

Supplemental information for
“A study on high efficiency phase organization segmentation
model for SEM images based on deep learning”

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United States of America

Table. S1 IoU values for all images in the validation set

Serial Number	Image File Name	IoU
1	czp-2-12-5kx_block_10_rotated_270.png	0.9734
2	czp-2-12-5kx_block_11_rotated_90.png	0.917
3	czp-2-12-5kx_block_12_rotated_180_flipped.png	0.8976
4	czp-2-12-5kx_block_12_rotated_270.png	0.8717
5	czp-2-12-5kx_block_13.png	0.9099
6	czp-2-12-5kx_block_13_rotated_180_flipped.png	0.9078
7	czp-2-12-5kx_block_14_rotated_180.png	0.9228
8	czp-2-12-5kx_block_15_rotated_270.png	0.9385
9	czp-2-12-5kx_block_15_rotated_90_flipped.png	0.9364
10	czp-2-12-5kx_block_16_rotated_270_flipped.png	0.9798
11	czp-2-12-5kx_block_17.png	0.9278
12	czp-2-12-5kx_block_17_rotated_270_flipped.png	0.8905
13	czp-2-12-5kx_block_18_rotated_270.png	0.8895
14	czp-2-12-5kx_block_18_rotated_270_flipped.png	0.8597
15	czp-2-12-5kx_block_20_rotated_180_flipped.png	0.9523
16	czp-2-12-5kx_block_22.png	0.9618
17	czp-2-12-5kx_block_23.png	0.885
18	czp-2-12-5kx_block_23_flipped.png	0.8718
19	czp-2-12-5kx_block_23_rotated_180.png	0.8763
20	czp-2-12-5kx_block_23_rotated_180_flipped.png	0.8675
21	czp-2-12-5kx_block_24.png	0.9494
22	czp-2-12-5kx_block_24_rotated_270_flipped.png	0.8672

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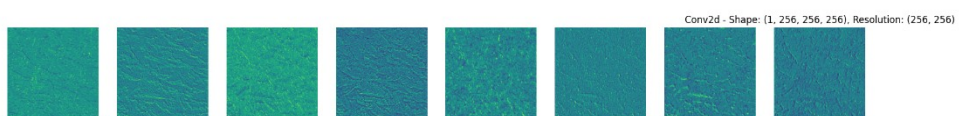
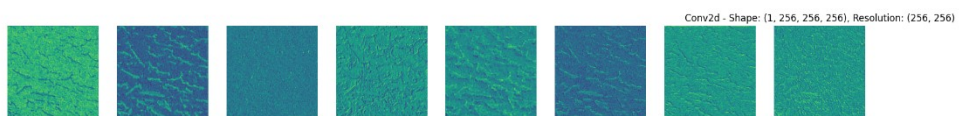
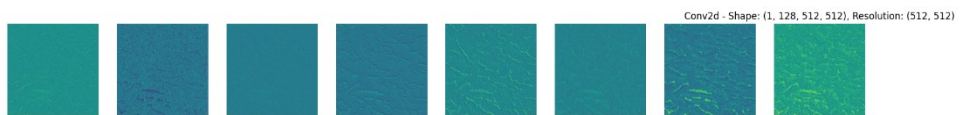
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24	czp-2-12-5kx_block_27_rotated_90_flipped.png	0.9567
25	czp-2-12-5kx_block_28_rotated_270.png	0.9722
26	czp-2-12-5kx_block_30_rotated_90_flipped.png	0.9659
27	czp-2-12-5kx_block_31_flipped.png	0.9678
28	czp-2-12-5kx_block_32_rotated_180.png	0.7193
29	czp-2-12-5kx_block_32_rotated_270.png	0.7825
30	czp-2-12-5kx_block_33.png	0.9488
31	czp-2-12-5kx_block_34.png	0.9642
32	czp-2-12-5kx_block_35_rotated_180_flipped.png	0.9657
33	czp-2-12-5kx_block_35_rotated_270.png	0.9577
34	czp-2-12-5kx_block_35_rotated_90_flipped.png	0.9651
35	czp-2-12-5kx_block_37_rotated_90.png	0.7882
36	czp-2-12-5kx_block_37_rotated_90_flipped.png	0.7812
37	czp-2-12-5kx_block_38_rotated_180.png	0.9401
38	czp-2-12-5kx_block_38_rotated_180_flipped.png	0.9421
39	czp-2-12-5kx_block_38_rotated_90.png	0.9446
40	czp-2-12-5kx_block_39_flipped.png	0.9225
41	czp-2-12-5kx_block_39_rotated_180_flipped.png	0.9226
42	czp-2-12-5kx_block_39_rotated_270.png	0.9247
43	czp-2-12-5kx_block_39_rotated_270_flipped.png	0.9245
44	czp-2-12-5kx_block_40.png	0.8122
45	czp-2-12-5kx_block_40_rotated_270.png	0.4827
46	czp-2-12-5kx_block_40_rotated_90_flipped.png	0.7359
47	czp-2-12-5kx_block_41_rotated_180.png	0.8881
48	czp-2-12-5kx_block_41_rotated_270_flipped.png	0.8995
49	czp-2-12-5kx_block_41_rotated_90.png	0.8675
50	czp-2-12-5kx_block_42_rotated_90_flipped.png	0.8956
51	czp-2-12-5kx_block_43.png	0.9665
52	czp-2-12-5kx_block_43_rotated_180.png	0.9657
53	czp-2-12-5kx_block_43_rotated_90.png	0.9665
54	czp-2-12-5kx_block_44.png	0.9311
55	czp-2-12-5kx_block_44_rotated_270.png	0.9351
56	czp-2-12-5kx_block_45.png	0.9144
57	czp-2-12-5kx_block_45_flipped.png	0.9114
58	czp-2-12-5kx_block_45_rotated_180.png	0.9184
59	czp-2-12-5kx_block_45_rotated_270.png	0.9165
60	czp-2-12-5kx_block_45_rotated_270_flipped.png	0.9239
61	czp-2-12-5kx_block_46_rotated_90_flipped.png	0.8634
62	czp-2-12-5kx_block_47_rotated_270.png	0.9464
63	czp-2-12-5kx_block_47_rotated_90_flipped.png	0.9406
64	czp-2-12-5kx_block_5_rotated_90.png	0.9192
65	czp-2-12-5kx_block_7_flipped.png	0.9457

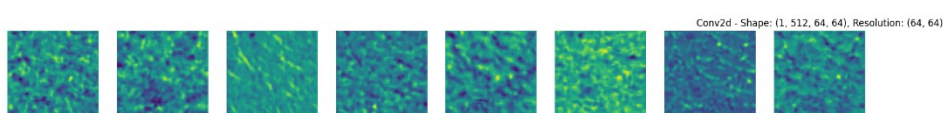
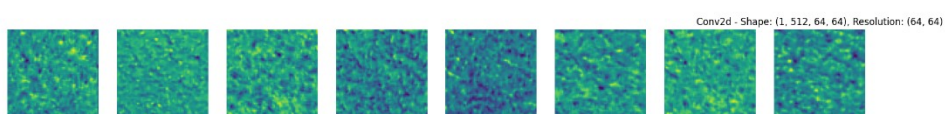
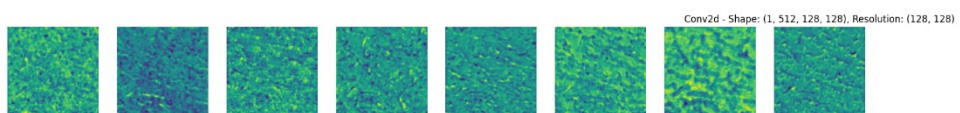
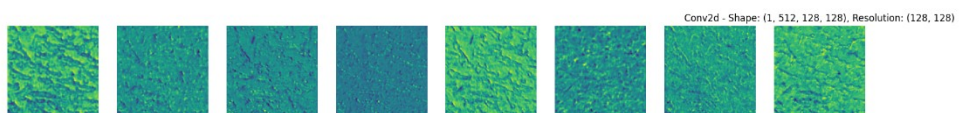
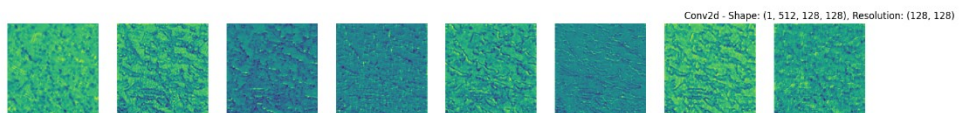
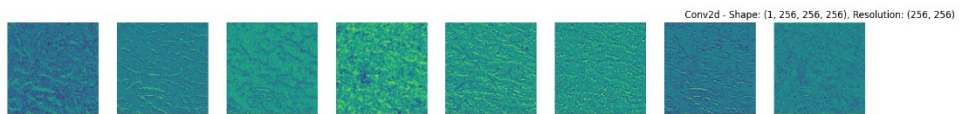
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67	czp-2-12-5kx_block_8.png	0.8973
68	czp-2-12-5kx_block_8_rotated_90_flipped.png	0.9152
69	czp-2-12-5kx_block_9_rotated_90_flipped.png	0.9317
Average value		0.9052

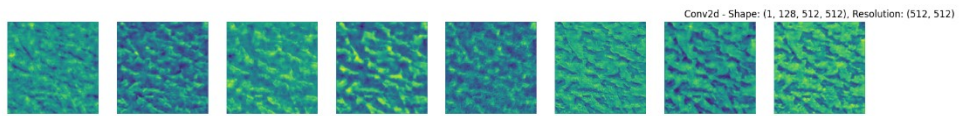
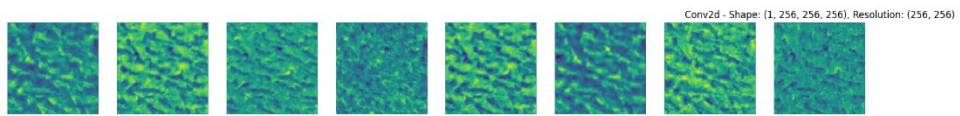
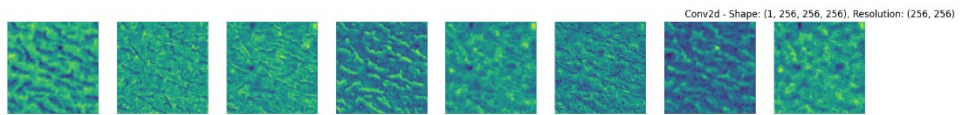
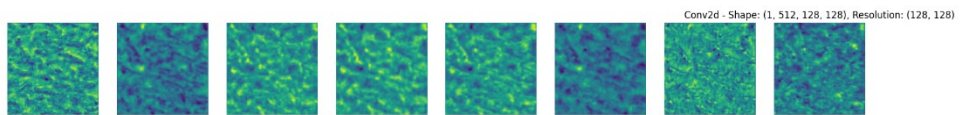
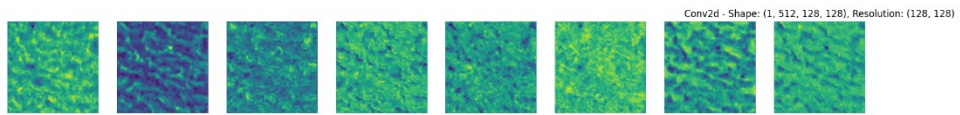
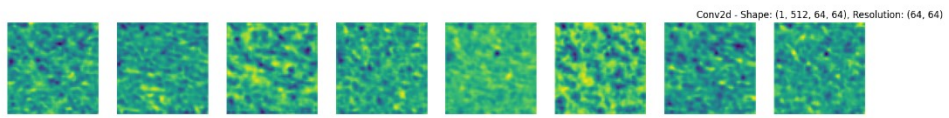
Table.S2 PA values for all images in the validation set

Serial Number	Image File Name	PA
1	czp-2-12-5kx_block_10_rotated_270.png	0.9936
2	czp-2-12-5kx_block_11_rotated_90.png	0.9952
3	czp-2-12-5kx_block_12_rotated_180_flipped.png	0.9857
4	czp-2-12-5kx_block_12_rotated_270.png	0.9811
5	czp-2-12-5kx_block_13.png	0.9897
6	czp-2-12-5kx_block_13_rotated_180_flipped.png	0.9898
7	czp-2-12-5kx_block_14_rotated_180.png	0.9936
8	czp-2-12-5kx_block_15_rotated_270.png	0.9878
9	czp-2-12-5kx_block_15_rotated_90_flipped.png	0.9875
10	czp-2-12-5kx_block_16_rotated_270_flipped.png	0.9947
11	czp-2-12-5kx_block_17.png	0.9784
12	czp-2-12-5kx_block_17_rotated_270_flipped.png	0.9654
13	czp-2-12-5kx_block_18_rotated_270.png	0.956
14	czp-2-12-5kx_block_18_rotated_270_flipped.png	0.9444
15	czp-2-12-5kx_block_20_rotated_180_flipped.png	0.9935
16	czp-2-12-5kx_block_22.png	0.9852
17	czp-2-12-5kx_block_23.png	0.9874
18	czp-2-12-5kx_block_23_flipped.png	0.9861
19	czp-2-12-5kx_block_23_rotated_180.png	0.9864
20	czp-2-12-5kx_block_23_rotated_180_flipped.png	0.9853
21	czp-2-12-5kx_block_24.png	0.9886
22	czp-2-12-5kx_block_24_rotated_270_flipped.png	0.9671
23	czp-2-12-5kx_block_25_rotated_180.png	0.9813
24	czp-2-12-5kx_block_27_rotated_90_flipped.png	0.9903
25	czp-2-12-5kx_block_28_rotated_270.png	0.9891
26	czp-2-12-5kx_block_30_rotated_90_flipped.png	0.9848
27	czp-2-12-5kx_block_31_flipped.png	0.9938
28	czp-2-12-5kx_block_32_rotated_180.png	0.9928
29	czp-2-12-5kx_block_32_rotated_270.png	0.9946
30	czp-2-12-5kx_block_33.png	0.9918
31	czp-2-12-5kx_block_34.png	0.9873
32	czp-2-12-5kx_block_35_rotated_180_flipped.png	0.996
33	czp-2-12-5kx_block_35_rotated_270.png	0.9953
34	czp-2-12-5kx_block_35_rotated_90_flipped.png	0.9963

35	czp-2-12-5kx_block_37_rotated_90.png	0.979
36	czp-2-12-5kx_block_37_rotated_90_flipped.png	0.9781
37	czp-2-12-5kx_block_38_rotated_180.png	0.9798
38	czp-2-12-5kx_block_38_rotated_180_flipped.png	0.9808
39	czp-2-12-5kx_block_38_rotated_90.png	0.9814
40	czp-2-12-5kx_block_39_flipped.png	0.9881
41	czp-2-12-5kx_block_39_rotated_180_flipped.png	0.9882
42	czp-2-12-5kx_block_39_rotated_270.png	0.9876
43	czp-2-12-5kx_block_39_rotated_270_flipped.png	0.9874
44	czp-2-12-5kx_block_40.png	0.9825
45	czp-2-12-5kx_block_40_rotated_270.png	0.9498
46	czp-2-12-5kx_block_40_rotated_90_flipped.png	0.9739
47	czp-2-12-5kx_block_41_rotated_180.png	0.9959
48	czp-2-12-5kx_block_41_rotated_270_flipped.png	0.9965
49	czp-2-12-5kx_block_41_rotated_90.png	0.995
50	czp-2-12-5kx_block_42_rotated_90_flipped.png	0.9861
51	czp-2-12-5kx_block_43.png	0.9834
52	czp-2-12-5kx_block_43_rotated_180.png	0.9828
53	czp-2-12-5kx_block_43_rotated_90.png	0.9832
54	czp-2-12-5kx_block_44.png	0.9919
55	czp-2-12-5kx_block_44_rotated_270.png	0.9928
56	czp-2-12-5kx_block_45.png	0.9815
57	czp-2-12-5kx_block_45_flipped.png	0.9812
58	czp-2-12-5kx_block_45_rotated_180.png	0.9829
59	czp-2-12-5kx_block_45_rotated_270.png	0.9817
60	czp-2-12-5kx_block_45_rotated_270_flipped.png	0.9835
61	czp-2-12-5kx_block_46_rotated_90_flipped.png	0.9829
62	czp-2-12-5kx_block_47_rotated_270.png	0.9817
63	czp-2-12-5kx_block_47_rotated_90_flipped.png	0.9793
64	czp-2-12-5kx_block_5_rotated_90.png	0.9881
65	czp-2-12-5kx_block_7_flipped.png	0.9674
66	czp-2-12-5kx_block_7_rotated_90_flipped.png	0.9734
67	czp-2-12-5kx_block_8.png	0.9907
68	czp-2-12-5kx_block_8_rotated_90_flipped.png	0.9925
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Average value		0.9846







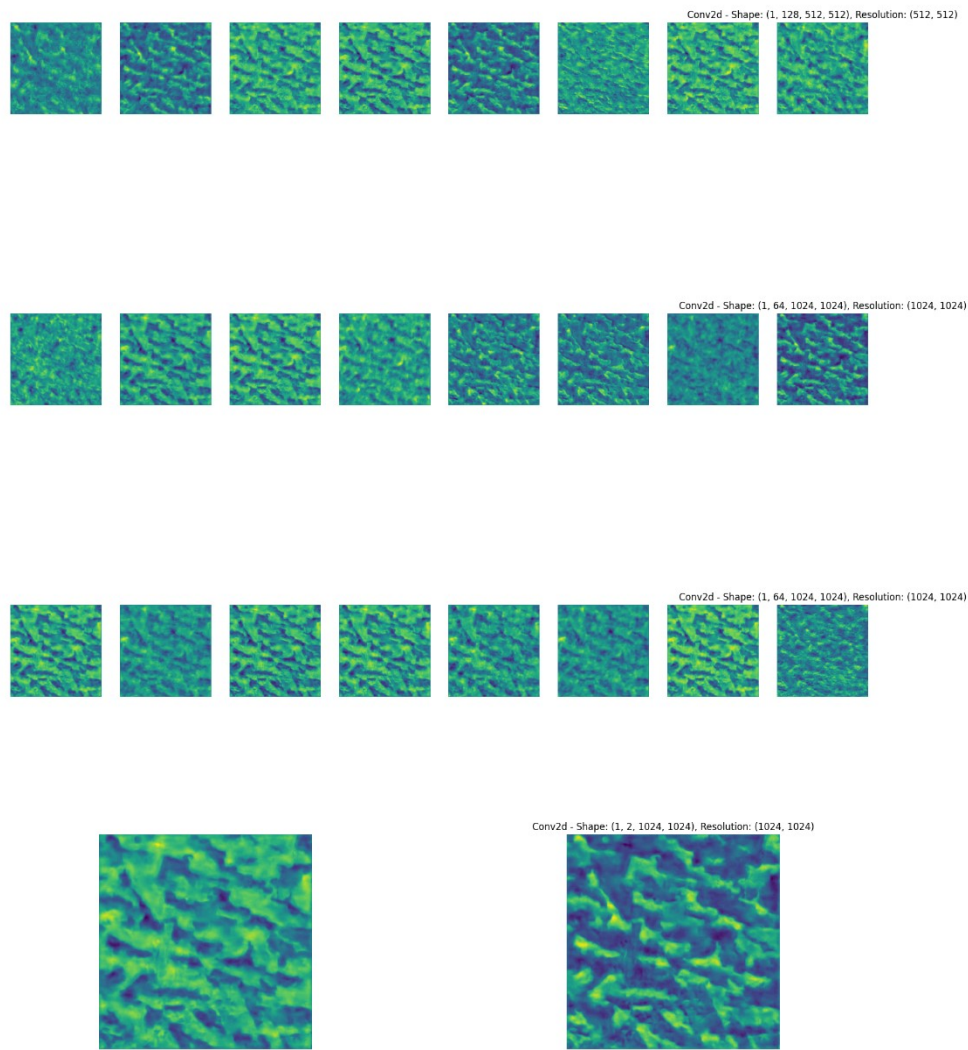
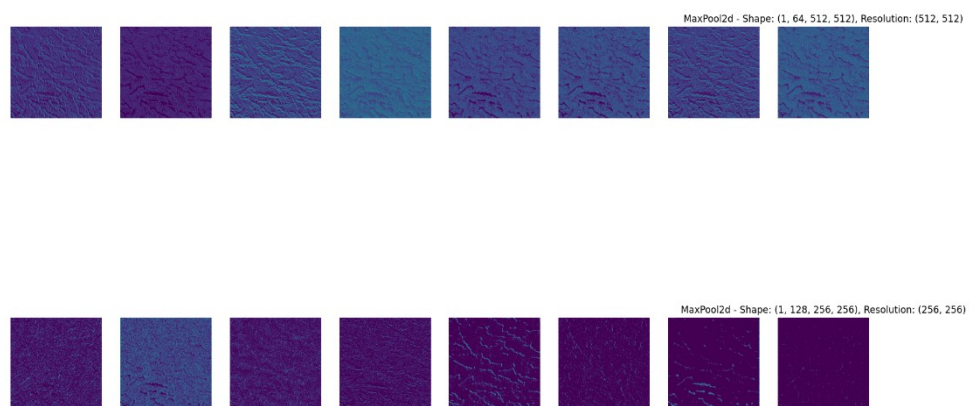


Fig. S1 All intermediate features extracted by the convolutional layer.



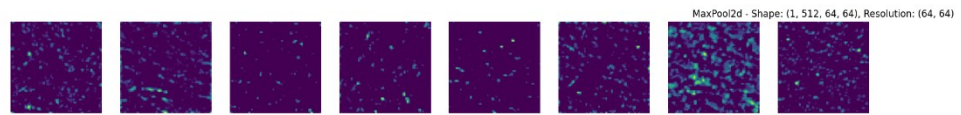
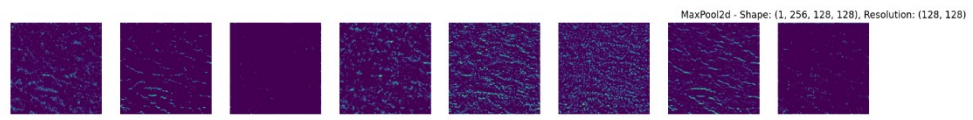


Fig. S2 All intermediate features of the maximum pooling layer.

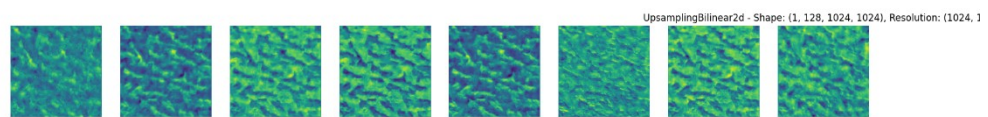
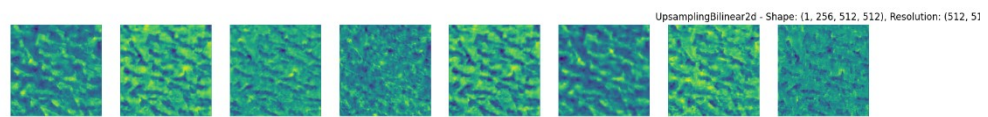
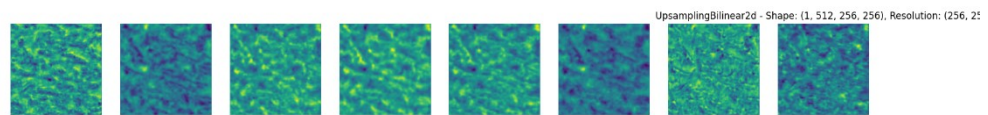
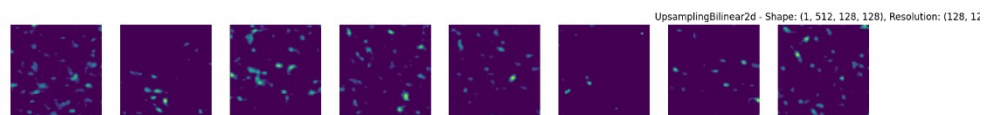


Fig. S3 All intermediate features in the upsampling layer.

