



# BioDynaMo Lab

CERN openlab summer student Lightning talks 2021



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# BioDynaMo

Source: Breitwieser et al. 2021, <https://doi.org/10.1101/2020.06.08.139949>  
<https://zenodo.org/record/4501515>

- Open-source, high performance, and modular agent-based simulation platform.
- Solves some of the problems In silico simulations have due to
  - Moore's law
  - Dennard Scaling
- BioDynaMo system properties:
  - Agent-based
  - General Purpose
  - Large Scale
  - Easily Programmable
  - Quality Assured



# Project Goals

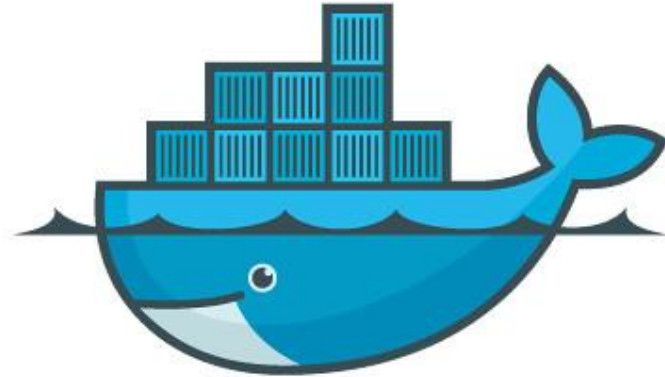
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- **Automate the build process** of the Jupyter notebook Docker containers with the **latest master build of BioDynaMo**
- Transfer from classic **Jupyter to Jupyterlab**
- **Create two templates** for developing BioDynaMo in the browser:
  - Compiled-mode
  - Interpreted-mode

# Implementation Challenges

Source: Breitwieser et al. 2021, <https://doi.org/10.1101/2020.06.08.139949>  
<https://zenodo.org/record/4501515>

- Dockerize Biodynamo with all its dependencies in a single container.

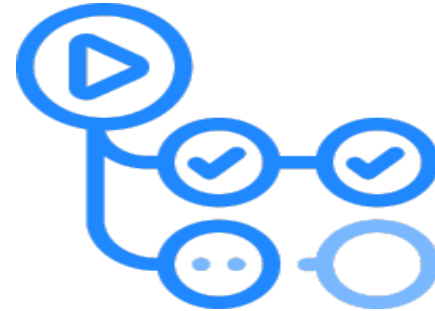
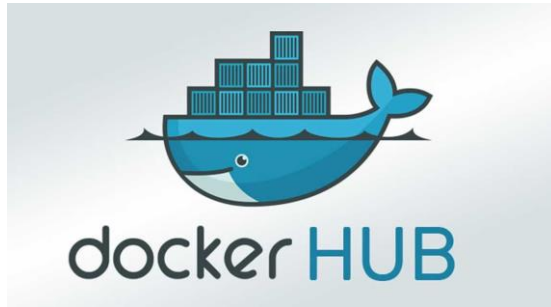


docker

# Implementation Challenges

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<https://zenodo.org/record/4501515>

- The Next Step was to push the container to Docker Hub.
- First we tried to Use Docker Hub to automatically create new Container Images but it became a paid service so we switched to Github Actions

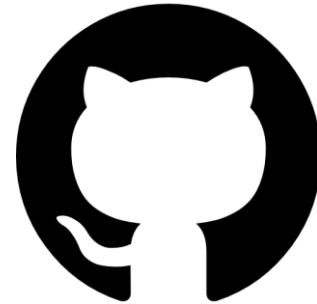


# Implementation Challenges

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<https://zenodo.org/record/4501515>

- Wrote YAML Scripts to **setup Github Actions** to ensure DockerHub Repository contains latest BioDyanmo Images as Github Repository.
- Used **Github Secrets to Authenticate** with Docker Hub.

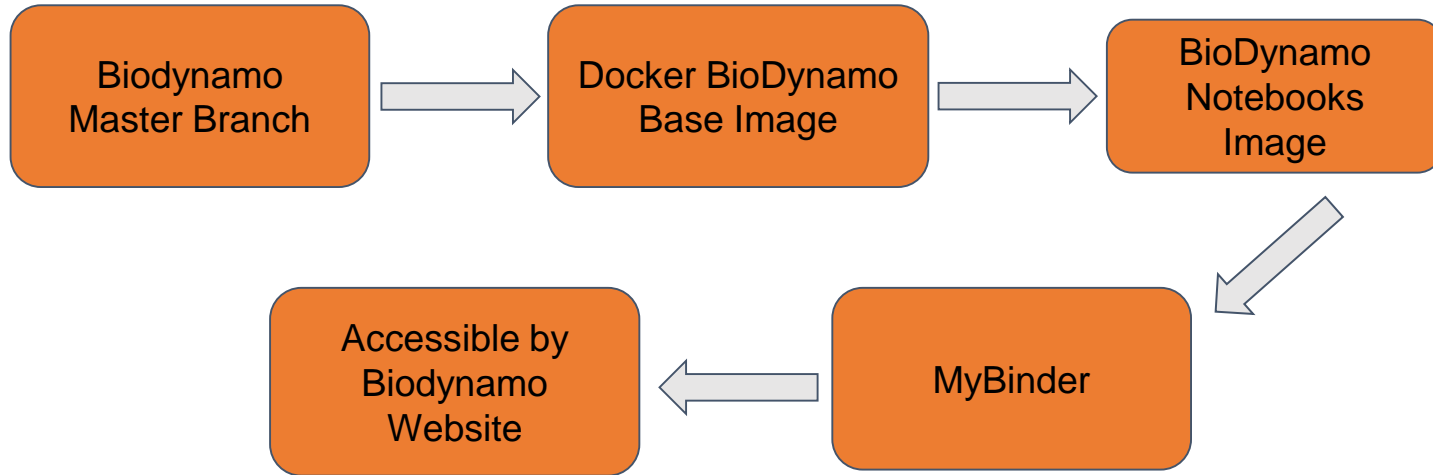
# GitHub



# Implementation Challenges

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<https://zenodo.org/record/4501515>

- Desired Build Process



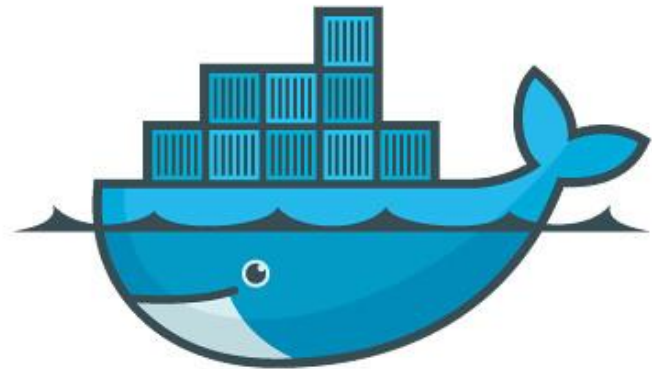


# Easier To Get Started with BioDynamo

Source: Breitwieser et al. 2021, <https://doi.org/10.1101/2020.06.08.139949>  
<https://zenodo.org/record/4501515>

- BioDynamo Container Available on Docker-hub with all Prerequisites Installed.
- Each Latest Version of Biodynamo is Pushed to DockerHub.
- Can be easily used as base images for Custom containers using BioDynamo  

```
FROM biodynamo/notebooks:latest
```
- Anyone can pull a container from Dockerhub and explore it without installing additional dependencies.



docker

# Making BioDynamo More Accessible

Source: Breitwieser et al. 2021, <https://doi.org/10.1101/2020.06.08.139949>  
<https://zenodo.org/record/4501515>

- **Easy To Run** Jupyter Notebooks Available on BioDynamo Website.
- Notebooks can be **Executed in Browser** using My-Binder.





# QUESTIONS?

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