

Study of Swimming Motility in the Bacterium *Pseudomonas extremaustralis* 2E-UNGS

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INTRODUCTION

Pseudomonas extremaustralis 2E-UNGS exhibits both swimming and swarming motility, secretes surfactants and extracellular polymeric substances related to both biofilm formation and cell aggregation. This microorganism was isolated from the highly contaminated Reconquista River basin (Bs. As., Argentina) and reports relevant environmental interest for the metal biosorption from electroplating effluents.

OBJECTIVE

The aim of this work was to deepen in the characteristics of *P. extremaustralis* 2E-UNGS swimming motility integrating experimental observations with computational modelling.

EXPERIMENTAL

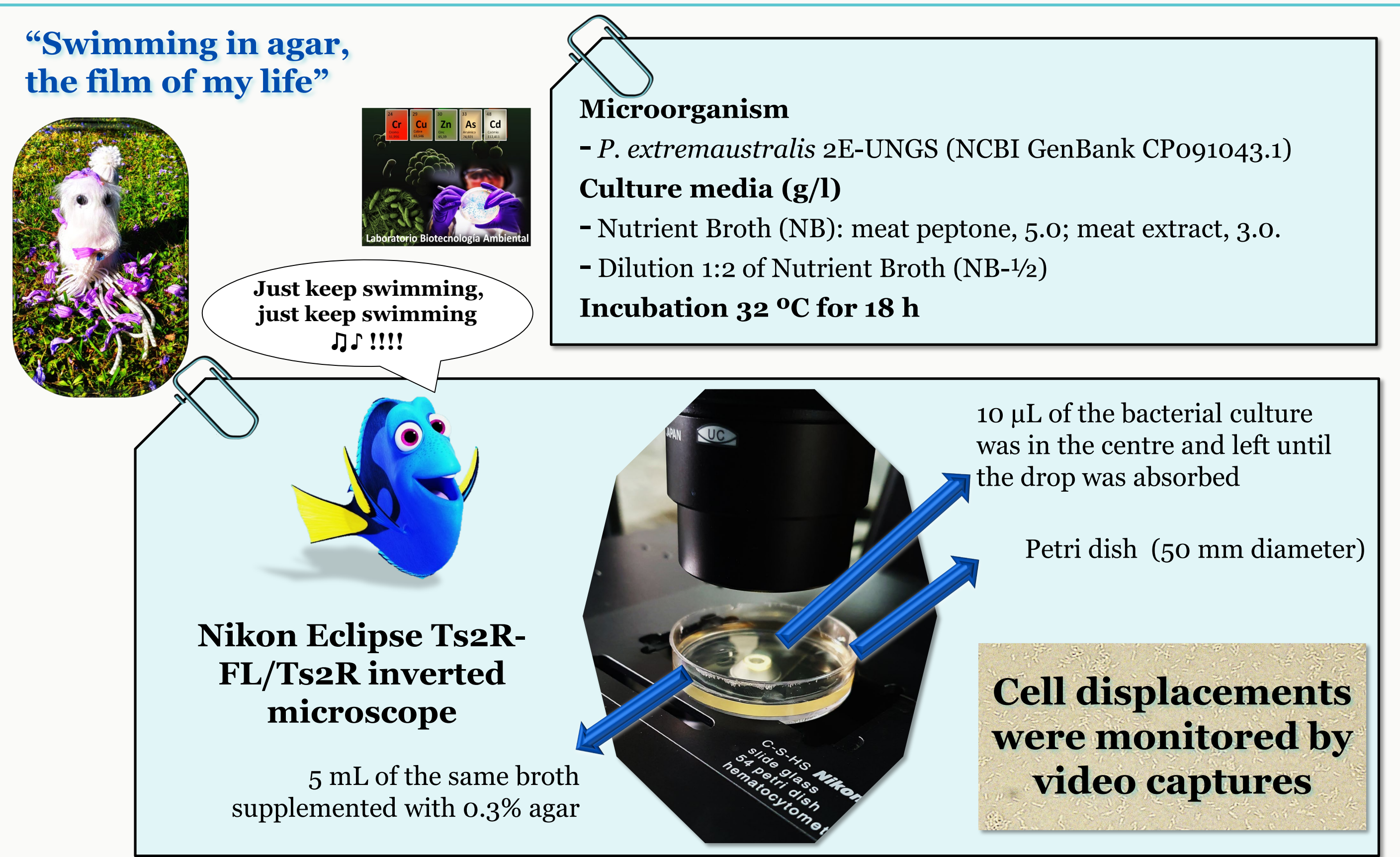


Figure 1: Schematic representation of the experimental procedure.

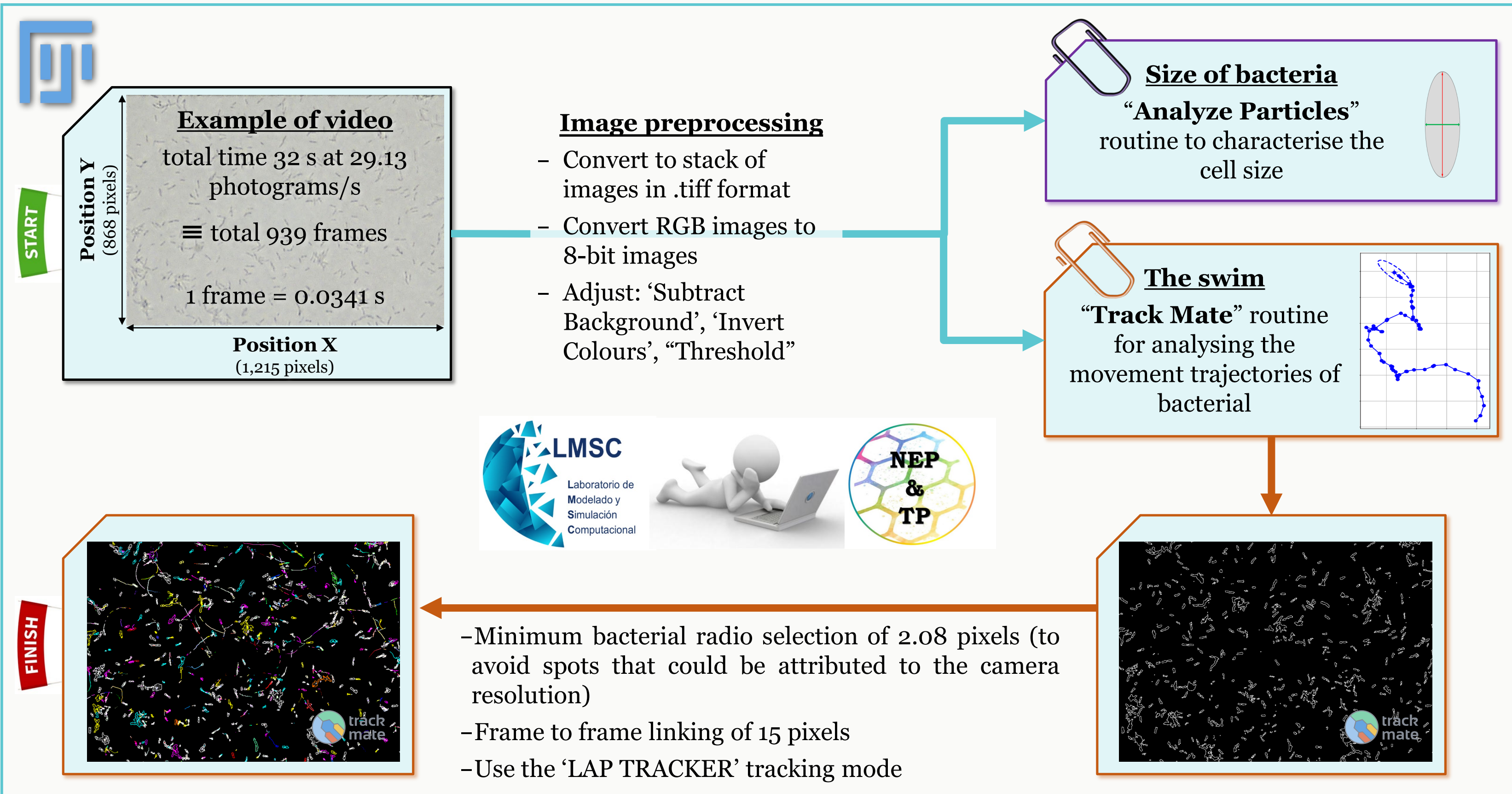
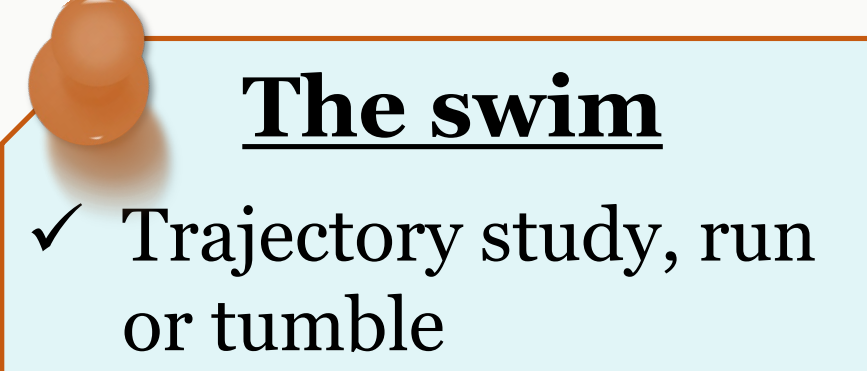
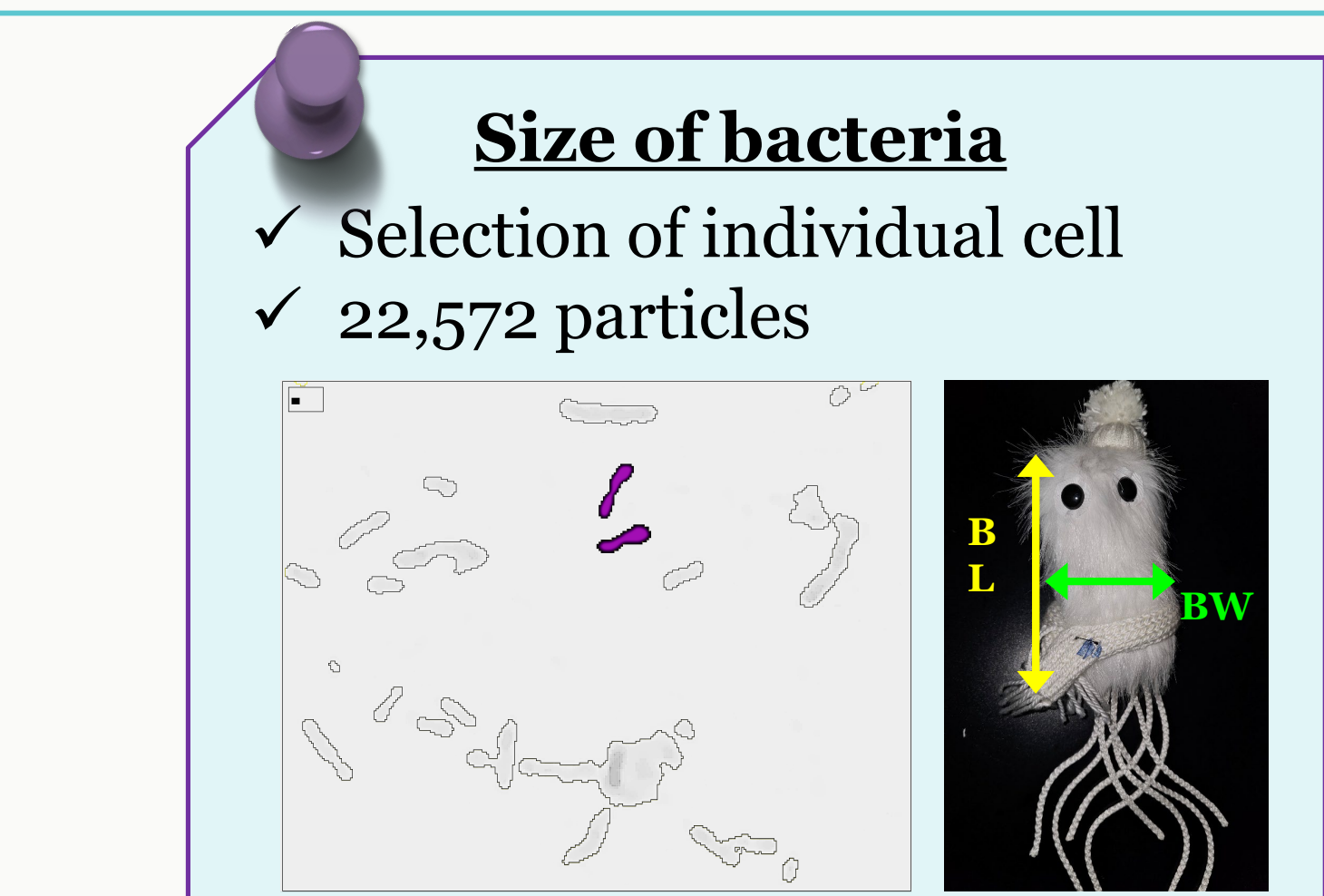


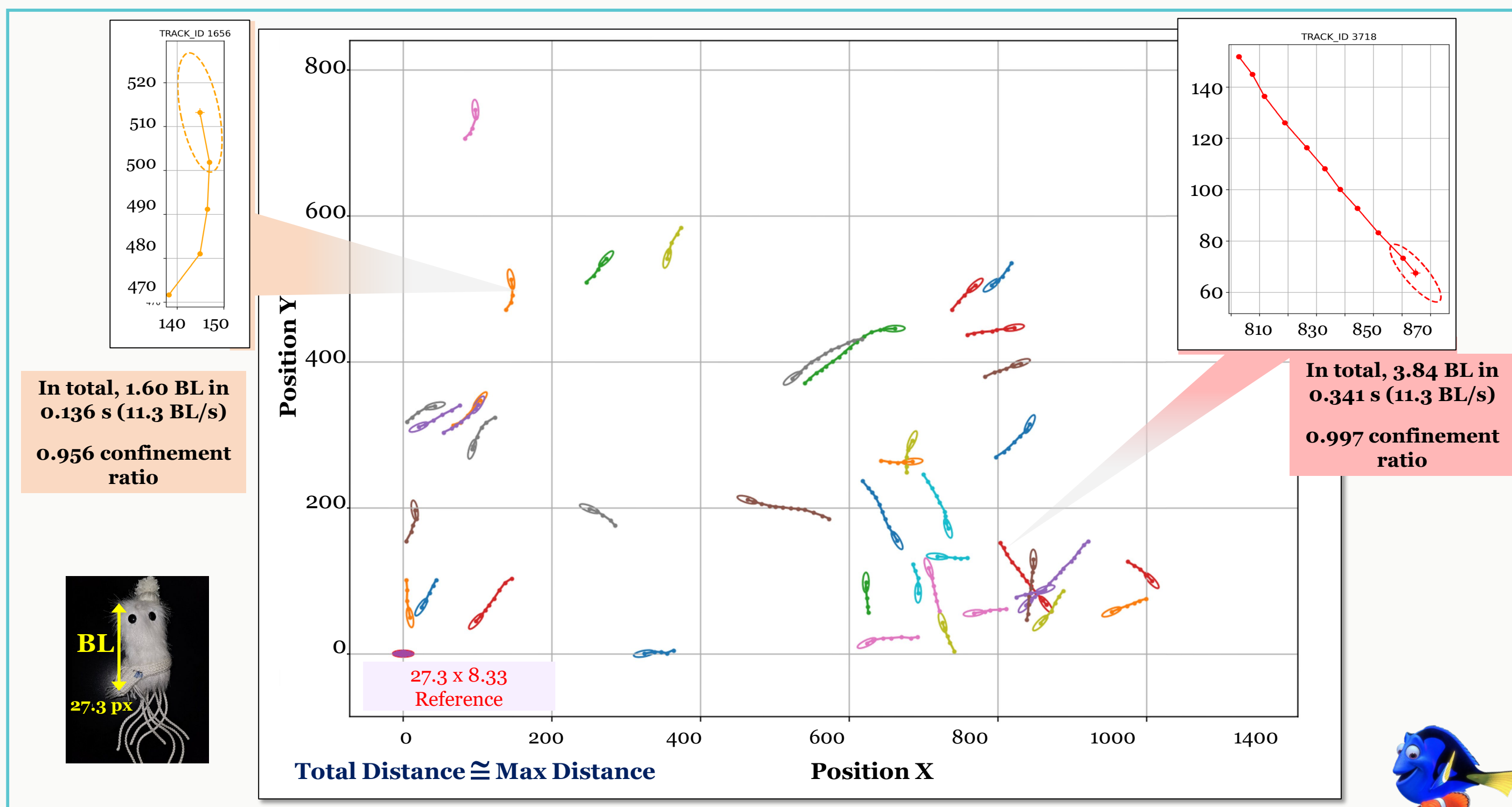
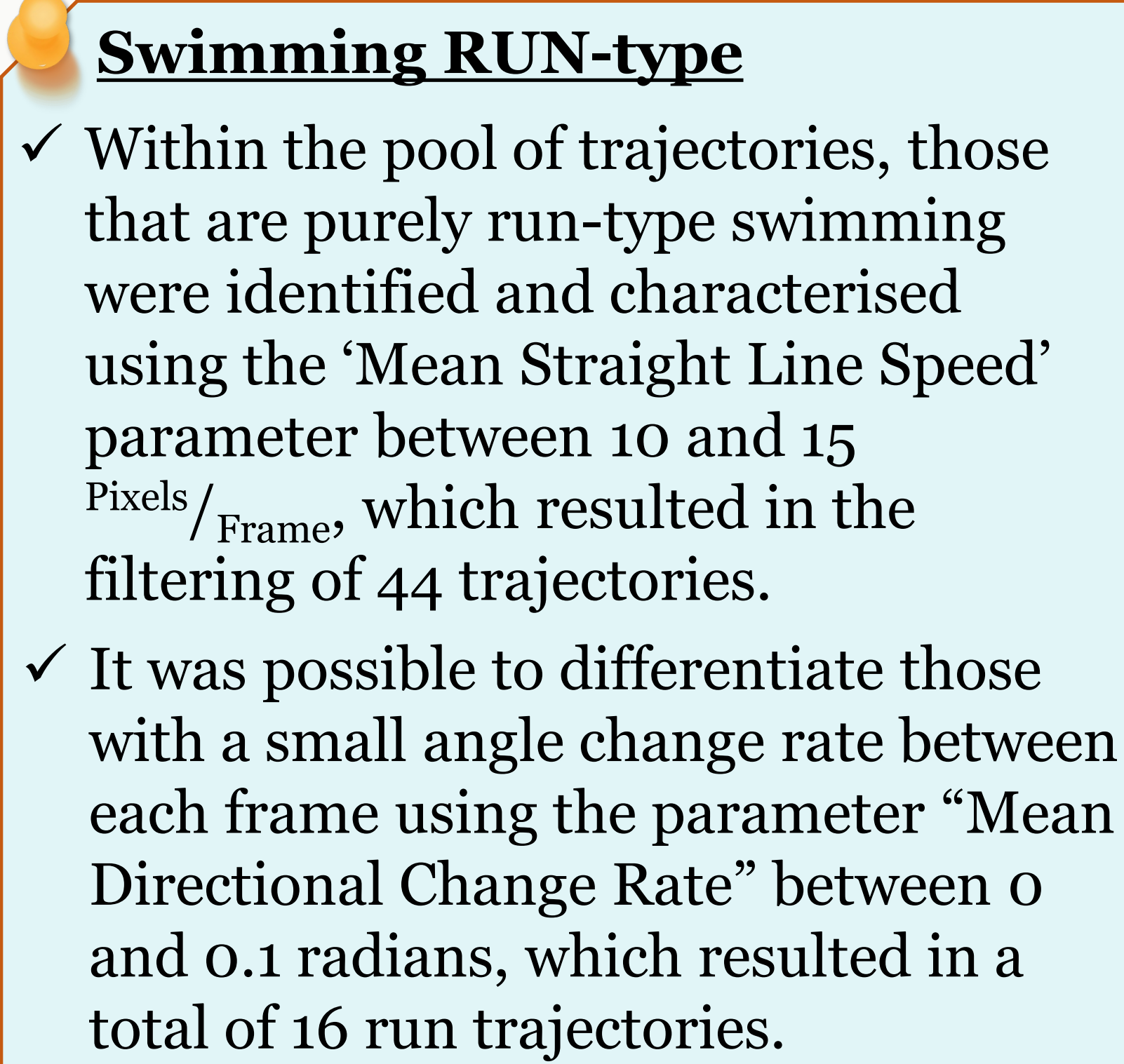
Figure 2: Schematic representation of the digital image analysis procedure with FIJI®.

RESULTS



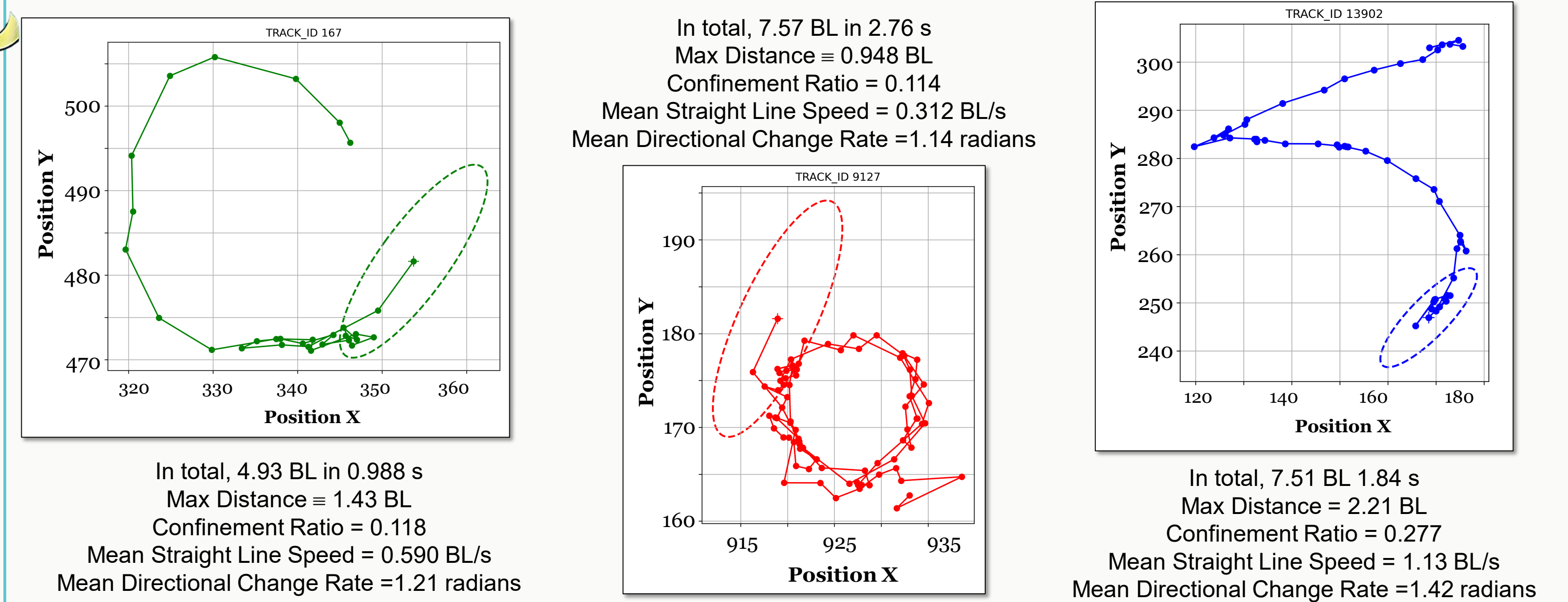
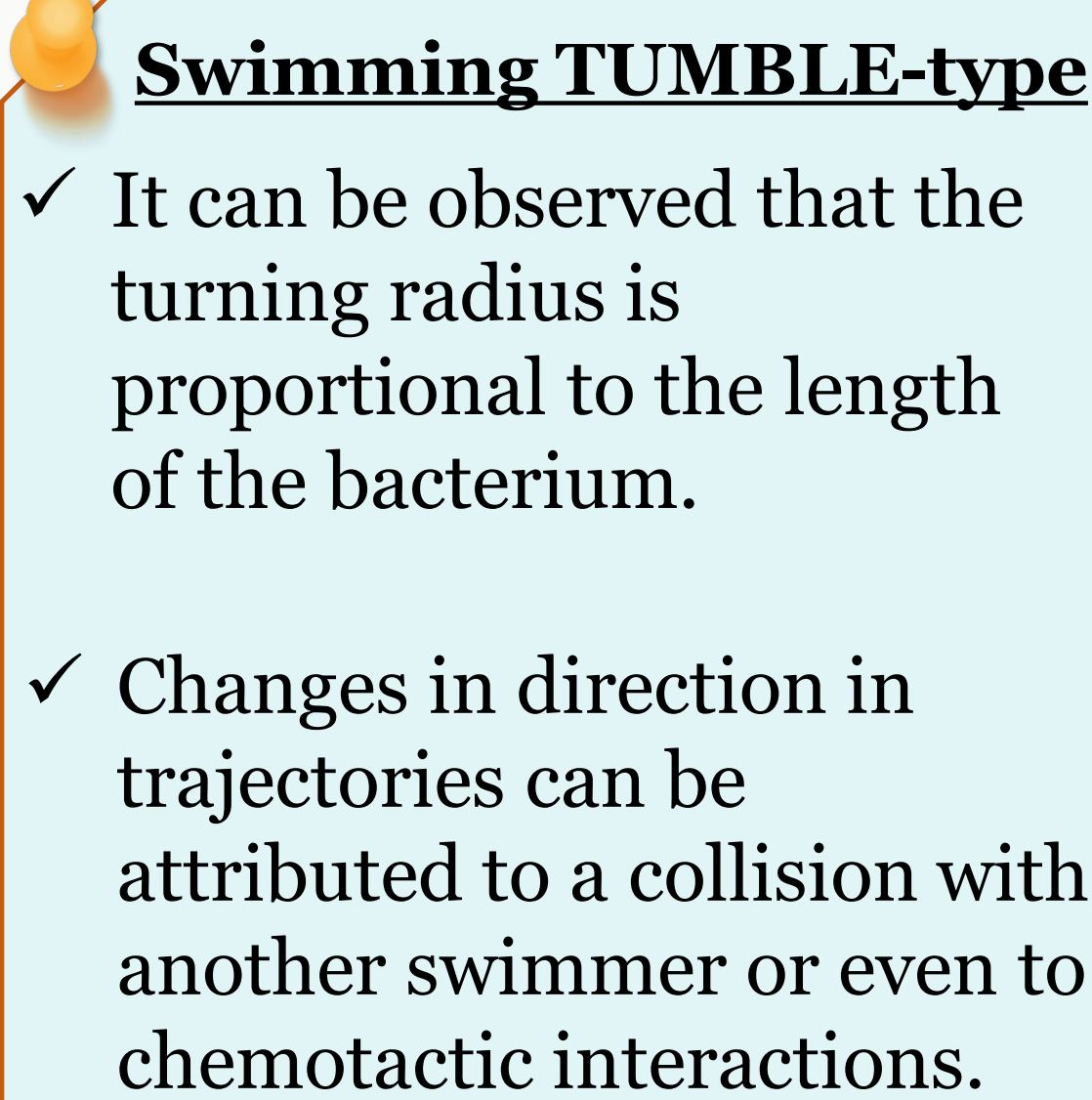
Filtering details

Of the total number of trajectories, only those occupying between 0.136 and 29.0 s (5 and 850 frames) were considered in order to avoid possible errors in the detection of each track, resulting in a total of 19,150 trajectories to be analysed.



Descriptive Parameters	Average
Area (pixels ²)	150.3
Length (Feret diameter, pixels)	27.3
Width (MinFeret, pixels)	8.33
Axis Major (pixels)	27.9
Axis Minor (pixels)	6.85
Aspect Ratio (AR)	4.09
Circularity	0.481
Roundness	0.246
Solidity	0.794

Figure 3: Size and morphological characteristics of *P. extremaustralis* 2E-UNGS.



CONCLUSIONS

- ♪ Trajectories with a single type of movement could be identified:
 - tumble over small distances with short temporal durations (0.5 s)
 - run that covered larger spatial distances with a longer temporal duration (1.7 s).

- ♪ However, most trajectories showed periods in which these combined swimming styles could be identified.
- ♪ The analysis of digital images using FIJI® and Python® contributed to track individual bacteria for a better understanding of the *P. extremaustralis* 2E-UNGS swimming behaviour.

Next steps:
Characterization of TUMBLE trajectories.

Acknowledgments

