



NeuroFedora

FOSS and Free and Open (Neuro)Science

NeuroFedora contributors

neuro.fedoraproject.org

Everyone should have the freedom to study, modify, and share scientific material¹.

¹<http://opensourceforneuroscience.org/>

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Scientists, academics, students, researchers, non-scientists, and non-academics should all have access to scientific material—irrespective of social status, location, age, nationality
....

¹<http://opensourceforneuroscience.org/>

- How the brain functions (physiology)

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- How it is structured (**anatomy**)

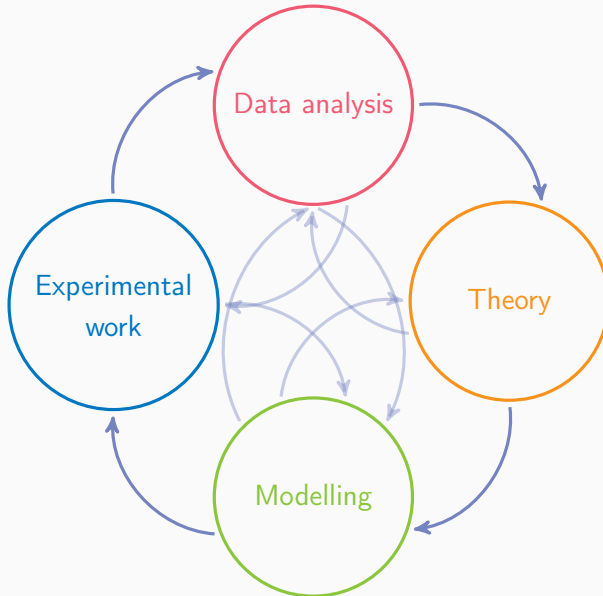
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- How it processes information (**computational**)
- About behaviours, and cognition (**behavioural, cognitive**)

How: Research Pipeline

Basic Workflow



Tools of the trade

Experimental:

- EEG, ECoG, intracellular and extracellular single and multi neuron recording,
- CT, DOI, MRI, f-MRI, MEG, PET,

Data analysis:

- Statistics,
- Machine Learning, Big Data, Deep learning,

Theory and modelling:

- Simulators of all kinds,

Free/Open (neuro) Science

The ideal, in short:

Free/Open Science:

Everyone should have the freedom to share, study, and modify scientific material.

FOSS:

Everyone should have the freedom to share, study, and modify software⁵.

Free/Open Science includes and relies heavily on Free/Open Source Software (FOSS).

²Free software foundation

So we strive to use more and more FOSS

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A Commitment to Open Source in Neuroscience

Padraig Gleeson • Andrew P. Davison • R. Angus Silver • Giorgio A. Ascoli  

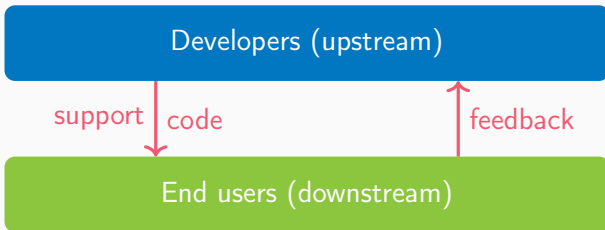
Open Access • DOI: <https://doi.org/10.1016/j.neuron.2017.10.013> •

NeuroFedora: why, how, what?

Neuroscience community: highly multidisciplinary

- various specialities: biologists, mathematicians, physicists, chemists, psychologists, . . . ,
- small proportion of trained software developers

FOSS: Developers and users



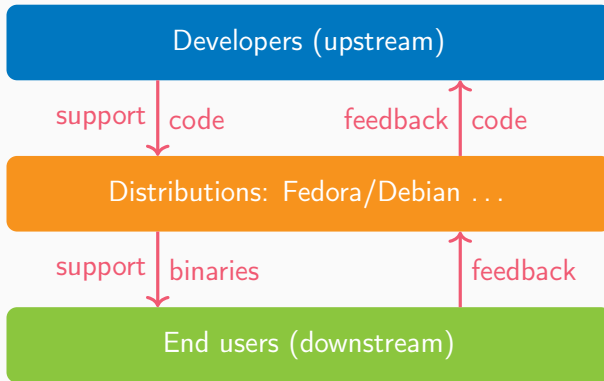
(Anecdotal) notes on development of research software

- often single developer, or small development teams
- limited maintenance, short-lived projects
- limited access to hardware/resources
- limited code quality
- limited use of established best practices
- limited testing for correctness (!)
- complex dependency chains
- lack of documentation and support
- lack of community development know-how

(Anecdotal) notes on users of research software

- waste time and effort installing (and reinstalling) their software stacks
- rarely run test suites (!)
- rarely report bugs upstream
- rarely send improvements upstream
- are unaware of helpful development tools

Distributions liaison between developers and users



Distributions, like Fedora, are in a unique position:

- liaison between upstream and users
- have the infrastructure
- follow best practices in software development
- constantly work on community development
- learn from one another—train while working
- disseminate information to end-users

Primary goal:

- Provide a ready to use, integrated FOSS platform for neuroscientists⁷.

Secondary/collateral goals:

- help improve the standard and maintenance of tools
- help users develop software development skills
- make neuroscience accessible to non-specialists

⁷ Researchers, academics, hobbyists, anyone!

NeuroFedora: What we offer?



- An OS to enable neuroscience
- Contains a plethora of computational neuroscience tools
- Packed with analysis and general productivity tools
- Integrated with GNOME

<https://labs.fedoraproject.org/en/comp-neuro/>

Comp-Neuro Container

- A ready-to-use comp-neuro container
- Can be used with Podman/Docker
- Can be obtained from standard public container image registries like Docker Hub



<https://docs.fedoraproject.org/en-US/neurofedora/containers/>

<https://podman.io/>

<https://www.docker.com/>

NeuroFedora: current metrics

- Will be 3 years old, in September 2021!⁸,
- 30 volunteer contributors
- software:
 - ~200 tools (packages) ready to install⁹:
 - NeuroMLlite, pyNeuroML, NetPyNE, Neuron, InterViews, NEST, Genesis, Brian (v1 and v2), Moose, python-libNeuroML, PyLEMS, PyNWB, ...
 - ~200 in queue¹⁰.
 - EDEN, NeuroMynerva, FlyBrainLab, GeNN, ...

⁸ in its second iteration

⁹ [src.fedoraproject.org: Neuro-SIG](https://src.fedoraproject.org/Neuro-SIG)

¹⁰ [Pagure.io: Neuro-SIG: issues](https://pagure.io/Neuro-SIG/issues)

Search: “NeuroFedora”



Mailing list: neuro-sig@lists.fedoraproject.org

IRC: [#fedora-neuro](#) on LiberaChat

Telegram: t.me/NeuroFedora

Documentation neuro.fedoraproject.org

Blog: neuroblog.fedoraproject.org

Pagure.io (FOSS Git forge): [neuro-sig/NeuroFedora](#)