Handling Noise in Single Image Deblurring using Directional Filters

Supplemental material (CVPR 2013)

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[1]Rutgers University [2]Adobe Research

- Please note that, due to the file size limit, images in this file are compressed, so the image details are slightly different from the original images.
- The bookmark of this PDF file can be used for quick landing.

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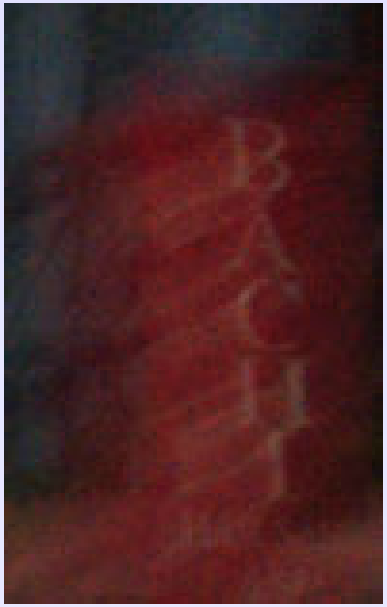
Comparison results on more real-world images

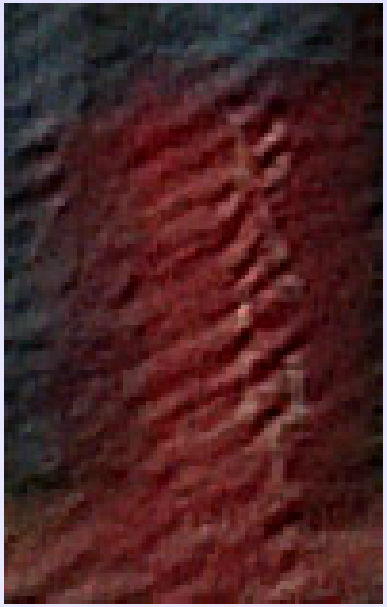
Comparison results on our real-world images of the state-of-the-art methods:

- Goldstein and Fattal (ECCV 2012)
- Cho and Lee (Siggraph Asia 2009)
- Cho *et al.* (CVPR 2011)
- Levin *et al.* (CVPR 2011)
- Our method

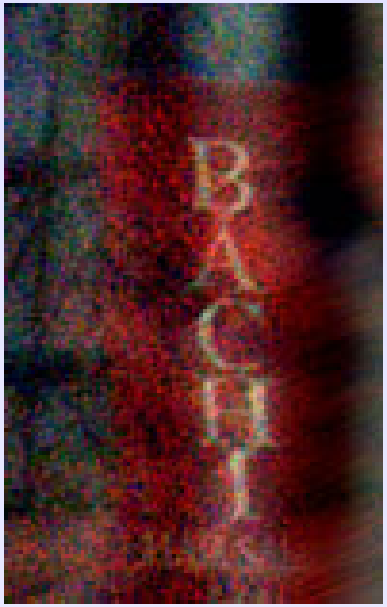
Example 1, Input



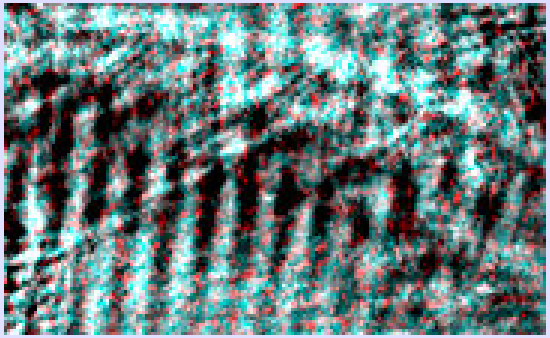
Goldstein and Fattal (ECCV 2012)

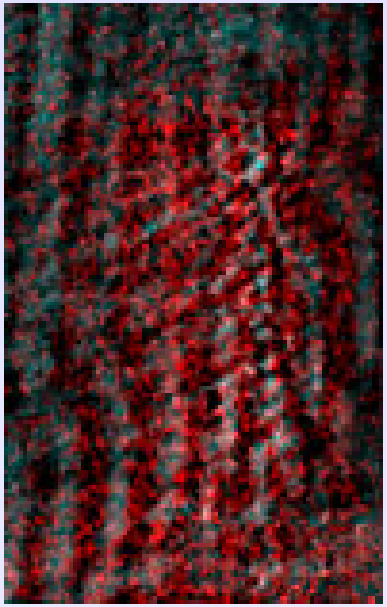


Cho and Lee (Siggraph Asia 2009)

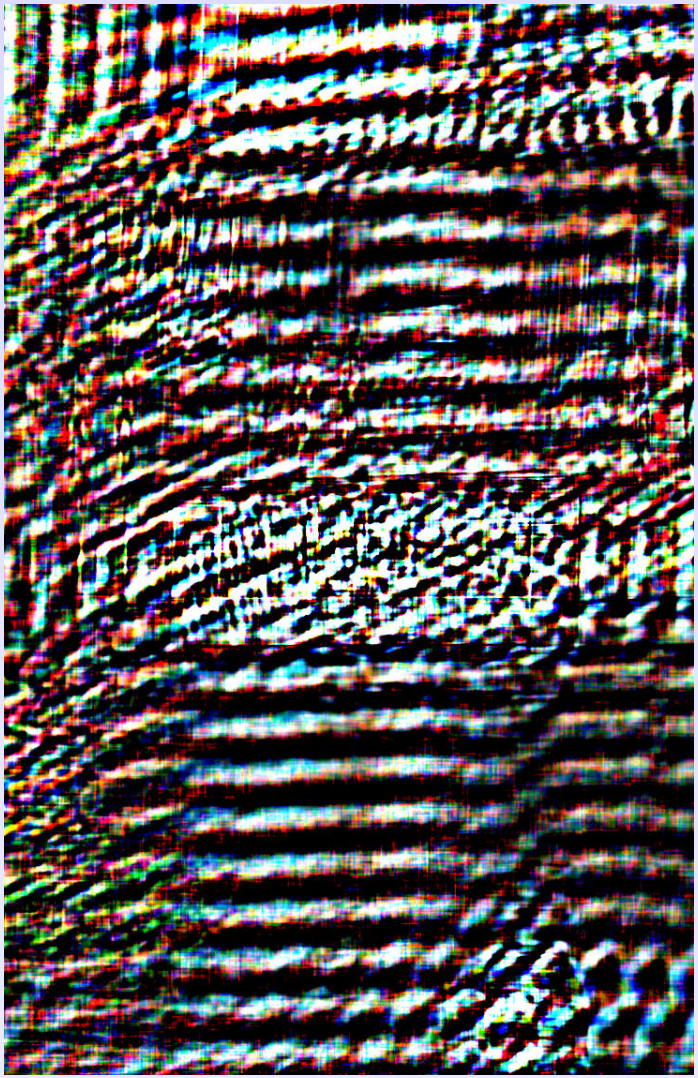


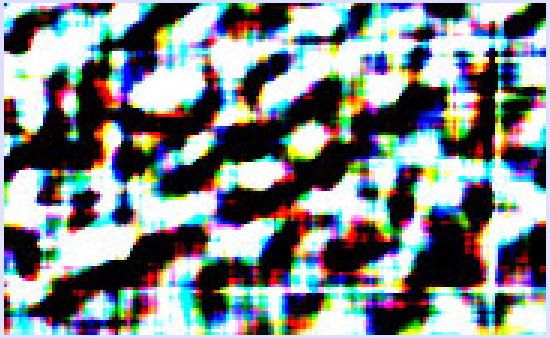
Cho *et al.* (CVPR 2011)

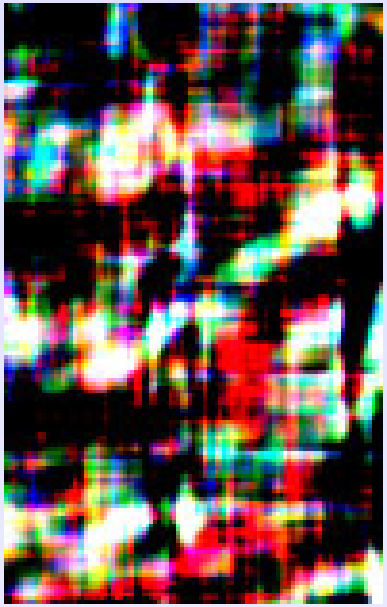




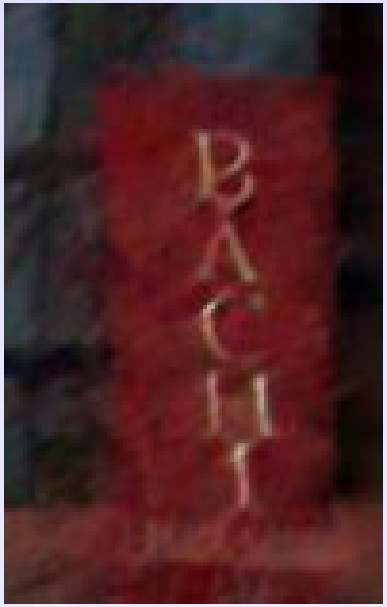
Levin *et al.* (CVPR 2011)







Our method



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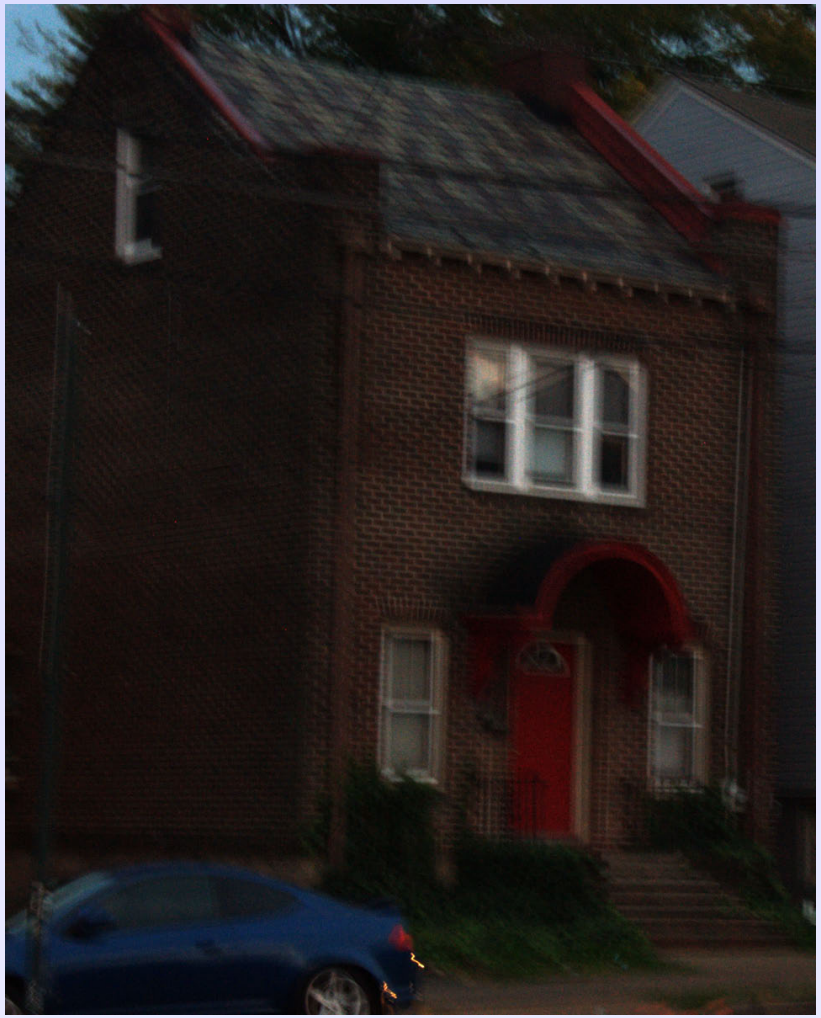
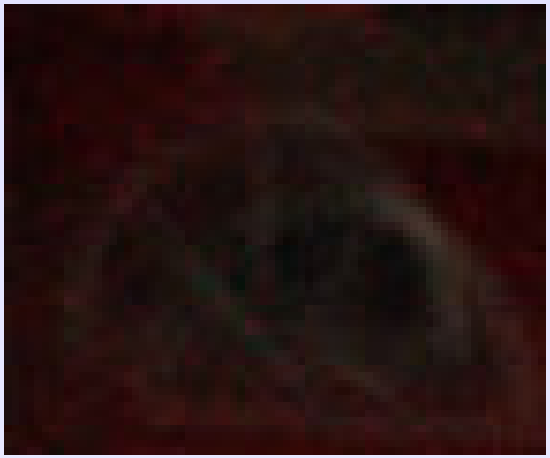
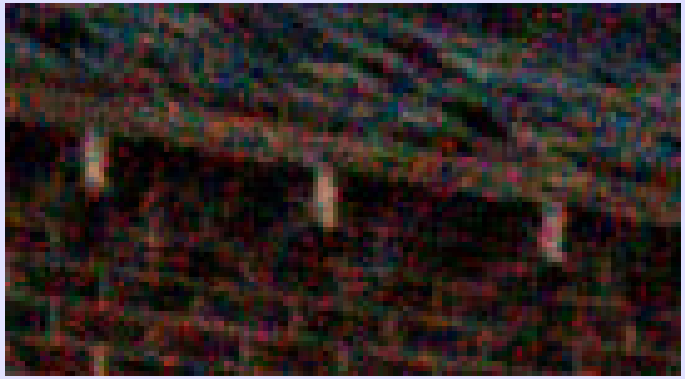
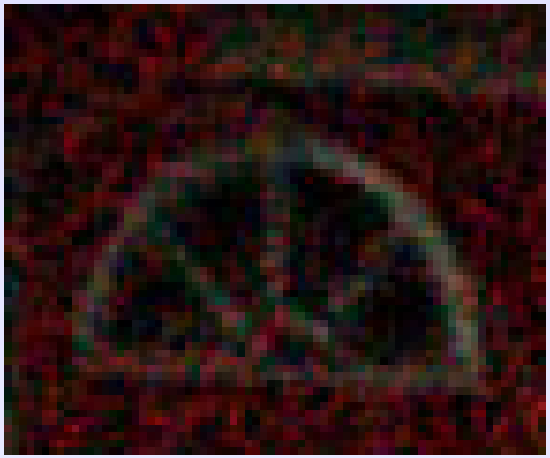




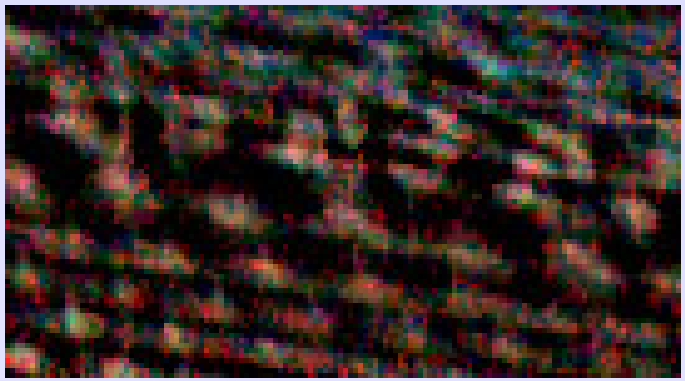
Goldstein and Fattal (ECCV 2012)

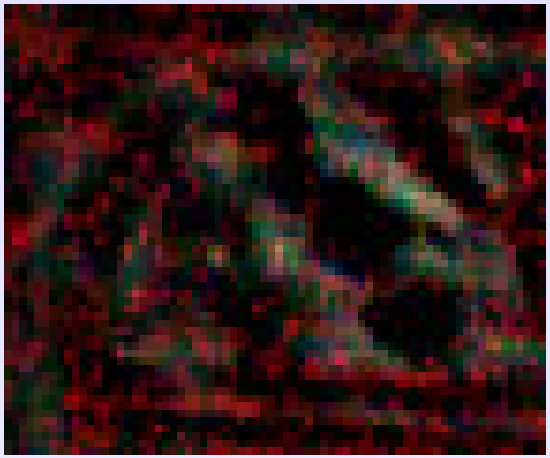
Cho and Lee (Siggraph Asia 2009)



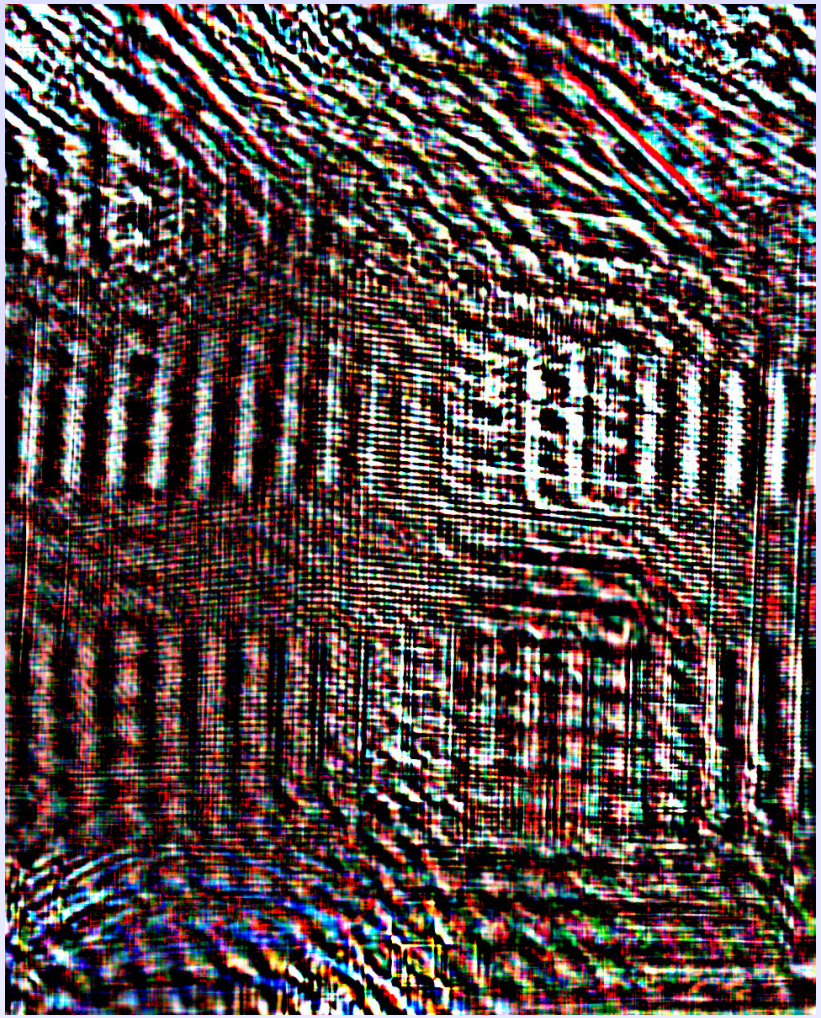


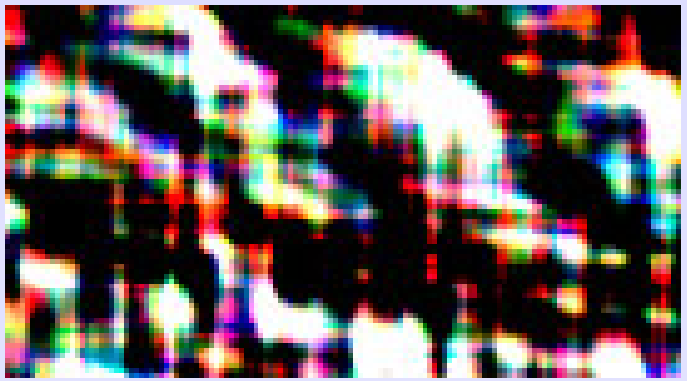
Cho *et al.* (CVPR 2011)

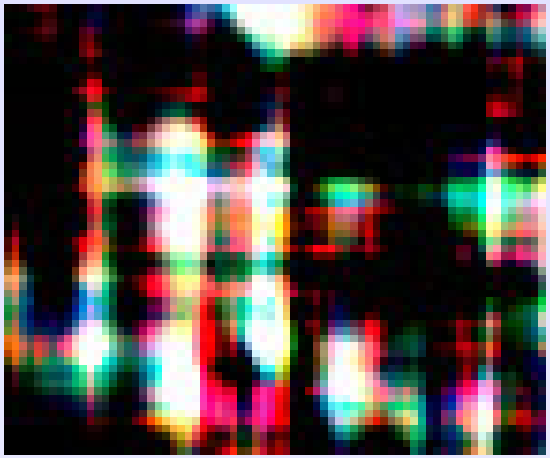




Levin *et al.* (CVPR 2011)







Our method

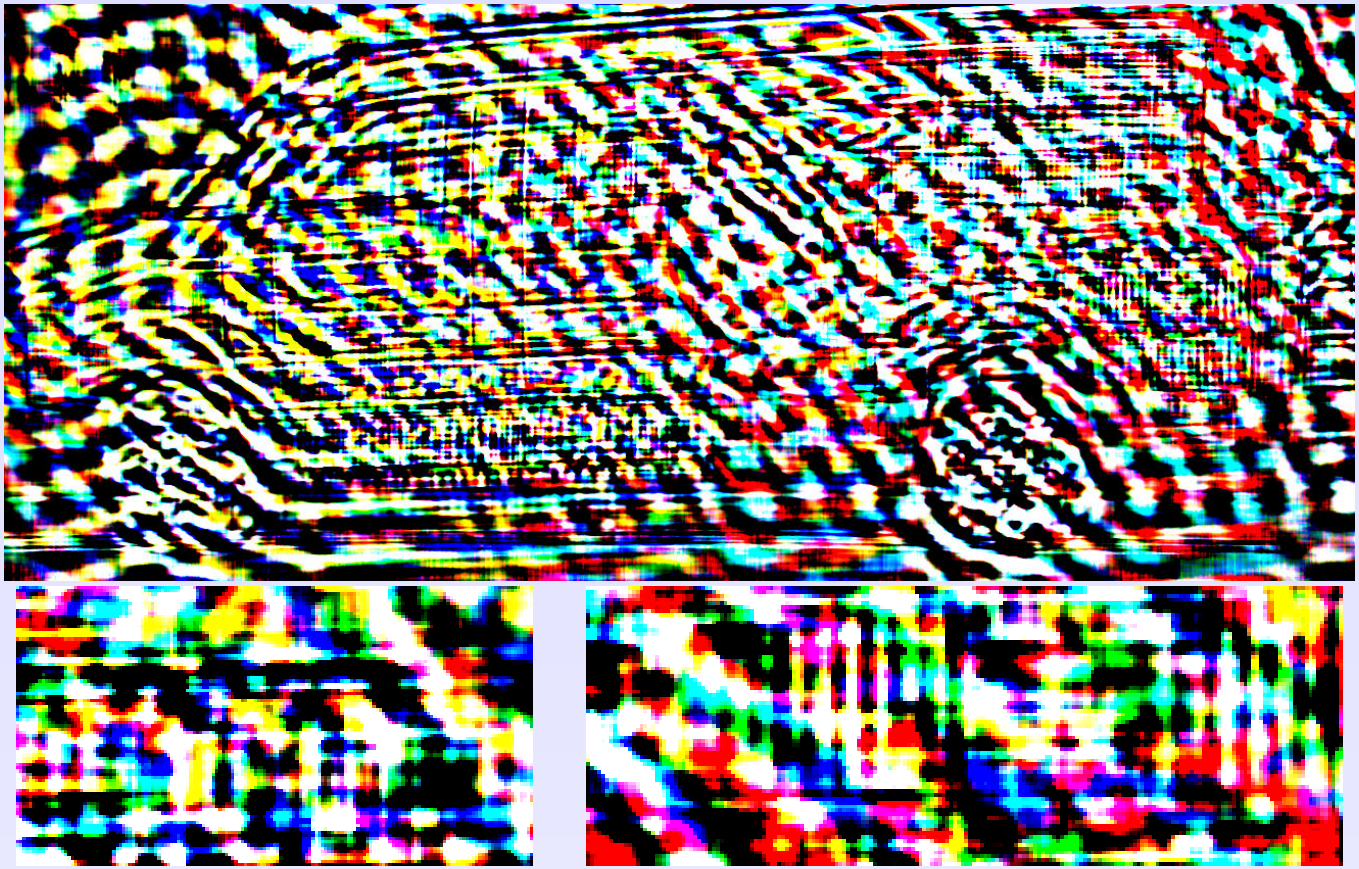
Example 3, Input

Goldstein and Fattal (ECCV 2012)

Cho and Lee (Siggraph Asia 2009)

Cho *et al.* (CVPR 2011)

Levin *et al.* (CVPR 2011)



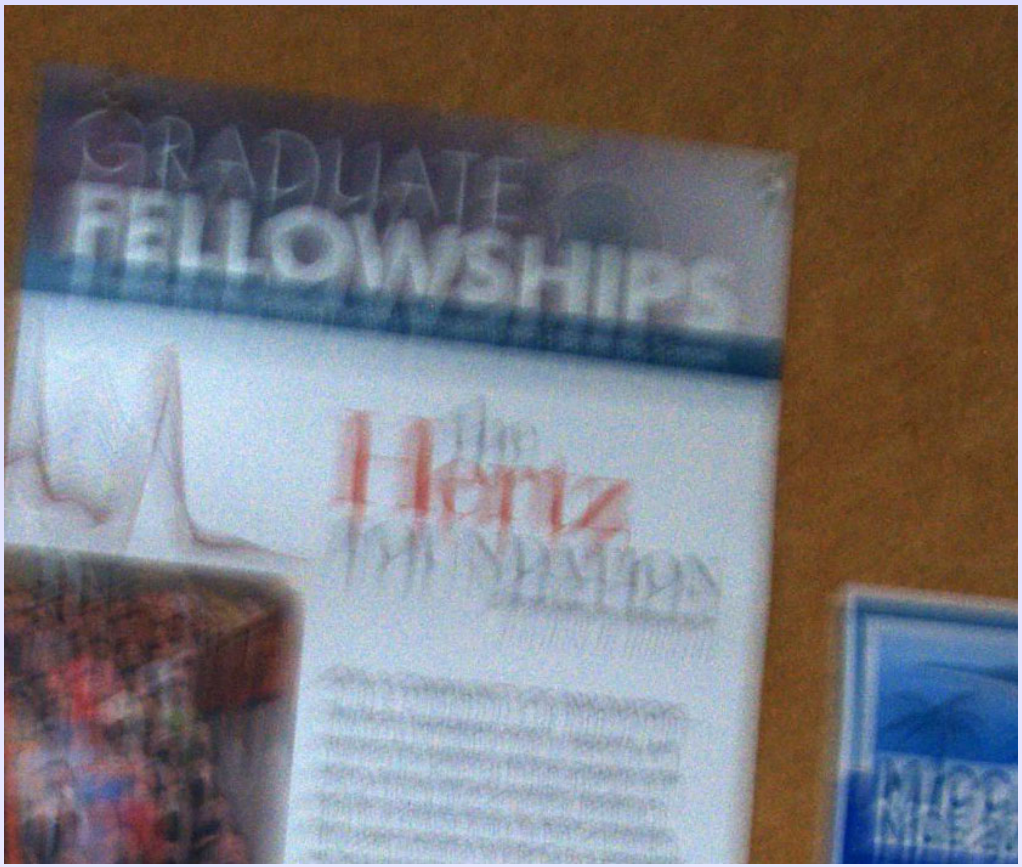
Our method


THE DAILY TARGUM
Catering Available
#1 sandwich
here!
732-246-2177
www.RUHungryNJ.net

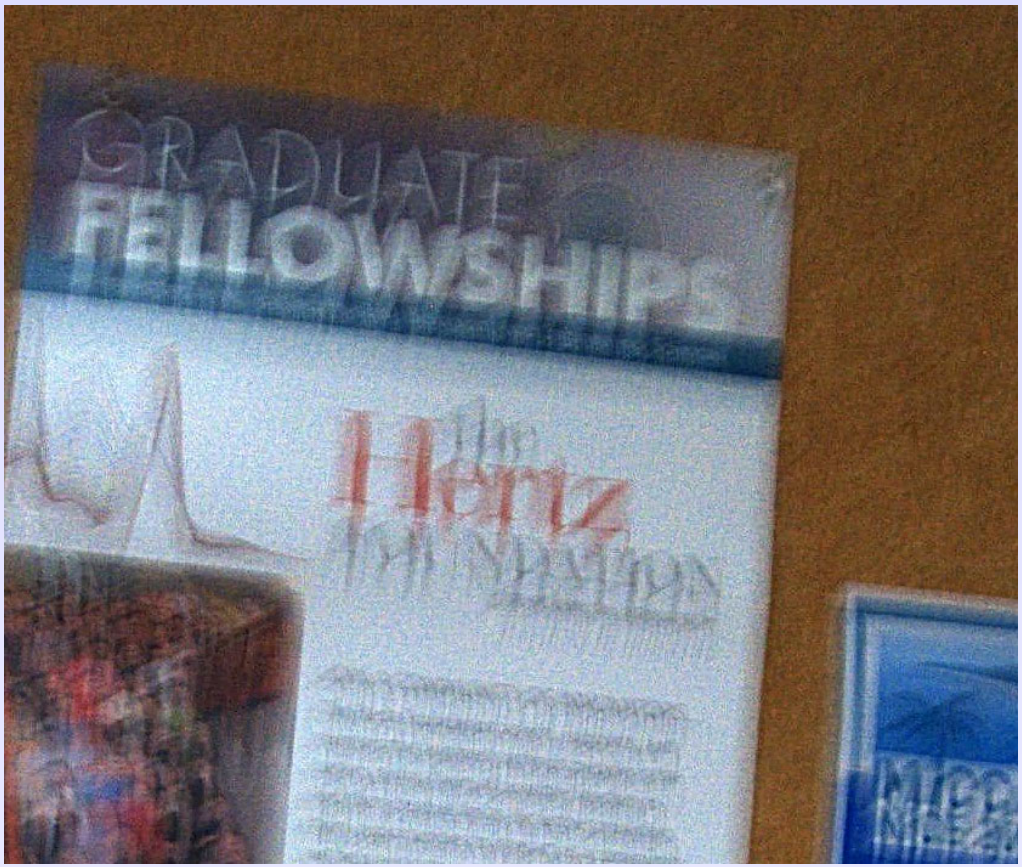

-2177
ryNJ.net


#1 sandwich

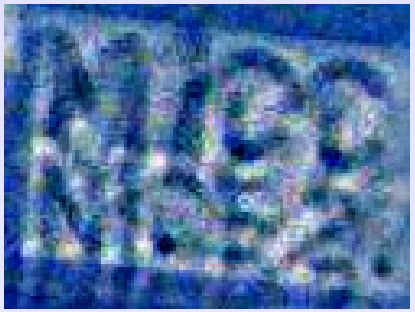
Example 4, Input



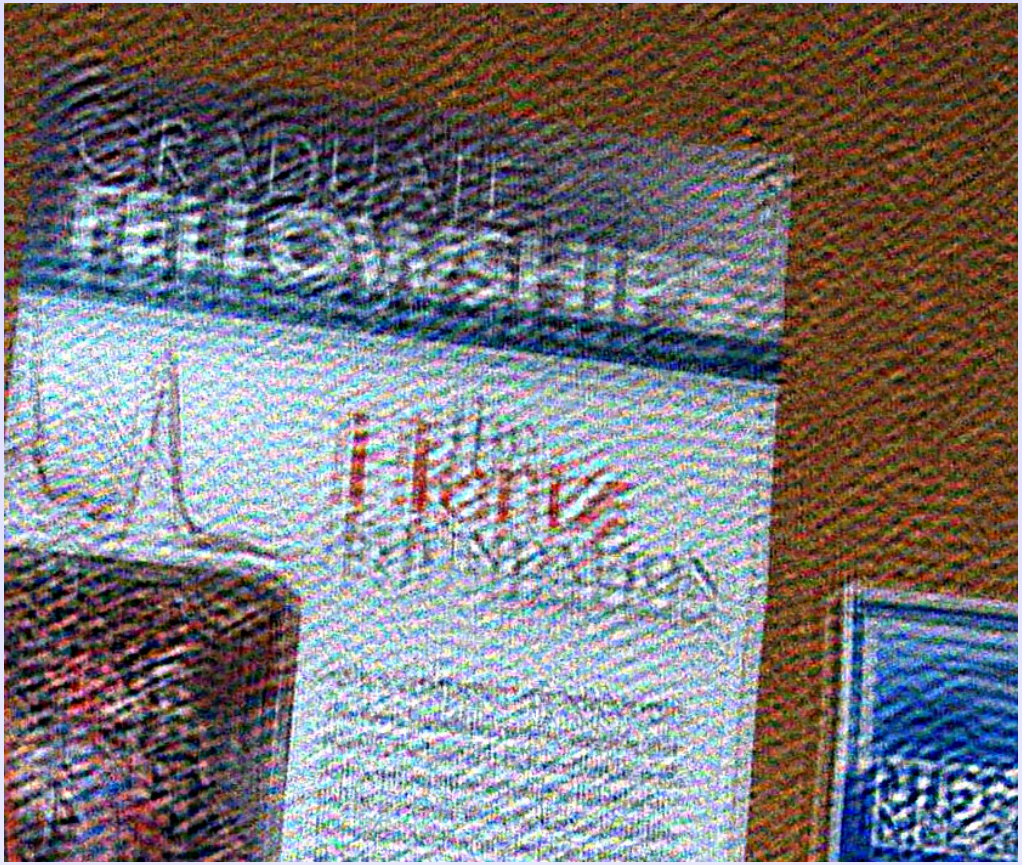
Goldstein and Fattal (ECCV 2012)

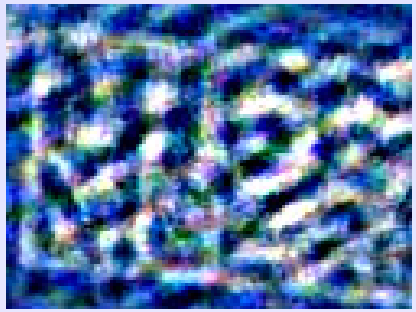


Cho and Lee (Siggraph Asia 2009)



Cho *et al.* (CVPR 2011)





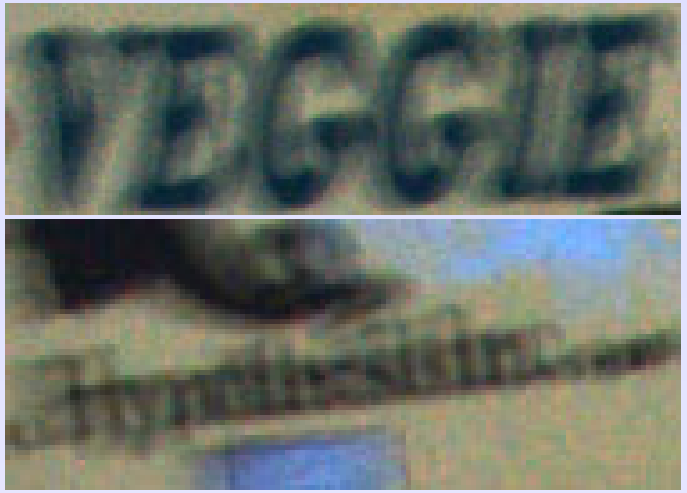
Levin *et al.* (CVPR 2011)

Our method


GRADUATE
FELLOWSHIPS
the
Hertz
FOUNDATION


the
Hertz
FOUNDATION

Example 5, Input



Goldstein and Fattal (ECCV 2012)

Cho and Lee (Siggraph Asia 2009)

Cho *et al.* (CVPR 2011)

Levin *et al.* (CVPR 2011)

Our method


FAT CATS • VEGGIE STUFF • GYRO
Hypothesis Inc.

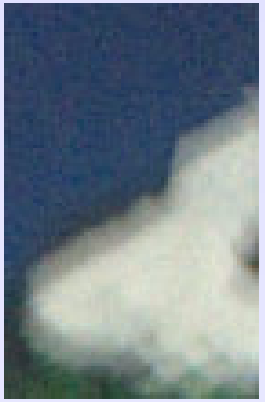

VEGGIE
Hypothesis Inc.

Comparison results on real-world images in Tai and Lin [17]

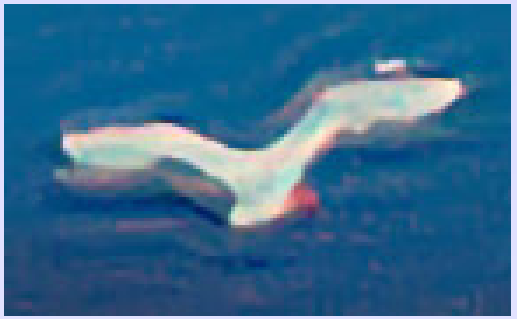
Results on three real images:

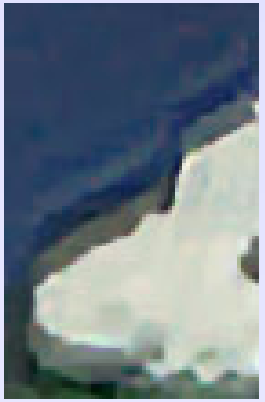
- Example "Santorini"
- Example "Books"
- Example "Plant"

"Santorini", Input

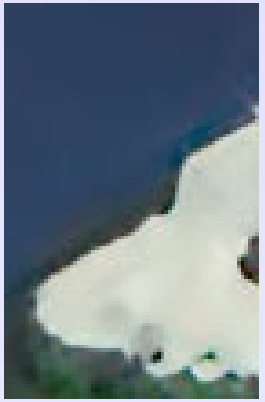


"Santorini", Tai and Lin's method





"Santorini", Our method

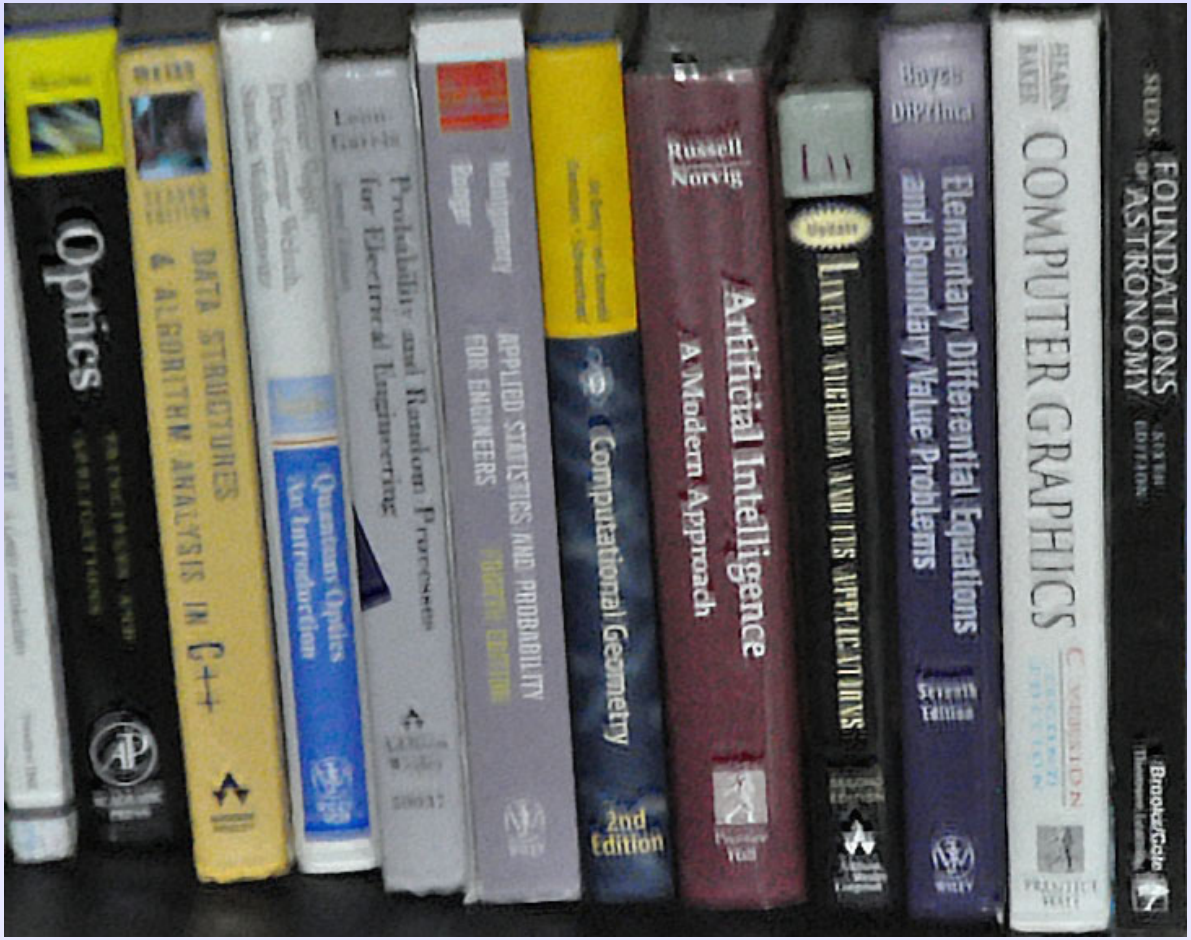


"Books", Input

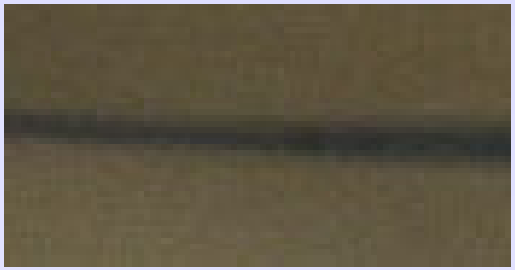

Optics
Data Structures & Algorithm Analysis in C++
Probability and Random Processes for Electrical Engineering
Computational Geometry
2nd Edition
Artificial Intelligence
A Modern Approach
Russell Norvig
Elementary Differential Equations and Boundary Value Problems
COMPUTER GRAPHICS
FOUNDATIONS of ASTRONOMY

"Books", Tai and Lin's method

"Books", Our method

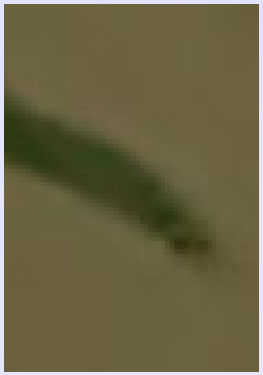


"Plant", Input



"Plant", Tai and Lin's method

"Plant", Our method

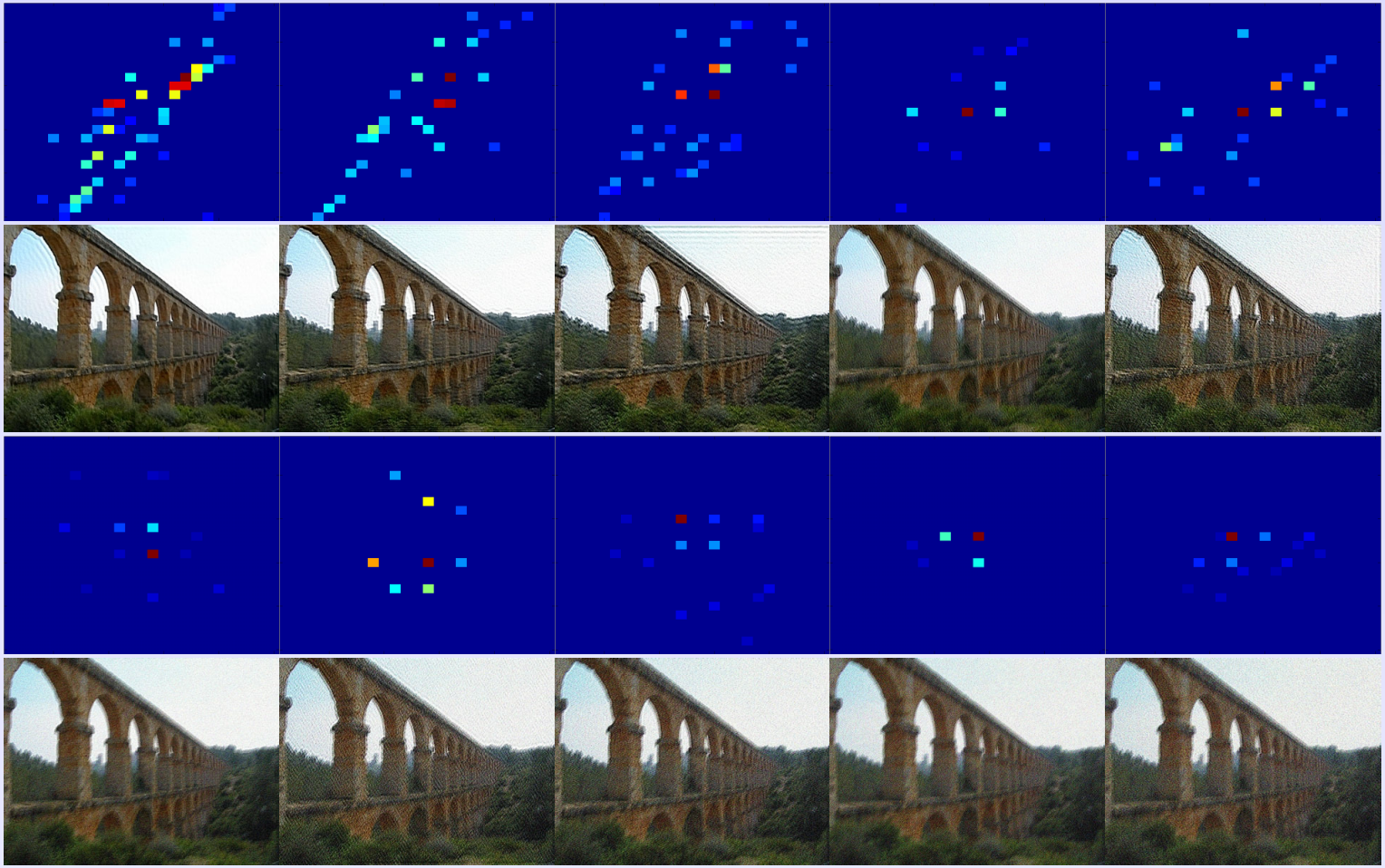


Comparison results with different noise levels

Comparison results on image "Aque" with 1% to 10 % noises using different methods, including:

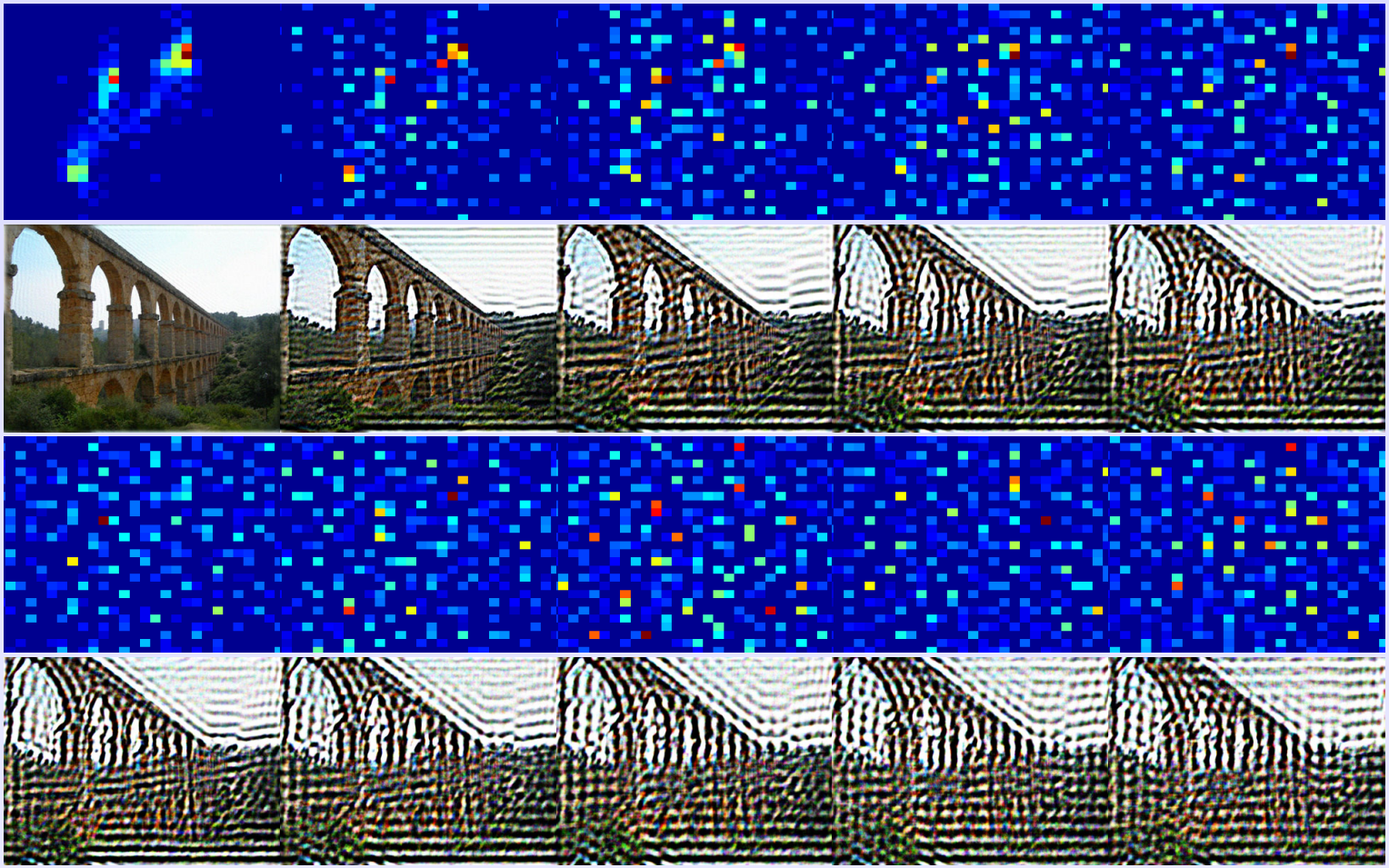
- Goldstein and Fattal (ECCV 2012)
- Cho and Lee (Siggraph Asia 2009)
- Cho *et al.* (CVPR 2011)
- Levin *et al.* (CVPR 2011)
- Our method

Goldstein and Fattal (ECCV 2012)



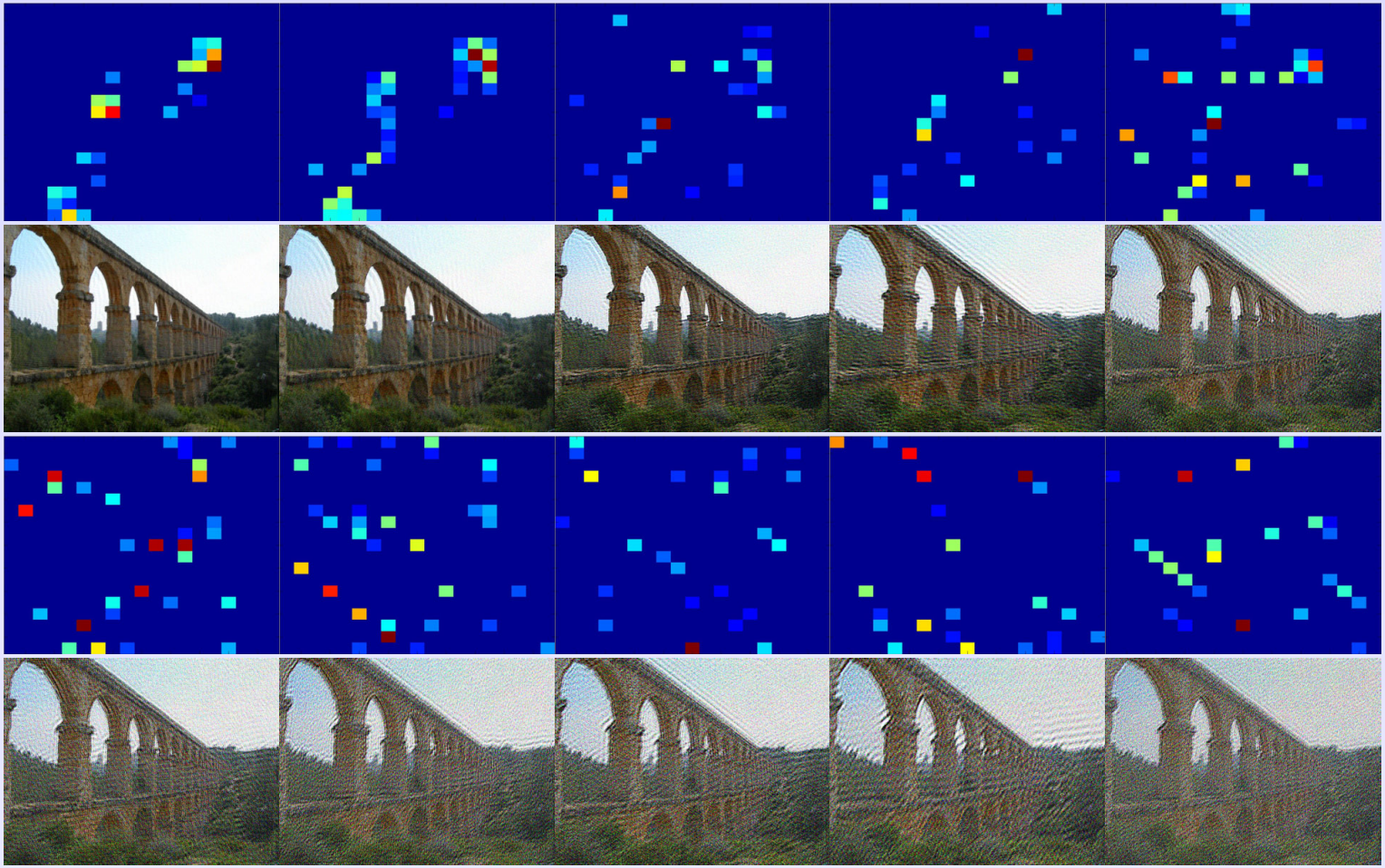
Estimated PSF and latent images with 1% to 10 % noise (ordered by rows)

Cho and Lee (Siggraph Asia 2009)



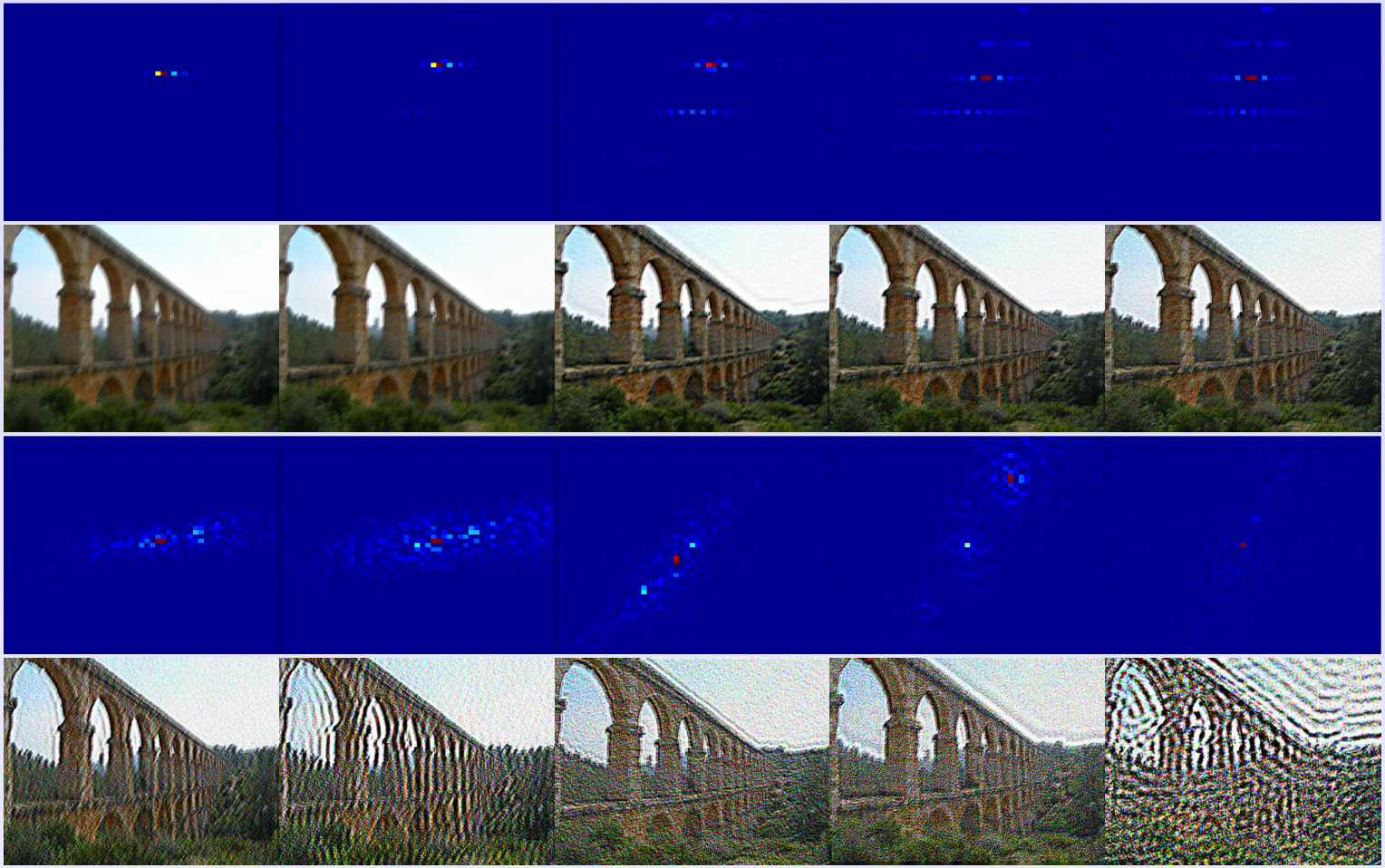
Estimated PSF and latent images with 1% to 10 % noise (ordered by rows)

Cho *et al.* (CVPR 2011)



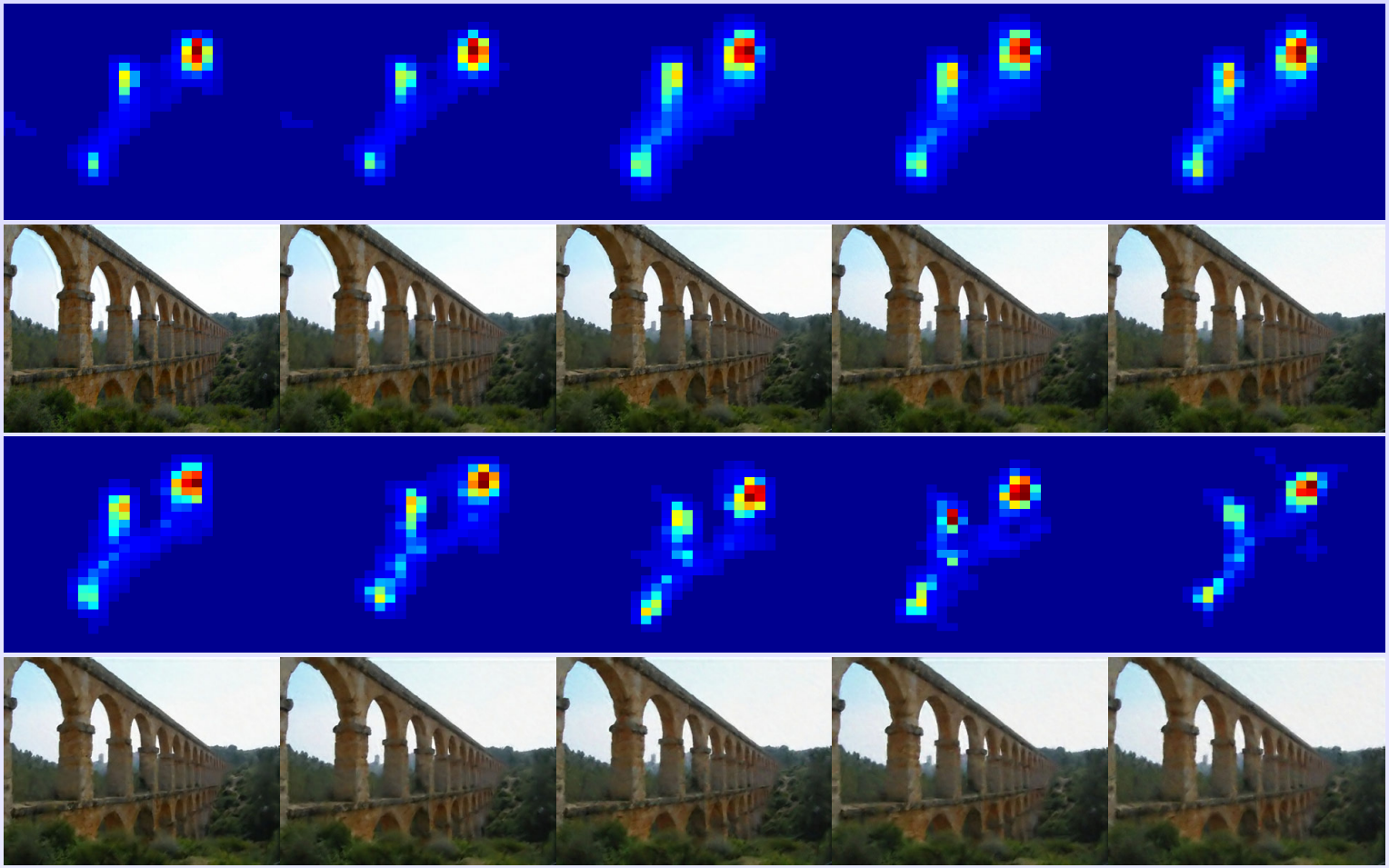
Estimated PSF and latent images with 1% to 10 % noise (ordered by rows)

Levin *et al.* (CVPR 2011)



Estimated PSF and latent images with 1% to 10 % noise (ordered by rows)

Our method



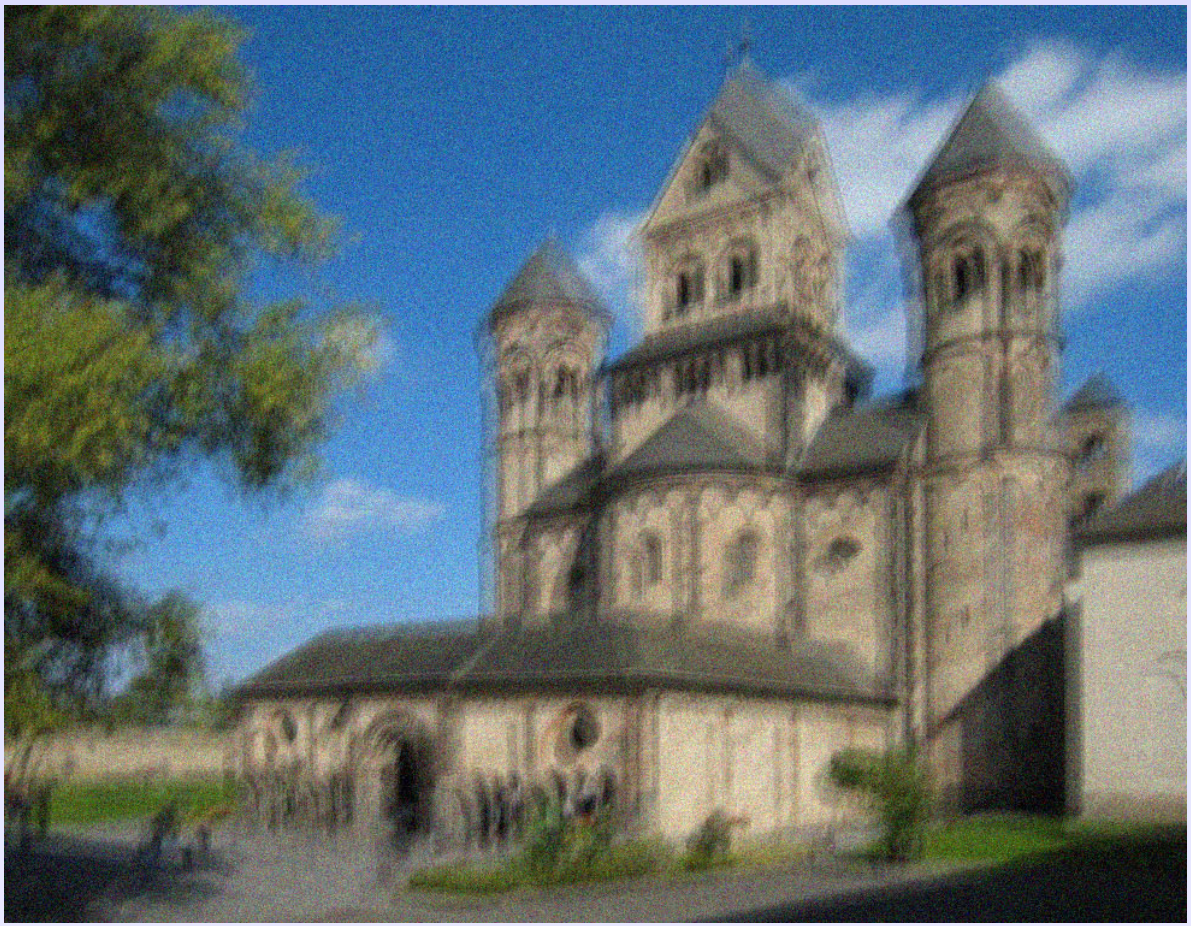
Estimated PSF and latent images with 1% to 10 % noise (ordered by rows)

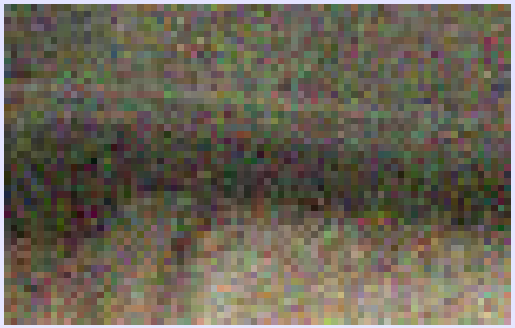
Comparison results on Synthetic images

Comparison results on synthetic images of Tai and Lin's method and our method:

- Results of "Abbey" with 5% and 10% noise
- Results of "Chalet" with 5% and 10% noise
- Results of "Aque" with 5% and 10% noise

Abbey, 5% noise, Input

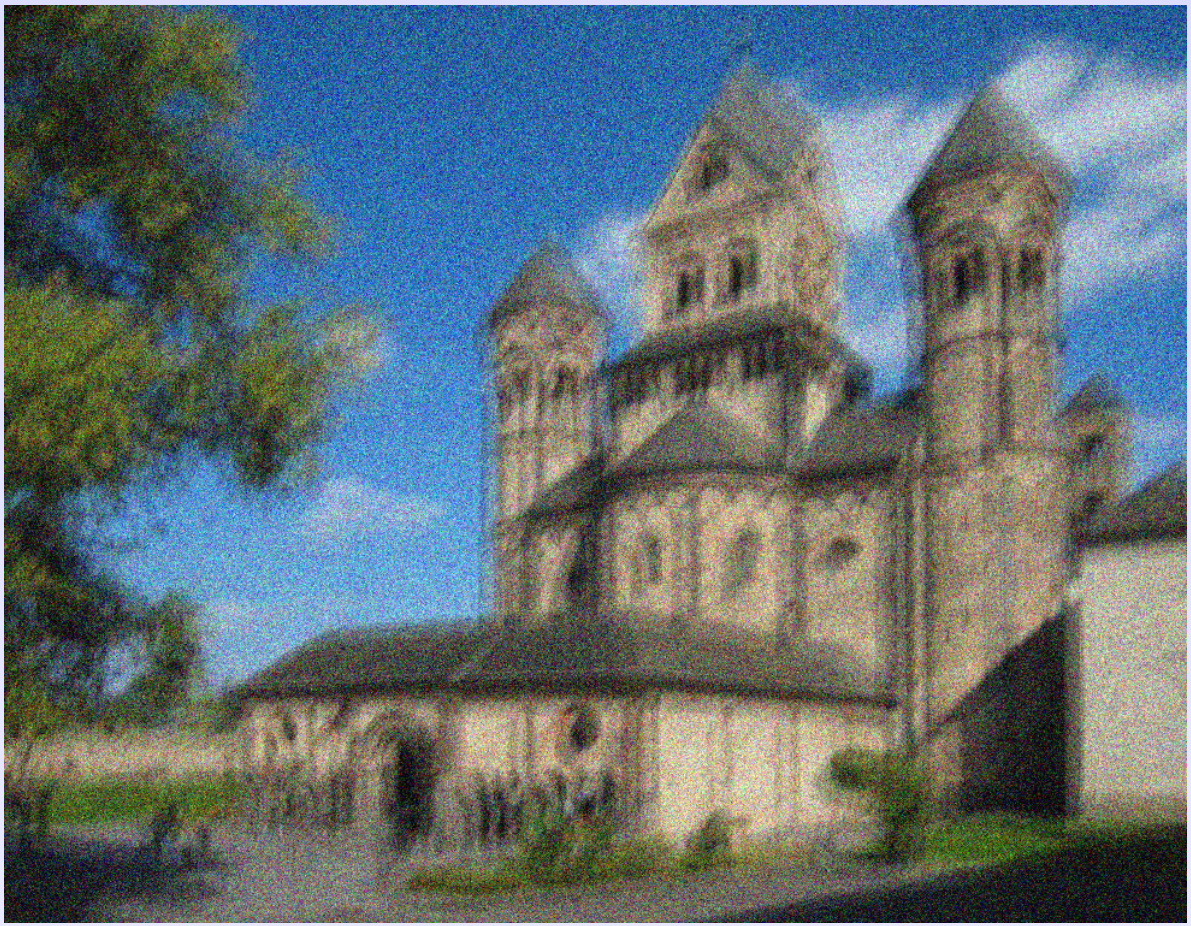


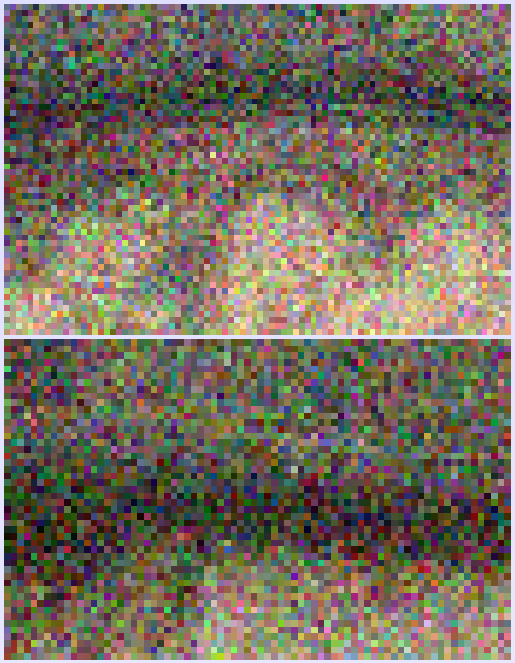


Abbey, 5% noise, Tai and Lin's method

Abbey, 5% noise, Our method

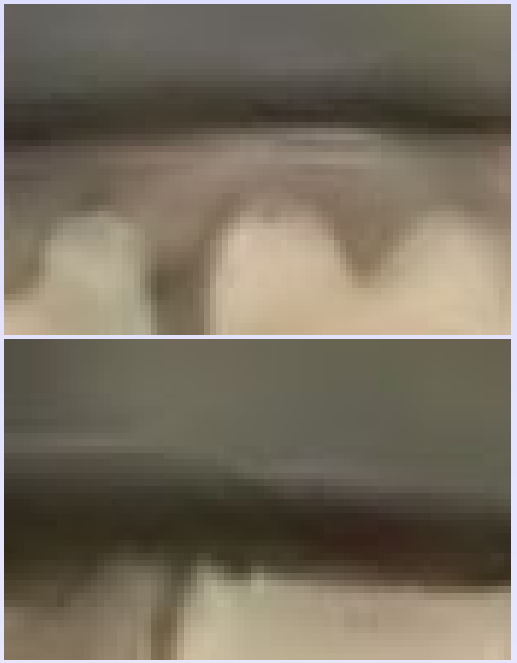
Abbey, 10% noise, Input



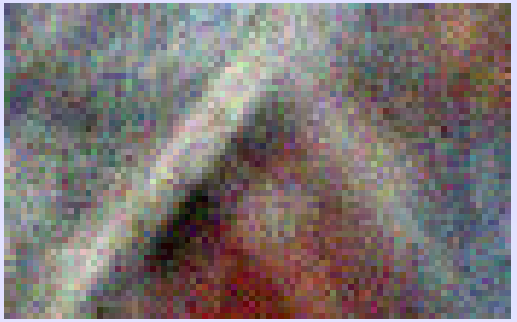


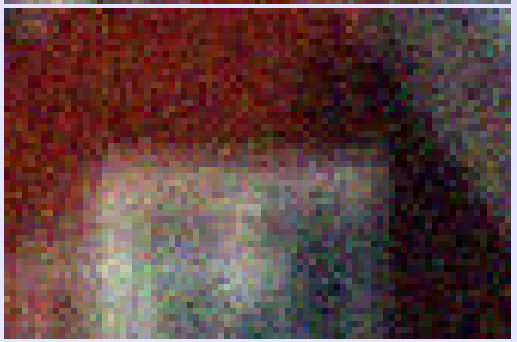
Abbey, 10% noise, Tai and Lin's method

Abbey, 10% noise, Our method

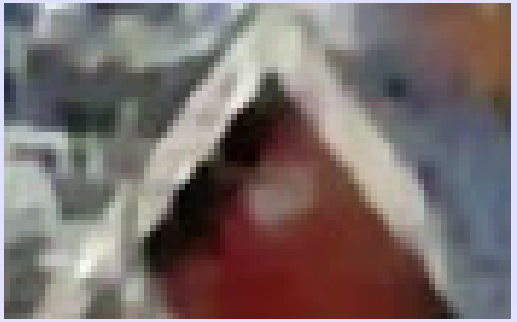


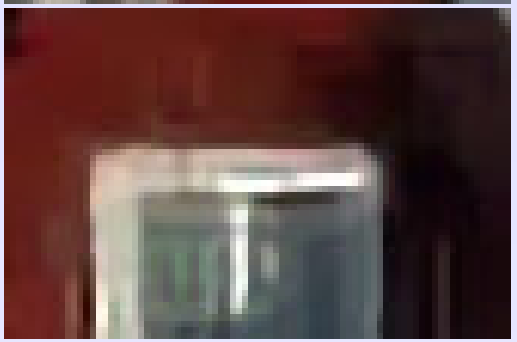
Chalet, 5% noise, Input



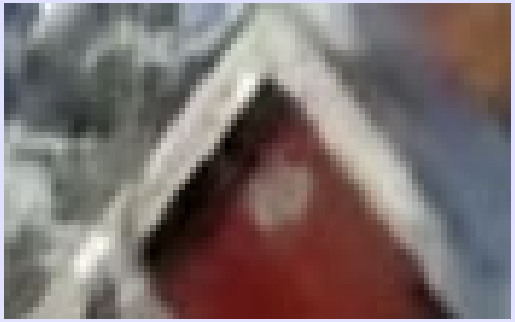


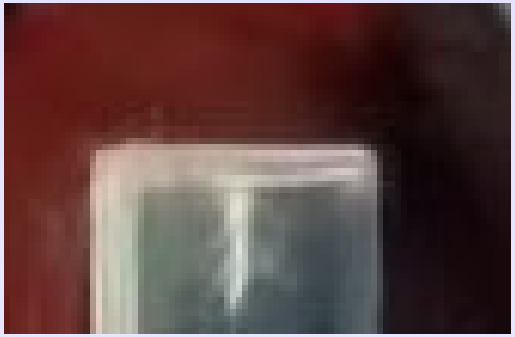
Chalet, 5% noise, Tai and Lin's method



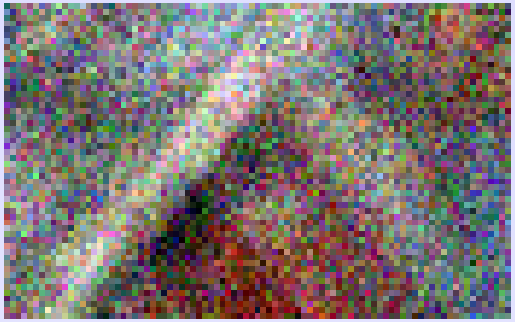


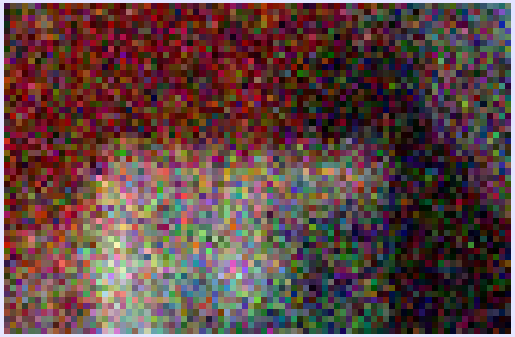
Chalet, 5% noise, Our method



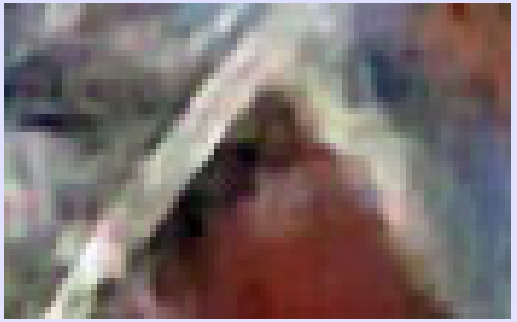


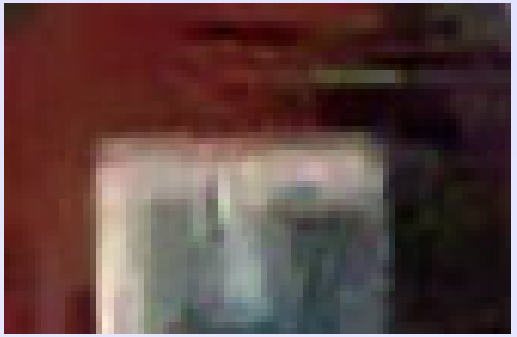
Chalet, 10% noise, Input



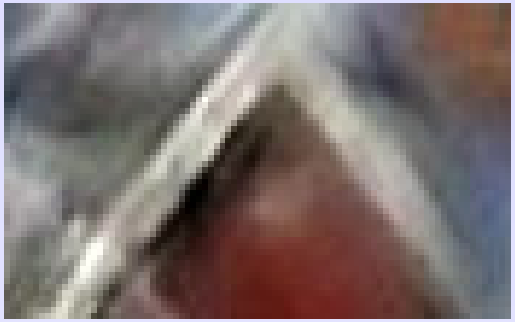


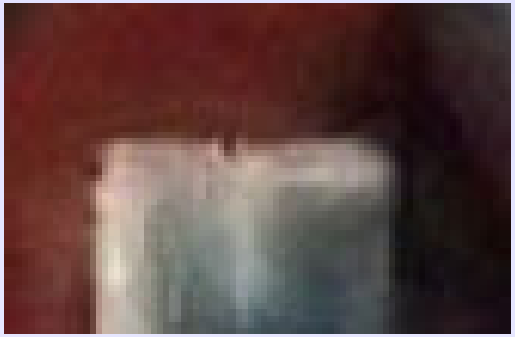
Chalet, 10% noise, Tai and Lin's method





Chalet, 10% noise, Our method



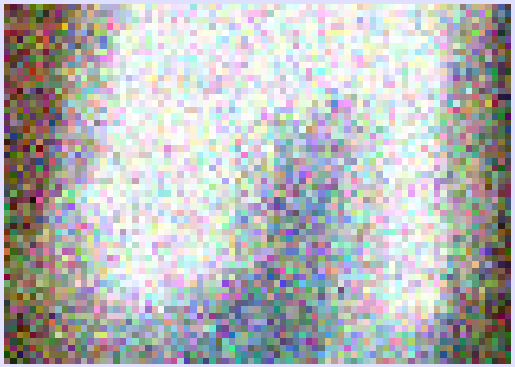


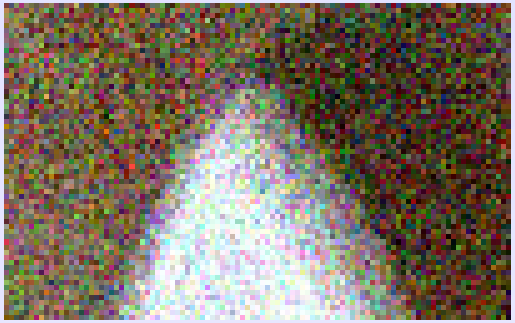
Aque, 5% noise, Input

Aque, 5% noise, Tai and Lin's method

Aque, 5% noise, Our method

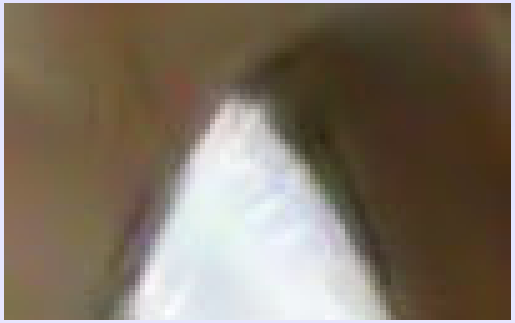
Aque, 10% noise, Input





Aque, 10% noise, Tai and Lin's method

Aque, 10% noise, Our method

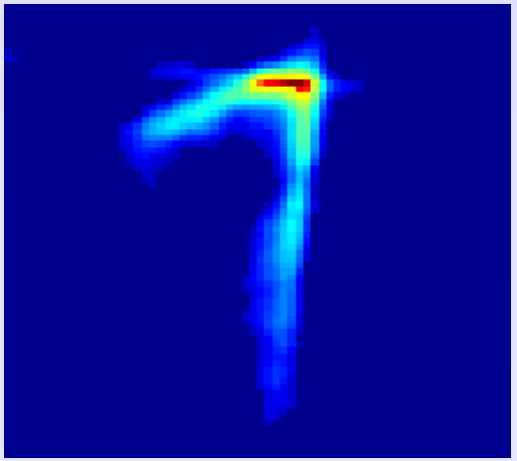


Comparison results on different nonblind deconvolution methods

Comparison results with the state-of-the-art nonblind deconvolution methods: (given blurry and noisy input image, and the estimated kernel)

- Cho *et al.* (ICCV 2011)
- Zoran and Weiss (ICCV 2011)
- Our method

Given input image and kernel



Cho *et al.* (ICCV 2011)

Zoran and Weiss (ICCV 2011)

Our method