Chair position in Artificial Intelligence offered by The Brittany Region and Inserm

PROFILE : Senior Scientist in Artificial Intelligence in the cardiovascular field

The Laboratory of Signal and Image Processing – Laboratoire Traitement du Signal et de l'Image (LTSI - http://www.ltsi.univ-rennes1.fr/) is a joint research unit from Inserm and University of Rennes 1, located in Rennes, Brittany, France, composed of about 80 permanent staff members and about 70 PhD students and post-docs. The SEPIA team, one of the five research teams of LTSI, has a strong international trajectory on translational research activity, integrating a continuum covering methodological and technological research, experimental and clinical evaluation and valorization and technology transfer.

From a **methodological standpoint**, our research strategy is based on an original approach combining multi-source management and processing of massive health data, multi-resolution integrative mathematical modeling of pathophysiological systems, and model analysis, parameter identification and machine learning methods. These methodological contributions are integrated into model-based reasoning approaches to be applied to concrete clinical solutions. The main applications concern the early detection of events, intelligent patient monitoring and the optimization and personalization of diagnosis and therapy in the context of chronic multifactorial cardiorespiratory pathologies. The team is also strongly invested in **technological research**, with the design and development of novel systems for massive health data management and processing, as well as novel monitoring or therapeutic devices integrating our methods. These devices or systems have been deployed in different hospitals in France and abroad, and are **major enabling components of a significant part of our research**. An important part of the team's activity is dedicated to **experimental preclinical and clinical research**. Preclinical research is performed internally, for experimentation on rodents and a new highly-advanced platform (Hybrid OR, CT, MRI,..) will be opened in 2023 for bigger animal experimentation. Concerning clinical research, most of the activities are carried out within the context of national or international clinical research programs, with the support of the Clinical Investigation Center- Technological Investigation of Rennes (CIC-IT) and the TherA-Image platforms. Finally, the SEPIA team is also characterized by a **strong valorization and technology transfer activity** and close collaborations with major players and startups in the MedTech industry. For instance, 52 individual patents were filed during the last 5 years and most of these patents have been licensed or co-registered with the industry.

Duties

Research

The successful candidate will integrate, manage, implement and expand an internationally relevant research program in the area of artificial intelligence (AI) applied to advanced medical devices in cardiovascular healthcare. Expected contributions will be both theoretical and application-oriented and based on data-driven and knowledge-driven (physiologically inspired) models. The program will include all phases of a translational AI research project, including (non-exhaustive and non-restrictive list):

- Massive, heterogeneous and longitudinal health data management, quality estimation and enhancement, interactive annotation, low-level processing, feature engineering, data fusion and model estimation/evaluation.
- Cardio-respiratory signal processing.
- Trustworthy, explainable and robust AI methods.
- Optimized inference models for on-the-edge decision support system applications
- Deployment and evaluation on real-life context, including prospective clinical evaluation.
- Valorization through publication, patents and technology transfer.

This research program will be executed in the context of an already available Chair funding, involving Inserm, the Brittany Region, the European Regional Development Fund and two major industrial partners (QUANTA Inc, MICROPORT Inc). The successful candidate will be a key player on managing the interactions and developing synergies between these players. The candidate will also rely and contribute to the expertise of the SEPIA team on the methodological, technological, clinical and technology transfer aspects.

It is also expected from the successful candidate to publish at the highest scientific level, to acquire competitive research funding and to supervise PhD and post-doc projects at an international level. The candidate will endorse the international research strategy and contribute to the further strengthening of the scientific reputation of LTSI and Inserm by taking a key role in the scientific and translational strategy at the regional and international levels in the aforementioned research domain.

Teaching

The successful candidate will provide a limited number of hours (~30 hours per year) of high-quality education, in particular in the Engineering School *ESIR* and will also contribute to the pedagogical project of the faculties through the supervision of master's theses and as supervisor of PhD candidates.

Profile

Candidates should have:
- A PhD in Engineering Sciences (Systems Engineering, Electrical Engineering, Biomedical Engineering, Computer Science) or an equivalent degree.
- A strong interdisciplinary research profile within the aforementioned research domains and an international research experience.
- High-quality research track, proven by publications in international leading journals and conferences.
- Organizational skills and a cooperative attitude, with leadership capacities within an interdisciplinary academic context.
- Demonstrable qualities related to academic education. Teaching experience is an asset.
- A good command of English is required.
- The official administrative language is French. If at the time of recruitment, you have no or insufficient knowledge of French, Inserm will provide you with a training program to learn French to the required level.

Offer

We are offering a full-time permanent 4-year contract for a senior scientist in an intellectually challenging environment. The position is open in Rennes, a historic, dynamic and lively city, capital of the Brittany Region, in western France, within 1.5 hours by train from Paris.

During the contract, this position opens the possibility to apply to the "Research Director" competition at Inserm. "Research Director" is the highest-level permanent research position in major research institutes in France. The starting salary will be 45600 euros gross per year.

Applications

Applications should be sent to **dr-nantes@inserm.fr** before June 24th 2022. If you have questions regarding the administrative aspects, please contact dr-nantes@inserm.fr. For more information on the scientific aspects, please contact: Alfredo Hernandez, Research Director at Inserm and head of the SEPIA team (alfredo.hernandez@inserm.fr).

The application requires the following documents and should be sent as a **single file in PDF format** exclusively:

- Your CV, following the format on annex 1 below.
- Your scientific application file, following the format in annex 2 below.

Annex 1

Format for the CV

Last Name:
First Name:

1- **Personal Information**

Last name
First name
Gender
Position
Personal postal address
Professional phone number
Email
Date of birth of child (ren)
Date and duration of military service and/or paternity leave

2- **Cursus**

PhD degree (year, place)
HDR (French habilitation for PhD supervision) if appropriate
Other diplomas (year, place)

3- Professional experience

Research experience:
Describe the PhD, post-doctoral trainings, current position and any additional professional training.
For each position, indicate the period, the Institution, the country and the name of your mentor(s).

Grant:
Indicate the grants obtained, specify whether you are the coordinator or a partner

Teaching and supervision experience:
University teaching responsibilities (academic year, university, level undergraduate, master, postgraduate)
Supervision of trainees, doctoral students, post-doctoral students

Awards and scientific prizes:
Names and date

Learned societies:
Membership(s) of learned societies, discussion groups (period of duty)

4- Institution where you currently work

Title of the research laboratory
Head of the research laboratory
Name and head of the team leader
Postal address of the research laboratory
Date of arrival in this laboratory

5- Five most important publications or realizations

6- Additional information

Web Site
Domains/Subdomains and Keywords
Language skills
Computer or other skills

Annex 2: Scientific Application file format

Last Name:
First Name:

The presentation of your previous professional experiences and how you plan to invest in the proposed project should not exceed 10 pages (font: Arial 10, references included)

1. Previous work experiences

Describe each experience separately:
- *title*
- *international context and working hypothesis;*
- *applied methodologies;*
- *results – provide details on the following aspects:*
  - *1- personal involvement in case of collaborative working;*
  - *2- specific original features;*
  - *3- contribution to the evolution of scientific knowledge.*

2. Achievements

A/ Publications:

Please highlight your name in the list of authors. Add an asterisk if you are a co-first / co-last / co-second / co-second to last or corresponding author.

All publications stemming from your thesis work, post-doctoral research must be listed separately and classified as follows:

- *original articles,*
- *review articles,*
- *conference proceedings,*
- *informative research papers.*

B/ Instrumental and methodological developments - Products and computer tools
- *software,*
- *databases,*
- *prototypes and demonstrators,*
- *platforms and observatories,*
- *tools presented in solver competitions.*

C/ Valorization

If applicable, aforementioned valorization and transfer activities must be clarified. Please develop on your personal contribution as well as their impact on:
- *fundamental or clinical research progress,*
- *innovation,*
- *society.*

3. Scientific supervision

If applicable, describe the organization of your research group.

4. Position in the chair project

Following your exchanges with the host laboratory and on the basis of your expertise, specify how you plan to develop the proposed project in the medium and long term.
   Describe your envisaged input with regard to:
- *working hypotheses;*
- *strategy;*
- *intended methods and experiments;*
- *synergy with the host lab's research thematic;*
- *foreseeable consequences on the evolution of scientific knowledge;*
- *preliminary data;*
- *human, material and financial resources;*
- *if applicable, working conditions as to the realisation of studies on human beings or animals (consultation of an ethics committee).*