# **COEDES Hands on**

## <u>Intro</u>

This document contains a simple hand on instructions that will help the user in using COEDES Matlab interface.

### **COEDES step by step**

- 1. Copy the COEDES source code to your area.
- 2. Add the folder src0 folder and its subfolder to the Matlab path.



3. Right click on the simGui.m file under src0 folder then click Run.

randpdf.m removeAfterLastDelem.pl saveDataAsBinary.m SearchLine.m sequentialDirectoryCreate.m sequentialFileCreate.m		
📓 simGui.ng	Open	Enter
🚵 simulator.fig	Open as Live Script	
👰 simulator.m	Hide Details	
🚈 tif2mat.m	Run	F9
🔤 tmp.m 🔊 ToColumnVector m	Run Script as Batch Job	
ToRowVector.m	View Help	F1
SOFISimulator3.rar	Show in Explorer	
🗄 🖬 src0.zip		
simGui.m (Function)	Create Zip File	
MATLAB code for simGui fig	Rename	F2
	Delete	Delete
simGui(varargin) simGui OpeningEcn(bObject eventdata b)	C	
simGui_Openingi ch(hObject, eventdata, hi simGui OutputEcn(hObject, eventdata, har	Compare Selected Files/Folders	
testButton_Callback(hObject, eventdata, hat is a second	Compare Against	>
🕘 runButton_Callback(hObject, eventdata, ha	Cut	Ctrl+X
browseButton_Callback(hObject, eventdata	Сору	Ctrl+C

4. In the open window click browse to choose the configuration file you wish to run the simulator with.

承 simGui		_	×
	SOFI Simulator UI		
Basic Configuration			
Confgis File Path		Brows	e
Simulation Options	Gpu Actions Test Run		

- 5. Check/Uncheck the desired options under the Simulation Options section in the Gui above.
- 6. Click test to display a randomly generated image based on the supplied configurations.
- 7. Click run to start the simulation.

#### **Configurations file hands-on**

The simulator configurations file is a simple .txt file that contains a set of assignments to parameters that are recognized by the simulator.

Each line of assignments should end by a ";", any data in the line that found after the ";" would be considered as comments.

A line comment can be started with %.

Please refer to table 3.1 in the project report for a full description of the configuration file.

Variable Name	Description
frames_number	The number of frames of the generated movie.

FOV	The FOV size in [nm] – we only use squared FOV.
output_directory	A full path string to the directory that the simulator
	output would be saved to.
log_file_name	The log file name, log files are located under Bin/Logs,
	if a log with this name already exist the log file would
	contain sequential number.
patern_file_path	A full path string to the file that contains the pattern
	data from which the movie will be generated from.
sample_size	The "Ground Truth" the object size in pixels.
quantom_dots_number	The number of quantum dots in the sample – this
	option can be replaced by defining the FOV and density
	of emitters' variables.
density	The density of quantum dots in [nm^2]
psf_file	A full path string to the file that contains the PSF image.
uncertinity	The uncertainty of the distribution function in terms if
	[nm].
tau_on	The life expectancy of the on-state of illuminating cell
	in [sec].
tau_off	The life expectancy of the off-state of illuminating cell
	in [sec].
cam_bin_level	The binning level of the camera simulator.
cam_noise_mean	The mean value of the Gaussian noise of the camera
	model.
cam_noise_var	The variance if the Gaussian model of the camera.
out_format	The output files format – string from {mat, txt, tif} that
	the output files would be saved in.
DC_level	The dc level of the simulation should be normalized to
	[0 1] interval.
out_of_focus_layers	The number of out of focus layers in the simulation.

#### **Configurations file example**

sampleCfg.txt :

```
log file name = sampleCfg;
patern file path = C:\COEDES\Bin\Cellular_structures\MicroT_test.mat;
patern file path sec = C:\COEDES\Bin\Cellular structures\MicroT test4.mat;
sample size = [512, 512];
frames number = 10;
quantom dots number = 1000;
density = 20;
FOV = 5120;
output directory = C:\COEDES\Bin\Outputs\MicroT test;
psf file = C:\COEDES\Bin\PSFGenerator\latest psf.mat;
uncertinity = 100;
tau on = 1.4;
tau off = 1.4;
cam noise mean = 0.01;
cam noise var = 0.0001;
cam bin level = 4;
mode = data;
out format = tif;
DC level = 0.01;
out of focus layers = 4;
```

running the simulator with those configurations will yield the following files:



#### Helper scripts

The file BatchProcess.m demonstrates how to use COEDES without the given UI, as it runs the simulator routinely with a change of a given parameter's value in each iteration.

Please refer to the code in the file BatchProcess.m for extra info.