



Det Naturvidenskabelige Fakultet

Detektion af vesikler i celler

Bachelorforsvar

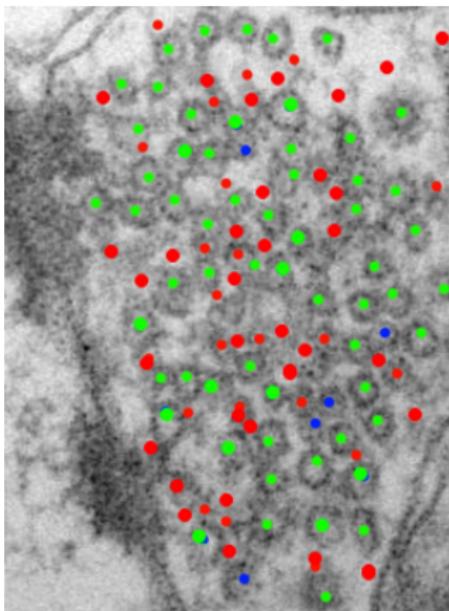
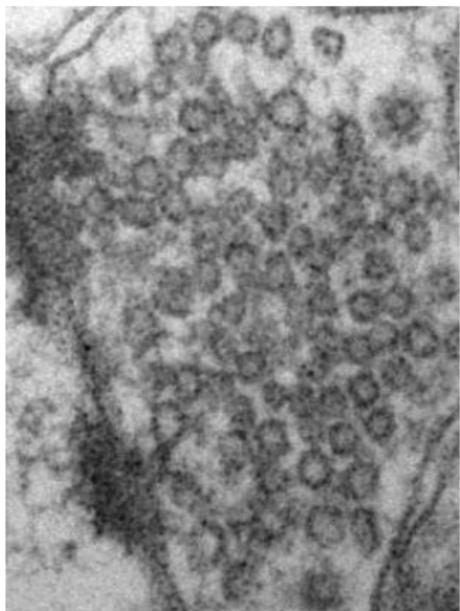
Claes Nøhr Ladefoged

Marcus Bjerg Gregersen

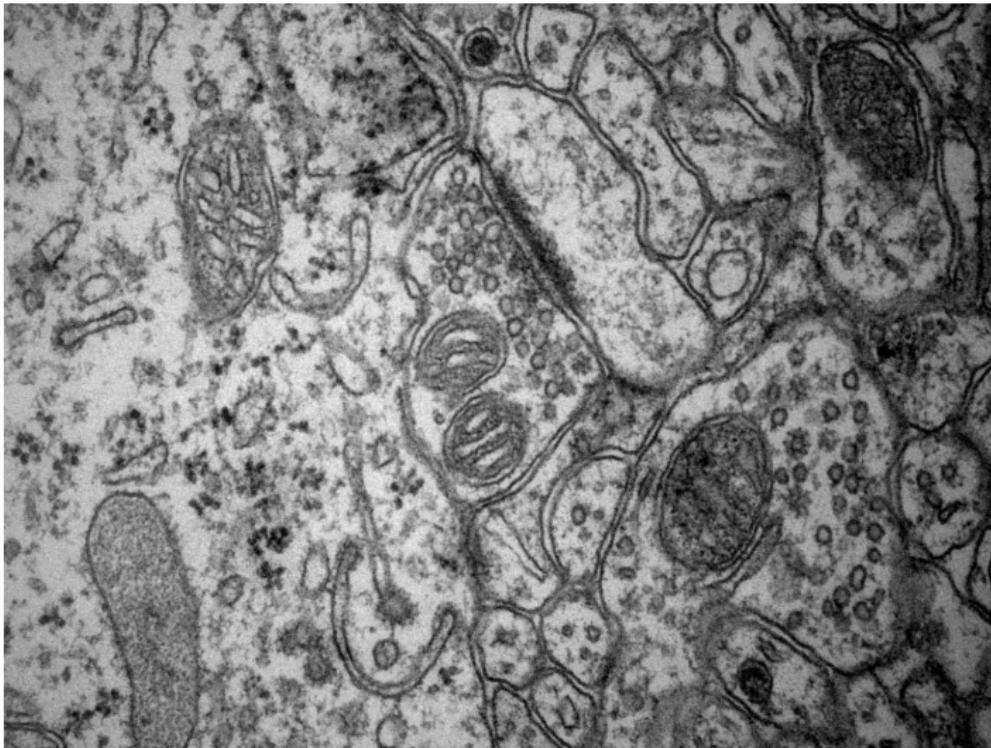
Datalogisk Institut



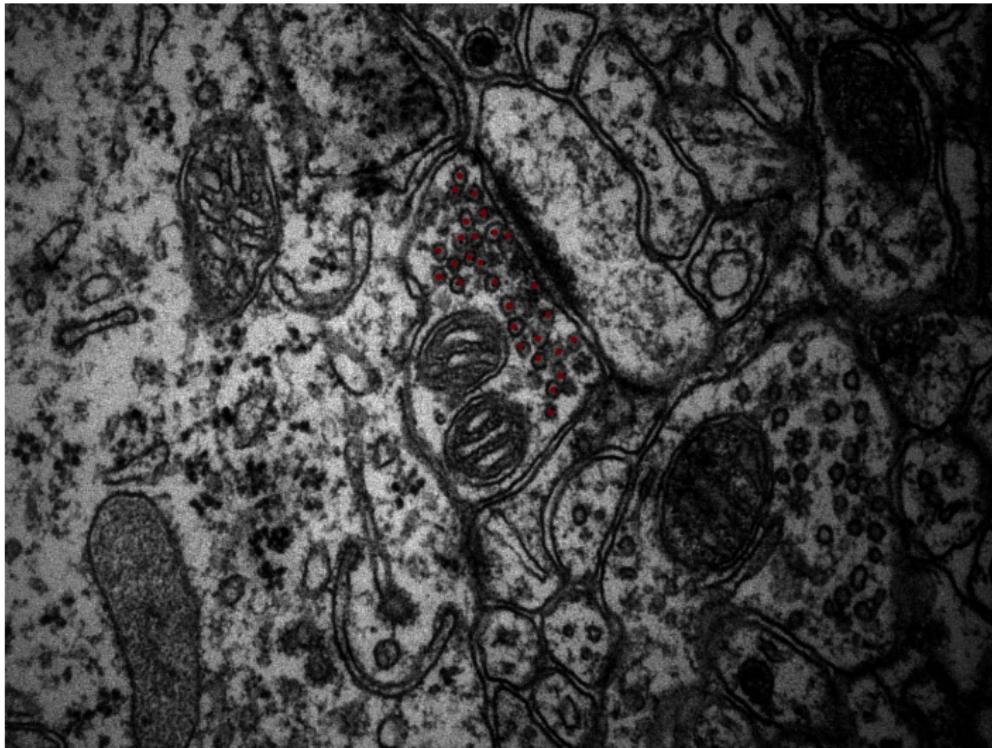
Resultatet



Introduktion



Introduktion



Billedbehandling - Fouriertransformation

Fouriertransformation

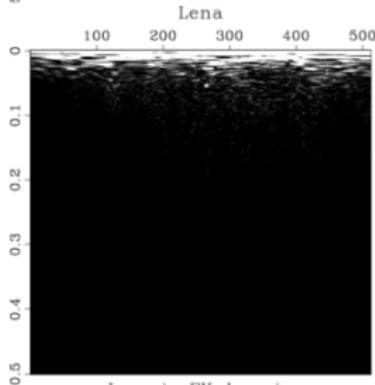
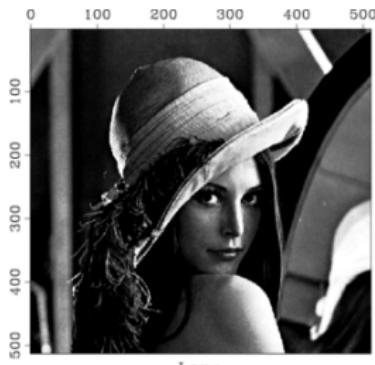
$$\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-2\pi i x \xi} dx, \text{ for } x \in \mathbb{R}$$

Invers fouriertransformation

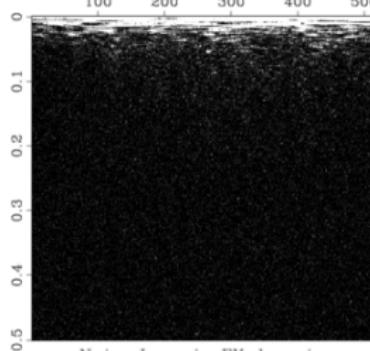
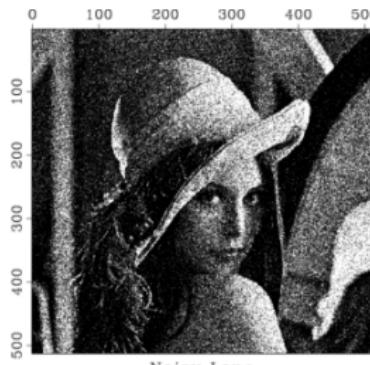
$$f(x) = \int_{-\infty}^{\infty} \hat{f}(\xi) e^{2\pi i x \xi} d\xi, \text{ for } x \in \mathbb{R}$$



Billedbehandling - Fouriertransformation



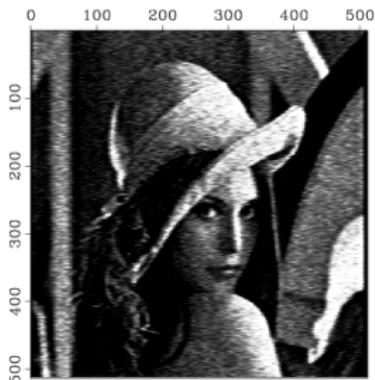
Lena in FX domain



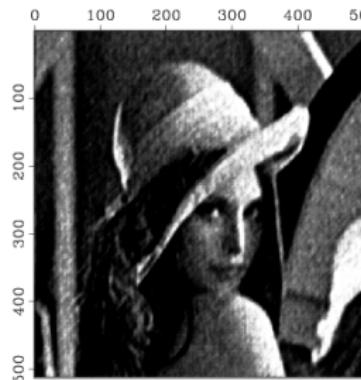
Noisy Lena in FX domain



Billedbehandling - Fouriertransformation



Noisy Lena LP filtered



Thresholding in the Fourier domain



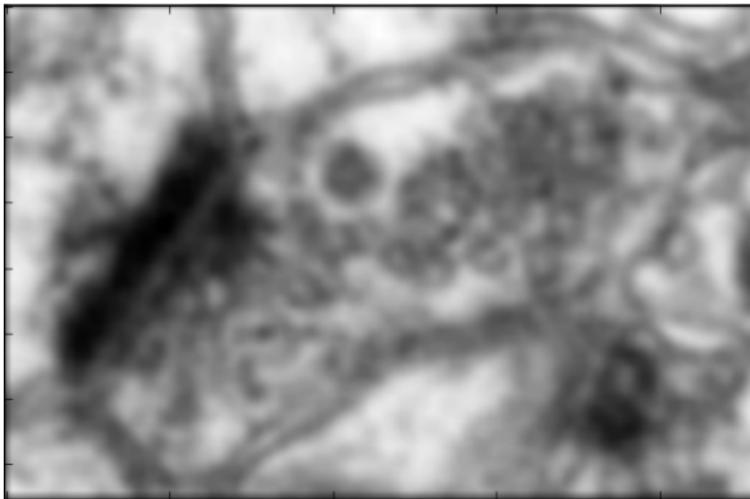
Billedbehandling - Foldning

$$f(t) * g(t) = \int_{-\infty}^{\infty} f(\tau)g(t - \tau)d\tau$$



Billedbehandling - Gaussisk udglatning

$$G(x, y) = \frac{1}{2\pi\sigma^2} e^{-\frac{x^2+y^2}{2\sigma^2}}$$



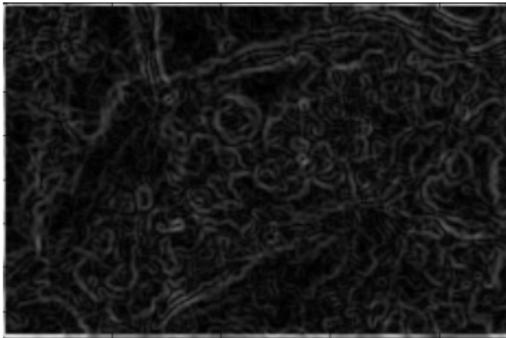
Billedbehandling - Sobelfilter

$$G_y = \begin{bmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix} * I \quad G_x = \begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{bmatrix} * I$$

$$G = \sqrt{G_x^2 + G_y^2} \quad \Theta = \arctan\left(\frac{G_y}{G_x}\right)$$



Billedbehandling - Sobelfilter

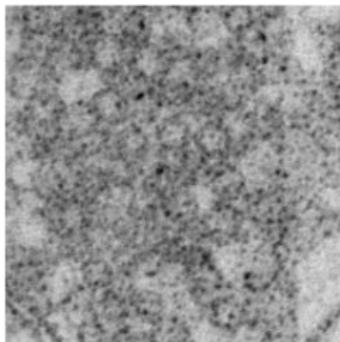


Billedbehandling - Hough-cirkeldetektion

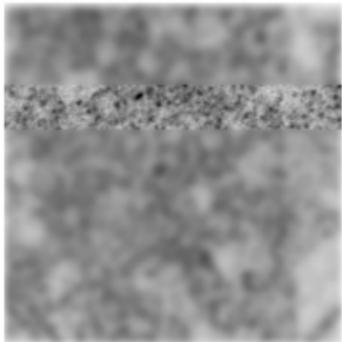
PLACEHOLDER



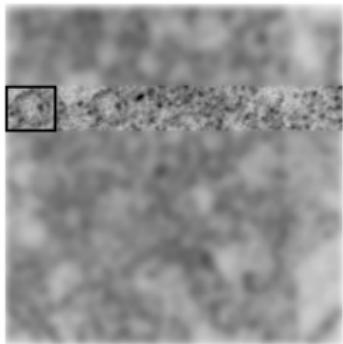
Segmentering med eksempelbilleder



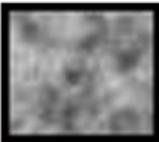
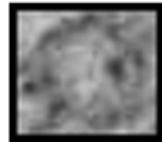
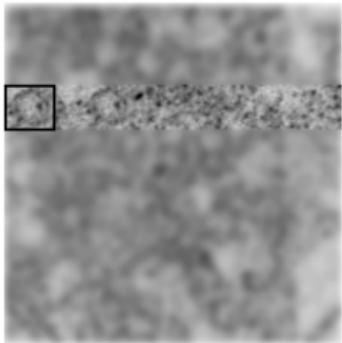
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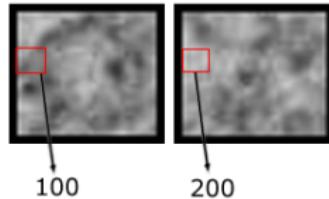
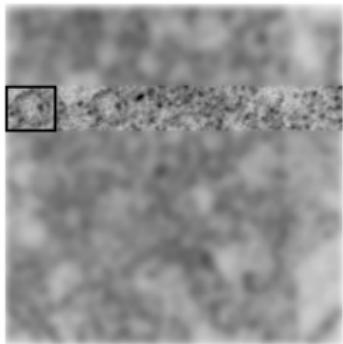
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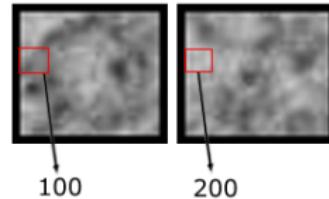
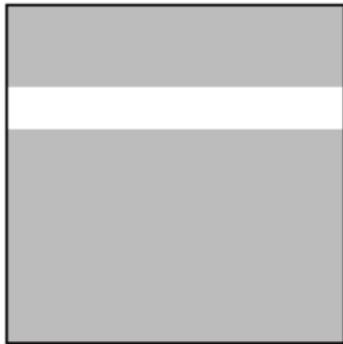
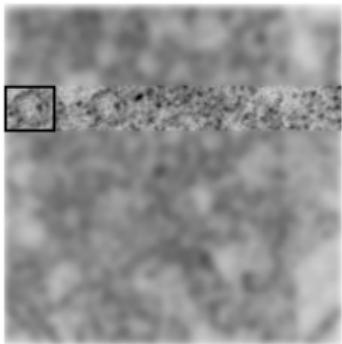
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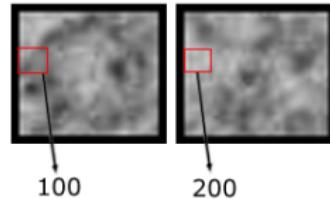
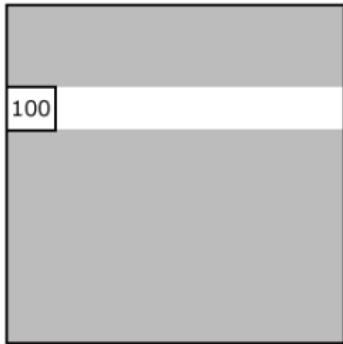
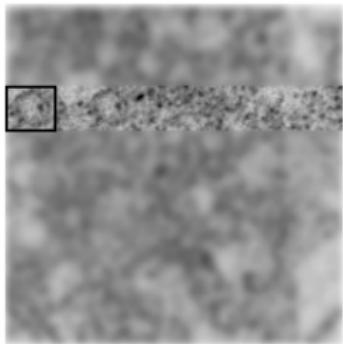
Segmentering med eksempelbilleder



$$\left(\frac{I\text{-mean}(I)}{\text{std}(I)} - \frac{J\text{-mean}(J)}{\text{std}(J)} \right)^2$$



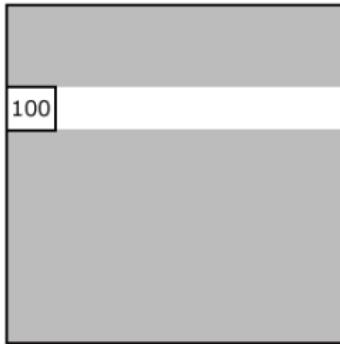
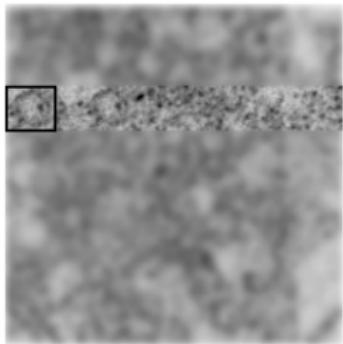
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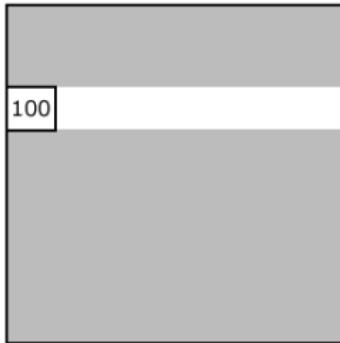
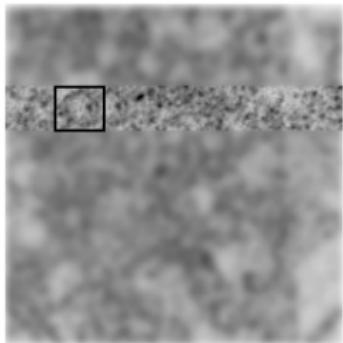
$$\left(\frac{I\text{-mean}(I)}{\text{std}(I)} - \frac{J\text{-mean}(J)}{\text{std}(J)} \right)^2$$



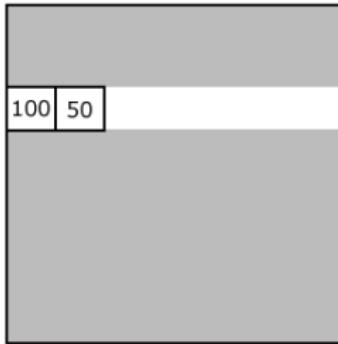
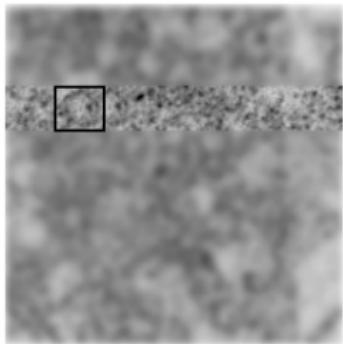
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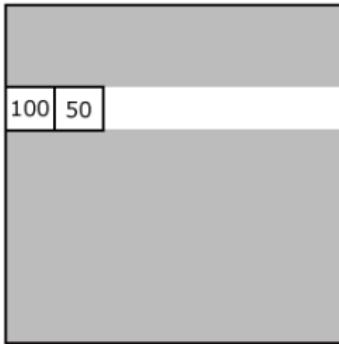
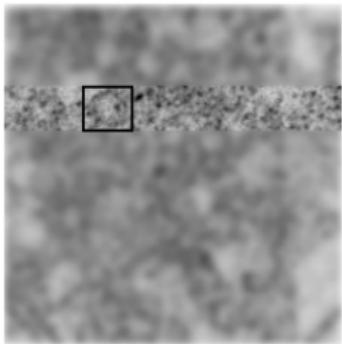
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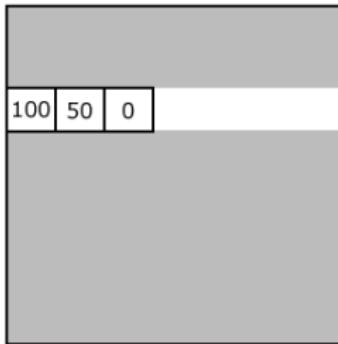
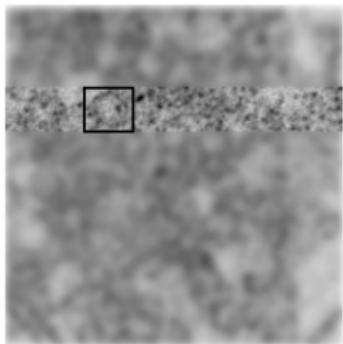
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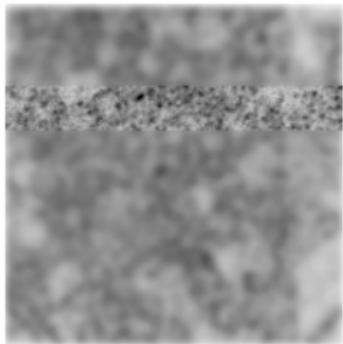
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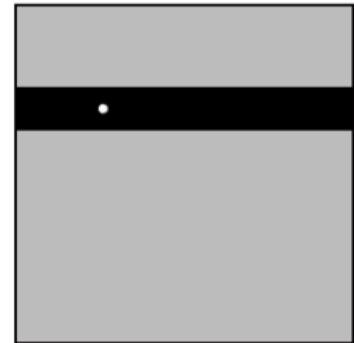
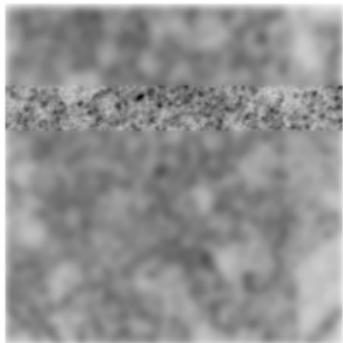
Segmentering med eksempelbilleder



Segmentering med eksempelbilleder



Segmentering med eksempelbilleder



Tester

