

MASTER 2 Computational Neurosciences

Internship proposal 2026-2027

(internship from January to June 2027)

Host laboratory: *Name + address*

Institut des Sciences Cognitives, 67 bd Pinel, 69675 BRON

Host team : *team name + website*

Team Jean-Claude Dreher

<https://dreherteam.wixsite.com/neuroeconomics>

Internship supervisors : *name + position + email*

Jean-Claude Dreher : dreher@isc.cnrs.fr

Project title : Learning rules underlying diffusion of information in social networks

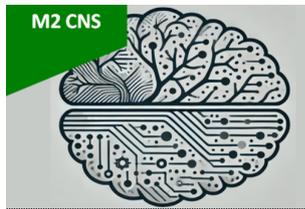
Project summary : *5-10 lines max*

The computations used to update beliefs are central to understanding how information spreads in social networks. Two contrasting theoretical frameworks coming from computer science and decision neuroscience propose that individuals adjust their beliefs either through synchronous averaging of their social connections' opinions (DeGroot learning) or through asynchronous, error-driven belief updating (Reinforcement learning). The goal of this project is to compare these computational learning mechanisms using both controlled social-network experiment and computational modeling in situations in which information spreads in real time. By linking individual-level computations to collective outcomes, we aim to provide a mechanistic account of how simple learning rules scale to network-level accuracy and consensus, with implications for mitigating misinformation in digital societies.

Related publications :

- P Lockwood, W. Van Den Bos, J-C Dreher, Moral learning and decision-making across the lifespan, **Annual Review of Psychology**, <https://doi.org/10.1146/annurev-psych-021324-060611>, 2025 (<https://osf.io/preprints/psyarxiv/b5xf7>)
- C Qu, Y Huang, R Philippe, S Cai, E Derrington, F Moisan, M Shi, and J-C Dreher. Causal Role of the Medial Prefrontal Cortex in Learning Social Hierarchy, **Communications Biology**, 7:304, (2024), DOI:10.1038/s42003-024-05976-2
- R. Philippe, R. Janet, K Khalvati, R.P.N. Rao, D Lee, J.C. Dreher, Neurocomputational mechanisms engaged in detecting cooperative and competitive intentions of others, DOI: 10.21203/rs.3.rs-1160167/v1, **Nature Communications**, 2024

Please send your proposal to matteo.divolo@univ-lyon1.fr for publication on the Master of Neuroscience website.



- K Khalvati, S A. Park, R Philippe, M Sestito, **J-C Dreher***, and Rajesh P. N. Rao*. Bayesian Inference of Other Minds Explains Human Decisions in a Group Decision Making Task, **Science Advances**, Vol. 5, no. 11, eaax8783, DOI: 10.1126/sciadv.aax8783 *: co-last author (contributed equally), 2019

- S.A. Park, M Sestito, E D. Boorman and **J-C Dreher**. Neural computations underlying strategic social decision-making in groups, **Nature Communications**, 10:5287, 2019