Analysis of SNR in AMDX2011P retinal images

Alex Matov
November 2022

Types of pixels in the image & computation approach

Very bright pixels (type of hot pixels) – excluded

Protein aggregates (AMDX-2011P) – foreground

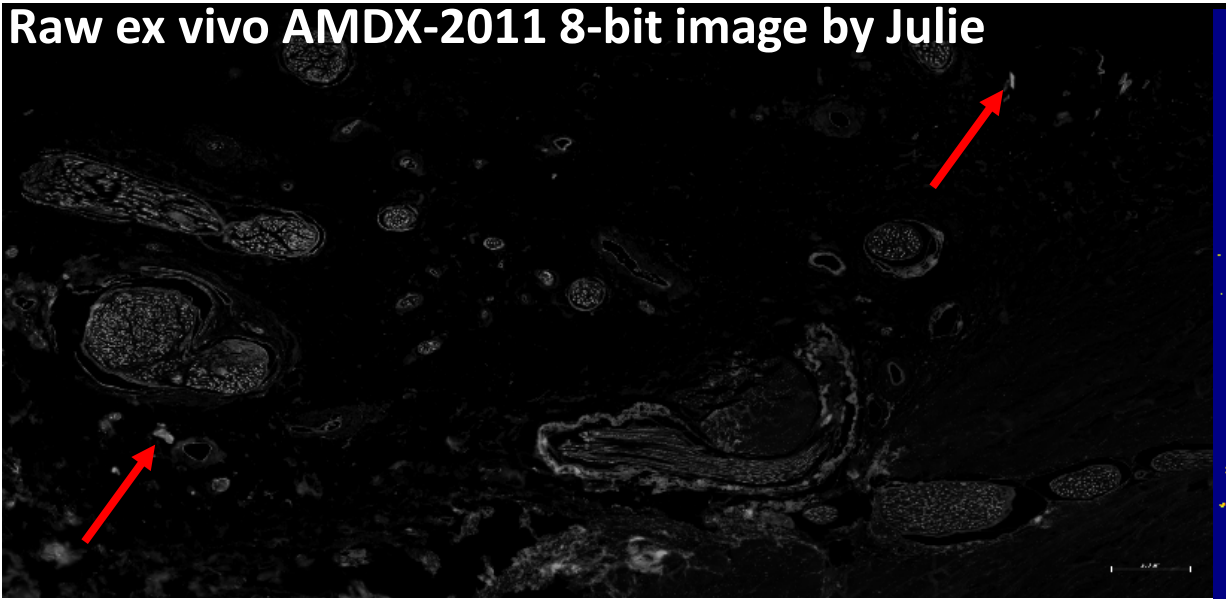
Cellular fluorescence (non-specific labeling) – background

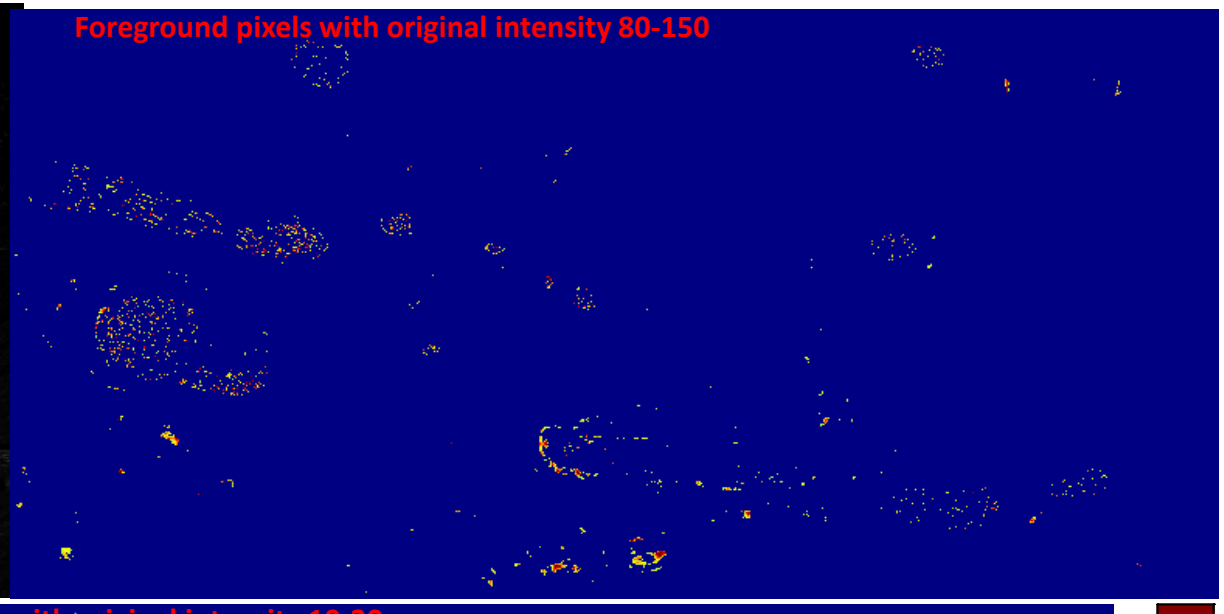
Camera noise (dark noise, shot noise) – excluded

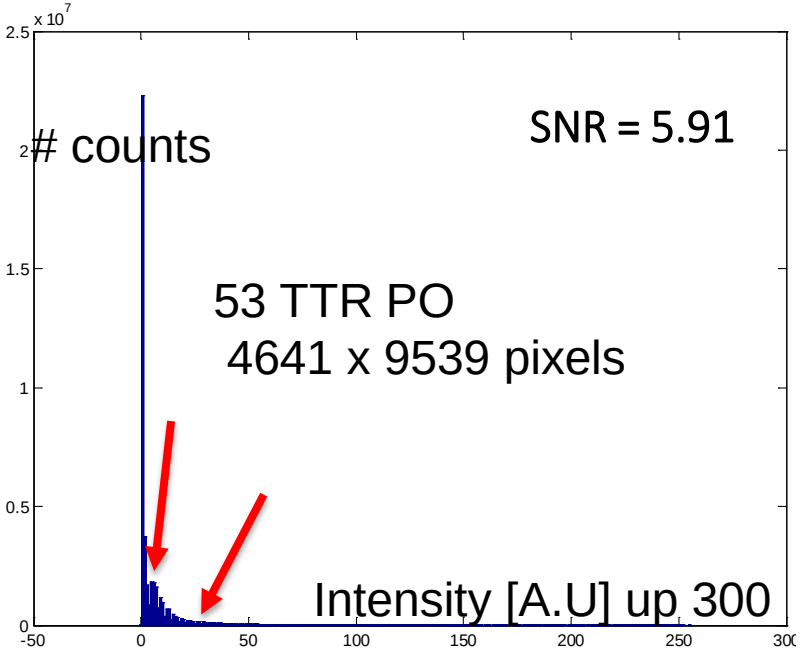
- **Areas of foreground & background in each image are identified by visual inspection (Julie)**
- **I segment the images based on this input into two intensity ranges (background & foreground)**
- **In control images, regions selected by eye (Julie) have intensity ranges of 50-100 for foreground & 10-50 for background (see histograms)**
- **In TTR images, regions selected by eye (Julie) have intensity ranges of 80-150 for foreground & 10-30 for background (see histograms)**
- **The average of the foreground pixels over the average of the background pixels is the SNR, which is 3-fold higher in TTR**

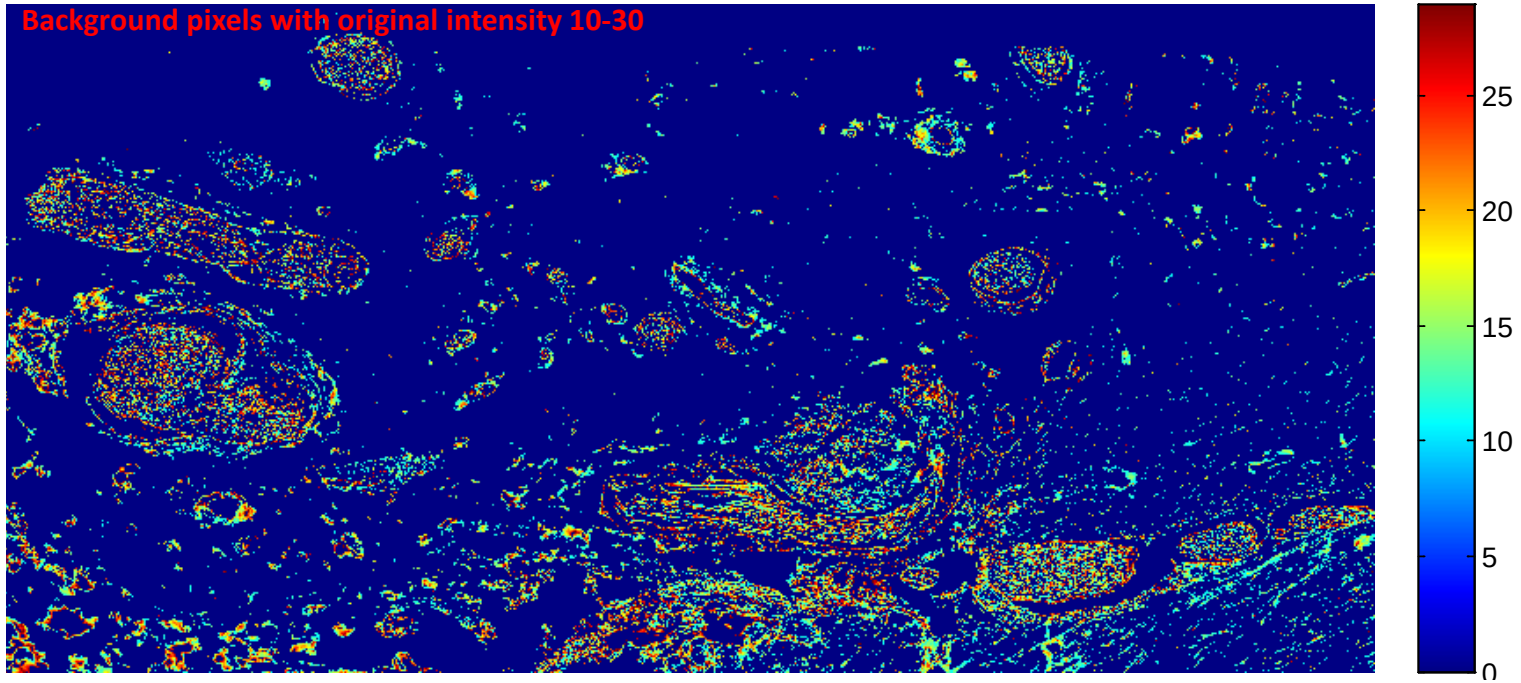
frgr = pixels with intensity between 80 & 150
bkgr = pixels with intensity between 10 & 30

SNR analysis of TTR images



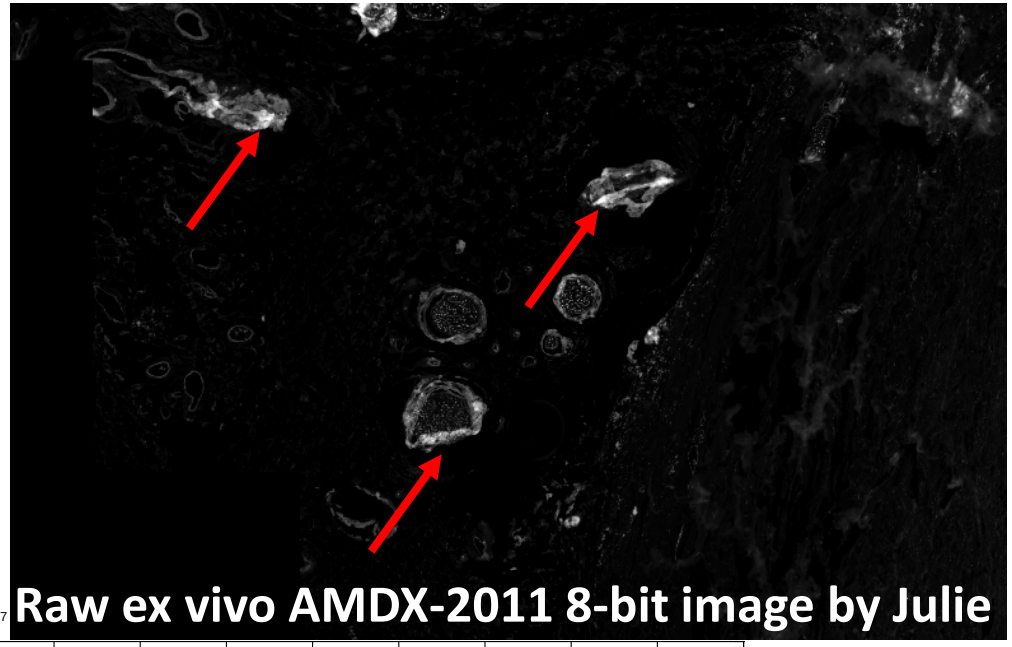


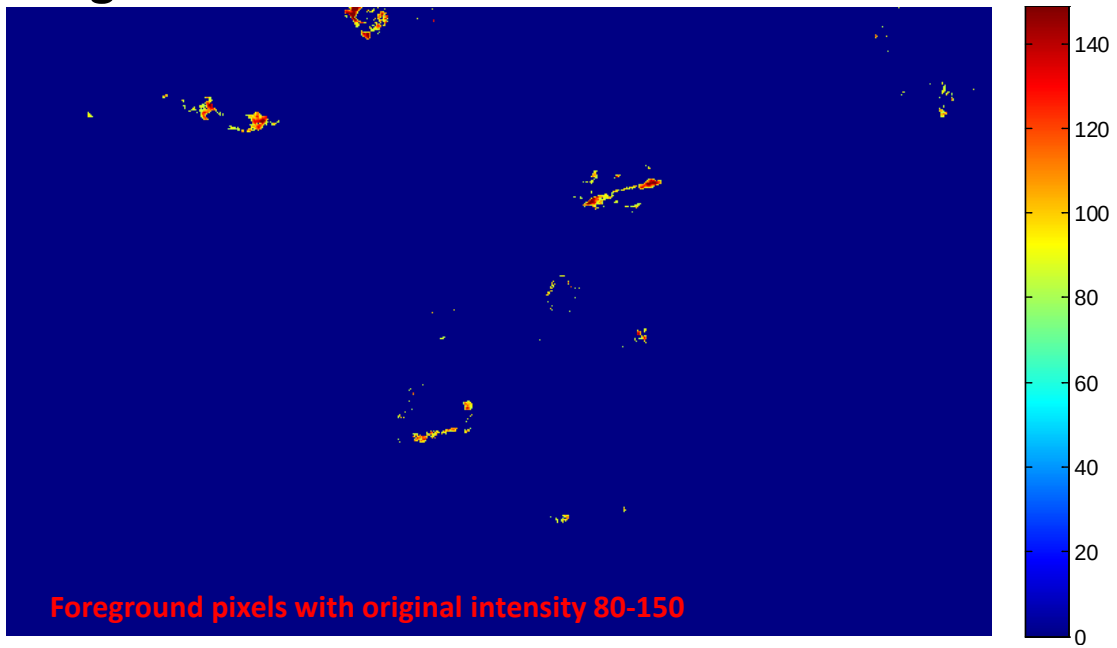


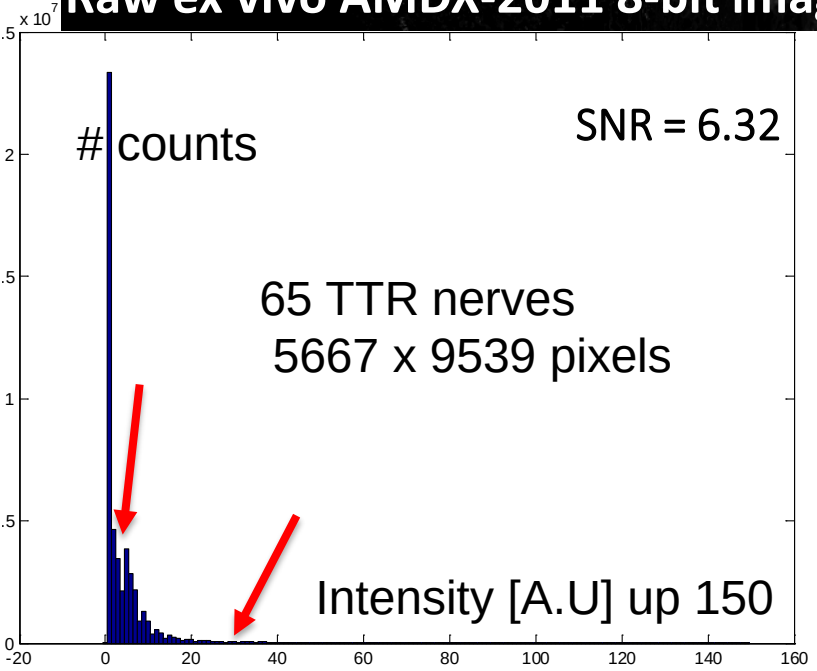


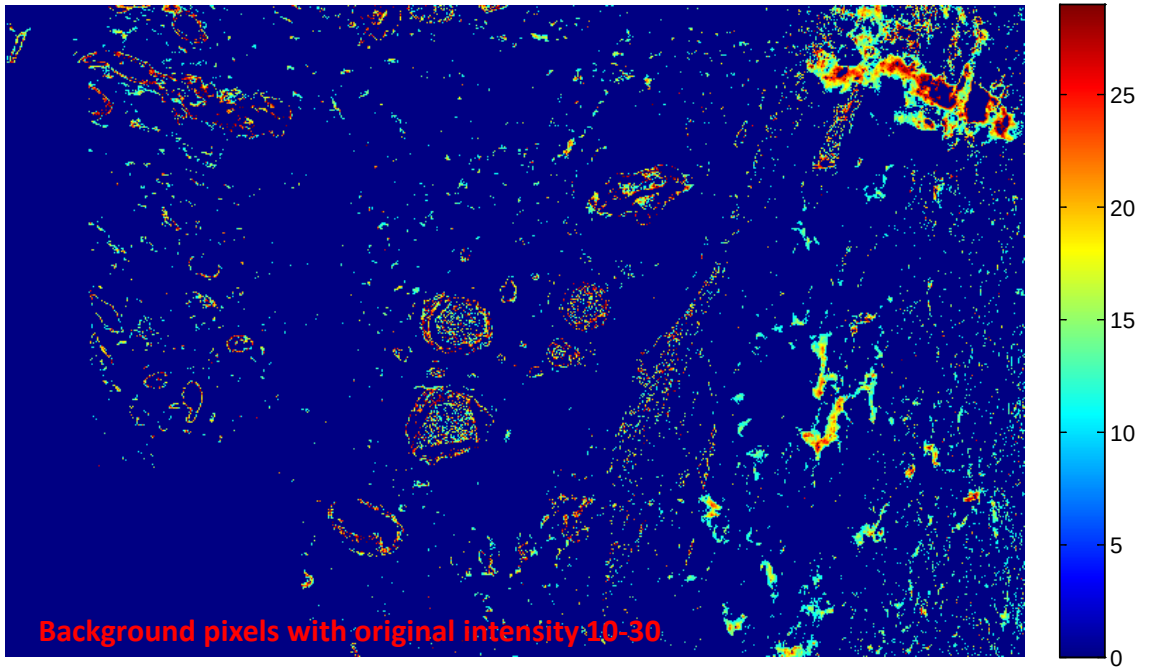
frgr = pixels with intensity between 80 & 150
bkgr = pixels with intensity between 10 & 30

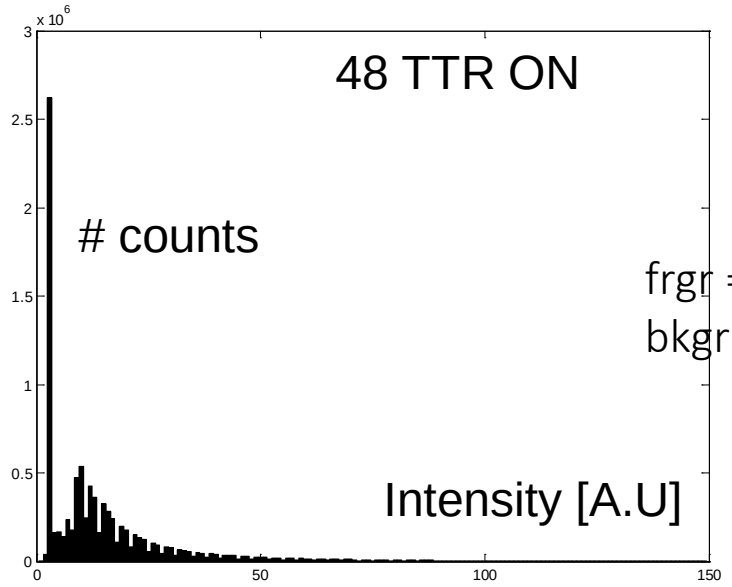
SNR analysis of TTR images





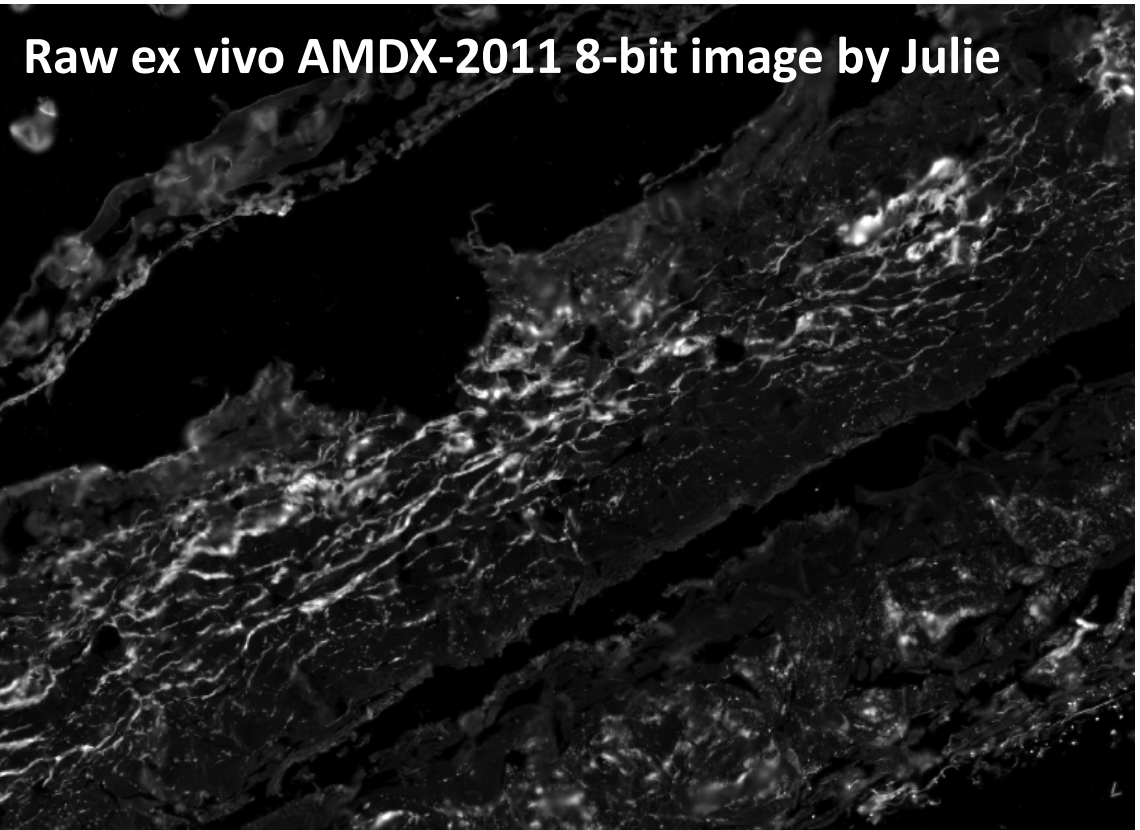


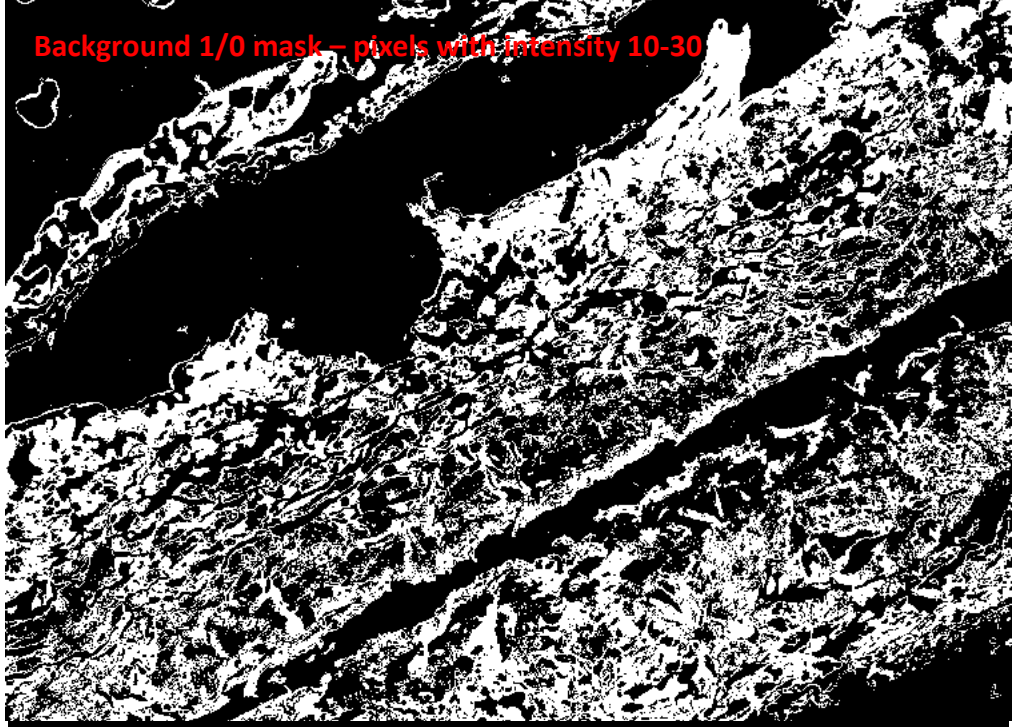


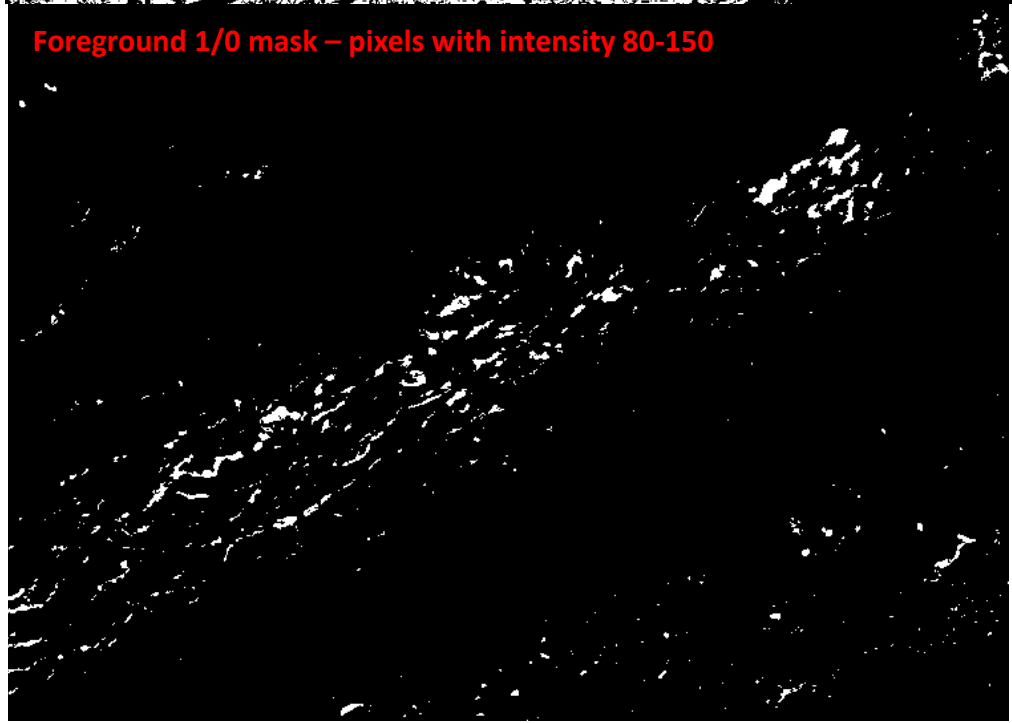


SNR analysis of TTR images

frgr = pixels with intensity between 80 & 150
bkgr = pixels with intensity between 10 & 30

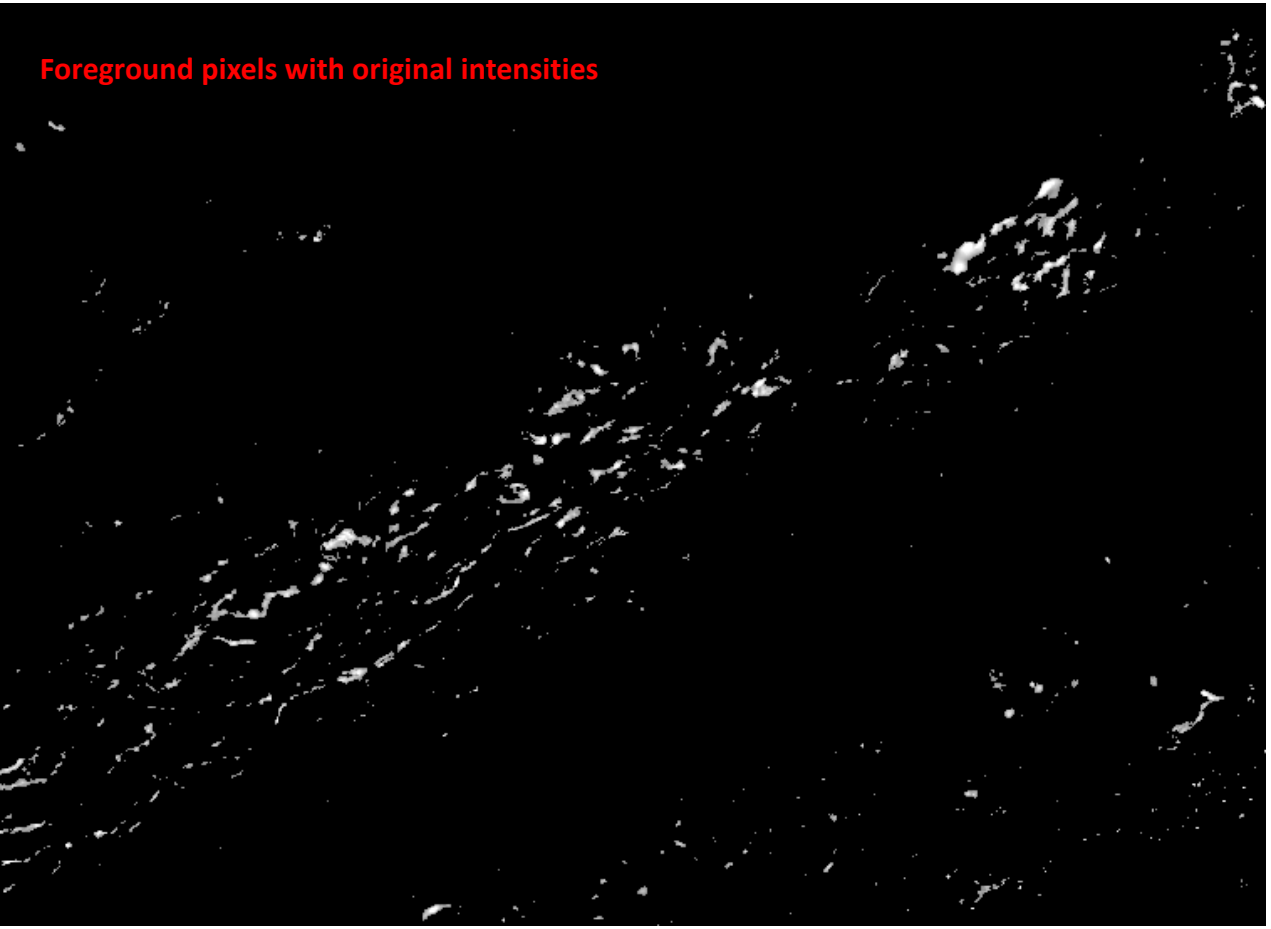


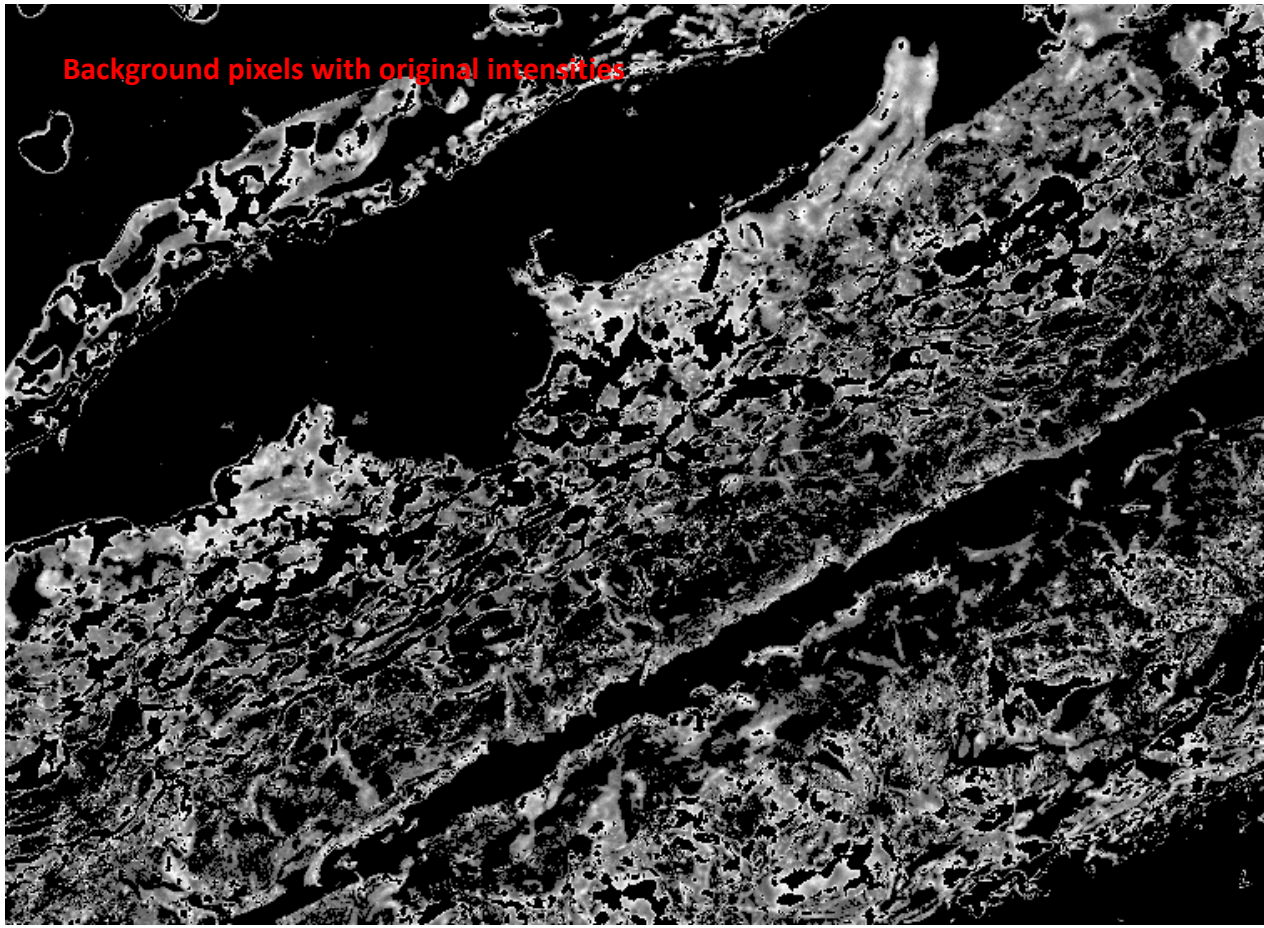




SNR analysis of TTR images

SNR = 5.92 (the average pixel intensity in the foreground over the average pixel intensity in the background)

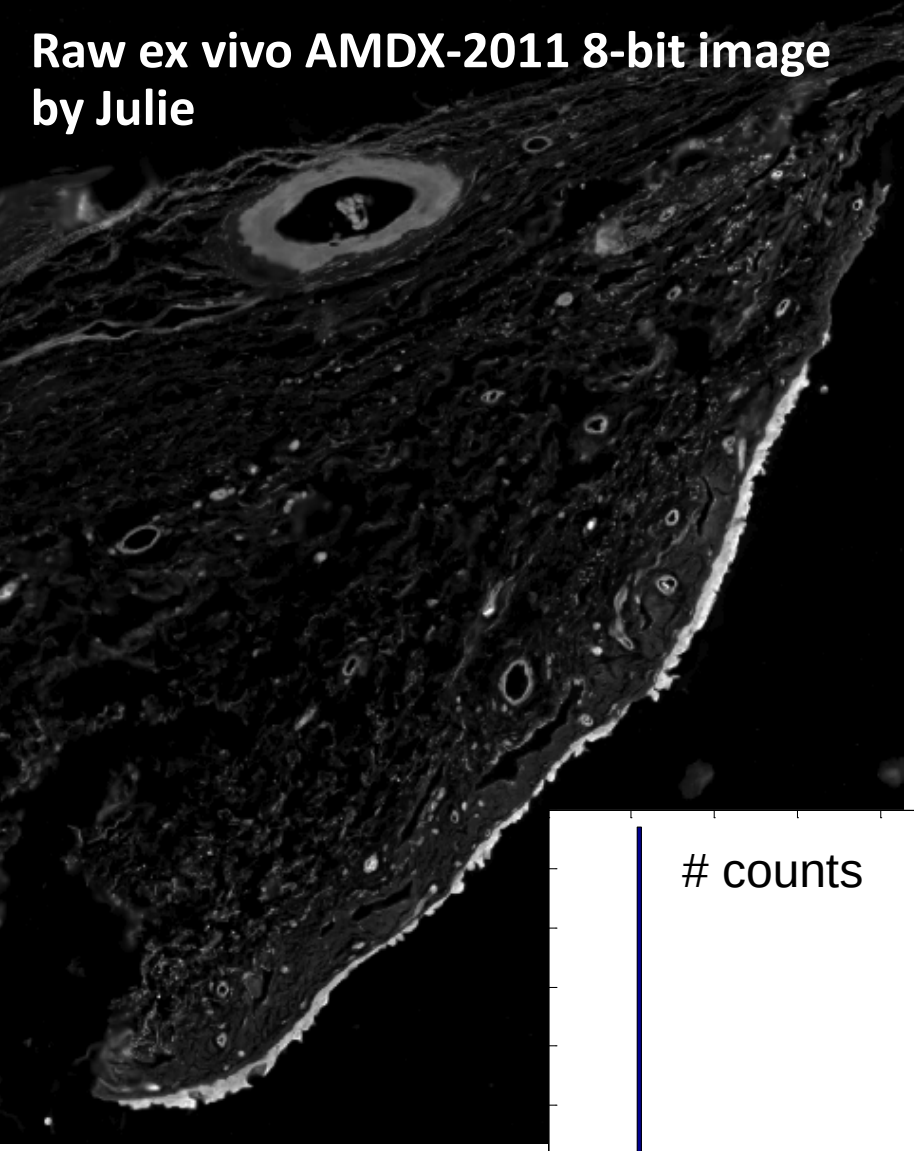


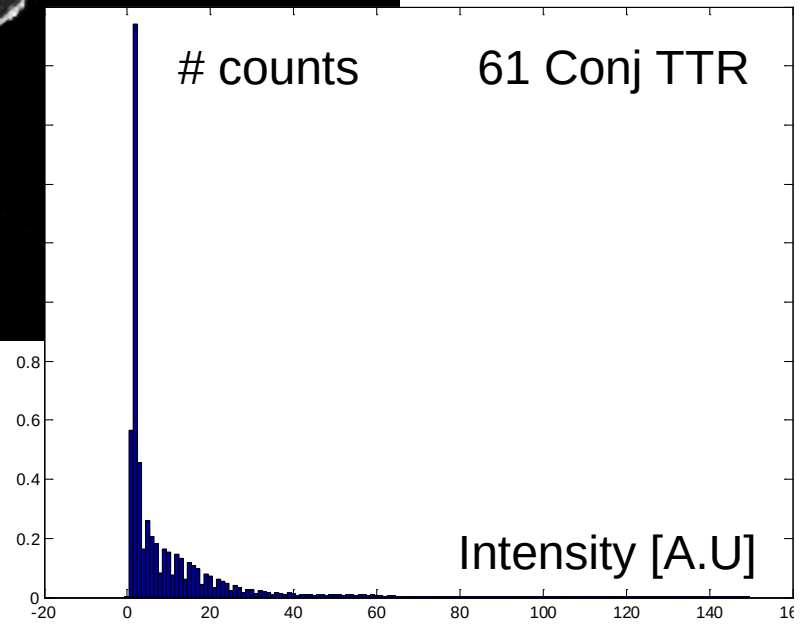


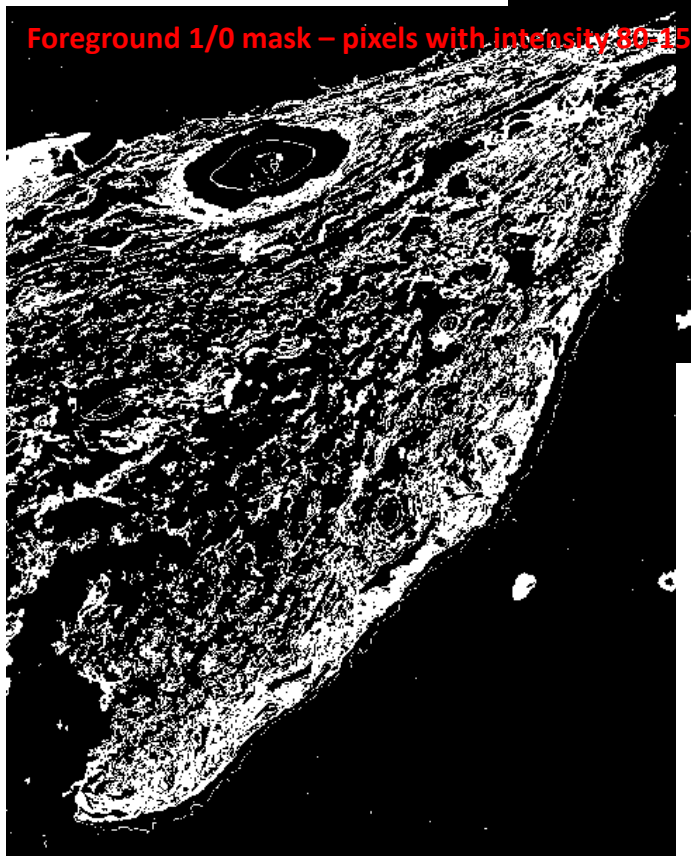
Raw ex vivo AMDX-2011 8-bit image by Julie

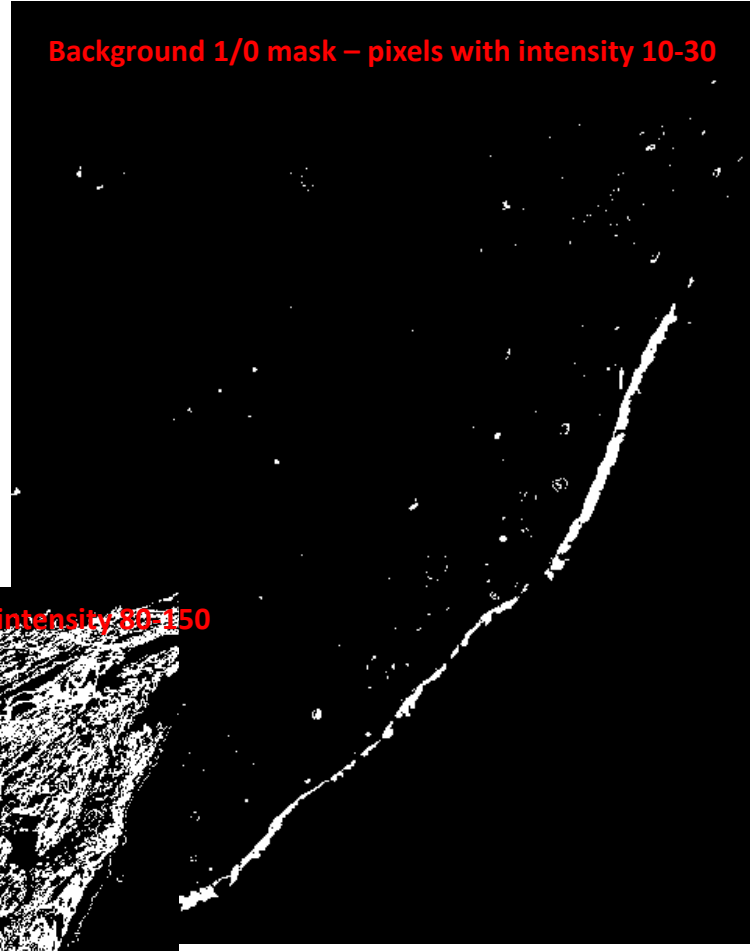
SNR analysis of TTR images

frgr = pixels with intensity between 80 & 150
bkgr = pixels with intensity between 10 & 30



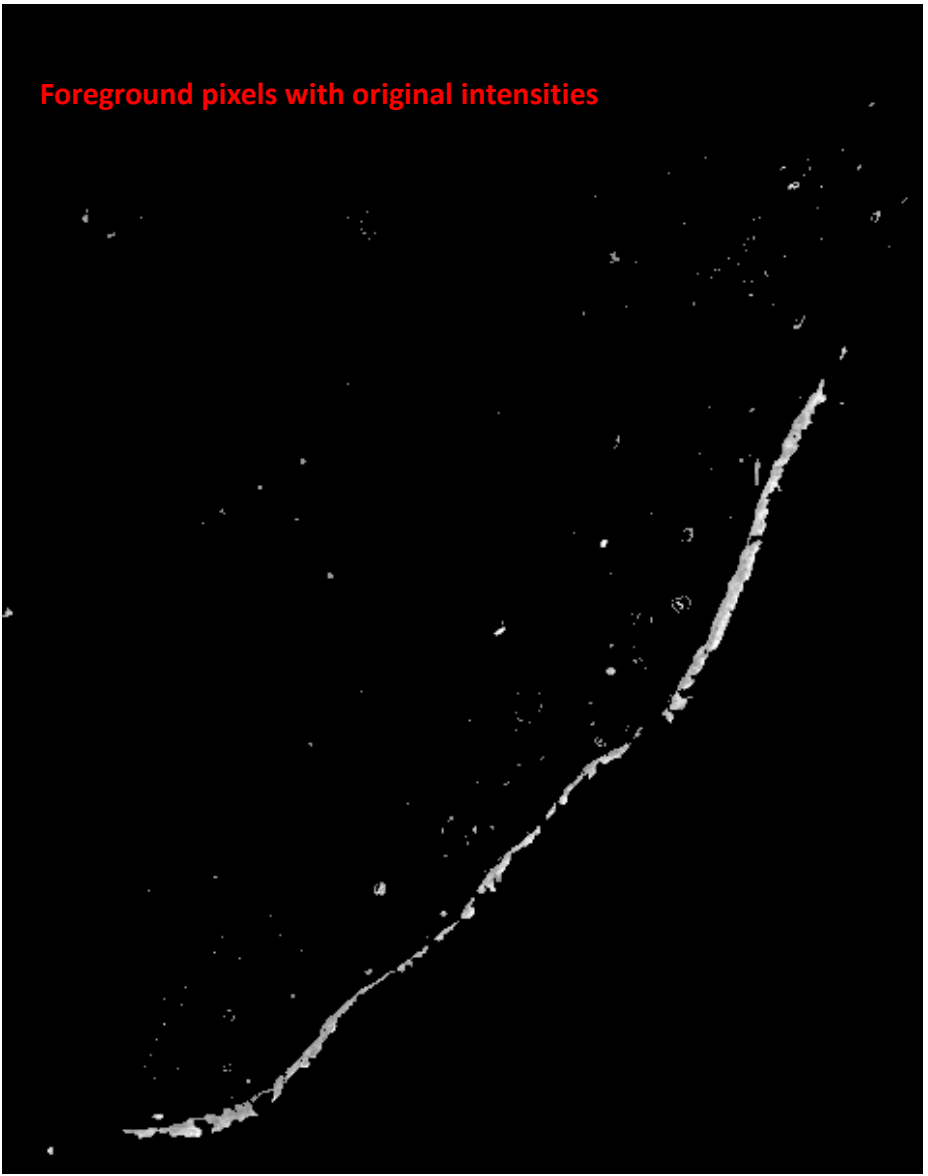


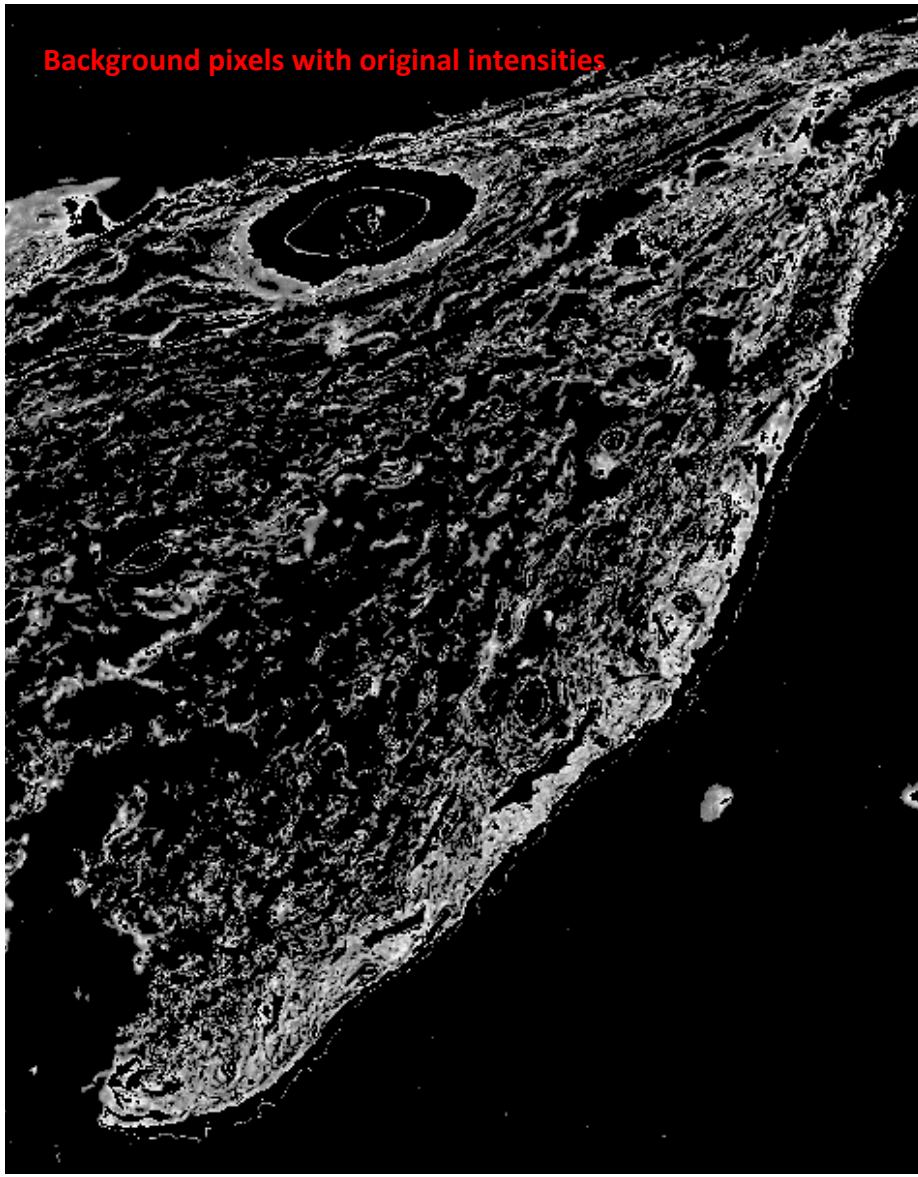




SNR analysis of TTR images

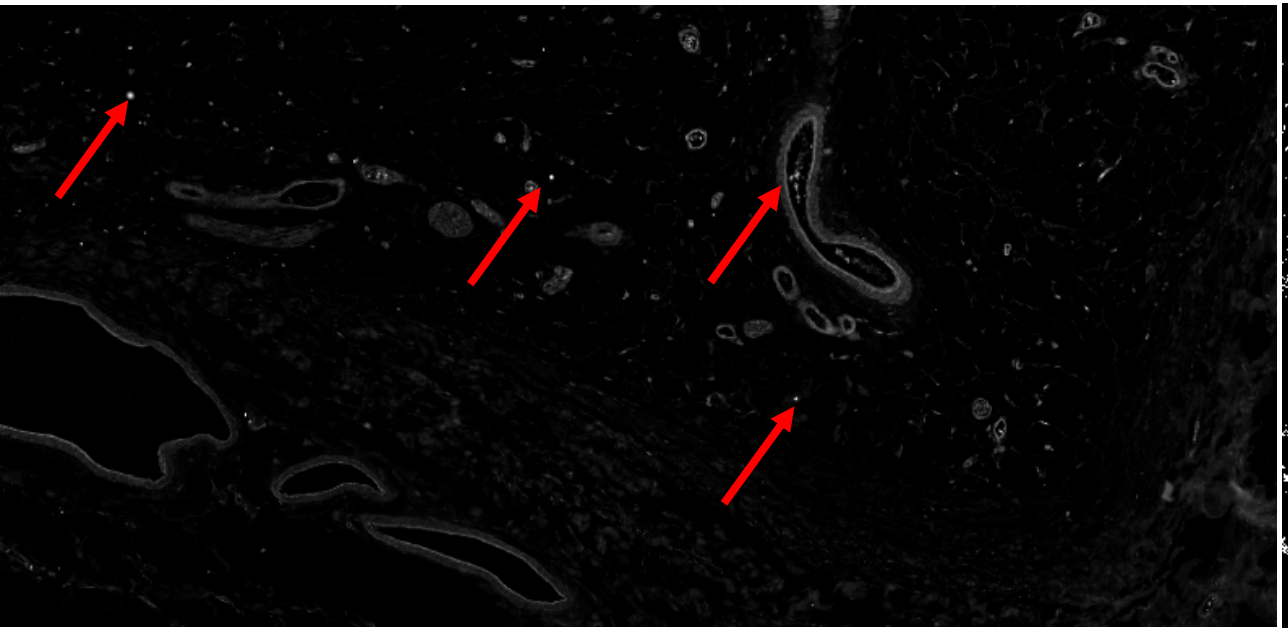
SNR = 6.18 (the average pixel intensity in the foreground over the average pixel intensity in the background)

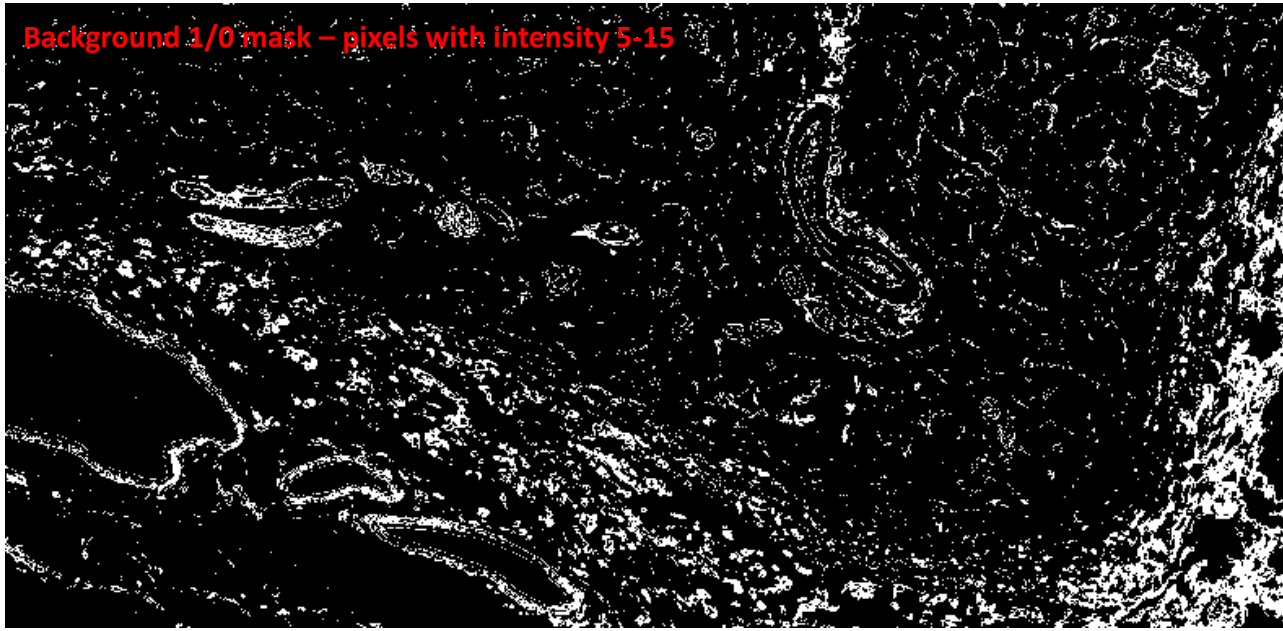


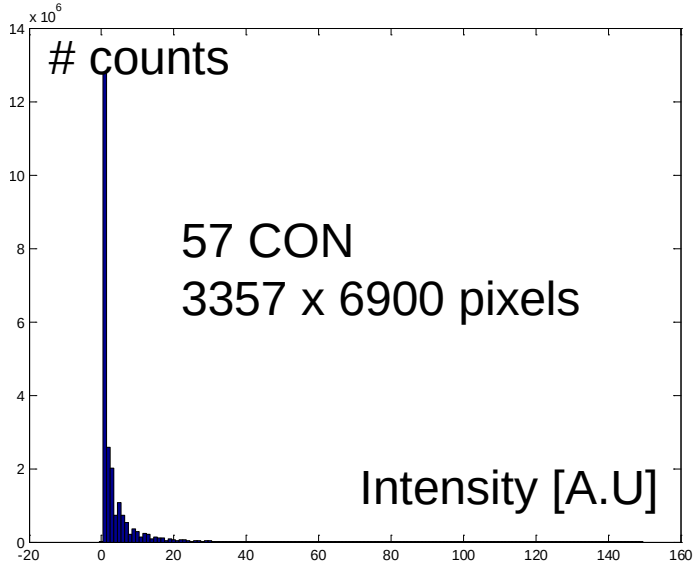


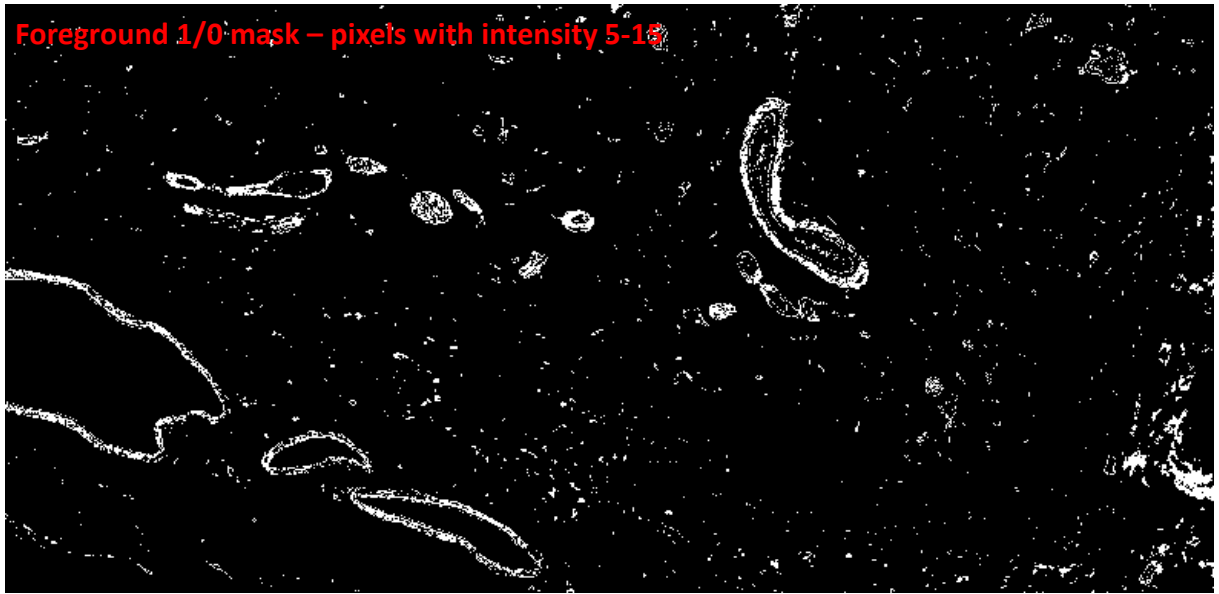
frgr = pixels with intensity between 15 & 30
bkgr = pixels with intensity between 5 & 15

SNR analysis of CTL images



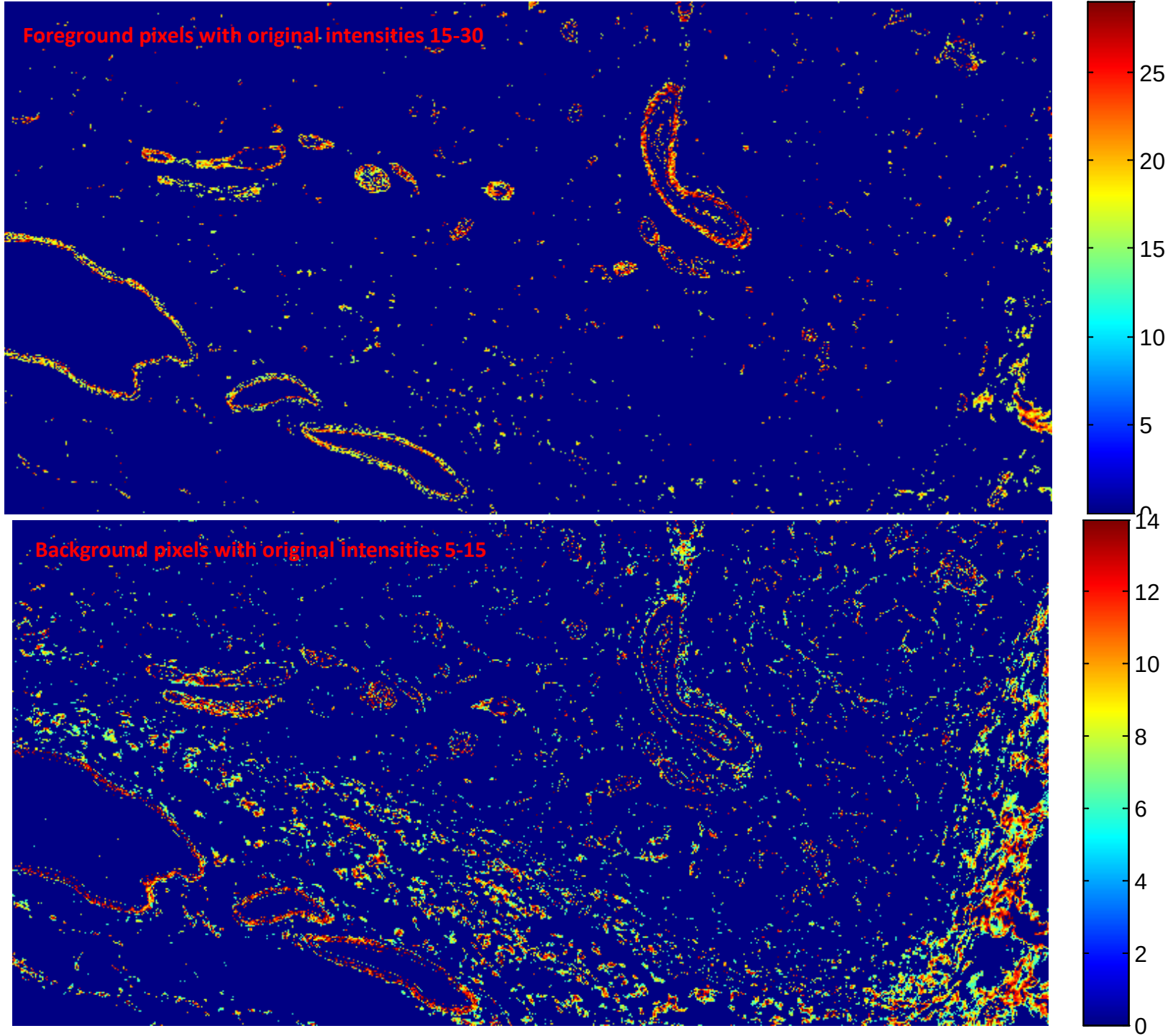






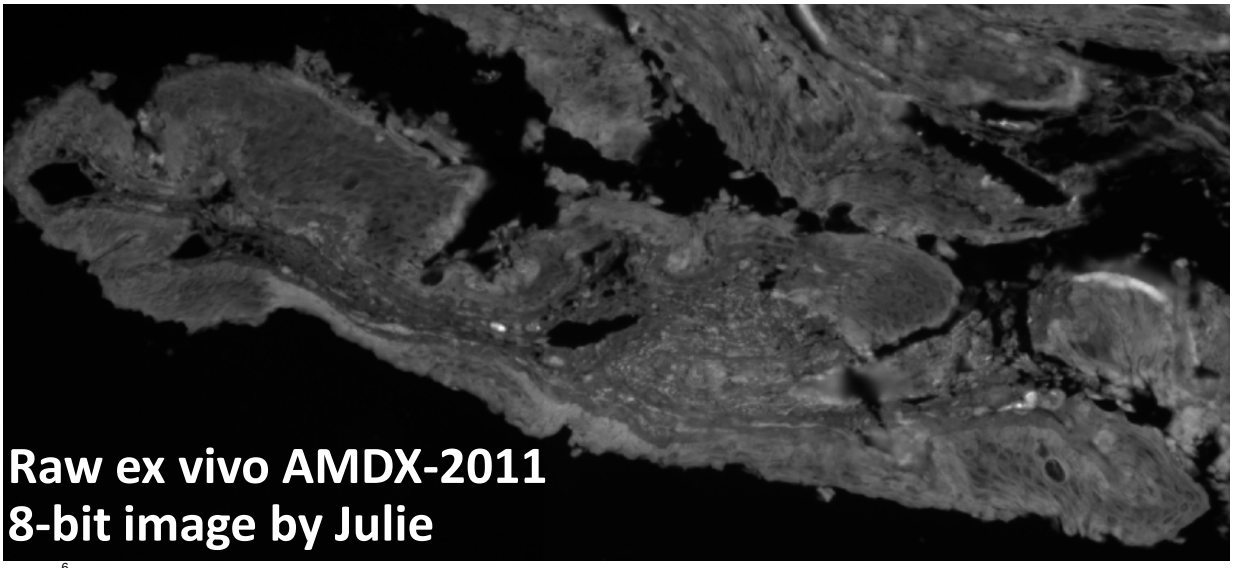
SNR analysis of CTL images

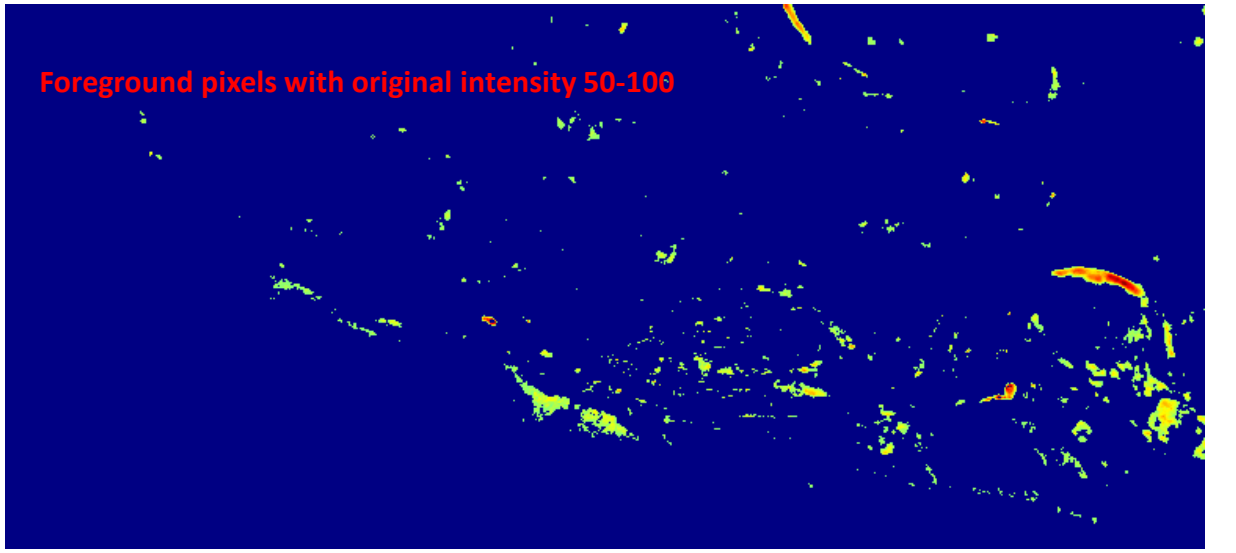
SNR = 2.24 (the average pixel intensity in the foreground over the average pixel intensity in the background)

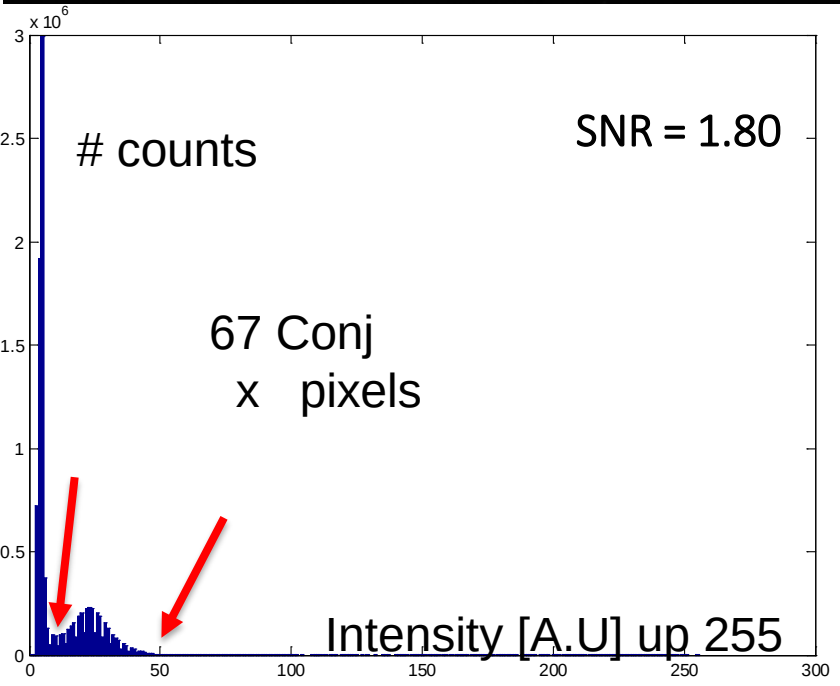


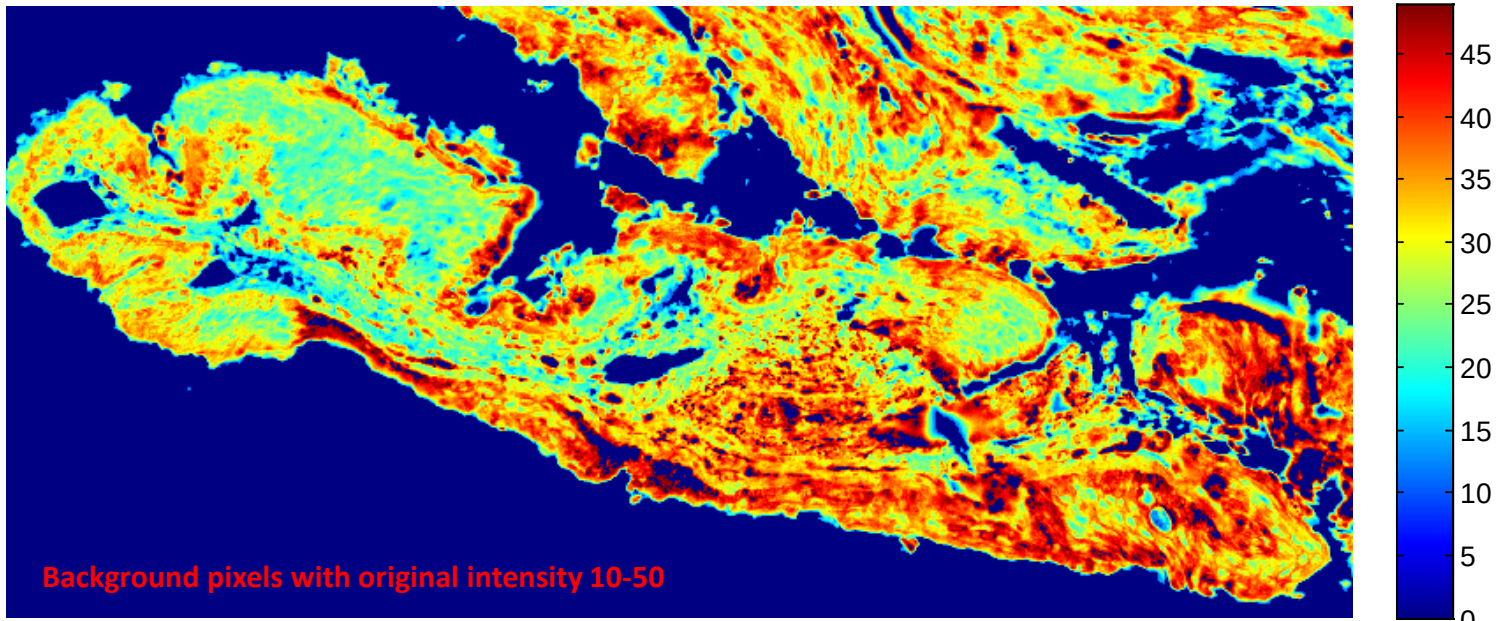
frgr = pixels with intensity between 50 & 100
bkgr = pixels with intensity between 10 & 50

SNR analysis of CTL images



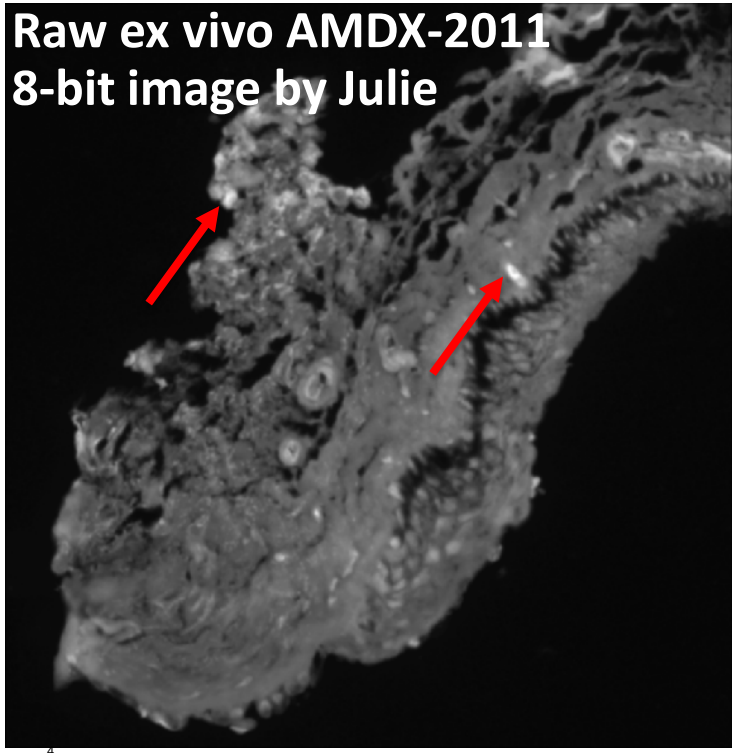


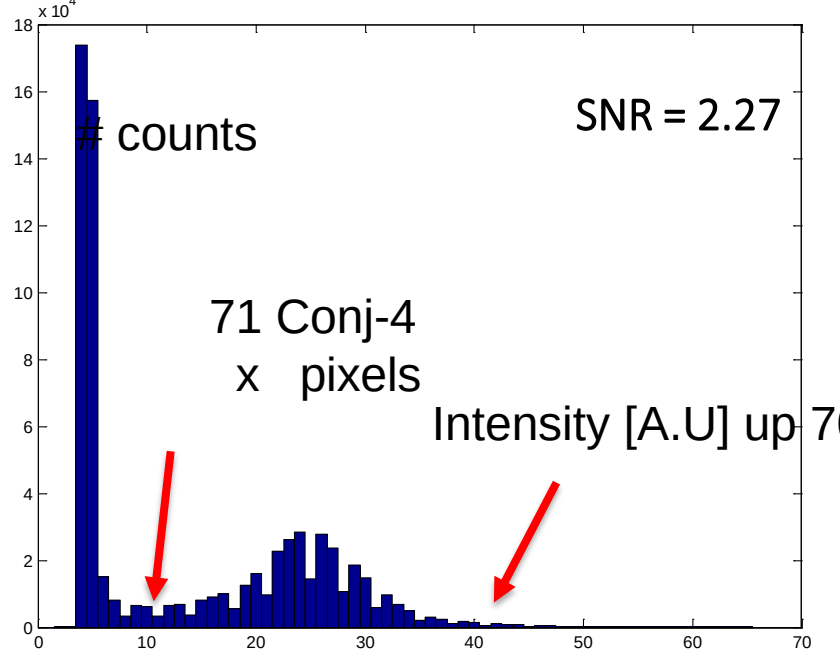


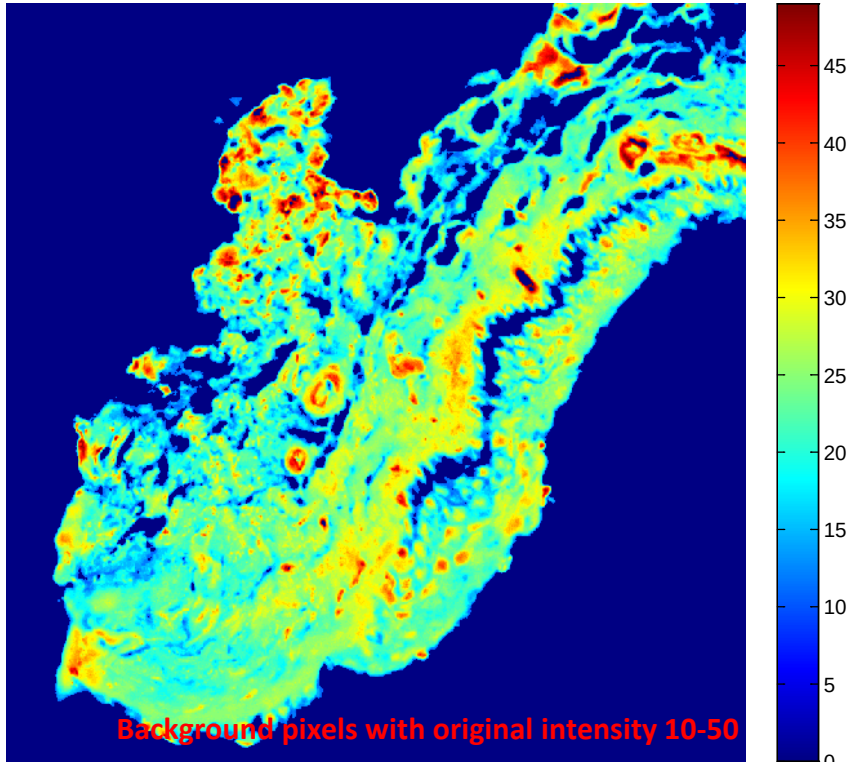


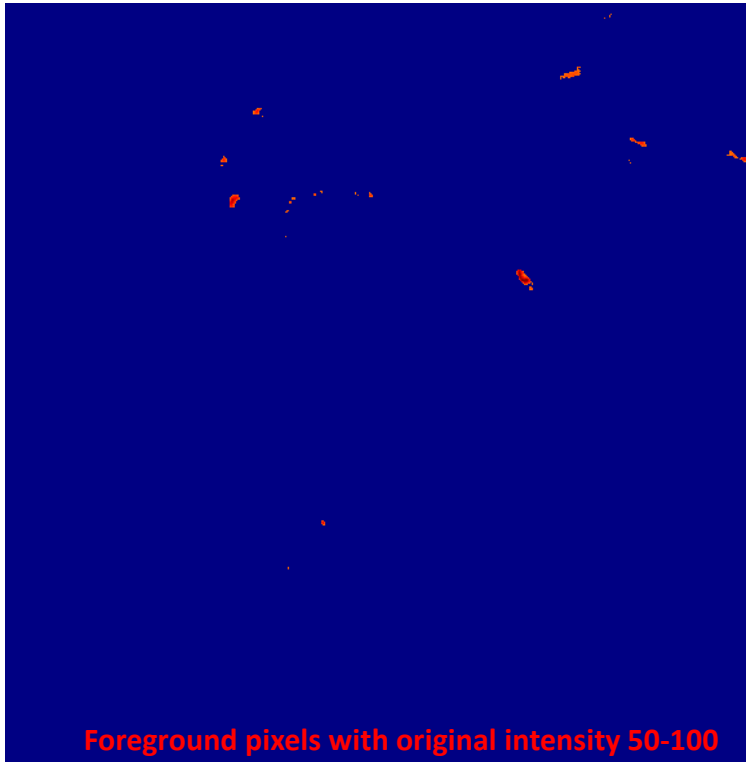
frgr = pixels with intensity between 50 & 100
bkgr = pixels with intensity between 10 & 50

SNR analysis of CTL images









frgr = pixels with intensity between 50 & 100

bkgr = pixels with intensity between 10 & 50

SNR analysis of CTL images