

David Benacom, Ph.D.

He/his

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Education

2020 – 2023, **Ph.D. Neurosciences, Collège de France** (PSL University), Paris

Directed by A. Di Nardo & A. Prochiantz - “Félicitations du jury”.

2017 – 2021, **Normalien** (MS2017), **École Normale Supérieure** (ENS-Ulm), Paris.

Neurosciences, bioinformatics and Inter-disciplinary degree.

2015 – 2027, **M.D., Sorbonne Université**, Paris.

Top 0.01% admission test.

Professional positions

2024 –, **Postdoctoral research, Stanford University**, Stanford.

Working in E. Mignot laboratory. Machine learning and Genetics.

2015 – 2018, 2024 –, **Clerkship, Hôpital de la Pitié Salpêtrière**, Paris.

4-month rotations in medicine and surgery.

2019 – 2024, **M2 internship, Assistant engineer, Graduate and Postdoctoral research, Collège de France**, Paris.

Working in A. Prochiantz laboratory. Neurosciences, Epigenetics and Bioinformatics.

2018, **M1 internship, Institut Pasteur**, Paris.

Working in G. Cecere laboratory. Epigenetic inheritance.

Competences

- Main expertise in quantitative analysis of multi-omics, microscopy, and behavioral data in R, Python, C and Java. Extensive experience on machine-learning modeling on human plasmatic proteins.
- Animal surgery, design, engineering and conduction of behavioral tests, histology, viral vector design including CRISPR-Cas9, advanced biomolecular techniques (TRAP, CUTNRUN...), libraries preparation, sequencing.
- Collaborative work, writing proficiency, student management, associative involvement.

Professional summary

My research centers on enhancing adult neural plasticity to enable therapeutic circuit rewiring. I focused on post-natal critical period biology and molecular strategies to promote plasticity in the adult brain. We showed that PV cells, key regulators of critical periods, miss a common transcriptomic pathway across different enhanced-plasticity paradigms, suggesting that multiple genetic routes can converge on similar functional plasticity. Building on this, we developed two disease models (Parkinson's disease and a psychiatric disorder) and tested plasticity modulation as a therapeutic strategy, with encouraging results. In the lab, I established methods and analysis pipelines for CUTNRUN, ATAC, and TRAP-Seq, as well as automated video tracking and machine-learning-based microscopy analysis that remain in use. I extended this work through a short bioinformatics post-doc on astrocyte transcriptomic data in collaboration with Nathalie Rouach.

I then joined Emmanuel Mignot's lab at Stanford to apply machine learning to medical data, investigating circadian rhythms using blood proteins. My contribution focuses on inferring organ-related circadian signals from blood markers alone. I am continuing this project while completing my medical degree, with a long-term goal of working at the interface of medicine, neuroscience, and AI, integrating principles of brain metaplasticity and connectomics into AI algorithms.

Publications

- Chataing, C.*, **Benacom, D.***, Prochiantz, A., Di Nardo A. A. (2024). Choroid plexus alterations following early-life stress are reversed with Otx2 loss of function. *In preparation*.
- **Benacom, D.***, Chataing, C. *, Prochiantz, A., Di Nardo A. A. (2025). Motor recovery through perineuronal net modulation in a Parkinson's disease mouse model.
Brain, awaf226, <https://doi.org/10.1093/brain/awaf226>
- **Benacom, D.**, Chataing, C., Apulei, J., Queguiner, I., Prochiantz, A., Di Nardo A. A. (2023). Plasticity state-dependent changes in visual cortex parvalbumin interneuron mRNA translation and chromatin.
BioRxiv, <https://doi.org/10.1101/2023.09.11.557035>
- Gibel-Russo, R.*, **Benacom, D.***, & Di Nardo, A. A. (2022). Non-Cell-Autonomous Factors Implicated in Parvalbumin Interneuron Maturation and Critical Periods.
Frontiers in Neural Circuits, 16. <https://doi.org/10.3389/FNCIR.2022.875873>
- Planques, A. *, Moreira, V. O. *, **Benacom, D.**, Bernard, C., Jourden, L., Blugeon, C., Dingli, F., Masson, V., Loew, D., Prochiantz, A., & Di Nardo, A. A. (2021). OTX2 Homeoprotein Functions in Adult Choroid Plexus.
International Journal of Molecular Sciences, 22(16). <https://doi.org/10.3390/IJMS22168951>

* : Co-first authorship

Conferences

Circadian Clock Dynamics and Physiology Across Biological Scales (2025, Barcelona)
TERAIS (2024, Bratislava)
Cognitive modeling (2024, Groningen)
ENCODS (2022, Paris- 2023, Faro),
Israel Society of Neurosciences (2019, 2020, Eilat),
Curie Institute, Epigenetics Course (2019, Paris).

Invited speaker

Harvard Circadian laboratory Seminar (2025, Boston)
CIRB seminar (2023, Paris)

Teaching and supervision

2020 – 2023, **Université de Paris-Cité**, Paris.

Teaching assistant in Biochemistry. Subjects covered: Molecular biology, Proteomics, Thermodynamics, Cellular Biology...

2016 – 2019, **Sorbonne**, Paris.

Tutor for pre-med student. Subjects covered: Biology, Chemistry, Anatomy, Physics and Biophysics.

2019 – 2024, **Collège de France**, Paris.

Supervision of Camille Chataing (M2 Sorbonne), Sofia El-hanafi (M2 Sorbonne), Pierre-Alexandre Curty (M1 EPHE), Uma Mani (Pre-med UChicago), Marion Binet (L2 psychology).

Associative

Organization of the 2022 edition of ENCODS meeting (FENS satellite event)

Member of ANDC (for MD-PhD), Gali'ENS, Israel Society for Neurosciences, Pasteur Institute former students, A-Ulm

Organization of the MIT Grand Hack Paris 2020

Personal interests

Writing (Novels, poems).

Climbing, swimming, cycling.

Programming, robotics.

References

Emmanuel Mignot : mignot@stanford.edu

Alain Prochiantz: alain.prochiantz@college-de-france.fr

Ariel Di Nardo: ariel.dinardo@college-de-france.fr

Alain Bessis : alain.bessis@bio.ens.psl.eu