Research project offer

CHU Sainte-Justine Research Center

Project title	From Inter-Brain Connectivity to Inter-Personal Psychiatry		
Study level(s)	☐ MSc	☐ PhD	☒ Postdoctorate
Principal investigator(s)	Guillaume Dumas		
Project duration	24 months		
Start date	Fall 2023		

Date of posting: 2023-06-20

Research laboratory presentation

The Precision Psychiatry and Social Physiology (PPSP) team merges insights from systems biology, cognitive neuroscience, and machine learning to delve into the intricacies of human cognition and behavior, especially within social contexts. The team strives to further close the gap in understanding the links between human brains (biology), behaviors (psychology), and social dynamics (social sciences). The resulting "social physiology" explores simultaneously how the brain and body enable interactions with others, and how social settings and dynamics impact neurobehavioral processes. The team employs theories from complex systems and cognitive sciences as well as methods from data science and neuroimaging, especially the hyperscanning technique that allows the simultaneous recording of multiple brains during social interaction.

In alignment with key values, the PPSP team prioritizes open science, working towards research that is transparent, reproducible, and contributes to a culture of inclusivity and solidarity. Teamwork is a cornerstone of their approach, celebrating diversity within the team and promoting an environment of mutual respect and collective growth. Their dedication extends beyond the lab, aiming to also create social impact. The goal is indeed to apply research discoveries to real-world situations, developing tools that can enhance the lives of individuals, whether they're in hospitals or at home.

Research project description

The PPSP laboratory is looking for an enthusiastic postdoctoral fellow to contribute to the field of social neuroscience, with a special emphasis on hyperscanning EEG. The chosen candidate will join an interdisciplinary team operating at the intersection of basic, translational, and applied science. They will be part of a two-year project scrutinizing inter-brain connectivity and interpersonal communication during social interactions in both healthy and clinical populations.

Neuroscience and psychiatry have traditionally failed to incorporate interpersonal dynamics, despite acknowledging the significance of social factors. This project aims to fill that gap. It integrates a decade of social neuroscience research on inter-brain synchronization during social interactions, applying both the methodological and theoretical knowledge gathered to clinical contexts. The project will offer mechanistic insights into the biological mechanisms underlying social interaction and develop new biomarkers based on inter-brain connectivity. These could be particularly relevant for conditions such as autism, which are characterized by altered social skills. The project will also explore potential treatments based on inter-brain neuromodulation.

Research Centre
CHU Sainte-Justine
Mother and Child University Hospital Centre
Université de Montréal

Overall, this research aims to set the stage for an interpersonal approach to psychiatry that integrates neural, behavioral, and social scales.

Key responsibilities:

• Conducting experiments using hyperscanning EEG, including designing experiments, recruiting and scheduling clinical participants, and acquiring and analyzing data.
• Collaborating with the research team to design and implement experiments and interpret results.
• Writing and publishing scientific articles in peer-reviewed journals.
• Presenting research findings at conferences and meetings.
• Assisting with the training and supervision of graduate and undergraduate students.
• Contributing to the writing of grant proposals.
• Contributing to the development of a Python toolbox specialized in hyperscanning analyses.

Required training and profile

• Ph.D. in neuroscience, psychology, or a related field.
• Strong expertise in EEG, including experience with data acquisition, processing, and analysis. Experience with hyperscanning is a plus.
• Strong publication record.
• Excellent written and verbal communication skills in English, proficiency in French is not required but is a plus.
• Strong coding skills, with experience in Python.
• Ability to work independently and as part of a team, and to manage multiple tasks and projects simultaneously.
• Strong organizational skills and attention to detail.

Conditions

This is a full-time position for two years, with a competitive scholarship, based on experience. The successful candidate will have access to state-of-the-art equipment and facilities.

The candidate must register at the Université de Montréal as a postdoctoral fellow and must meet the eligibility requirements of the program. Postdoctoral fellows at the CHUSJ are **Scholarship recipient postdoctoral fellows** (stagiaires postdoctoraux boursiers “SPB”). They are considered as researchers in training and are not employees of the CHUSJ. They are paid in the form of a scholarship (stipend), not a salary. For this reason, CR-CHUSJ postdoctoral fellows are not eligible for employment insurance, parental insurance, pension plans and other benefits exclusive to employees. Taxes will be deducted at the source.

The CHU Sainte-Justine has a minimum remuneration policy for all its students and postdoctoral fellows. Remuneration may come from the researcher's funds or from an external nominal award.

The duration of the research project is conditional to:

- The availability of research funds;
- The progress of the project;

- The candidate's eligibility to maintain a postdoctoral fellowship status at the university.

Submit your application

Candidates must send the required documents before **15/07/2023** to **Guillaume Dumas** at **guillaume.dumas@umontreal.ca**.

Please provide:

√ *Curriculum vitæ*

√ Most recent transcripts

√ Cover letter

√ References

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Equity, diversity and inclusion

The masculine gender is used without discrimination and for the sole purpose to facilitate reading. The CHU Sainte-Justine subscribes to the principle of equal access to opportunities and invites women, members of visible and ethnic minorities, persons with disabilities and Indigenous people to apply. We would appreciate it if you could inform us of any disabilities that would require technical and physical accommodation adapted to your situation during the selection process. Please be assured that we will treat this information as confidential.

Studies at the CHU Sainte-Justine Research Center

Pursue your graduate or postdoctoral studies at the **CHU Sainte-Justine Research Center**, and be one of the 500 students, fellows and interns involved in accelerating the development of knowledge in the field of maternal, child and adolescent health, whether in basic or clinical research. Under the supervision of prominent scientists, especially in leukemia, rare pediatric diseases, genetics, perinatology, obesity, neuropsychology and cognition, scoliosis and rehabilitation, you will have the opportunity to work with multidisciplinary scientific teams and collaborators from all over the world.

About the CHU Sainte-Justine Research Center

CHU Sainte-Justine Research Center is a leading mother-child research institution affiliated with Université de Montréal. It brings together more than 200 research investigators, including over 90 clinician-scientists, as well as 500 graduate and postgraduate students focused on finding innovative prevention means, faster and less invasive treatments, as well as personalized approaches to medicine. The Center is part of CHU Sainte-Justine, which is the largest mother-child center in Canada and the second most important pediatric center in North America. More on research.chusj.org