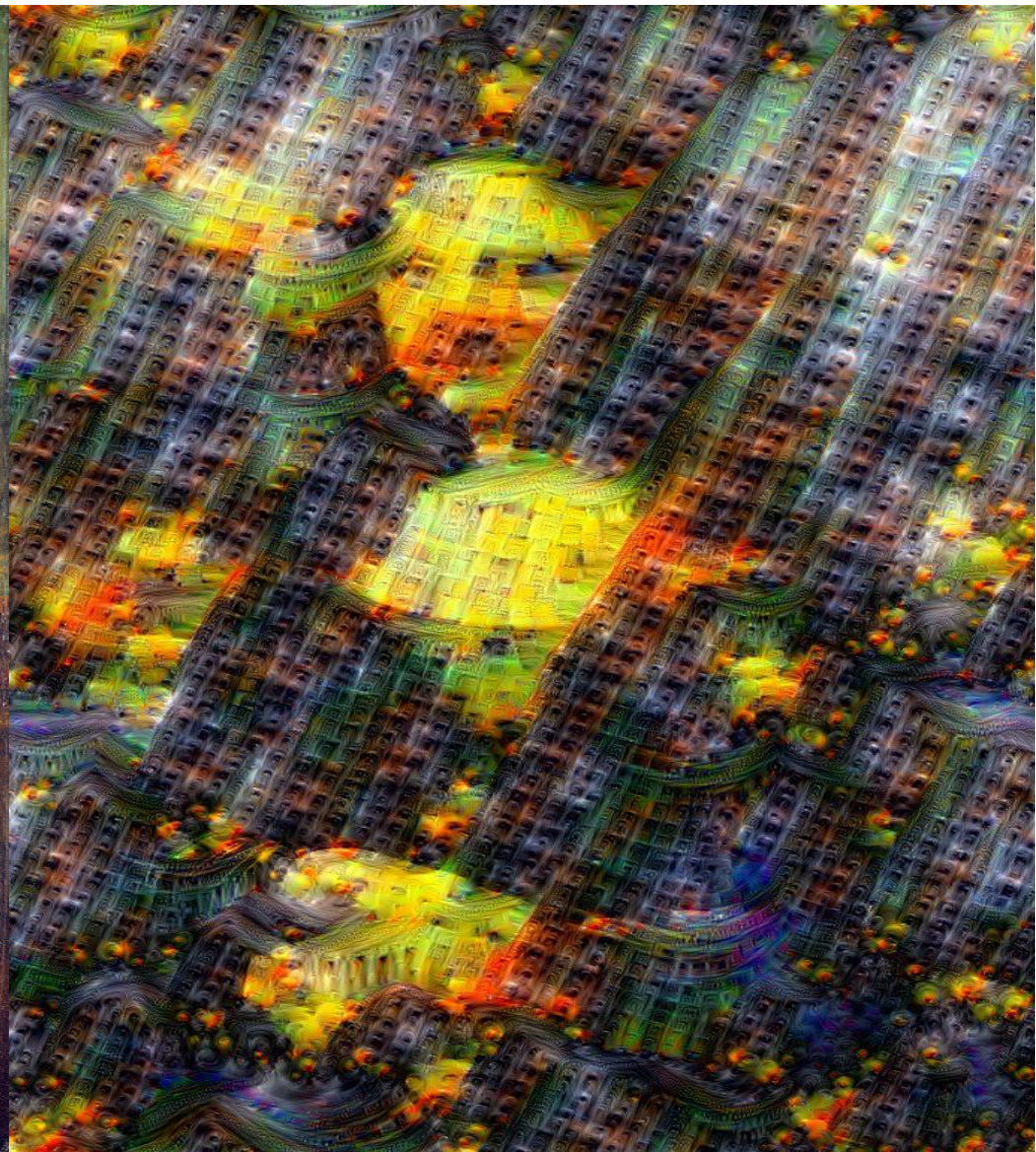
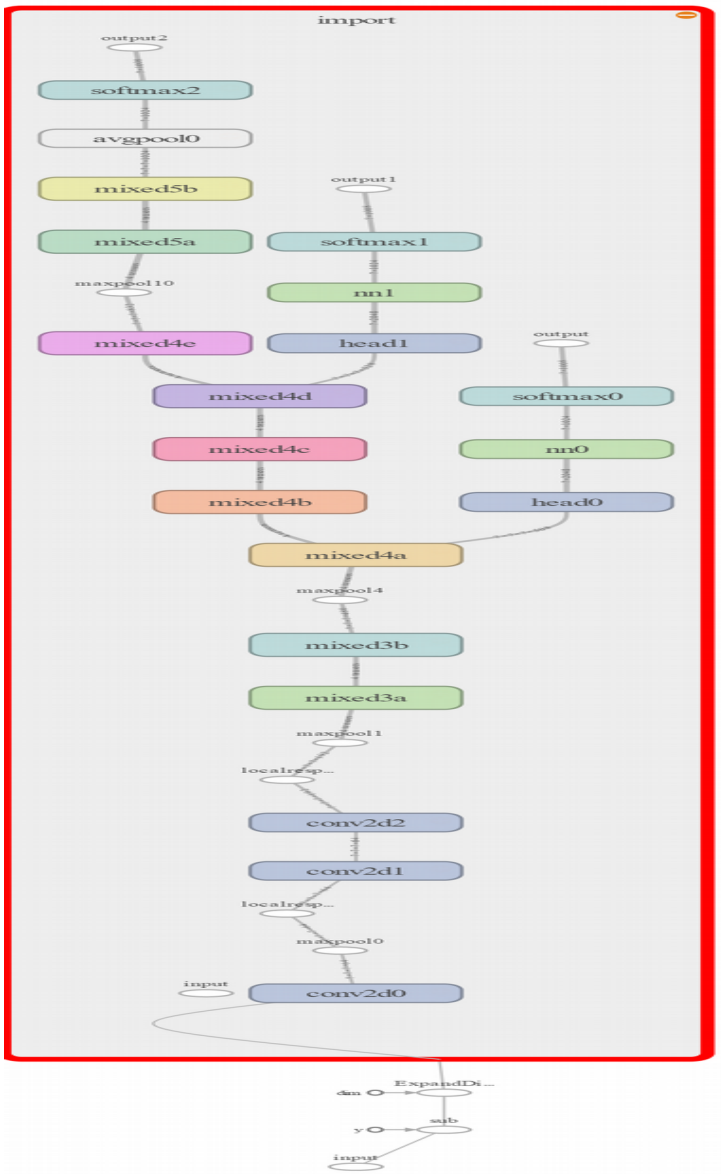
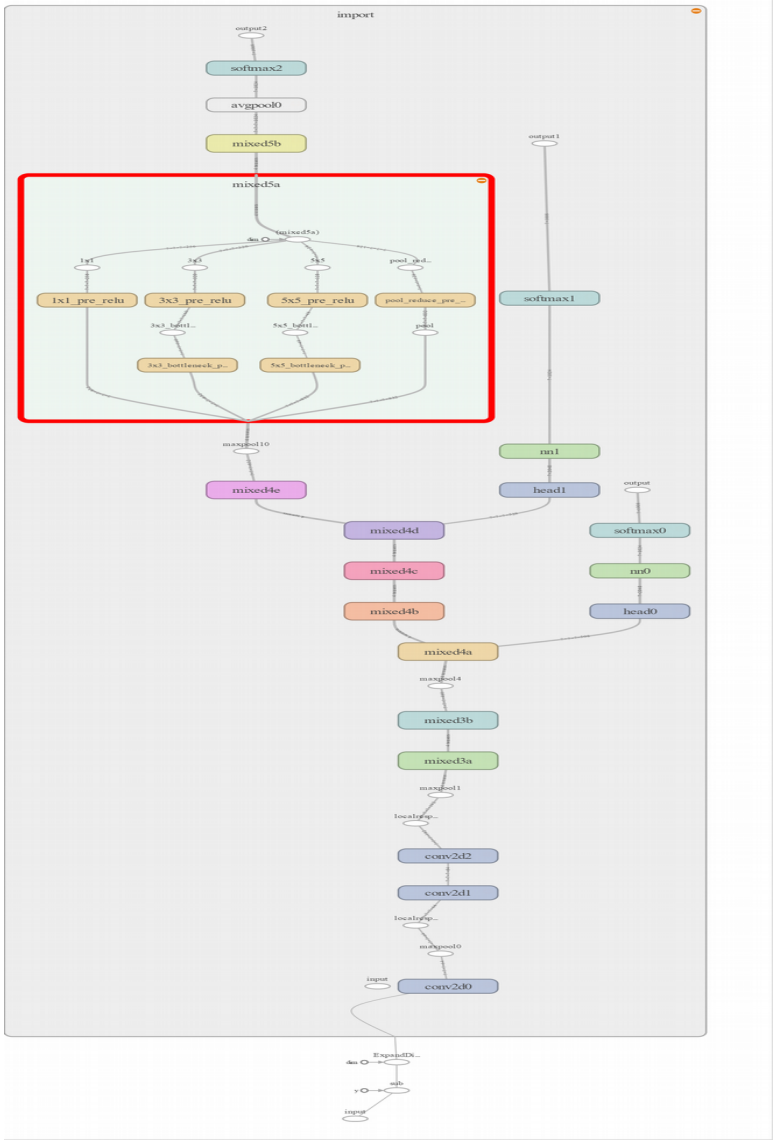
Deep Dream(Yiming Liu)



GoogLeNet


import
output2
softmax2
avgpool0
mixed5b
mixed5a
maxpool10
mixed4e
output1
softmax1
nn1
head1
output
softmax0
nn0
head0
mixed4d
mixed4c
mixed4b
mixed4a
maxpool4
mixed3b
mixed3a
maxpool1
localresp...
conv2d2
conv2d1
localresp...
maxpool0
input
conv2d0
ExpandDi...
dim
y
sub
input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conv2d1
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ExpandDi...
dim
y
sub
input

How does Deep Dream work ?

- Firstly, feed an image forward
- Secondly, stop at a layer in which we are interested, and begin to back-propagate.
- Lastly, update image based on a gradient ascent process

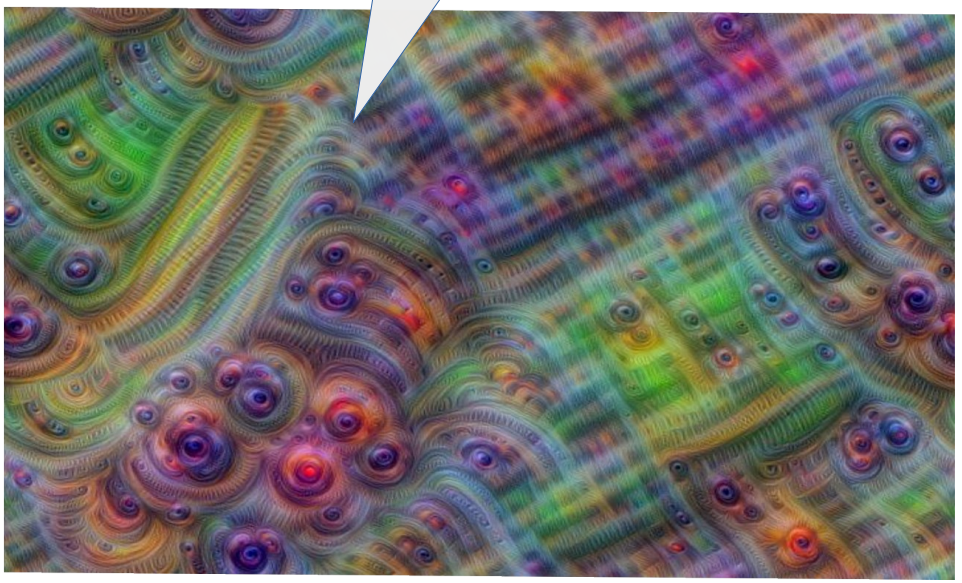
```
def deepdream(t_obj, img0=img_noise,
                     iter_n=10, step=1.5, octav

    t_score = tf.reduce_mean(t_obj) # optimizat
    t_grad = tf.gradients(t_score, t_input)[0]
```

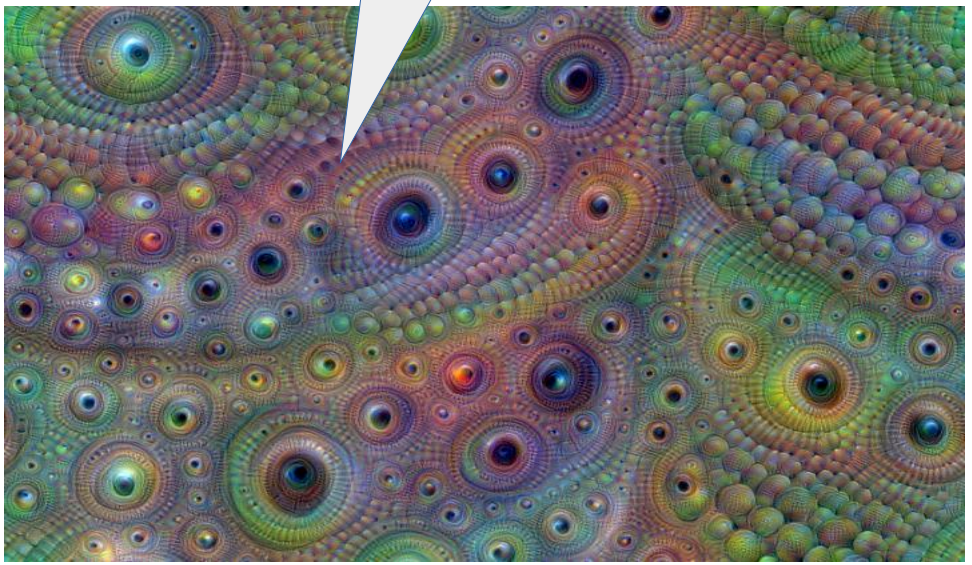
```
for i in range(iter_n):
    g = calc_grad_tiled(img, t_grad)
    img += g*(step / (np.abs(g).mean()+1e-7))
```

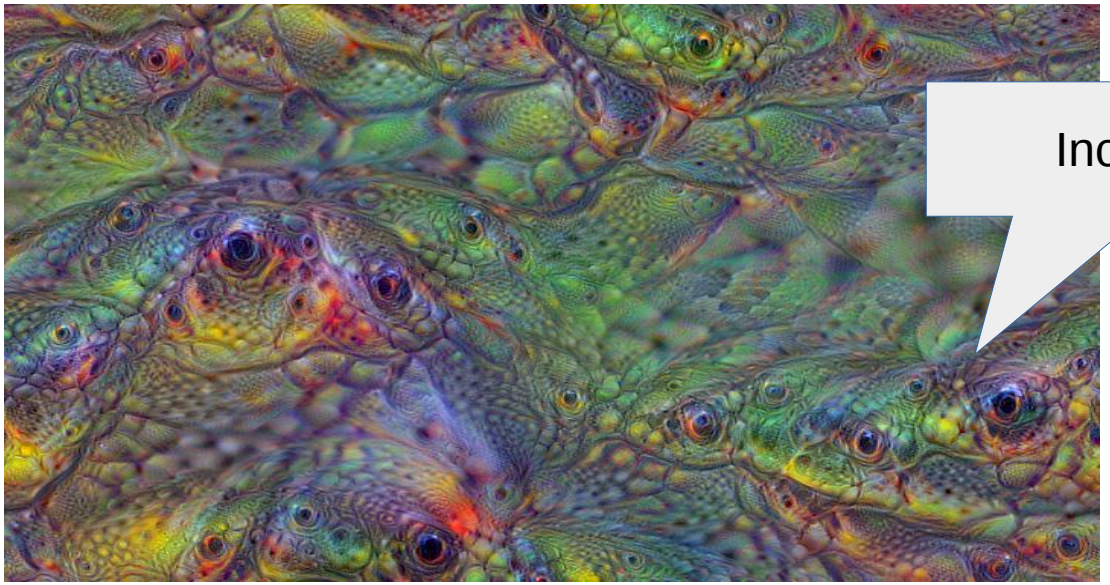
Insights

Inception 3b



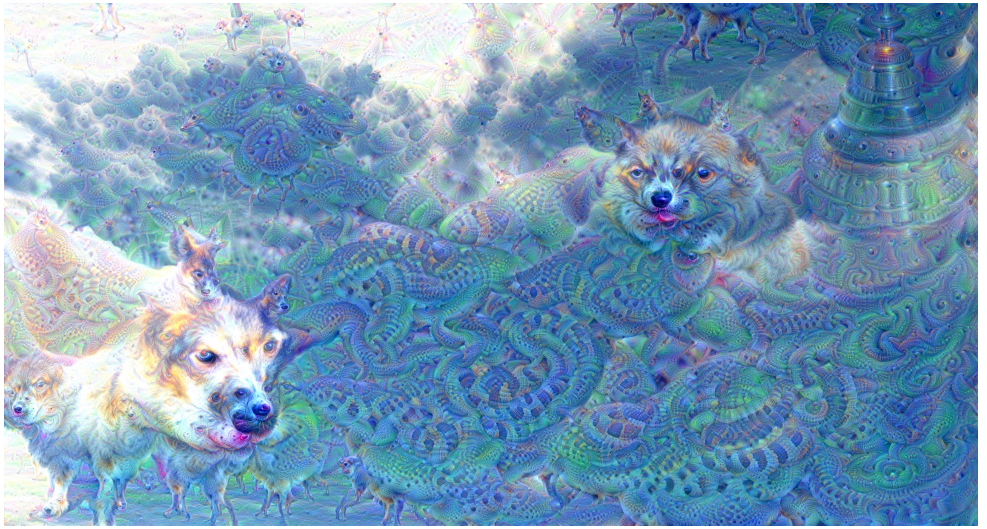
Inception 4b

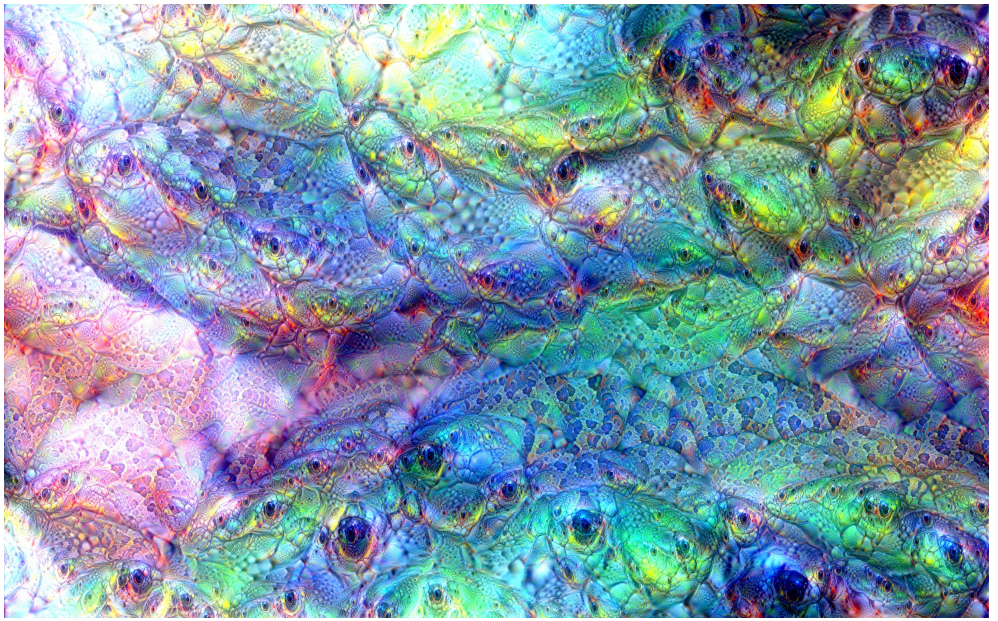




Inception 4d

Dogs Everywhere?

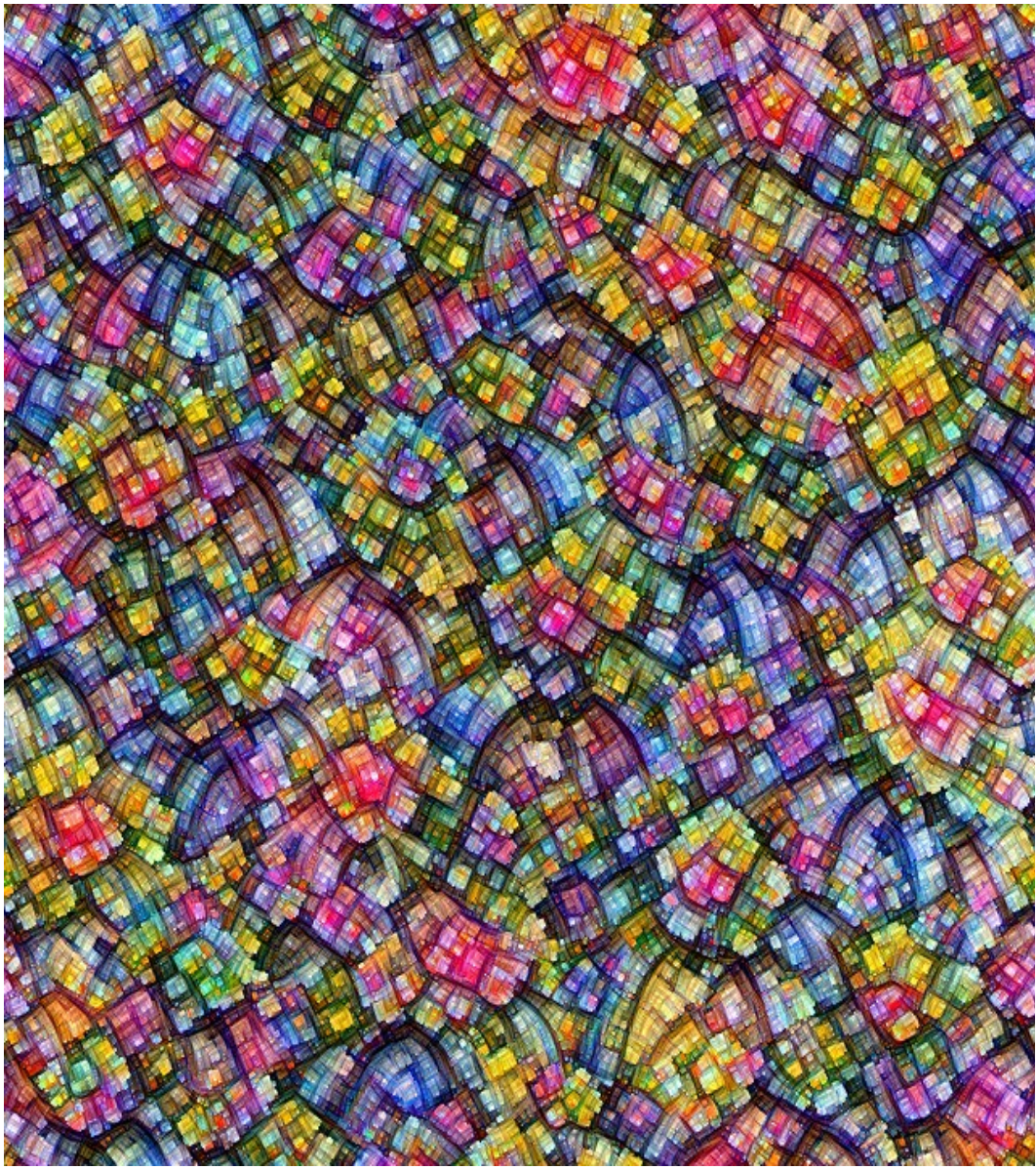


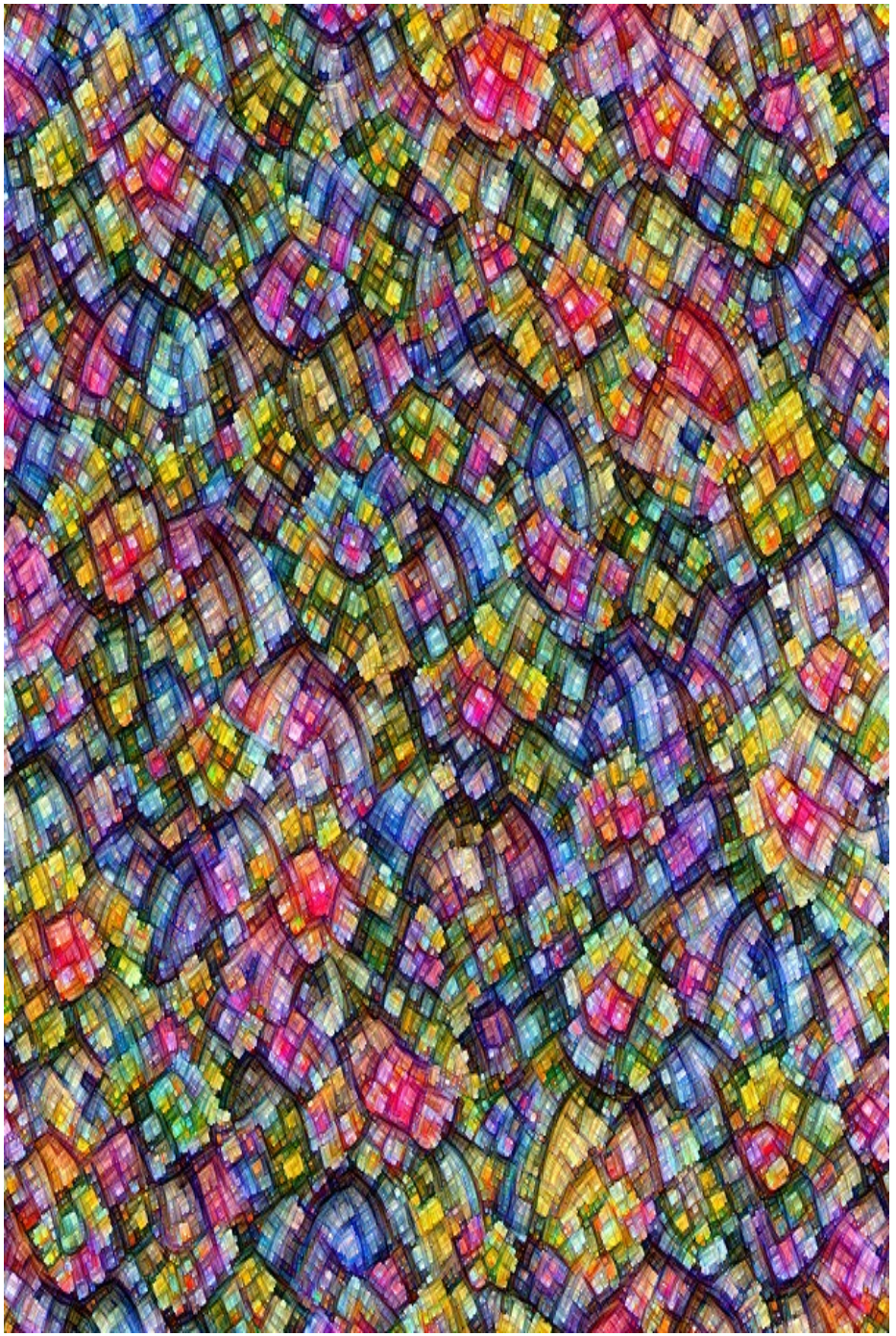


For dog lovers, try inception 4c

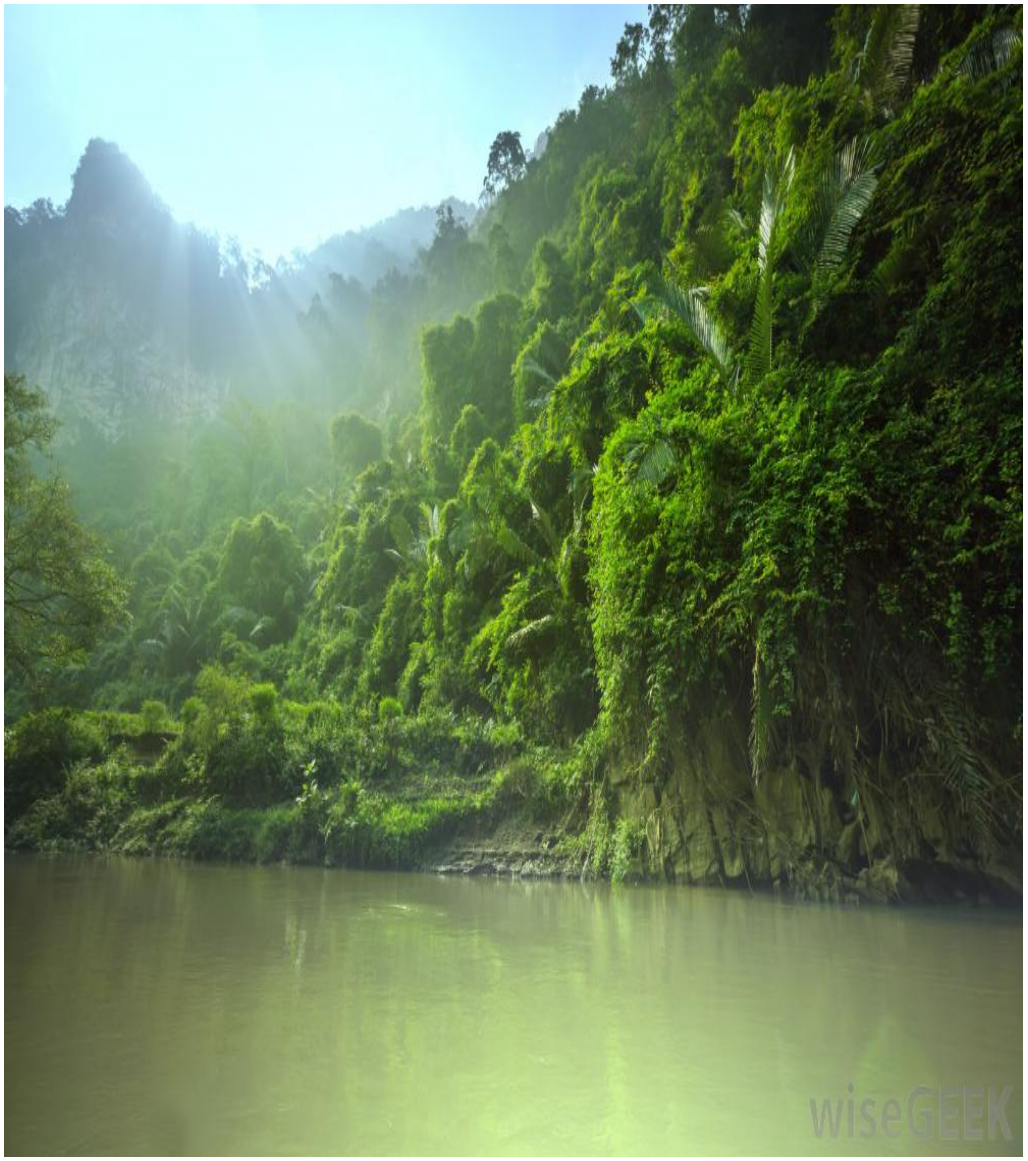
Regularized Dream

- Pick a subset of feature maps, or just a single feature map instead of entire Inception layer

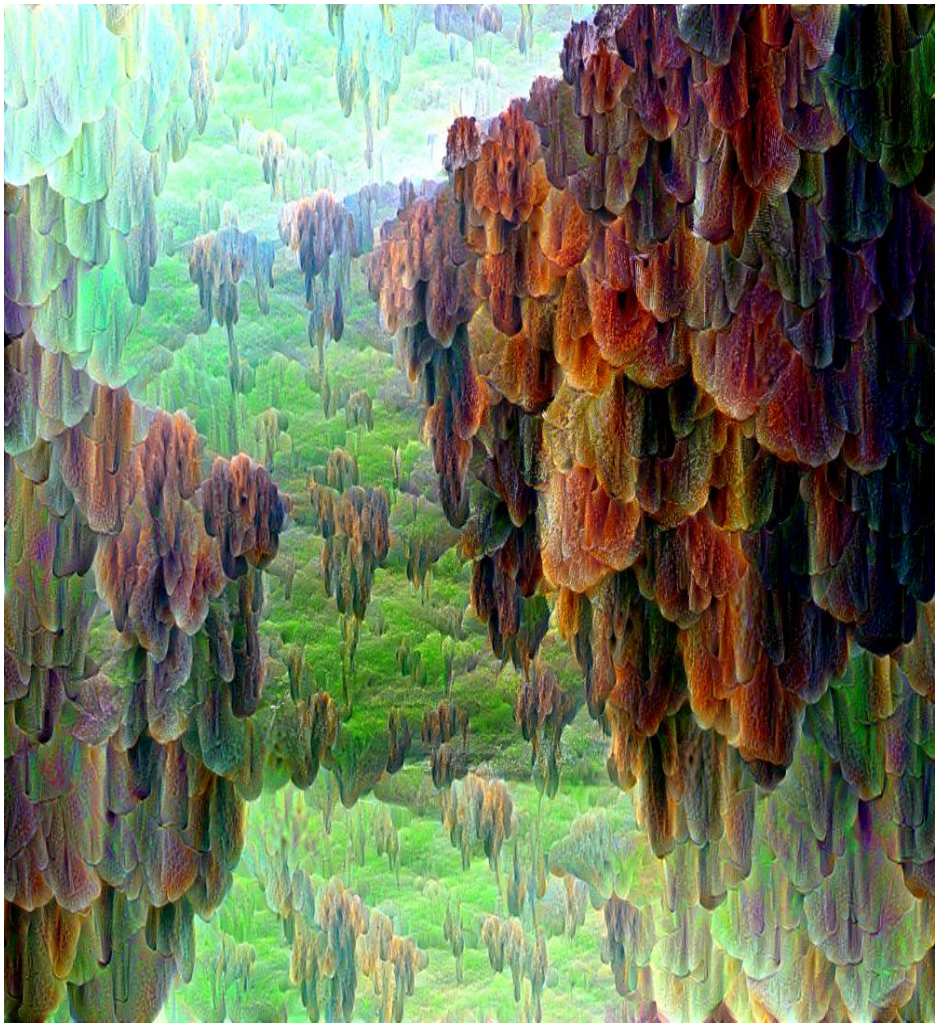




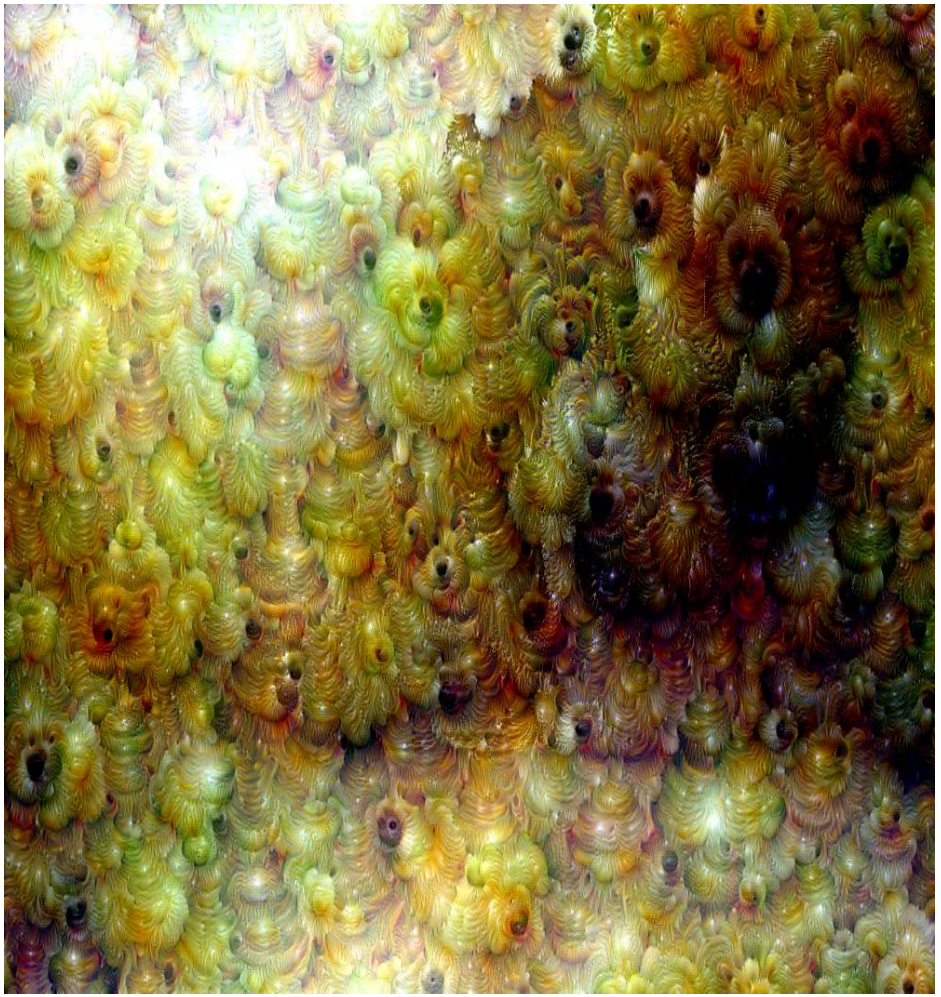
- By experimenting with various feature maps, lots of unexpected imagery can be created



Inception 3b, 20th
Feature map



Inception 4c, 15th
Feature map



Inception 4c, 111th Feature map

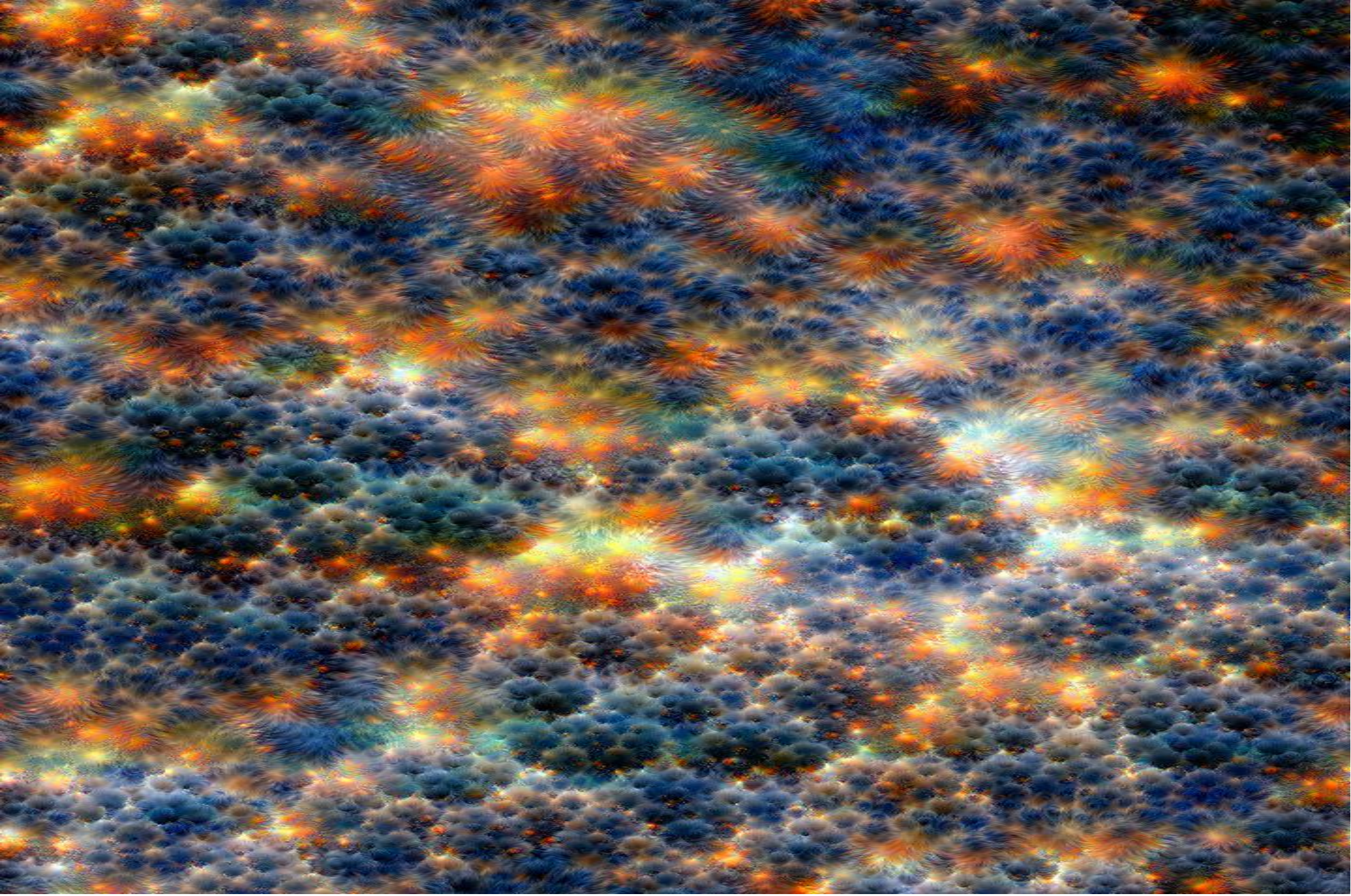
Inception 4d, 77th Feature map

Guided Dreaming

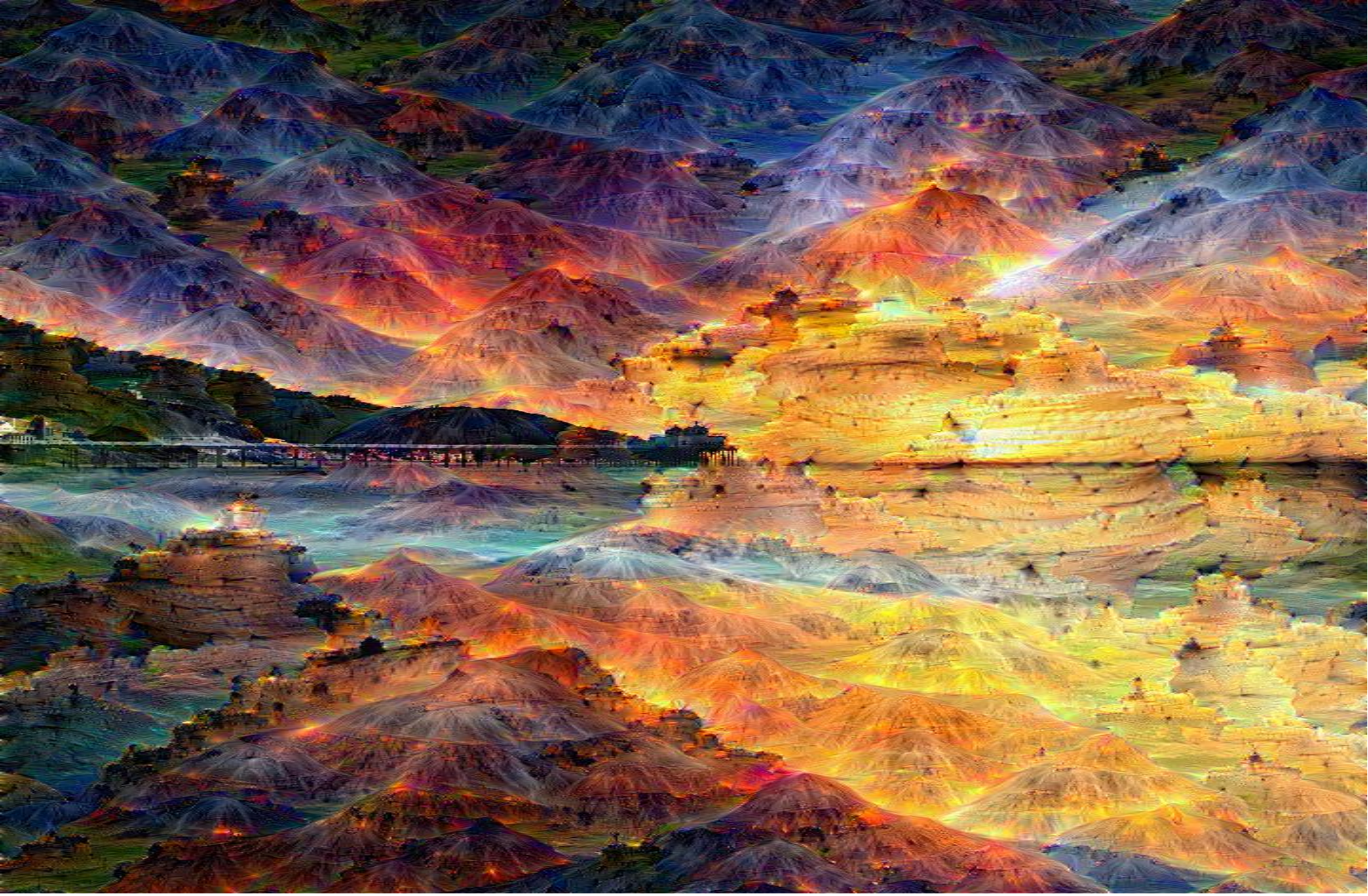
- Similar to Style transfer, we will use a second image to guide what the network should dream

Guide and Target image

Inception 4e



Inception 3b



Inception 4d