

Tutorial 3: Generating *in-silico* microscopy image with different resolution (f_s) and brightness (I_0)

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28 Dec, 2020

1. Generate PSF.

In this tutorial, we will create images for two different f_s and three different I_0 for each f_s . Since we created the PSF for “ $f_s = 800$ ” in Tutorial 1, we can reuse these files. Additionally, we will create images with “ $f_s = 600$ ”. To create PSF with this f_s , we just change the value of f_s in `run_genpsf.py` provided in Tutorial 1, and run it.

```
term$ python run_genpsf.py
```

2. Generate *in-silico* monochrome image data files

This step, is similar to Tutorial 1. Instead of “parameter.dat”, we have two parameter files “param_800.dat” and “param_600.dat”. The file “param_800.dat” is identical to “parameter.dat”. The only difference between “param_600.dat” and “param_800.dat” is the value of “f”. It is 600 in the former and 800 in the later.

The monochrome image data files is created using the commands,

```
term$ ../../gen_mono -p param_800.dat -f dp100.gro -o img100
term$ ../../gen_mono -p param_600.dat -f dp100.gro -o img100
```

3. Generate colored *in-silico* microscopy images

To generate the images with different maximum intensity I_0 and FWHM scaling factor f_s we use the script `gen_I0_fs.sh`,

```
term$ bash gen_I0_fs.sh
```

In the script, value of f_s is changed using the replace function of `sed`,

```
sed 's/fs=.*fs=600/g' png_param.dat > foo.dat
sed 's/fs=.*fs=800/g' png_param.dat > foo.dat
```

Similarly value of I_0 (both $lam1$ and $lam2$) is changed using replace function of `sed` over a for loop,

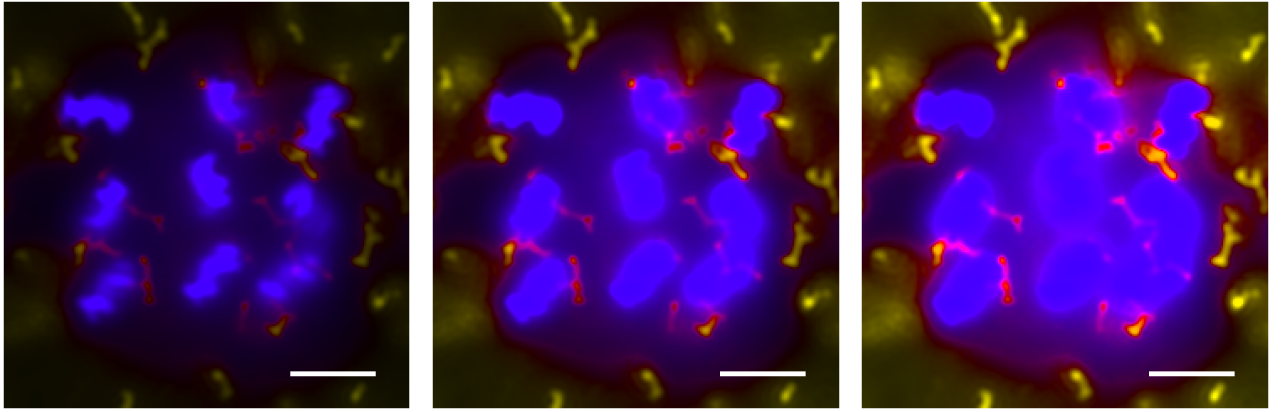
```

for I0 in 0.1 0.2 0.3
do
    sed -i "s/lam1_I0=.* /lam1_I0=$I0/g" foo.dat
    sed -i "s/lam2_I0=.* /lam2_I0=$I0/g" foo.dat
    python ../../mono2color.py -f img -p foo.dat -t 100
done

```

This creates PNG files: img100_fs600_T1_I_0.1_0.1.png, img100_fs600_T1_I_0.2_0.2.png, img100_fs600_T1_I_0.3_0.3.png, img100_fs800_T1_I_0.1_0.1.png, img100_fs800_T1_I_0.2_0.2.png, and , img100_fs800_T1_I_0.3_0.3.png.

Images for $f_s = 600$: $I_0 = 0.1$ (left), 0.2 (middle), and 0.3 (right)



Images for $f_s = 800$: $I_0 = 0.1$ (left), 0.2 (middle), and 0.3 (right)

