Evaluation on BSD200 For testing efficiency, we convert the images to gray-scale and resize them to smaller ones on BSD-200. Then all the methods are run on these images to get average PSNR and SSIM results of σ 10, 30, 50, and 70, as shown in Table 2. For existing methods, their denoising performance does not differ much, while our model achieves 0.38dB, 0.47dB, 0.49dB and 0.42dB higher of PSNR over WNNM.

Table 2: Average PSNR and SSIM results of σ 10, 30, 50, 70 on 200 images from BSD.

	PSNR								
	BM3D	EPLL	NCSR	PCLR	PGPD	WNNM	RED10	RED20	RED30
$\sigma = 10$	33.01	33.01	33.09	33.30	33.02	33.25	33.49	33.59	**33.63**
$\sigma = 30$	27.31	27.38	27.23	27.54	27.33	27.48	27.79	27.90	**27.95**
$\sigma = 50$	25.06	25.17	24.95	25.30	25.18	25.26	25.54	25.67	**25.75**
$\sigma = 70$	23.82	23.81	23.58	23.94	23.89	23.95	24.13	24.33	**24.37**
	SSIM								
$\sigma = 10$	0.9218	0.9255	0.9226	0.9261	0.9176	0.9244	0.9290	0.9310	**0.9319**
$\sigma = 30$	0.7755	0.7825	0.7738	0.7827	0.7717	0.7807	0.7918	0.7993	**0.8019**
$\sigma = 50$	0.6831	0.6870	0.6777	0.6947	0.6841	0.6928	0.7032	0.7117	**0.7167**
$\sigma = 70$	0.6240	0.6168	0.6166	0.6336	0.6245	0.6346	0.6367	0.6521	**0.6551**

3.2 Image super-resolution

The evaluation on Set5 is shown in Table 3. Our 10-layer network outperforms the compared methods already, and we achieve even better performance with deeper networks. The 30-layer network exceeds the second best method CSCN by 0.52dB, 0.56dB and 0.47dB on scales 2, 3 and 4 respectively. The evaluation on Set14 is shown in Table 4. The improvement on Set14 in not as significant as that on Set5, but we can still observe that the 30 layer network achieves higher PSNR than the second best CSCN by 0.23dB, 0.06dB and 0.1dB. The results on BSD100, as shown in Table 5, are similar to those on Set5. The second best method is still CSCN, the performance of which is worse than that of our 10 layer network. Our deeper network obtains much more performance gain than the others.

Table 3: Average PSNR and SSIM results on Set5.

	PSNR								
	SRCNN	NBSRF	CSCN	CSC	TSE	ARFL+	RED10	RED20	RED30
$s = 2$	36.66	36.76	37.14	36.62	36.50	36.89	37.43	37.62	**37.66**
$s = 3$	32.75	32.75	33.26	32.66	32.62	32.72	33.43	33.80	**33.82**
$s = 4$	30.49	30.44	31.04	30.36	30.33	30.35	31.12	31.40	**31.51**
	SSIM								
$s = 2$	0.9542	0.9552	0.9567	0.9549	0.9537	0.9559	0.9590	0.9597	**0.9599**
$s = 3$	0.9090	0.9104	0.9167	0.9098	0.9094	0.9094	0.9197	0.9229	**0.9230**
$s = 4$	0.8628	0.8632	0.8775	0.8607	0.8623	0.8583	0.8794	0.8847	**0.8869**

Table 4: Average PSNR and SSIM results on Set14.

	PSNR								
	SRCNN	NBSRF	CSCN	CSC	TSE	ARFL+	RED10	RED20	RED30
$s = 2$	32.45	32.45	32.71	32.31	32.23	32.52	32.77	32.87	**32.94**
$s = 3$	29.30	29.25	29.55	29.15	29.16	29.23	29.42	29.61	**29.61**
$s = 4$	27.50	27.42	27.76	27.30	27.40	27.41	27.58	27.80	**27.86**
	SSIM								
$s = 2$	0.9067	0.9071	0.9095	0.9070	0.9036	0.9074	0.9125	0.9138	**0.9144**
$s = 3$	0.8215	0.8212	0.8271	0.8208	0.8197	0.8201	0.8318	0.8343	**0.8341**
$s = 4$	0.7513	0.7511	0.7620	0.7499	0.7518	0.7483	0.7654	0.7697	**0.7718**

3.3 Evaluation using a single model

To construct the training set, we extract image patches with different noise levels and scaling parameters for denoising and super-resolution. Then a 30-layer network is trained for the two tasks respectively. The evaluation results are shown in Table 6 and Table 7. Although training with different levels of corruption, we can observe that the performance of our network only slightly degrades