



HAL
open science

Flash Talks/Poster session: GDPR-compliant human neuroimaging data sharing using Shanoir

Camille Maumet

► **To cite this version:**

Camille Maumet. Flash Talks/Poster session: GDPR-compliant human neuroimaging data sharing using Shanoir. EOSC France Tripartite Event 2024, Sep 2024, Paris, France. hal-04700527

HAL Id: hal-04700527

<https://inria.hal.science/hal-04700527>

Submitted on 17 Sep 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Flash Talks/Poster session



GDPR-compliant human neuroimaging data sharing using **Shanoir**

Camille Maumet

Inria, Univ Rennes, Inserm, CNRS, IRISA

10 years of brain data sharing...

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

10 years of brain data sharing...

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024



Why sharing neuroimaging data?

10 years of brain data sharing...

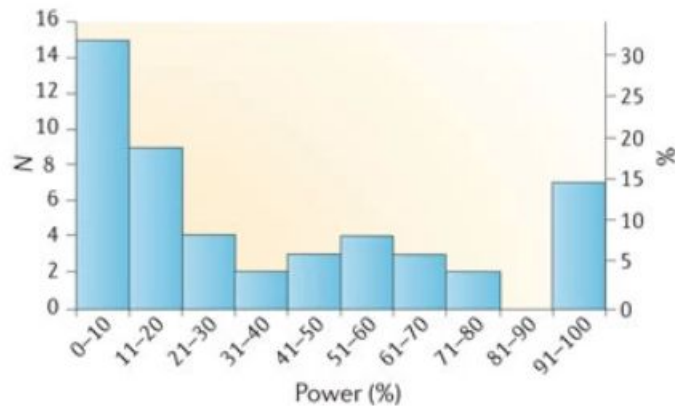
2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024



Why sharing neuroimaging data?

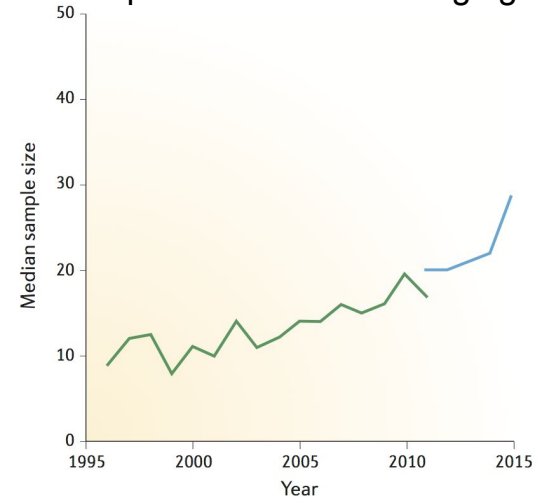
Small samples and low statistical power

Power of neuroscience studies



(Button et. al, 2013)

Sample sizes in neuroimaging



(Poldrack et. al, 2013)

High rate of **false positives** in the literature

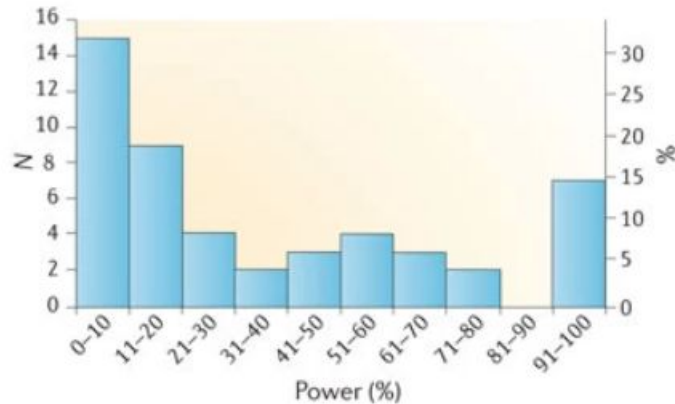
10 years of brain data sharing...

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Why sharing neuroimaging data?

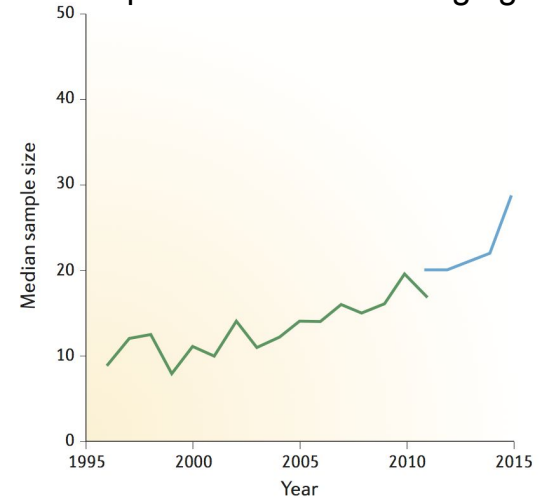
Small samples and low statistical power

Power of neuroscience studies



(Button et. al, 2013)

Sample sizes in neuroimaging



(Poldrack et. al, 2013)

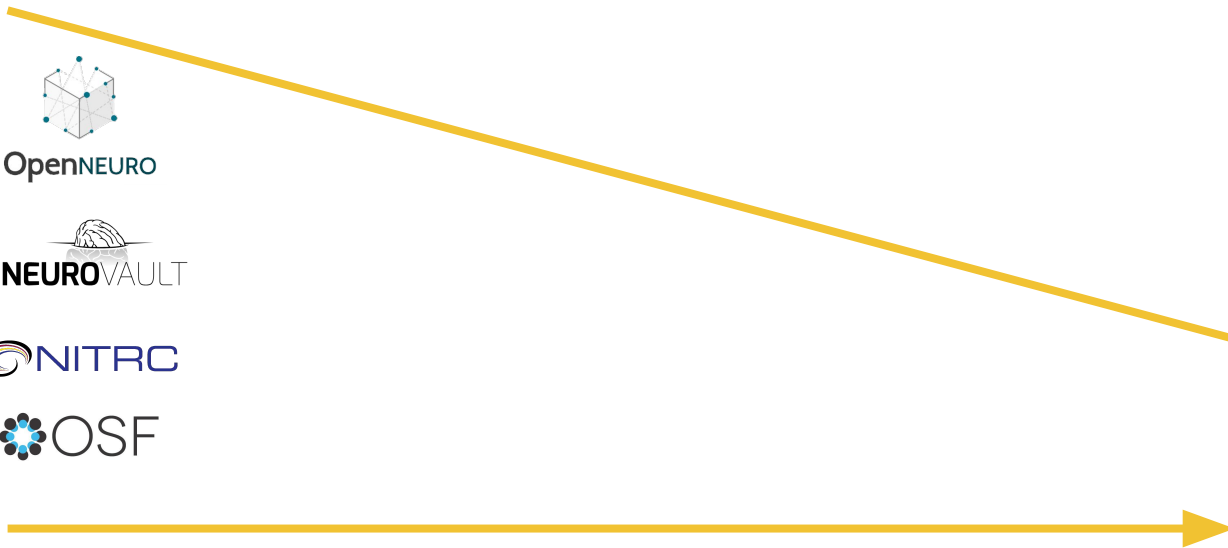
High rate of **false positives** in the literature

Solution: Data sharing to get to **larger samples**

Neuroimaging data sharing

Single study

30 sub.



OpenNEURO



NEUROVAULT



OSF

Neuroimaging data sharing

Single study

30 sub.



OpenNEURO



NEUROVAULT

NITRC

OSF

Consortium

1000 sub.



ABIDE
Autism Brain Imaging
Data Exchange



CORR
CONSORTIUM FOR
RELIABILITY AND
REPRODUCIBILITY



1000 Functional
Connectomes Project

Neuroimaging data sharing

Single study

30 sub.



OpenNEURO



NEUROVAULT

NITRC

OSF

Consortium

1000 sub.



ABIDE
Autism Brain Imaging
Data Exchange



CORR
CONSORTIUM FOR
RELIABILITY AND
REPRODUCIBILITY



1000 Functional
Connectomes Project



HUMAN
Connectome
PROJECT

Cohort

100 000 sub.

biobank
improving the health of future generations

10 years of brain data sharing...

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Why sharing neuroimaging data?



10 years of brain data sharing...

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Why sharing neuroimaging data?



Generalizability and fairness

X-ray: Lung opacity detection

Model trained on male images, tested on female images



(Larrazabal et. al, 2020)

Biased models

10 years of brain data sharing...

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Why sharing neuroimaging data?



Generalizability and fairness

X-ray: Lung opacity detection

Model trained on male images, tested on female images



(Larrazabal et. al, 2020)

Biased models



Solution: Decentralized data sharing
to get **more diverse samples**

10 years of brain data sharing...

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Why sharing neuroimaging data?



Generalizability and fairness

X-ray: Lung opacity detection

Model trained on male images, tested on female images

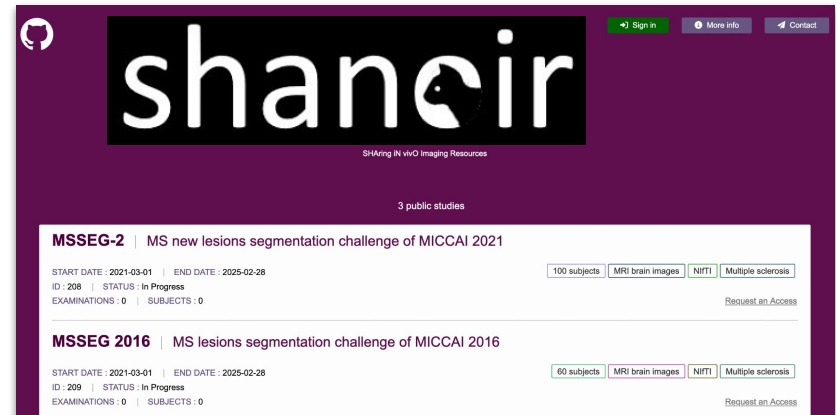


(Larrazabal et. al, 2020)

Biased models



Solution: Decentralized data sharing
to get **more diverse samples**



Web-based application for **medical imaging storage** and

- Share data with a **Data user agreement**
- **Open source** software
- **Shared governance**

Flash Talks/Poster session

GDPR-compliant sharing of human neuroimaging data using Shanoir

presented by Camille Maumet at **EOOSC France Tripartite Event** (Sept. 2024)

A web-platform for medical imaging data

With the impetus towards a more open science, researchers are looking for practical solutions to share more data in support of their findings. In the field of brain imaging, European researchers must comply with the General Data Protection Regulation (GDPR) when sharing human neuroimaging data.

We present **Shanoir**, a long-standing open source web-platform for medical imaging data that can be used to share neuroimaging data in compliance with GDPR.

Data sharing with Shanoir

Brain images → Directly identifiable information removed → 3D image → Non anonymous (Individualisation) Data sharing must comply with GDPR (Open Brain Consent, OBC 2021)

3 steps

- 1- List shared datasets <https://shanoir.eiscs.fr/>
- 2- Sign the Data User Agreement
- 3- Access the data

Further resources

Shanoir is Open Source software: <https://github.com/Inria/shanoir>
 Developments are led by a community of members through the **Shanoir Consortium**: <https://project.inria.fr/shanoirconsortium/>

References

Berlin, C., Basso, E., Comanich, O., Conage, I., Bani, A., Fakhini, I., Gullerud, J., Yao, Y., & Kim, M. (2019). Shanoir: Applying the Software as a Service Distribution Model to Manage Brain Imaging Research Pipelines. *Frontiers in ICT*, 3. <https://doi.org/10.3389/fitc.2019.00003>

Comanich, O., Comanich, O., Collet, F., & Durr, M. (2021). MIBES2: challenge proceedings. Multiple solutions: new lesion segmentation challenge using a data management and processing infrastructure.

Comanich, O., Maas, A., Kain, M., Lantier, B., Lamy, F., Simon, M., Pop, S. C., Girard, P., Anet, B., Fain, J.-C., Karkou, A., Tzafetta, T., Comanich, F., Gallet, S., Beaumont, J., Ouy, B., Farkas, F., Hoop, E., Huetten, A., ... & Balle, C. (2019). Optimal Estimation of Multiple Subsets: Lesion Segmentation using a Data Management and Processing Infrastructure. *Statistical Papers*, 58(1), 105-120. <https://doi.org/10.1007/s00180-018-0822-2>

Comanich, O., Kain, M., Collet, F., Anet, B., Fain, J.-C., Karkou, A., Tzafetta, T., Comanich, F., Comanich, F., Gallet, S., Gallet, S., Valois, S., Elan, G., Balle, C., Durr, M., & Collet, F. (2021). Multiple solutions: new lesion segmentation challenge proceedings. The MICCAI 2019 challenge dataset. *NeuroImage*, 241, 119189. <https://doi.org/10.1016/j.neuroimage.2021.119189>

Open Brain Consent (OBC). The Open Brain Consent: sharing research participants and sharing consent to share brain imaging data. *Human Brain Mapping*. <https://doi.org/10.1002/hbm.24544>

Shanoir core development is supported by Shanoir Consortium (InriaSoft) and FLI-IAM

GDPR-compliant human neuroimaging data sharing using Shanoir

Camille Maumet

Shanoir core development is supported by:
Shanoir Consortium (InriaSoft) and FLI-IAM