CellOrganizer 1.9.0 Release Notes

March 17, 2013
http://cellorganizer.org

New features

1. 3D cell frameworks (cell boundary and nuclear boundary) can now be synthesized not only from the original parametric models (cylindrical spline surface [CSS] model and cell/nucleus ratio [CNR] model) but from non-parametric diffeomorphic shape models (using Large Deformation Diffeomorphic Metric Mapping [LDDMM]).

2. 3D pattern instances drawn from models generated at different resolutions can now be combined within a single framework. The model format has been updated to include the resolution.

3. Users can now choose which components of an instance they wish to output. For example a user may choose to output only nuclear shape instances, cell shape instances, or frameworks in addition to the previous framework and protein pattern option.

4. 3D models can now be learned from only single channel images. If the same image is provided as the "cell boundary" image and the "protein pattern" image, a CSS model will be built by fitting an active shape model around the "outside" of the fluorescence, a DNR model built by fitting an active shape model to the nuclear "hole", and then the chosen model type (e.g., Gaussian object) will be fit to the single channel image. The next release will contain a demo script to illustrate this process.

Bug fixes

Major speed improvements in 2D model training.
Debug and Verbose parameters now accept logical, numerical or string input.

Contributors

This release contains contributions from Ivan Cao-Berg, Devin Sullivan, Gregory R. Johnson, Taraz Buck, Bob Murphy and Gustavo Rohde.

Model files distributed with this version

2D HeLa

Models can be found in models/2D/

Filename	Description
Included in model structure of pattern files	MAS (medial axis spline) and CNR (cell/nucleus ratio) framework models
Nucleolus.mat	Nucleoli
Lysosome.mat	Lysosomes
Endosome.mat	Endosomes
Mitochondrion.mat	Mitochondria

3D HeLa

Models can be found in models/3D/

Filename	Description
Included in model structure of pattern files	CSS (cylindrical spline surface) and CNR (cell/nucleus ratio) framework models
diffeomorphic.mat	LDDMM combined framework model
Nuc.mat	Nucleoli
Lamp2.mat	Lysosomes
Tfr.mat	Endosomes
Mit.mat	Mitochondria
Centro.mat	Centrosome
Tub.mat`	Microtubules

Model files planned for distribution with future releases

Additional models will be released shortly. These will include a 3D LDDMM combined framework model for NIH 3T3 cells and a MAS/CNR framework for Chinese Hamster Ovary cells.