

## **MASTER 2 Fundamental and Clinical Neurosciences**

### **Internship proposal 2023-2024**

*(internship from January to June 2024)*

**Host laboratory:** Institut des Sciences Cognitives, UMR 5229 CNRS/UCBL, 67 Bd Pinel, 69675 Bron, France (<http://isc.cnrs.fr>)

**Host team :** Decision, Action, and Neural Computation (DANC) team  
(<https://www.danclab.com/>)

**Internship supervisors :**

James Bonaiuto, Chargé de recherche  
University / Institution: CNRS/ University Lyon 1  
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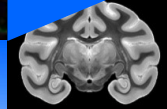
Holly Rayson, Postdoctoral researcher  
University / Institution: CNRS/ University Lyon 1  
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**Project title : Neural dynamics of infant motor development**

**Project summary :** Everyday actions involve an intricate interplay between sensory integration, muscle coordination, and motor learning. These processes are not fully developed in newborns, but young infants spontaneously make arm movements toward objects in their sight. These arm movements lead to the development of object-directed reaching and then grasping, with refinement of these actions continuing throughout childhood. The internship will be part of a larger project testing the hypothesis that developmental changes in grasping ability correspond to increasing reliance on internal, predictive models for reaching and grasping, signaled by neural activity in the beta frequency band. This project involves the longitudinal study of infants across the first year of life, using MRI/DTI, EEG, and behavioral tests. The internship project will involve helping to collect data from 3, 6, and 12 month old infants, and analyzing EEG data and video recordings during reaching and grasping actions. The results from this project are expected to provide a framework for identifying biomarkers for early diagnosis of atypical sensorimotor development and effective interventions for developmental disorders characterized by aberrant beta activity.

**3-5 recent publications :**

Please send your proposal to [marion.richard@univ-lyon1.fr](mailto:marion.richard@univ-lyon1.fr) for publication on the Master of Neuroscience website.



Rayson H, Debnath R, Alavizadeh S, Fox N, Ferrari PF, Bonaiuto JJ. (2022) Detection and analysis of cortical beta bursts in developmental EEG data, *Developmental Cognitive Neuroscience*, 54: 101069.

Bonaiuto\* JJ, Little\* SJ, Neymotin SA, Jones SR, Barnes GR, Bestmann S. (2021) Laminar dynamics of beta bursts in human motor cortex. *bioRxiv* doi: <https://www.biorxiv.org/content/10.1101/2021.02.16.431412v1>, *NeuroImage*, 242: 116862.

Little\* S, Bonaiuto\* J, Barnes G, Bestmann S. (2019) Human motor cortical beta bursts relate to movement planning and response errors. *bioRxiv* doi: <https://doi.org/10.1101/384370>, *PloS Biology*, 17(10): e3000479.

Rayson H, Bonaiuto JJ, Ferrari PF, Chakrabarti B, Murray L (2019) Building blocks of joint attention: Sensitivity to having one's own gaze followed in early infancy. *Developmental Cognitive Neuroscience*, 37: 100631.

Rayson H, Bonaiuto JJ, Ferrari PF, Murray L (2017) Early maternal mirroring predicts infant motor system activation during facial expression observation. *Scientific Reports*, 7: 11738.