

# Mind Uploading in *C. Elegans*

## NEMALOAD

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# Mind Uploading

- Brain Simulation
- (World Simulation)
- Snapshot of Biological Neuron System (neuron and synaptic structure, current weighing, non-destructive?)
- Snapshot of Other Variables (hormonal levels etc.)

# Caenorhabditis Elegans

- Wiggly Wormy Tiny Translucent Thingie
- Two forms: Male and **hermaphrodite**

## C. Elegans Neuron Network

- 302 neurons (in two mostly separate networks), 8000 synapses
- Structural information is already detailed but still a moving target (ongoing research)
- Exact synaptic behavior is not researched yet, neurons appear to be non-spiking!
- Tiny neurons make mechanical potential measurement difficult

Images at [wormatlas.org](http://wormatlas.org)

# Our Mind Uploading Project

[nemaload.davidad.org](http://nemaload.davidad.org)

- Molecular Biology stage (GM c. elegans)
- Imaging stage (tracking 3D microscope; lightfield and lightsheet)
- Perturbation stage (two-photon digital holography)
- Modeling stage (OpenWorm cooperation?)
- (Feedback loops between the stages)

# Challenges

- High resolution, high framerate 3D microscopy is difficult and expensive
- Modelling is very difficult and imprecise yet
- No clue how to account for chemical factors (hormones)
- Very small team

# Current State

- Theoretical research regarding modelling pipeline and feedback loops
- **NemaShow** visual worm dataset explorer
- Dataset improvement - straightening neuron positions
- Basic computer vision processing - pose extraction, neuron interposition
- Steps forward - more theoretical research, improving datasets, lightsheet data processing, signal extraction

That's all, folks!

Thank you; questions?