

Reproducibility, reusability, discoverability



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We have launching a new journal, *Physiome*,

Reproducibility, reusability, discoverability

Reproducible mathematical models of physiological processes



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and it is all about reproducibility of mathematical models of physiological processes.

Reproducible mathematical models of physiological processes



Error!



Computer models should be easy to reproduce, because code is easy to share and consistent, and yet, anyone who has tried knows that it is common to have lots of things going wrong.

This is intensely frustrating, but even worse it how this effects our scientific output.

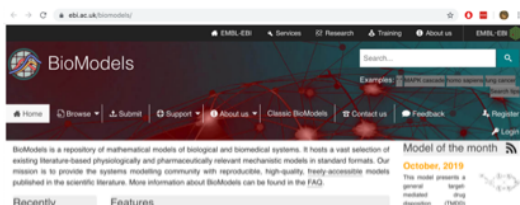
Reproducibility, reusability, discoverability



650 curated models

Over 90% of models
could not be reproduced
on initial attempt
based on published information!

BioModels Database



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Physiome Model Repository



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Example: Center for Reproducible Biomedical Modelling looked at how reproducible models are. They looked at approx 600 models in the two repositories, including the code submitted for the publications, in these repositories.

90% On those models could not be reproduced from the original publication. Some could not even be reproduced by the group that published them in the first place. Even if the code is in the repository, it is not necessarily working.

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Model code in appropriate format

Curated and version controlled

Credit where credit is due

Open access



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This is what *Physiome* is trying to fix. We help authors make their models available in appropriate formats by publishing the curated and version controlled code.

It is hard to get citations for models -> less funding.

Open Access, of course.

FAIR = Findable, Accessible, Interoperable, and Reusable

What is a *Physiome* publication?



What is a Physiome publication?

Code (curated, reusable, everything needed to run the model), this is the most important part of the publication

Primary paper (validation) domain specific, peer reviewed journal. We are a secondary journal.

Pdf (descriptive summary)

Types of *Physiome* publications

- Original
- Letter
- Retrospective
- Review



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Original = Once primary article is published you can publish your model in Physiome

Letter = Minor changes to already existing model not big enough to be a new article

Retrospective = older model from other group

Review = review of models of the same organ etc

Publish on figshare

New publishing model for physiological modelling

Citable
Curated
Version controlled
Modular
Annotated



Discoverable
Reproducible
Reusable



A new publishing model for physiological models is needed, and we try to provide that.

Citable – discoverable, curated and version controlled – reproducible, => reusable.
Even more with modularity (download and combine) and annotation (context) in a perfect world

Open access for immediate download and execution

We will make the model code citable, curated and version controlled, and in the best of worlds modular and annotated.



Our webpage if you want to read more about our philosophy.

10

Reproducibility, reusability, discoverability

Submission, curation and publication system

PHYSIOME SUBMISSION PORTAL

Andre

ACTIVE SUBMISSIONS

ID	Submission Title	Date	Status	Submitter	Assigned	Actions
s000005	Best article ever Karin	July 4, 2019	SUBMITTED	Andre	Assign to me	

[+ CREATE NEW SUBMISSION...](#)

<https://github.com/Physiome/physiome-coko>

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This is our submission system. Log in with ORCID. Code of the system is available open source on github, is anyone is interested. Thank you to coko foundation and Digital Science.

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Submission system



Daniel Hook



Simon Porter



Jared Watts



Collaborative
Knowledge
Foundation

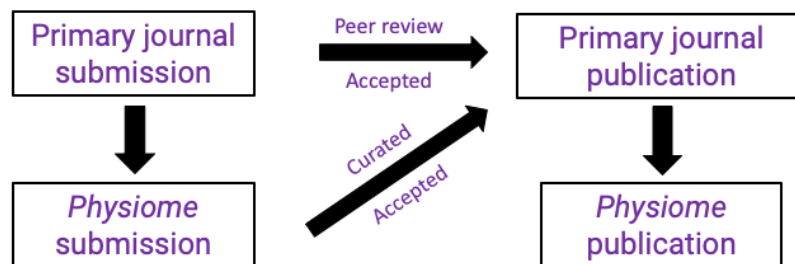


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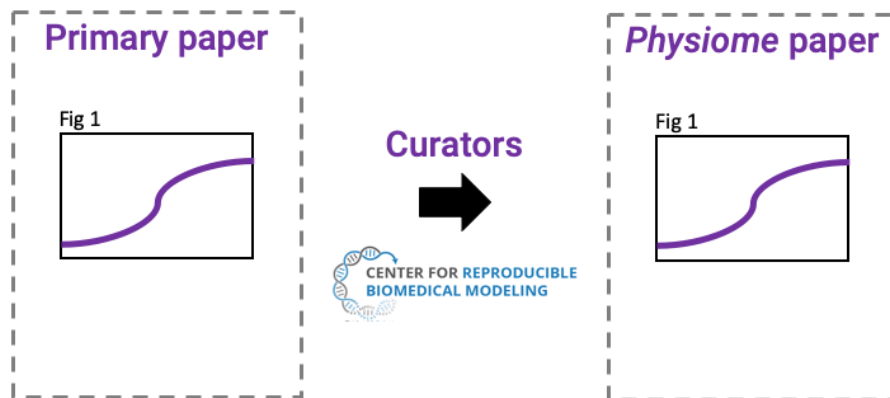
We are building it in collaboration with Digital Science, who have kindly lent us two excellent programmers to develop the submission system.
Digital Science building it on top of the koko foundation.
Code available on GitHub, open source

Dream #1: Simultaneous publishing



Simultaneously submit to Physiome, possibly through the Primary journal.
We do curation and evaluate reproducibility, and report back to the Primary journal.
Primary journal peer review as they normally do.
If the primary journal decides to publish, Physiome will publish after, making the code available at the time the Primary Journal wants.
Complement, not competition. We don't need to be first, we just want to be forever.

Curation



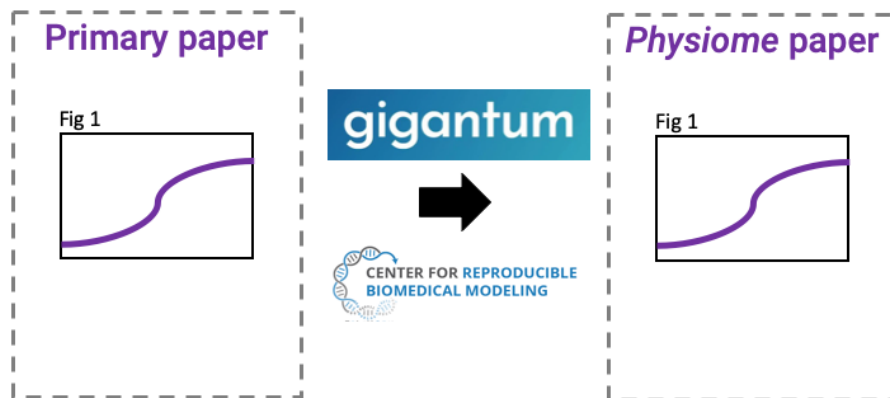
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Another thing that Digital Science is helping us with is the curation. Right now it is manual. Curators download the code and test: run, equations, reproduce predictions and other simulations (the output presented in primary publication) using the submitted code and instructions.

Curation



Collaboration with the Centre for Reproducible Biomedical Modelling -> reproduce model building.
How to capture reproducible workflow and larger scale models – gigantum through Digital Science.

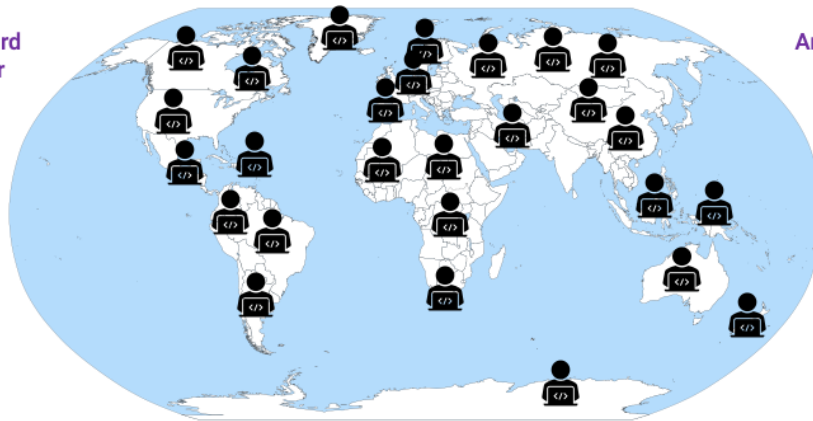


Karin Lundengård
Editor, Curator

Dream #2: Crowd curation



Anand Rampadarath
Curator



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Right now we are two curators: capacity limited by our knowledge of models and programming languages (and biology).

I want a network of curators from everywhere: crowd curation.

Platform where experimentalists can discuss and wish for models, to increase their visibility and usefulness.

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Editorial Board

					
Denis Noble	Peter Hunter	Walter Boron	Andrew McCulloch	Stig Omholt	Daniel Hook

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Stig Omholt, Norwegian University of Science and Technology

Peter Hunter, University of Auckland

Daniel Hook, Digital Science

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Organisations that support Physiome

Reproducible mathematical models of physiological processes

Discoverability
Reproducibility
Reusability



Science quality



Frustration



Summary: Physiome will promote reproducibility (through curated model code), discoverability (citations and open access to the code), both of which support reusability.

So if we increase all of these, we improve the quality of our scientific work and hopefully reduce some of the stress and frustration in our community

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