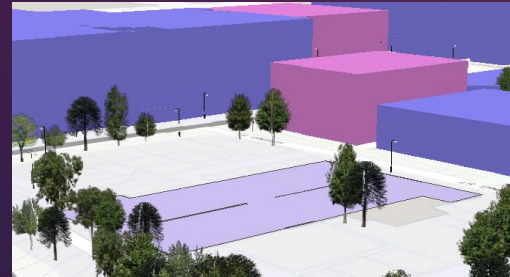
# Working with Surfaces

- **Elevation surface is a digital representation of features in three-dimensional space**
- **For editing, a surface can be used to get accurate elevation values (Zs) when creating new features**
  - Data can be on, above, or below the surface
- **Scenes have ground surface by default from ArcGIS Online (Terrain 3D)**
  - You can add your own custom surface
  - DEM, TIN, Terrain, LAS, Raster, LERC



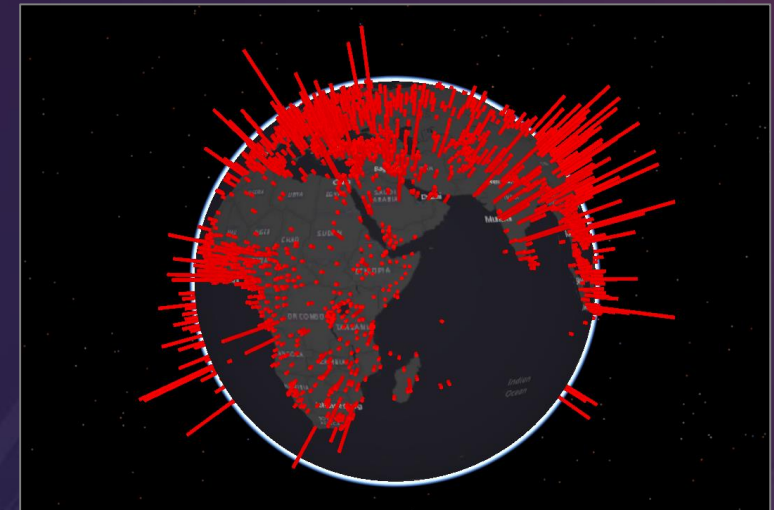
# 3D Geometry vs 3D Symbology


- All features can participate in 3D – even if they are not Z enabled
  - E.g., 2D points as Realistic Trees
- 3D symbology can be applied to 2D layers
  - Extrusion
  - 3D models (points)
  - Rule Packages (RPK)
- 3D symbols can be connected to attributes
  - Fields for height, width, size can drive appearance



# Local Scenes vs Global Scenes

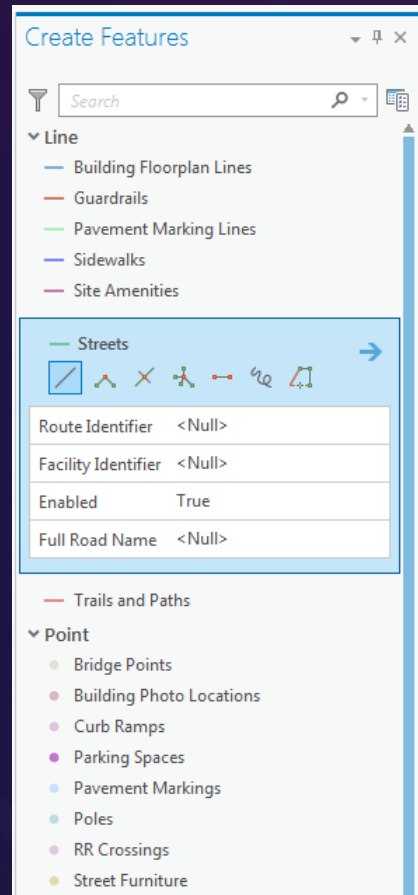
- **Benefits of Local Scenes**
  - use a projected coordinate system and linear units
  - manage data below the surface
  - use your own ground elevation source
- **Use Global Scenes when you need to...**
  - work in a fixed geographic coordinate system (WGS 84)
  - work in large, multiple geographic areas
  - use enhanced illumination and time effects
- **You can easily switch between these scene types**



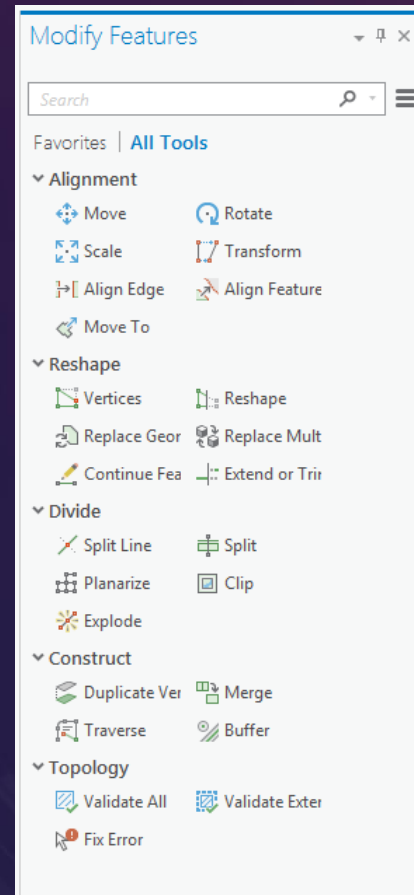
The background features a dark purple gradient with various abstract elements. On the left, there are overlapping, semi-transparent geometric shapes in shades of blue, green, orange, and red. These shapes appear to be layered, creating a sense of depth. In the center and right, there are faint, light-colored patterns that resemble topographic maps or data visualizations, including lines and clusters of dots. The overall aesthetic is modern and technical.

# Demo: Key Concepts

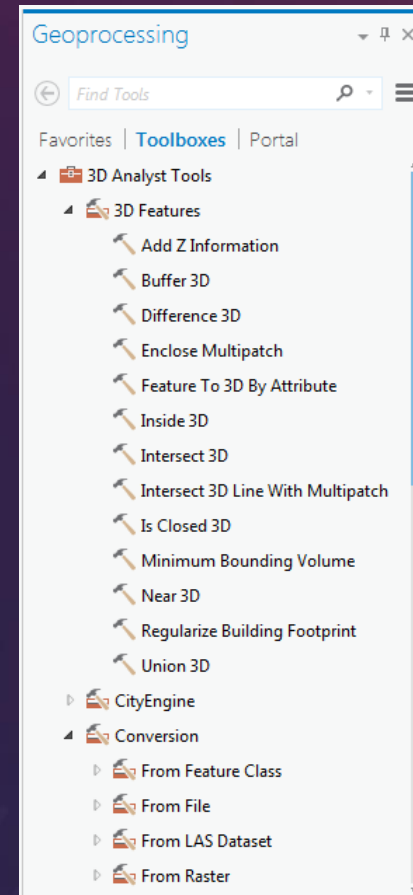
# Using 3D Layers in Pro



Data Creation

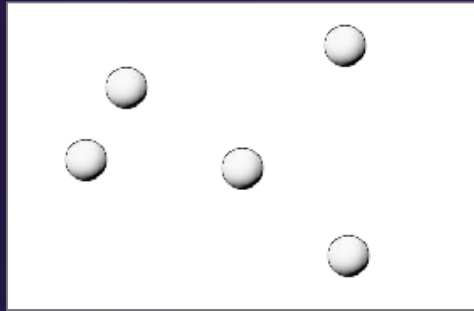


Maintenance

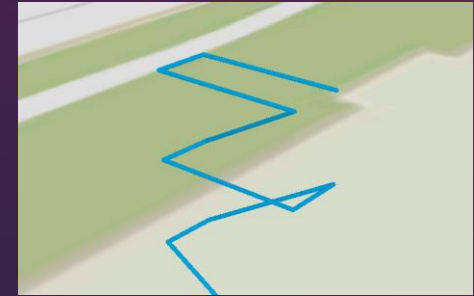
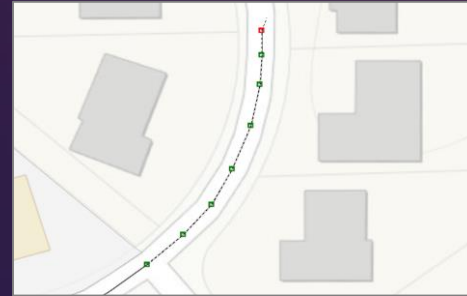


Analysis

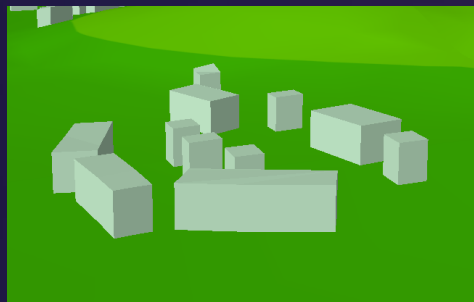
# Feature Geometries



Points



Lines



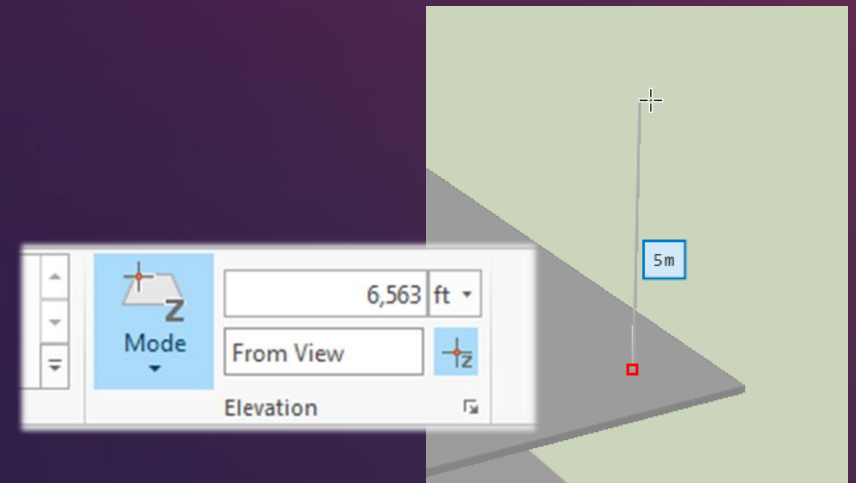
Polygons



Multipatches

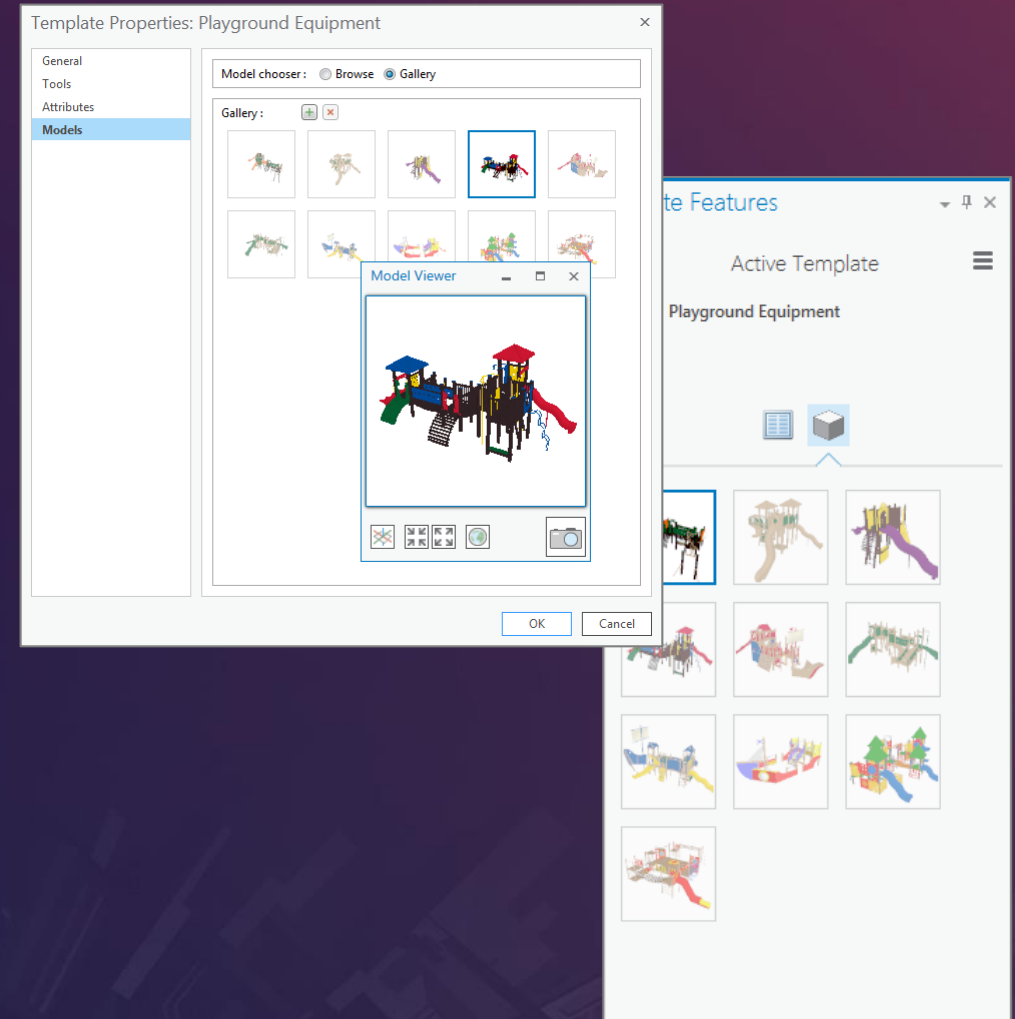
# 3D Data Creation Tools

- Constant Z allows you to set the elevation so new features inherit Zs
  - Can get Zs from surface or vector features
  - Set elevation by entering a value and units
- Draw lines in 3D space
  - Vertical or with a pitch
  - Snapping to other 3D features in scene
- Duplicate features vertically to easily create multiple instances at various heights
  - Specify number of copies and distance between them



# Working with 3D Models

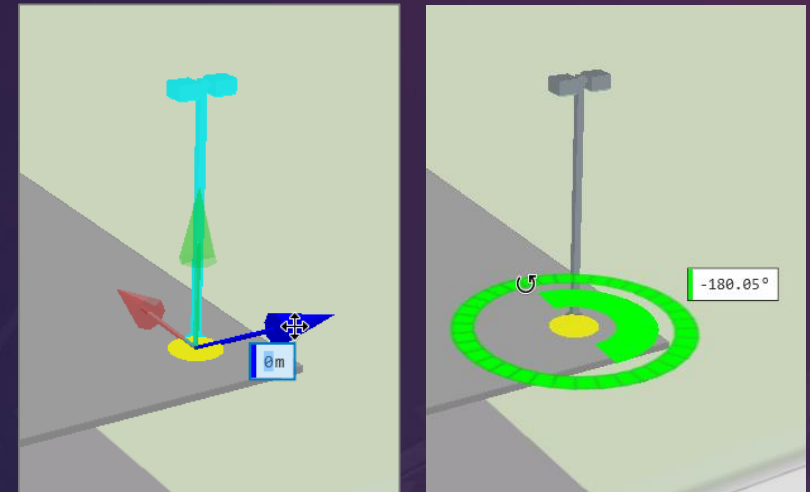
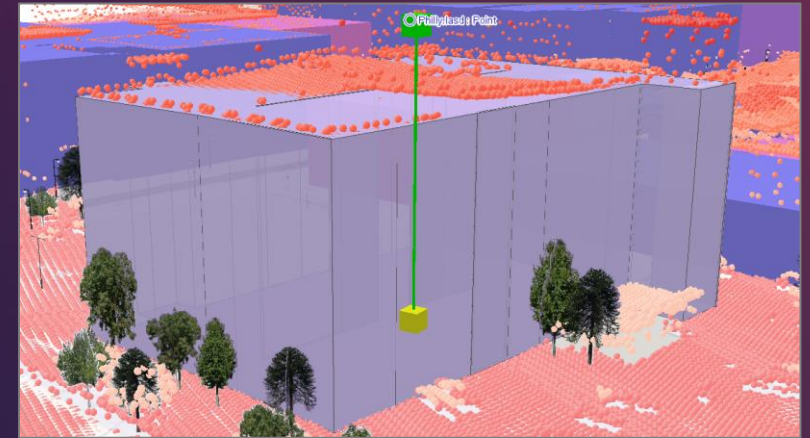
- Multipatch layers can store 3D models through feature templates
  - .dae, .3ds, .flt, .wrl
- Two methods for adding models through the Create Features pane
  - Single model through a file browser
  - Choose from a gallery of models
- Template properties window allows you to add models to the gallery
  - Can change the size and orientation and update snapshot





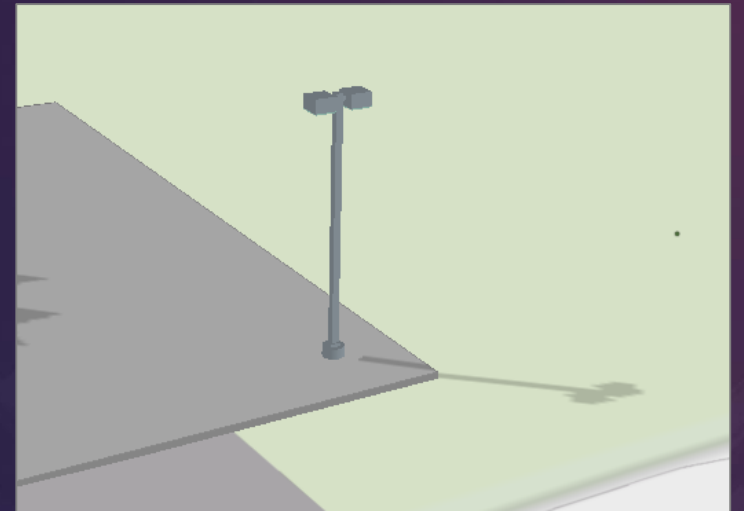
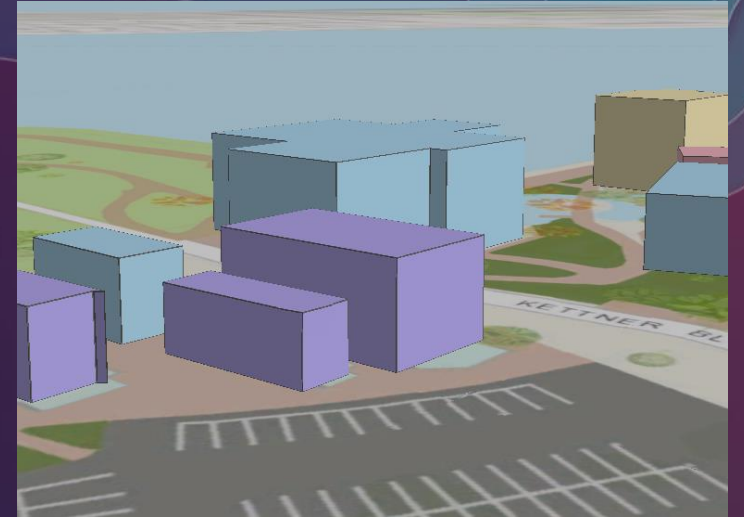
# Feature Modification

- Move, rotate, and scale features
  - Interactively with handles or by value with constraints
  - Perform a 3D affine transformation of features or entire layers
- Edit vertices of features
  - Interactively with the Edit Vertex tool (Move, Add, Delete)
  - Update XYZ vertex coordinate values in grid
- Replace models directly in a scene
  - Choose a different model from disk with the Replace Multipatch tool



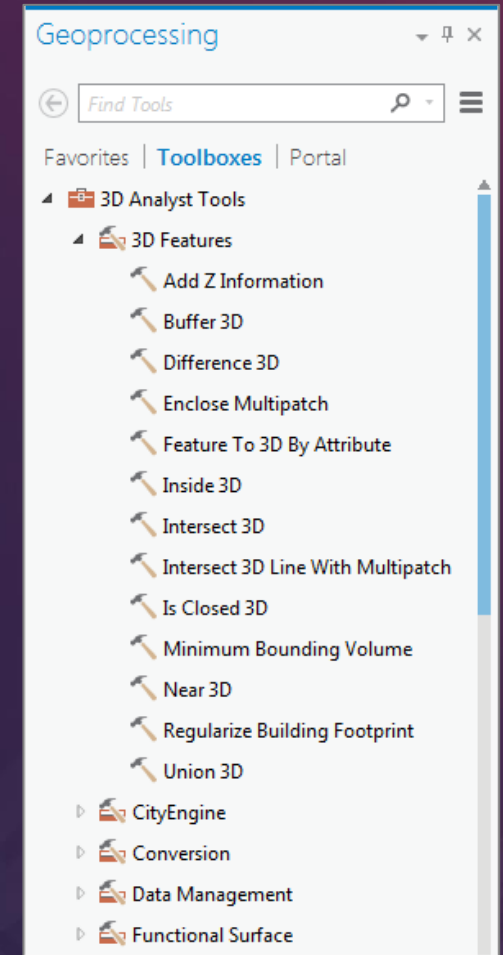
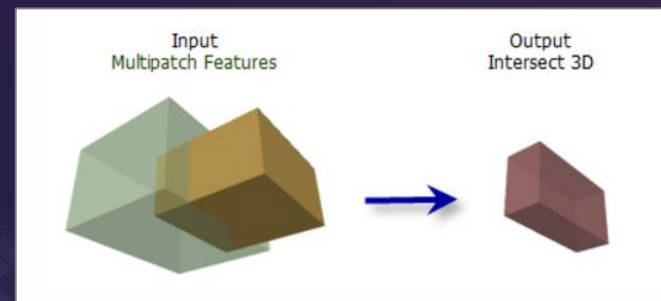
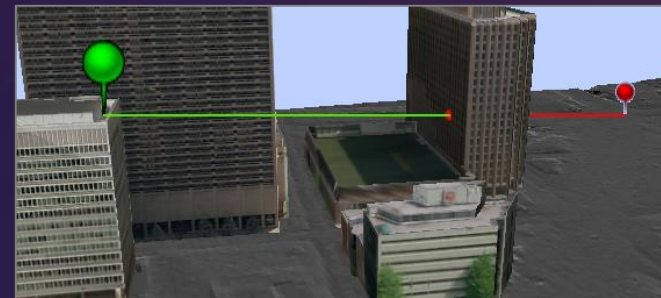
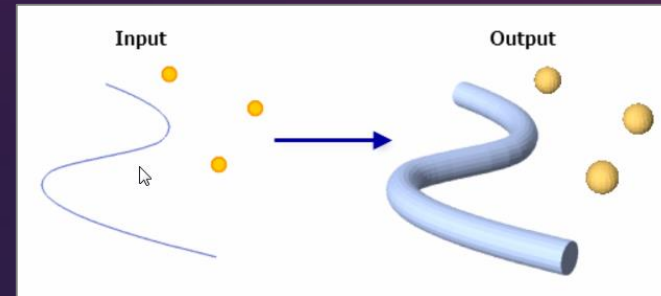
# Layer Effects

- Extrusion is one of the easiest ways to create 3D visualization
  - Specify height value
  - Calculate height
  - Use field values
- 3D visualization
  - Enhanced with shadows
  - Available in the Map Properties window



# 3D Geoprocessing Tools

- Many 3D Analyst tools available in Pro
  - Proximity
  - Conversion
  - Data Management
  - Surface-based



The background features a dark purple-to-blue gradient. On the left side, there is a complex, layered composition of colorful, semi-transparent geometric shapes and lines in shades of blue, green, orange, and red. These shapes overlap and create a sense of depth and movement. In the lower right quadrant, there are faint, light-colored contour lines and small circular markers, suggesting a map or data visualization theme. The overall aesthetic is modern and technical.

# Demo: Working with Multipatches

# See Us Here

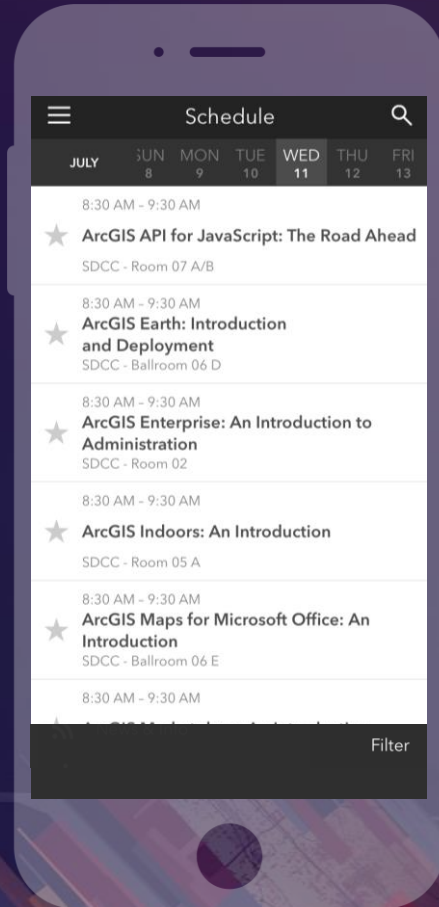
WORKSHOP	LOCATION	TIME FRAME
<ul style="list-style-type: none"><li>• <b>ArcGIS Pro Editing: An Introduction</b></li></ul>	<ul style="list-style-type: none"><li>• SDCC - Ballroom 20 D</li></ul>	<ul style="list-style-type: none"><li>• Thursday 10:00 – 11:00</li></ul>
<ul style="list-style-type: none"><li>• <b>ArcGIS Pro: 3D Editing</b></li></ul>	<ul style="list-style-type: none"><li>• SDCC - Room 31 B</li></ul>	<ul style="list-style-type: none"><li>• Wednesday 1:00 – 2:00</li></ul>
<ul style="list-style-type: none"><li>• <b>ArcGIS Pro: Data Alignment and Topology</b></li></ul>	<ul style="list-style-type: none"><li>• SDCC - Ballroom 06 F</li><li>• SDCC - Room 32 A/B</li></ul>	<ul style="list-style-type: none"><li>• Tuesday 2:30 – 3:30</li><li>• Wednesday 2:30 – 3:30</li></ul>
<ul style="list-style-type: none"><li>• <b>ArcGIS Pro Editing: Tips and Tricks</b></li></ul>	<ul style="list-style-type: none"><li>• SDCC - Room 07 A/B</li><li>• SDCC - Room 10</li></ul>	<ul style="list-style-type: none"><li>• Tuesday 1:00 – 2:00</li><li>• Wednesday 4:00 – 5:00</li></ul>

# Please Take Our Survey on the App

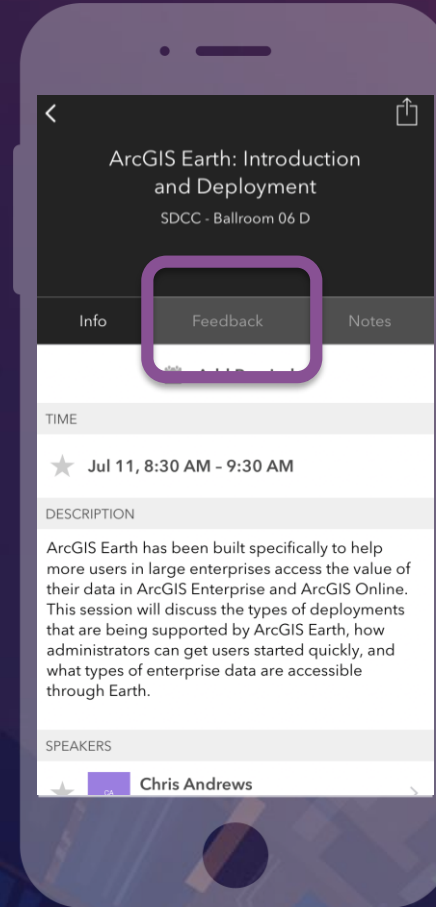
Download the Esri Events app and find your event



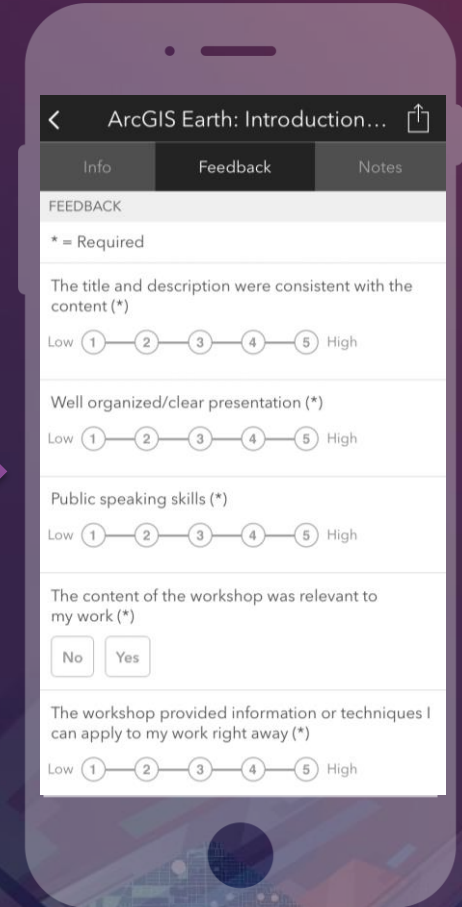
Select the session you attended



Scroll down to find the feedback section



Complete answers and select "Submit"



# Questions

The background is a dark blue gradient with a faint grid pattern. In the bottom corners, there are abstract, colorful geometric shapes in shades of red, orange, yellow, and blue, resembling digital data or architectural structures.

**Thank you for attending!**





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