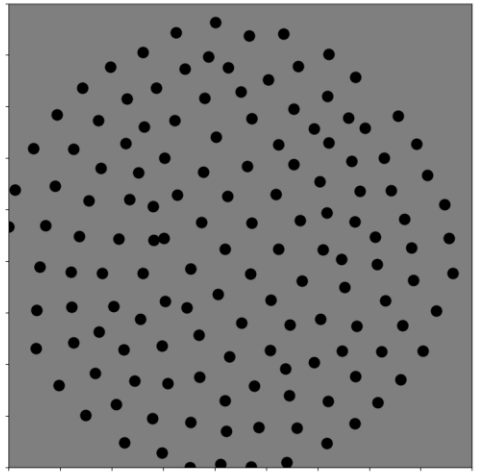
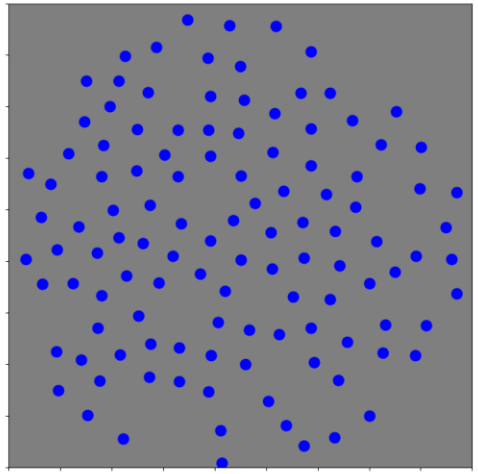
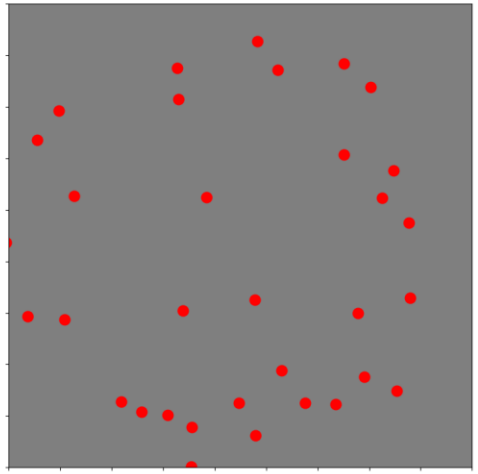
Outline for today

1. 2-color channel now gives proper mosaics
2. Are surrounds weaker?
3. Changes/Improvements to DoG fits

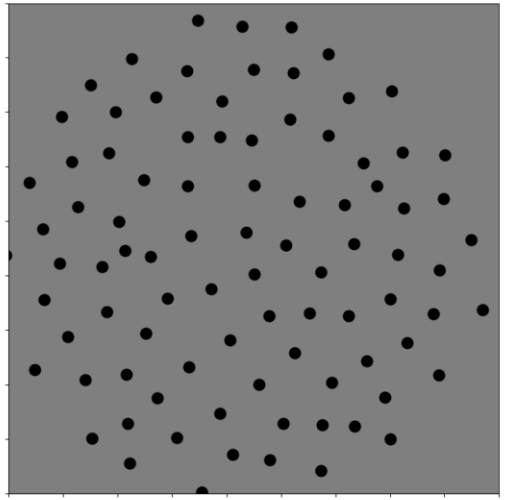
Before: 2-channel mosaics

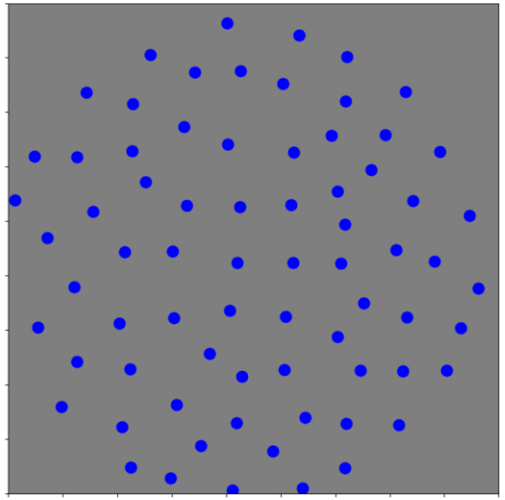


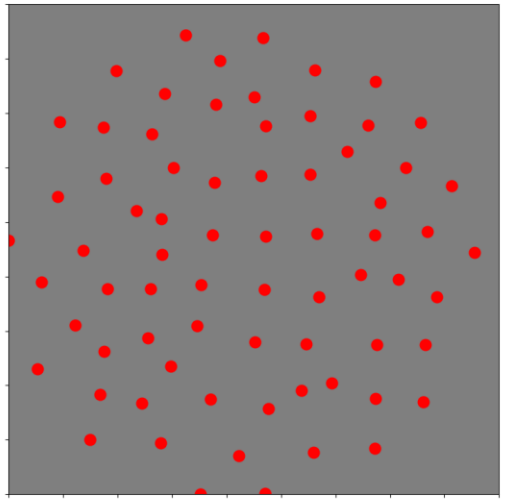


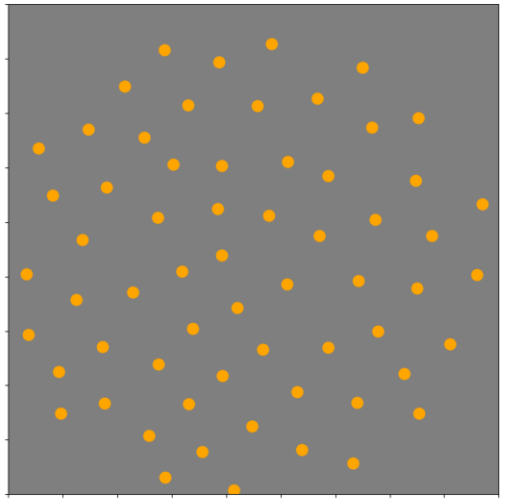


Now: 2 channel mosaics









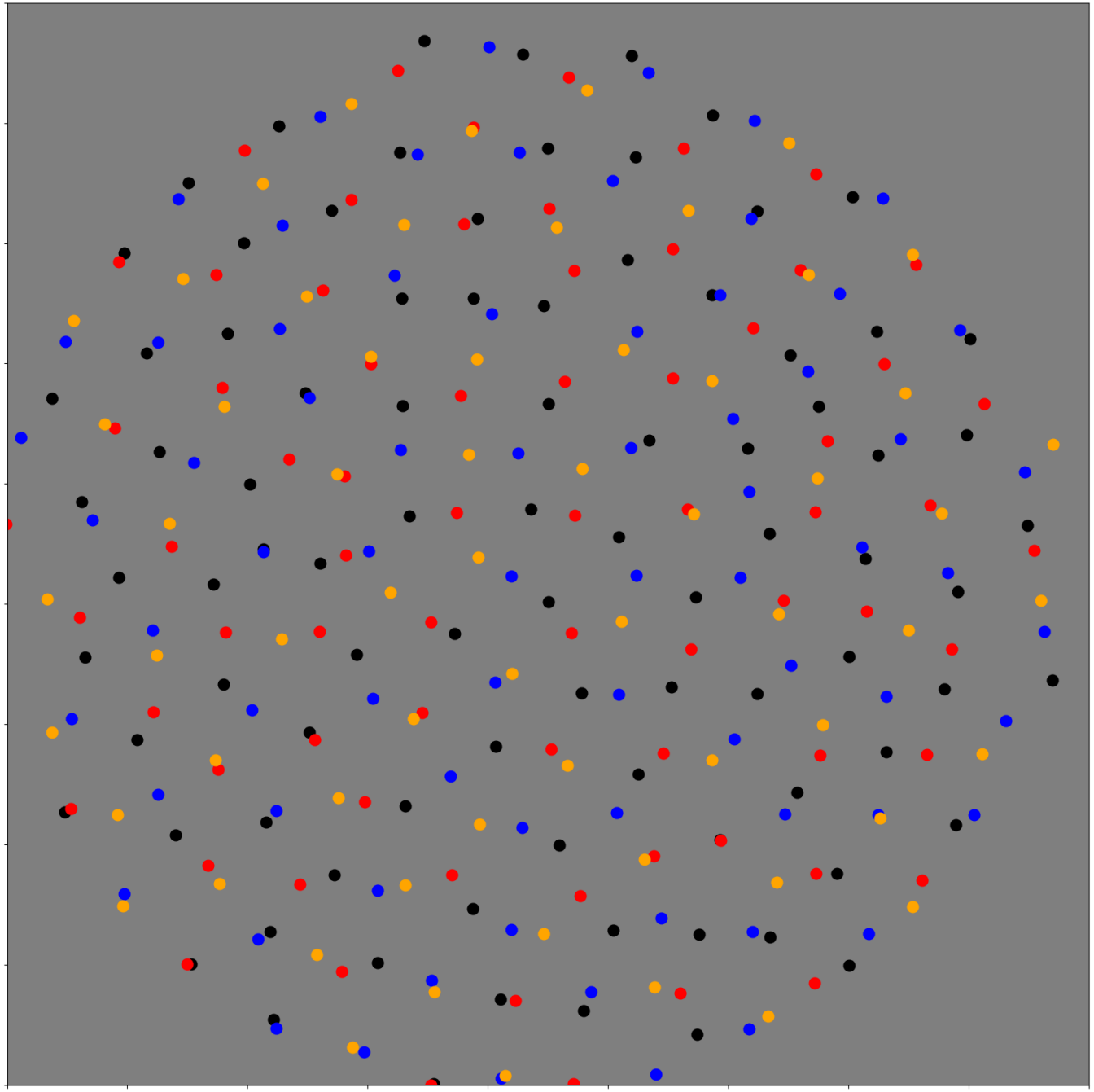
'240301-055438'

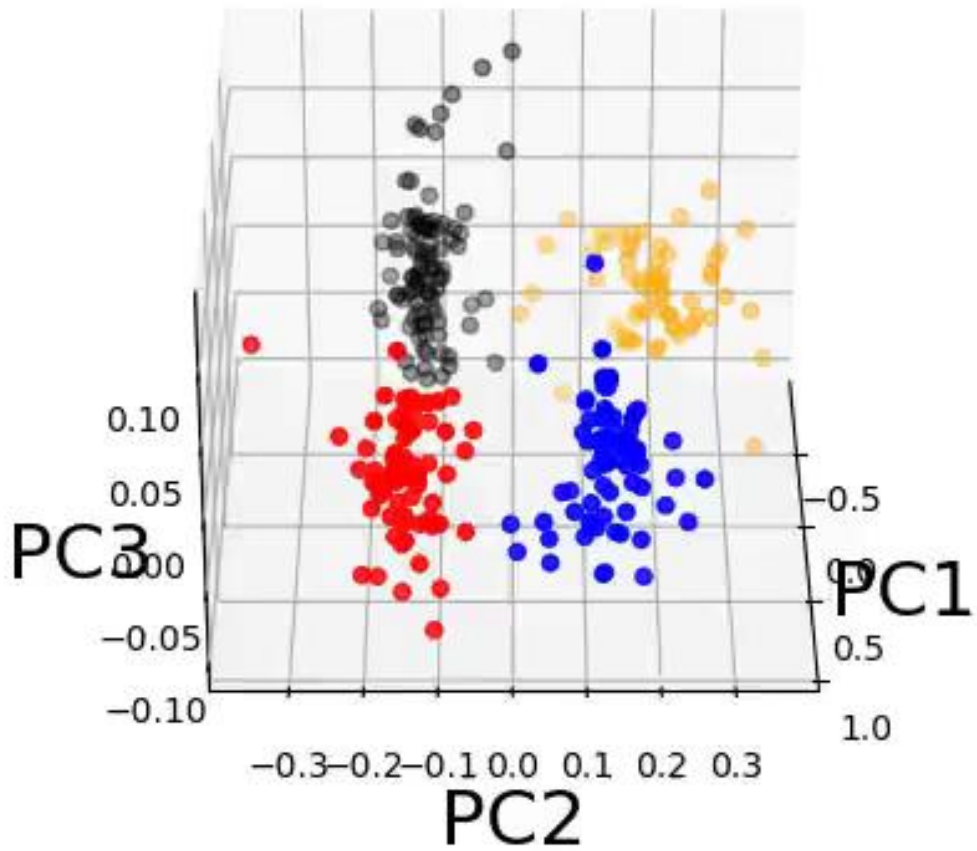
What changed?

```
def __call__(self, n_comps, rad_dist, n_clusters):
    plt.close('all')
    self.get_DoG_params()
    if self.parametrized:
        self.increase_res(100, norm_size = False)
        self.radial_averages(rad_dist)
        self.pca_radial_average(n_comp = n_comps, plot = False)
        self.get_pathways(n_clusters)
```

Culprit

```
self.RF_centers = self.kernel_centers * (self.RF_size/self.kernel_size)
```




PC3
0.10
0.05
−0.05
−0.10
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
PC2
−0.5
0.5
1.0
PC1

OFF parasol

ON parasol

Radial distance from center (pixels)

ON pathway #2

OFF pathway #2

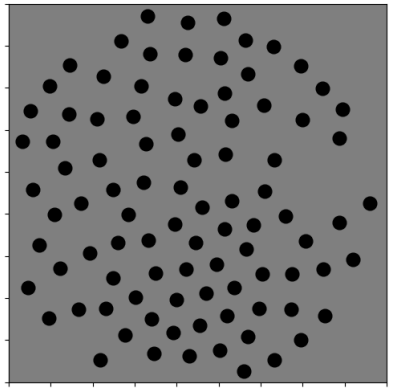
Changing input and output noise

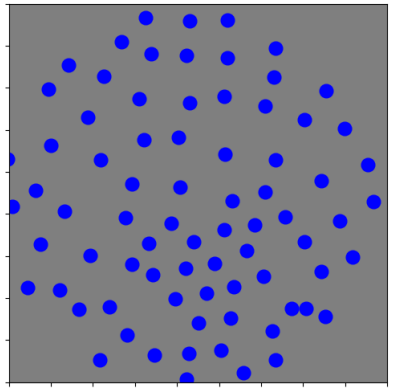
We get weak surrounds and weak color opponency: maybe we need to lower noise?

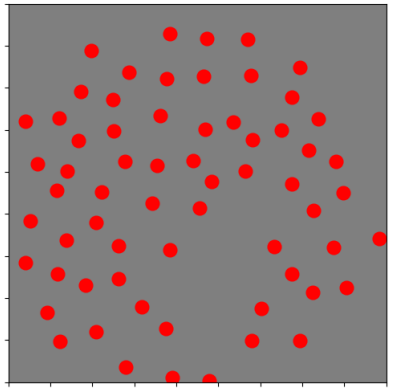
Original: Output = 3, input = 0.4

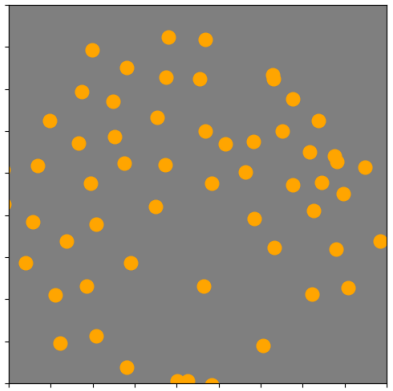
What you just saw: Output = 2, input = 0.2

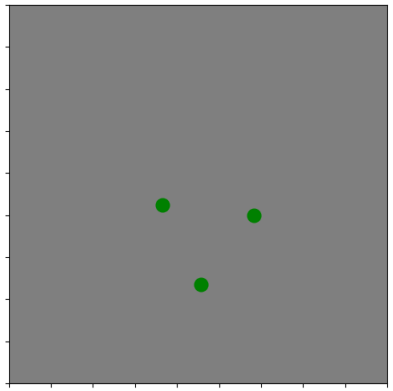
What I'm about to show: Output = 1, input = 0.05.











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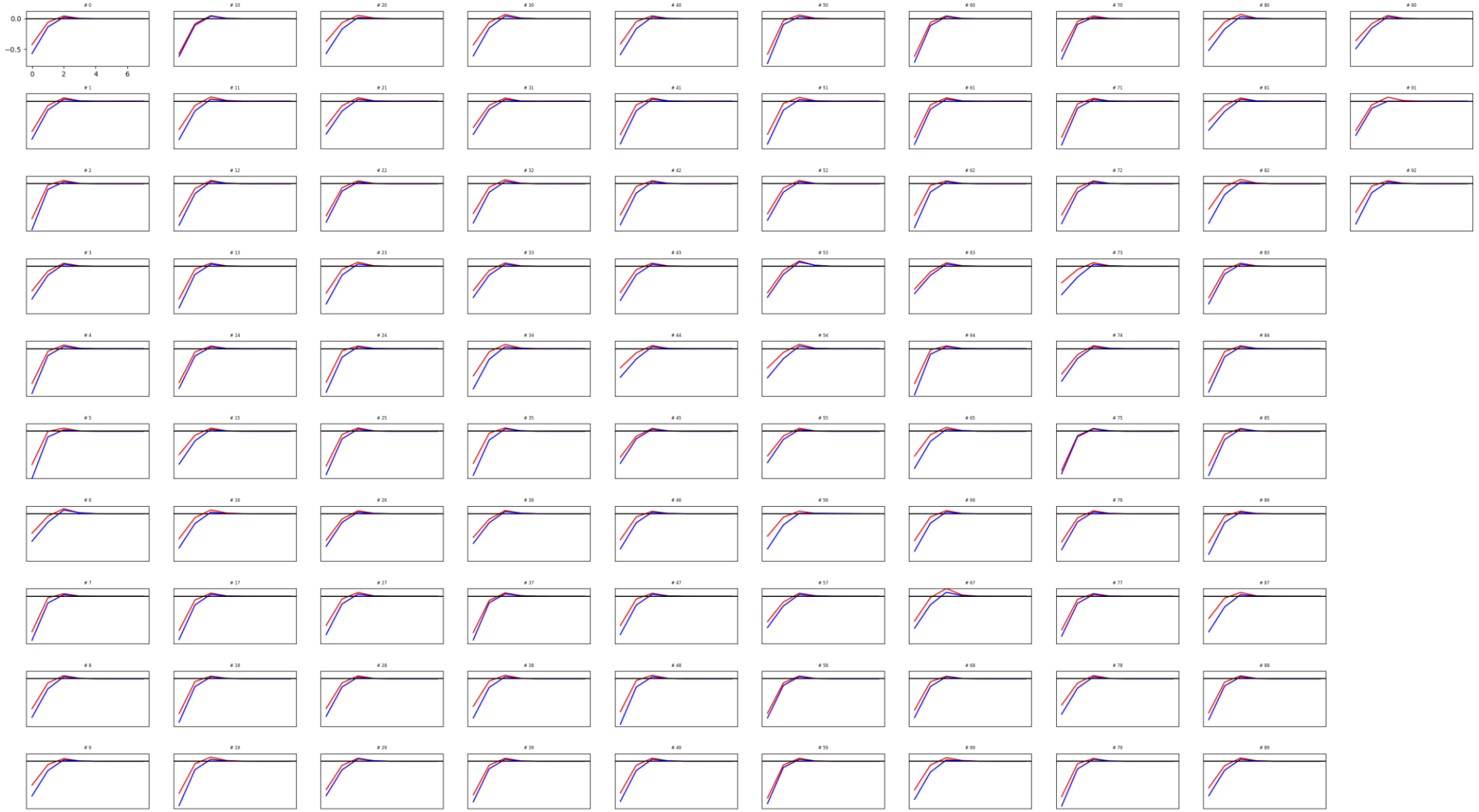
Notes

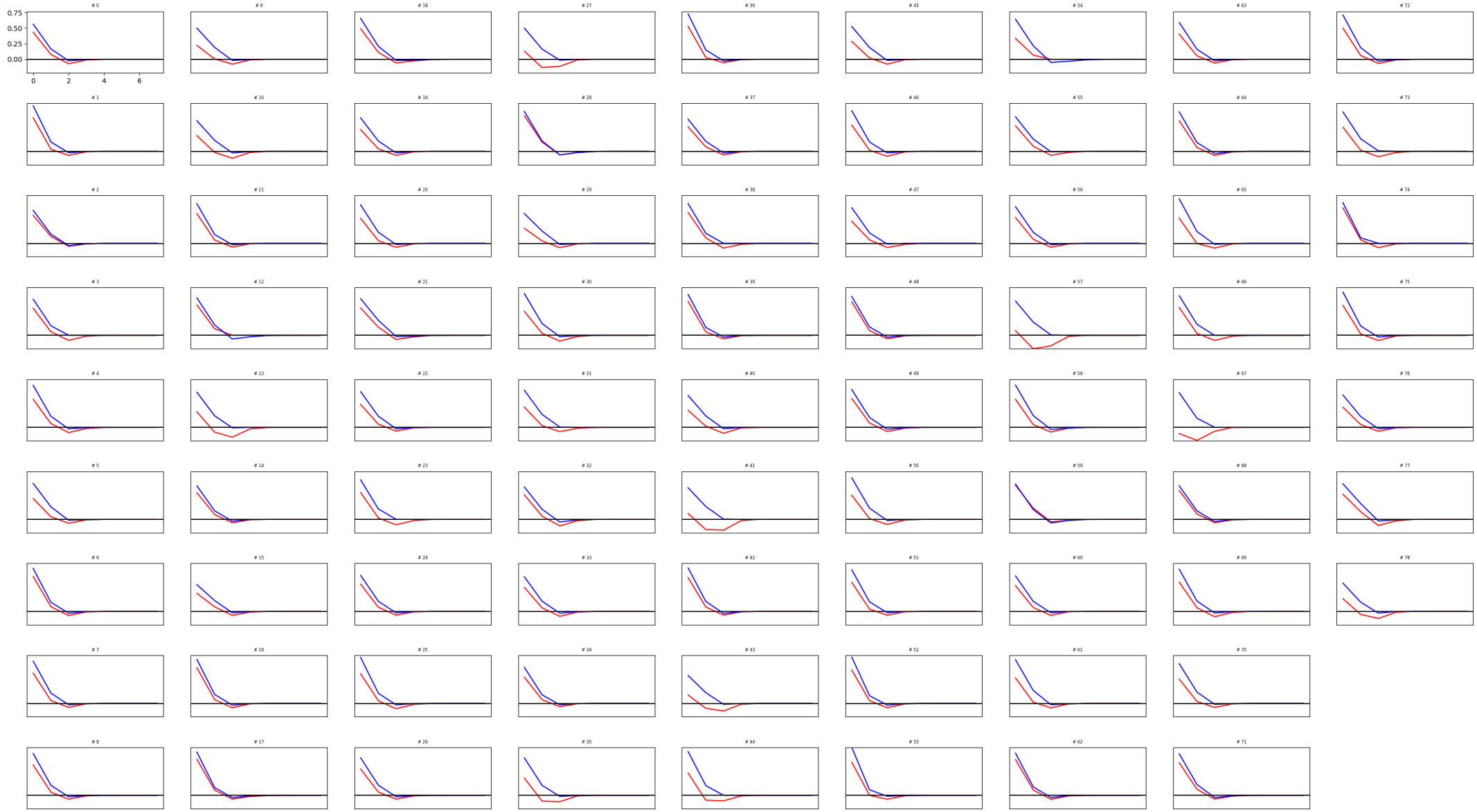
As we go from mosaic 1 to mosaic 5:

- Surrounds become stronger
- Color opponency becomes stronger

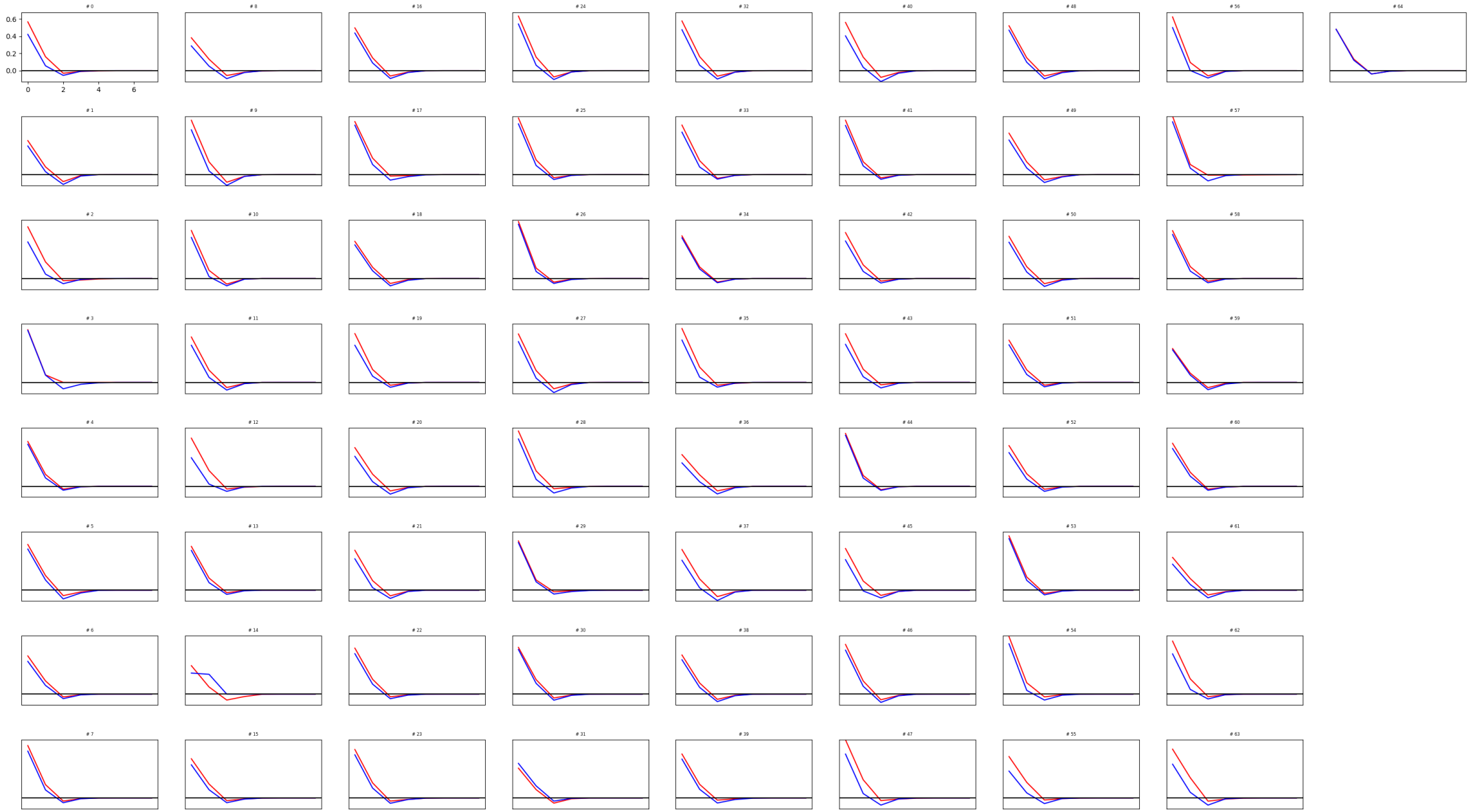
Mosaic 1



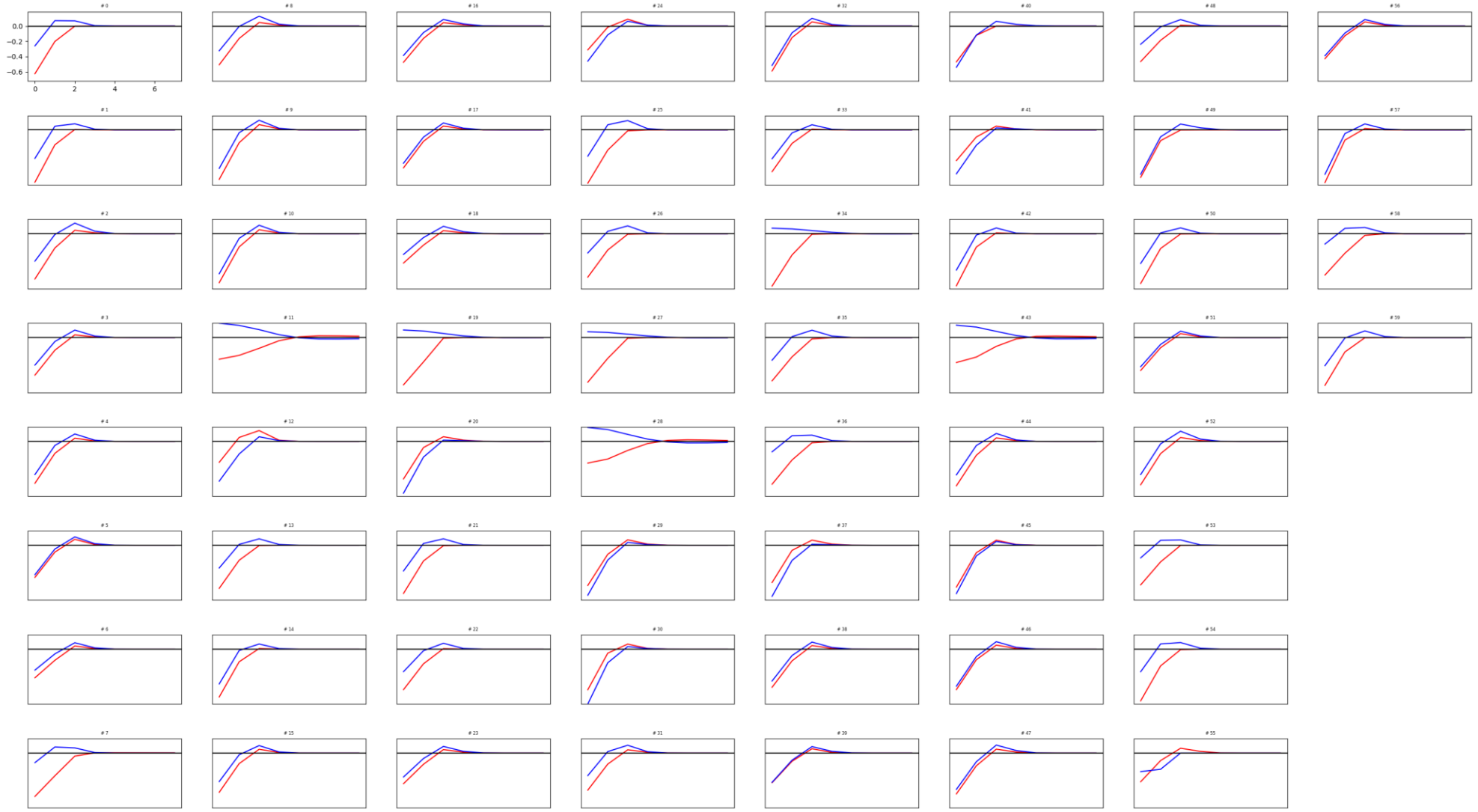
Mosaic 2



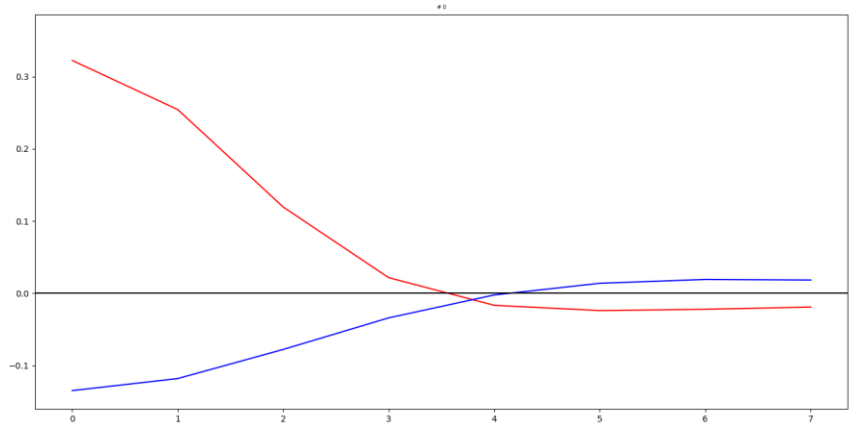
Mosaic 3

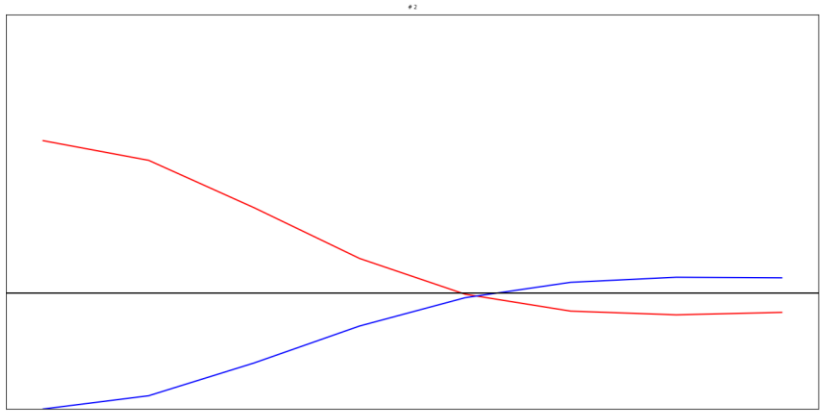


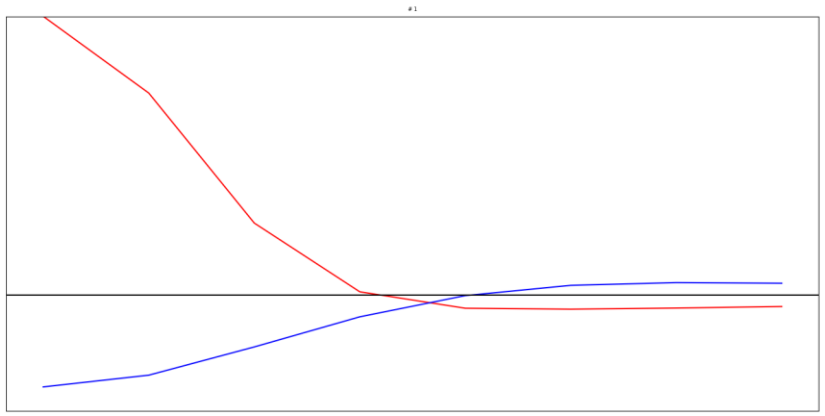
4th mosaic, quite a few opponent cells



5th mosaic







Radial distance from center (pixels)

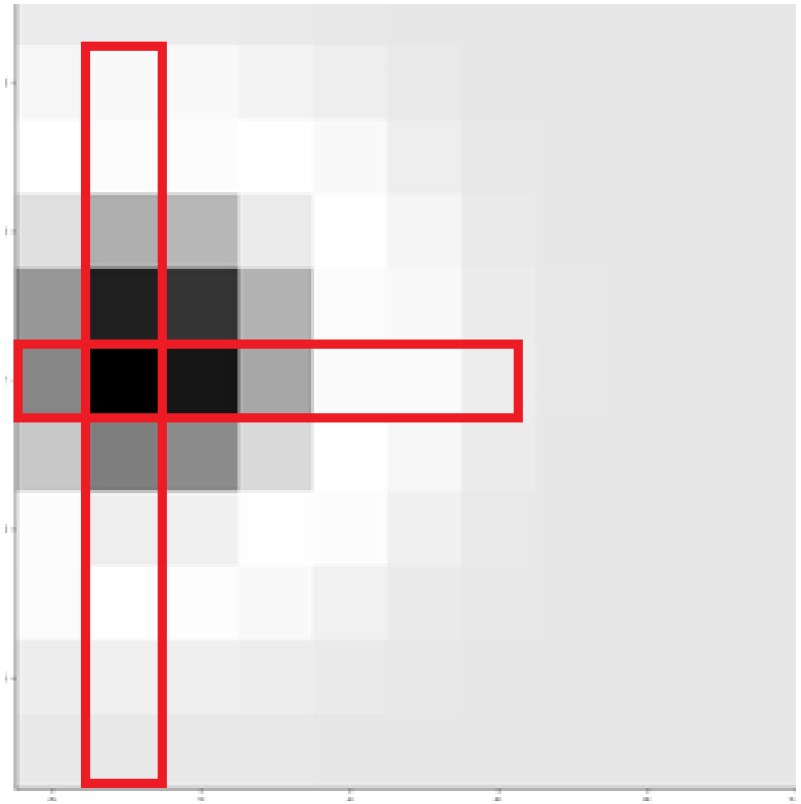
Notes

- Seems like I still need to lower noise to get more opponency
- 3 channels experiment still don’t make clean mosaics

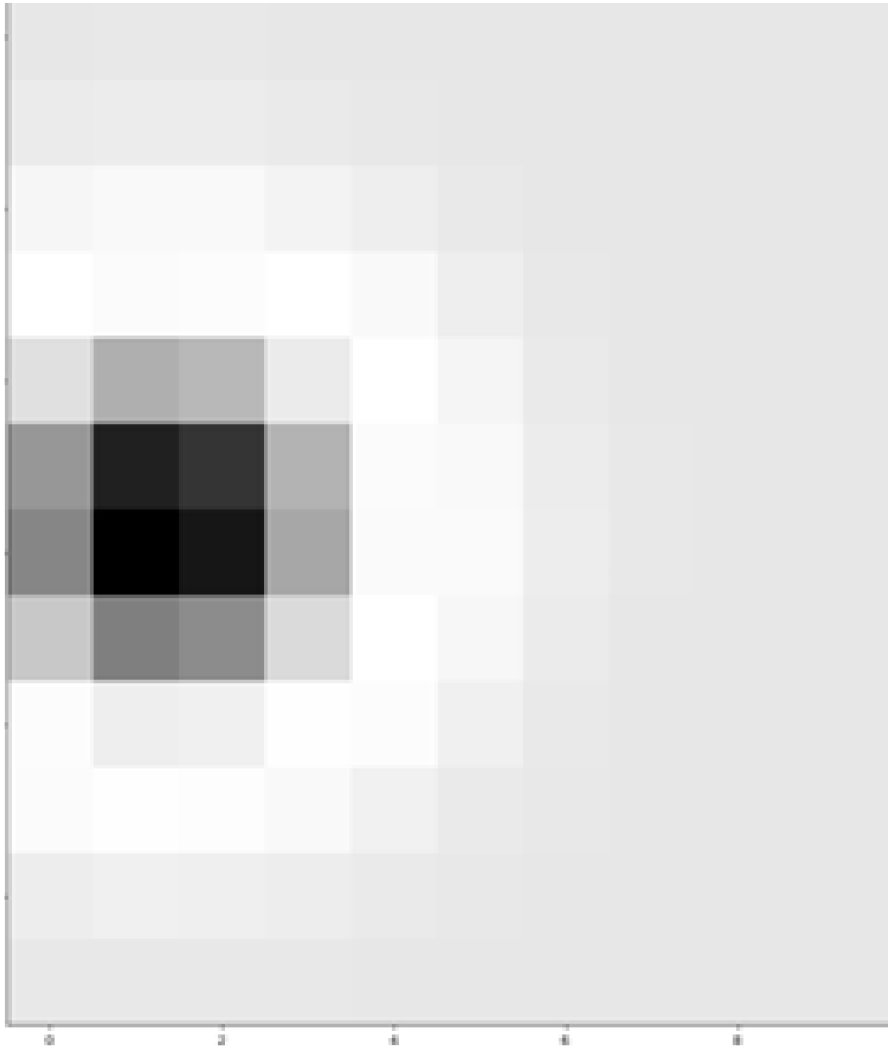
Are surrounds weaker?

No they are not

How I compute radial averages makes surrounds seem weaker than they are

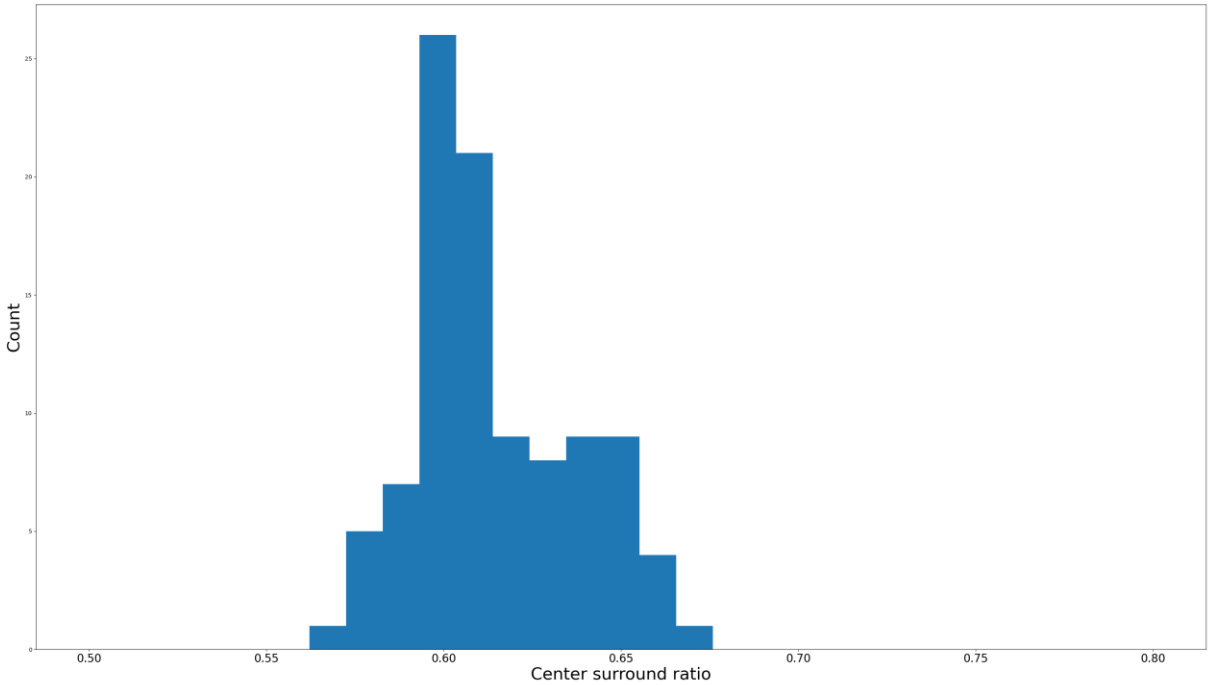


Center surround ratio index

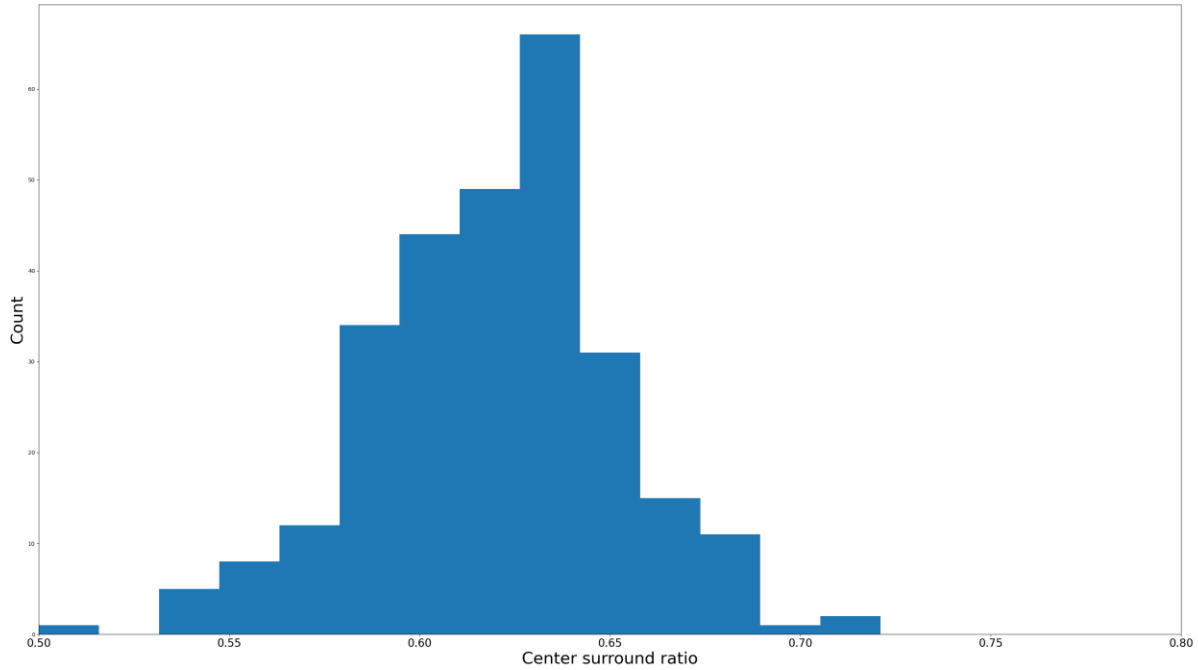


$$\frac{\sum |\, Center \,|}{\sum |\, Center \,| + \sum |\, Surround \,|}$$

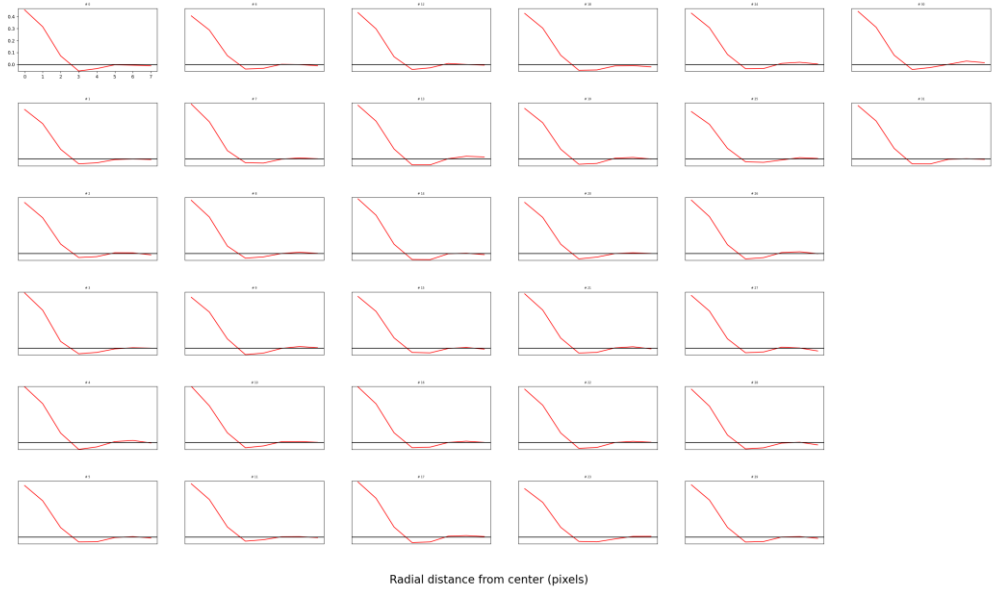
Nayoung’s model. Input noise = 0.4



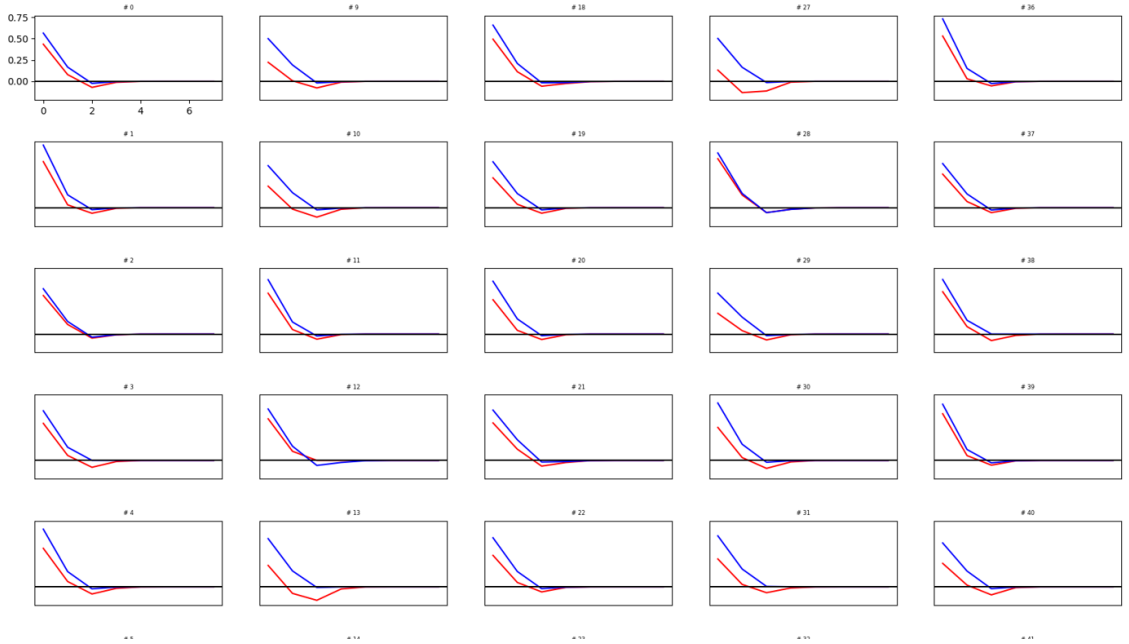
2 color channels. Input noise = 0.2



Nayoung’s model

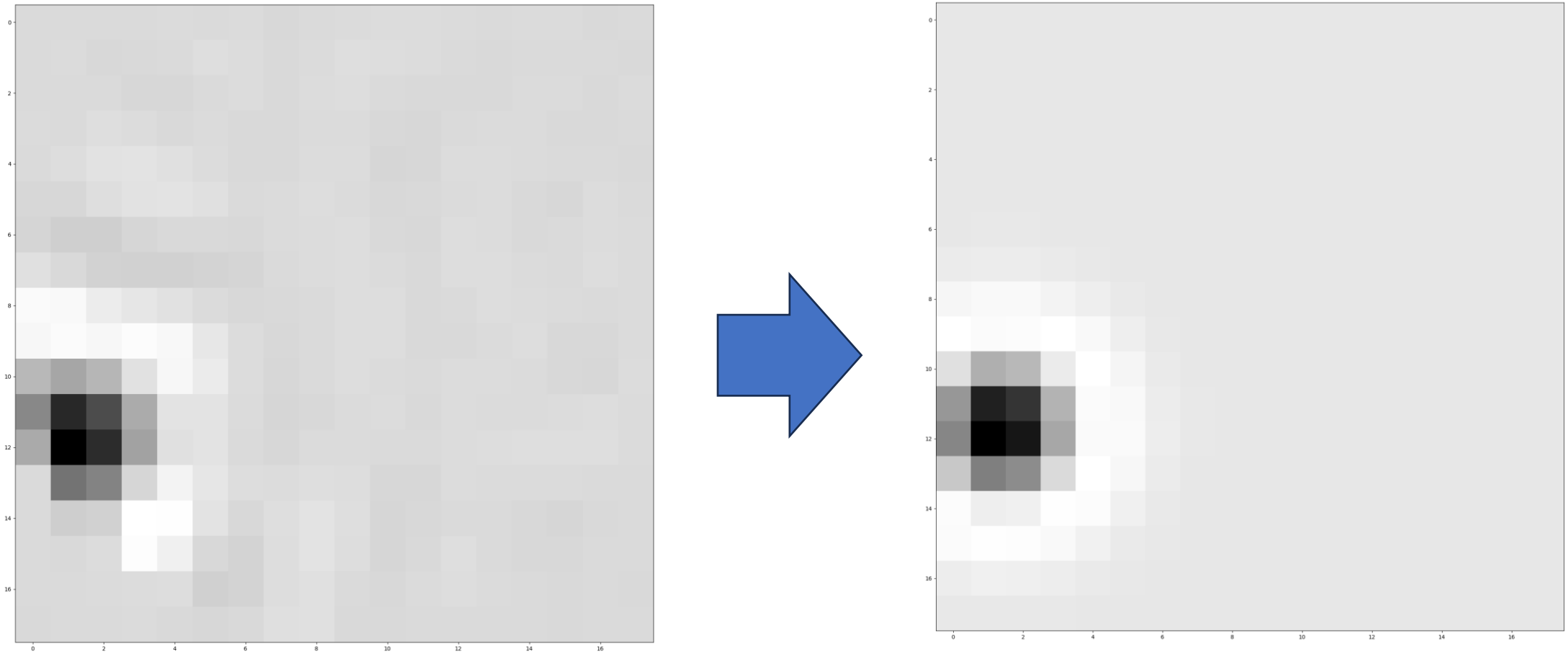


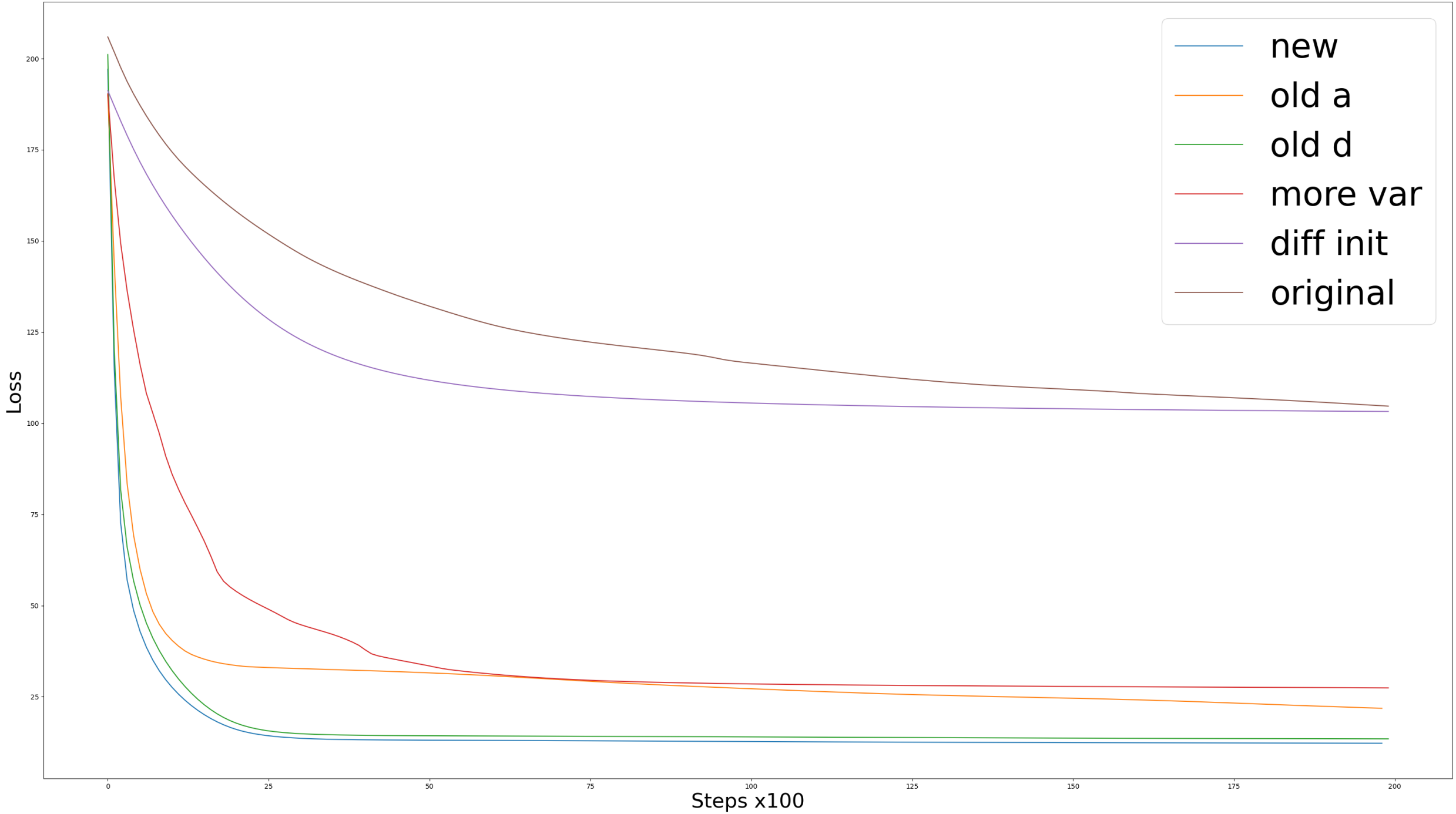
2 color channels



Changes/Improvements to DoG fits

Trying to fit DoG to unparametrized RFs




new
old a
old d
more var
diff init
original
Loss
Steps x100
200
175
150
125
100
75
50
25
0
25
50
75
100
125
150
175
200

List of changes

1- Diff init: Initialized center and surround to be larger

2- more var: Initial parameter values are drawn from a Gaussian with 10x less variance

3- old d: d parameter is switched from having its norm = 1 to being a sigmoid

4- old a: a = a_pre + b -> b = 1/(1/a + 1/b)

Old a vs new a : more steps