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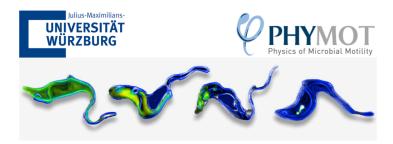
ThirdPeak –a software to process, visualize and analyze tracks in two and three dimensions

Life, as we know it, is sustained but also constrained by Brownian motion and the diffusion of vital nutrients and proteins required for cell growth and survival. The advent of super-resolution microscopy techniques has revolutionized our ability to observe molecular dynamics within cells with improved temporal and spatial resolution. Although tools exist for localizing [1] and connecting tracks [2] in two and three dimensions, visualization and analysis software often only cater to two-dimensional data [3].

To simplify the exploration and analysis of three-dimensional track data, we developed ThirdPeak—a MATLAB-based software with a user-friendly graphical interface. This software offers flexibility by supporting various data formats, accommodating track or localization data from diverse sources and length scales. During preprocessing, users can apply quality filters and correct for drift. Once the results are validated, in-depth analysis becomes possible.

ThirdPeak enables users to select individual tracks, focus on tracks within specific regions of interest, or analyze multiple files concurrently. We have successfully utilized this software to uncover the dynamics within the endosomal system of Trypanosoma brucei. We believe that ThirdPeak can serve as a valuable addition to the workflow of researchers studying similar systems or conducting three-dimensional track analysis.

[1] Ries, J. Nat Methods 17, 870–872 (2020).

[2] swift Endesfelder U. et al., manuscript in prep., beta-testing repository http://bit.ly/swifttracking

[3] Kuhn, T., Hettich, J., Davtyan, R. & Gebhardt, J. C. M. Sci Rep-uk 11, 9465 (2021).

Primary authors: ENGSTLER, Markus (Würzburg university, Würburg, Germany);   MUELLER, Thomas

Presenter: MUELLER, Thomas