**Description of Worm279dir.mat dataset (11 July 2012)**

**Most of the data is identical to that in Worm279.mat, this contains:**

**Worm279\_labels**

There are 280 non-pharyngal neurons in C eleans. We then excluded neuron VC6 which connects only through neuromuscular junctions (cf: Varier et al 2011)

**Worm279\_positions**

2D position of all 279 neurons. Of these, positions for 277 neurons were obtained from the dataset (celegans277.mat, which includes VC6) published on Marcus Kaiser’s website: <http://www.biological-networks.org/?page_id=25>

As in Varier et al (2011), we reconstructed the positions of the 3 neurons not included in this dataset (AIBL, AIYL, SMDVL) based on the positions of the contralateral neurons (AIBR, AIYR, SMDVR).

**Worm279\_brithtime**

Birth times of the 279 neurons (as reported in Varier et al 2011), obtained from the website: <http://www.biological-networks.org/?page_id=25>

**Worm279\_matrix**

Connectivity matrix for 279 neurons, constructed from the edgelist provided o the website: <http://www.wormatlas.org/neuronalwiring.html>

Which described the data as follows:

Provided is a compilation of an updated version of *C. elegans* wiring diagram (280 nonpharyngeal neurons (CANL/R were excluded since they have no obvious synapses), covering 6393 chemical synapses, 890 electrical junctions, and 1410 neuromuscular junctions). Pivotal works published by [White et al, 1986](http://www.wormatlas.org/ver1/MoW_built0.92/toc.html) and [Hall and Russell, 1991](http://www.wormatlas.org/ver1/hall_1991/toc.html) had provided neuronal circuitry in the head and tail, but lacked connection details for 58 motor neurons in the ventral cord of the worm. Most of the missing data for this region is now compiled by using original electron micrographs (EM) and handwritten notes from White and co-workers. The dorsal side of the worm around the mid-body was not previously documented. Using original thin sections prepared by [White et al, 1986](http://www.wormatlas.org/ver1/MoW_built0.92/toc.html), new EM images were generated and neuron processes of animal “N2U” in this region were reconstructed. The new version of the wiring diagram incorporates original data from [White et al, 1986](http://www.wormatlas.org/ver1/MoW_built0.92/toc.html), new reconstructions, as well as updates based upon later work ([Hobert, O. & Hall, D. H.,1999](http://elegans.swmed.edu/wli/%5Bwbg16.1p24%5D/?%5Cbh%5Ba%AA%E1%E0%E2%E5%E4%E3%E6%5Dll%5Cb%3B%5Cbh%5Bo%BA%F3%F2%F4%F6%F5%F8%5Db%5Be%E9%E8%EA%EB%5Dr%5Bt%FE%5D%5Cb); and [Durbin, R. M., 1986,](http://elegans.swmed.edu/parts/neurodata.txt) [Achacoso and Yamamoto W.S., 1992](http://www.wormatlas.org/ver1/handbook/references.htm)). Inconsistencies within the data were reconciled by checking against original EM and handwritten notes from White and co-workers. **Over 3000 connections, including chemical synapses, electrical junctions, and neuromuscular junctions were added and/or updated from the previous version.** Due to rather sparse sampling of data along lengths of the sub-lateral, canal-associated lateral, and mid-body dorsal cords, connectivity ambiguities for a select few neurons remain.

This data was first discussed by Chen, Hall, and Chklovskii, in "Wiring optimization can relate neuronal structrure and function", PNAS, March 21, 2006 103: 4723-4728 ([doi:10.1073/pnas.0506806103](http://dx.doi.org/10.1073/pnas.0506806103)). More recently, full analysis of the data can be found by Varshney, Chen, Paniaqua, Hall and Chklovskii in "Structural properties of the *C. elegans* neuronal network" PLoS Comput. Biol. Feb 3, 2011 3:7:e1001066 ([doi:10.1371/journal.pcbi.1001066](http://dx.doi.org/doi:10.1371/journal.pcbi.1001066)). Any publication made utilizing the following data should make a reference to this paper. Correspondence should be addressed to bethlchen at yahoo.com or mitya at janelia.hhmi.org.

**Worm279\_Wmatrix**

This weighted matrix contains the same data as “Worm279\_matrix”, but each edge is weighted by the total number of synapses between the two neurons (this all types of synapses).

**Worm279\_elist\_connectiontype**

This is an edgelist of the connections in “Worm279\_matrix”, listing the type of each connection (note that this list is longer than the number of edges in the matrix, since it lists different synapse types between the same pair of neurons as separate entries).

**Worm279\_elist\_connectionstrengths**

This is a list of the number of synapses corresponding to each connection between pairs of neurons in “Worm279\_elist\_connectiontype”

**In addition, this Worm279dir.mat dataset also contains:**

**Worm279\_synapse\_matrix\_dir**

separate matrix of synaptic connections (which isn't symmetric)

and

**Worm279\_ejunct\_matrix\_dir**

gap junctions(symmetric)

**Worm279\_matrix\_dir**

I also included the sum of the two matrices:

Worm279\_matrix\_dir=Worm279\_ejunct\_matrix\_dir+Worm279\_synapse\_matrix\_dir