

# Tracking of cells in early animal embryogenesis by PDEs methods of image processing and validation of the results

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We present results of the cell tracking by our novel algorithm obtained for large-scale 3D+time microscopy images of early stages of embryo development of various organisms. In our data processing we first start with geodesic mean curvature flow filtering of the raw data [1], then we continue using level-set center detection [2] and then we extract the cell trajectories forming the lineage tree from potential field calculated from combination of distance functions computed inside 4D segmentations of the processed data [3]. By careful choice and tuning of algorithm parameters we can adapt the calculations to the microscope images of different vertebrate species. Then we can compare the results with gold standard tracking obtained by manual checking of cell links by biologists and measure the accuracy of our algorithm. Using visualisation tool displaying our results, gold standard and original 3D images simultaneously we can easily verify the correctness of the tracking.

## References

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