

Complete Version Change History up to Version 4.1

PersistenceVersion_4_2 (August, 2016):

1. Fixed more bugs.
2. Improved the user interface for stabilities and visualizations.
3. Improved all three fitting procedure to obtain persistence length. Now can automatically cut the abnormal average cosine correlation data points at long contour length. The abnormal average cosine correlation data points, often going up, at long contour length is due to the bias caused by down sampling because there only few long filaments.

PersistenceVersion_4_0 (July, 2016):

1. Superimposed the skeleton image on top of original image for better visualization.
2. Improved filament pixels smoothing by the continuous third order spline functions.
3. Replaced end-to-end length vs contour length data fitting 3D equation with the 2D version.
4. Changed filament confirmation from left and right mouse button to left and right arrows on keyboard.
5. Several major bugs fixed.

Persistence_V3_2 (April 2015):

1. Minor code changes for optimization.
2. Added filament curvature output in Column 4 of file xxx_ _Nfils_tangent_angles.txt. See the readme file for the complete description of output files.

Persistence_V3_1 (September 2014):

1. Fixed minor bugs.
2. Changes to output files:
 - a. Added frame number (col 15) and filament number in that frame (col 16) to file xxx_ Nfils_bending_modes.txt
 - b. Added frame number (col 4) and filament number in that frame (col 5) to xxx_ _Nfils_tangent_angles.txt
 - c. Added frame number (col 6) and filament number in that frame (col 7) to xxx_ Nfils_contours.txt
 - d. Added standard errors for cosine correlation and the correlation angle. The columns in xxx_ Nfils_ave_Cs.txt are:
Column 1: segment length.

Column 2: averaged cosine correlation values.

Column 3: standard deviation of cosine correlation.

Column 4: standard error of cosine correlation.

Column 5: average relative angle.

Column 6: standard deviation of relative angle.

Column 7: standard error of relative angle.

Column 8: number of raw data points for the corresponding averaged data point.

3. Added complete manual filament reconstruction function. Select "Yes" for "Construct filament manually?"

Persistence_V3_1 (September 2014):

Changes made since version 1:

1. Algorithm has been optimized to improve performance and accuracy of results.
2. Added the option to ignore branches of user-defined size during filament searching. Apparent filament branching seen in images of filaments are usually the result of the interaction of two or more filaments and should not be considered for analysis of single filaments. The previous version of *Persistence* excluded all filaments with branches and crossovers by default. However, apparent branches seen in images of skeletonized filaments are usually artifacts of image processing. In this version, a branch tracking algorithm is implemented allowing the user to specify the size of short branches to be ignored during filament searching.
3. Added the option to allow a single pixel gap during filament searching. Small, low intensity gaps of one or two pixels in filament images create ambiguity whether it is a continuous filament or two separate filaments. Some gaps are image artifacts, while others are due to filaments positioned near each other. Previously, the program treated a single pixel gap as an artifact by default in filament searching. Now users can whether or not to allow a single pixel gap during the filament search.
4. Removed the "single fluctuating filament" question. Calculation of persistence length using end-to-end length distance analysis requires more than two filaments. In the previous version, that analysis could be excluded via the "single filament" pull-down dialog. Version 2 automatically identifies if single or multi-filament analysis is required.
5. Modified some output files to provide more relevant data, as described in the file description files.