

WormLoco.org - An open-access resource for data sharing

All our data, including raw videos, processed measurements, are available at the open-access database WormLoco.org .



Quantitative profiles of *C. elegans* locomotive behaviors

Pattern Search

Experiment Search

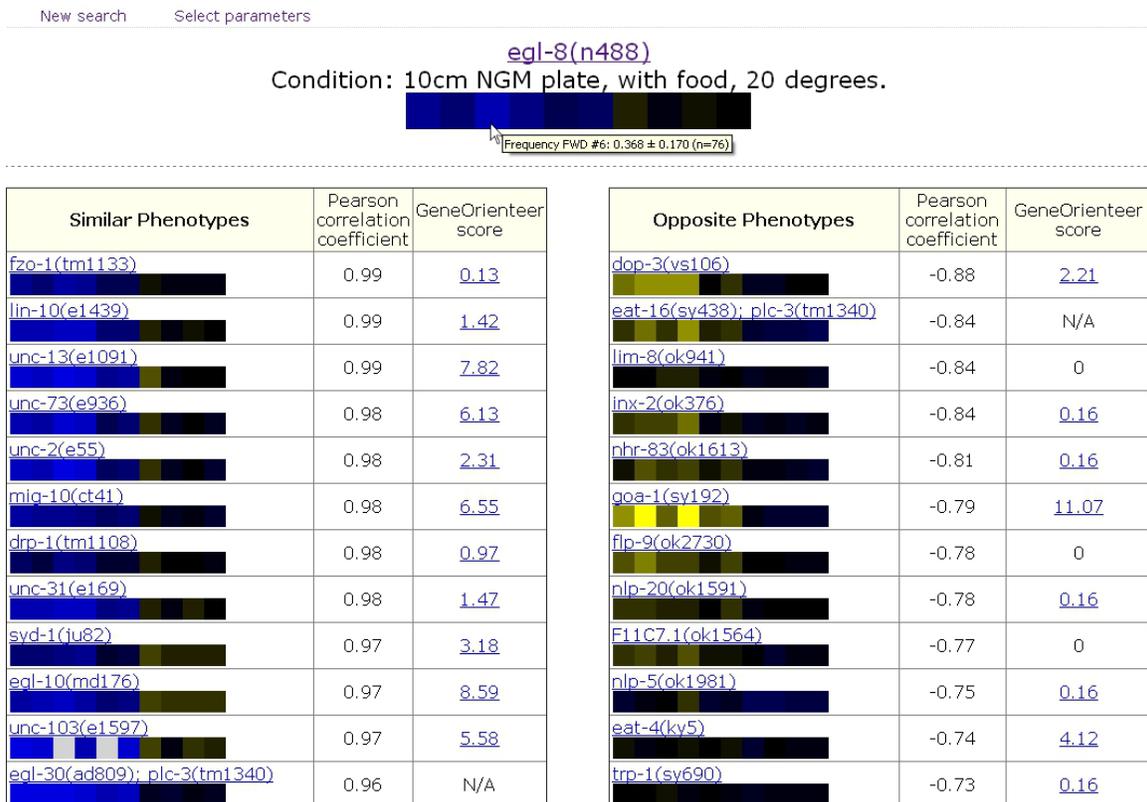
Data Organization. The data are organized into three levels at WormLoco. At the bottom is the individual animal level. At this level, each animal is associated with three types of information: description of the animal such as genotype, experimental date and experimental condition, video that is in the format of MOV or AVI, locomotion data that include both original measurements and normalized values for 77 parameters such as velocity and flex. Normalized values are computed from the original data using the wild-type animals tracked on the same day. The second level is the experiment level. At this level, animals with the same genotype, same experimental condition and date are organized into one experimental group. We computed the average normalized values from all worms in the same experiment. At the top level, we pooled animals from multiple experimental dates to measure the average normalized values for all animals with the same genotype and experimental condition.

Data Query. All data can be retrieved from the web user interface. For example, to search for interacting genes, one can type in keywords to search for a genotype at the home page (Figure below) and click on the “Pattern Search” button.



Quantitative profiles of *C. elegans* locomotive behaviors

After selecting the right genotype, one will reach a result page listing the behavioral profile of the queried genotype and other behavioral profiles of similar (PCC>0.7) or opposite (PCC<-0.7) patterns:



The profiles are displayed as heat maps showing how normalized mutant values deviate from wild-type values. One can hover the mouse over the heat map to display the parameter values on which the heat map was based. This page also lists the PCC values and GeneOrienteer scores between the queried profile and the related profiles.

The web interface also supports data query at all three data levels. At the home page, one can type in keywords to search for a genotype and click on the “Experiment Search” button.



Quantitative profiles of *C. elegans* locomotive behaviors

After selecting the right genotype, one will reach a result page displaying both the combined behavioral profile from all experiments (top level data), and individual results from each experiment (second level data). Both genotype-level and experiment-level results are displayed as heat maps as previously described. Listing of experimental results enables users to easily detect any variance among different experiments.

[egl-8\(n488\)](#)

Condition: 10cm NGM plate, with food, 20 degrees.



- 1. [egl-8\(n488\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2008-02-05, by: Shahla

- 2. [egl-8\(n488\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2008-02-07, by: Shahla

- 3. [egl-8\(n488\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2008-08-21, by: Shahla

- 4. [egl-8\(n488\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2008-09-04, by: Shahla

- 5. [egl-8\(n488\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2008-09-05, by: Shahla

- 6. [egl-8\(n488\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2008-09-08, by: Shahla

Clicking of the link above the heat map brings one to the page of individual worm data (bottom level data) that shows all animals examined in that experiment. Unlike the previous page that displays normalized values, this page displays original values for all parameters. The thumbnail images on the left are links to the video of that animal.

Genotype: egl-8(n488)

Condition: 10cm NGM plate, with food, 20 degrees. Date: 2010-07-29, by: hui

Worm	Video	Velocity FWD [mm/sec]	Velocity BWD [mm/sec]	Frequency FWD [Hz] #6	Frequency BWD [Hz] #6	Flex FWD [rad] #6	Flex BWD [rad] #6	Amplitude FWD [mm]	Amplitude BWD [mm]	Wavelength FWD [mm]	Wavelength BWD [mm]
1		0.06156	-0.07189	0.08588	0.10356	0.69797	0.67965	0.2669	0.29211	0.69135	0.70735
2		0.05414	-0.0568	0.08238	0.0967	0.49449	0.55242	0.28629	0.31035	0.76017	0.76649
3		0.07032	-0.08663	0.10058	0.13917	0.71803	0.79262	0.2546	0.3197	0.72393	0.71162
4		0.05751	-0.07837	0.08172	0.12304	0.65533	0.79787	0.2751	0.2893	0.67646	0.66796
5		0.05422	-0.0664	0.07761	0.10252	0.5606	0.62998	0.28569	0.32001	0.73229	0.73937
6		0.06062	-0.05981	0.07618	0.07371	0.6844	0.66755	0.25209	0.27027	0.64353	0.58349
7		0.08028	-0.05554	0.11254	0.09749	0.68515	0.57409	0.28773	0.3159	0.75145	0.76576
8		0.06578	-0.09697	0.09163	0.14294	0.67463	0.87148	0.29845	0.3046	0.70946	0.69501

Data Download. Several data files can be downloaded from the home page of WormLoco.org. These include: 1) List of all genes and mutants; 2) Behavioral profiles for mutants with locomotive defects; 3) Behavioral profiles for all single mutants; 4) Gene pairs with $|PCC| \geq 0.7$; 5) Gene pairs with GeneOrienteer score ≥ 4 ; 6) Gene pairs with $|PCC| \geq 0.7$ and GeneOrienteer score ≥ 4 .

In addition, one can perform customized data downloads using the “basket” function of WormLoco. Similar to an online shopping cart, the basket allows users to choose and add different data sets and check out at once. There is an “add to basket” button next to each heat map on the experiment page.

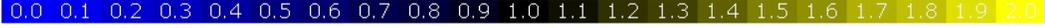
New search Select parameters Display basket (3)

There are 3 items in the basket

1. [eat-16\(sy438\); egl-8\(n488\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2008-02-21, by: Shahla

2. [eat-16\(sy438\); egl-8\(n488\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2009-01-14, by: weiwei

3. [goa-1\(sy192\)](#)
Condition: 10cm NGM plate, with food, 20 degrees. Date: 2008-11-27, by: weiwei


Legend: 

[Go back to the previous search](#)

Clicking this button will add all worm data in the selected experimental group into the basket. One can display the contents in the basket by clicking the “Display basket” link on the top of the page. This brings one to a new page showing all data in the basket and the user can perform the following operations by clicking appropriate buttons: download the original data with or without the control (N2 animals tracked on the same day), download the normalized data of these worms, or empty the basket.

One can further customize data downloading by changing the parameter selection.

Clicking “Select parameters” on the top of all the result pages brings one to a web interface of customizing parameters.

New search Select parameters Display basket (3)

Customize values to be displayed and listed in downloaded text files

Length	Velocity FWD	Velocity BWD	Centroid Velocity FWD	Centroid Velocity BWD	Frequency FWD #1	Frequency BWD #1	Frequency FWD #2	Frequency BWD #2	Frequency FWD #3	Frequency BWD #3	Frequency FWD #4	Frequency BWD #4	Frequency FWD #5	Frequency BWD #5					
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
Frequency FWD #6	Frequency BWD #6	Frequency FWD #7	Frequency BWD #7	Frequency FWD #8	Frequency BWD #8	Frequency FWD #9	Frequency BWD #9	Frequency FWD #10	Frequency BWD #10	Frequency FWD #11	Frequency BWD #11	Flex FWD #1	Flex BWD #1						
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
Flex FWD #2	Flex BWD #2	Flex FWD #3	Flex BWD #3	Flex FWD #4	Flex BWD #4	Flex FWD #5	Flex BWD #5	Flex FWD #6	Flex BWD #6	Flex FWD #7	Flex BWD #7	Flex FWD #8	Flex BWD #8	Flex FWD #9	Flex BWD #9	Flex FWD #10	Flex BWD #10	Flex FWD #11	Flex BWD #11
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Time Delay FWD #1-2	Time Delay BWD #1-2	Time Delay FWD #2-3	Time Delay BWD #2-3	Time Delay FWD #3-4	Time Delay BWD #3-4	Time Delay FWD #3-4	Time Delay BWD #3-4	Time Delay FWD #4-5	Time Delay BWD #4-5	Time Delay FWD #5-6	Time Delay BWD #5-6	Time Delay FWD #6-7	Time Delay BWD #6-7	Time Delay FWD #7-8	Time Delay BWD #7-8				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Time Delay FWD #8-9	Time Delay BWD #8-9	Time Delay FWD #9-10	Time Delay BWD #9-10	Time Delay FWD #10-11	Time Delay BWD #10-11	Amplitude FWD	Amplitude BWD	Wavelength FWD	Wavelength BWD	Duration of FWD Movement	Duration of BWD Movement	Duration of Stopped Time	Number of Reversals						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

 [Go back to the previous search](#)

While the default parameter set is the ten parameters selected in this article, the user can select any combination of the 77 available parameters. Once the parameters are changed, all data pages including the basket page will change accordingly to display the new parameters in heat maps and data tables. In addition, the pattern search will compute PCC using the new parameter set. The data downloaded from the basket will also have the new parameters.