



# OpenCV 3.0

Computational Photography



# Plan

1. HDR
2. Cloning
3. Non-photorealistic rendering



# HDR

- tonemaps 

```
class Tonemap : public Algorithm  
class ToneMapDurand : public Tonemap
```
- algorithms: align exposure, median threshold  
bitmaps, camera response calibration  
(Debevec, Robertson), merge exposures

```
class AlignExposures : public Algorithm;  
AlignExposures::process(InputArrayOfArrays src, std::  
vector<cv::Mat> &dst, InputArray times, InputArray response)
```

# Edge-preserving smoothing

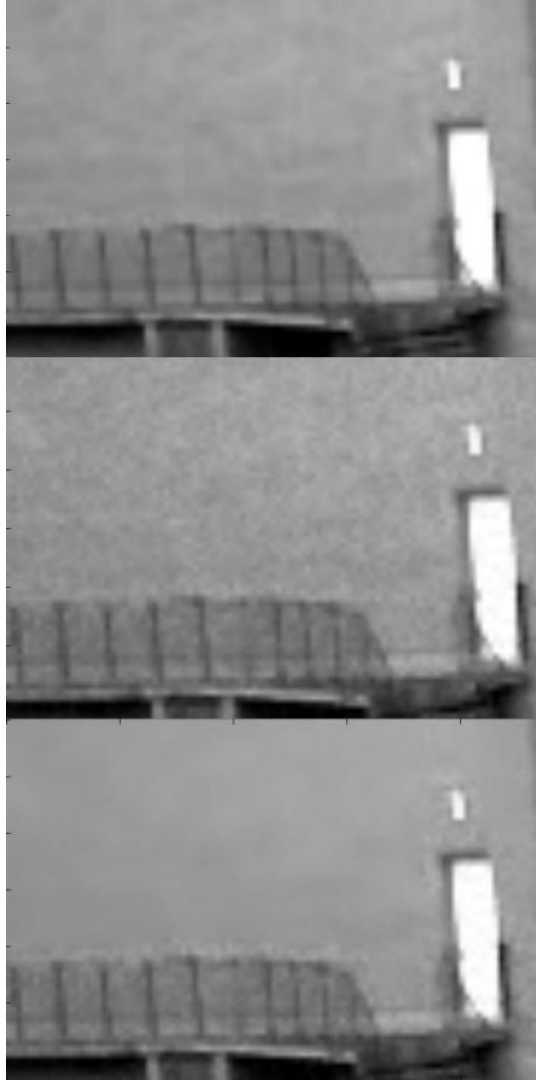


Eduardo S. L. Gastal, Manuel M. Oliveira: Domain transform for edge-aware image and video processing. *ACM Trans. Graph.* 30(4): 69 (2011)



# Denoising

Non-local Means Denoising





# Edge-preserving smoothing

```
void edgePreservingFilter(InputArray src, OutputArray dst,  
int flags=1, float sigma_s=60, float sigma_r=0.4f)
```



# Edge enhancer



# Edge enhancer



```
void detailEnhance(InputArray src, OutputArray dst, float  
sigma_s=10, float sigma_r=0.15f)
```





# Pencil Drawing



```
void pencilSketch(InputArray src, OutputArray dst1,  
OutputArray dst2, float sigma_s=60, float sigma_r=0.07f,  
float shade_factor=0.02f)
```



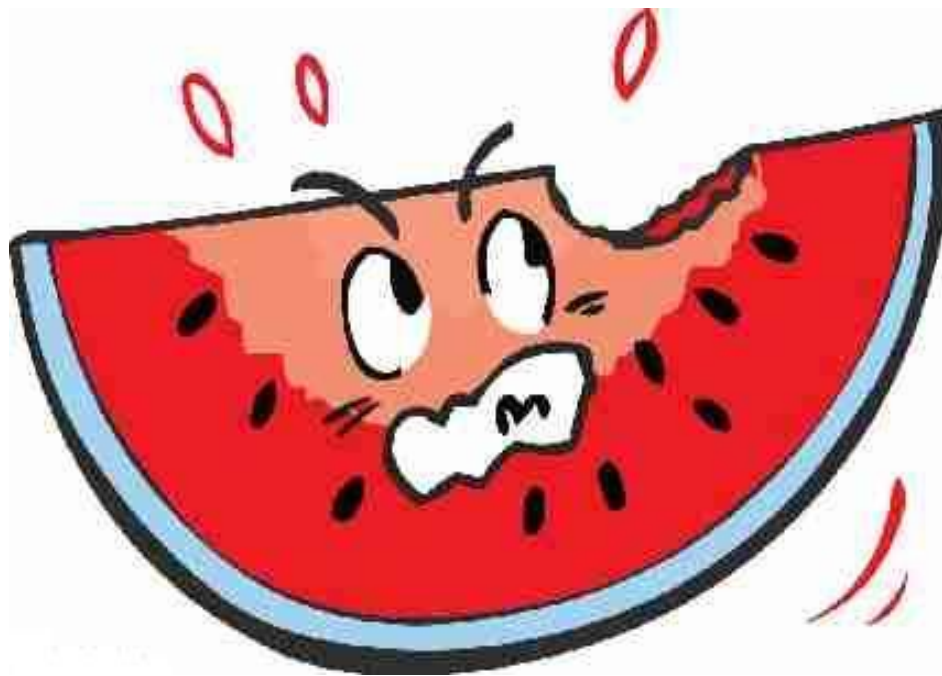
# Stylization



```
void stylization(InputArray src, OutputArray dst, float  
sigma_s=60, float sigma_r=0.45f)
```



# Artefact removal



# Edge removal



# Seamless cloning



# Image decomposition

