David Benacom, Ph.D.

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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 (IMaLiS) and inter-disciplinary degree (DENS).

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. Circadian Rhythms, machine Learning and genetics.

2015 – 2018, 2024 –, **Clerkship**, **Hôpital de la Pitié Salpêtrière**, Paris.
4-month rotations in medicine and surgery.

2019 – 2024, **M2, Assistant engineer, Graduate and Postdoctoral research, Collège de France**, Paris.
Working in A. Prochiantz laboratory. Neurosciences, epigenetics and bioinformatics.

2018, **M1**, **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, and Java. Extensive experience in machine-learning modeling on human plasmatic proteins.
- Animal surgery, engineering and conduction of behavioral tests.
- Histology, viral vector design including CRISPR-Cas9, advanced molecular techniques (TRAP, CUTnRUN…), cell culture.
- Teaching, collaborative work, articles/grant writing, 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 early-life stress, 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 N. Rouach.

I then joined the E. Mignot laboratory 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., Jourdren, 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

A.Loupy PITOR labmeeting (2025, Paris)
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