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Cartographes du cerveau

Camille Maumet

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EN EUROPE ET DANS PLUS DE
120 VILLES EN FRANCE

11 ————— 17 MARS



Le cerveau numérique : explorons-le !

Cartographes du cerveau

Camille Maumet – Chercheuse

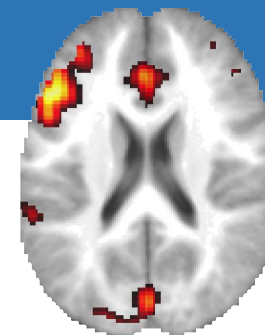


camille.maumet@inria.fr
Inria, Univ Rennes, CNRS, Inserm



Camille Maumet

Chercheuse — Neuroinformaticienne

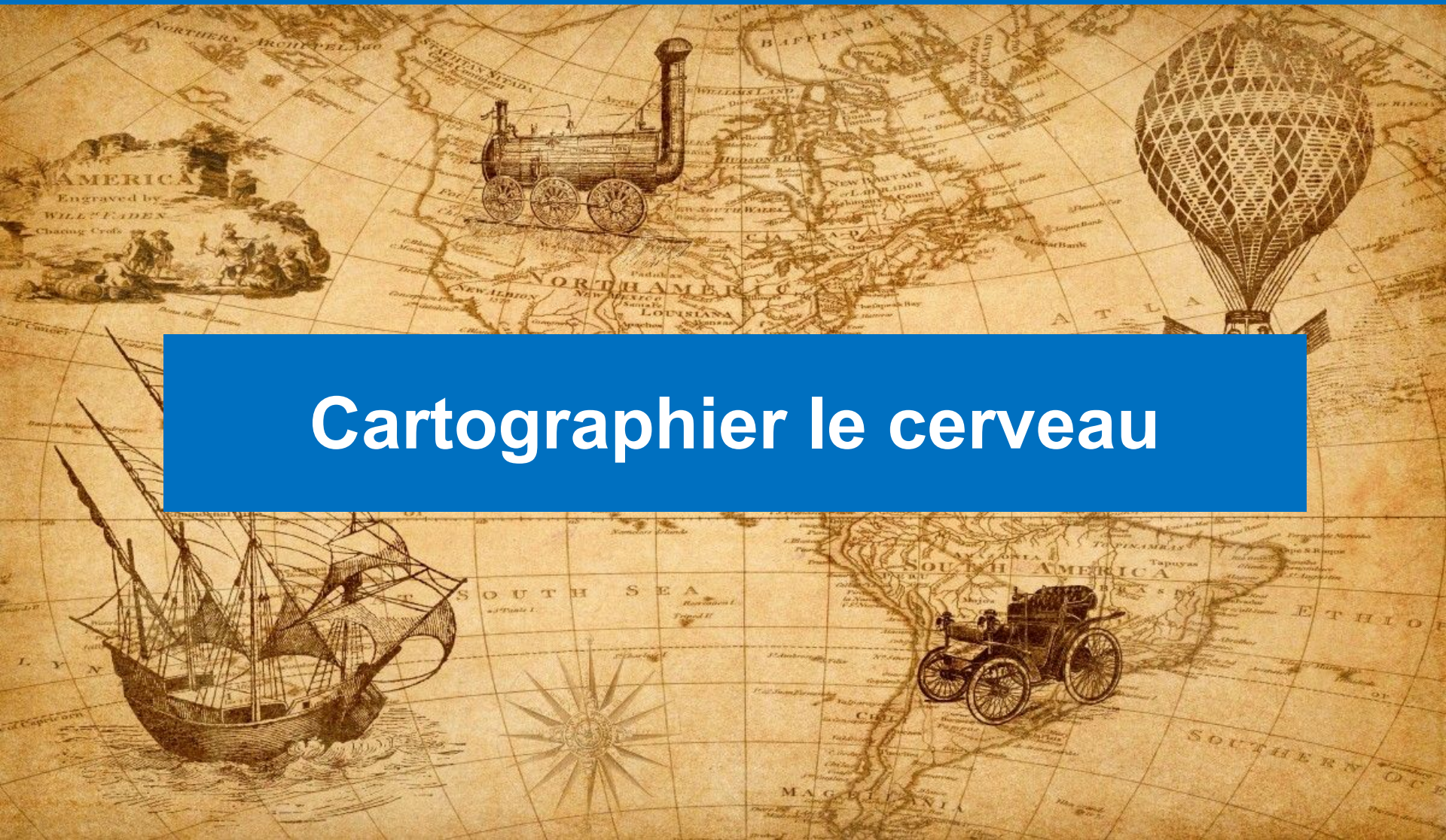


Ingénieur en informatique



L'équipe de recherche Empenn



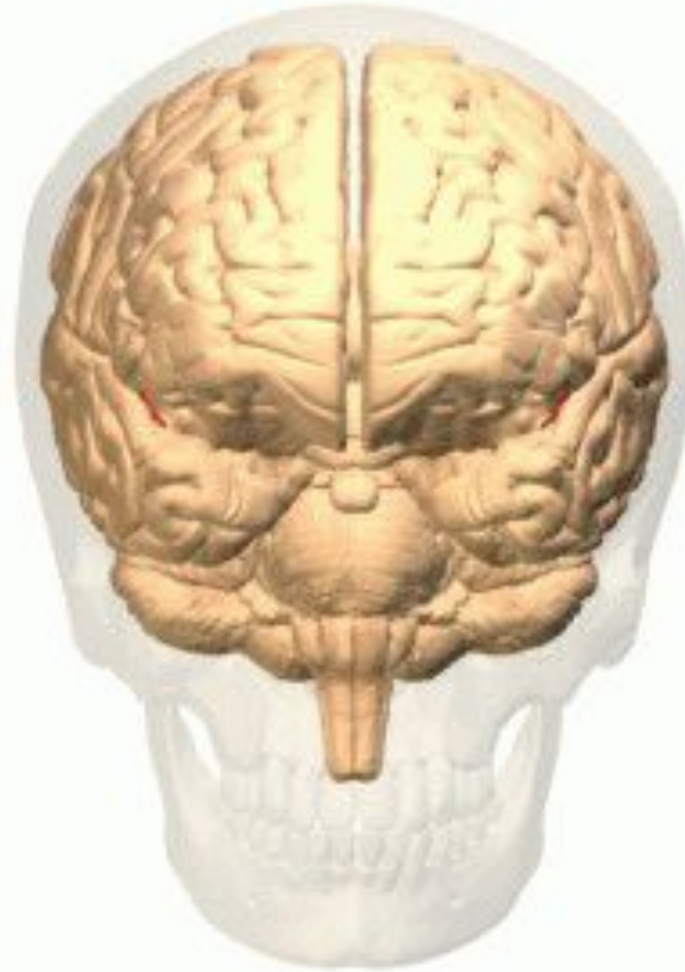


Cartographe le cerveau

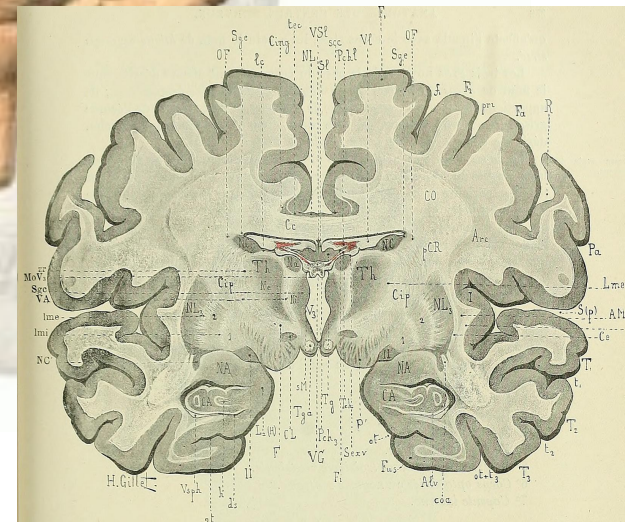
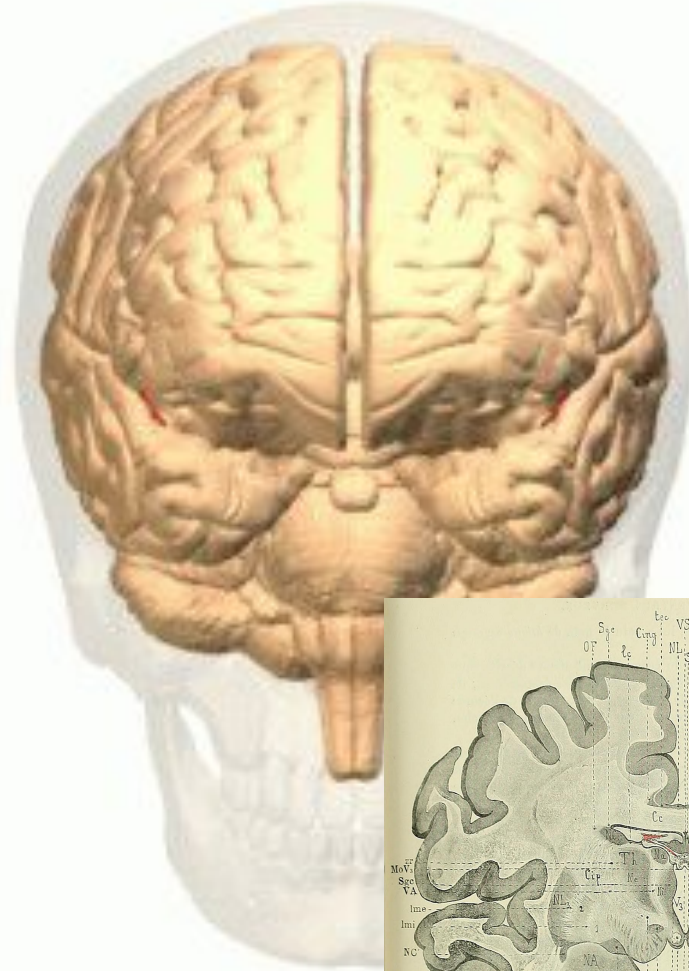
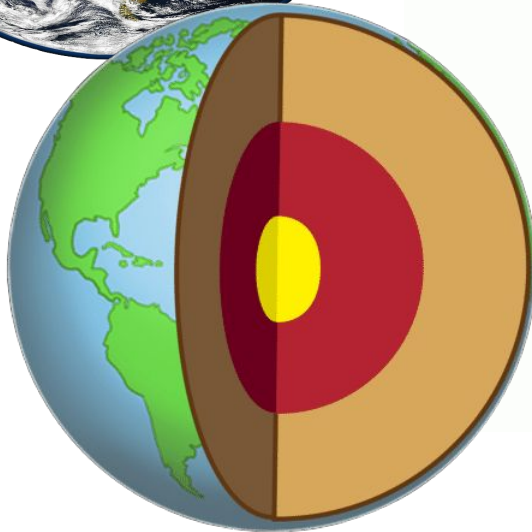
Des cartes anatomiques



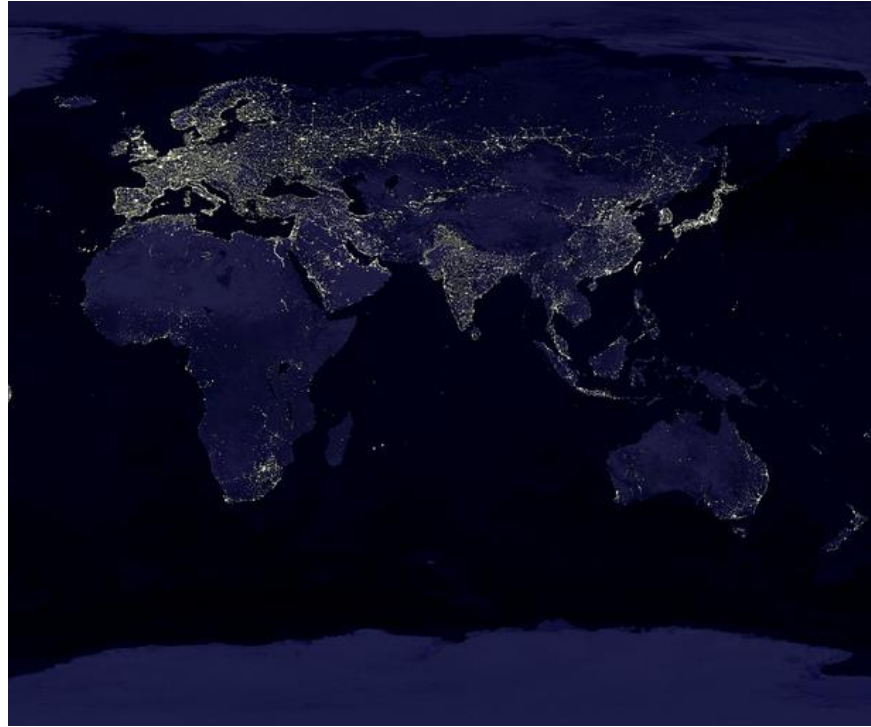
Des cartes anatomiques



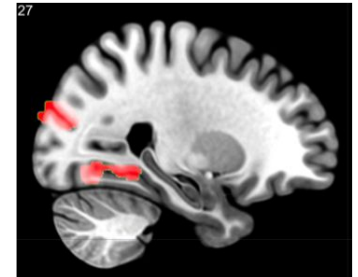
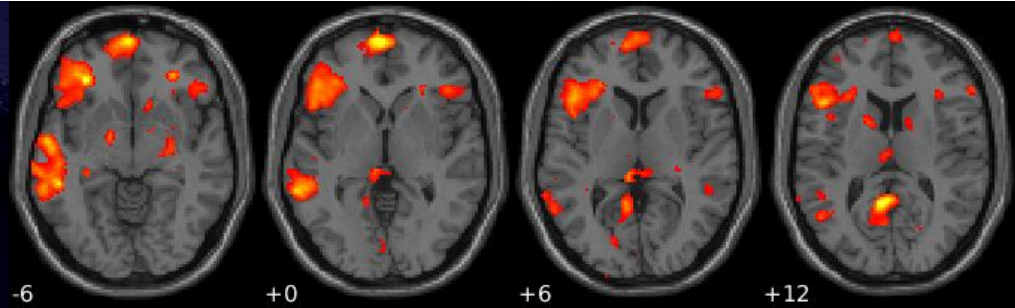
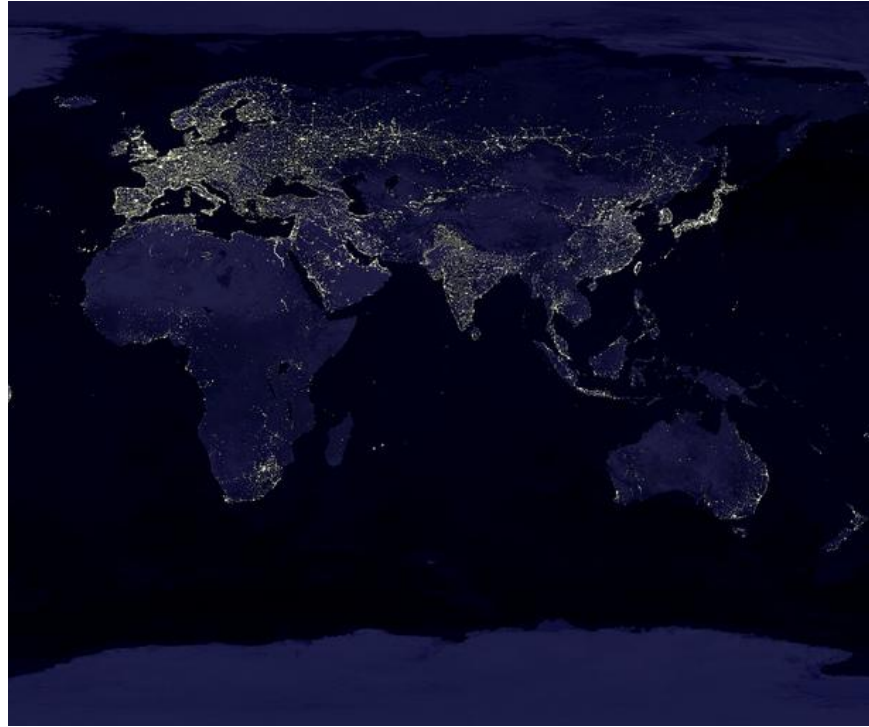
Des cartes anatomiques



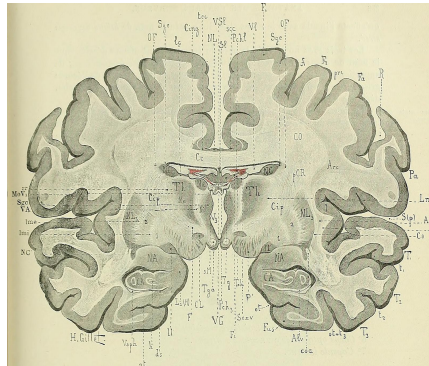
des cartes d'activité ...



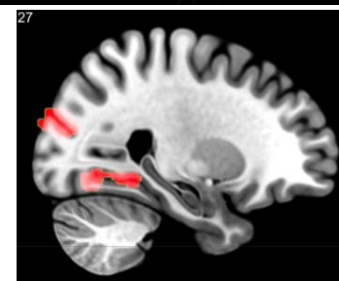
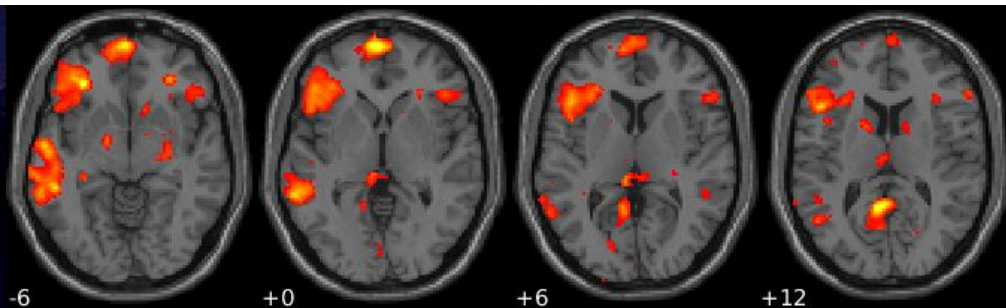
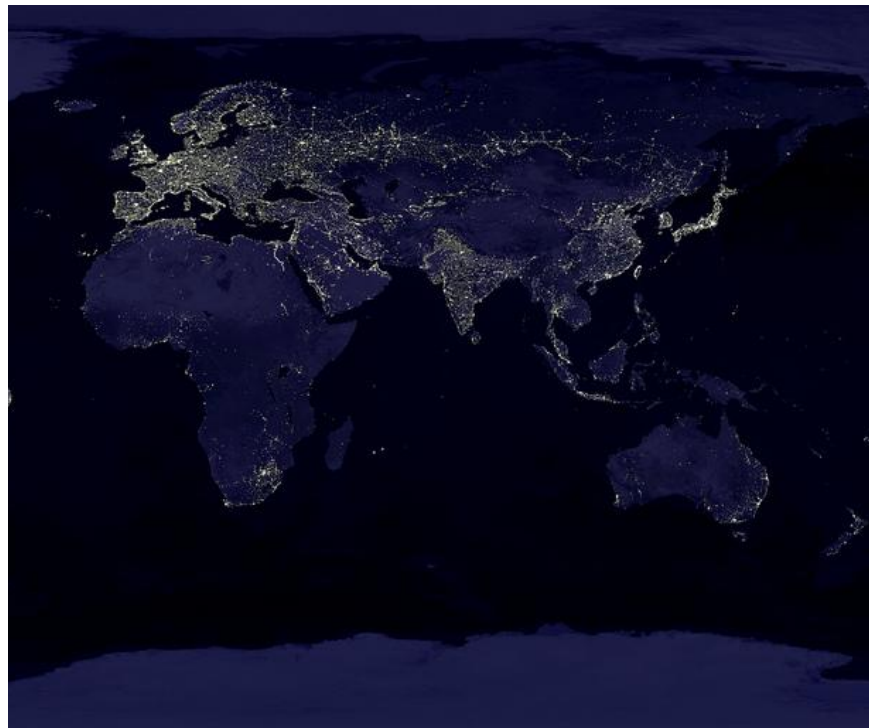
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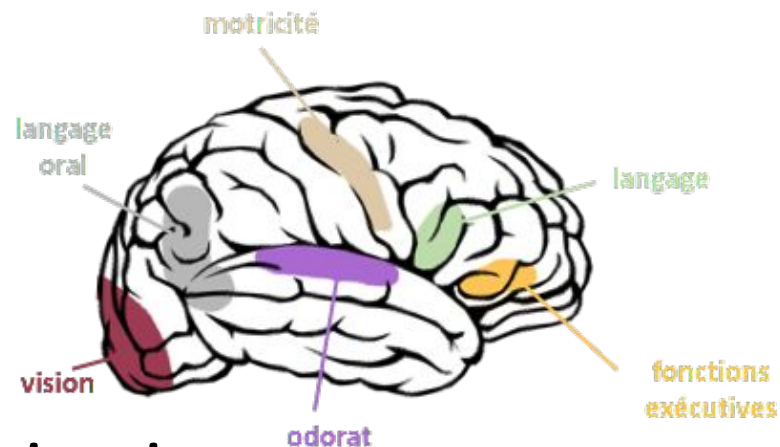
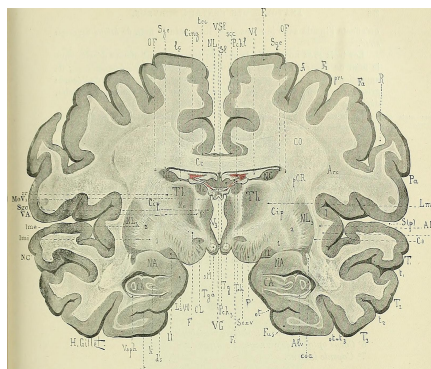
Regarder des visages
& paysages



des cartes d'activité ...

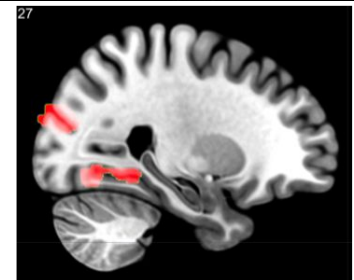
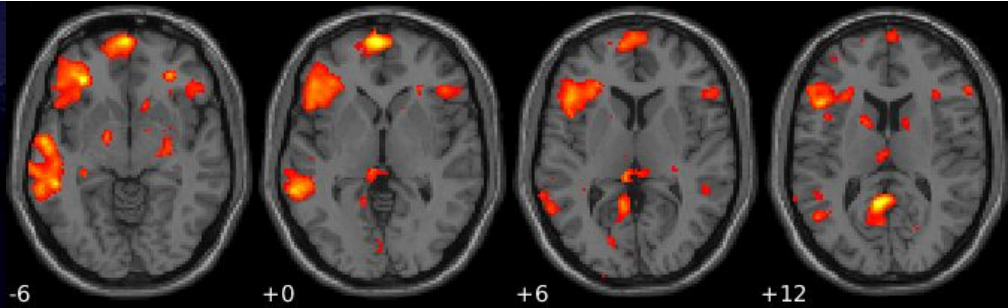
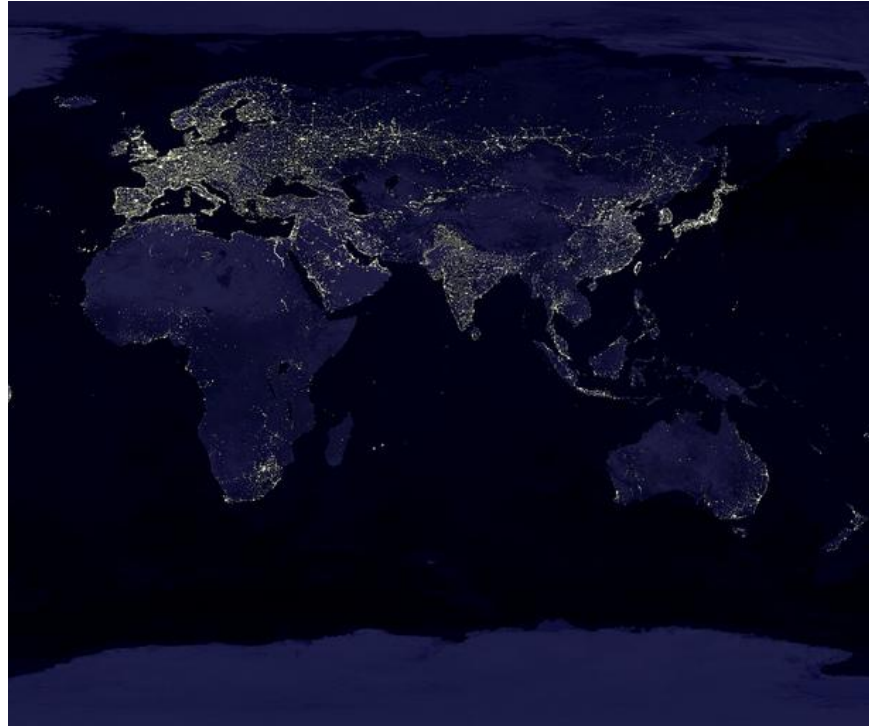


Regarder des visages
& paysages

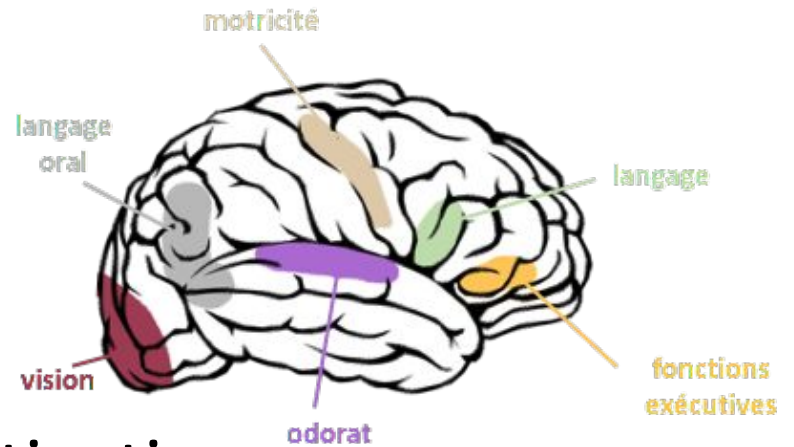
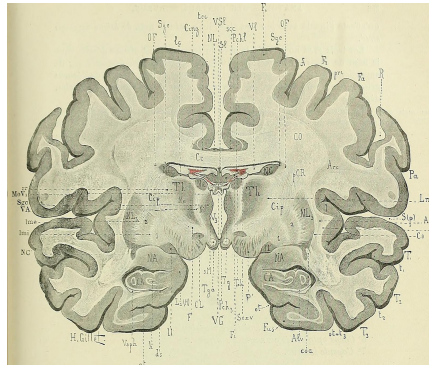


Activation

des cartes d'activité ...

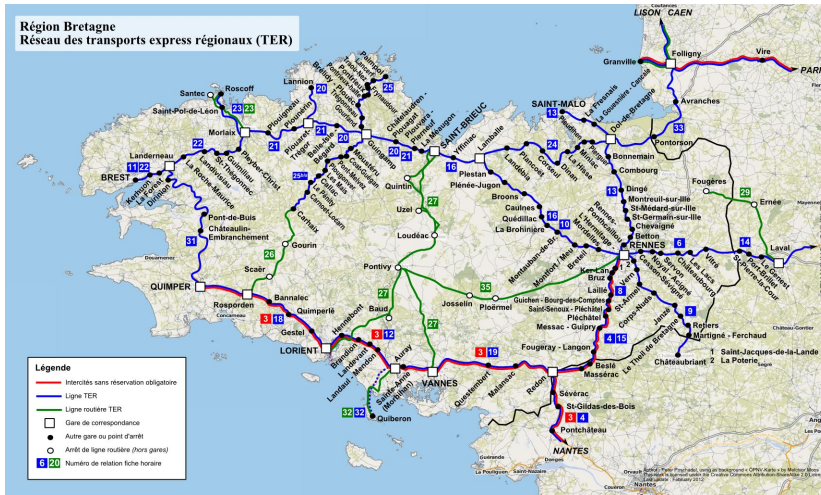


Regarder des visages
& paysages

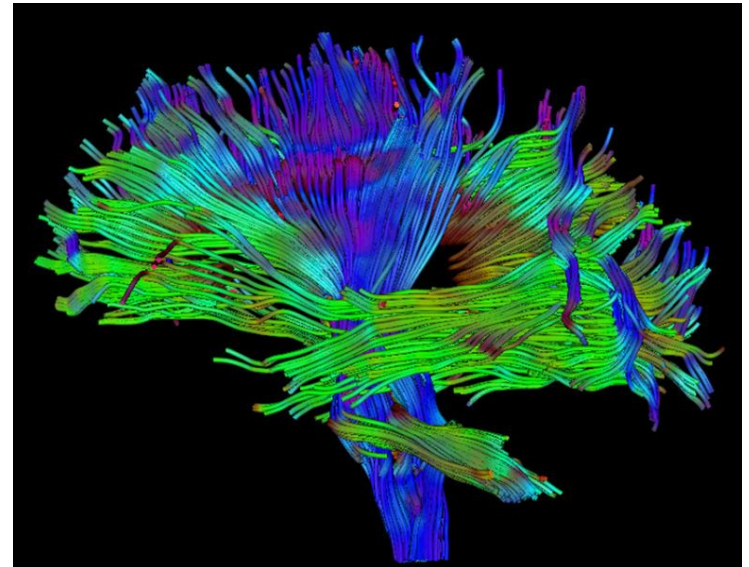
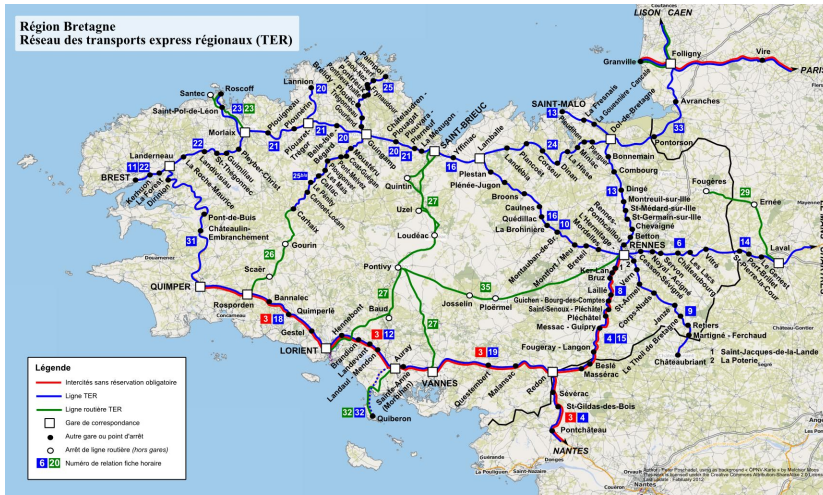


Activation

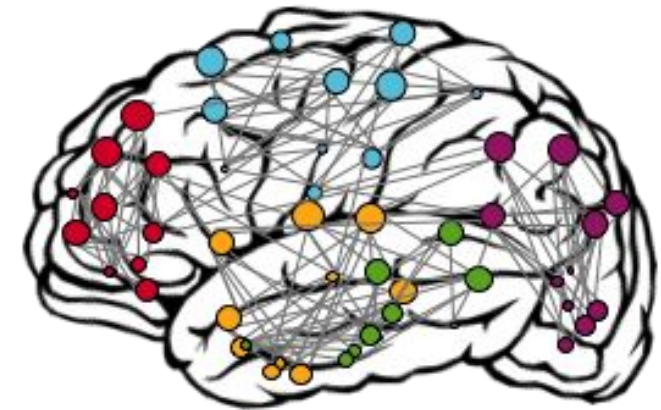
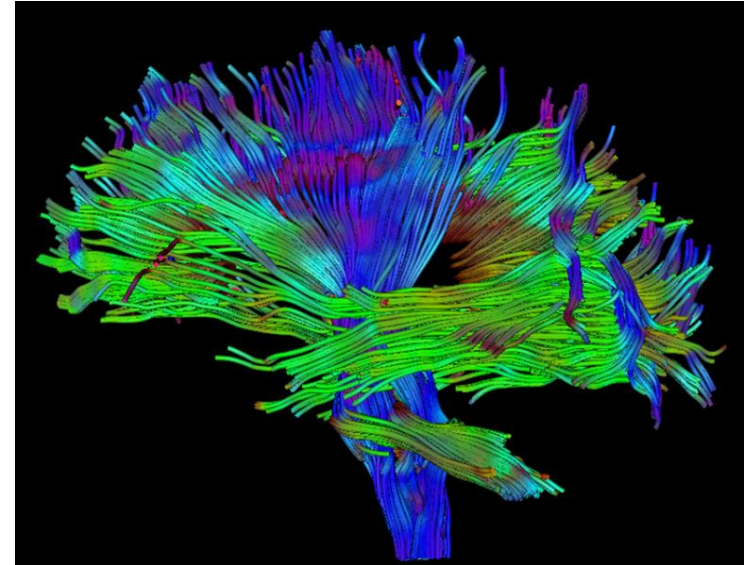
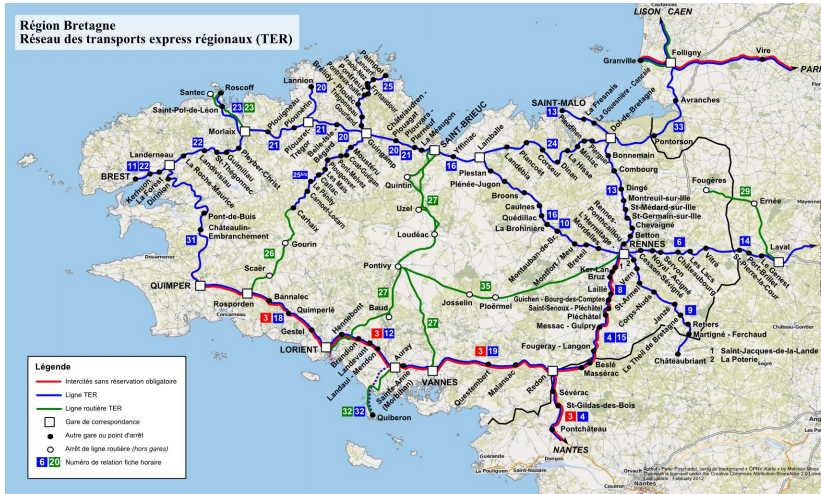
... des cartes de connexions ...



... des cartes de connexions ...



... des cartes de connexions ...

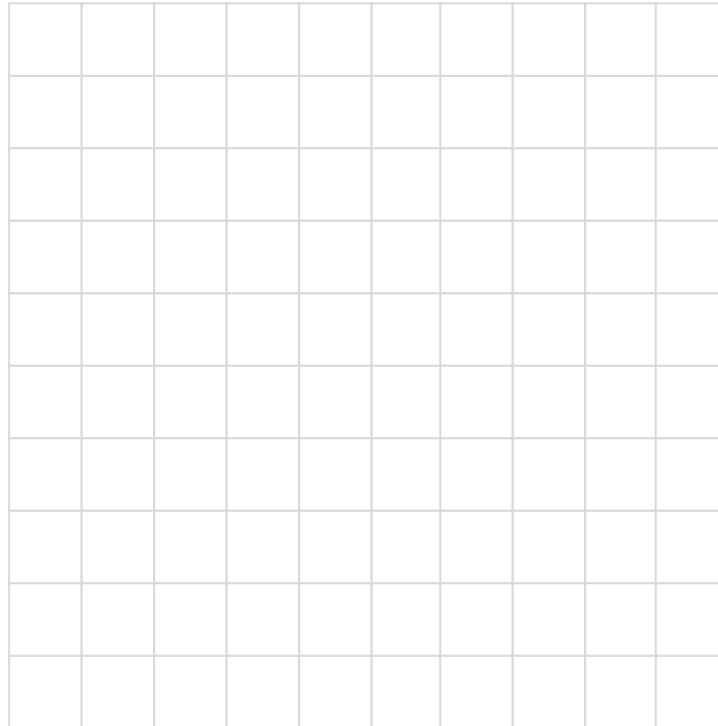


Connectivité

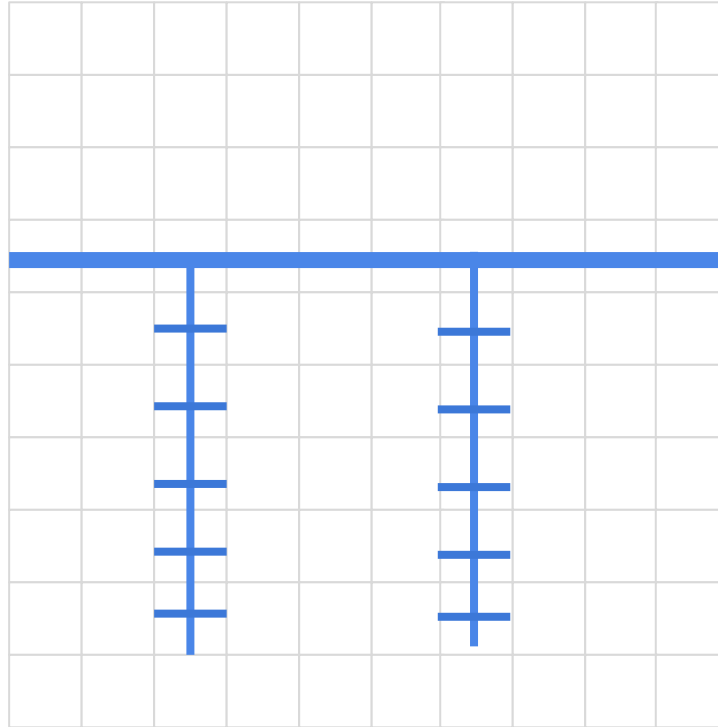
... des cartes d'hydratation ...



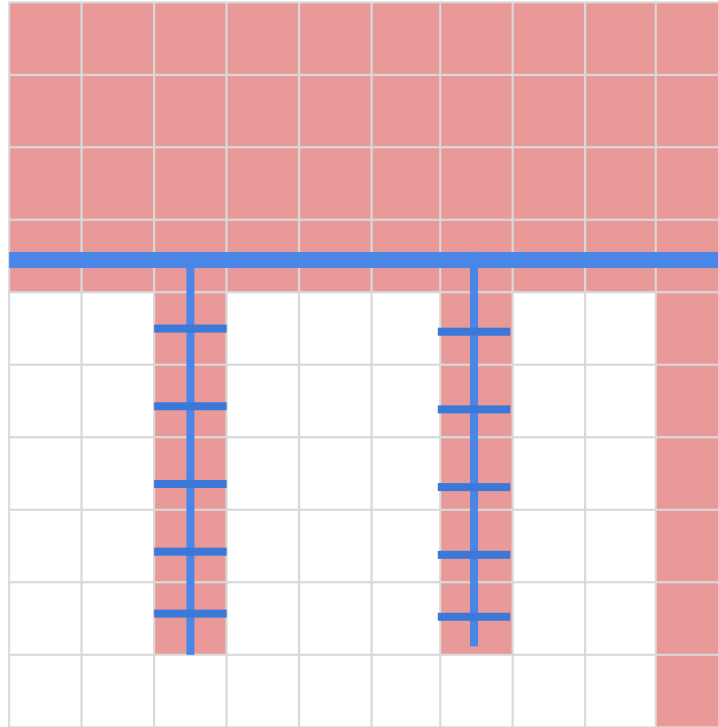
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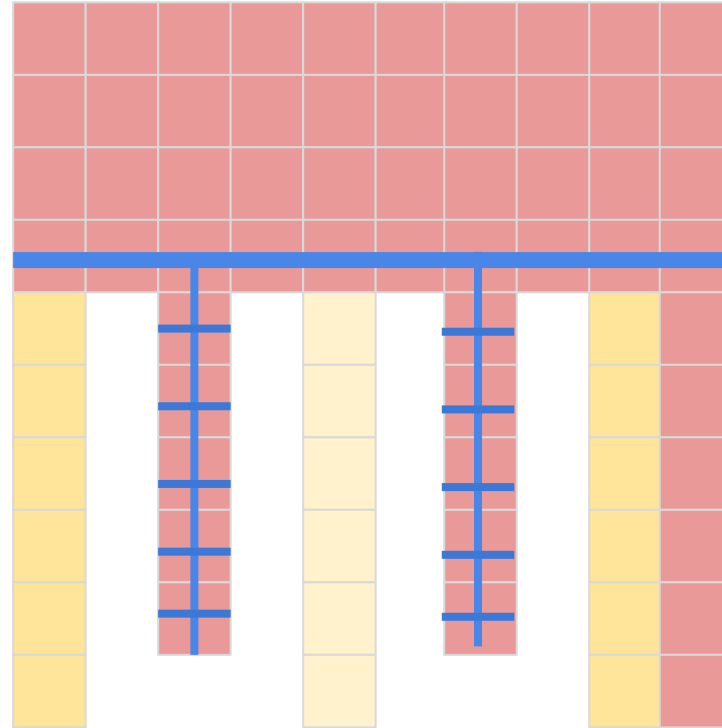
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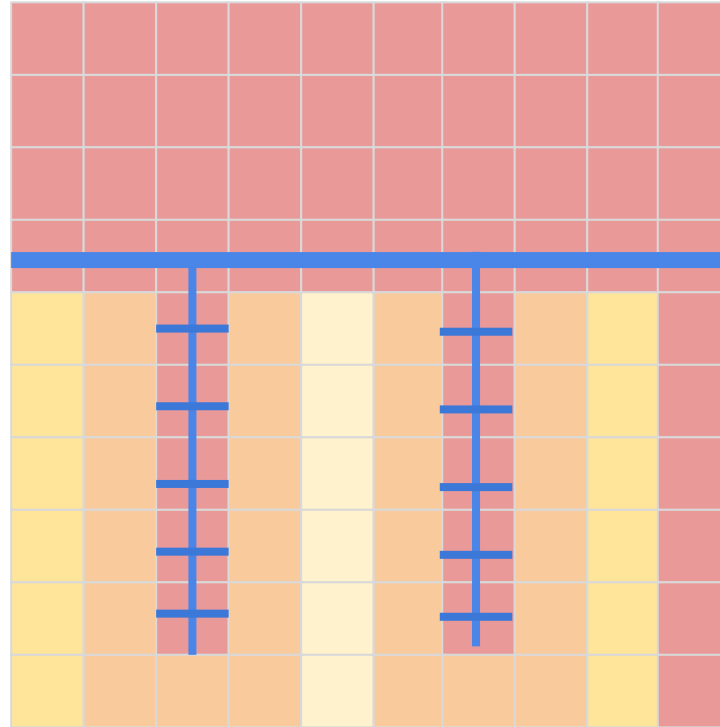
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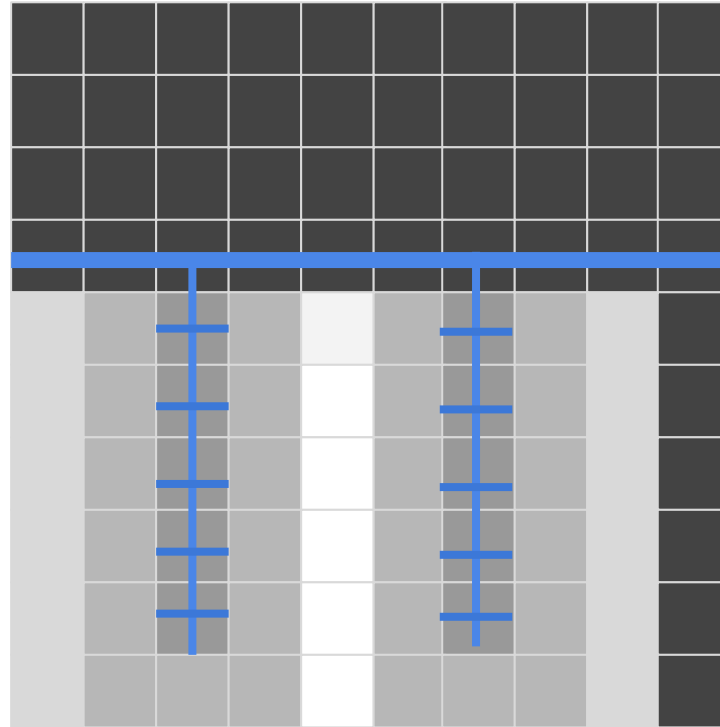
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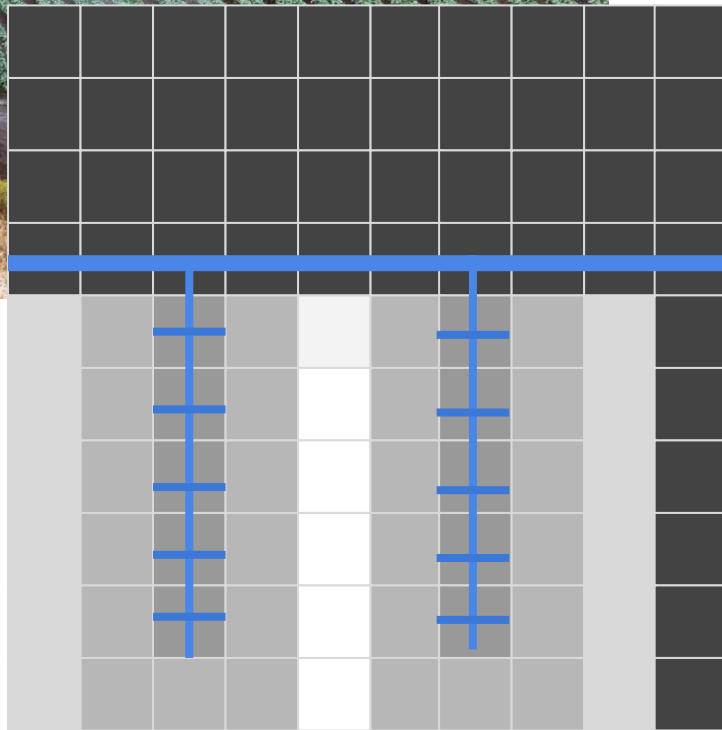
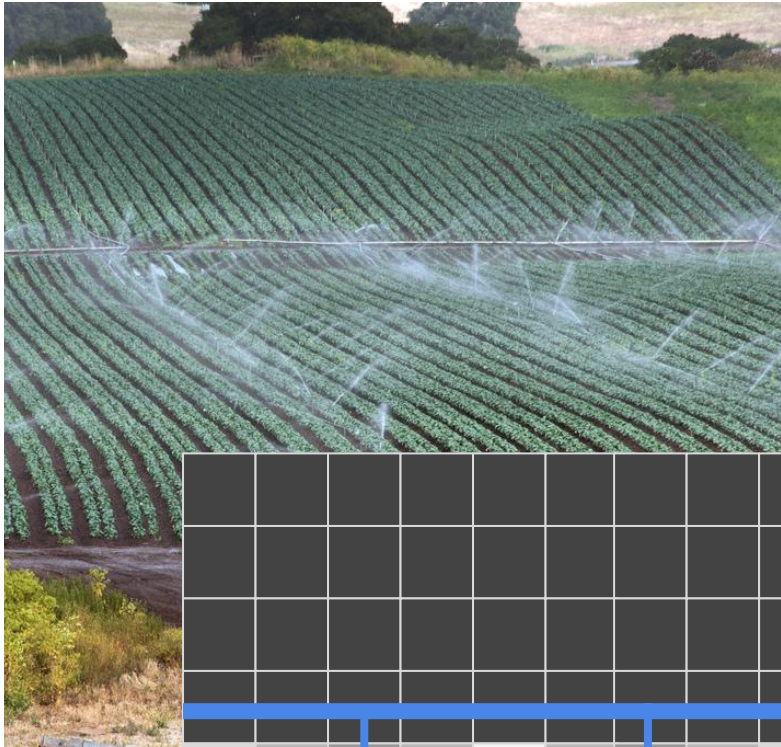
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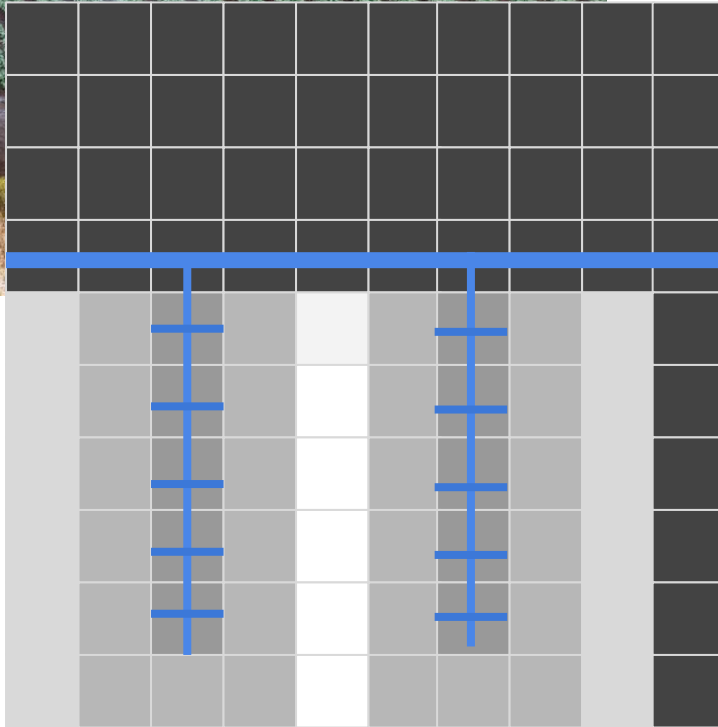
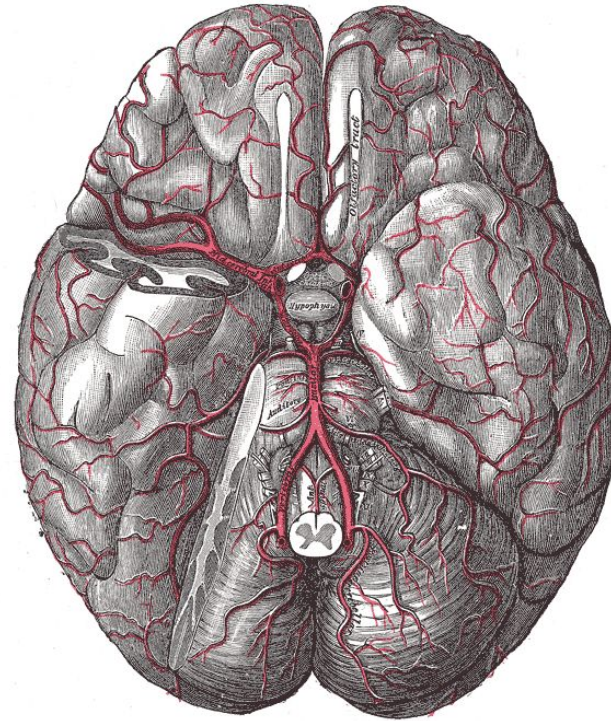
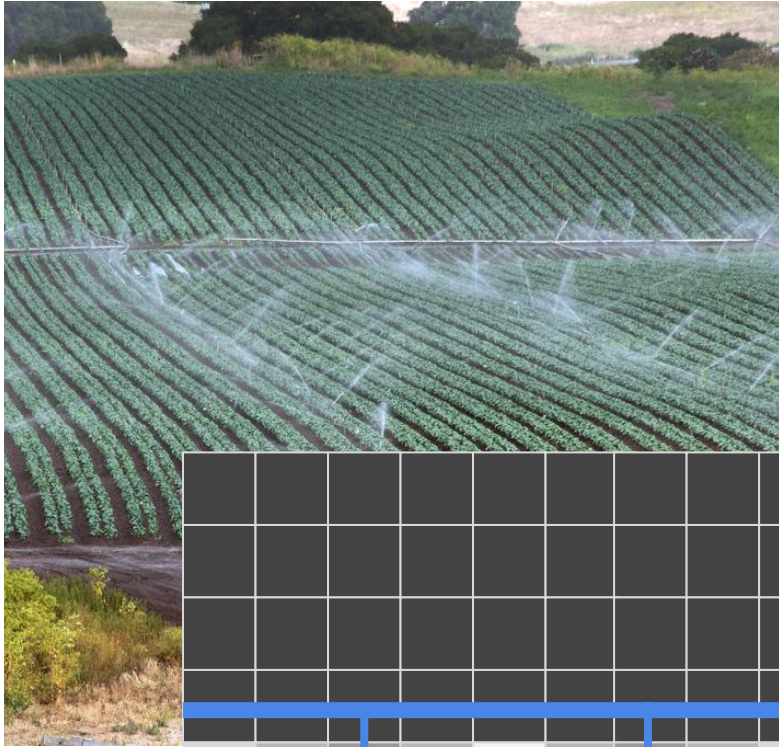
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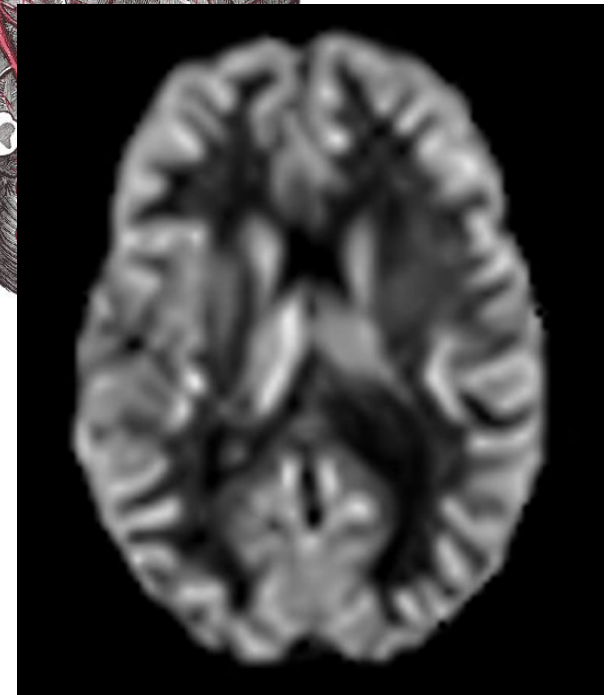
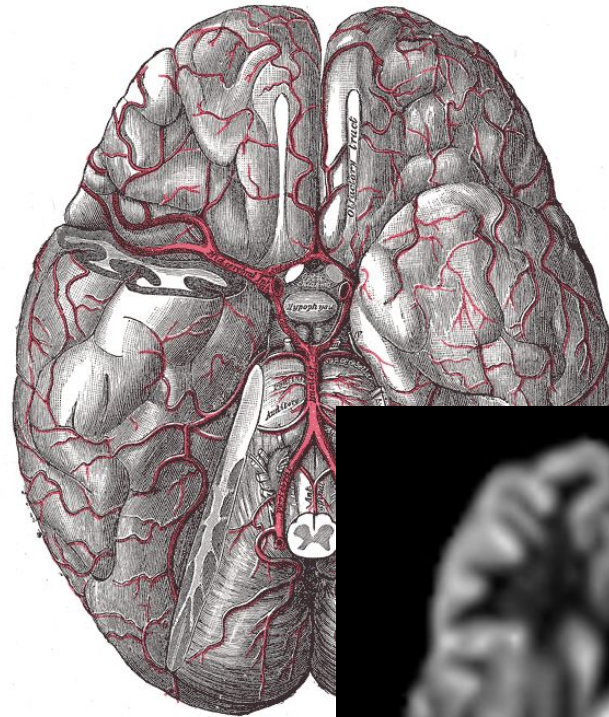
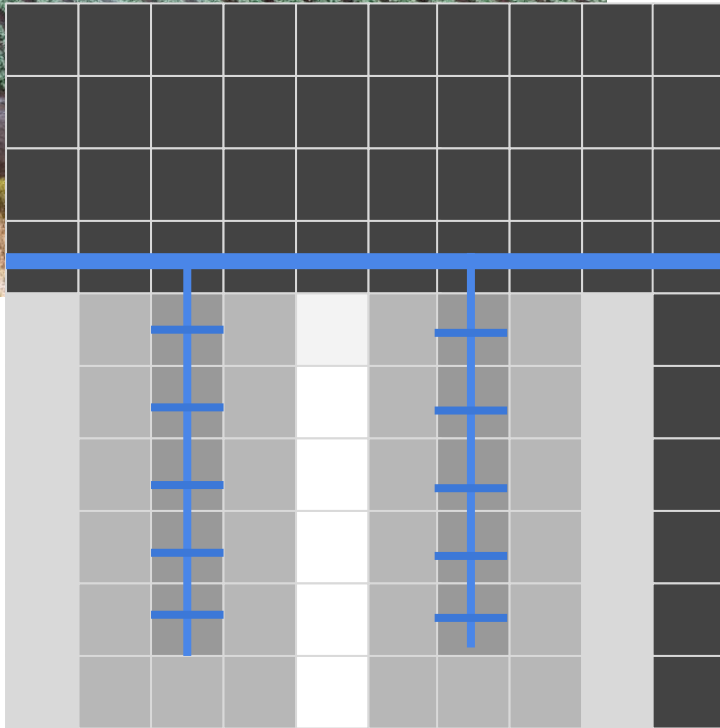
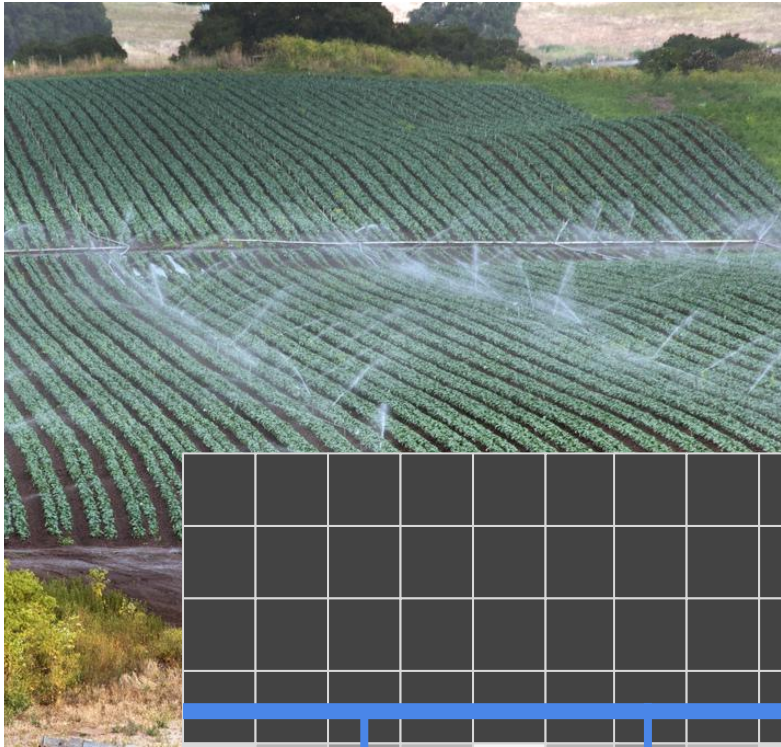
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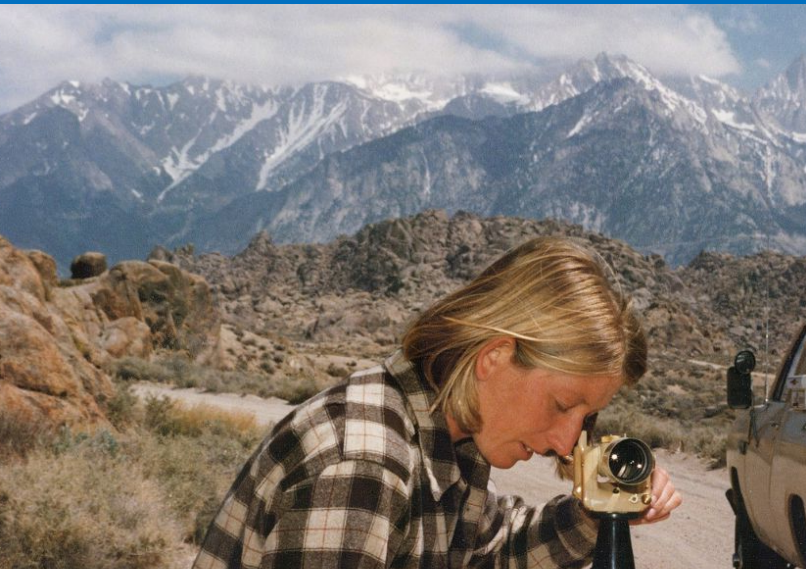
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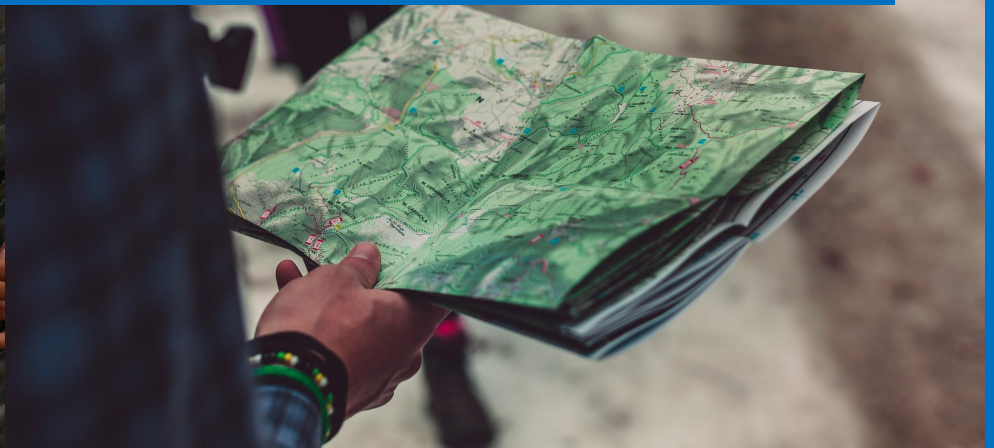
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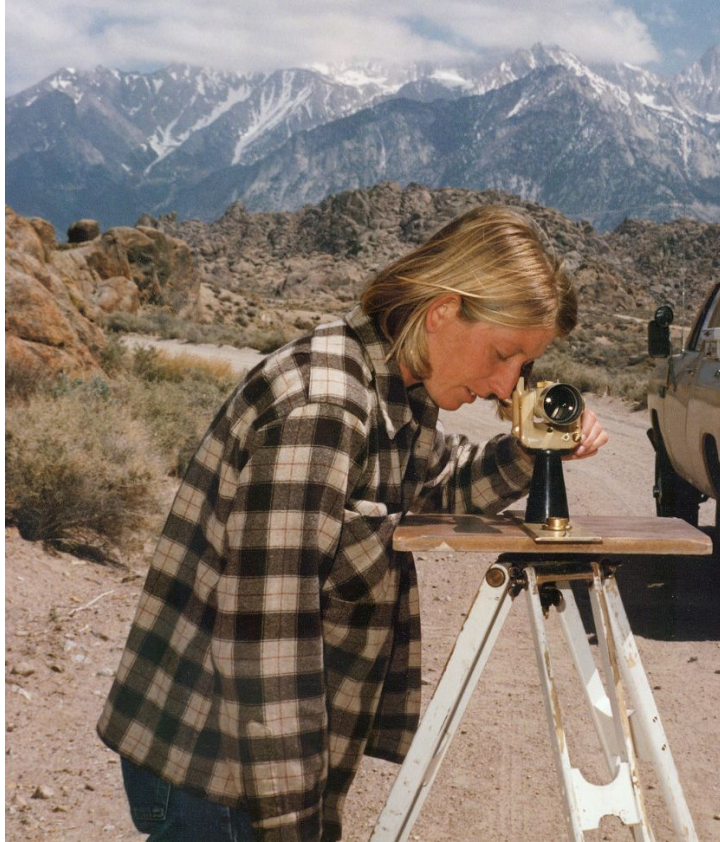
Perfusion



Notre métier : la cartographie du cerveau

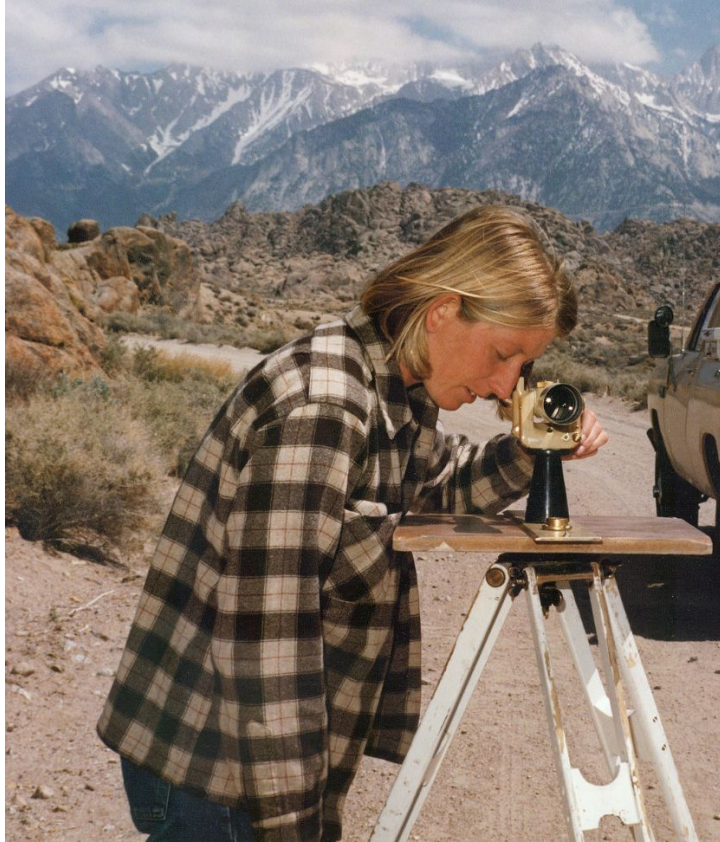


Travailler la mesure



Topographe

Travailler la mesure

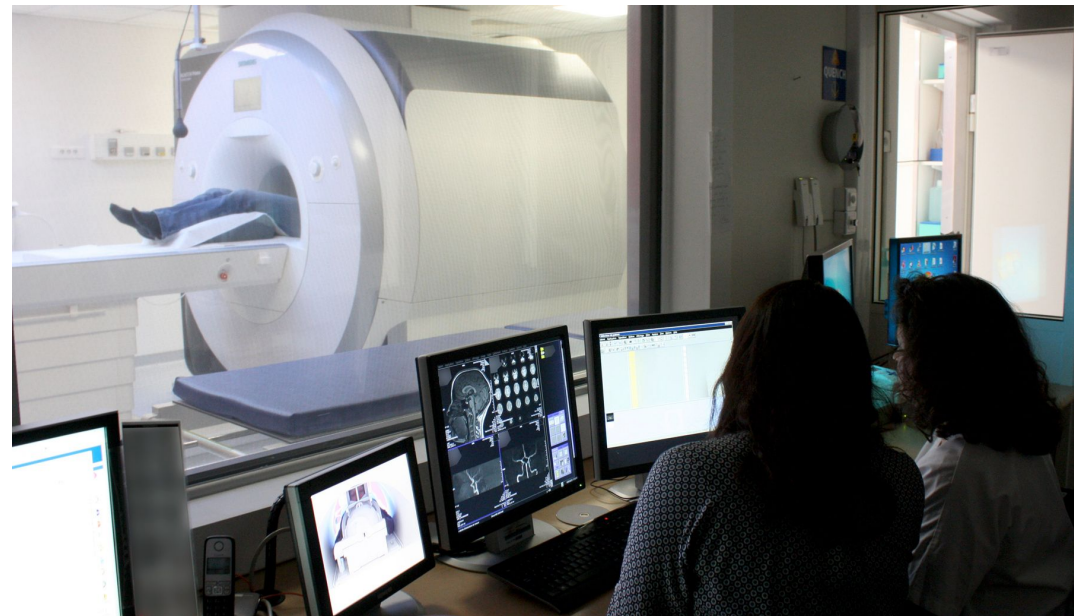


Topographe



**Elise
Bannier**

**Physicienne
de l'IRM**



Créer de nouvelles cartes



Créer de nouvelles cartes



Mathématicien

**Antoine
Legouhy**

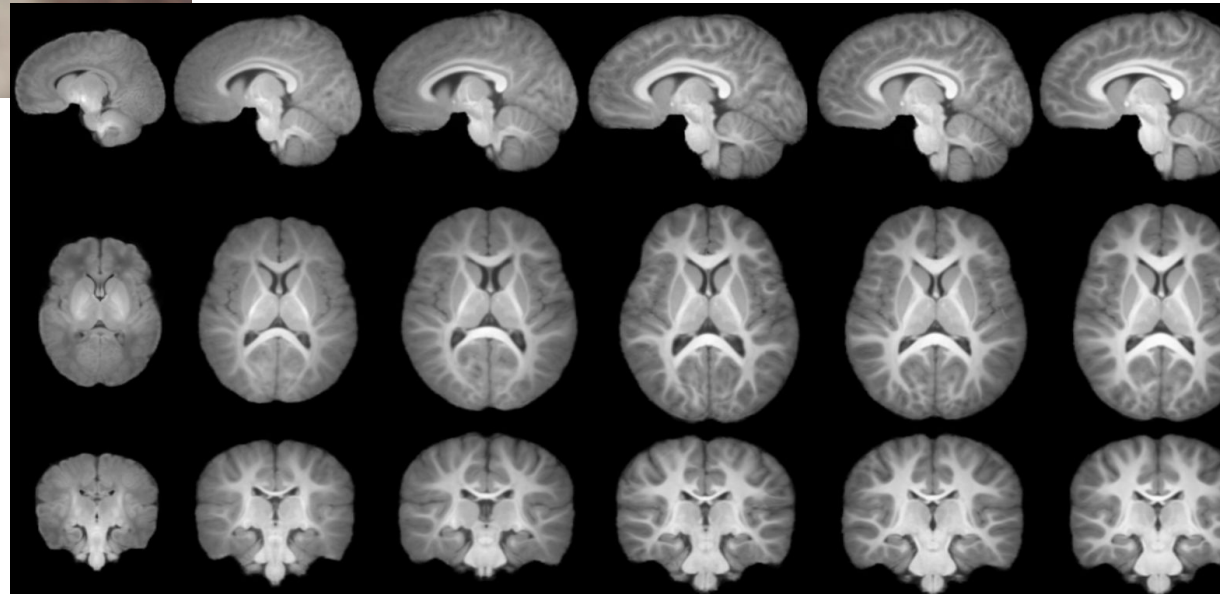
Cartographe

Créer de nouvelles cartes



Mathématicien

**Antoine
Legouhy**



0 0.5 1 1.5 2 2.5
âge en année

Cartographe

Découvrir de nouveaux horizons



Découvrir de nouveaux horizons



**Marine
Dubois**

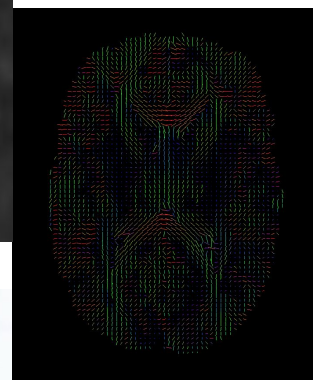
Radiologue

Découvrir de nouveaux horizons

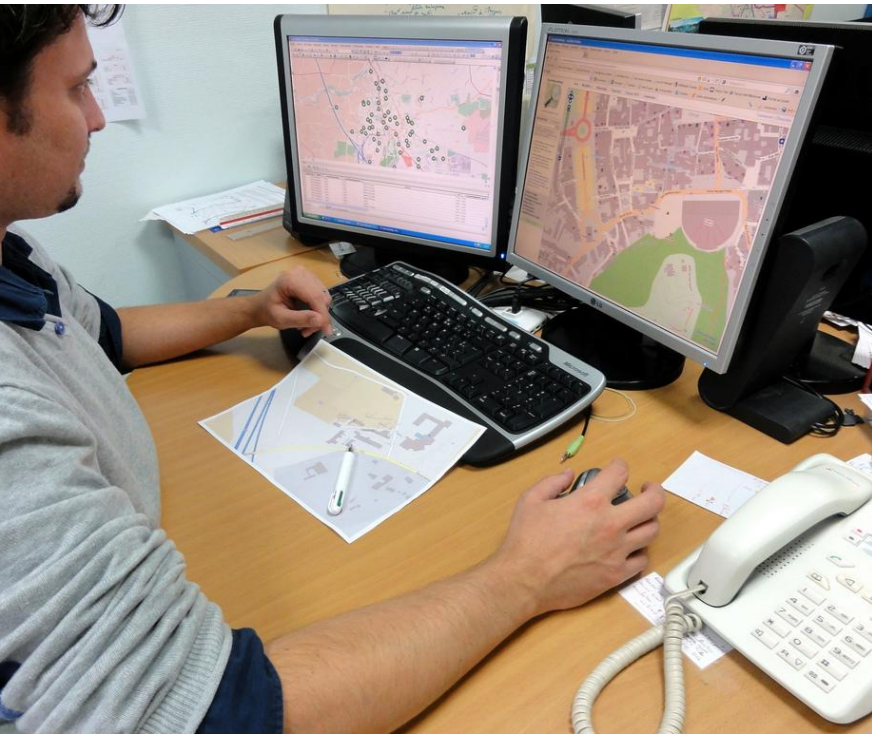


**Marine
Dubois**

Radiologue



Gérer & Combiner les données



Géomaticien·ne



**Camille
Maumet**

**Neuro-
informaticienne**



L'imagerie cérébrale du futur !

Une étude démontre les biais de la reconnaissance faciale, plus efficace sur les hommes blancs

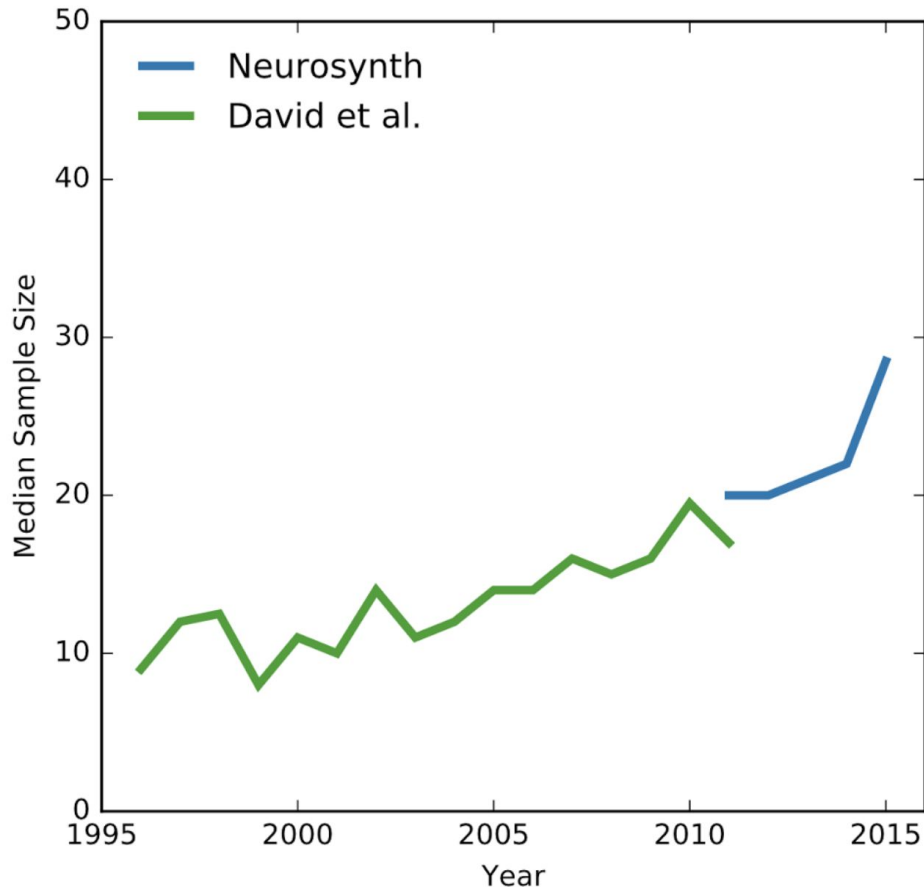
Lorsqu'il s'agit de reconnaître le genre d'un homme blanc, des logiciels affichent un taux de réussite de 99 %. La tâche se complique lorsque la peau d'une personne est plus foncée, ou s'il s'agit d'une femme.

LE MONDE | 12.02.2018 à 14h52 • Mis à jour le 13.02.2018 à 18h18 |

Par Perrine Signoret

Source : P. Signoret, [Le Monde](#).

En imagerie cérébrale



2015 : ~30 sujets / étude

Source : Poldrack et al, [Nature Neuroscience 2017](#)

Les données “ouvertes”

Étude unique

30 sujets

Consortium

1000 sujets

Cohorte

1 000 - 100 000 sujets



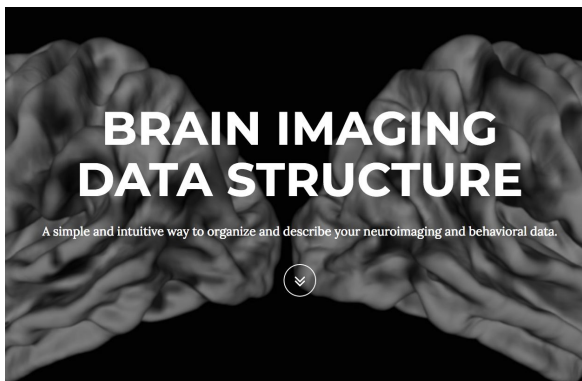
Photo de Neil Conway

Comment tirer parti de ces données ?

Trouver un langage commun



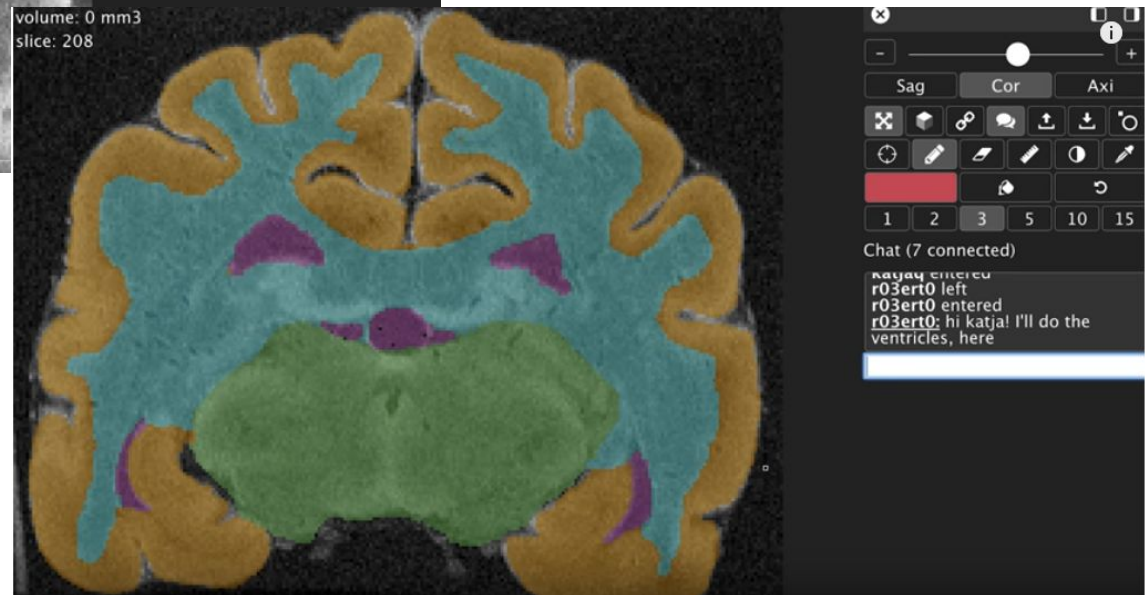
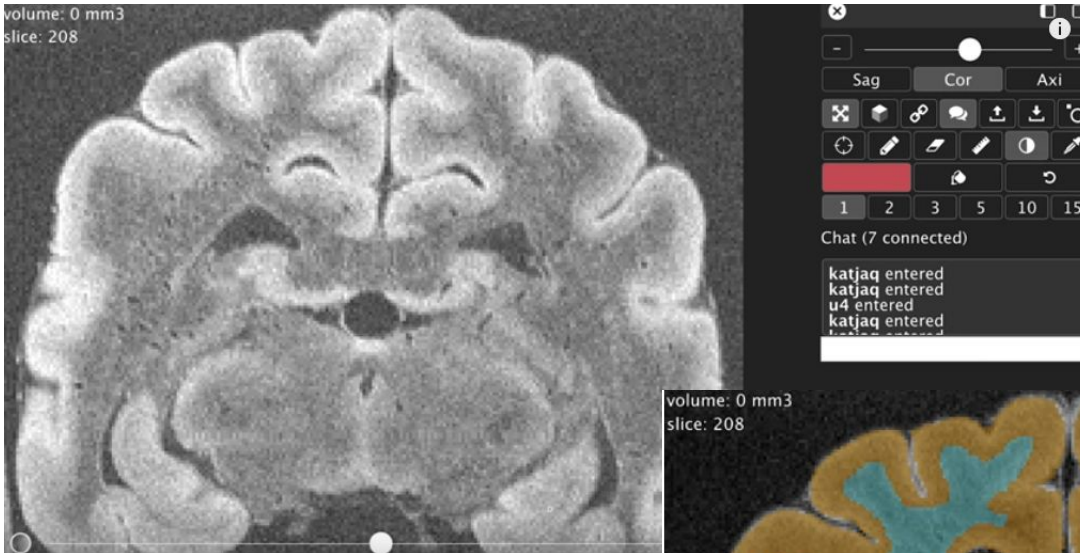
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my_dataset/  
├── participants.tsv  
├── sub-01/  
│   ├── anat/  
│   │   └── sub-01_T1w.nii.gz  
│   ├── func/  
│   │   ├── sub-01_task-rest_bold.nii.gz  
│   │   └── sub-01_task-rest_bold.json  
│   └── dwi/  
│       ├── sub-01_dwi.nii.gz  
│       ├── sub-01_dwi.json  
│       ├── sub-01_dwi.bval  
│       └── sub-01_dwi.bvec  
├── sub-02/  
├── sub-03/  
└── sub-04/
```



Production participative “Crowdsourcing”

BrainBox

<http://brainbox.pasteur.fr>

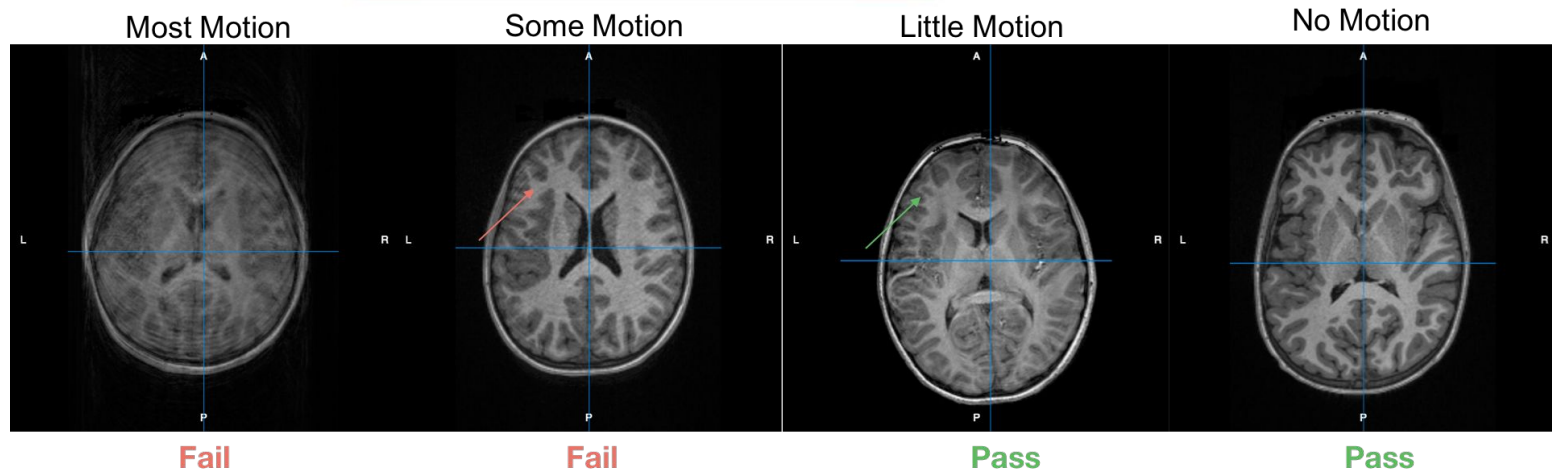
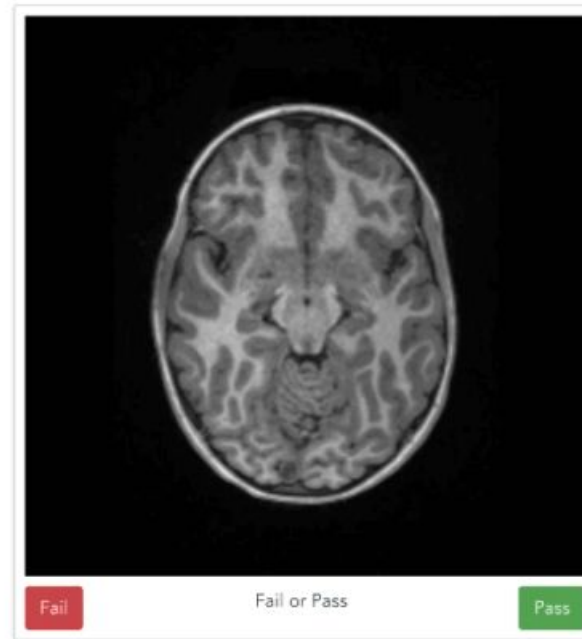


<https://www.youtube.com/watch?v=kwsLoVKnw24>

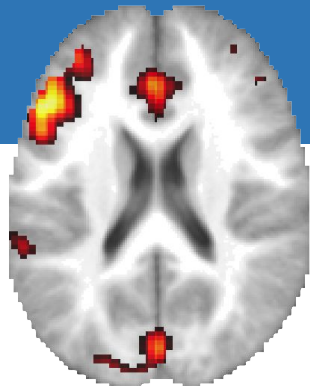
Participez à la science du cerveau !

Braindr

<https://braindr.us/>



Cartographes du cerveau



Camille Maumet

Univ Rennes, Inria, Inserm, CNRS, IRISA

Merci !

Elise Bannier, Giulia Lioi & Claire Cury

À toute l'équipe Empenn !

Luc Maumet

Et vous toutes et tous pour votre participation !

<http://camillemaumet.com>



[cmaumet](https://twitter.com/cmaumet)

<https://team.inria.fr/empenn/>



[empenn_lab](https://twitter.com/empenn_lab)

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