**Fluocell – Diffusion Module User’s Guide**

**Installation**

1. Download and unzip the diffusion module to a folder on your computer, for example, in the folder “D:\sof\diffusion\_analysis\”. Download the sample data from this web link (<http://wang.ucsd.edu/~kalu/index.php> ) to a local folder that is readable by the user, say, “D:\sof\data\diffusion\_sample\”.
2. Add the paths of diffusion module source code to MATLAB to allow recognition. In MATLAB, select: File 🡪 Set Path 🡪 Add Folder with Subfolders 🡪 “D:\sof\diffusioin\_analysis\src” , and “D:\sof\diffusion\_analysis\app”.
3. Edit the file “sample\_diffusion\_init\_data.m” such that the line

root = 'D:\sof\data\diffusion\_sample\' ;

is changed to the current location of your sample data;

**Unit test**

>> cd diffusion\_analysis/app

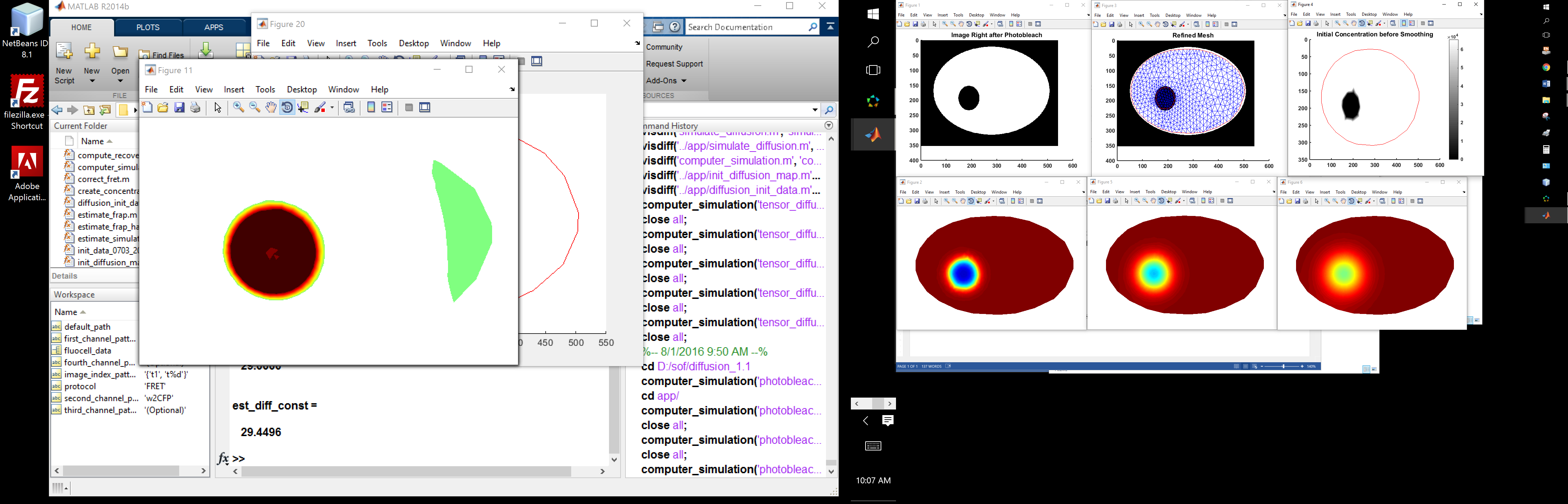
>> test\_diffusion\_analysis();

**Forward Simulation**

>> cell\_name = 'photobleach\_cell';

>> data = sample\_diffusion\_init\_data(cell\_name);

>> data = computer\_simulation(data, 'dt', 0.25, 'simulation\_time', 40);

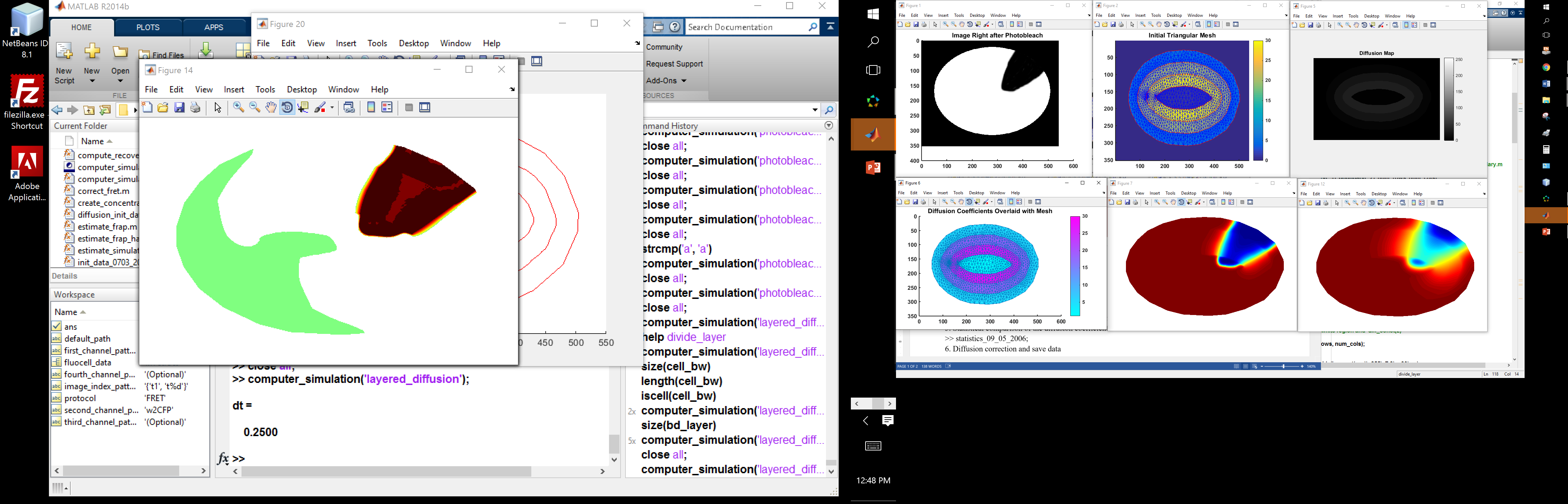


The parameter information of the FRAP and FRET experiments can be found in the database file: sample\_diffusion\_init\_data.m

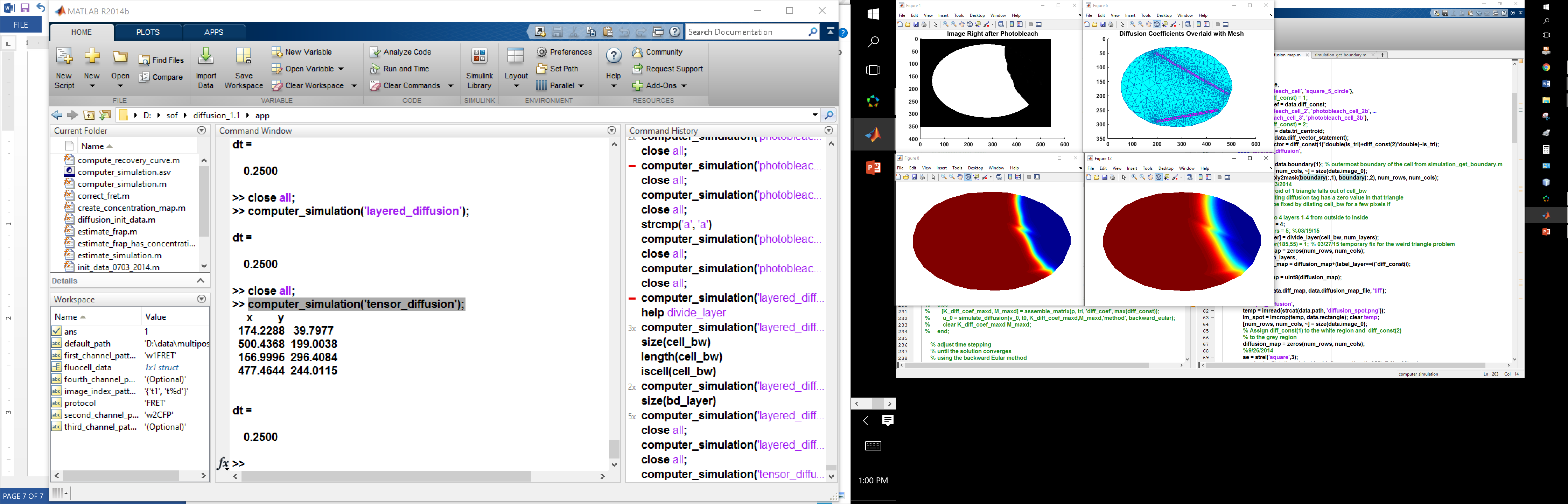
>> close all; clear all;

>> data = sample\_diffusion\_init\_data('layered\_diffusion');

>> computer\_simulation(data, 'dt', 0.25);



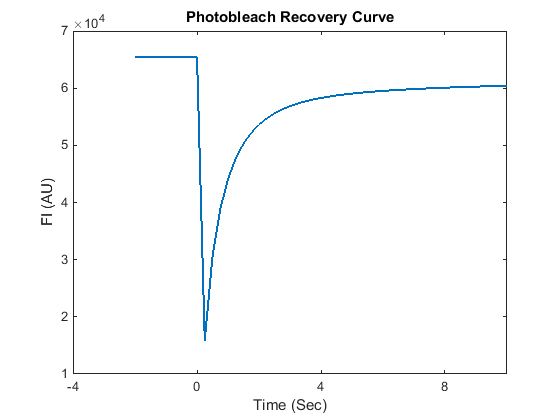
>> data = sample\_diffusion\_init\_data('tensor\_diffusion');

>> computer\_simulation(data, 'dt', 0.25);

Note that the results has been pre-generated by previous commands.

>> data = sample\_diffusion\_init\_data('photobleach\_cell');

>> data = computer\_simulation(data, 'dt', 0.25, 'simulation\_time', 40);

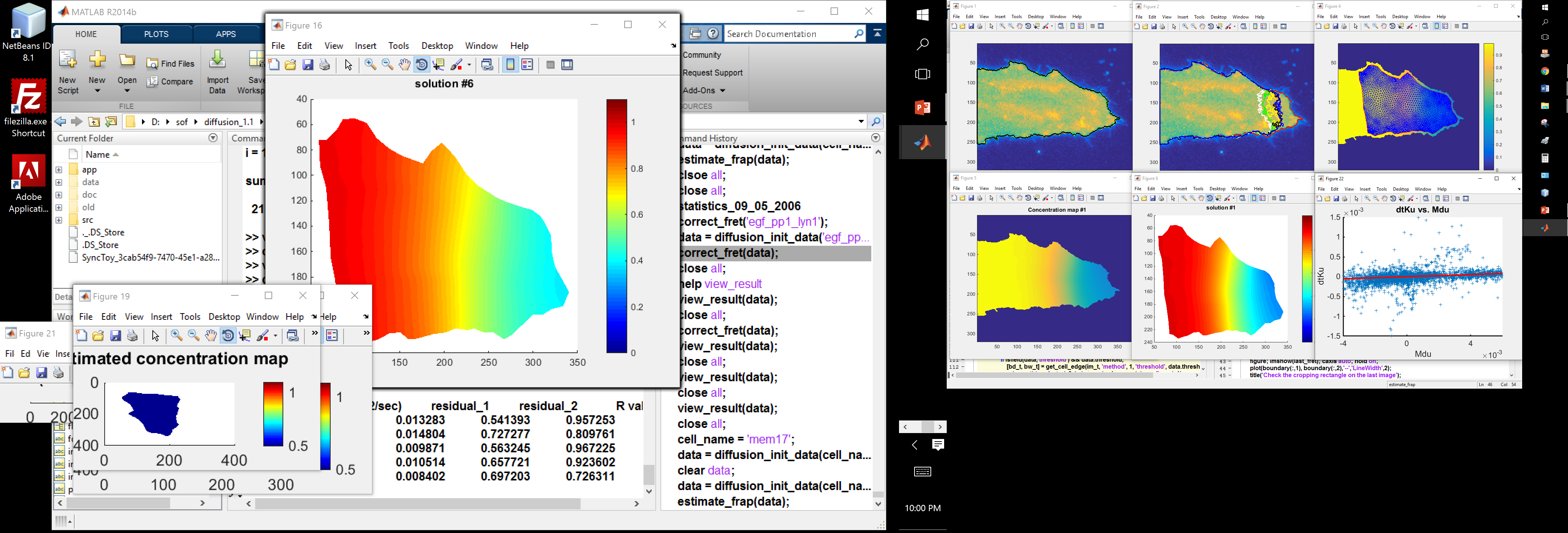
>> compute\_recovery\_curve(data);

**Estimate diffusion coefficients based on frap imaging experiment results**

>> cell\_name = 'mem17';

>> data = sample\_diffusion\_init\_data(cell\_name);

>> estimate\_frap(data);



Statistical comparison of the diffusion coefficients.

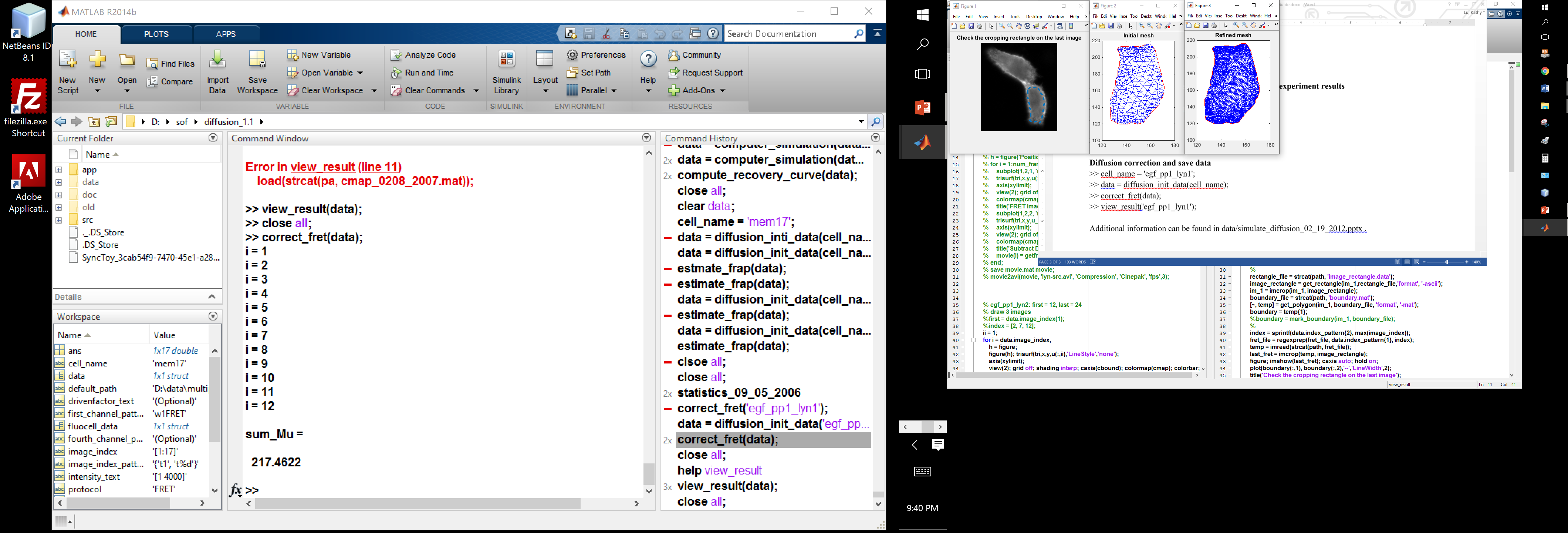
>> statistics\_0905\_2006;

**Diffusion correction and save data**

>> cell\_name = 'egf\_pp1\_lyn1';

>> data = sample\_diffusion\_init\_data(cell\_name);

>> correct\_fret(data);



>> view\_result(data);

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| Fig. 1 | Fig. 13 | Fig. 26 |