Making Models FAIR: An educational initiative to build good ABM practices

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Imagine a world where models are available to build upon. You do not have to build from scratch and painstakingly try to figure out how published papers are getting the published results. To achieve this utopian world, models have to be findable, accessible, interoperable, and reusable (FAIR). With the "Making Models FAIR" initiative, we seek to contribute to moving towards this world.

The initiative – Making Models FAIR (https://www.tobefair.org/) – aims to provide capacity building opportunities to improve the skills, practices, and protocols to make computational models findable, accessible, interoperable and reusable (FAIR). You can find detailed information about the project on the website (tobefair.org (https://tobefair.org)), but here we will present the motivations behind the initiative and a brief outline of the activities.

There is increasing interest to make data and model code FAIR, and there is quite a lot of discussion on standards (https://www.openmodelingfoundation.org/ (https://www.openmodelingfoundation.org/)). What is lacking are opportunities to gain skills for how to do this in practice. We have selected a list of highly cited publications from different domains and developed a protocol for making those models FAIR. The protocol may be adapted over time when we learn what works well.

This list of model publications provides opportunities to learn the skills needed to make models FAIR. The current list is a starting point, and you can suggest alternative model publications as desired. The main goal is to provide the modeling community a place to build capacity in making models FAIR. How do you use Github, code a model in a language or platform of your choice, and write good model documentation? These are necessary skills for collaboration and developing FAIR models. A suggested way of participating is for an instructor to have student groups participate in this activity, selecting a model publication that is of interest to their research.

To make a model FAIR, we focus on five activities:

1. If the code is not available with the publication, find out whether the code is available (contact the authors) or replicate the model based on the model documentation. It might also happen that the code is available in programming language X, but you want to have it available in another language.
2. If the code does not have a license, make sure an appropriate license is selected to make it available.
3. Get a DOI, which is a permanent link to the model code and documentation. You could use comses.net (https://comses.net) or zenodo.org (https://zenodo.org) or similar services.
4. Can you improve the model documentation? There is typically a form of documentation in a publication, in the article or an appendix, but is this detailed enough to understand how and why certain model choices have been made? Could you replicate the model from the information provided in the model documentation?
5. What is the state of the model code? We know that most of us are not professional programmers and might be hesitant to share our code. Good practice is to provide comments on what different procedures are doing, defining variables, and not leave all kinds of wild ideas commented out left in the code base.

Most of the models listed do not have code available with the publication, which will require participants to contact the original others to obtain the code and/or to reproduce the code from the model documentation.

We are eager to learn what challenges people experience to make models FAIR. This could help to improve the protocols we provide. We also hope that those who made a model FAIR publish a contribution in RofASSS or relevant modeling journals. For publishing contributions in journals, it would be interesting to use a FAIR model to explore the robustness of the model results, especially for models that have been published many years ago and for which there were less computational resources available.

The tobefair.org (https://www.tobefair.org/) website contains a lot of detailed information and educational opportunities. Below is a diagram from the site that aims to illustrate the road map of making models FAIR, so you can easily find the relevant information. Learn more by navigating to the About (https://tobefair.org/about) page and clicking through the diagram.

(https://roasss.files.wordpress.com/2023/05/fair-fig1.png)
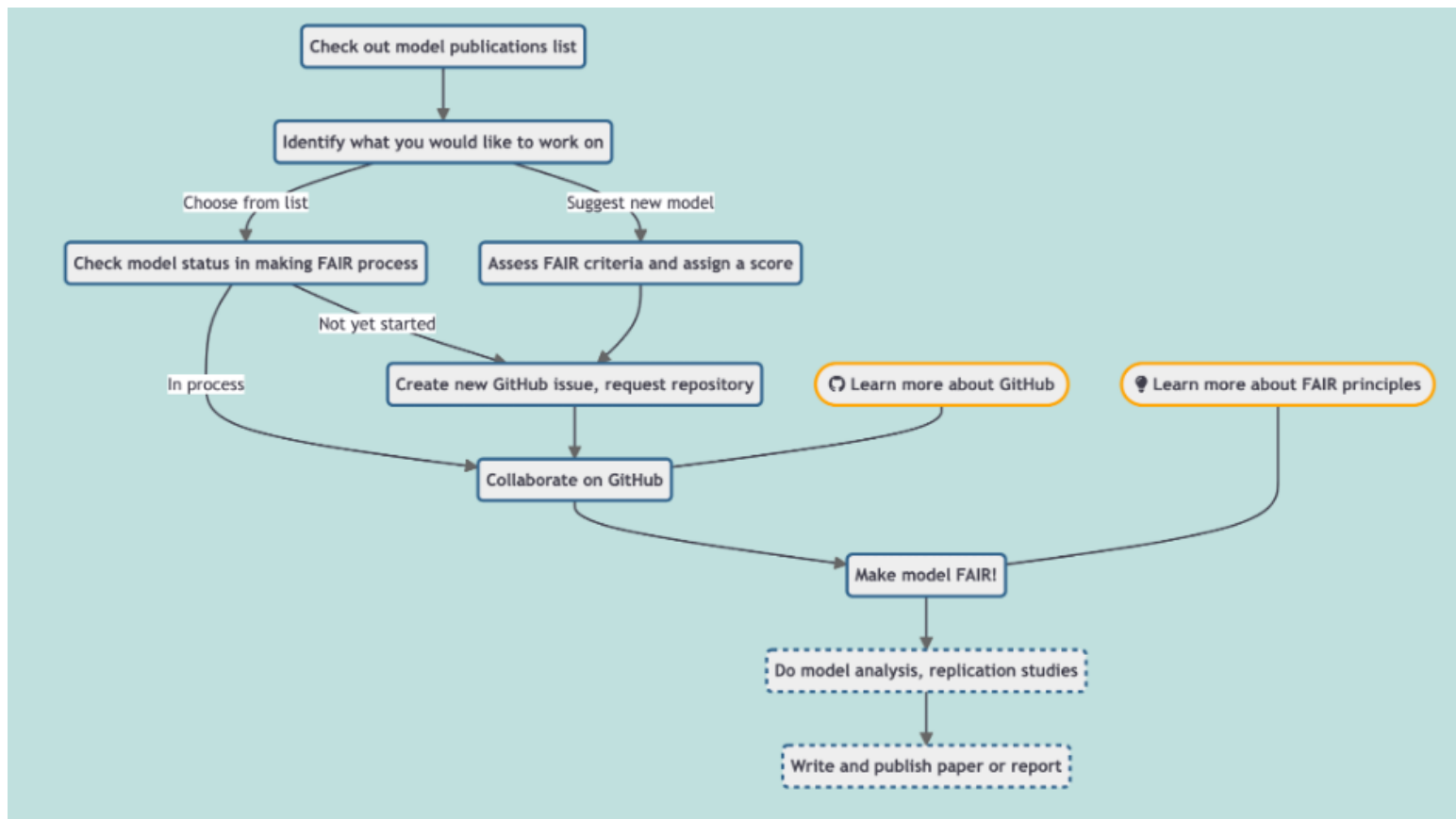
Making simulation models findable, accessible, interoperable and reusable is an important part of good scientific practice for simulation research. If important models fail to reach this standard, then this makes it hard for others to reproduce, check and extend them. If you want to be involved – to improve the listed models, or to learn the skills to make models FAIR – we hope you will participate in the project by going to tobefair.org (https://tobefair.org/) and contributing.

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