Fully Open Engineering-based PhD thesis

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What is the kind of science you always dream of? Is it not one that is along the lines of reproducibility, inclusiveness, transparency, reusability and open accessibility? In trying to answer such questions, I am sharing in this post my four-year PhD journey that ended up in my thesis which, to my knowledge and with the confirmation of the library services, is the first open accessible and reproducible thesis since the establishment of University of Birmingham in 1900.

So, even knowing the time-wise and budget-wise limitations, I adventured myself to start my PhD in November 2014, by, firstly, struggling to put together sentences in a language different from my mother tongue, Spanish, to then the use of new programming languages (e.g. R, python, julia, etc.), open access software applications and tools (e.g., GNU-Linux distributions, version control tools, etc.). Then in May 2015, when I was in the second year of my PhD, I joined twitter with the desired of handing-out with like-minded human beings. In such stage of exploration/procrastination, I bumped into the amazing profile of Olivia Guest (https://twitter.com/o_guest) and all her nice contributions in Github. Then, by the end of 2015, I founded the repositories of Severin Lemaignan, a robotics who is considering himself an open-source enthusiast (https://github.com/severin-lemaignan), who also was as well a role model on how to write up beamer presentation, ros packages, etc. Also that year I met Jon Tennant (https://twitter.com/protohedgehog) who was an eye-opener on making knowledge is a human right and discovering other people like himself with the endeavour of making open science. Then by the third year of my PhD, I was mainly refining experiments, collecting, analysing data and finding ways to make them open accessible and reproducible with the use of GitHub. Hence, I reached the scary fourth year that come along with the challenge of putting together a thesis combining all the previous experiences and skills in open science to the be able to merge them into the final version of my thesis. And the

cherry on the cake was the the discovery of the repository starry by Rodrigo Luger (https://github.com/rodluger/starry) that beautifully embedded links to the python code and various Github websites and repositories such the NVIDIA toronto AI lab (https://github.com/nv-tlabs/meta-sim) that inspire me to the final version of my thesis. So, that was my four-years PhD journey along with the accumulated experiences that allow me to get into open accessible, reproducible and reproducible science by putting together GitHub repositories for the LaTeXproject, data and code, website, zenodo links as well as a video in youtube to just realise that it is only the beginning to keep pushing forward the future of open access and reproducible science.

Recently, Heise and Pearce 2020 [1] pointed out that in the context of open access thesis there are still various challenges in the existing system of formal scientific communication (e.g. performance evaluation of scientific work, speed in the communication process, efficiency, defect resistance and quality assurance, dissemination and accessibility, quality and prevention of misuse and scientific misconduct) and some has been tackled on above entry. So my hope is that others can be inspired and can consider to change the direction of how science has been done by pursing a similar approach to get us closer to a science that is along the lines of reproducibility, inclusiveness, transparency, reusability and open accessibility [2].

References

[1] Christian Heise and Joshua M. Pearce. "From Open Access to Open Science: The Path From Scientific Reality to Open Scientific Communication". In: *SAGE Open* 10.2 (2020). DOI: 10.1177/2158244020915900.

[2] Miguel Xochicale. *Github repository for PhD thesis*. https://github.com/mxochicale-phd/thesis/. Aug. 2019.