## Job description

### Tenure track 2024 (chaire de professeur junior)

#### Faculté de Santé

**Research Unit:** Paris Brain Institute – Institut du Cerveau  
**Partner body:** Institut national de la santé et de la recherche médicale (Inserm)  
**Location:** Sorbonne Université, Campus La Pitié Salpêtrière, 91 boulevard de l'hôpital, 75013 PARIS

#### Job Identification

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Computational neuroscience</th>
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<tbody>
<tr>
<td>Corresponding CNU sections</td>
<td>CNU 69 - Neuroscience</td>
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<tr>
<td>Job title</td>
<td>Tenure track</td>
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<tr>
<td>Duration of the contract</td>
<td>3 years</td>
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<tr>
<td>Quotity</td>
<td>100 %</td>
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<tr>
<td>The minimum monthly remuneration is fixed by decree at 3,443.50 euros gross</td>
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<tr>
<td>Status</td>
<td>open</td>
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#### Profil

**Computational neuroscience**

**Job Profile**

**Computational neuroscience**

#### Education

**Teaching Project Summary:**

The close connection between the laboratory's research and teaching subjects ensures a strong synergy between the fundamental research developed by CPJ and teaching, which will enhance the dynamism of neuroscience and physiology teaching teams. Thanks to their expertise in computational neuroscience (analytical approaches, numerical simulations, artificial intelligence) and neurophysiology (from basic concepts to experimental approaches), CPJ laureates will be able to contribute to various undergraduate courses (levels 1 to 3) in cell biology, physiology, neuroscience, mathematics applied to biology, computational approaches and modelling, and artificial intelligence. They may also be involved in teaching at Masters level. The teaching load will be 64 hours per year during the initial years, then increase to 190 hours after CPJ's tenure is approved by the CNU.

**Target Duration:** 3 years

**Distribution of financial needs:**

**ANR package:** €200,000 which could cover support for scientific staff (PhD or other) and operating costs (consumables, platforms, missions, etc.).

#### Research

**ERC Scientific Theme:** Biology and Health

**Institutional Strategy:**

This CPJ has the ambition to strengthen themes in which SU has demonstrated leadership, central to its institutional project, particularly within the "comprehensive approach to health" axis of the ExcellencES SOUND project (PIA 2012). Training and research activities associated with this CPJ are directed towards addressing societal challenges collectively. The Paris Brain Institute (ICM) is a unique, internationally
renowned research center, innovative in its conception and organization as it brings together patients, doctors, and researchers. Its goal is to rapidly develop treatments for nervous system injuries for swift application to patients. Scientists from diverse backgrounds and countries conduct cutting-edge research in this field. Partnerships between public and private sectors at the ICM have swiftly translated discoveries into therapeutic solutions for patients. Since 2017, the ICM has been STATION F's leading health partner, offering a competitive edge in connected health. The CPJ offered by ICM focuses on studying the flexibility of information processing by neuronal networks in the cerebral cortex. A modern multidisciplinary expertise combining computational neuroscience (simulations, AI, etc.) and advanced experimental neurophysiology is required for this multidisciplinary study.

Hosting Laboratory Strategy:

The hosting laboratory aims to understand the neural basis of perception using advanced imaging and electrophysiology techniques. Analyzing, interpreting, and understanding the workings of these complex neural networks require a combination of experimental, computational, and theoretical approaches. The junior professorship will strongly develop this multidisciplinary aspect, fundamental to modern neuroscience research, within a young and dynamic team at the Institute, the "Cellular Mechanisms of Sensory Processes" team. The CPJ will bring expertise combining computational neuroscience (analytical approaches, numerical simulations, artificial intelligence) and advanced experimental neurophysiology (biphotonic imaging, optogenetics, high-density electrophysiology, etc.) to the hosting laboratory. The CPJ will promote the development of a scientifically dynamic field within the institute: computational neuroscience.

Summary of Scientific Project:

The scientific project will explore the processing of sensory information by neuronal circuits. Specifically, it aims to understand how different types of cells in cortical networks participate in sensory information processing. Special attention will be given to the modulation of sensory perception by environmental and behavioral context. The neural bases of this phenomenon are still unknown, and its medical and technological applications remain unexplored. To achieve the proposed objectives, the candidate must employ both theoretical and experimental approaches. On one hand, the project will investigate this phenomenon through numerical simulations analyzing the computational flexibility of artificial neural networks. In parallel, the candidate must also use biphotonic imaging, visual stimulation, and optogenetic manipulations to study how neuronal representations in the visual cortex are influenced by behavioral context and the cellular mechanisms involved in this representation.

International Attractiveness Strategy:

Preparing students for the high demands of modern research in terms of analytical skills is a major challenge for the university. The CPJ will significantly contribute to strengthening this aspect by introducing dedicated teaching units in the university's programs. The CPJ will also attract students with quantitative backgrounds (physics/mathematics tracks, engineering schools, etc.) to neuroscience programs by offering training in theoretical and experimental neuroscience. The CPJ will establish important partnerships with major international players in neuroscience research. The hosting laboratory will thus sustain its collaboration with the Allen Institute of Brain Science (USA), dedicated to the detailed characterization of cortical microstructure using digital tools. The CPJ will also benefit from collaborations with research groups working on the latest biotechnological advances in neuroscience (development of opsins, neuronal activity indicators, etc.). The CPJ will facilitate the establishment of demanding standards in scientific data management at the university and the institute, notably through collaboration with the Ebrains platform (ebrains.eu), the European initiative for data management and sharing in neuroscience.

Scientific Dissemination:

Like all research topics, the results obtained in the context of the CPJ will be published in international journals and presented at international conferences and congresses. As it is fundamental research, no knowledge transfer activities other than publications or scientific mediation are envisaged. In research, the laureate will have the opportunity to interact with researchers at the ICM and neighboring or partner laboratories. They will enhance the discipline, the laboratory, and the University by participating in
international conferences and workshops to present results. In supervision, they will have the opportunity to recruit a postdoctoral researcher or a doctoral student using the provided budget and may also co-supervise students and interns from the research team.

Science and Society:

The Institute has a communication service that disseminates researchers' scientific discoveries to the public. In collaboration with this service, the researcher will disseminate their results through their communication channels (social networks, institute website, university website, etc.) throughout the project. The institute is a major player in the "Brain Week," an annual event to raise public awareness about the importance of brain research. The chair will integrate the presentation of computational neuroscience research into the seminars, workshops, and debates of this annual event. The public will thus become familiar with this multidisciplinary approach at the interface of biology, mathematics, and artificial intelligence. Given the computational nature of the project, a significant portion of the communication will be done through dedicated digital platforms for describing and sharing algorithms and programming code (github.com and associated blogs, etc.). The project implementation will be open-source to maximize its impact and reach the widest possible audience.

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<tr>
<th>Laboratory</th>
<th>Sigle (UMR, UMRS, etc.)</th>
<th>N°</th>
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<tbody>
<tr>
<td>Paris Brain Institute</td>
<td>UMR</td>
<td>7225</td>
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Application procedure

Applications are open from the 1st of June 2024 10:00 am (Paris time) to July 1st - 2024 4:00 pm (Paris time). Applications must be submitted on the Galaxie website. Candidates who do not have access to this Galaxie application (in particular non-French candidates) may exceptionally submit the complete application electronically according to the established schedule and procedures. Send the application files to pascale.bechu@sorbonne-universite.fr with the subject "Candidature CPJ".

The documents to be attached to the application file are set by the decree of February 6, 2023, as amended, concerning the general terms and conditions for the transfer, secondment and recruitment by competition of lecturers, university professors and junior professors (see in particular Title III - articles 24 to 27 and Title IV - articles 28 to 31).

Candidates who do not hold a doctorate must have their university diplomas, qualifications and titles recognized as equivalent to a doctorate, in accordance with one of the procedures provided for in article 5 of decree no. 2021-1710 of December 17, 2021 concerning the junior professorship contract provided for in article L. 952-6-2 of the Education Code and article L. 422-3 of the Research Code. Any incomplete application by the above-mentioned deadline will be declared inadmissible.

Only candidates selected by the selection committee on the basis of their applications will be invited to an audition. The auditions will take place in September, according to procedures to be announced shortly.

Setting in a work-related situation: No

The aforementioned decree n° 2021-1710 of December 17, 2021 determines the conditions of renewal of the contract, the modalities of assessment, before the tenure, of the scientific value and the aptitude to carry out the missions of each body, the modalities of appointment of the members of the selection and tenure commissions and the conditions of the commitment to serve.

Contacts

**Research**: Géraldine Gouzer, Directrice des affaires scientifique et médicale de l'Institut du Cerveau, scientific.affairs@icm-institute.org

**Education**: Alain Carrié, Vice-Doyen Formation, Faculté de Santé, Sorbonne Université, alain.carrie@aphp.fr