

MASTER 2 Computational Neurosciences

Internship proposal 2025-2026

(internship from January to June 2026)

Host laboratory: Institut des Sciences Cognitives,

UMR 5229 CNRS/UCBL, 67 Bd Pinel, 69675 Bron, France

Website: <http://isc.rivetweb.org/index.rvt?display=umr5229>

Host team : Neuroeconomics, reward and decision making lab

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

Internship supervisors :

Jean-Claude Dreher, Directeur de recherches CNRS, HDR

University / Institution: CNRS/ University Lyon 1

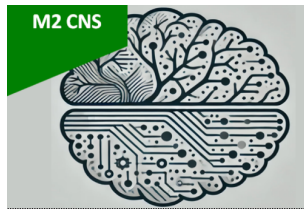
E-mail address: dreher@isc.cnrs.fr

Project title : Neurocomputational mechanisms of information propagation in social networks

Project summary :

Social networks play a crucial role in informal transmission of information. Computational social science and economics games played in networks have started to study collective behavior in social networks. However, there is a need for understanding social learning processes at different levels, bridging the gap between computational principles at the individual level, the brain system level and the level of collective behavior. This project aims to reveal the brain computations underlying the integration of information in social networks and the decision to send information to others. To do this, we will use an interdisciplinary approach in humans combining functional MRI, economics games played in networks and computational models from machine learning and AI/Recurrent Neural Networks. This master's project will be part of a larger project which encompasses 3 general aims. First, we will determine the learning rules underlying the integration of information from peers in social networks. Second, we will use fMRI to investigate how the topologies of social networks, and the participant's position in the network, affect the neurocomputational mechanisms underlying learning from one's neighbors in a large social network. Third, we will consider a more naturalistic situation, in which participants in the fMRI scanner assess the veracity of real ambiguous news and receive opinions of others propagating in a social network. It aims to determine how the brain integrates one's own beliefs about the veracity of information and the beliefs of others in the social network. Together, these studies will identify the brain mechanisms integrating private and social information propagating in networks. We will establish a mechanistic foundation for understanding the brain computations underlying decisions to integrate, learn and send information in social networks, to bridge the gap between the brain system level to the levels of individual and collective behavior.

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



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>)
- Guigon, V., & Villeval, M.C, Dreher, J.C. Metacognition Biases Information Seeking in Assessing Ambiguous News, *Communications Psychology*, <https://doi.org/10.21203/rs.3.rs-3921235/v1> (2024)
- Janet, R.; Derrington, E.; Dreher, J.-C. Relationships between Serotonin Transporter Availability and the Global Efficiency of the Executive Control Brain Network. *Int. J. Mol. Sci.* 2024, 25, 5713. <https://doi.org/10.3390/ijms25115713>
- 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, JC. Dreher, Neurocomputational mechanisms involved in adaptation to fluctuating intentions of others, DOI: 10.21203/rs.3.rs-1160167/v1, *Nature Communications* ,15, 3189 (2024). <https://doi.org/10.1038/s41467-024-47491-2>