

Junior Professor Chair in Data Driven Intelligent Surgical Procedures

INSERM, LaTIM

Recruitment structure : INSERM

Site : Laboratoire de Traitement de l'Information Médicale (LaTIM), Brest, France

Partners : *UBO, IMT Atlantique*

keywords : Computer Assisted Surgical Interventions, Connected and personalized medical implants, Surgical Navigation and Management systems, Augmented/Virtual Reality, AI and multimodality data analysis and modeling

Scientific domain : Healthcare technologies, Data-driven surgical and interventional procedures, Data Science

Section (s) CNU/CoNRS/CSS: CNU 61 (secondary 27), CSS7 INSERM

Strategy of the host institution:

INSERM is the leading healthcare research institution at a European level and one of the best worldwide. One of its major fields of activity concerns that of healthcare technologies and INSERM has the ambition of accompanying through the development of top level research programs the numerical transformation of patient management within the hospital environment and beyond. Amongst these domains affected by this numerical revolution is that of the personalization of surgical interventions and the development of the operating block of the future. The development of multimodality technologies and data science is at the heart of this process and INSERM ambitions to be one of the leading research institutions in this field.

Strategy of the host laboratory:

LaTIM's research is focusing on Multimodal Technologies and Data Science in Healthcare, aiming for the optimisation of overall patient management from prevention to diagnosis, therapy and follow-up. Within this context one of its main pillars of activity is in the field of surgical interventions where over the past two decades the laboratory has gained national and international recognition through large scale research projects and the creation of several start-ups. Different clinical applications include the musculoskeletal system, vascular, ophthalmology but also oncological diseases. The objectives are to design key technologies enabling personalised surgery, including (i). planning with the integration of multimodal information for patient modelling and design of customised implants, (ii). intervention through development of new surgical navigation and monitoring systems integrated within hybrid operating blocks, and (iii). patient follow-up via novel connected implants and monitoring of different physiological processes. Through these technologies, big data is acquired and analysed through artificial intelligence algorithms during each of the pre-, per-, and postoperative phases. The proposed position is therefore part of this strategy of integrating new sensors and data processing using AI for personalized surgical procedures.

Summary of the scientific project:

The scientific project will be part of the "Data-based surgical management" axis of the team IMAGINE and will aim at leading the development of new interventional environments. In particular, research will be carried out on the integration of multimodality patient-specific data into the surgical process in order to guide pre-operative planning, through the development of novel implanted sensors and new multimodal intraoperative navigation systems to personalize the surgical intervention and optimize patient follow-up. The objective will be to subsequently exploit the acquired heterogeneous and multimodal data using artificial intelligence approaches to improve the overall surgical procedure and associated workflow (pre-, per- and post-operation) by identifying new signatures and multimodal indicators for the personalization of patient management during these different phases of an operation. Several clinical applications will be targeted, in the field of orthopaedic, oncology (mainly neurosurgery, gastrointestinal surgery) and vascular surgery. The evaluation, optimisation and validation of the various developments will be based on the PLATIMED platform (<https://platimed.fr>) and the state of the art hybrid operating blocks of the CHU Brest with a view to facilitating technology transfer.

Summary of the teaching project:

The training of doctors, engineers and computer scientists working in the field of health care must take into account the technological and organisational transitions that are currently taking place within the hospital environment. It is therefore necessary to develop new educational programmes in these fields, such as for example developing courses that provide a dual competence in medicine and engineering. The junior professor will provide such new training courses, covering for example, areas such as Computer-assisted medical and surgical procedures, medical devices & sensors, connected medical devices, AI and multimodality healthcare data analysis within the context of multiple educational programs available within the partner institutions of the LaTIM (double diploma medicine-engineering from UBO and IMT-A and the Master 2 course on Signal and Image in Biology and Medicine at the UBO Faculty of Medicine). An original teaching project implementing problem solving skills combining theory and practice as well as system design and implementation is expected.

Financial Package: An initial budget of 300k€ will be available for the successful candidate's project development

Timelines

Application opening : February 2023

https://eva3-accueil.inserm.fr/sites/eva/appels-a-projets/chaieres_Inserm/Chaires_Inserm-2023/Pages/projets.aspx

Auditions : May/June 2023

For more details and an informal discussion contact :

Dimitris VISVIKIS (dimitris.visvikis@inserm.fr)