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You can download the sources of this presentation here:  
<https://github.com/mxochicale/riots-sth-20200225>

# Fully Open Access PhD Thesis

RIOTS Club @ St Thomas

25th February 2020 for 13h00m  
at Maisey Seminar Room



**Open Access  
PhD Thesis**

Miguel Xochicale, PhD

@\_mxochicale @mxochicale

School of Biomedical Engineering and Imaging Sciences  
King's College London

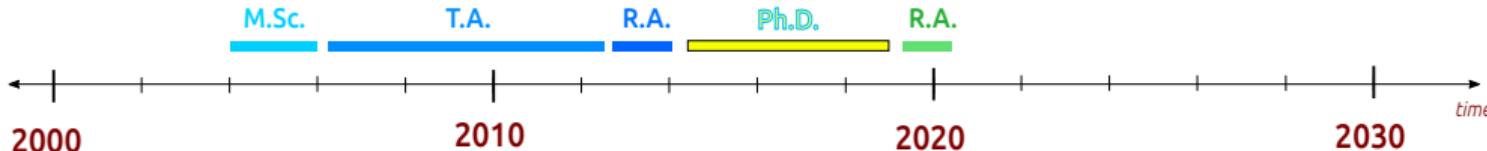
# Outline

1. My journey in Open-Access Science
2. Who to follow?, What to read?, what to heard?
3. What tools I use?
4. My Open-Access PhD Thesis
5. Takeaways

# INTRODUCTION

# My journey as a open-source enthusiast and open-access scientist

- **(2004-2006)** MSc in Signal Processing  
Installed Open Suse and bought my first Arduino
- **(2006-2012)** Teaching Associate in Mechatronics  
Using OpenSuse, Arduino, LaTeX, and Free Software tools.
- **(2013-2014)** Research Assistant in Robotics at INAOE  
Discovered R and GitHub [[@jwf-zz/tdetools](#)]
- **(2014-2019)** PhD student in Robotics at Uni of Bham  
Role models: open-access scientist [[@o\\_guest](#)]  
& open-source enthusiast [[@severin-lemaignan](#)]
- **(2019-present)** Research Associate in Ultrasound-Guidance Intervention at KCL  
Continuously-integrated Open-source Reproducible TeX [[@rodluger/corTeX](#)]



PEOPLE

Olivia Guest (pro-#openscience)

The screenshot shows the GitHub profile of Olivia Guest. At the top, there's a large photo of her face. Below it, her name "Olivia Guest" and the title "collagelist" are displayed. To the right, there are sections for "Contributions", "Organizations", and "Repos". The main area shows her GitHub stats: 363 contributions in the last year, 133 forks, 133 stars, and 133 issues. There are also sections for "Popular repositories", "Recent activity", and "Projects". A sidebar on the left lists her GitHub roles: "Collaborator" and "Owner" for "collagelist".

ReScience organization

Reproducible Science is good. Replicated Science is better.

Bordeaux <https://frescience.github.io>



 [Repositories](#) 11

[rescence.github.io](https://rescence.github.io)  
Machine learning website tutorials



Top languages

- TEX
- Python

The ReScience journal. Reproducible Science is Good. Replicated Science is

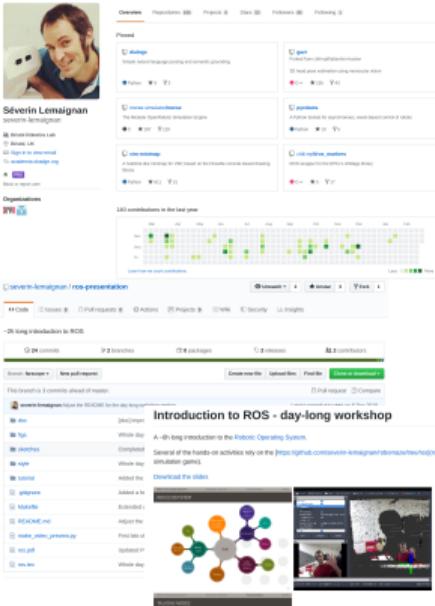
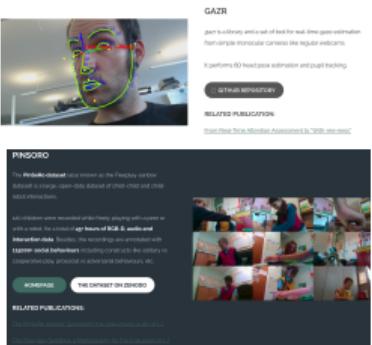
journal · revision · computational-science · peer-reviewed

ReScience-submission  
ReScience submission repository



 <https://github.com/oliviaguest>

Severin Lemaignan (open-source enthusiast)



# Who to follow?, What to read? & what to heard?

## Open Science Advocates



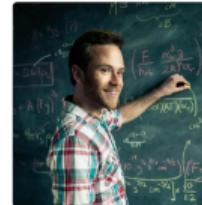
**Dr. Rachael Ainsworth**  
@rachaelainsworth  
@Gfauweraund Community Manager & #OpenScience advocate @OfficiumLumis. ♀  
@H2020radio Astrophysicist. ☀️ @OpenAdvocates @OpenData @T2Dx Speaker |  
shyner  
Manchester, England. ♂ | rachael@rhinkie.co.uk | Joined April 23, 2018  
1,094 Following 1,887 Followers



**Ulrich Dirnagl**  
@dirnagl  
orobio@080-800-8753...  
Berlin, Germany. ♂ | @kaglLines | Joined December 2009  
96 Following 1,380 Followers



**Corin A. Logan**  
@LoganCorin  
Are graphics invisible because they're dead? @TheGreatProject Senior  
Researcher. I'm a scientist. I'm a writer. I'm a nerd. I'm a geek.  
I'm Logan, coming to @CorinLogan | Joined September 2012  
1,275 Following 1,915 Followers



**Rodrigo Luger**  
rodluger

Astronomer at the Center for Computational  
Astrophysics  
Flatiron Institute  
New York, NY  
<https://rodluger.github.io>



**Björn Brembs**  
@Brembs  
Professional student of Neurogenetics @neurobiology\_Insurancen  
#OpenScience @openbrembs.net lab.Brembs.net  
Bremen, Germany. ♂ | brembs | Joined June 2008  
998 Following 8,673 Followers



**Jon Tennant**  
@ProfTennant  
Nomadic rogue scientist. Latest book: <http://openscience-reviews.com/>  
@BookReviewsUK.com | Joined August 2011  
642 Following 17,2K Followers



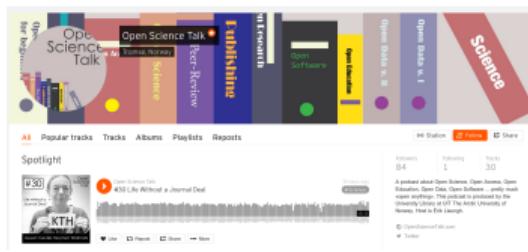
**Rebecca Willén**  
@rmwillen  
Scientist & Psychologist, Founding Director @EDCUREinstitute. Fan of science,  
scientists, independence and freedom.  
Sweden. ♂ | rmwillen | Joined July 2017  
401 Following 1,113 Followers

## Podcasts



**SCIENCE FOR PROGRESS**  
Because Science is Fundamental in the 21st Century  
[scienceforprogress.eu](http://scienceforprogress.eu)  
support us on Patreon!

**Science For Progress - Science Advocacy**  
@SciForProgress  
#Science and Humanities, and their interaction with Society and Governance.  
Podcast and Twitter rotating curation @S7Pmou, @DennisEckmehl!  
Germany | scienceforprogress | Joined August 2017  
1,547 Following 3,320 Followers



**Open Science Talk** | Peer-Review | Publishing | Software | Open Access | Open Data | Science

All Popular tracks Tracks Albums Playlists Reports

**Spotlight**

430 Life Without a Journal Deal

Answers 64 Following 1 Tracks 210

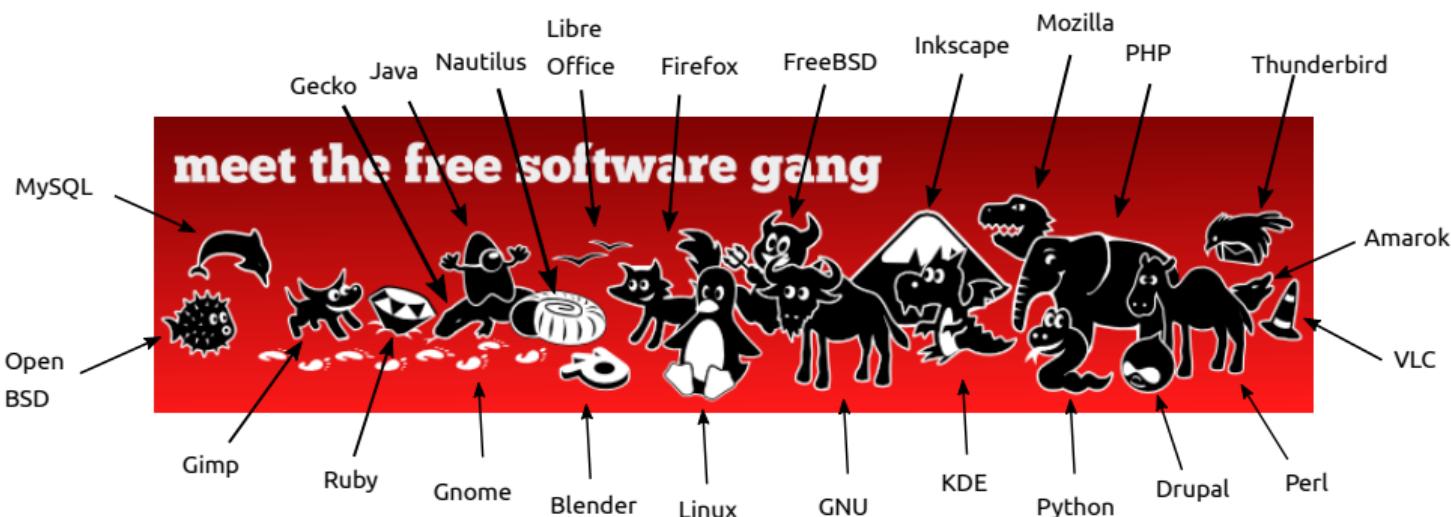
A podcast about Science, Open Access, Open Data, Open Software – pretty much every anything. This podcast is produced by the International Society for Open Knowledge (ISOKE). Host is Eric Langer.

OpenScienceTalk.com

TOOLS

# Free Software

“Free software” means that the users have the freedom to run, copy, distribute, study, change and improve the software



# Open Source Software

"The promise of open source is higher quality, better reliability, greater flexibility, lower cost, and an end to predatory vendor lock-in."



# My Collection of Scientific Tools



LATEX



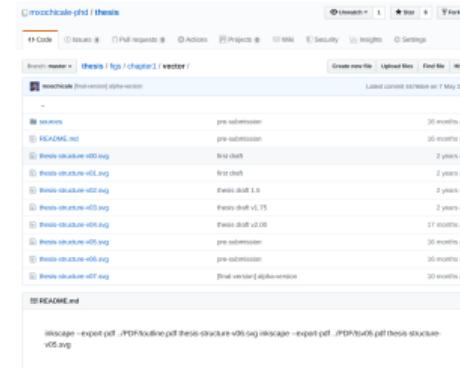
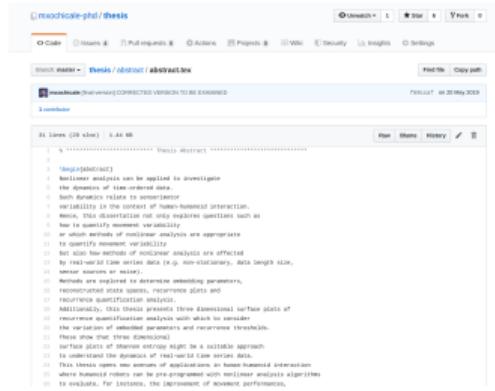
 <https://github.com/mxochicale/tools>

*The tools we use have profound (and devious!) influence on our thinking habits, and therefore, on our thinking abilities.*

PHD THESIS

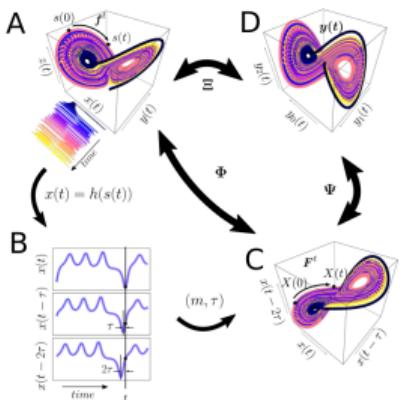
# LATEX and vector files

# LATEX

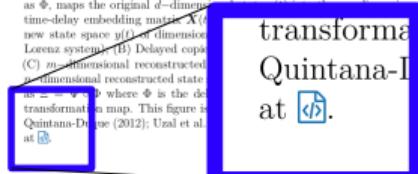


# Embedded code in Figures

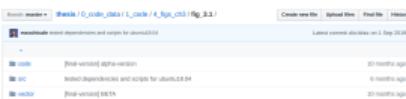
Nonlinear Analysis



**Fig. 3.1 State space reconstruction methodology.** State space reconstruction is based on  $x(t) = h[s(t)] = h[f^t[s(0)]]$  where  $h[]$  is a function  $h : M \rightarrow \mathbb{R}$ , defined on the trajectory  $s(t)$ .  $f$  is the true dynamical system,  $f : M \rightarrow M$ , defined as evolution function and  $f^t$ , with time evolution  $t \in \mathbb{N}$  which is the  $t$ -th iteration of  $f$  that corresponds to an initial position  $s(0) \in M$ . The time-delay embedding represented as  $\Phi$ , maps the original  $d$ -dimensional time-delay embedding matrix  $X(t)$  (new state space  $y(t)$ ) of dimension  $(d, m, \tau)$  into a  $(m, d\tau)$ -dimensional reconstructed state space (e.g. Lorenz system); (B) Delayed copies; (C)  $m$ -dimensional reconstructed state space  $X(t)$ ; (D)  $m$ -dimensional reconstructed state space  $\tilde{X}(t)$ ; (E)  $m$ -dimensional reconstructed state space  $\tilde{X}(t)$ .  $\Phi$  is the delay embedding map;  $\Psi$  is the transformation map. This figure is Quintana-Díaz et al. (2012); Uzal et al. (1991); available at [DOI](https://doi.org/10.4236/ojs.2012.21111).



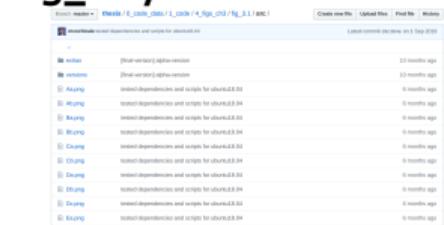
fig\_3.1



fig\_3.1/code



fig\_3.1/src



fig\_3.1/vector

## More with GitHub

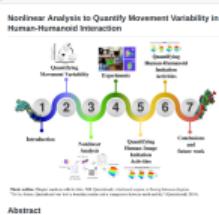
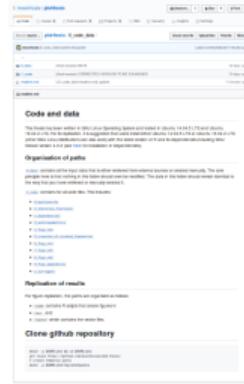
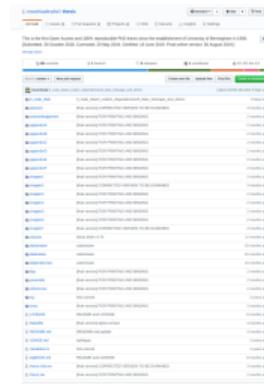


A screenshot of a web browser showing the "Open Access PhD Thesis Logo" page. The page has a light blue header with the text "Open Access PhD Thesis Logo". Below the header is a large green circular graphic containing a white flask with liquid, a blue bar chart icon, an orange padlock icon, and a brown graduation cap icon. The text "Open Access PhD Thesis" is overlaid in the center of the circle. At the bottom of the page, there are sections for "Usage" (with a "Get" button), "About" (with a "View source" link), and "Attribution" (with a "Attribution" link). A footer at the very bottom contains the URL "http://igitur-archive.unimaas.nl/thesis/logo" and the text "Digitized by the University Library Maastricht".

# FIRST Open Access PhD Thesis at UoB (since 1900)



<https://github.com/mxochicale-phd/thesis>



<https://doi.org/10.5281/zenodo.1473140>

Submitted: 26 October 2018/Corrected: 20 May 2019.

Certified: 18 June 2019/Final online version: 30 August 2019.

## OA PhD Thesis

- \* LaTeX project
- \* Vector files

## OA DATA

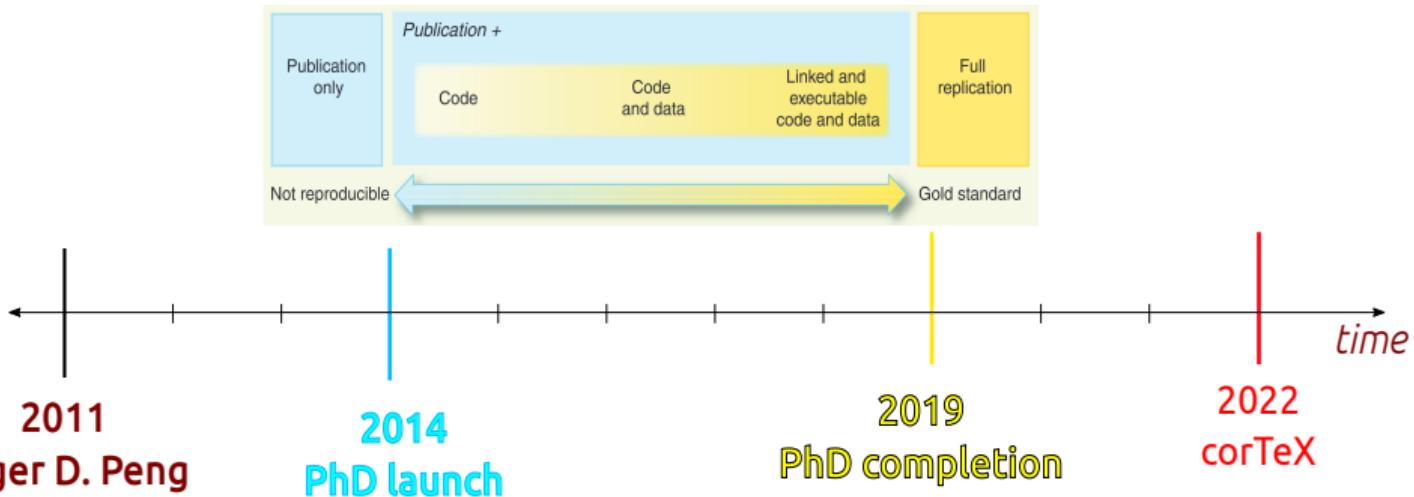
- \* Multidimensional Times-series
- 22 participants,
- 4 IMUs (6 axis), and
- 4 Activities.

## OA SOFTWARE

- \* R version 3.4.4 (2018-03-15)
- \* R packages:
  - data.table
  - ggplot2
  - tseriesChaos
  - nonlinearTseries
  - RccArmadillo
- \* GNU Octave 4.0.2

# TAKEAWAYS

# My journey in OA according to the Reproducibility Spectrum



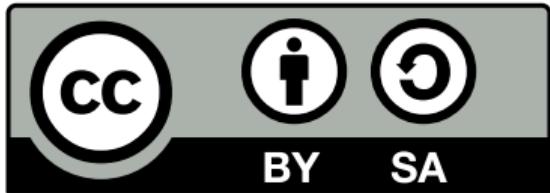
## Takeaways

1. Learn from other open access scientists and open source enthusiasts (there are quite amazing human beings in  and )
2. Make use of free and open source software and hardware as much as you can, and perhaps also contribute to it. (happy to help!)
3. Read, replicate, learn, fail, share and do not stop exploring the exciting world of open access science!



## References

- 
- Xochicale Miguel
- 
- » Nonlinear Analysis to Quantify Movement Variability in Human-Humanoid
- 
- Interaction «
- 
- Open Access Ph.D. Thesis (2019)
- 
- <https://github.com/mxochicale-phd/thesis>



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