



# **HBP Collaboratory**

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Application Development

<https://collab.humanbrainproject.eu/#/collab/54/nav/368>

HBP Code Jam Workshop 7

Olivier Amblet, 12 Jan 2016



# Today:

## Getting started with HBP Collaboratory app development

- Now
  - HBP Collaboratory in 2'
  - Example of apps
  - Getting Started
  - Roadmap & Conclusion
- 3:30 to 5pm
  - Collaboratory App Development Tutorial

HOME COLLABS HELP FEEDBACK

How to develop Apps

Workspace

Apps Manager

### Register a new App

Title

Required, the perfect title is descriptive of what your app is doing.

Description

Required, a fuller description of the app.

Main URL

Required, a HTTPS URL to the runnable view of the app.

Edit URL

Optional, a HTTPS URL to the configurable view of the app.

Human Brain Project, 2015



# **2' introduction**

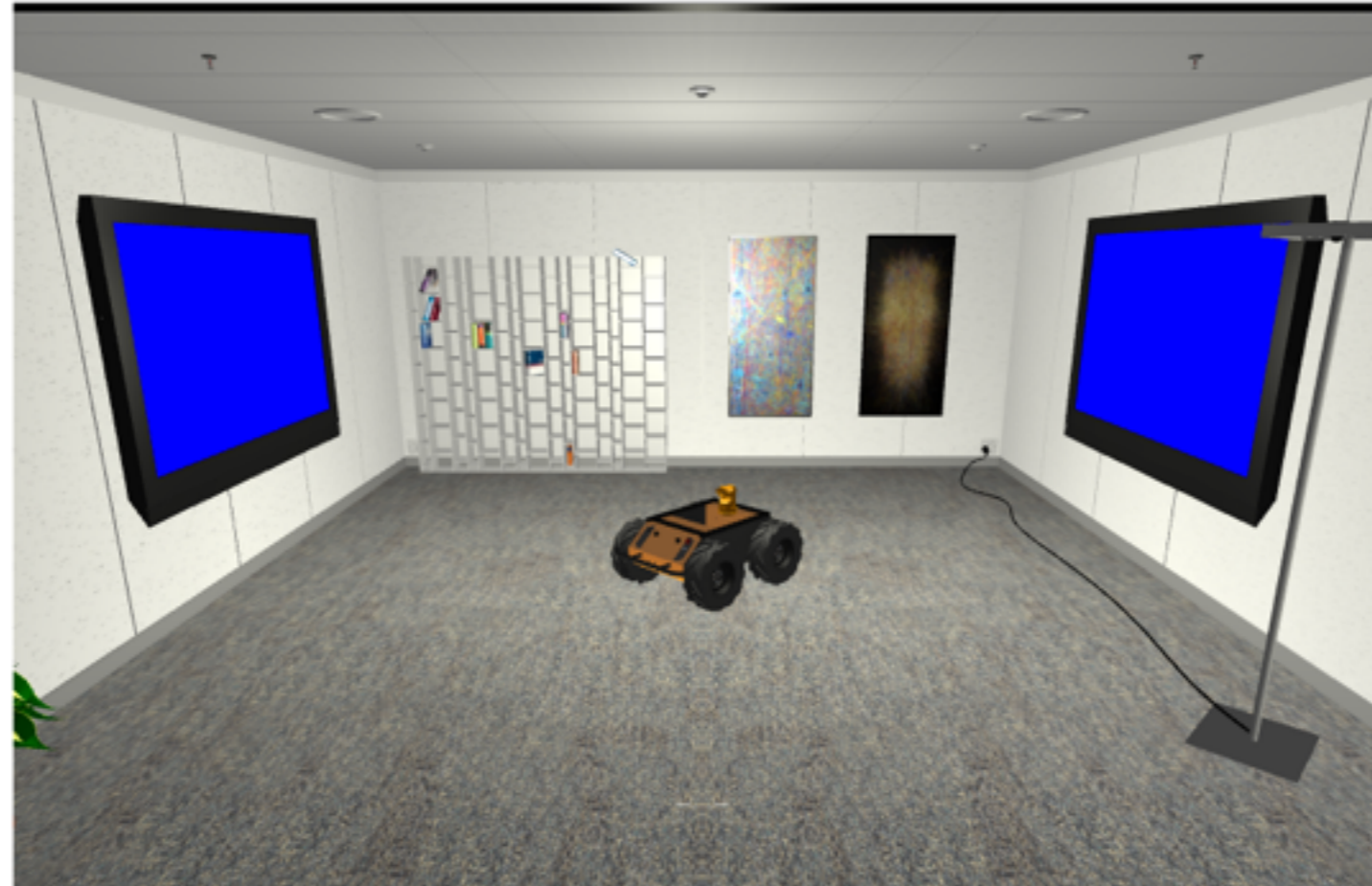
Neurorobotics Platform

Navigation

- Overview
- Platform
- Documentation
- Dev Platform
- Team
- Settings
- Storage
- TestExperiment

Workspace

Dev Platform



⏸ ■
 Simulation time: 00 00:01:54  
 Real time: 00 00:01:57  
 Timeout: 00 00:01:18

📍 🔍 📊 👁 🎨 🔄 ?

Human Brain Project, 2015

Collaboration


*This is the very beginning of the current collab's chat. Start using it to collaborate*

Send a message

Activity

Provenance

# Discover, Explore, Experiment

Discover the HBP software ecosystem

Explore, visualise and share **data**

Access **scientific tools**

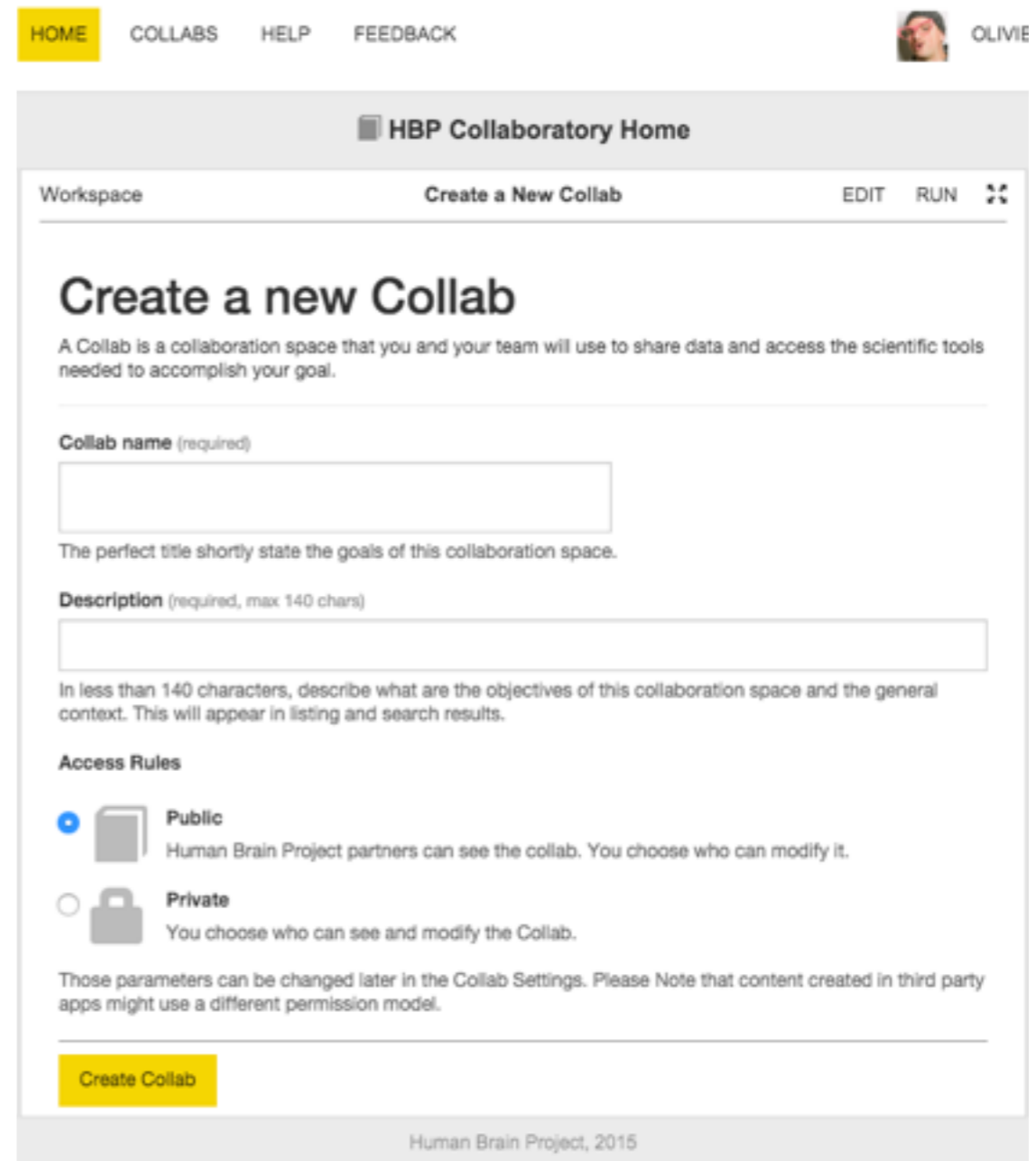
Enable **collaborative work** on neuroscience project

# Create Your Collab

A team of scientists create a Collab.

A “collab” is a team space to:

- **Collaborate** with all your partners on a scientific project
- **Explore and share** research data and resources
- Access the HBP Platforms via dedicated **Apps**



The screenshot shows the 'Create a New Collab' form on the HBP Collaboratory Home page. The page has a navigation bar with 'HOME' (highlighted in yellow), 'COLLABS', 'HELP', and 'FEEDBACK'. A user profile for 'OLIVIE' is visible in the top right. The form itself is titled 'Create a new Collab' and includes a sub-header 'Workspace' with 'Create a New Collab', 'EDIT', and 'RUN' options. The form fields are: 'Collab name (required)' with a text input box and a note 'The perfect title shortly state the goals of this collaboration space.'; 'Description (required, max 140 chars)' with a text area and a note 'In less than 140 characters, describe what are the objectives of this collaboration space and the general context. This will appear in listing and search results.'; and 'Access Rules' with two radio button options: 'Public' (selected) with a folder icon and the text 'Human Brain Project partners can see the collab. You choose who can modify it.', and 'Private' with a lock icon and the text 'You choose who can see and modify the Collab.'. A note at the bottom of the form states: 'Those parameters can be changed later in the Collab Settings. Please Note that content created in third party apps might use a different permission model.' A yellow 'Create Collab' button is at the bottom of the form. The footer of the page reads 'Human Brain Project, 2015'.

Superb Project Experiment

Navigation

- Overview
- Team**
- Storage
- Settings

Workspace

Team

EDIT RUN

Navigation Label

Team

type user name

Team members



Olivier Amblet (editing)

Role

Product Owl

Save

Remove User



Jean-Denis Courcol

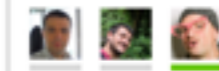
Lead Developer - Systems Engineer, EPFL



Stefano Zaninetta

Software Engineer, EPFL

Collaboration



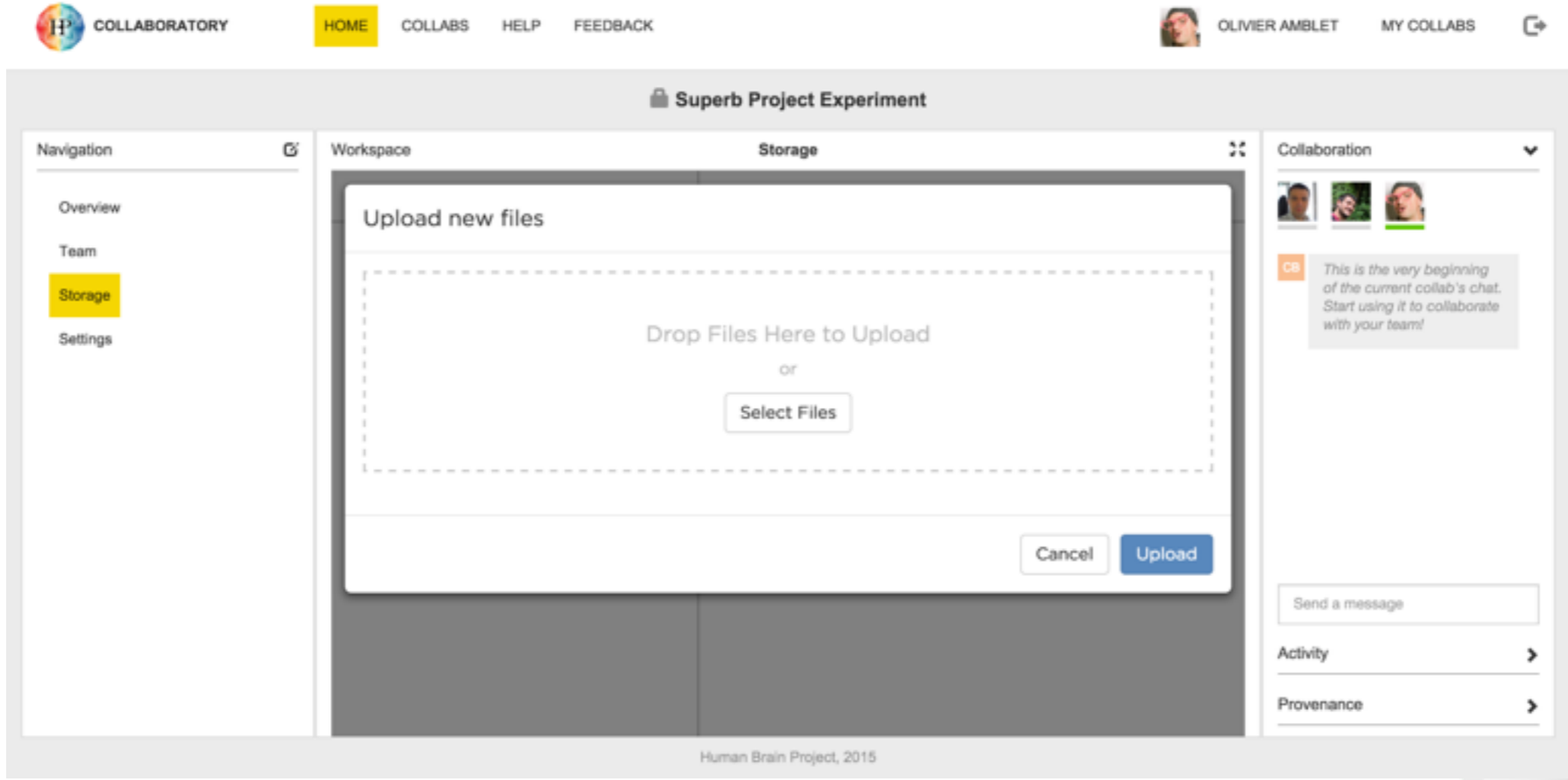
This is the very beginning of the current collab's chat. Start using it to collaborate with your team!

Send a message

Activity

Provenance

**Build your team**



# Share Data

Use our Cloud Storage to share scientific data among the team

COLLABORATORY HOME COLLABS HELP FEEDBACK OLIVIER AMBLET MY COLLABS

### Superb Project Experiment

Navigation **ADD**

- Overview
- Team
- Storage
- Settings

Workspace **Add To Collab**

New Navigation Item  All

- FO** **Folder**  
Create a folder + Add to Navigation
- AT** **Add To Collab**  
User form to add new entries to a Collab + Add to Navigation
- AM** **Apps Manager**  
Provide a UI that let's user register new Collaboratory Apps. It can be used to edit the registered informations of existing Apps. + Add to Navigation
- AM** **Assign ME-type**  
Assign a morphological and electrical type per cell position + Add to Navigation
- AM** **Assign Morphology**  
Assign the morphology to each position + Add to Navigation
- AS** **Assign Synapse Class**  
Using previously selected regions, assign an Excitatory or Inhibitory type + Add to Navigation

Collaboration

*This is the very beginning of the current collab's chat. Start using it to collaborate with your team!*

Send a message

Activity >

Provenance >

Human Brain Project, 2015

**Apps makes your collab unique**





# Families of app

- **Core App**

Completely new apps developed by the Collaboratory team to support key Collaboratory services: [M30]identity, [M30]cloud storage, [M30]notification

- **Integrated App**

Collaboratory team developed integrations of well known external applications (eg: Jupyter notebook).

- **Platform App**

Apps provided by the HBP Platform teams to support key functionality for end-users.

- **Community App**

Applications that are developed by the community. These are deployed by the Collaboratory Team, but developed and supported by the community.

- **3rd party App**

- None of these yet, but already we already have interest from a number of neuroscientific industrial product vendors.

The screenshot shows the HBP Collaboratory Home page. At the top, there is a navigation bar with the HBP logo, the word 'COLLABORATORY', and links for 'HOME', 'COLLABS', 'HELP', and 'FEEDBACK'. On the right, a user profile for 'OLIVIER AMBLET' and a 'MY COLLABS' link are visible. The main content area is titled 'HBP Collaboratory Home' and is divided into three columns: 'Navigation', 'Workspace', and 'Collaboration'. The 'Navigation' column contains links like 'Getting Started', 'Create a New Collab', 'My Profile', 'HBP Websites', 'Platform Collaboratories', 'Software Catalog' (highlighted), 'Roadmap', 'App Development', and 'Co-design Projects'. The 'Workspace' column features a search bar with the text 'Enter your search terms' and a list of software items: 'eFEL library' (Electrophys Feature Extraction Library, v2.7.7), 'Elephant library' (Electrophysiology Analysis Toolkit, v0.2.0), 'FLATIndex tool' (Spatial Indexer (FLATIndex) Tool for the Blue Brain Project, v1.7), 'Functionalizer tool' (Functionalizer is used by the Blue Brain Project to build a functional circuit by applying a series of filters to the structural circuit..., v3.5), and 'GABAergic cell fractions per Layer Validation task' (Gabaergic cell fractions per layer circuit validation). A link at the bottom of the workspace says 'Learn how to add your software to the HBP Software Catalog'. The 'Collaboration' column shows a chat interface with messages from 'Yesterday' and 'Today', including 'So good to have the SGA1 submitted' and 'Congrats for the SGA1 submission milestone!'. There is also a 'Send a message' input field and links for 'Activity' and 'Provenance'. The footer of the page reads 'Human Brain Project, 2015'.

# Software Catalog [Core App]

Find/Register HBP libraries, tools, app, web service and more.

The code you produce should be advertised here if you want other people to see it.  
*You should want other people to see it.*

COLLABORATORY HOME COLLABS HELP FEEDBACK OLIVIER AMBLET MY COLLABS

Superb Project Experiment

Navigation ADD

- Overview
- Team
- Storage
- Settings
- Assign EI type to positions
- Jupyter Notebook

Workspace Jupyter Notebook EDIT RUN

```
In [18]: !pip install requests
import requests;

Requirement already satisfied (use --upgrade to upgrade): requests in
./local/lib/python3.4/site-packages
Cleaning up...

In [19]: resp = requests.get('http://xkcd.com/info.0.json')
data = resp.json()
data['img']

Out[19]: u'http://imgs.xkcd.com/comics/fire_ants.png'

In [20]: from IPython.display import Image
Image(data['img'])

Out[20]:
```

I'M HAVING SECOND THOUGHTS ABOUT GRAND SCHOOL AND COULD USE SOME ADVICE.

CONSIDER THE FIRE ANTS. WHEN THERE'S A FLOOD, FIRE ANTS SURVIVE BY JOINING TOGETHER INTO GIANT FLOATING RAFTS.

WAIT, WHAT LESSON AM I SUPPOSED TO TAKE FROM THAT?

ANTS ARE SO COOL!

...YOU'RE NOT BIG ON METAPHORS, ARE YOU.

I AM BIG ON ANTS.

Human Brain Project, 2015

Collaboration

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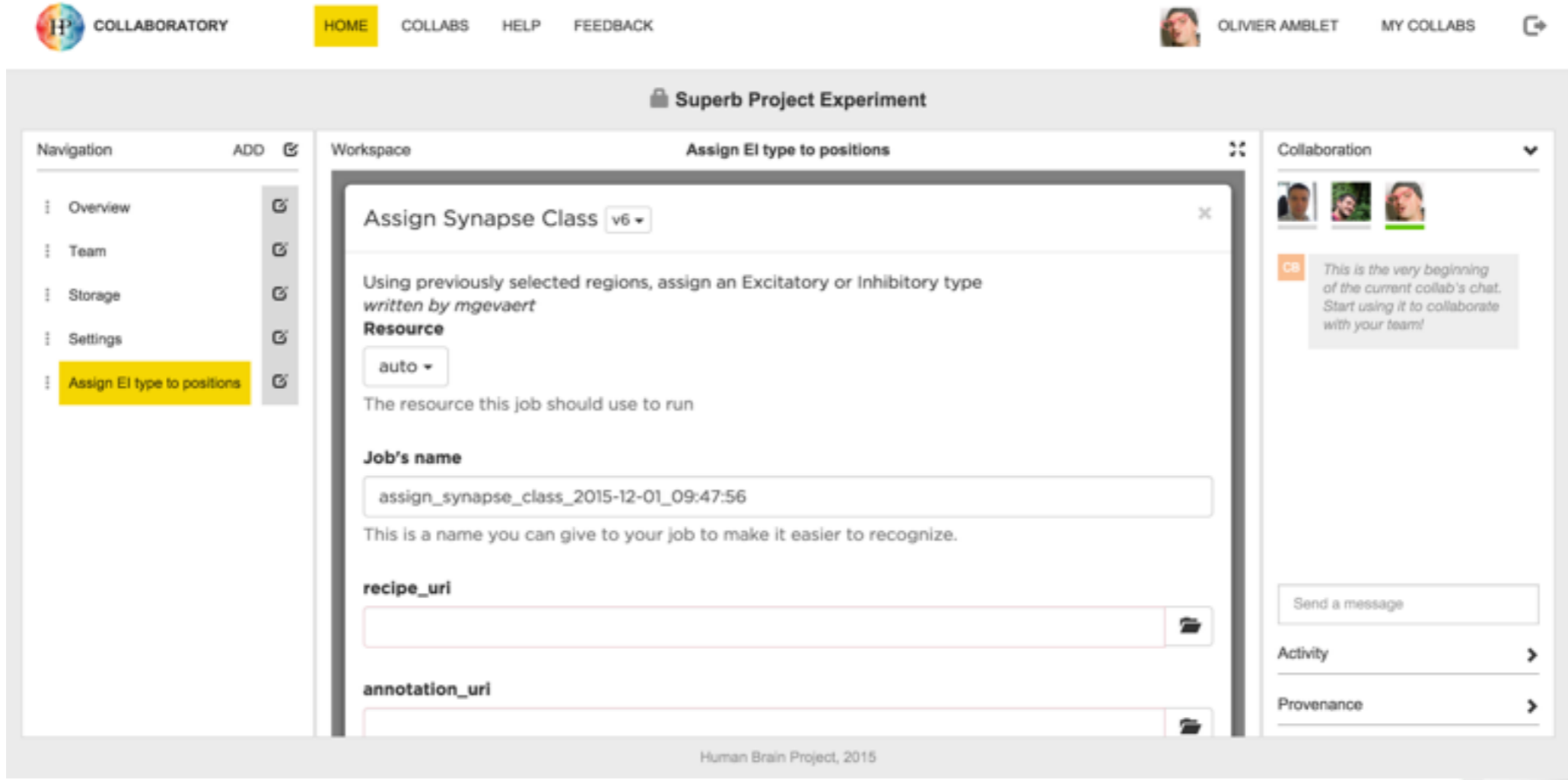
Send a message

Activity

Provenance

# Jupyter Notebook [Integrated App]

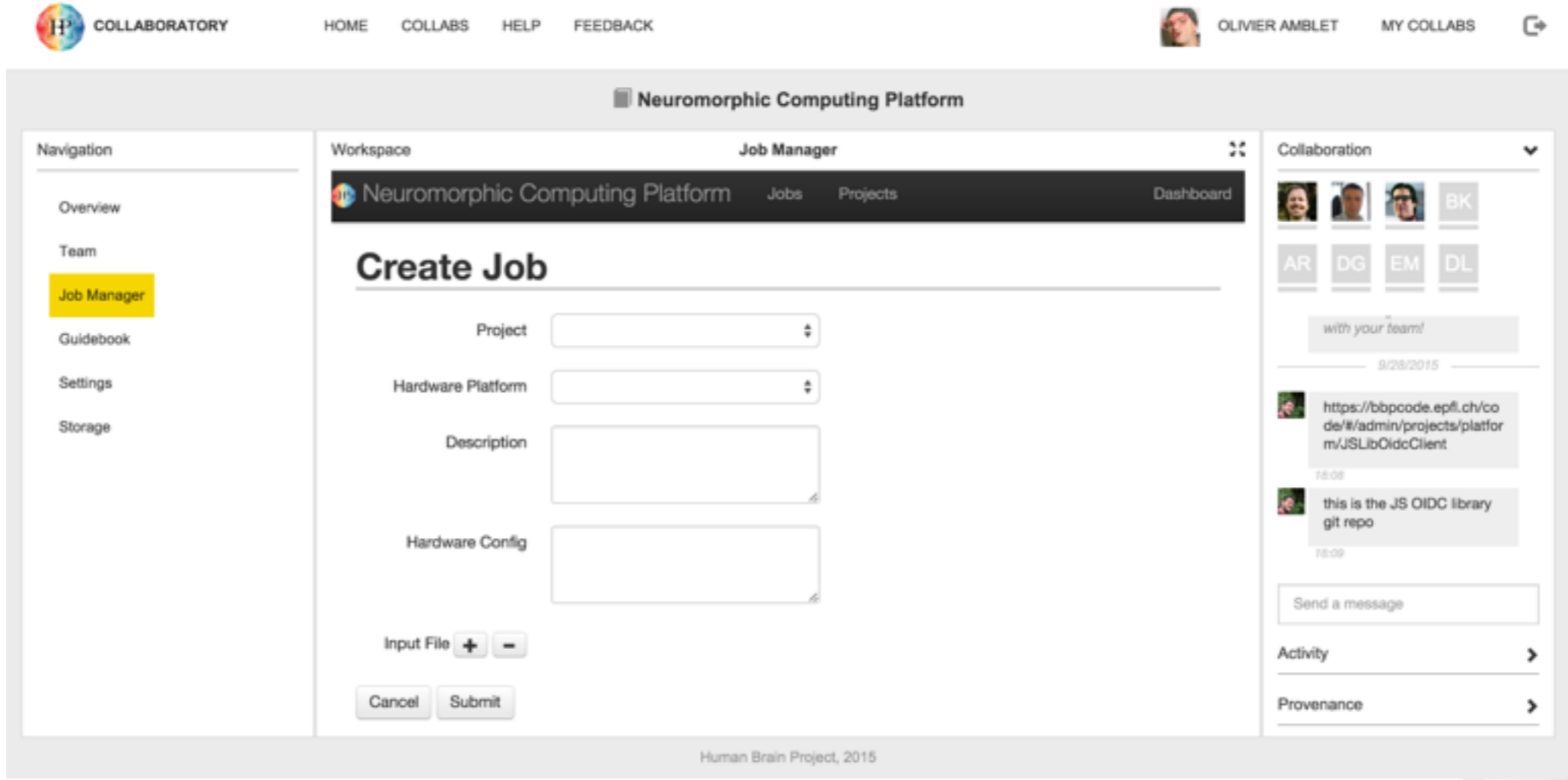
[M30 disclaimer] Currently intended ended for demos and code samples. Limited to Python 2.6 and no access to HPC storage or compute. This will not change before M30



# Python Tasks [Community App]

Common interface to queue jobs on HPC

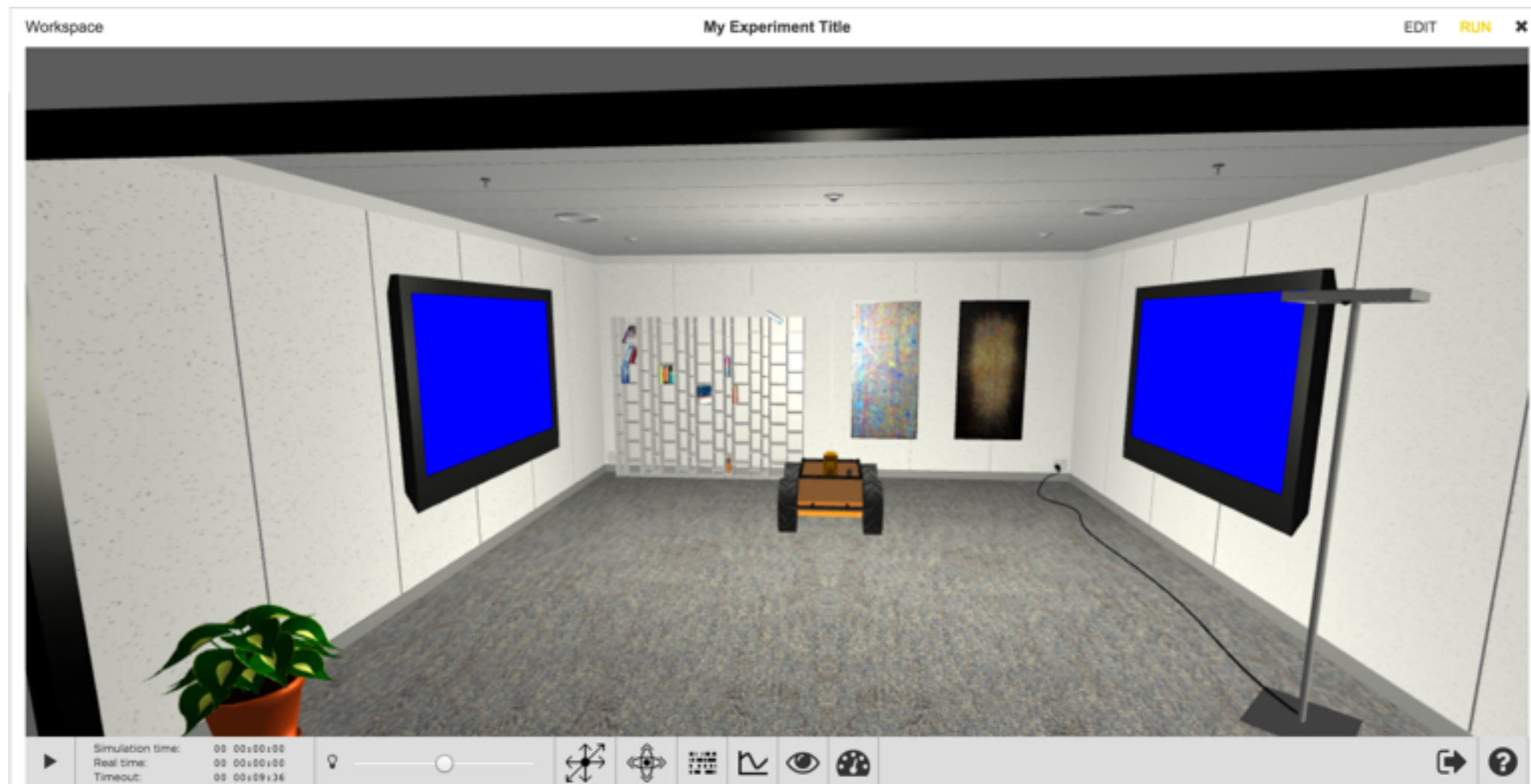
Tasks are written in Python, pushed to a trusted Git repository and run on Cluster



## Neuromorphic Computing Platform [Platform App]

Provided by Neuromorphic Computing

Run PyNN simulations on one of the two Neuromorphic Hardware Platforms



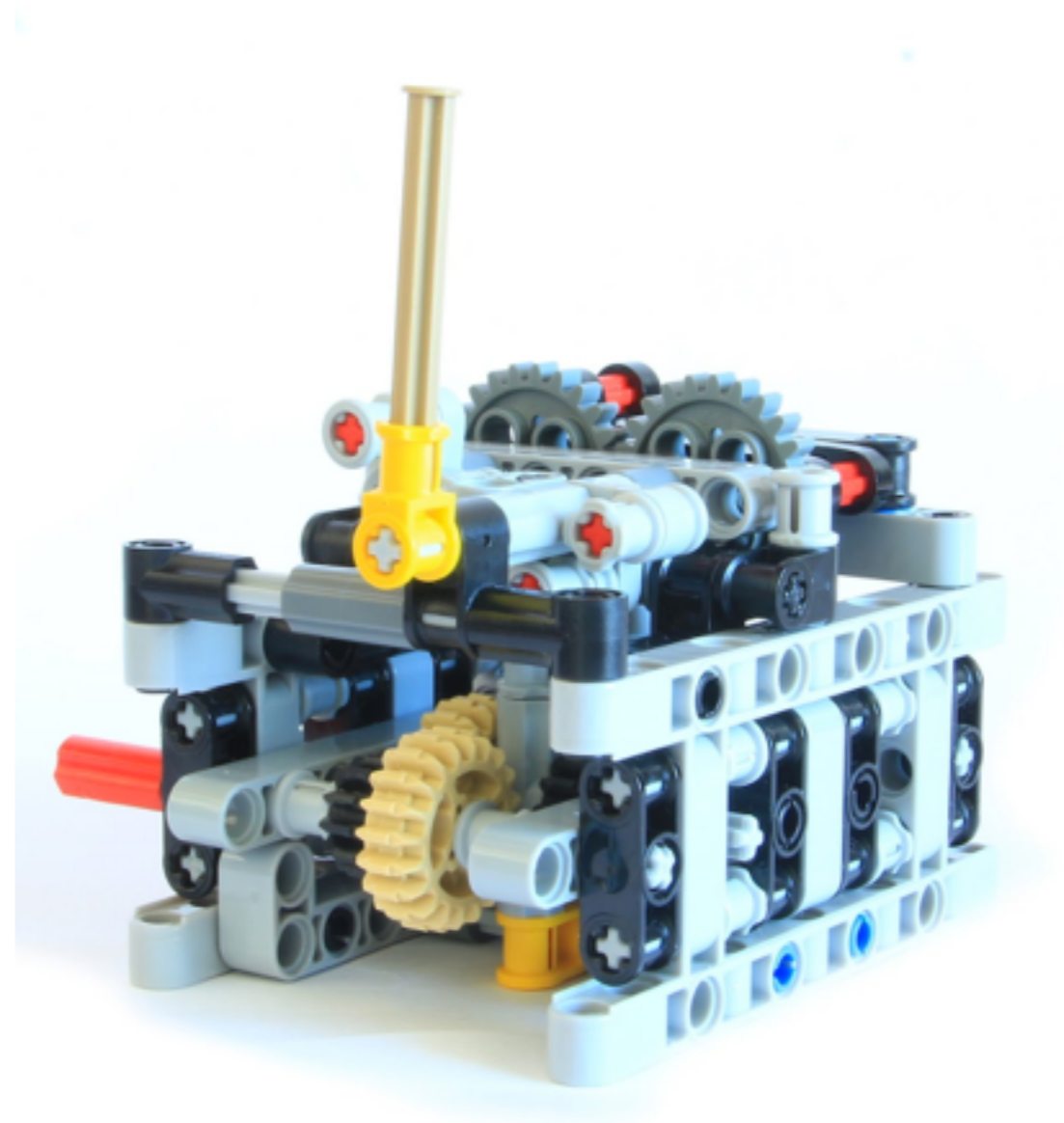
## **Build Your Robot Neural Circuit [Platform App]**

Provided by Neurorobotics Platform

An Internet-accessible simulation system that allows the simulation of robots controlled by spiking neural networks.

# App Development

- An 'app' is basically a website that:
  - is registered as a HBP Collaboratory app
  - is aware of the Collaboratory
  - use one or more HBP API
  - is served over a SSL connection (<https://>)





# Getting Started

- Have good knowledge of a web stack
  - We provide tooling for Python/Django, AngularJS and bootstrap
- Come at the tutorial this afternoon
- Ask me to join in a code session
- **Read the getting started guide**
- Engage with our team



# The App Developer Collab



HOME

COLLABS

HELP

FEEDBACK



MY COLLABS



## How to develop Apps

Navigation



App Developer Manual

Apps Manager

OpenID Connect Client Manager

▶ API Documentation

Team

▶ Related Softwares

Engage Users

Workspace

App Developer Manual

EDIT

RUN



HBP Collaboratory Documentation



previous: [User Manual](#)

next: [Introduction](#)

## App Developer Manual

The beginner to master guide of *HBP Collaboratory* App development.

- [Introduction](#)
  - [Intended Audience](#)
  - [Document Status](#)
  - [Applications](#)
    - [Backend](#)
    - [Applications that are a good fit for Collaboratory](#)
    - [Application Requirements](#)
    - [Developing Application](#)
    - [Streamline Publication](#)
  - [Architecture Overview](#)
    - [Basic user interaction with an App within Collaboratory](#)
  - [General Concepts](#)
    - [Roles and ACL](#)
    - [Edit/Run](#)
    - [Context UUID](#)
- [Quick Start](#)
  - [A Simple Example](#)

Collaboration



10:17



Nice, thanks.

10:20



I have to say. The content of this collab was invaluable when I was writing the Dataset Information Card app

10:20

Send a message

Activity



Provenance





# Services you can leverage

- Web-Services

- **HBP Identity**: authenticate users, query groups act on their behalf with their authorisation (OpenID Connect standard)
- **Collab Service**: use project space to manage your resource ACL, use current collab resources
- **Storage Service**: use cloud storage to store/retrieve data
- **Notification Service**: notify user of important events
- **Task Service**: schedule jobs on HPC
- **Provenance Service**: create entry in Provenance database [Status is special here, if you're interested in provenance tracking see Olivier or Jeff after presentation]

- Libraries

- **Python**: Python clients, Django helpers
- **Javascript**: OpenID Connector, javascript clients
- **CSS**: Bootstrap Theme

- Other

- **Sphinx** Documentation Project, Sphinx Documentation template



# Application Development Support Roadmap

- M30
  - Community Accounts
  - Support for HBP partners
  - Polish and enhance existing functionality
- Beyond
  - Activity
  - Support for external partners
- App/Service we want to provide with the support of the partners
  - Task Service
  - Provenance Service
  - Viewers



# Conclusion

- Creating an app is "just" web development
- Provide an easy way to integrate common functionality and enable interoperability
- Better visibility of your contribution in the Human Brain project
- Let you provide your expertise, tools and data to the community
- *If you build an app, library, simulator, or format specification for others to use, make sure you register in the Software catalog*



# Thanks

- Open to questions and remarks
- Support:
  - Chat in <https://collab.humanbrainproject.eu/#/collab/54/nav/368>
  - Send an email to [portal.support@humanbrainproject.eu](mailto:portal.support@humanbrainproject.eu)
  - Come say “hello”