CALL FOR APPLICATION
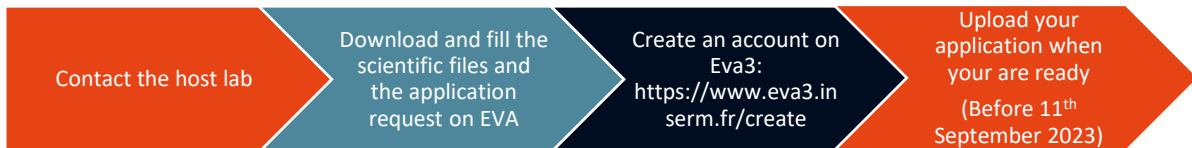
INSERM CHAIR Recruitment

Neurotechnologies: innovations for a better portability of medical devices

The Inserm chair recruitments opened to Inserm are intended for researchers with strong potential to manage and lead research teams and participate in national, European or international projects.

This recruitment, based on research and teaching projects, is aimed at researchers with a doctorate or equivalent and a first post-doctoral experience. The position is offered on a fixed-term contract (CDD) with a view to tenure in the Inserm Research Directors personnel at the end of the contract.

Application on EVA: https://eva3-accueil.inserm.fr/sites/eva/chaires/2023/session2/Pages/default.aspx

Contact the host lab	Download and fill the scientific files and the application request on EVA	Create an account on Eva3: https://www.eva3.inserm.fr/create	Upload your application when your are ready (Before 11th September 2023)

Supporting institution:	Inserm : Institut national de la Santé et de la recherche médicale
Name of the head of the institution:	Pr. Didier Samuel
Academic region:	Paris
Location/ Site concerned:	Ile-de-France Centre-Est - Paris - LIB - U1146
Partner institution:	Sorbonne Université
Research contact	Véronique MARCHAND-PAUVERT veronique.marchand-pauvert@inserm.fr LIB-MPR, Service de Rééducation, Hôpital Pitié-Salpêtrière, 89 bd de l'Hôpital, 75013 Paris - Tél.: 01 42 16 11 20
Administrative contact	chaires-professeur-junior@inserm.fr
Research fields EURAXESS :	Biotechnology
Keywords:	signal processing, brain signalling, biomarkers, diagnosis, prognosis, personalized medicine, brain disorders

Job title to be filled:	Chaire en neurotechnologies : innovations pour une meilleure portabilité des dispositifs médicaux
Body after tenure:	Research Director

Anticipated duration of the contract:	5 years
Scientific domains/fields:	Neurotechnologies, Data Sciences, Neurosciences, Neurologie Section (s) CNU27/CoNRS61
Corresponding specialized scientific commissions (CSS):	CSS7 : Technologies pour la Santé
Project name:	Neurotechnologies: innovations for a better portability of medical devices

Funding :	
ANR package :	200k€
Co-funding	0k€
Total project	200k€

Remuneration package	3 500€ - 5 000€ according to research experience
Quota	Full Time

Strategy of the host institution:

In 2018, Sorbonne Université (SU) regrouped major Humanities, Science & Engineering and Medical faculties in Paris to empower multidisciplinary teaching and research to meet major challenges facing today's world. SU offers a large range of academic programs, includes 159 research laboratories and works in close association with all the national research organizations, including Inserm. SU's strategy is based on 3 fundamental pillars to: (i) support emerging research and transmit knowledge at the frontier of current research (ii) favor interdisciplinary research and education and (iii) promote open science. SU is engaged in Alliance 4EU+, an innovative European University, for which the 1st of 4 flagship programs is "Health and demographic change in an urban environment". SU established the Sorbonne Center for Artificial Intelligence (SCAI) to promote interdisciplinary research in artificial intelligence (AI). With its partners in Alliance SU, SU was awarded the project Excellence ES SOUND in 2022 for which the "Global approach for health" is one of the three major programs. This CPJ is strongly placed within SU's priority to develop interdisciplinary bioengineering and health science, open science and academic exchange with national and international partners. This project is also soundly within Inserm's Strategic Plan, 2020-2025, which underlines the call to reinforce the health research continuum while promoting disruptive research.

Strategy of the host laboratory:

The Laboratory of Biomedical Imaging (LIB, U1146) leads research in advanced biomedical imaging and engineering to better understand pathophysiological processes, provide more sensitive diagnosis and improve patient care. Neurological diseases are a key focus in LIB research with i) The Neural Connectivity and Plasticity (NCP) team at Pitié-Salpêtrière hospital, working with the departments of neurology, neuro-resuscitation, nuclear medicine and rehabilitation to probe anatomical and functional organization of neural networks and their modulation under physio- and pathological conditions in humans by coupling multimodal neuroimaging and electrophysiology to develop models of connectivity and plasticity, isolate quantitative parameters used as biomarkers to improve diagnosis, prognosis and develop new tools for precision medicine and ii) The Physiology and Pathology of Microcirculation (PPM) team at Cordeliers Research Center developing 3D, super-resolution ultrasound techniques based on micrometric localization and tracking of

injected ultrasound contrast microbubbles to noninvasively reveal microvascular architecture and flow in the brain for transfer to diagnosis of stroke victims. The LIB regroups multidisciplinary expertise in neurosciences, mathematics, physics, biomedical engineering and clinical research supported by prestigious grants (EU grant programs including ERC, ANR, BPIFrance etc.).

Summary of the scientific theme:

The project is to develop new methodologies for processing electrophysiological brain signals (EEG, MEG, iEEG, ECoG, LFP, etc.) to i) develop physiological, pathophysiological and theoretical models of neural interactions and anatomo-functional connectivity, ii) to investigate the relationships between clinical evaluation and metrics of neural dysfunctions to identify biomarker(s) for accurate patient stratification and develop data-driven predictive models of functional outcomes and therapeutic responses and iii) to design assessment and/or therapeutic devices that can be easily used in clinical routine, transportable, usable by patients easily and with secure remote monitoring. On-line and transportable new approaches to optimize personalized neuropathological evaluation and care, that can be used in or out of the hospital, are central to LIB research. One of the best illustrations in this field in LIB is the development of portable device to collect in-ear EEG and mobile app interfaces that enables out hospital EEG monitoring. The recruited researcher will have strong expertise in signal processing of brain signals, have a high-quality scientific publication record and have demonstrated evidence in working in a multi-disciplinary team. In addition, experience in leadership of research groups and experience in the strategic planning, acquisition and implementation of R&D projects are desirable in this context. Lastly, good knowledge in deep learning would be appreciated.

Summary of the teaching project:

The recruited researcher will reinforce teaching in courses related to computer sciences and signal processing within the bachelor's and master's level courses in computing and robotic automation at SU. The undergraduate courses provide an initial introduction to data science and to key approaches in artificial intelligence. Master's courses are more specialized and organized around a dedicated cursus. The recruited researcher will be particularly called upon to strengthen courses related to advanced image and signal processing within the Master's degrees in "Computer Science" or "Engineering of Intelligent Systems" or "Robotic Automation". The recruited researcher will be encouraged to introduce practical laboratory instruction based on his/her research into all levels of training at SU and to contribute to the international program Computer Science Master-level.

Scientific dissemination/ Open Science :

The policy of the U1146 lab is to publish in the journals and conferences in our discipline. The recruited researcher is expected to publish regularly as principal author but also as co-author. Several presentations at key international conferences in neurotechnogy and specific technologies related to his/her research will be part of the expected contributions.

Open Science :
In view of the industrial potential for this work, major innovations will systematically combine patent filling followed by scientific publications. All published articles will be on HAL in their integral version. As for the data collected and prepared for research, they will be made available to the community as soon as possible, after a possible embargo period.

Science and society:

SU participates every year in the *Fête de la Science* and the *Nuit des Chercheurs*. The recruited researcher will be expected to actively participate in these events and communicate with the general public. Depending on his or her current situation, he or she may also be interviewed by journalists from the general or popular scientific press.

Selection of candidates:

It is expected the recruited researcher to become rapidly a group leader in the team. So the candidate should demonstrate ability to supervise Ph.D students, post-doctoral fellow and technical support staff. She/he should have the capacity to obtain competitive funding to manage her/his group.

Successful candidates are chosen by a selection commission composed of six to ten members, the majority of whom are specialists in the fields of research concerned.

The commission carries out an initial examination of the applications, focused in particular on candidate experience and skills relative to the research and teaching project presented above. A shortlist of candidates is then selected for interview.

Only candidates selected by the selection committee on the basis of their applications will be invited to interview.

The interviews are followed by a deliberation during which selection commission will discuss the quality, originality and, where appropriate, the interdisciplinarity of the research and teaching projects presented by the candidates, their motivation and their scientific and teaching supervision capacity.

The candidates selected at the end of the selection process will be offered a researcher contract, following approval from the President and CEO of Inserm.

Required profile:

Education Level **: Phd**

Researcher Profile : R3/R4

R3 Established researcher A stage in a researcher's career describing those who have developed a level of independence and can described as an established researcher
R4 Leading Research A stage in a researcher's career where they can be termed a 'leading researcher'. This would include the team leader of a research group or head of an industry R&D laboratory.

Your application will be evaluated according to the following criteria :

- Relevance and originality of the project related to the research field
- International exposure in research projects
- Your ability to raise funds
- Participation in editorial and reviewing activities
- Your teaching experience
- Your ability to lead a team…

Indicators:

Teaching: The recruited researcher will contribute to the new international program project led by Alliance 4EU+ with Master's level courses in his/her domain of expertise in English and potential participation in the organizational basis of the courses. In addition to reinforcement of course teaching in signal processing and related subjects, he/she will be encouraged to introduce practical laboratory instruction based on his/her research.

Research: Regular publication and co-publication of research and participation in professional international conferences and scientific organizations and expertise will be fostered and expected to ensure that the recruited researcher attains the level of scientific recognition associated with an Inserm DR. Active initiation of new projects and search for independent funding is expected. The recruited researcher is expected, in particular, to apply ambitiously for high level funding such as (but not limited to) ERC grants or ANR. In these efforts, the researcher will be well guided and oriented by members of the LIB who already have obtained such funding and the guidance program, APACHE, which has recently been established by the Faculty of Sciences and Engineering (FSI) of SU.

Knowledge transfer: The recruited researcher will be expected to invest within the programs of Sorbonne University to share knowledge. He/she will also animate a transversal working group to transfer techniques to researchers and students within the LIB.

Application instruction :

Applications can be submitted online at EVA.
Deadline application: 11th September 2023

Please complete the scientific file in English.

It is imperative to contact the laboratory corresponding to the Chair you have applied for in order to build the project with them.

Position also open to 'Bénéficiaires de l'Obligation d'Emploi' (disabled persons), as defined in article 27 of law no. 84-16 of January 11, 1984 on statutory provisions for the civil service.