

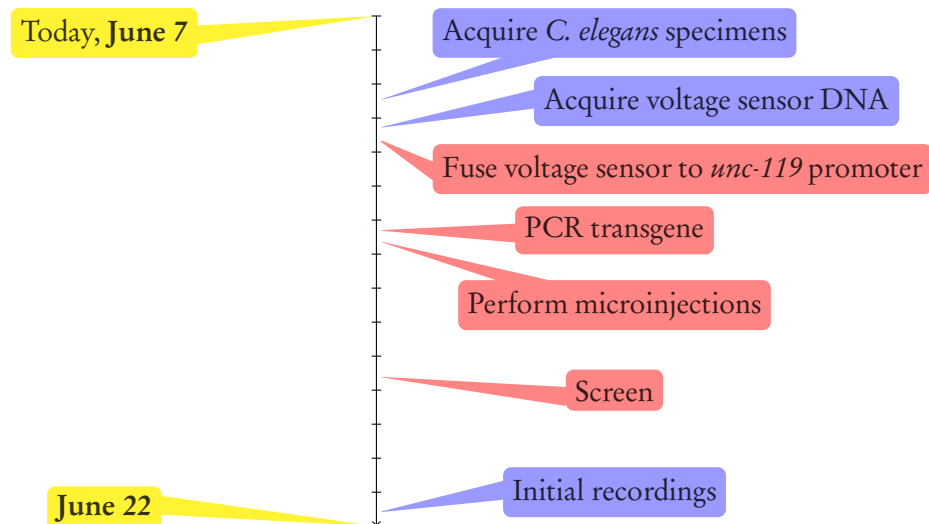
WHOLE-BODY NEURAL RECORDINGS IN A MONTH

An ambitious proposal by David Dalrymple

As a reader of this document, you are already aware of my goal to simulate the complete nervous system of *C. elegans* in software, based on new experimental data enabled by a suite of technologies coming to be known as “optical patch-clamping.” By systematically perturbing neurons using light-driven channels and pumps, then observing the response of the network using fluorescent voltage sensors, it is my hope and belief that we can accurately infer circuit dynamics.

A initial exploratory step towards this goal is to exclude the perturbative aspect. This would mean that no special algorithms would be needed to perform the physical experiment, since all the data can be recorded and analyzed post-hoc. Even this level of recording would be, as far as I know, unprecedented, and very likely to be scientifically interesting. The voltage sensor and associated imaging tools are already working in other model systems, like *E. coli* and cardiomyocytes, so the major barrier to this milestone is the pan-neuronal expression of the voltage sensor in *C. elegans*.

I’m going to be traveling for much of July and August. I know next to nothing about transgenesis, but I’m pushing to reach this goal by July 1. I’d like your feedback on whether this proposed timeline makes any sense:



It would also be very helpful if someone experienced with these procedures could coach me through them; in addition, it’s not clear in what laboratory they should be performed.

Thank you for your time and assistance!