



THE INSTITUTE OF INTELLIGENT SYSTEMS AND ROBOTICS*

POSTDOC OFFER

PostDoc position in Surgical Robotics at Sorbonne University

A PostDoc position is available to start at the beginning of 2021 at Sorbonne University, ISIR, Institut des Systèmes Intelligents et de Robotique (<http://www.isir.upmc.fr>), in the field of surgical robotics.

The successful applicant will become part of the AGATHE team (Assistance to Gesture with Application to THERapy) belonging to ISIR. This is a multi-disciplinary research team grouping researchers in design and control of robots, human-machine interaction, neurosciences and medical sciences.

The successful applicant will join the European project FAROS (Functionally Accurate RObotic Surgery), an H2020-funded project that is bound to start on January 1st, 2021 and coordinated by KU Leuven (<https://h2020faros.eu>) and involving King's College London, University of Zurich and Sorbonne Université.

About the project: A key motivation for introducing robots in operating rooms has been their ability to deliver superhuman performance. Surgical robots are able to execute highly precise gestures that rapidly and stably position instruments in many degrees of freedom (DOFs). However, for the vast majority of surgical procedures, robotic positioning precision alone is not sufficient to realize the “right gesture”. Surgical plans are generally only a much-idealised sketch of the intraoperative reality, which is also defined by patient motion, tissue deformation, bleeding, and the like. Therefore, when finally deciding where exactly to make “the cut” (or intervene on tissue in any other irreversible manner), surgeons “disconnect” from the preoperative plan. Surgical teams resort to their own senses and experience. On the spot, based on the interpretation of the limited intraoperative scene, tactical decisions will be made.

In this context, for orthopaedic applications (e.g. pedicle screw placement), a rich set of sensors that could then form a comprehensive representative of surgical scenes can be utilized to offer the sufficient sensory information for autonomous robotic control.

Locally at ISIR, the project benefits from a high added-value environment: an innovative technology experimental platform, including a KUKA IIWA robot with an open controller, instruments, and a plurality of interfaces, is already operational and will be available to support the experimental research. Access to preclinical facilities will favor in-vivo evaluation when duly justified and validated by an ethical committee. Collaboration with clinical teams, both locally and within the FAROS project, will help targeting real problems with the aim of effectively influencing surgical robotics as practiced in ORs.

Candidate Profile: We seek for applicants who hold a PhD in one of the following domains: robotics, applied control, signal processing.

Required skills: programming skills in C/C++, C# and Python. Fluency in English (both written and oral expression).

Bonus skills: Experience in machine learning, deep learning; experience in conducting experiments involving both practical development of interactive devices and evaluation (protocol design, statistical results analysis).

**The Institute of Intelligent Systems and Robotics (ISIR) is a Joint Research Unit (UMR7222) under the supervision of [Sorbonne University](#), [The French National Centre for Scientific Research \(CNRS\)](#) and [Inserm](#) (ERL-U1150). This multidisciplinary research laboratory brings together researchers and teacher-researchers from different disciplines of Engineering and Information Sciences as well as Life Sciences.*

Duration: 12 months renewable for a period of 24 months (36 months in total).

Desired starting date: as soon as possible.

Deadline for application: the process stops as soon as the appropriate candidate is found.

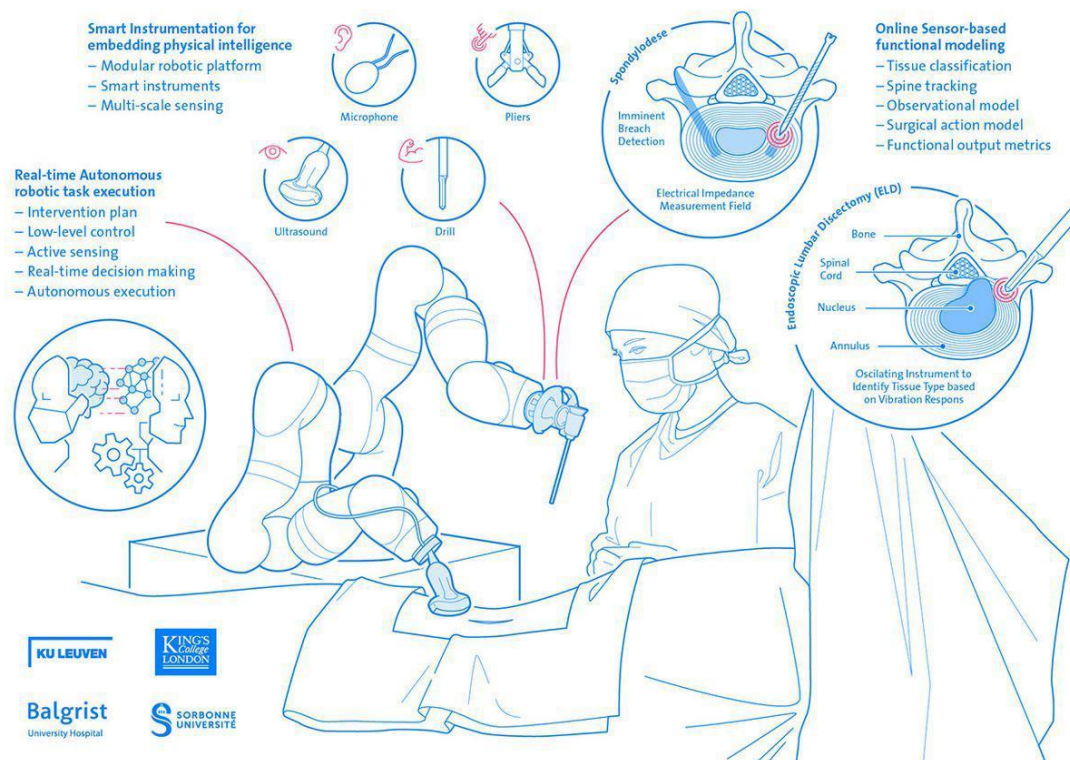
Location: ISIR (Institut des Systèmes Intelligents et de Robotique), 4 Place Jussieu 75005, Paris. The AGATHE team, dedicated to Medical Robotics at ISIR groups approx. 8 permanent staff and 15 PhD students and postdocs.

Contact: Send an application in a single pdf file with short CV, list of publications and potential references to:

Guillaume Morel, Prof. Sorbonne Université: guillaume.morel@sorbonne-universite.fr

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Key words: intraoperative sensing, orthopaedic surgery, multimodal sensing, data fusion, decision making, autonomous robot control, minimal invasive surgery, human-robot interaction.



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