

Tutorial 4: Generating *in-silico* microscopy image with different optical axis and focus coordinate

Subhamoy Mahajan

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1. Generate PSF.

PSF files generated in Tutorial 1 is used.

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

The monochrome image data files is created using the script “gen_imgdat_xyz.sh”,

```
term$ bash gen_imgdat_xyz.sh
```

The optical axis and focus coordinate in parameter.dat is changed using sed,

```
for dir in 0 1 2
do
    sed "s/opt_axis = ./opt_axis = $dir/g" parameters.dat > foo.dat
    for val in 3 6 9
    do
        sed -i "s/focus_cor = ./focus_cor = $val/g" foo.dat
        ../../gen_mono -f dp100.gro -p foo.dat -o img_${dir_name[$dir]}${val}_100
    done
done
```

This creates image data files, img_x3_100_lam518_fs800.dat, img_x3_100_lam670_fs800.dat, img_x6_100_lam518_fs800.dat, img_x6_100_lam670_fs800.dat, img_x9_100_lam518_fs800.dat, and img_x9_100_lam670_fs800.dat for x as the optical axis. Similar files are generated for y and z axis as the optical axis.

3. Generate colored *in-silico* microscopy images

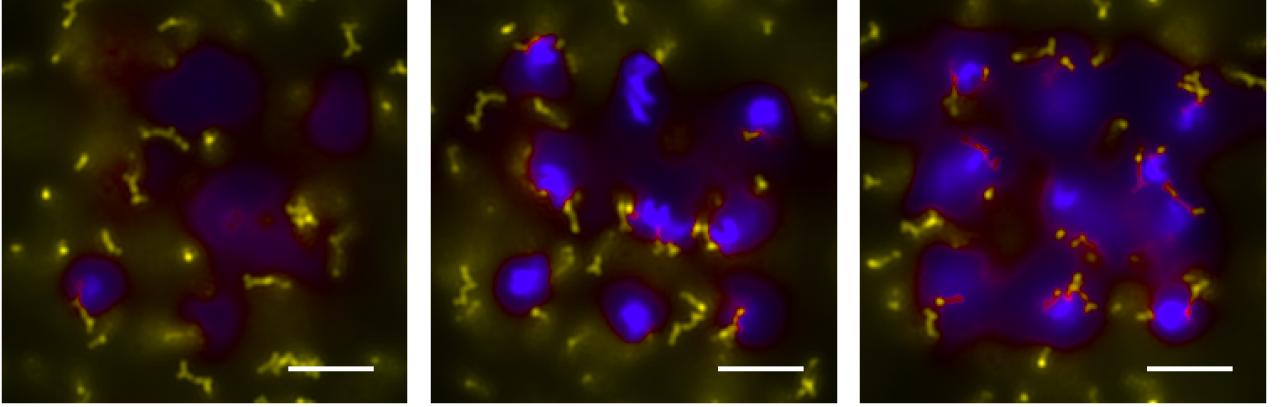
The generation of colored microscopy images is similar to Tutorial 1. It is achieved through the script gen_png_xyz.sh.

```
term$ bash gen_png_xyz.sh
```

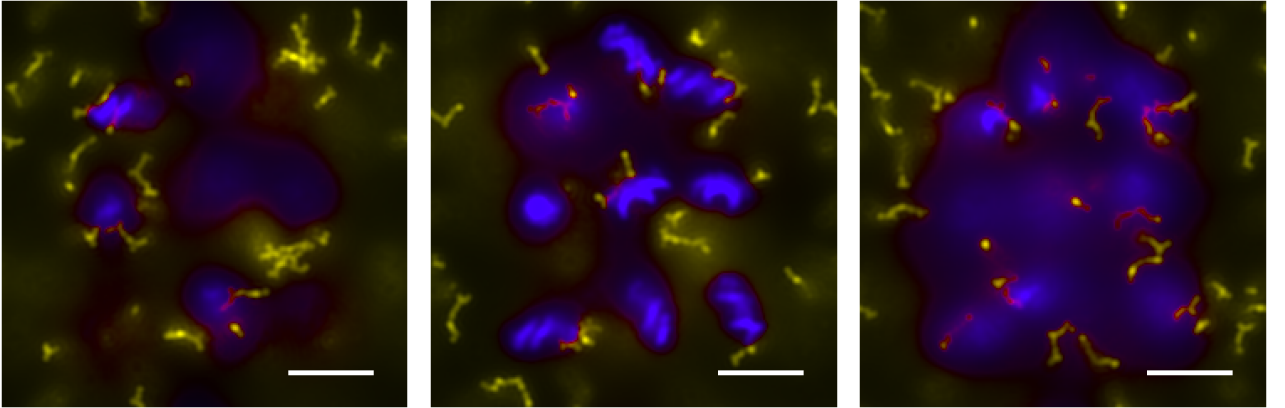
No changes in png_param.dat is required.

This creates PNG files: img_x3_100_fs800_T1_I_0.13_0.25.png, img_x6_100_fs800_T1_I_0.13_0.25.png, img_x9_100_fs800_T1_I_0.13_0.25.png for x as the optical axis. Similar files are generated for y and z axis as the optical axis.

Images for $\text{opt_axis} = n = x$: focus_cor = $n_O = 3$ (left), 6 (middle), and 9 (right)



Images for $\text{opt_axis} = n = y$: focus_cor = $n_O = 3$ (left), 6 (middle), and 9 (right)



Images for $\text{opt_axis} = n = z$: focus_cor = $n_O = 3$ (left), 6 (middle), and 9 (right)

