

Welcome to Brainhack

A brief history, motivation, and overview

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COSN Hackathon

Who am I : Communities

Open Science

- Brainhack & TrainTrack
- OHBM OS Group (Treasurer, Hackathon Chair)
- Canadian Open Neuroscience Platform

Reproducibility

- Cross tool comparisons
- Tool stability evaluation

Tool Development

- Harmonization, evaluation, and preprocessing
(covered in 2 slides)

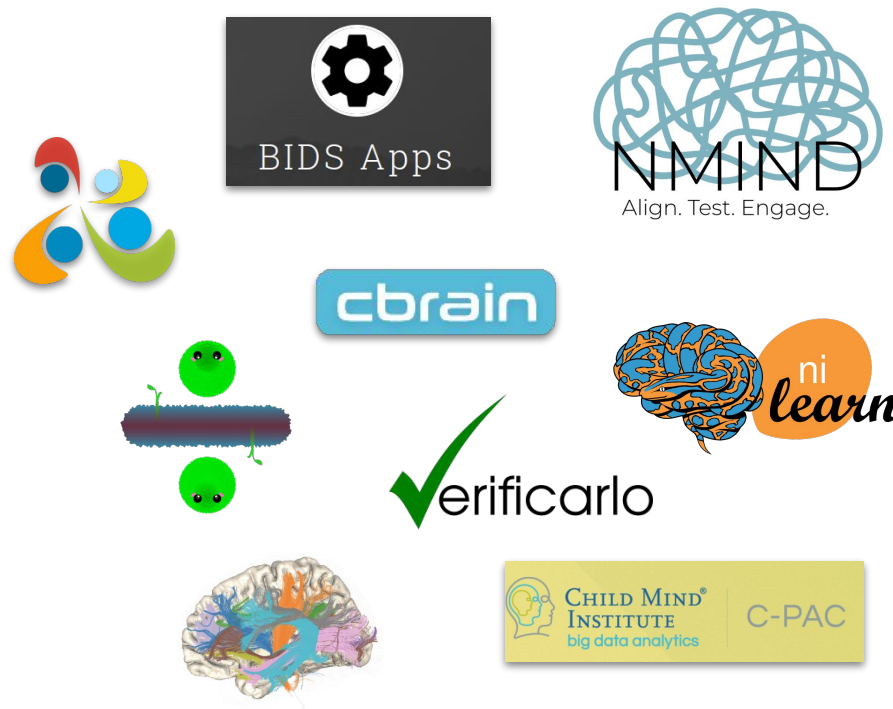


Who am I : Collaboration

leadership
core participant
peripheral

Harmonizing data analysis workflows across teams or infrastructures

- BIDS
- Boutiques
- Clowdr
- pyBIDS
- BIDS apps
- CBRAIN
- NMIND



Evaluating the trustworthiness of results

- Discriminability
- Nilearn
- Fuzzy
- Verificarlo

Constructing pre-processing workflows

- C-PAC
- pyAFQ
- m2g

Who am I : Current

Research Scientist (Senior Scientist Track)

PI, Signo Lab

Lead, Center for Data Analytics, Innovation, and Rigor (DAIR)

Child Mind Institute (located in NYC; I'm based fully in Montreal)

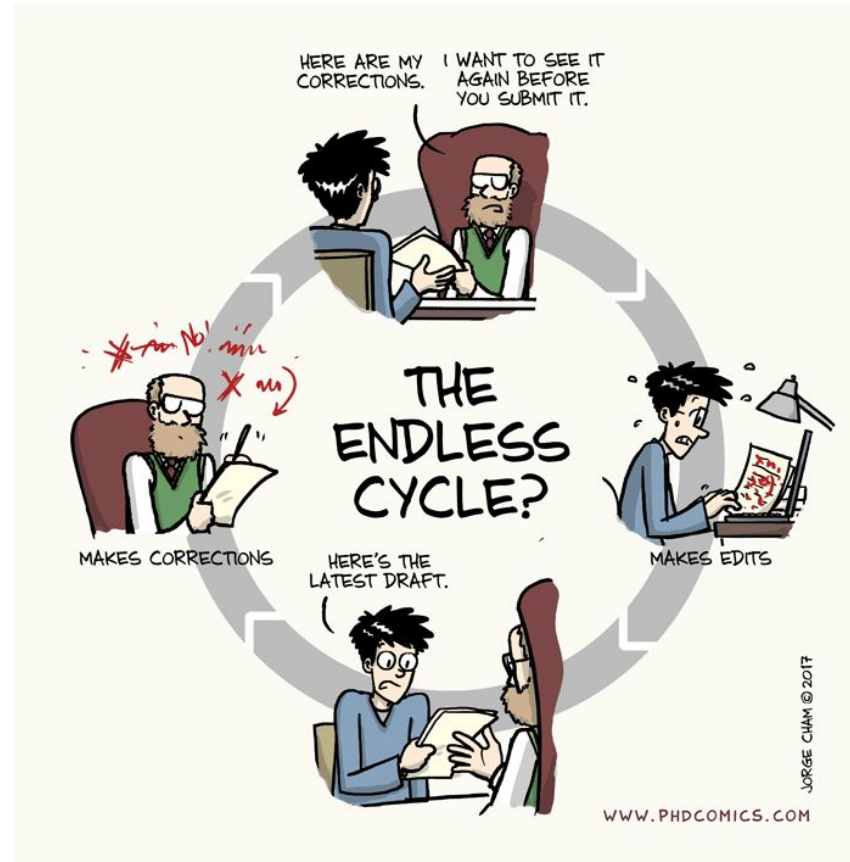
- My research is on methods evaluation — "How can we know if A is better than B?"
- I spend ~50% of my time **not** on research, but working on front-line projects to improve diagnosis/assessment and interventions for mental health in children
- I spend more time deciding priorities and enabling others to do nitty-gritty work than conducting analysis and experiments myself



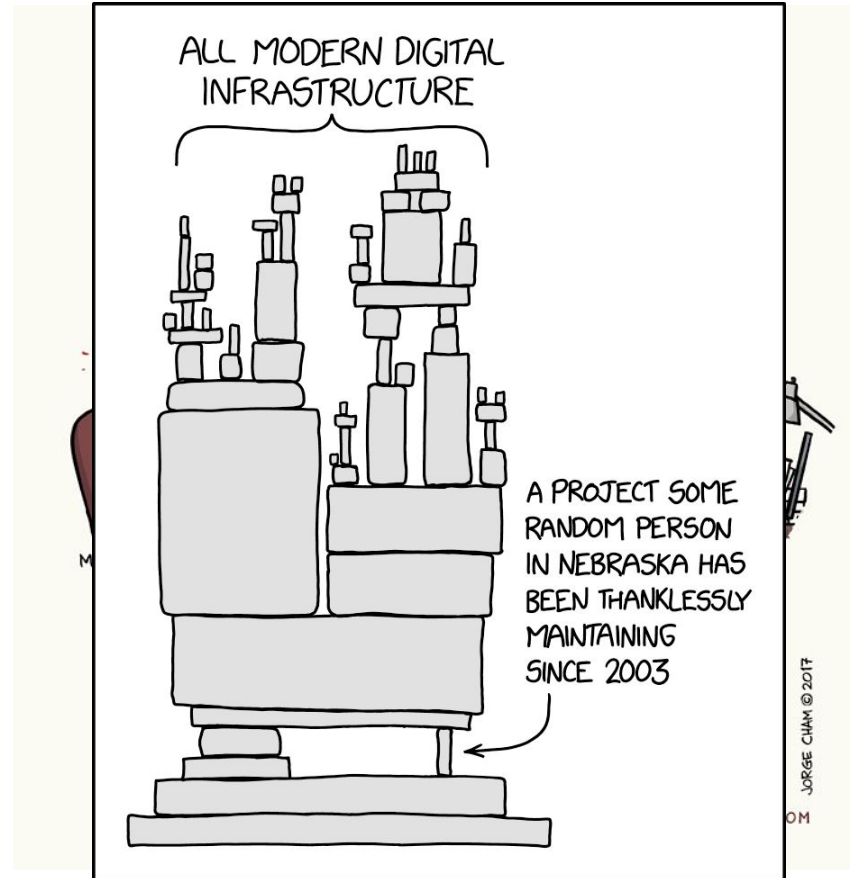
What is Brainhack?

This first requires us to answer, "What is Academia?"

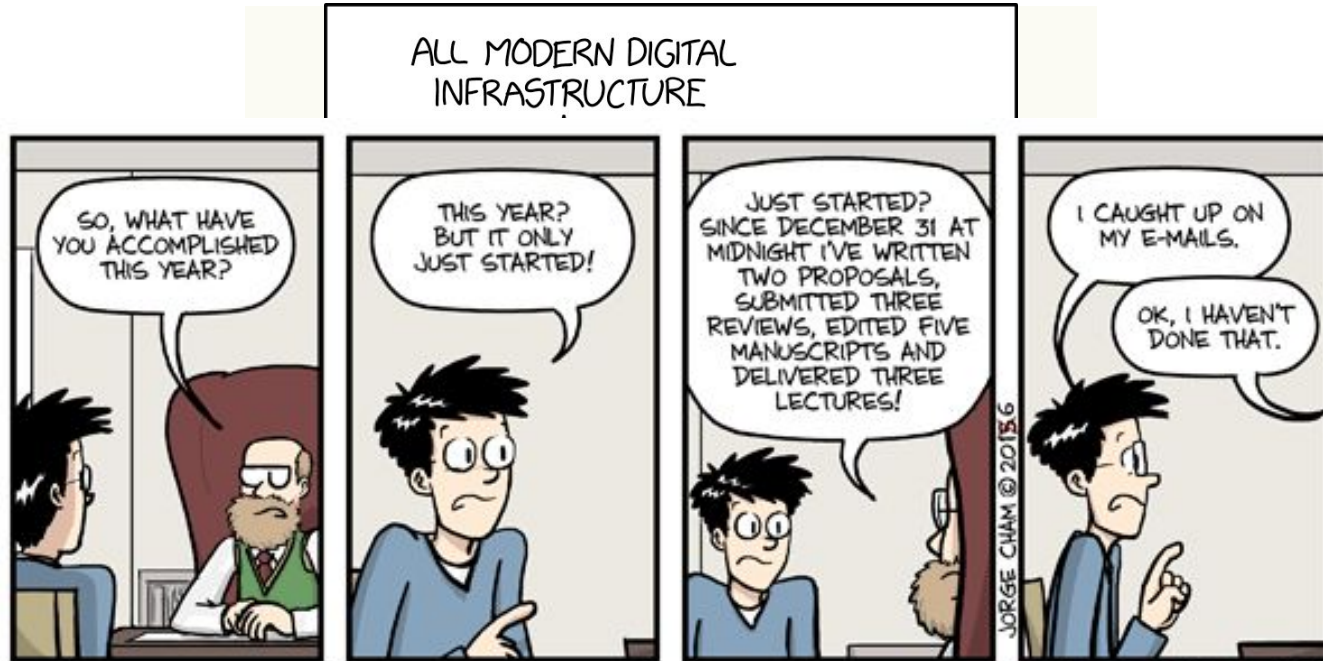
What is Academia: Paper Writing



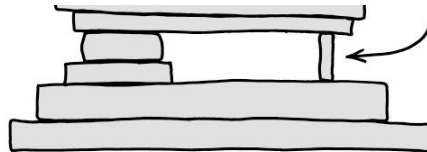
What is Academia: Experiment Creep



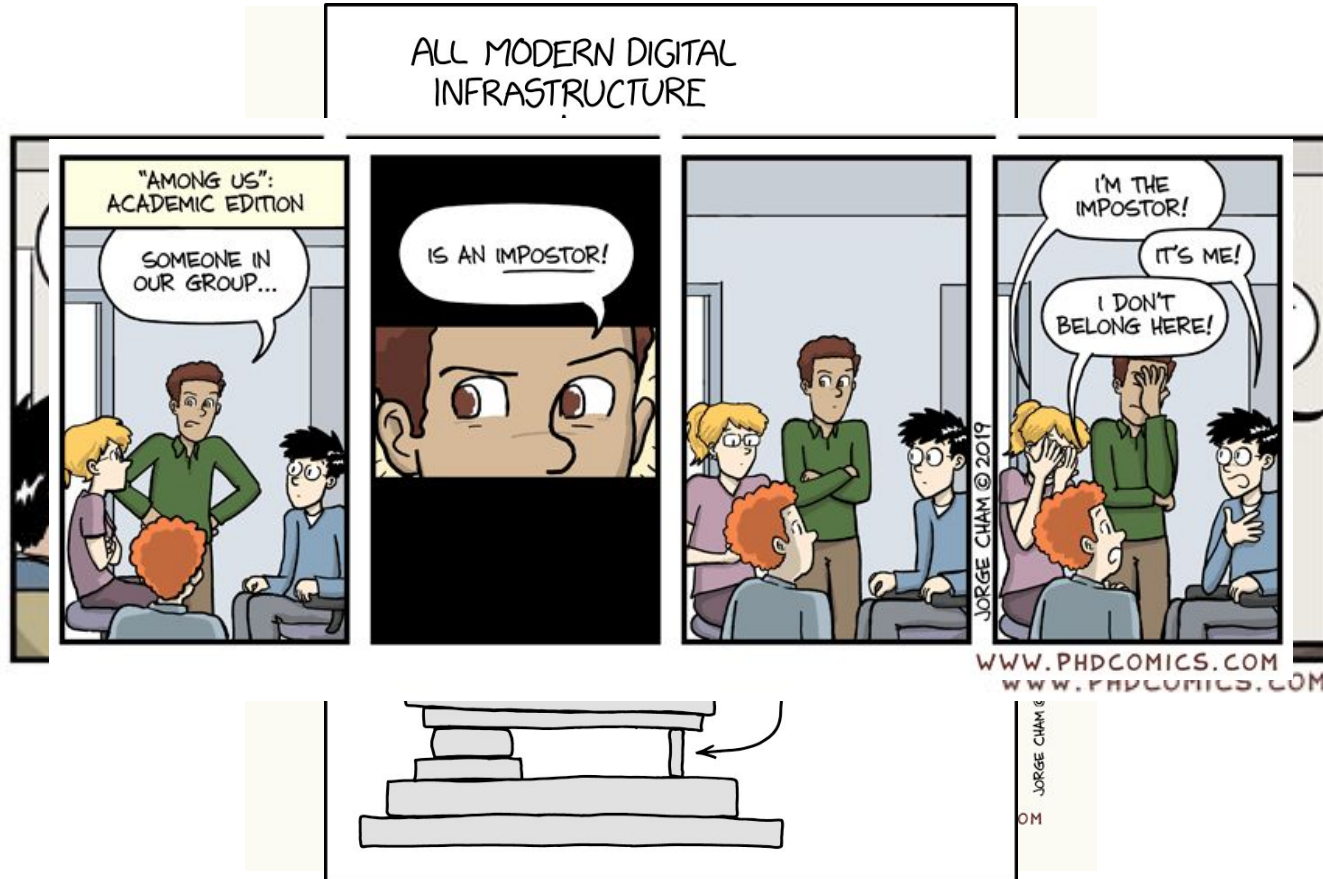
What is Academia: Perception of Expectations



WWW.PHDCOMICS.COM



What is Academia: A Common Reality



What this system perpetuates

- Short term thinking
- Optimization of objectives that are out of sync with sustainability or progress
- Overwork and underappreciation
- Isolation of learning, experiences, and progress

Brainhack != Academia

Neuron

 CellPress



NeuroView

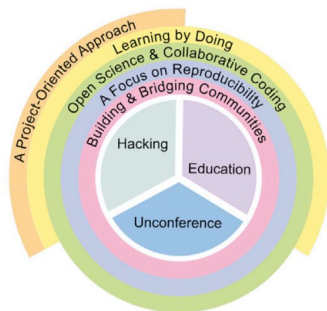
Brainhack: Developing a culture of open, inclusive, community-driven neuroscience

Rémi Gau,^{1,76,*} Stephanie Noble,^{2,76} Katja Heuer,^{3,4,76} Katherine L. Bottenhorn,^{5,76} Isil P. Bilgin,^{6,7,76} Yu-Fang Yang,^{8,76} Julia M. Huntenburg,^{9,76} Johanna M.M. Bayer,^{10,11,76} Richard A.I. Bethlehem,^{12,13,76} Shawn A. Rhoads,¹⁴ Christoph Vogelbacher,¹⁵ Valentina Borghesani,¹⁶ Elizabeth Levitis,^{17,18} Hao-Ting Wang,^{19,20,21} Sofie Van Den Bossche,²² Xenia Kobeleva,^{23,24} Jon Haitz Legarreta,²⁵ Samuel Guay,²⁶ Selim Melvin Atay,²⁷ Gael P. Varoquaux,^{28,29} Dorien C. Huijser,^{30,31} Malin S. Sandström,³² Peer Herholz,³³ Samuel A. Nastase,³⁴ AmanPreet Badhwar,^{16,35,36} Guillaume Dumas,^{37,38} Simon Schwab,³⁹ Stefano Moia,^{40,41} Michael Dayan,⁴² Yasmine Bassil,⁴³ Paula P. Brooks,³⁴ Matteo Mancini,^{20,44,45} James M. Shine,⁴⁶ David O'Connor,⁴⁷ Xihe Xie,⁴⁸ Davide Poggiali,⁴⁹ Patrick Friedrich,⁵⁰

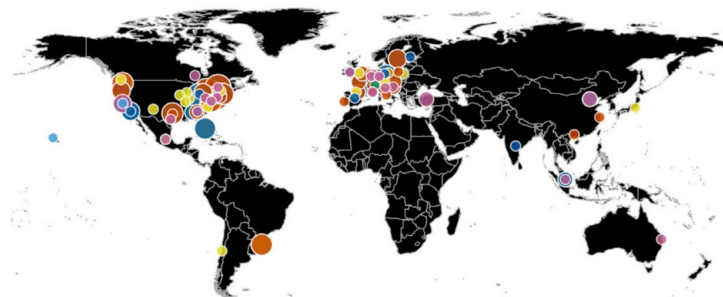
(Author list continued on next page)

Brainhack != Academia

A Anatomy of a Brainhack

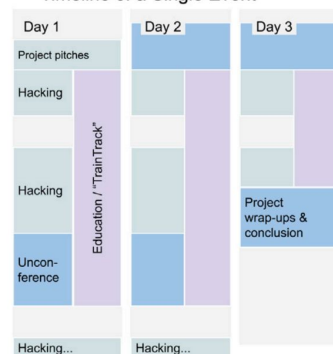


C Brainhack Cartography

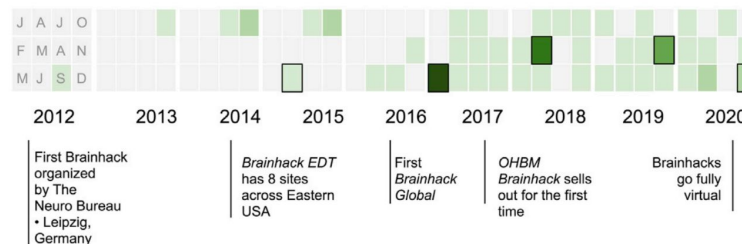


Number of events 1 ○ ○ ○ 7 Year 2012 ● 2013 ● 2014 ● 2015 ● 2016 ● 2017 ● 2018 ● 2019 ● 2020 ●

B Timeline of a Single Event



D Brainhack Timeline



of Events: 0 1 8 15 22 29 36 40

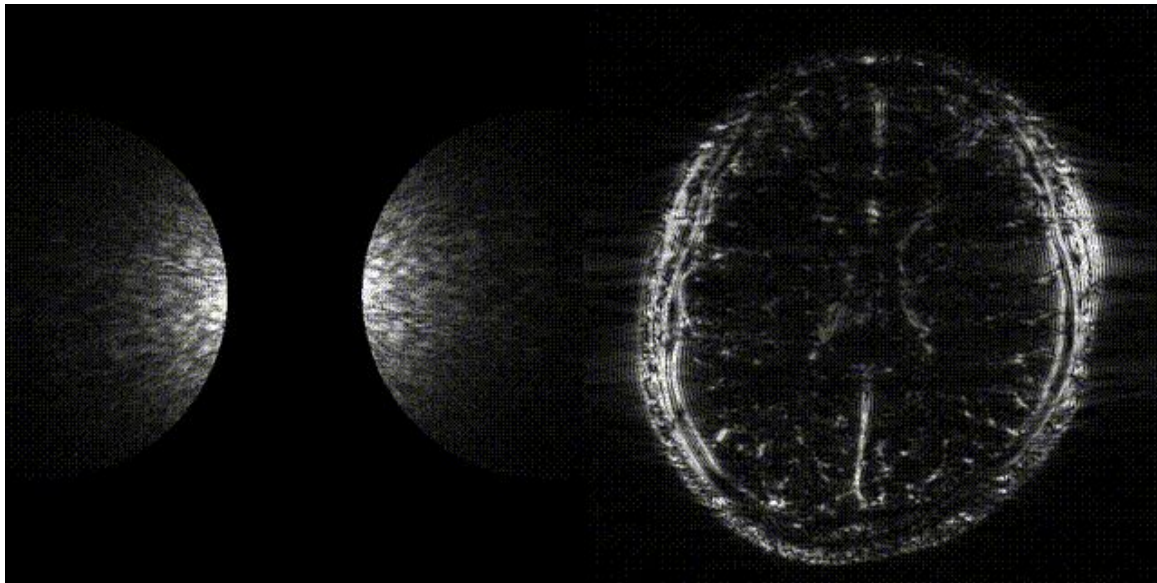
Brainhack Global: ☐

Brainhack != Academia

- ~~Short term thinking~~ → **A break from tunnel vision**
- ~~Optimization of objectives that are out of sync with sustainability or progress~~
→ **Building sustainable resources**
- ~~Overwork and underappreciation~~ → **Collaborating on the necessary "plumbing"**
- ~~Isolation of learning, experiences, and progress~~ → **Shared learning & development**

A break from tunnel vision

- Work on projects totally beyond the scope of your every day work
- This project explores how sampling/removing points in k-space affects reconstructed images



<https://github.com/ohbm/hackathon2023/issues/10>

Building sustainable resources & Collaborating on necessary plumbing

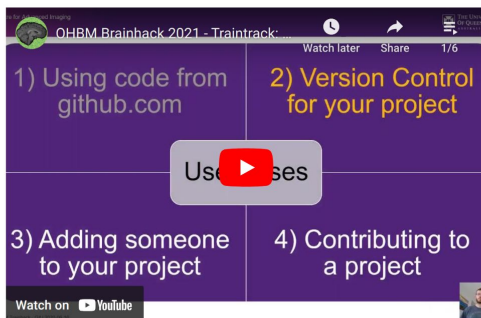


Nipype:
Neuroimaging in Python
Pipelines and Interfaces

Shared learning & development

Pre-recorded tutorials

We collected videos from many of the amazing virtual events from the past year and put together a playlist to prepare for the hackathon! The videos cover six general topics: version control; code testing; reproducible workflows; data visualization; machine learning; community building.



Hands-on sessions

Learn by doing always feels like something special - this is why this year we put together a series of hands-on sessions. These sessions need small groups to allow everyone to get their hands dirty, and since we have a limited number of fellows to lead them we are collecting expression of interest to register - we will confirm the registration for every form submitted. If you are interested in multiple topics, you can submit multiple forms, but take into account that we will aim at giving the chance to participate to as more people as we can. You can find the form [here](#).

LEARN GIT AND GITHUB BY WRITING A GIT GUIDE ON GITHUB Fellow: Sin Kim Time slot: Rising Sun	LEARN GIT AND GITHUB BY WRITING A GIT GUIDE ON GITHUB Fellow: Eva Lancaster Time slot: Atlantis	CODE TESTING STEPS, TOOLS, AND TIPS Fellow: Han Zhang Time slot: Atlantis	TD LIKE TO REPRODUCE YOUR RESULTS - AND OTHER TALES IN REPRODUCIBLE WORKFLOWS Fellow: Seyma Bayrak Time slot: Rising Sun
TD LIKE TO REPRODUCE YOUR RESULTS - AND OTHER TALES IN REPRODUCIBLE WORKFLOWS Fellow: Stephanie Heunis Time slot: Atlantis	INTRODUCTION TO NEUROIMAGING DATA VISUALIZATION IN R Fellow: Sid Chopra Time slot: Rising Sun	MACHINE LEARNING AND DATA VISUALIZATION WITH PYTHON Fellow: Sina Mansour Time slot: Rising Sun	INTRODUCTION TO MACHINE LEARNING AND DATA VISUALIZATION WITH PYTHON Fellow: Martina Vilas Time slot: Atlantis
OPEN SCIENCE - COLLABORATIVE SCIENCE: A COMMUNITY BUILDING WORKSHOP Fellow: Jivesh Ramduny Time slot: Rising Sun	OPEN SCIENCE - COLLABORATIVE SCIENCE: A COMMUNITY BUILDING WORKSHOP Fellow: Marta Topor Time slot: Atlantis		

At the core of Brainhack

This is a safe space to learn

This is a safe space to experiment

This is a safe space to build new collaborations



Happy Hacking!!!