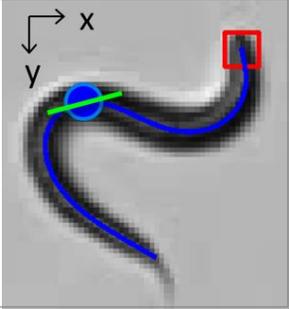
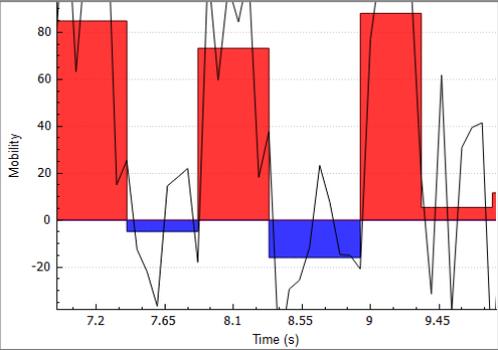
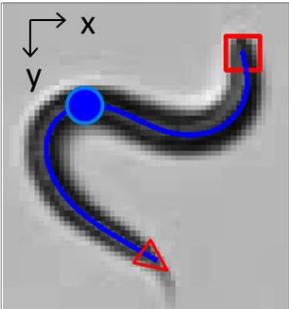
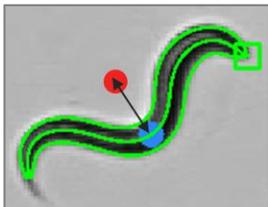
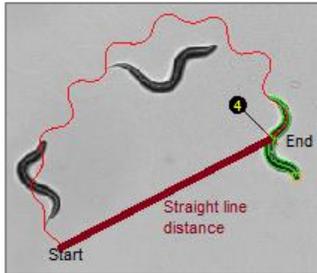
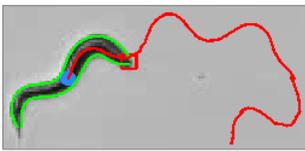
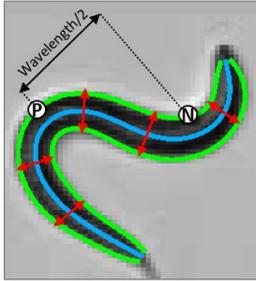


<p>Center Points</p>	<p>X,Y coordinates for multiple, evenly spaced sample points along the central axis. The table displays data for a single track.</p>
<p>Direction</p> 	<p>Angle between the line segment (green) located at the midpoint and the X axis. Angles are limited to the range $-\pi$ to π radians (-180 to 180 degrees). The 0 degree direction is in the direction of the X axis (to the right).</p> $1 \text{ rad} = \frac{180}{\pi} \text{ deg}$
<p>Mobility</p> 	<p>Mobility is similar to Moving Average Speed but provides additional analytical tools (speed threshold and minimum duration) to track motion. A block of color indicates a series of frames meeting the Mobility criteria. The y-value of a given color block represents the moving average speed for the series of frames.</p>
<p>Position</p> 	<p>X,Y coordinates displayed for head (red square), tail (red triangle), or midpoint (blue circle).</p>
<p>Reversal</p>	<p>Worm moving in a backward direction for a minimum number of frames.</p>

<p>Speed</p>	<p>Distance per second covered by the worm along its central axis.</p> <ul style="list-style-type: none"> • If the sign is positive, the worm is moving forward (head direction). • If the sign is negative, the worm is moving backward (tail direction). <p>The speed is based on the position of the mid-point along the central axis. Image noise may affect speed measurements.</p>
<p>Moving average speed</p>	<p>Speed for a particular worm, averaged across a number of frames. The number of frames is known as the size of the moving window.</p> <p>Using a moving average reduces the effects of noise, and also results in a latency in speed measurement.</p>
<p>Smoothed speed</p>	<p>Moving average speed smoothed over a user-defined frame span using locally weighted polynomial regression.</p> <p>This method can remove outliers caused by worm model fitting error.</p>
<p>Validation (see Validation workflow)</p>	<p>WormLab provides validation data by Count or Percentage.</p> <ul style="list-style-type: none"> • Detect FN: Number or percentage of false negative matches. A false negative is a worm you marked that wasn't detected by the software. • Detect FP: Number or percentage of false positive matches. A false positive is a software-detected worm that you didn't mark. The most likely reason for a false positive is that the object detected is not a worm. • Detect matched: Number of worms or percentage detected by the software and that you matched. • Detected: Number of worms detected by the software. • Frame: Frame number. • Head matched: Number or percentage of heads matched by you and the software. • Head missed: Number or percentage of heads missed by the software. • Head/Tail measurement error: Distance error in μm for marking head/tail between you and the software. This is an accuracy measurement. • Total (row): Total across all validation frames. • Total for head/tail measurement error (row): Average of all Head/Tail Measurement Error values. • Validated: Number of worms marked.

Track summary



Mathematical average for each worm:

Mean worm length: From head to tail along the central axis (blue)

Mean width: Cross-section (red) averaged over the entire length

Mean area: Region within worm's contour (green)

Wavelength: Measurement between the positive (P) and the negative (N) stationary points multiplied by 2

Track length: Length of forward motion plus length of reverse motion (red) over the total number of frames tracked.

Peristaltic track length: Length of forward motion minus length of reverse motion.

Speed: Includes averaging of negative values, when the worm is reversing.

Peristaltic speed: Peristaltic track length divided by time.

Straight-line distance (red): Shortest path between the starting and ending point of the worm track.

Mean amplitude: Average centroid displacement over an entire track.

Max amplitude: Maximum centroid displacement over an entire track.

Centroid displacement (black double-arrow): Distance between the mid-point (blue) and the average location (red) of the central axis points.