Part 2: Animation in After Effects

Intro to Animation for Science Communication

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LAST WEEK’S POWERPOINT WORKSHOP REVIEW

• VECTOR v RASTER graphics
• Digital Art tips
• PowerPoint Design Basics (color, design, tips, and tricks)
• 2D animation - creating animations for your science graphics
  • Embedding and animating videos
  • Using the Morph transition to bring graphs to life
• 3D animation - embedding and animating stock and custom 3D models

Key words and concepts:

Design:
• Embed videos
• Embed 3D models
• Crop to Shape
• Change Color

Shortcuts and Tools:
• Duplicate
• Align
• Distribute
• Slide Master
• Skip to Slide
• See All Slides

Transitions:
• Wipe transition
• Morph transition

Animations:
• Wipe
• Motion Paths
• Spin/Rotation
• Exporting animations
WHERE YOU’RE AT

Your self-described experience level in PowerPoint:

- **COMFORTABLE**: 57
- **BASIC**: 19
- **WELL-VERSED**: 15
- **ADVANCED**: 11

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To see the graph, please refer to the visual representation above.
WHERE YOU’RE AT

Your self-described experience level in After Effects:

- **BEGINNER**: 17 people
- **COMFORTABLE**: 1 person
- **No experience**: 66 people
DEFINING SOME THINGS

Animation
A method in which static figures appear as moving images, by changing the graphic in sequential frames

Motion Graphics
Animations which mostly involve text and graphics

After Effects
A “motion graphics and visual effects software”
What Adobe Software should I use to create a video?

Start in:

- **After Effects**
  - Creating a video with many motion graphics or visual effects***

  Within After Effects, you can link to updating Adobe files such as Photoshop and Illustrator Files.

- **Premiere Pro**
  - Video editing with multiple clips
  - And then link to an After Effects file for adding title motion graphics or visual effects.

- **Photoshop**
  - Creating digital paintings with raster graphics, compositing illustrations, and editing a single photo.

- **Illustrator**
  - Creating vector graphics (good for editing your figures)

***There is also Adobe Animate for traditional animation, but After Effects has most of the same capabilities and is a bit easier to use in my experience.
Can add labels, captions, and graphics to existing footage or 3D rendered animations.

3D tag model created in AutoDesk MAYA - program we will explore next time!

Can create your own line animations from scratch.

Background inside of theater created in Adobe Photoshop.

these humpback whales fed.
EXAMPLES

Can import Adobe Illustrator files and animate them.

Can bring 2D objects into 3D to make simple 3D animations.
Can import files from Adobe Animate...

Color and texturize them...

To achieve a hand-drawn/watercolor look:
Tutorial

Linking CSV Data to your Animation

Using COVID-19 Case data downloaded from the COVID Tracking Project at https://covidtracking.com/data/download
1. CREATE NEW PROJECT & COMPOSITION

**Composition Settings**

- **Composition Name**: CA_COVID_Composition
- **Width**: 1920 px
- **Height**: 1080 px
- **Frame Rate**: 30 frames/second

**Details**

- This will create standard high-res format.
- Define the frame rate (frames/second).
- Define the duration of your animation.
2. IMPORT YOUR CSV

3. DRAG INTO COMPOSITION

4. EXPLORE YOUR FILE
5. Add new shape layer

6. Create path with pen tool
7. Format Shape

8. Open Expressions

9. Add This Expression

This code is in Javascript. To create new variables, type “var variable name = whatever you’d like the variable to be;”

```javascript
var numberOfPoints = ThisComp.layer("CA_COVID_History.csv").footage("Data").dataValue([3,i]);
// Setting # of Point variable equal to the number of rows of data in CSV
var spacingForPoints = thisComp.width / numberOfPoints; // Spacing points
var startPointX = 0; // Setting the first X value position
var thePath = content("Shape 1").content("Path 1").path; // Renaming path
var maximumYValue = 1200000; // Maximum Y value
var lineHeight = 0; // Initializing lineHeight variable
var arrayOfPoints = [];
// Creating an empty array called arrayOfPoints

for(var i = 0; i < numberOfPoints; i++) {
    var data = ThisComp.layer("CA_COVID_History.csv");
    var dailyCases = data.footage("CA_COVID_History.csv").dataValue([3,i]);
    lineHeight = linear(dailyCases, 0, maximumYValue, content("Shape 1").content("Stroke 1").strokeWidth/2, thisComp.height)*-1;
    // Function remaps data from the bottom of the composition to the top.
    arrayOfPoints[i] = [startingPointX, lineHeight];
    // Store new x and y data into the array arrayOfPoints
    startingPointX += spacingForPoints;
    // Update x value by adding the spacing between points
}

thePath.createPath(points=arrayOfPoints, inTangents=[], outTangents=[], is_closed=false);
// Create a path with the array of points and keep it an open path
```

Inspiration and guidance from a brilliant tutorial: https://www.youtube.com/watch?v=oqWtaIFksO
10. Align Path

11. Rename Shape Layer

Align left and align bottom.
12. **DUPLICATE LAYER**

Ctrl + D / Command + D to duplicate layer

13. **RENAME DUPLICATE**

Change name to "Highlight"

14. **LINK LAYER TO PARENT**

This causes any transforms to layer "Highlight" to also apply to "Dataset"

15. **CHANGE FILL & STROKE**

Change color & width for "Highlight"

16. **ADD TRIM PATH TO SHAPE**

This will allow us to animate along the path to reveal the stroke.
17. SET END OF DATA ANIMATION
Place playhead where you would like your animation to stop.

18. ADD KEYFRAMES
Keyframes fix the value of a certain property at the playhead.

19. NAVIGATE TO BEGINNING
Either press "J" and "K" to navigate between keyframes or drag the playhead and hold down Shift to snap between keyframes and other landmarks.

20. ADD KEYFRAMES
Between keyframes, the values shift between the previous and subsequent keyframes.

21. CHANGE VALUE
Change "End" value to 0% at 0 seconds
22. PREVIEW ANIMATION
Scrub forward with the playhead to preview the effect you’ve just added.

23. SELECT KEYFRAMES
Drag and drop to select the four keyframes.

24. COPY/PASTE KEYFRAMES
Copy keyframes (Ctrl+C), navigate to layer you would like to place them on (onto layer “Dataset”), and paste keyframes (Ctrl+V)
***The first pasted keyframe will be aligned with the playhead.***

25. ADJUST TRIM PATH
Change “Start” value to 75% at 10 seconds.

26. LET HIGHLIGHT EXIT
Change “Start” value to 100% at 11 seconds.
27. ADD SOME STYLE

Add **TAPER**: Contents > Shape > Stroke > Taper

Add **GLOW**: Right Click > Layer Styles > Outer Glow

Add **SHADOW**: Right Click > Layer Styles > Drop Shadow

Can select Drop Shadow effect and copy/paste it onto another layer, like "Dataset".
28. **ADD TEXT COUNTER**

Select text tool, click and drag to create text box, and scale text so that it is visible.

29. **ADD A SLIDER CONTROL**

Search the Effects menu and drag & drop the Slider Control onto the Text layer.

30. **ADD AN EXPRESSION**

Alt- or Option- click on the stopwatch to add and edit an expression.

```javascript
var current = Math.floor(effect("Current Data Row")("Slider"))
var dailyCaseData = footage("CA_COVID_History.csv").dataValue([3, current]);
```

The expression above will show the current case data for each row based on the slider value.
31. ADD SLIDER KEYFRAMES

Go to the beginning of the animation and create a keyframe with the “Current Data Row” slider = 0 (1st row)

Since JavaScript indexing starts at 0, 1, 2, etc.

Go to the END of the animation (10 seconds) and create a keyframe with the “Current Data Row” slider = 256 (last row)

The text box should display the # according to the row indicated by the slider.
32. DUPLICATE COUNTER LAYER

Change text in expression to be associated with column 0 to get date counter.

```javascript
var current = Math.floor(effect("Current Data Row")("Slider"));

var dateCounter = footage("CA_COVID_History.csv").dataValue([0, current]);

dateCounter;
```

33. RENAME & MOVE LAYERS

Can also align layers

Use Position control slider
34. Finishing Touches! Create horizontal gridlines, y-axis labels, and any other titles, styles, or effects.

**Horizontal Gridlines:**
- Create horizontal path (by holding Shift)
- Add Repeater with n copies
- Transform each instance of the repeater by adjusting the Y-value for Transform : Repeater 1

**Y-axis labels:**
- Create text box "0" and left align paragraph text
- Ctrl + D to create a label for each gridline
- Change text for each layer

**Changing position and scale**
- You can also change the position and x-scale of the graph, so that you can zoom into the data as it changes over time.
- Be Creative! 😊
35. EXPORTING AN .MP4
Practice

Syncing timeseries data to a video

Using your own data or the toadfish data generously provided in the workshop folder by Jacey Van Wert & Loranzie Rogers from Mensinger et al. 2019
**DOWNLOAD SAMPLE DATA**

Go to [jessiekb.com/resources](http://jessiekb.com/resources) password ucsc

Download sample data. These data are provided for educational use and are not intended for distribution or reproduction—thank you!

*Data demonstrating increased anterior lateral line afferent neuronal activity during self-generated swimming.*

Toadfish video and data provided by LJ Rogers & Jacey Van Wert from Mensinger et al. 2019.

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**PREPPING YOUR OWN DATA**

1) A figure—vector graphic format with transparent background or with your data in a separate layer in illustrator/PDF .ai or .pdf (with layers) file formats are ideal, but .eps or .svg can work.

2) .CSV file with the data you used to create your figure. Keep it simple with 2 columns, one for time and one for your data.

3) A video file that you’d like to sync or pair with the data.
1) **FIGURE:** vector graphic format with transparent background or with your data in a separate layer in Illustrator/PDF .ai or .pdf (with layers) file formats are ideal, but .eps or .svg can work.

I copy/pasted an Excel graph of the data from a CSV into Illustrator, selected the path with the data, copy/pasted the line with the data into a new layer ("Layer 2" above), saved the file as type ".ai" (Illustrator file).

2) **DATA:** .CSV file with the data you used to create your figure. Keep it simple with 2 columns, one for time and one for your data.

3) **VIDEO:** A video file that you'd like to sync or pair with the data.

I trimmed the video to the exact length that I had data for.
1) **CREATE PROJECT & COMPOSITIONS**

   A) If you are bringing in your data as an illustrator file, just make 1 composition. Name it “Data Synced with Video” and scale it to 1920 x 1080, 30 fps.

   B) If you are bringing in your data as an .eps file or .png, make 2 compositions. The first will be your “Data” composition and your second will be your “Data Synced with Video” composition. Scale your final version, the “Data Synced with Video” composition to 1920 x 1080, but scale up your “Data” composition horizontally depending on how fast you want your data to move across the screen. For me, I chose to zoom in by a factor of ~4.2: 8090 x 1080. When you bring in your figure, scale it up so that it fills the composition.

2) **IMPORT FILES:** your figure, video, and CSV file.

   Import your files by dragging & dropping OR by right clicking in the Project Panel > Import > File. If you are importing an illustrator file, make sure to import it as a Composition instead of as footage, so that each Illustrator layer becomes a separate After Effects Layer. This way you can just hide the layer with the rest of your graph and only display the timeseries data.

3) **SYNC DATA TO VIDEO!**

   Drag your “Data” or Illustrator composition into your “Data Synced with Video” composition. Drag your video into that composition as well. Navigate to the beginning of the video and add a Position keyframe to the data layer to align the beginning of the datastream where you would like it to appear. Navigate to the end of the video and add a Position keyframe to the data layer where you would like it to stop. After the video is synced, you can use the same methods in our previous tutorial to create time counters and stylize your animation.
1) SOME NEW THINGS

A) Creating time counter:

Just like the expressions we used in the last example to create numerical counters, we can add a counter to keep track of time elapsed.

```javascript
var slider = effect("Custom Start Time")("Slider");
var rate = 1;
var clockStart = slider;

function padZero(n){
    return (n < 10 ? "0" : ") + n;
}

clockTime = clockStart + rate*(time - inPoint);

if (clockTime < 0){
    sign = ");
    clockTime = -clockTime;
} else{
    sign = ");
}

t = Math.floor(clockTime);
hr = Math.floor(t/3600);
min = Math.floor((t%3600)/60);
sec = Math.floor(t%60);
ms = clockTime.toFixed(3).substr(-3);

sign + padZero(hr) + ":" + padZero(min) + ":" + padZero(sec) + "." + ms
```

BUT! What if we don’t want the whole timestamp?

Either alter the code OR if you think you might want it later, you can just add a mask to hide the HH:MM and reveal the seconds.

Select the layer you want to mask and then draw a rectangle over what you want to hide. Make sure the mask is set to "Subtract".

Inspiration and guidance from a helpful tutorial: https://www.youtube.com/watch?v=1MN1Uq5RtU&t=49s