Omega Paper Prompts for Supplementary Videos

Supplementary Video	Prompts:	Dataset to load and notes:
Supp. Video 1	Segment the cell nuclei present in the selected layer.	Load the ‘Human Mitosis’ built-in napari sample dataset.
	Count the number of segmented nuclei.	
	Write a csv file on the desktop that lists all segmented nuclei, together with their area, and coordinates. Sort the rows by decreasing area. Open the file when done.	
Supp. Video 2	Segment the cell nuclei on the selected 3D image.	Load the ‘Cells (3D + 2C)’ built-in napari sample dataset. Keep the nuclei channel
	Count the number of segments	
Supp. Video 3	Make a step-by-step plan to segment nuclei in a 2D image. The nuclei are brighter than the background.	Load the ‘Human Mitosis’ built-in napari sample dataset.
	Let’s apply step 3	
	For step 4, let’s do two erosions	
	Would it not be better to apply erosions first on the grey-level image instead?	
	Let’s do step 3 with just one opening operation.	
	Let’s do one step of erosion on the selected image please.	
	Let’s go back to the steps, apply 4 and 5.	
Supp. Video 4	Segment the nuclei on the selected 2D image.	Load the ‘Human Mitosis’ built-in napari sample dataset.
	Make a widget that takes a labels layer and returns a new labels layer but filtered. Only labels within a provided range of areas (min_area, max_area) are kept in this new layer.	
Supp. Video 5	Please write a widget that color projects a 3D stack along the Z axis. The hue of the projected pixel is proportional to the depth of the voxel of max intensity, the luminance is proportional to that max intensity, and the saturation is proportional to the contrast between the max intensity and the average intensity.	Load the ‘Cells (3D + 2C)’ built-in napari sample dataset. Keep the nuclei channel
Supp. Video 6	Please make a widget that returns the FFT spectrum of a 2D image as the absolute logarithm of the Fourier transform magnitude. Ensure that the DC component is at the center of the image. Use reflection padding and apodization to reduce artifacts due to discontinuities at the image borders.	Load the camera image and load the ‘Cells (3D + 2C)’ built-in napari sample dataset. Keep the nuclei channel. This way, one can test the original 2D widget and the one modified by the AI tool in the editor.
Supp. Video 7	N/A	
Supp. Video 8	Hello, who are you?	
	Please create a 2D image of dimensions 2000x2000 filled with random Gaussian noise of zero mean and sigma=100 and open it in napari.	
Supp. Video 9	Segment image on first layer using the SLIC superpixel segmentation algorithm.	Load the ‘coffee cup’ built-in napari sample image.

Supplementary Video	Prompts:	Dataset to load and notes:
Supp. Video 10	Open the following Zarr file: https://uk1s3.embassy.ebi.ac.uk/idr/zarr/v0.4/idr0062A/6001240.zarr	
	Open a photograph of Albert Einstein in napari.	
	Thank you.	
Supp. Video 11	Tell me what you know about gradient-based image fusion, feel free to do a web search to gather extra information.	Load the ‘grass’ and ‘gravel’ built-in napari sample image.
	Please make a widget that applies this idea to fuse two image layers.	
Supp. Video 12	Hi! What is the value of 10^10+1 ?	
	What is the number of permutations of a list of 10 objects?	
	Write all permutations of this list: [‘a’, ’b’, ’c’, ’d’, ’e’] to a file on my computer’s desktop. One permutation per line. When you are done, tell me the path of the file.	
	Please open that file using the system’s default viewer.	Omega might get confused about opening the file, if you are explicit about which file it will do it.
	Thank you!	
	Please create a new file called filtered_permutations in the same folder, that only contains the permutations where the letters a and b follow each other. For example: bdeca would be filtered out, while edabc would be kept.	
	Does this file exist? <path_to_desktop_folder>/filtered_permutations.txt ?	Note: Omega got confused and did not run the code; I had to ask again, which sometimes happens. You might experience a different turn of events…
	Ok, so please run the code you suggested above.	
	Please open the file you just produced	Again, got confused, but in the end it works
	Yes, open it with a text file editor.	I had to explain this was text file…
Supp. Video 13	Switch viewer to 3D mode.	Load the ‘KIdney(3D+3Ch)’ built-in napari sample dataset.
	Rotate the view by 20 degrees along all axis.	
	Zoom by 50%	
	Zoom by another 50%	
	Set the gamma of all layers to 1.3	
	Remove all layers except the first one called ‘nuclei’	
	Keep only the layer named ‘nuclei’	For some reason, it did not get it the first time, but this works better in the last versions of Omega because it now is aware of all loaded layers.
	Zoom out by 100%	
	Switch back to 2D mode	
Supp. Video 14	What is the signature of the ndimage convolution function?	Load the ‘KIdney(3D+3Ch)’ built-in napari sample dataset. Keep only the ‘nuclei’ channel.
	Apply this function to the selected image.	
	Yes, the image is 3D.	This is typically not needed in the recent version of Omega, as it knows the list of the layers.

Supplementary Video	Prompts:	Dataset to load and notes:
Supp. Video 15	Segment the nuclei on the selected image using Cellpose.	Load the ‘Cells (3D + 2C)’ built-in napari sample dataset. Keep the nuclei channel. Max project that channel.
Supp. Video 16	Denoise the selected image using Aydin’s FGR approach.	Load an image to denoise. Note: Aydin does not currently run on Arm Macbooks.
	Denoise the selected image using Aydin's FGR approach.	Load another image to demoise
Supp. Video 17	Create an empty float image of dimensions 1024x1024	
	Add Gaussian noise to it with variance 100 and zero mean.	
	Apply the function: f(x) = log1p(abs(x)) to the image	
	Substract the mean from the image.	
	Blur the image with a Gaussian filter of sigma = 16	
	Apply the function f(x) = 1/(0.02+abs(x))	
	Normalize the image so that the max value is 1.0 and the min is 0.0	
	Apply the following gamma transformation: f(x) = x^4	
	Segment dark connected components on the image that are separated by thin bright curves. Each segment should have its own label. The result should be in its own labels layer.	
	Amazing, thanks Omega, you got a perfect score on this task!	
	Ok, so please give me some statistics on this labels layer content: number of segments, average area of segments.	
	Create a new labels layer, but just with the largest segment please.	
	Convert the labels layer with all the segments into a binary image, where pixels covered by a segment have value 1 and all other pixels have value 0.	After a perfect stretch, Omega hit a difficulty. It assumed the name of the labels layer. I needed to help. This cannot happen anymore in the latest version of Omega since I provide the current list of layers in the system prompt.
	Sorry, I should have said that the label layer, I mean, is named Segmented Components.	
	Apply 10 erosion steps to that image.	
	Beautifull work of Art!	
	Make sure that the image is of type float, and then apply a Gaussian blur with sigma 2.	
Supp. Video 18	I have loaded an image into the viewer. The image shows coins on a darker background. Please devise a step-by-step plan to segment the coins from the background.	Load the coins image from the napari sample images.
	The image is already grayscale so that we can skip step 1and there is not much noise, so we can skip step 2. However, the image has a very non-uniform background. What methods for background removal/subtraction would you recommend?	
	Let’s try the rolling ball algorithm to remove uneven illumination.	

Supplementary Video	Prompts:	Dataset to load and notes:
	Hmm, that did not work. Please remind me of the methods I could use to correct background illumination.	
	What about CLAHE? Would that be applicable here?	
	Let's try it on the selected image	
	Wow, that's pretty good! Let's try to threshold the image now.	
	Wow, that's ok but there are lots of holes.	
	Great, now we can binarise the image again, and label it	
	Not bad, but I think the threshold is not great. Let's apply a threshold of 0.001 to the selected image.	
	Binarise, apply some hole-filling filter, and label the selected image.	
	Ok, that's not bad!	
Supp. Video 19	Open this file in napari: https://github.com/intel-iot-devkit/sample-videos/raw/master/people-detection.mp4	Make sure that OpenCV is installed and functional on your system. Omega will attempt to install it and ask for permission, but you must restart Omega.
	Detect people in each frame of the video (contained in layer 0) using OpenCV	
Supp. Video 20	Z-project the selected image using numba-accelererated code.	Load the 'Cells (3D + 2C)' built-in napari sample dataset. Keep the nuclei channel. Prompt is too ambiguous; I should have written: 'maximum project along z ….'
	Z-project again the selected image using numba, but this time avoid using a call to numpy, instead write the projection manually.	To make it indeed faster than numpy, or at least try to be competitive, I should have asked for Numba's loop parallelism too.
	Do the same z-projection, but do a max-projection.	Note that in the video you can see how Omega remembers that it needs to write the loop itself instead of calling numpy.
Supp. Video 21	Please check that cupy is installed	Load the Cells (3D + 2C) built-in napari sample dataset.
	Now, max project all images using cupy.	
	Fantastic, thank you :-)	
Supp. Video 22	Bonjour, comment t'appele-tu?	
	Cree une image monochrome de dimensions 2048x2048, chaque pixel a une valeur de zero.	
	Ajoute du bruit Gaussien a cette image.	
	Applique un filtre boite de dimensions 16x16.	
	Please summarise everything we have done up to now in Spanish.	
Supp. Video 23	Which of the 4 images depicts a cup of coffee?	Load the following built-in napari sample images: the black&white horse, the coffe cup, the cat, and the camera image. Rename the corresponding layers to: A, B, C and D, respectively.
	What is the name of the corresponding layer?	
	Congrats! You are very smart!	

Supplementary Video	Prompts:	Dataset to load and notes:
Supp. Video 24	Segment the biological structures on the two loaded image layers. For each image, please look at the contents to determine what there structures are and how to segment each of them best.	Load the 2D image from the Cellpose examples and keep the cytoplasm channel after channel splitting, and load the napari example image ‘Human Mytosis’ and keep the nuclei channel. Rename the images so that the image names don’t give it away!
	Thank you!	Omega should go on to check both images and make its best guess that it should Stardist for the nuclei image and Cellpose for the cell cytoplasm image.