**MATLAB for image processing: Session 3 worksheet**

In this worksheet we’re going to use what you’ve learnt about arrays, matrices and images to implement a basic image segmentation and analysis workflow. This workflow involves loading an image of cell nuclei, subtracting a background intensity profile (provided from a reference image), followed by binarizing the image and identifying connected regions (nuclei). The image to the right shows an outline of the steps you’ll be taking (Note: the first few lines use the parula colourmap to enhance the contast). In an optional final exercise, you will measure the size of the nuclei in terms of the number of pixels they occupy in the image.

1. **Loading images from file**

The first step we need to take is to load the two images into the workspace. One shows the nuclei we want to segment, while the other shows the general background intensity profile. In a real situation you can get such background images when no sample is present, or for fluorescence microscopy, by imaging a sample with homogeneous fluorescence (e.g. a fluorophore solution).

1. Create a new script file, into which we will create our nuclei segmentation workflow. Save this file to a location accessible to MATLAB. Note: remember to start the script with the *clear* command.
2. Load the nuclei image to the workspace and assign it a reference. The image to use (“NucleiImage.tif”) is included in the Session 2 GitHub repository (<https://github.com/SJCross/MATLAB-course>).
3. Load the background image to the workspace and assign it a reference. The image to use (“BackgroundImage.tif”) is included in the Session 2 GitHub repository (<https://github.com/SJCross/MATLAB-course>).
4. Use *imshow* to display the two images.