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

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28 Dec, 2020

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

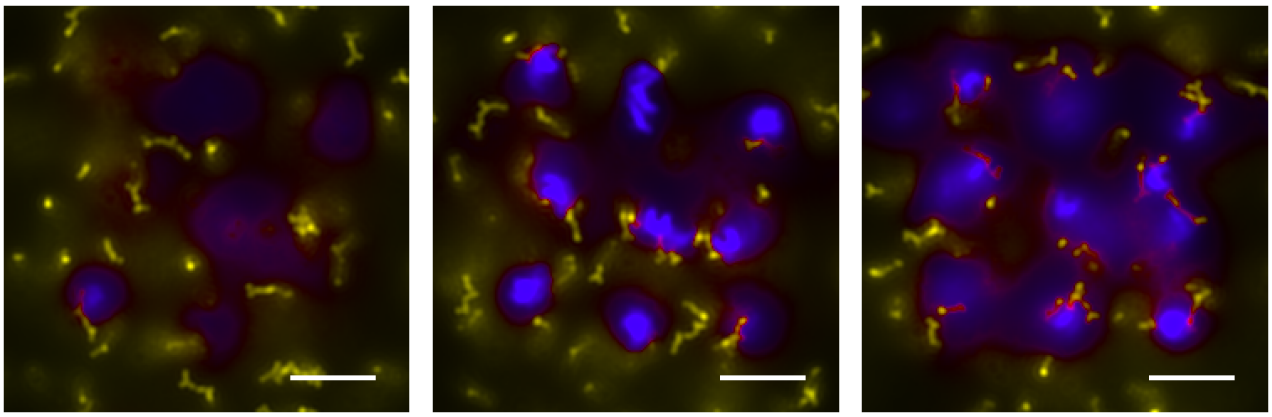
   The generation of colored microsocpy images is similar to Tutorial 1. It is achieved through the script gen_png_xyz.sh.

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

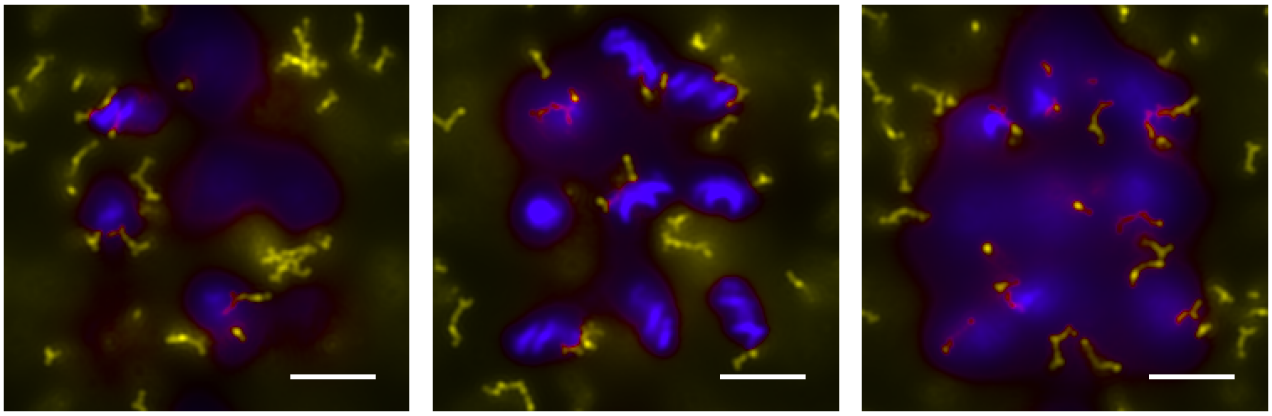
No changes in png_param.dat is required.

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



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



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