

# Cognition & Brain Dynamics

This document is the internal lab manual of the [Cognition and Brain Dynamics](#) research team. If you are reading this manual, you likely joined the lab recently so welcome! If you are a current member, please, frequently refer to it for updated contents; better yet, make suggestions for improvements!

## Our location and mailing address

CEA, DRF/Joliot, NeuroSpin  
INSERM, Cognitive Neuroimaging Unit  
Université Paris-Saclay  
Bât 145 PC 156  
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[googlemap: P5C2+6F Gif-sur-Yvette]

## Our official affiliation (to use in all publications)

CEA/DRF/Inst. Joliot, NeuroSpin; INSERM, Cognitive Neuroimaging Unit; Université Paris-Saclay, Gif/Yvette, 91191 France

### *What do those acronyms stand for?*

UNICOG is hosted by [NeuroSpin](#), which refers to the physical building located on the “plateau de Saclay) at Gif s/ Yvette. The director of NeuroSpin and of UNICOG is Prof. Stanislas Dehaene ([College de France](#)). [Cognition & Brain Dynamics](#) is one of the five labs/research teams within [UNICOG](#). The Cognitive Neuroimaging Unit ([UNICOG](#)) is a research unit affiliated to the:

- 1) Institut National de la Santé et de la Recherche Médicale ([INSERM](#) for short)
- 2) Commissariat à l'Energie Atomique et aux Energies Alternatives ([CEA](#) for short). The Direction de la Recherche Fondamentale (DRF) and Institut Joliot (Inst. Joliot). The institutional hierarchical structure is thus: CEA > DRF > Joliot (Institute) > Neurospin (Department) > UNICOG (Unit/Lab) > CBD (Team/Lab)
- 3) [Université Paris-Saclay](#)

CEA, INSERM, and Université Paris-Saclay are three independent institutions and we are affiliated to all three. Some teams at UNICOG are also affiliated to the Centre National de la recherche Scientifique ([CNRS](#)) and to the Collège de France.

# Welcome to Cognition & Brain Dynamics!

## Scientific vision

*The Brain - is wider than the Sky -  
For - put them side by side -  
The one the other will contain  
With ease - and You - beside -*

[Emily Dickinson](#)

*The human brain has 100 billion neurons,  
each neuron connects to ten thousand other  
neurons. Sitting on your shoulders is the most  
complicated object in the known universe.*

[Michio Kaku](#)

Cognitive neuroscientists have the privilege to study the most complex organ known in the universe. The hardship in understanding the (human) brain is quite likely as great as its complexity. Cognitive neurosciences do not rely on common intuition, which is often highly misconstrued but on hard thinking, theoretical foundations and empirically tested frameworks. Some theories perish, some survive, and all benefit from the highest standards of scientific method and integrity. Because good science is hard, it can feel personal at times due to how much intellectual investment you have to put in, but it is important to remain humble and realize that if scientists are after (not just reality but) truth itself, such endeavor necessarily stands far beyond personal achievements and egos.

The Cognition & Brain Dynamics team thrives to gain deeper mechanistic insights on the inner working of the human mind. Created in 2011 by Virginie van Wassenhove, we initially focused on implementing state-of-the-art MEG research, and investigated multisensory integration and temporal cognition.

**Multisensory Integration:** How do brains causally infer that distinct sources of physical energies signify the same event in the world? From the physicist's perspective, molecules vibrating in the air (what auditory pathways analyze) and photons (what visual pathways analyze) do not *a priori* designate a single physical entity. Yet, our brain integrates these two sources of energies so that our perception of the spatial location of a sound or even its meaning can be changed by visual inputs (e.g. ventriloquism and the McGurk effect, respectively). Multisensory integration is a first level of meaningful abstraction in our mind. It is also an interesting case study to investigate neural operations such as temporal coincidence, integration, simultaneity, sequence processing or order.

**Temporal cognition:** We are trying to solve how the human brain represents time from making temporal predictions, building expectations in time, storing time information in memory, or navigating time in the mind. We are also interested in timing. To catch nuances in this field, please read this chapter

van Wassenhove, V., Herbst, S. K., & Kononowicz, T. W. (2019). Timing the brain to time the mind: Critical contributions of time-resolved neuroimaging for temporal cognition. *Magnetoencephalography: From signals to dynamic cortical networks*, 855-905.

The dynamic scales at which neural computations operate can be conceived as a chronoarchitecture: dynamic properties of neural activity do not solely reflect adaptive changes, they also reflect dynamic constraints in a complex system (the brain) that provides stability for a thinking and a feeling mind to emerge. Our theoretical and empirical approach considers factors that are endogenous (oscillatory regimes, prediction) and exogenous (temporal statistics of sensory inputs, body movements).

**Methods:** Our scientific work uses tools from traditional experimental psychology (psychophysics, questionnaires, in the lab and online) combined with state-of-the-art neuroimaging techniques (MEG, EEG, fMRI, mobile EEG), signal processing methods (spectral and time-frequency analyses, source estimation, cross-frequency coupling, functional connectivity) and model-based neuroimaging (multivariate TRF, decoding). We try to foster collaborative opportunities that can be fundamental, multidisciplinary (collaborations with artists, physicists), or applied (partnership with industries like SNCF, Orange).

## Team Culture

Diversity and multiculturalism are pillars of science. They are indispensable for the healthy functioning of any team. We are aware that the (academic) world is not free of discrimination, but we actively work towards awareness, and elimination, of sexism, racism, and any other aspect of discrimination in our interactions. You are here to join us in every aspect of the exciting endeavor to better understand the human brain and mind! We foster curiosity, enthusiasm, questioning, motivation, critically reading as much as one can, telling each other where we may be wrong, and learning what we do not know. Science thrives on lively discussions that constantly evolve, new insights, and constant adjustments in our thinking.



by Raphaël Bordas (June, 2023)

## Core Values

*We are not thinking machines that feel; rather, we are feeling machines that think*

[Antonio Damasio](#)

### Collegiality

We strive to make the lab a give-give place in which we all learn from each other, irrespective of experience level. Science is hard enough, we foster being constructive and collaborative, not destructive and competitive!

*Joining a research team means you contribute your critical thinking, your skills, and your diligence to the team. In turn, all of us help you sharpen your thinking, acquire new skills and techniques, and advance your work much further than you could do on your own. Newbies should not need to reinvent anything, you should not be starting your experiments from scratch, but build on what previous researchers have already achieved locally or worldly. For this, you are expected, like generations before you, to document clearly and thoroughly your research path to help future members of the team.*

### Diversity

Different cultural, social, and educational backgrounds define the scientific community. We try our best to reflect this diversity at the level of the team and constantly train ourselves to overcome existing structural and cognitive biases.

*While the Implicit Association Test (IAT) is [controversial](#), it remains a helpful diagnostic tool to see where you stand on social biases and whether you display some strong implicit biases. You can test yourself here: <https://implicit.harvard.edu/implicit/selectatest.html>.*

### Integrity

Everyone must follow strict institutional, scientific (see dedicated section on scientific integrity), and ethical guidelines. No exception, no discussion.

### Excellence

We strive for the highest quality of scientific research from the theoretical formulation of a question to the minute experimental details.

### Perseverance

Finish whatever you started, whether it leads to a failed experiment or to a new discovery. You need an end to begin again.

### Open Science

Open science practices increase the replicability and objectivity of scientific work, which is great! It also requires careful attribution of credit and ownership.

# Getting Started

## Newcomers checklist “Newcomers 2DOLIST”

We compiled a **Newcomers checklist** (see *our shared gdrive*) for all administrative procedures. All info to complete the checklist is either in our welcome lab manual or on the [Neurospin Wiki](#).

## Administrative guidance

For general administrative guidance and human resources help, please be in touch with Vanna Santoro, the UNICOG manager. The contact information of everyone at NeuroSpin can be found [here](#).

## Communication and sharing

Please ask a PI to be added to and request access to the Cognition & Brain Dynamics (“brainthemind”):

- **Gmailing list**
- **GDrive**: sharing documents, pre-registrations, project reports, slides, ...
- **Gcalendar to be used for:**
  - Recurrent team or grant meetings (unicog, neurospin, dedicated hackathons have their own accessible ones, please avoid duplications),
  - PI’s (un)availabilities
  - Conferences, deadlines, and important events of interest to members of the team
  - CBD team zoom use and non-availability of the zoom,
  - Members away (e.g. experiments in the wild, vacations, etc.)
- **Slack**<sup>1</sup>: exchange with your project collaborators (dedicated channels), communicate organizational matters (#general channel – especially important in pandemic times), get help with technical problems (#psychtoolbox, #meeg) share papers (#papers) and discoveries, be social (#fun), on the fly discussions for problem solving!  
*Note that our Slack account does not include a lot of memory so do not expect any preservation of messages or documents there! If you want to keep track use the google drive or dropbox or a shared cloud of your choice...*
- **Zoom** for remote meetings<sup>2</sup>
- [BraintheMind Github](#)
- **Whatsapp**: when at conferences or social events

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<sup>1</sup> When joining the #general channel, you should be automatically added also to the channels #papers #fun #psychtoolbox and #meeg. Please ask Sophie Herbst to add you if it did not work.

<sup>2</sup> The team has a paid zoom account, which you can use to organize meetings without a time limit. Please ask Sophie Herbst for the login.

## Resources

**NeuroSpin** is a neuroimaging center with great tools on site, and lots of technical and methodological knowledge available. NeuroSpin has a [wiki](#), where you can find a lot of practical information (*ask for the password*). Please, do check it often as it will answer many practical questions you may have, from how to pay for a conference to who is in charge of the IT, how to use triggers with MEG or how to analyze DTI. Also, please update information if it is outdated to keep it alive and helpful! Neurospin also has a Slack “[neurospin.slack.com](https://neurospin.slack.com)”. Visit the [tips website page](#) of our site where we also keep a list of reliable and relevant info from funding sources to how to make nice figures.

### Access to Journals & Library

We have books onsite and in electronic format in our shared google drive (*ask for the password*). If you think that we need a book, please bring it up during our lab meeting. Please ask **Vanna Santoro** for electronic journal access.

### Basic office supplies

All office supplies (pens, envelopes, paper, external hard disks, memory sticks) can be found in the room opposite of the copy machine, in front of Laurence and Stan’s offices. The key is in Laurence’s office.

### Computers and IT infrastructure

Every incoming **PhD and postdoctoral fellow** will be provided with a laptop, which can be windows or linux depending on your computational needs. Please let Sophie know which you need as soon as possible during the hiring process. Master students can be provided with a laptop if needed. **It can take up to 3 months to get a new computer ordered and installed.**

Check the NeuroSpin wiki for ample information about IT infrastructure and contacts. For any IT issues, [check the Wiki](#). If you have technical issues with your machine you or your peers can’t solve, call the **+33** from any landline phone at NeuroSpin. Also, check out the [MEG-Wiki](#) for some questions related to MEG-technicalities (this site may need updates).

Because the NeuroSpin server is highly secured, you need an electronic password generator device (“mobipass”) that is yours only to access the server from outside the CEA. This is essential if you want to do data analysis on the local clusters. When you arrive and meet with Vanna, we do ask you to request a [mobipass for access to the server from outside](#).

We now mostly perform our analyses on the dedicated MEG cluster Narval but others are available.

## Software and Computing Environments

Typical tools we have been using based on project needs are listed in the table. For specific needs, build on the expertise of the lab and ask for existing code, examples, or stimuli! Also visit the [tips page](#) for more info.

	For what?	Pros	Cons	How to	Toolboxes
<b>Python</b>	Psychophysics (stimuli, experiments) Data Analysis Statistics M/EEG Analysis	Free, open source  Tool of choice for M/EEG analysis in the team	Dependencies can be difficult to navigate	Use the <a href="#">mne-python installer</a> unless you are an advanced user  Find your preferred editor: <a href="#">Spyder</a> <a href="#">VSCode</a>	<a href="#">PsychoPy</a> <a href="#">ExPyrimint</a> <a href="#">Psignifit</a> <a href="#">SciPy</a>  <a href="#">MNE Python</a>
<b>Matlab</b>	Psychophysics Data Analysis Statistics M/EEG analysis	Commercial software Many existing psychophysics scripts in the team	Expensive	<a href="#">Install Matlab</a> Ask your PI for a license or use trial version;  <a href="#">Octave</a> can be used as a replacement	<a href="#">Psychtoolbox</a> <a href="#">Psignifit</a> <a href="#">Fieldtrip</a>
<b>JASP &amp; Jamovi</b>	Statistics	Free, open source Beginner oriented May provide a good kickstart towards R	Limited No coding flexibility	Install code Gui interface	<a href="https://jasp-stats.org/">https://jasp-stats.org/</a>  <a href="https://www.jamovi.org/">https://www.jamovi.org/</a>
<b>R</b>	Data Analysis Statistics	Free, open source Advanced data visualization and statistics	Many packages evolved in parallel	Install <a href="#">R</a>  Editor: <a href="#">R studio</a>	<a href="#">Ggplot2</a> <a href="#">LME4</a>

## How to do science at Neurospin

### Ethics

If you have never taken a formal training course in ethics and research integrity, please, follow this course <https://researchethics.od.nih.gov/Introduction1.aspx> to learn about the responsibilities we have as researchers working with human participants.

Every experimental study needs approval by an ethics committee before participants can be tested (it can be a CPP or a CER): the differences between those protocols is explained in the [NeuroSpin Wiki](#). In short, CPP is a more restrictive protocol covering mainly Neuroimaging experiments, and CER is used for other types of experiment (behavioral, EEG, ..).



**Be aware that if a new protocol or an amendment has to be submitted, approval can take several months.** Make sure you read the chosen protocol and comply with it. In particular, make sure you know the rules for recruiting and including participant, protect participants' personal rights, never share non-anonymized data, and always check your ethics protocol and confirm with the responsible researcher before making data public. If in doubt, ask your PIs and/or the nurses for advice. The Neurospin's ethics officer, Bernadette Martins, can also be consulted for advice.

Typically, we use **CPP 100 049** (Legal responsible researcher: Florent Meyniel) for MEG studies run at Neurospin. The document is available on the NeuroSpin wiki: "*Exploration des fonctions cognitives chez l'Homme par magneto- et electroencephalography (CEA 100 049 / ID RCB: 2018-A02586-49)*".

We have several **CER** protocols running, notably for behavioral, EEG, mobile EEG, virtual reality, and online experiments (all on the google drive, including consent forms). If your experiment is run under a CER, please consult this page for instructions on how to organize the testing:

<https://www.neurospin-wiki.org/pmwiki/Main/RunningExperimentsUnderCERAtNeuroSpin>

**Well before recruiting any participants, and as you are in the planning stage of your study, you need to think about which CPP or CER you will be using as they entail distinct procedures. Please, consult the general rules of thumbs [explained here](#) and check with your PI about whether you can use any of [the existing protocols](#). In your publications, always mention the ethical protocol in the 'participants' section.**

## Data saving and documenting

All collected data, acquisition scripts and data analyses scripts should be placed on the Neurospin server. This will ensure daily backup and secured access to all collaborators on the project.

Your data folder should be accompanied by an easy README.txt file explaining what the folder contains, who are the researchers involved in the project, the naming convention of the files, where things are and what they mean. **Documenting your experimental work is a must.** Imagine that a new collaborator or a new incoming student has to replicate your work or join the project in mid-course. Someone who knows nothing about the project should be able to understand the database and the code even if you are not there to explain it.

### Behavioral and eye-tracking experimental data

All behavioral data, acquisition and data analysis scripts should be placed in a folder named "yyyy\_mystudy\_myname" in this folder: <\\fouet.intra.cea.fr\neurospin\unicog>

### Neuroimaging (MEG, EEG) data



v2 (VvW, 202309); v1 (VvW, 202207); v0: (VvW, SH, 202009)

Last updated [VvW]: Nov. 28th 2023

All acquisition scripts, MEG and EEG data, analysis scripts, statistical outcomes and relevant information about the project should be placed in a study folder placed under:

\\fouet.intra.cea.fr\neurospin\meg\meg\_tmp\

First, please create a folder for your project : **yyyy\_mystudy\_myname** with yyyy = year, mystudy = the acronym of your project (it should be identical to the one you used in the institutional pipeline from ethics to data acquisition), and myname = your last name for identification purposes.

Then, in your yyyy\_mystudy\_myname folder, create four subfolders:

#### “MEG”

The MEG folder will contain a folder for each participant with symbolic links to their raw MEG recordings. Please do not copy the raw data. Use symbolic links to raw data, and put them for each participant in their own folder.

You can name the raw data files as this:

participantID\_StudyName\_raw.fif.

If your data has multiple runs:

participantID\_StudyName\_run01\_raw.fif

“**system\_calibration\_files**” in which essential calibration files for the MEG system will be placed

The "system\_calibration\_files" folder will contain the calibration files.

“**scripts**” in which you can place your codes and analysis pipelines

“**MRI**” will contain the participants' MRI files

# Lab life

## Happenings & Calendars

### [NeuroSpin calendar](#)

Weekly NEUROSPIN invited conferences are held on Monday, 11 am, in the amphitheater Bloch.

### [UNICOG calendar](#)

Weekly UNICOG meetings are Friday 3pm, room 183. This is the place to exchange with other members of the lab. We highly encourage your presence and active participation. You will be asked to present your project there, too.

### [Brainthemind calendar](#)

Weekly Cognition & Brain Dynamics lab meetings are held on Tue 1:30 pm, room 2033 (Claude Bernard). Each member will present their project at different stages of completion for brainstorming and help. We also do journal clubs and round tables to which everyone contributes. **This meeting is for you**, and an opportunity to ask questions, express doubts, learn from feedback, and interact on important questions to prepare you for presenting your work to the outside academic world.

For 2020, the organizer is Harish Gunasekaran

For 2021, the organizers are Anna Wagelmans & Valentine Mandin

For 2022, the organizer are Yunyun Shen & Anna Wagelmans

For 2023, the organizer is Raphaël Bordas

For 2024, the organizer is Camille Grasso (Matthew Loggie as substitute)

## Working Hours

**NeuroSpin is open from 7 am to 8:30 pm on weekdays (closed on weekends), and has some fixed closing dates (usually on bank holidays, marked in the Unicog calendar).**

We do not enforce rigid working hours as long as you attend scheduled meetings (weekly lab meetings, project meetings...), either live or via zoom or hybrid. Nevertheless, it is preferred that meetings be attended on site by all. We will determine scientific objectives for each project on an individual basis with a clear and tenable schedule. From there, you are free to adapt your schedule to your own needs, work from home or a library if needed (e.g.: literature review, writing, etc), but you have to stay reachable on slack, emails, zoom ... **What matters is that milestones are reached, not the accumulation of hours worked.**

Also... while everyone has their own [chronobiology](#), it is still fun to interact at lunch time or share coffee breaks and other random thoughts “en présentiel”... Since we encourage flexible working schedules, it can result in late or weekend emails from PIs. Please do not feel obliged to answer outside of your working hours. **Do inform sigma (CEA employees) or sirene (INSERM employees) of your teleworking days and holidays.**

## Holidays must be taken and communicated to your hierarchy and the HR

Depending on the duration of your contract, a certain number of holidays is given to you as per the French legal system. **You must take yearly holidays in due time for your own health and well-being.**

Please notify human resource and your supervisor about the dates of your vacation, or diverse absence. You must inform officially your contractual institution (sigma for CEA contracts, sirene/gaia for INSERM or your University).

Please, also indicate your absence in the google team calendar for organizational purposes.

If you have health concerns and are on an extended sick leave, please let us know and inform the lab's human resource manager **Vanna Santoro**.

## Psycho-social Support

If you have any personal or interpersonal issues that you would prefer not to directly discuss with your PI at work, you can in all confidentiality approach Vanna to discuss any problems, or **Isabelle Denghien** (official referent person for personal safety including issues related to harassment), as well as the student representatives at the Unicog level, currently Alexis Thual (PhDs) and Alexander Paunov (Post-Docs). Also see the wiki for [more resources](#).

[Science accueil](#) can also provide help for health related and other practical questions. For more info, also see this [booklet](#). Contact: [contact@science-accueil.org](mailto:contact@science-accueil.org), +33(0)7 49 32 14 18

## Emergencies

When at CEA, in an emergency situation, type 18 on any stationary phone or 01 69 08 22 24 on your cell.

## Outside the lab

For orientation/ living in France/ language classes: <https://www.science-accueil.org/>

Social events: check the NeuroSpin wiki and ask other students about the monthly lab picnics, after-work beers, post-lab meeting drinks, neurobreakfast (unfortunately all compromised by the pandemic), ... We also go on lab outings occasionally, feel free to organize an opportunity!

# Expectations and Responsibilities

## What you can expect from the team director

- Hidden and visible administrative duties to ease the team's scientific productivity
- Availability for meetings regarding the advancement and orientation of scientific projects in the team
- Advice on the advancement of your career, whatever your level
- Help with grant writing and scientific strategizing
- Improving working rules to suit evolving needs while maintaining scientific productivity in the team
- Dissemination of our work in the bigger picture
- Keep any promise I made to finish a scientific project with you (even if the intended deadline has expired and you have joined another lab or left academia). However, projects are designed to be finished in the time of your lab stay! ;-)

## What you can expect from your PIs

- Insuring available funding for research projects and/or helping you jumpstart your own skills to get funding
- Guidance at all stages of your research project: from the initial question, to the paradigmatic approach, relevant literature, etc.
- Help you reach reasonably working code, help with debugging, tips for sanity checks
- Feedback on your analyses and display of results
- Discussions, brainstorming, and interpretations of your results
- Feedback on your presentations (slides), training in front of the group and general communication skills
- Thorough rounds of revision on written work (reports, and especially papers)
- Weekly one-to-one meetings (more if needed, less if needed)
- Weekly group meetings to gather more team level feedback and insure we are all on the same page
- A scientific work environment where you will hear and learn about various topics and questions
- Discussions and guidance about your career wishes, and how we can best help you achieve it

## What PIs expect from every team member

- All **administrative requirements including deadlines** (signatures, conventions, etc.) necessary to join the team, university programs or doctoral schools (report deadlines, committee meetings) are your responsibility.

Please be aware that the administrative procedures at the CEA take 1 to 3 months, so be swift with handing in your paperwork. Not having a badge will prevent you from testing participants and makes it difficult to buy lunch on site.

- **Critical thinking and knowledge:** you are responsible for the critical mastery of the literature relevant to *your* project, and for seeking information and tools that will help *you* achieve it!
- **Documentation and transparency:** your data and code must be organized and documented so that anyone entering the project would understand what is going on without having to ask you. You will see how useful it can be to start your own study building on the work others did before you (experiment code, analysis scripts). Please, carry on with that effort!
- **Acknowledgements:** systematically and generously acknowledge everyone who contributed to your work (including supervisors, engineers, post docs) on slides and reports.

**Please, keep in mind that acknowledging someone is not about being kind but about being able to objectively assess and recognize the contribution of each person in a working team.** Please, use the [CRediT](#) to help you achieve this goal. For instance, you can start listing what you expect or envision collaborators' implication to be in the project. Then, you can revise these expectations upon completion of the project (adding or removing the contributors based on factual contribution to the project). These should be openly discussed: be generous but fair. Most projects are the result of teamwork. Consistently prefer “we” to “I” when presenting outcomes, except on the day of your PhD defence.

## What PIs expect from...

### Post-Doctoral Fellows

You are considered a junior colleague and collaborator, who has already acquired full intellectual autonomy, both theoretically and empirically. The definition of your scientific project depends on the funding source (a grant held by one of the PIs, or your own), and will be discussed and adapted continuously between you and one or several PIs.

You are a pillar of the team in that you can help mentor students, provide reliable expertise in your field of research and preferred methods. We also expect you to know the limits of your own expertise and knowledge and seek senior expertise on ongoing projects.

We expect you to take initiatives: for instance, organize journal clubs, lead discussion sessions, eventually organize hackathons or work sessions that you see fit for projects you take part in.

You are welcome to invite colleagues to give talks, you should give talks to the lab, to Neurospin, as well as national and international crowds, and advance your career by exploring new horizons at the frontier of your current knowledge.

## PhD students (senior graduate students)

You will conduct all stages of the scientific project, including narrowing down the initial question and building up on it, preparing the experimental protocols, data acquisitions and analyses. Hence, as a PhD student, you become the major driving force of scientific work, which means you are responsible for the mastery of the literature, all technical details of your studies, the testing of participants, the analysis of the data, their interpretation, communication, etc...

The direction of your work will be initially defined with your director/mentor and possible advisor(s), but you are progressively expected to rise to intellectual autonomy, both theoretically and empirically. In fact, you should become the best expert in the team on your own topic! If all goes well, you will get to start working in collaboration with the master students and start learning how to transmit the how to, work solo but also in a team.

### **Comité de Suivi Individuel (CSI) or “Individual Follow-up Committee”:**

You are fully responsible for planning and scheduling yearly CSI. You are expected to ask your PhD mentor to establish the committee during the first 6 months of the start of your PhD. You are then expected to contact your PhD mentor and committee members at least 3 months ahead of the expected date of your CSI to schedule the meeting. The general definition of CSI below is helpful to communicate to international committee members.

A CSI is made compulsory by Article 13 of the Minister Decree (May 25th 2016): "An individual PhD student follow-up committee shall ensure the smooth running of the programme on the basis of the doctoral charter ("charte du doctorat") and the training agreement ("convention de formation"). In an interview with the doctoral student, it evaluates the conditions of his training and the progress of his research. It makes recommendations and sends a report of the interview to the director of the Doctoral School, to the PhD student and to the PhD supervisor. In particular, it shall ensure that all forms of conflict, discrimination or harassment are prevented. The composition, organization and functioning of this committee are determined by the doctoral school council. The members of this committee do not participate in the direction of the PhD student's work."

### **Exemple taken for Biosigne Doctoral School of Université Paris-Saclay**

The progress of a doctoral project is annually followed by an individual "thesis committee", composed of an expert (HDR) external to the doctoral school and Paris-Saclay University and a tutor (HDR) chosen outside the host laboratory, but who may belong to University Paris-Saclay.

The tutor and the external expert are appointed by the thesis director and the doctoral student during the first 6 months of the thesis. The doctoral school is informed of the choice for approval. Expert and tutor may also become part of the thesis defense jury, provided that the rules for its composition are respected, and that they have not co-authored the thesis work.

**At the end of each academic year, the doctoral student presents his research work before the thesis committee, in the presence of the thesis director. The doctoral student prepares in advance an annual report, which he sends to the committee to prepare the interview. The aim is to help the doctoral student to consolidate his research work with possible instructions for the continuation of the thesis, to prepare his thesis defense and to define his professional project. The Committee will report at the end of the interview. This report is requested at the beginning of the academic year and is included in the re-enrollment file. In the absence of this document, the re-enrollment of the doctoral student for the following year may not be granted.**

## **Master 2 students (junior graduate students)**

You will go through all stages of a scientific project, including narrowing down the question, preparing the experimental protocol, data acquisition and analysis. Depending on the project, this might include several behavioral pilot experiments and/or data M/EEG acquisition and/or analysis.

The direction of your work will be pre-defined by your advisors, but you are expected to contribute also to the theoretical aspects and to the implementation. We expect you to take over responsibility for your study as early as possible, to master the relevant literature, and be the expert concerning all technical details, as well as for the documentation of your work. You will likely be responsible for testing participants, and you will definitely analyze data and interpret the results. We do not expect you to be fully fluent in programming, but you will have to learn efficiently to eventually write your own.

## **Master 1 and Licence students (undergraduate students)**

This is likely your first hands-on encounter with the scientific method. You will go through all stages of a project, and take more autonomy throughout the process. You will test participants, analyze the data, interpret and present the results. We encourage you to take over all those aspects as early as possible. We expect you to master the related literature and contribute to the improvement of the experimental design.

We do not expect you to be fluent in programming, but you will have to learn to understand and modify code, and eventually write your own. You are in charge of documenting your work.



# Scientific Communication

Uncommunicated science is not science. A scientist finishes the work by reporting and communicating it. Academic reports teach you the basics, but it takes a lot more efforts to publish your work in international peer-reviewed journals (basically, our gold standard). Most members of the team will have to bear with the consequences of [being non-native speakers of English](#) but we can hope for the collegiality of native speakers to help us revise. AI can also be of assistance too if used wisely (e.g. <https://www.deepl.com/write/>) !

## Main rules

**Anything that leaves the lab (written reports, presentations, abstracts, articles) has to be shown to the supervisors and co-authors beforehand.** You are responsible for leaving enough time for at least one round of revisions before the deadline on any work (see below for more specifics).

Submission to a journal implies some minimal information to convey to the senior author:

- Reasons for choosing the journal (adequacy of the research with the theme of the journal)
- Impact Factor (*is your work objectively extremely novel and impactful in many ways (large audience) or a very good incremental science for an expert audience?*)
- Cost: what budget is needed to publish in this journal Open Access or not
- [...] Please discuss with the senior author

Absolutely no work must be submitted to a journal without prior consent of the senior author. Failing this rule, the senior author may contact the editor and retract the submission.

## Specifics

**Academic reports (midterm, final written theses)** have to be approved by your supervisor before submission. If your supervisor does not get to read and approve before submission, the university program will anyway require her evaluation of your work. Ideally, we wish to continuously discuss your advances and the write up of your reports. Minimally, we wish to receive your **Master thesis or reports 2 weeks before the deadline**, and your **PhD thesis, at least one month before the submission to your doctoral jury**.

Regarding the oral presentations, you are expected to rehearse in front of the team at least one week before the defense (you should rehearse a few times before your PhD defense really ;-)).

**Conference abstracts (posters, talks) and proceedings:** feel free to bring it up when you think that a conference would be appropriate for you to present your work. Before submission, you have to explain to your advisor which data you want to submit, why you chose this conference

and establish the budget that would be needed. The lab may cover the costs (registration fees and travel). Approval from all co-authors before submission will be needed. See Conferences section.

**Peer-reviewed articles in scientific journals:** this is the natural outcome of an effortful work and it may feel like less fun than the actual hands on work. Nevertheless, it is essential to situate your work in a bigger theoretical context and take the distance on how an experiment has achieved or not what it was intended to. We will iterate many times on this, and seek external advice too. If you are a master student, you are expected to minimally produce the Figures, the Materials & Methods and the Results section. As a PhD, you are expected to write a full initial draft version of your work. As a postdoctoral fellow, you are expected to provide a very elaborated first version of your work. **Be a finisher. If you don't communicate the work you did, it simply does not exist.**

## Intellectual ownership & Authorship

We will systematically discuss authorship: who did what, who contributed to what in a project, etc. At all times, we will discuss openly and ethically the contribution of everyone. While we may agree initially on a particular order of authorship, the realized contribution will be taken into account in a final version.

For this discussion to be objective and fair, I encourage you to fill out a CRediT author statement as the project unfold:  
<https://www.elsevier.com/authors/policies-and-guidelines/credit-author-statement>

Systematically acknowledge those who contributed to the work (including supervisors, engineers, post-docs, undergrads) on slides and reports. It is always nice to know that one's contribution has been taken notice of, irrespective of seniority.

## Good scientific practice

Generally, we expect every member of the team, no matter the level of training or duration of stay in the lab to respect the following guidelines:

### Scientific integrity

We strive to improve our scientific methods and practice every day and never stop learning. An important criterion for scientific quality is the **replicability** and **objectivity** of results, across studies and labs.

To assure that we only publish high quality work, we ask you to do your best to prevent errors, double check your code and results, and avoid common statistical fallacies (see below). You have to take responsibility for your work, towards your collaborators as well as towards the scientific community.

- **Check your experimental protocols:** timing or randomization errors cannot be corrected once the data is recorded, and might result in a huge waste of your time and the team's money (**an MEG experiment costs ~30.000€**). This includes making sure the experiment runs without errors and checking the output of 1 or 2 pilot participants for timing, randomization, and task-related aspects. Consult with your advisor if you make changes to the planned experimental protocol.
- **Write clean and commented analysis code**, check it for errors, and include sanity checks in your analysis. Think carefully about your choices of analysis parameters and test several options.
- **Report results as they are, including null-findings.** If we always knew the results of our experiments, there would be no point in doing them.
- **Be aware of biases and common statistical fallacies** (just to name a few important ones, also see References below):
  - selective exclusion of participants
  - Double-dipping (identifying a region where an effect occurs before selectively running statistics; Vul et al. 2009)
  - p-hacking (tweaking parameters until you get a significant result; Head et al 2015; Ioannidis, 2019)
  - confirmation and publication bias
  - high variability in results due to low power (small samples; Button et al. 2013)
- **Errors happen**, even to the best and to all of us, over and over again. The first step is of course to try and prevent them, but when you come across one, act on it: check its impact, make sure appropriate corrections are applied, and **report it to the collaborators**. Only those who do not do anything, make no mistake.

## Plagiarism, Not

Cite all references you used and *never* copy sentences or passages from other people's work, without explicitly acknowledging the original source. Plagiarism will be sanctioned by your committee (worsening your grade up to leading to rejection of your work in bad cases) and the scientific community (rejection of your work with legal consequences in very bad cases). Plagiarism and intellectual dishonesty are a sure way to lose the trust and respect of your colleagues.

## Team culture & Open Science

We work in a collegial, collaborative, and friendly atmosphere. Asking others for support, providing support, caring about our colleagues' matters, and behaving respectfully to everyone within and around the team at any time is key. Every team member, no matter the level of expertise is encouraged to speak up, ask questions, interact and contribute to the life of the team.

To increase replicability of cognitive neuroscience studies, and allow for large-scale approaches, the community currently shifts towards a more open data and open source oriented culture. Sharing data and code simply becomes a requirement from journals and grant agencies, but it should also become a goal to increase your visibility in the community, and allow you to get feedback from researchers outside the lab.

Open science requires very clearly documented data and code, which will enable any external peer to replicate your findings from A to Z, eventually catch mistakes or even improve and extend your work well beyond its original intent. You can start some training with the [exact instructions challenge](#).

Of course, open science practices are still fairly new and the system is not quite yet fully adapted to them. It makes it all the more important to be very careful in crediting contributions and attributing ownership. For instance, designing a good experimental paradigm and solid analyses is hard work that goes far beyond efficient coding. Make sure that all the sweat and thought you and your collaborators put into a study are well credited for, and do not share any work without the agreement of everyone involved. Also think carefully about the time point to share, for instance you might not want to publicly post an experimental paradigm before you finished data collection... and in all cases, not without approval of your collaborators. Like it or not, authorship feeds metrics that count in a highly competitive (academic) job market.

## References

- Button, K. S., Ioannidis, J. P., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S., & Munafò, M. R. (2013). Power failure: why small sample size undermines the reliability of neuroscience. *Nature reviews neuroscience*, 14(5), 365-376.
- Head, M. L., Holman, L., Lanfear, R., Kahn, A. T., & Jennions, M. D. (2015). The extent and consequences of p-hacking in science. *PLoS Biol*, 13(3), e1002106.
- Ioannidis, J. P. (2019). What have we (not) learnt from millions of scientific papers with P values?. *The American Statistician*, 73(sup1), 20-25.
- Vul, E., Harris, C., Winkielman, P., & Pashler, H. (2009). Voodoo correlations in social neuroscience. *Perspectives on Psychological Science*, 4(3), 274-290.

# Communication (to scientists and to the general public)

## Online presence and communication

### Professional Websites

Cognition & Brain Dynamics has a website (<http://brainthemind.com/>) where each member should be listed and briefly introduced. Please, send us a short snippet describing your interests and prior work, a picture (square format with good resolution) to keep our online list of lab members to date. Provide your wish to have your email and social media handles made public or not.

UNICOG has a website (<https://www.unicog.org/>) that should also be kept to date. Marianna Lamprou-Kokolaki is currently helping Vanna on this.

As a young scientist, it is important to have an easy to find profile to help colleagues find you for many reasons. For instance, a fellow scientist may want to contact you to ask access to your dataset or ask a specific question about an analysis you published. An editor may want to ask you to review a submission to their journals, etc... Having an online presence with your contact information and your current affiliation is important.

### X (twitter), bluesky, mastodon (in transition)

You have to decide whether you will publish only professional or personal or a mix of both and provide a disclaimer in your profile accordingly.

VvW: @virginie\_vw; @vww.bsky.social

SH: @herbstso; @herbstso.bsky.social

To discuss eventually...

### Logo and exemple slides

All institutional logos and CEA template PPT are available here:

<https://drive.google.com/drive/folders/1gX6KXvexTvBGZ1hj-G055Ey2-oRF7a6X?usp=sharing>

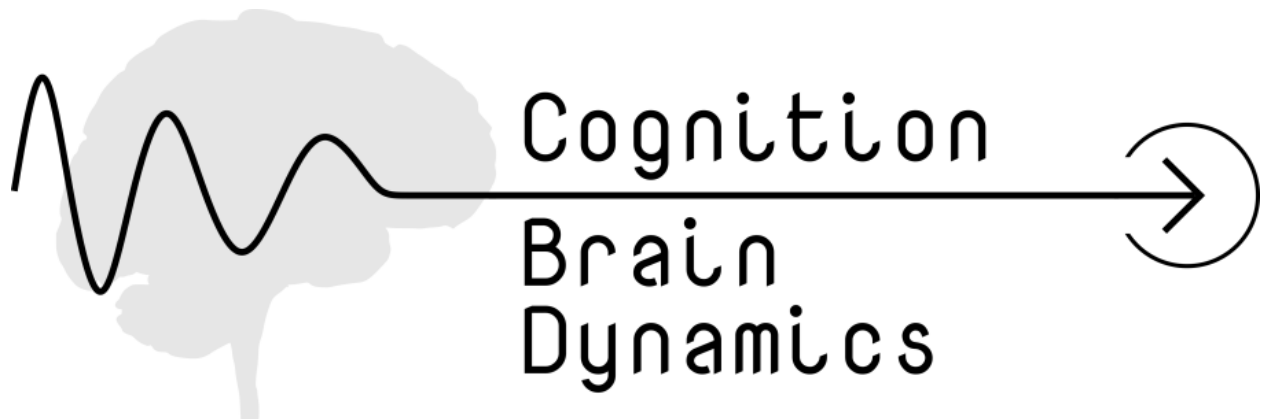
Please, do update when logos change. Use them sparingly.

The CBD team logo is available in . SVG format is here

<https://drive.google.com/drive/folders/1xyk0ivlahHd96FMz1dRUUKbnnJ9yubxa?usp=sharing>

The brain color can be changed as you wish.

There is also a template figure for the slides



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## Conferences

In all cases, please discuss with your PI. Rules for attending conferences are flexible but here are some general guidelines:

- **Postdocs:** you will typically have at least 1 international conference per year funded by the team. If you request more, we will discuss it on a per case basis.
- **PhD students:** if your project provided reliable and novel results, you should ask your PI to submit to an international conference.
- **Master students:** unless you have novel data to submit or you will pursue as a PhD student in the team, you are not *a priori* eligible for international conferences.

### How to attend a conference?

#### 1) **As early as possible: approval by the PI and team leader**

Once you identified a conference you deem relevant for your project, send an email to your PI and ask for their ok. They need to know:

- Which conference (Name, Topic, When, Where)
- An approximate budget (including registration fees, travel and accomodations)

Please, be considerate of expenses at all times

- Which results you would like to present

Ask your PI which budget will fund your trip and whether the budget line is administered by CEA or INSERM.

If the budget is administered by CEA, your main contact point is Maryline Hevin <[marylin.hevin@cea.fr](mailto:marylin.hevin@cea.fr)>

If the budget is administered by INSERM, your main contact point is Laurence Labruna <[laurence.labruna@cea.fr](mailto:laurence.labruna@cea.fr)>

## 2) **At least 2 weeks before the submission deadline:**

- Prepare an abstract for the submission deadline, and submit it to your co-authors for approval at least 2 weeks before the deadline.
- Your PI will discuss with you which type of presentation is appropriate for the state of your project (poster / talk).
- Once the conference approaches, prepare the poster or talk.

***! See previous sections about deadlines and acknowledgments for submissions.***

## 3) **At least 2 months before the conference if your submission has been approved**

**Travel plans** (travels, hotels)

- Register for the conference before the early registration deadline to save the team money. You can either advance the registration fee and get reimbursed, or ask your contact point (Maryline / Laurence) whether they can help you do it.
- You may request an advanced payment but only for hotel nights (100% of the planned cost). Please, ask your contact point (Maryline / Laurence) on how to proceed.
- Fill in a ‘**Demande d’Ordre de Mission**’ (OM) form and send it to your admin contact:

*If your conference travels are funded by CEA, send your CEA OM specifying all necessary travel arrangements to Maryline Hevin. If you are an INSERM employee, you need to also send an INSERM OM “sans frais” specifying travel dates and “sans frais” to Laurence Labruna. Please, do add your date of birth on the INSERM OM!!*

*If your conference travels are funded by INSERM, send your INSERM OM specifying all necessary travel arrangements to Laurence Labruna. If you are a CEA employee, you need to also send a CEA OM “sans frais” specifying travel dates and “no cost” to Maryline Hevin.*

*The appropriate forms can be found in the team’s gdrive folder ‘CONFERENCES’.*



- Find appropriate travel (flight, train) needs but do not book them. Instead, report the travel information (company, flight number, train number) on the OM form (print a screenshot of it to be safe). Your contact point will book it for you so you don't have to advance the money.
- Book your accommodation: be considerate of expenses. By sharing a room with your colleagues if possible (expected for PhD students and PostDocs). Specific rules may apply for INSERM / CEA (maximal allowance, CEA does not allow booking through AirBnB). You will be reimbursed after the conference.

Importantly, whether through CEA or INSERM, you can benefit from an advance payment on your registration fees and your hotel and your travels will be booked for you. Hence, you may only have to cover your own food and local transportations (buses, metro).

- Last, please mark your absence in your employer's system (e.g. sigma for CEA).

#### 4) During the conference

Keep **all** receipts and bills incurred by your professional activity (food, necessary transports, etc.)

For each day there is a set amount that can be effectively reimbursable for food + accommodation. Inquire with Marylin or Laurence.

#### 5) After the conference

You are expected to report the interesting scientific work you learned about to the team.

#### Reimbursement and finalizing paperwork:

- via CEA:
  - Complete page 2 of the OM sent to you by Maryline (dates and times must be filled in)
  - Glue all your receipts on blank sheets (no staples) sorted in chronological order
  - send them all to Marylin by e-mail before depositing the originals in her mailbox
- via INSERM:
  - Make an excel table indicating all of your expenses (food, transportation, etc)
  - Please indicate your mean food expenses per day.**
  - Glue all your receipts on blank sheets (no staples) sorted in chronological order
  - Send them all to Laurence by e-mail before depositing the originals in her mailbox

*Amounts spent in another currency should NOT be converted into € (unless you produce a bank statement showing the expenses concerned); the rate used by the financial*

*department will be the one in effect on the day your file is processed by the Financial Department.*

### Generalist

	<b>when</b>	<b>where</b>	<b>Society Journals</b>
<a href="#">SFN</a>	Yearly; Oct-Nov	USA	<a href="#">Journal of Neuroscience</a> <a href="#">eNeuro</a>
<a href="#">CNS</a>	Yearly; April-March	USA	<a href="#">Journal of Cognitive Neuroscience</a>
<a href="#">Cognitive Science Society</a>	Yearly	International	<a href="#">Cognitive Science</a>
<a href="#">ICON</a>	Every other year	Europe	

### Specialized

	Conference	Country	Expertise
<a href="#">Biomag</a>	Every 3 or 4 years		MEG, EEG
<a href="#">CuttingEEG</a>	Every other year	Europe	MEG, EEG methods
<a href="#">TRE</a>	Every other year	International	Time and timing
<a href="#">IMRF</a>	Yearly	international	Multisensory perception
<a href="#">HBM</a>	yearly		Human neuroimaging, fMRI <a href="#">HBM journal</a>
<a href="#">VSS</a>	Yearly	USA	Vision sciences
<a href="#">ARO</a>	Yearly		Auditory sciences
<a href="#">COSYNE</a>	yearly		Computational neuroscience
<b>BryCoCo</b>	Yearly	international	Brain oscillations
<a href="#">CCN</a>	Yearly	international	Neural computations, behavior
<a href="#">APAN Hearing</a>	Yearly, 1 day, Satellite to SfN	USA	Auditory cognition
<a href="#">RPPW</a>	Yearly		Rhythms
<a href="#">NeuroMatch</a>	TBD	Fully online	

### List of Lists

You can sign up to the following mailing lists to hear about smaller workshops and other announcements:

v2 (VvW, 202309); v1 (VvW, 202207); v0: (VvW, SH, 202009)

Last updated [VvW]: Nov. 28th 2023

[Vision List](#)   [Auditory List](#)   [Systems Neurosciences List](#)   [FieldTrip List](#)   [MNE Python List](#)  
[MEG Community](#)