Publishing Computational Research and Open Science Publishing

*CHIST-ERA workshop on Open Science in transnational research, 5.3.2020*

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Generation Research / a needs based approach to researchers

Software Citation
Imagine if no one had cataloged books for the last 50 years, this is what happened to software!

Climate Change and Open Science - Open Energy Modelling
Open Science is key to having verifiable energy simulations — essential to planning long term government energy policies.
Platforms

Computational research publishing and open science publishing

- Address Open Science questions: replicability, reproducibility, etc
- Real-time runtime environment: software, code, data, paper, etc.
- Jupyter Notebook
- Containerized runtime environments: Binder, Popper, o2r.
- Joining with conventional publishing platforms: PKP + o2r - explored at OJSde workshop Heidelberg UP

Some things about Jupyter Notebooks

Why so popular?
Democratising Data Science

Because you can code, make charts, share and reuse them on the web

Predication
In the near future all papers will be written in Jupyter Notebooks (like) authoring environments

- “reproducibility” as in independent people analyzing the same data
- peer review of data and research
What is Jupyter Notebooks

Jupyter Notebooks are a way in which you can write and execute code in the browser

‘Jupyter Notebooks in Higher Education’ - GenR

https://genr.eu/wp/jupyter/

Interactive diagrams

Plotly library
https://plot.ly/python/chart-studio/
Creative Commons Legal Code Attribution 3.0 Unported
https://github.com/plotly/documentation/tree/source-design-merge/_posts/python/chart-studio/ipython-notebooks/
A research paper in Jupyter

- Peer review of research
- Paper on Arxiv
- Experiments and figures as MyBinder

Image: Stephan Rasp @raspstephan 3 July 2019
https://mobile.twitter.com/raspstephan/status/1146325984267898881
https://github.com/raspstephan/Lorenz-Online
https://arxiv.org/abs/1907.01351 Attribution 4.0 International (CC BY 4.0)
Platforms Continued: In context

Advantages of open modeling

- Eradicate privileged/path dependencies of existing closed models
- Improve quality / robustness through multiple users
- Expand existing models instead of having to start from the beginning
- Enable other researchers → More model runs
- Increase transparency
- Community building initiatives
- Better results and higher acceptance for results

Open Energy Modelling
Two communities:
- Open Energy Modelling Initiative
- OpenSay

Open Climate Knowledge #OCK

Use data mining and Peter Murray-Rust’s ContentMine software make a plan for 100% open research <30% open

Invitation:
Energy bridge meeting of modeling community, civil society organizations and interested public
Saturday, 18.01., DIW Berlin
Over the horizon

- **Infrastructure as Code: IaC**
  - Terraform
    Containers, Docker, Kubernetes, cloud provision

- Data mining and semantification of research
  - Powerful APIs: Europe PMC

- Semantification of research: JATS (MECA), knowledge graphs and WikiData

- FOSS
  - Made so that others really can really use: PKP is a good example.

- Research Software Engineering
- Software libraries: e.g., Software Heritage

```terraform
resource "google_container_cluster" "primary" {
  name               = "${var.gke_cluster_name}"
  region             = "${var.gke_cluster_region}"
  initial_node_count = "${var.gke_node_count}"
  min_master_version = "${var.gke_version}"

  labels {
    cluster       = "fiduswriter-runtime"
    environment   = "${var.gke_environment}"  
  }
}
```
Transnational questions

- PKP OPS/OJS/OMS
  - Translation: Weblate
  - Economic models: AmeliCA
    - free to publish, free to read
- Wikidata stemming words
- Open energy modelling: clear licencing and problems with ambiguous terms and non-profit definitions.
- DOI pairing on translations: FAIR data on FORCE11: FOSTER open science manual
- Economic models of platform provision: PKP
Thank you!

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