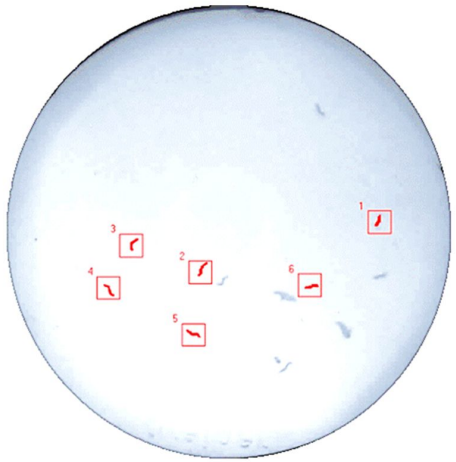
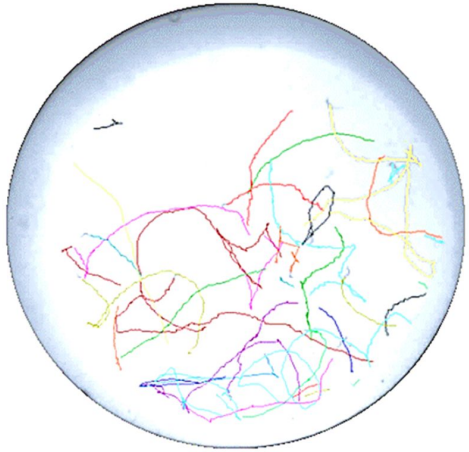
Wmicrotracker SMART





Phylum TECH

Wmicrotracker® SMART is our new technology that allows you to obtain real-time information on the behavior of small animal populations over time and space. The "Equipment + Software" system is optimized to quantify the speed and distance traveled of small organisms in 35 mm Petri dishes.

Many biological assays are complex to perform, requiring great manipulation skills and analysis time. This makes the work tedious and limits experiments based on their level of difficulty. Therefore, at Phylumtech, **our vision is to provide unique, agile, and real-time solutions that enable immediate, reliable, and reproducible results.** Founded in 2009 as a joint venture between the public and private sectors, we combine the latest advances in science and research with cutting-edge technologies

After years of experience, we are committed to the development of new products that are **more accessible and have WIFI connectivity**. The **Wmicrotracker® SMART**, based on non-invasive technology of infrared microbeams and camera detection, developed with CONICET and protected by international patents. **SMART allows the quantification of activity, trajectory, and speed of small organisms in a 35 mm diameter Petri dish format**. The detection system is compatible with small organisms such as C.elegans and other nematodes.

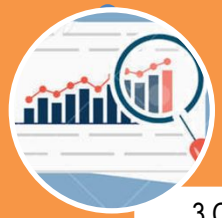
HOW IT WORKS?

The system has the ability to work in 2 different modes:

1) Infrared Images, with the plate upside down: This arrangement allows the tracking of the route of multiple C.elegans (or similar-sized worms) using NGM-type solid medium cultures. The method is based on an optical phenomenon of Silhouette Amplification by Infrared Refraction, where infrared light waves refract at the worm-agar interface, generating an amplified image that will be captured by a sensitive HD optics/camera system. The digital image processing will be carried out by software specially designed for real-time data acquisition.

2) Grid of infrared microbeams, with the plate upside up: It allows the quantification of the behavior of multiple organisms of size > 0.1 mm using solid, liquid or air medium cultures. It also allows defining the activity area on the plate for use in chemotaxis experiments. This patented method is based on detecting movement through the light scattering caused by a grid of infrared microbeams

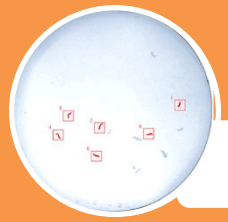
SOFTWARE



3.Calculation of parameters

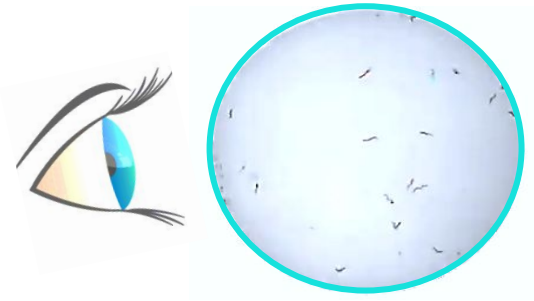
- # Worms per frame
- Average speed [mm/s]
- Distance traveled [mm/worm]
- Mobility Score
- Rotation Index
- Individual worm data

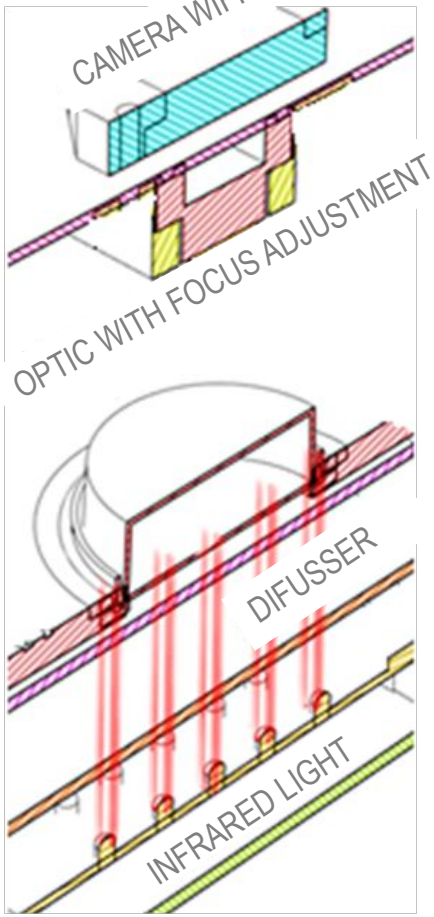
2. Tracking of organisms



1. Recognition of organisms

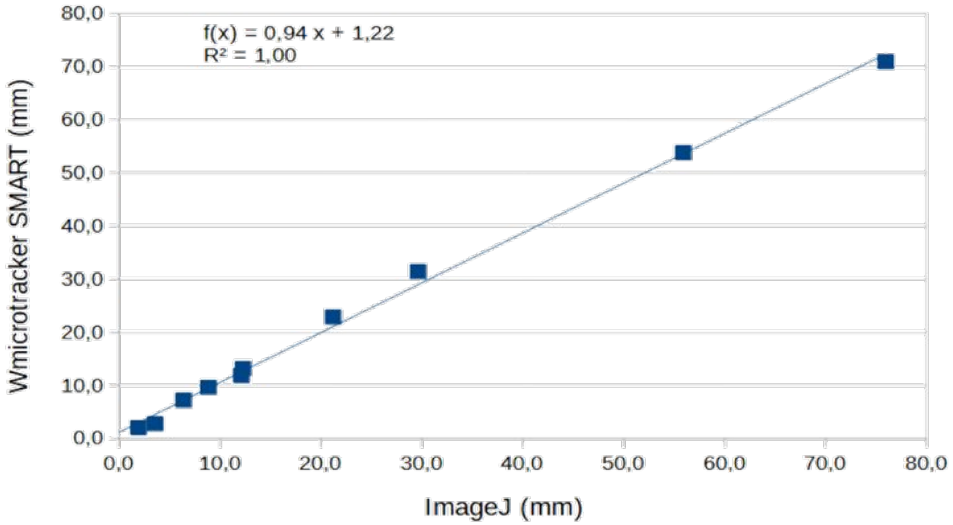
Infrared Amplification





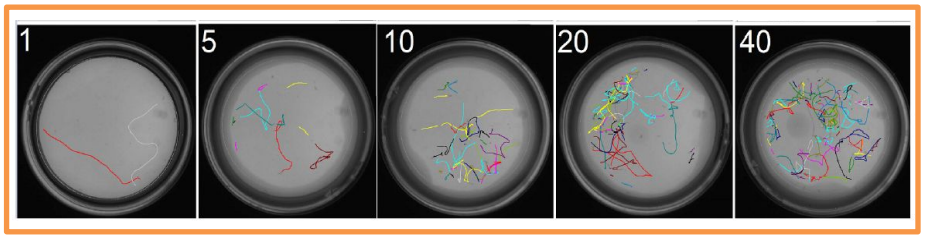
SMART

The calculated distances correlate very well with manual processing

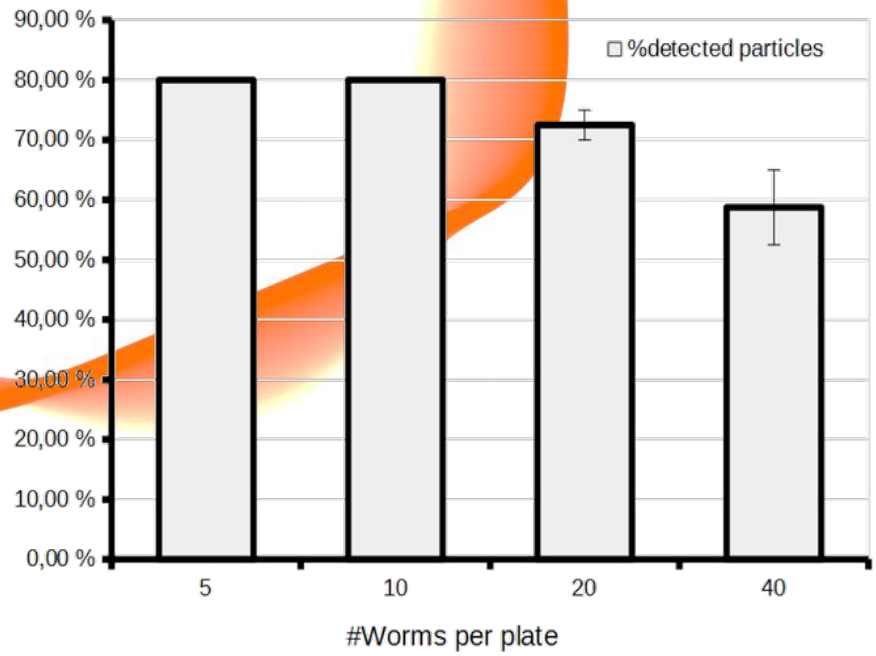


Worm Travel Distance [mm]

ImageJ	SMART
1,9	2,1
3,6	2,8
6,4	7,2
8,9	9,6
12,1	11,9
12,3	13,2
21,2	22,9
29,6	31,4
55,9	53,8
76,0	71,0

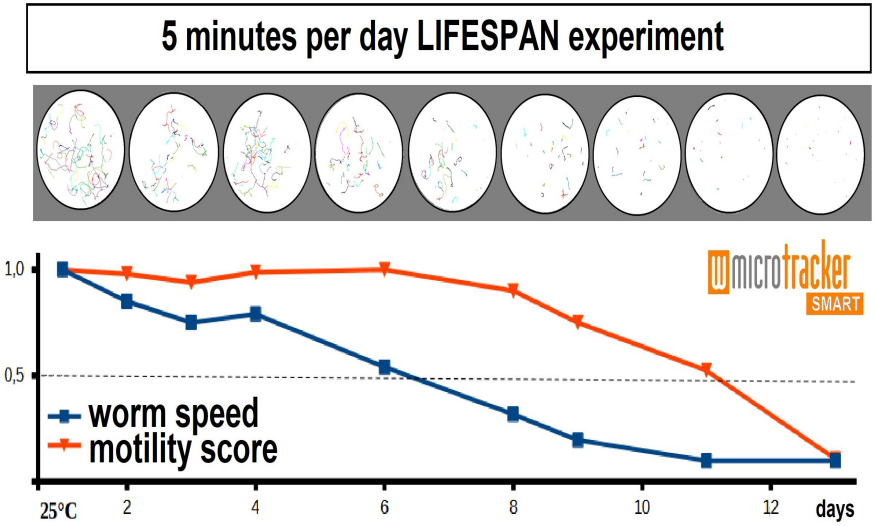


In the current version, the recognition of worms is 80%



APLICATIONS

Neurodegeneration-Lifespan-Toxicity-Microbiota-RNAi-Hypoxia

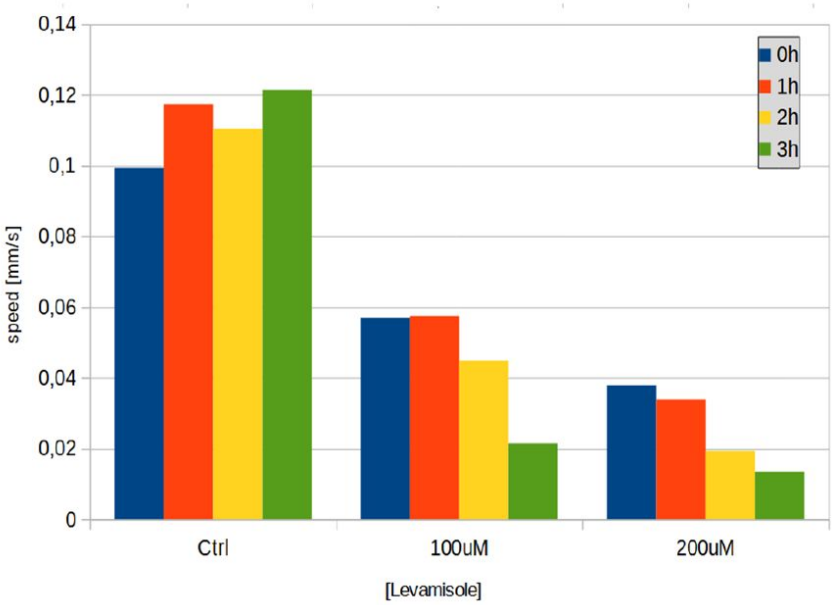


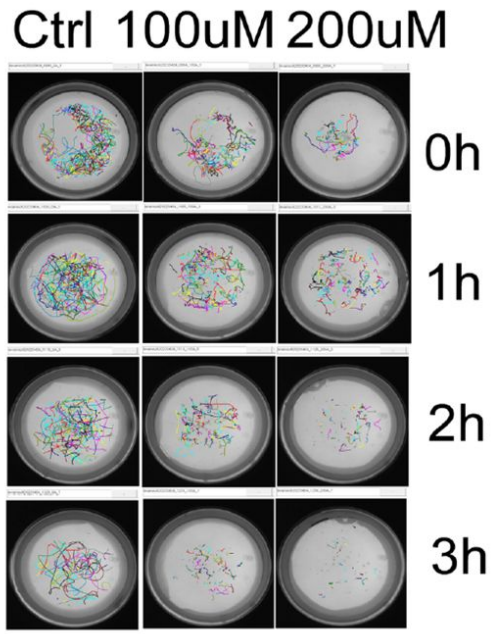
LIFESPAN

The graph shows the tracks of individual worms on the plate and their decrease with age. 20 adult C.elegans were cultured at 25°C on a 35 mm Petri dish with NGM+FuDR 80 µM. Data acquisition was performed once a day, using a 5-minute acquisition interval. The plates were subjected to mechanical stimulation of "tap" before each measurement. It can be seen that the 50% velocity rate decreases earlier compared to when worms become immobile.

TOXICITY

Example of kinetics for levamisole treatment. 25 worms were cultured in 35mm Petri dishes containing NGM and increasing concentrations of levamisole [0 to 200 uM]. The plates were recorded for 5 minutes every hour, after mechanical stimulation by "tap". The graphs show the decrease in worm movement speed.





Components Included

	Wmicrotracker SMART acquisition hardware
	Plate mode adapter: Microbeam grid side-up Tracking mode Side-up Tracking mode, side down
	Tray petri plate p35
	WIFI Mini Router Access point configured to provide "phylumtech.com" network connection
	5V DC, 1 or 2 Amp_Power Supply MicroUSB* *In some countries might not include it due to customs restrictions

Measurements

Product Dimensions and Manufacturing

- LWH 10cm x 10cm x 22cm (3.94in x 3.94in x 8.66in).
- Manufacturing Technology: 3D Printing

Requirements

- IBM PC compatible with the following minimum requirements:
  - Pentium Core i3 processor or above
  - 2Gb of RAM memory
  - 1 USB port available to power WiFi access point.
  - MSWindows 7 (or higher) operating system
  - > 1Gb of free HD space for experiment images storage.