**MASTER 2 Neurosciences Fondamentales et Cliniques****Internship proposal 2021-2022**

*(internship from January to end of May 2022)*

**Host laboratory:** Institut des Sciences Cognitives, UMR 5229 CNRS/UCBL, 67 Bd Pinel, 69675 Bron, France

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**Host team :** Research team Neuroeconomics, reward and decision making

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**Internship supervisors :** Jean-Claude Dreher, Directeur de recherches CNRS, HDR

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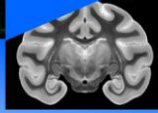
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**Project title : UNDERSTANDING THE NEURAL MECHANISMS BEHIND FOOD VALUATION**

**Project summary :** *approx 10 lines*

A fundamental component of our decisions in our daily life is the valuation of food. This decision process is performed multiple times a day, and is common to many species including humans. According to an array of studies using diverse methods, the orbitofrontal cortex (OFC) and adjacent medial prefrontal cortex (PFC) play a key role in representing the expected value or utility of options at the time of decision making. Value signals have been found in this region in response to cues or actions associated with many different types of potential outcomes, such as food rewards, but also monetary rewards, consumer goods and even more abstract goals such as pursuing imaginary leisure activities. Yet, we do not know much about how the value signals for food and other rewards are constructed by the brain.

We therefore intend in this PhD Project to study the brain mechanisms which lead to a representation of value for food. To do so, we will use a food-based decision task in human participants from which we will measure brain activity. The representation of the value of food may depend on many different aspects of the food item itself, such as nutritive constituents, texture, color, etc., but also on the subject's hunger, past experience with the food, culture, habits, etc. We will expend a related task used by Suzuki et al. (2018) to investigate whether subjective values can be predicted, not only from beliefs about constituent nutritive attributes of food (protein, fat, carbohydrates and vitamin content), but also from the subject's past experiences, habits and *a priori* with a food item. Using fMRI in this task, we will establish whether there is a correlation between Willingness-To-Pay (WTP) and the aforementioned parameters. The measurements



acquired from our task will then be used to train and test a model of how food is processed when observing familiar and unfamiliar food items. This should provide us a better understanding of the valuation and decision process of food in time and space domain. The potential outcomes of this project would be a better understanding of the processes behind food valuation. These findings could then potentially be generalized to the valuation of food items in different pathologies, such as eating disorders.

### Recent publications :

- O'Connor, D., Janet, R., Guigon, V., Belle, A., Vincent, B.T., Bromberg, U., Peters, J., Corghnet, B, & **Dreher, J.C.** The proximity effect: rewards that are near increase impulsive action, **iScience**. In press.
- Janet, R., Fournel, A., Fouillen, M., Derrington, E., Corghnet, B., Bensafi, M., & **Dreher, J. C.** (2021) Cognitive regulation of food odor/image in the human brain, **Neuroimage**.  
<https://doi.org/10.1016/j.neuroimage.2021.117811>
- Romuald Girard, Ignacio Obeso, Stéphane Thobois, Seongmin A. Park, Tiphaine Vidal, Emilie Favre, Miguel Ulla, Emmanuel Broussolle, Paul Krack, Franck Durif and **Dreher JC**, Wait and you shall see: sexual delay discounting in hypersexual Parkinson's disease, **Brain**, Jan 1;142(1):146-162. doi: 10.1093/brain/awy298, 2019
- Park, S.A., Sestito, M., Boorman, E.D., & **Dreher, J.C.** (2019). Neural computations underlying strategic social decision-making in groups. **Nature Communications**, 10:5287.
- Khalvati, K., Park, S.A., Philippe, R., Sestito, M., Dreher\*, J.C., & Rao\*, P.N. (2019). Modeling other minds: Bayesian inference explains human choices in group decision-making. **Science Advances**, Vol. 5, no. 11, eaax8783. \*: co-last author