

Science communicators get access to real data for 3-D modelling

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Professor Nicholas Woolridge is the author of NeuronBuild, a plug-in script for 3D modeling software. NeuronBuild allows science communicators to access neuron structures stored in the online repository NeuroMorpho.org. Credit: Maeve Doyle

Free, open-source software created by a U of T Mississauga professor is

giving science communicators access to real data for science illustrations and animations.

NeuronBuild 1.8 is now available for immediate download from [GitHub.com](https://github.com). This latest version includes bug fixes and [new features](#).

NeuronBuild is a plug-in script for the 3-D modeling software Cinema 4-D. The plug-in makes neuron structures stored in the online repository NeuroMorpho.org available to a new community of users.

Nicholas Woolridge, associate professor in the Master of Science in Biomedical Communications at the University of Toronto Mississauga first wrote the software in 2013.

"Science communicators can use NeuronBuild to populate their animations and illustrations with accurate neuron structures," says Woolridge.

The structures of cells

Neurons are specialized cells of the nervous system that receive, process and transmit information, says Bryan Stewart, neuroscientist and professor of physiology at U of T Mississauga. "They are responsible for all our sensory experiences—vision, hearing, taste, touch, smell—as well as learning, memory and thinking. They control all our actions and movements, while also being responsible for regulating many of the body's systems and functions."

Neuroscientists interested in cell shape study neurons and record and plot their structures, or morphology. They publish their data to NeuroMorpho.org for access by other [research scientists](#).

"But prior to NeuronBuild, the files were difficult or impossible for

[science](#) illustrators and animators to use and we advocate to our students to, whenever possible, use real data," Woolridge says. NeuronBuild allows science communicators to choose a neuron datafile, select some options and import it into Cinema 4-D. "Then, boom. You create a realistic complex 3-D neuron model."

Woolridge says he made NeuronBuild free and open source in the spirit of the numerous students and scientists who contributed the neuron structures to the database. He has also created a different version of the script for use with ZBrush, another 3-D modeling application.

"This tool democratizes data," says Kent Moore, U of T Mississauga's vice-principal, research. "With access to real data, science communicators can share the knowledge to even more audiences such as students, other researchers and the public."

Fixes and features

Earlier versions of NeuronBuild only imported neurons. The plug-in can now reconstruct additional cell types, such as astrocytes.

One major new feature allows users to turn a representation into a single object, which makes texturing the cells easier. "This is really technical and specific to the user audience, but using NeuronBuild with Cinema 4-D's new volume system, you can turn the object into a single polygon mesh, which makes the [structure](#) easier to render," says Woolridge.

Another new feature eases the process of creating dynamic representations such as growing [neurons](#) or animations of neural impulses.

"Besides its use by illustrators and animators, I would also really like to see NeuronBuild used by scientists to create presentation-ready versions

of their neuron structures," Woolridge says.

He finds it gratifying to hear that this tool is useful to others. "The best thing is when I'm contacted by students using it at other medical illustration programs. It's nice to know that it's coming in handy."

Provided by University of Toronto Mississauga

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