SECTOR: Higher Education Institution

LOCATION: France, Grenoble

RESEARCHER PROFILE:
□ First stage researcher,

INSTITUTION: Univ. Grenoble Alpes, University of Innovation

One of the major research-intensive French universities, Univ. Grenoble Alpes**1 enjoys an international reputation in many scientific fields, as confirmed by international rankings. It benefits from the implementation of major European instruments (ESRF, ILL, EMBL, IRAM, EMFL*2). The dynamic ecosystem, grounded on a close interaction between research, education and companies, has earned Grenoble to be ranked as the 5th most innovative city in the world. Surrounded by mountains, the campus benefits from a natural environment and a high quality of life and work environment. With 7000 foreign students and the annual visit of more than 8000 researchers from all over the world, Univ. Grenoble Alps is an internationally engaged university.

A personalized Welcome Center for international students, PhDs and researchers facilitates your arrival and installation.

In 2016, Univ. Grenoble Alpes was labeled «Initiative of Excellence ». This label aims at the emergence of around ten French world class research universities. By joining Univ. Grenoble Alpes, you have the opportunity to conduct world-class research, and to contribute to the social and economic challenges of the 21st century (“sustainable planet and society”, ”health, well-being and technology”, ”understanding and supporting innovation: culture, technology, organizations” ”Digital technology”).

* ESRF (European Synchrotron Radiation Facility), ILL (Institut Laue-Langevin), IRAM (International Institute for Radio Astronomy), EMBL (European Molecular Biology Laboratory), EMFL (European Magnetic Field Laboratory)

Key figures:
- + 50,000 students including 7,000 international students
- 3,700 PhD students, 45% international
- 5,500 faculty members
- 180 different nationalities
- 1st city in France where it feels good to study and 5th city where it feels good to work
- ISSO: International Students & Scholars Office affiliated to EURAXESS

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1 Univ. Grenoble Alpes
MANDATORY REFERENCES:

IDEX PROJECT TITLE: Multidisciplinary Institute in Artificial Intelligence, “Computer-Assisted Medical Intervention Assistant” chair
SUBJECT TITLE: AI-based assistance for real-time prostate biopsy navigation
RESEARCH FIELD (cf mots clefs sur Euraxess Jobs): Computer Science, Medical Science, Biomedical Engineering
SCIENTIFIC DEPARTMENT (LABORATORY’S NAME): TIMC-IMAG Laboratory
DOCTORAL SCHOOL’S: ED MSTII or ED ISCE
SUPERVISOR’S NAME: Jocelyne TROCCAZ and Sandrine VOROS

SUBJECT DESCRIPTION:
In the context of cancer detection, performing biopsies (removal of tissue cores) for an anatomo-pathological examination is the major diagnostic element. These biopsies can be performed under ultrasound guidance, as is the case of prostate biopsies. In the case where an MRI exam has been performed and reveals a suspicious area, a difficulty for the clinician is to reach this specific target area not necessarily visible on ultrasound imaging. These targeted biopsies can be supplemented by so-called randomized biopsies (distributed uniformly over the prostate). Another difficulty is to know precisely the position of biopsies performed in order to make the best therapeutic decisions for the patient. Let underline the fact that the prostate is a mobile and deformable organ which position and shape significantly vary during the intervention. For several years, assistive devices have been developed to improve the knowledge of biopsy positions or even to guide the clinician to specific areas. Essentially, the solutions combine ultrasound probe position measuring devices and 2D and 3D image processing methods. In order to meet the limitations of the existing, we propose to develop innovative support tools using techniques of Artificial Intelligence. The main issue is to be able to process and fuse reliably complex information coming from medical images and sensors in real time. Another challenge comes from the intrinsic low quality of ultrasound images (noisy, with many artifacts) and from their dependence upon both the operator and patient. Methods must demonstrate their accuracy and robustness in that challenging application domain.

This thesis will be carried out at the TIMC-IMAG laboratory in the GMCAO team, which has been developing methods of assisting the medical and surgical procedure since 1985 in collaboration with clinical teams at the University Hospital of Grenoble in particular. The work will be done in close collaboration with the KOELIS company, created in 2006, which develop assistive device in the field of urology. KOELIS is one of the world leaders in the field with its TRINITY system, among others.

ELIGIBILITY CRITERIA
Applicants must hold a Master's degree (or be about to earn one) or have a university degree equivalent to a European Master's (5-year duration),

Applicants will have to send an application letter in English and attach:
- Their last diploma
- Their CV
- A short presentation of their scientific project (2 to 3 pages max)
- Letters of recommendation are welcome.

Address to send their application: Jocelyne.Troccaz@univ-grenoble-alpes.fr before 12th of July or after 12th of August