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# Automated tracking and characterization of cell dynamics for classifier models

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**Project Aim** 

Automated characterization of cell tracks based on



interpretable features, in order to construct classifier models based on dynamic cell properties.

### State of the art work

**Cell track description** 



#### **Cell track analysis**

Basic types

- Highly localized migration (HL) max displacement ( $D_{max}$ ) within the course of time less than cell diameter d.
- High-speed linear migration (HsL) track speed of cell not less than one cell diameter per minute; it is possible to fit the track by a line without knots.
- High-speed persistent migration (HsP) speed of cell not less than one cell diameter per minute, direction of migration fairly the same within the course of time.

 $D_{max} < d$ 

 $P(S_i | S_i \in \{0.43, 1, 2, 3\}) = 1$ 

 $P(S_i | S_i \in \{0.43, 1, 2, 3\}) = 1$ *Cr*<0.1



Experiment: polymorphonuclear leukocytes, 9 populations in different conditions<sup>1</sup>



<sup>1</sup>(data from H. Schoeler, MAM HKI)

#### Network

Create and analyze a classifier model, implement tracklet analysis.

Test on various data sets: different cell types in different conditions and different imaging parameters (WP 1-3, 9). Provide results for WP 1-3.

Combine this method with shape descriptors (WP12). Adopt the method to 3D track data, analyze 3D track data (WP 8).