1. The image *IM\_0069\_rot.raw* was saved in raw data. The matrix size is 512×512, the FOV is 614.4mm × 614.4mm and the bit depth is 16 bits, type signed integer, **big endian**.
2. Open the image and write the Matlab code you used:

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1. Display the image with ***imshow***. Use **colorbar** to display the values in the image. Insert a screenshot and write the Matlab code you used:

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1. Do a noise measurement in terms of coefficient of variation () in a homogenous area of size 24 mm × 24 mm, similar to the one shown in red in the figure. Insert the Matlab code and result of measurement.

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1. Create a new image that is a subsampled version of *IM\_0069\_rot.raw* with a matrix size of 256×256 by grouping pixels. Each pixel in the new image must be the result of combining four pixels in the original.
2. What do you think is better to maintain the clinical meaning, adding, or averaging the four pixels? Explain why.

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You can subsample the image using two different approaches:

* Approach I: Use two loops, one for each dimension, *x* and *y*.
* Approach II: Create two index arrays that subsample the image every two pixels. This approach does not use any loop.

1. Write the Matlab code for each approach. The result of both options should be the same, but which one is faster (use ***tic*** and ***toc***)?

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1. Display the subsampled image in a different figure and compare with the original. Do you think we have lost spatial resolution? Why?

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1. Measure the noise again (same area of 24 mm × 24 mm that you chose in 1c). Insert the Matlab code and result.

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1. Calculate the percentage of noise reduction by , where CVoriginal is the value calculated in 1c and CVsubsampled is the value calculated in 2d. Insert Matlab code and result. Comment the result discussing whether the noise was reduced or not and the reasons for it.

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