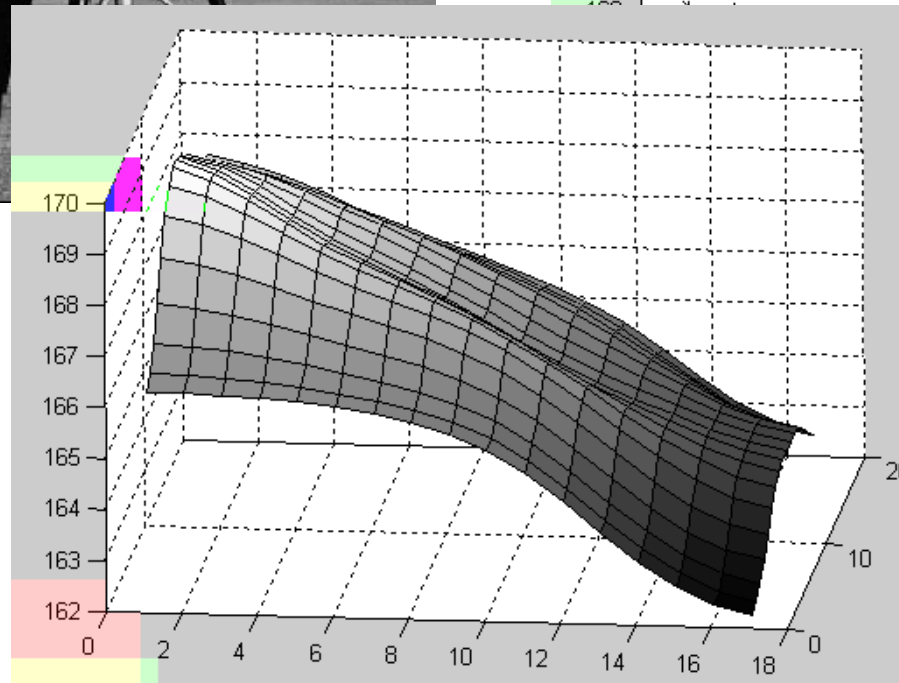
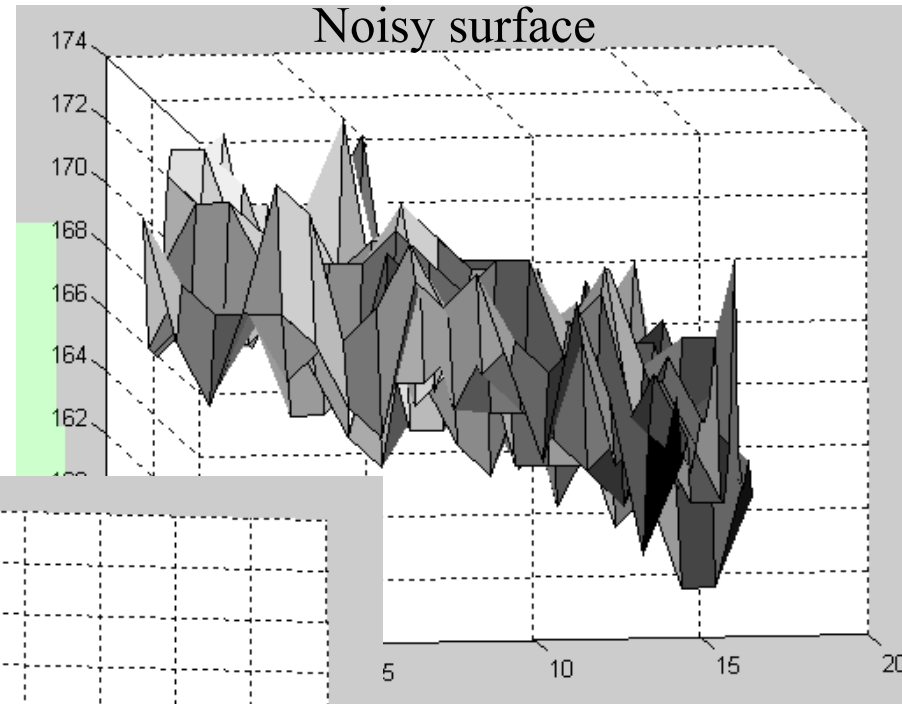
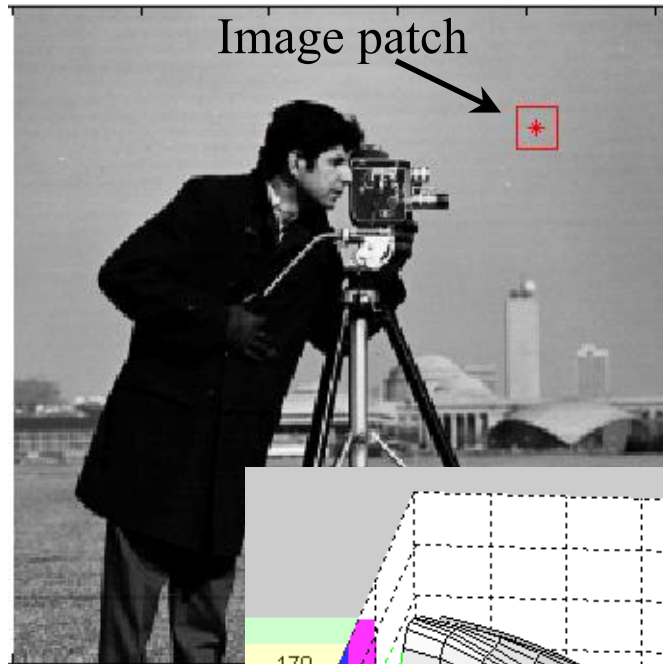


# Notes on smoothing

*Intermezzo aperto*

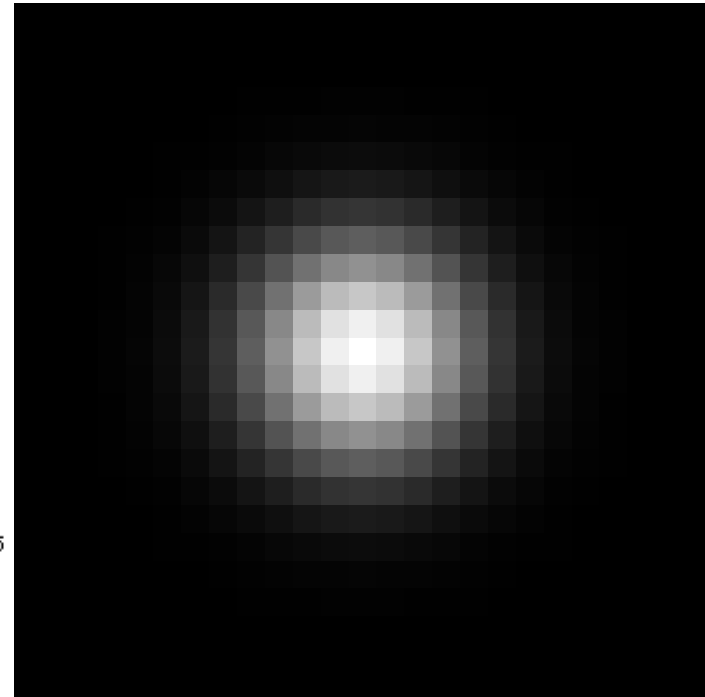
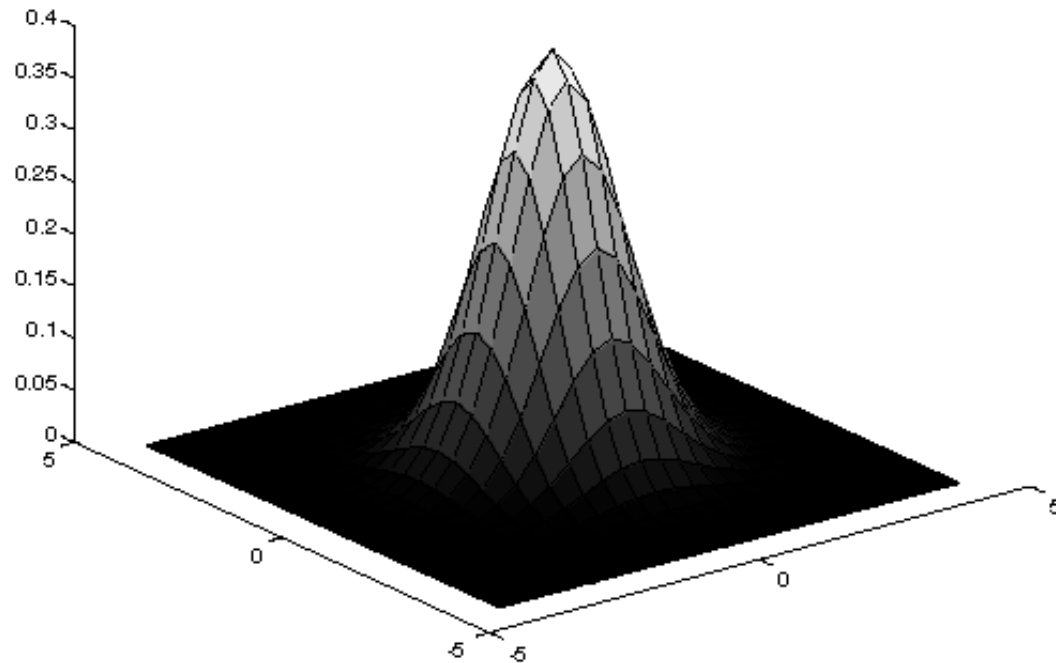
# Today: Smoothing Reduces Noise



smoothing reduces noise,  
giving us (perhaps) a more  
accurate intensity surface.

# Gaussian Smoothing Filter

An isotropic (circularly symmetric) Gaussian:



# Gaussian Smoothing Example



**original**



**sigma = 3**

Robert Collins  
CSE486, Penn State

# Gaussian Smoothing at Different Scales



**Balancing act: smooth enough to “clean up”  
the noise, but not so much as to remove  
important image gradients.**

# Notes on image segmentation