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

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1. Generate PSF.

   In this tutorial, we will create images for two different fs and three different I_0 for each f_s. Since we created the PSF for "fs = 800" in Tutorial 1, we can reuse these files. Additionally, we will craete images with "fs = 600". To create PSF with this fs, we just change the value of fs 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 fs is changed using the replace funciton of sed,

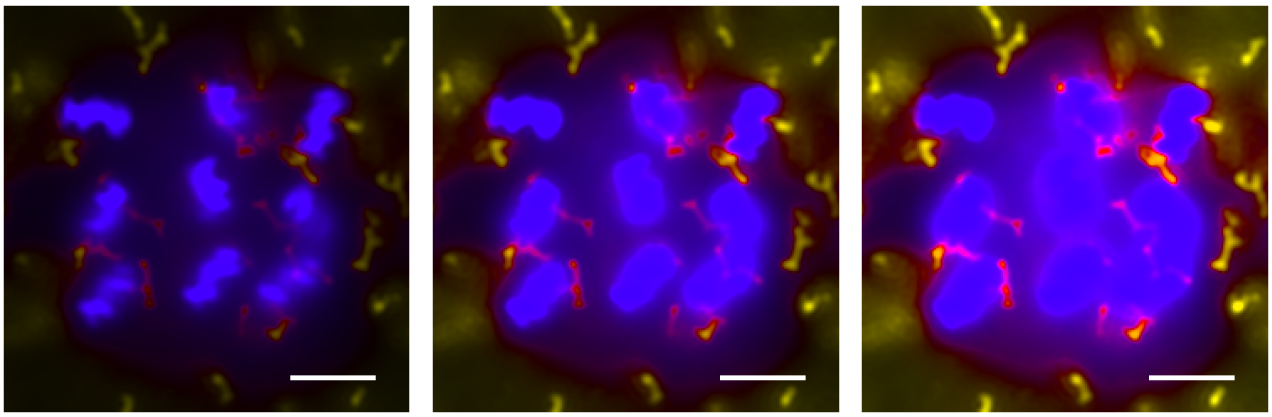
   ```
   sed 's/fs=.*/fs=600/g' png_param.dat > foo.dat
   sed 's/fs=.*/fs=800/g' png_param.dat > foo.dat
   ```

   Similarly value of I0 (both lam1 and lam2) is chaned 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)