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OPEN PhD POSITION in Innovative Training Networks

We are looking for a dedicated and highly motivated Early Stage Researcher (ESR), who will join our team to build multidisciplinary expertise for fostering future medical solutions applied to tendon repair and diagnosis.

P4 FIT description (4 years MCSA-ITN-EJD project starting January 2021)

Perspectives For Future Innovation in Tendon repair (P4 FIT) fosters to build a new generation of ESRs with adequate skills to explore non-conventional therapeutic and diagnostic solutions by exploiting the technological advances in nanomedicine. The translation of innovative nanodevices carried out on integrated pre-clinical and vet/human clinical settings are expected to produce solid evidence-based datasets able to reduce fragmentation still limiting the impact of biomedical discoveries and to offer a unique opportunity for identifying new predictive biomarkers through the use of AI and deep learning data analysis. Working across disciplines and sectors, **P4 FIT** will foster the 15 ESRs to be creative, critical, autonomous intellectual risk takers at the frontiers of research with the R&I mind-set necessary for thriving careers. **P4 FIT** will allow to fill the EU gap in tendon healthcare, building up a generation of researchers able to develop nano-based biomedical devices by integrating biology advances to technology innovation, and to computational revolution. The **P4 FIT** cross-disciplinary approach includes 6 beneficiaries and 21 partner organizations (10 academic and 11 non-academic) from across Europe.

ESR14 – UNISA (double degree with Friedrich-Alexander Universität Erlangen-Nürnberg) Tendon wireless monitoring sensors for injury prevention and supporting rehabilitation

Objectives: Design and development of smart bio/nano sensors and AI data analytics algorithms for tendon monitoring. Sensors will measure both mechanical and biochemical features of tendon behavior. The software component analysing the sensors data will provide on healthy subject a risk level for injury prediction; on rehabilitation patient will support medical staff on continuous monitoring of the follow-up status.

Expected Results: The ESR will contribute to (1) Design and development of biosensors for detecting biochemical parameters on the patient. (2) Fabrication of nanomaterial-based sensors for mechanical and physical features (e.g., strain and temperature); the devices may be used in patients for clinical studies and implanted in horses for preclinical studies. (3) Design and optimization of sensors electrical interface and HW and software components based on algorithms and models of AI (machine learning and deep learning) for data analysis and interpretation. In particular, the medical device will be capable to monitor the tendon performance. Such device will be used by healthy persons (like athletes) for injury prevention and by orthopedic and physiotherapist staff for rehabilitation progress monitoring. The software components will support the usage of the bio-nanosensors and will interpret the data and give a meaning to them in terms of risk level for injury prediction and for continuous monitoring of the rehabilitation activities.

Keywords: biosensors, nanomaterials, machine learning, smart devices, tendon pathologies, rehabilitation

Applicant Profile: Master level in Computer Engineering, Biomedical Engineering or related fields, ideally with background in Embedded systems, IoT, bio/nano sensors and machine learning. Excellent communication skills (both written and oral) in English.

PhD main locations: The recruited ESR is given the opportunity to conduct 3-years of PhD studies at [Department of Information and Electrical Engineering and Applied Mathematics, University of Salerno \(UNISA, Italy\)](#) and secondments at [Institute of Biomaterials of the Friedrich-Alexander-Universität Erlangen-Nürnberg \(FAU, Germany\)](#) and at [AI4Health srl \(Italy\)](#).

Double PhD Tutors: Prof. N. Maffulli and Prof. F. Tortorella (Doctoral Programme in Computer Science Engineering, UNISA); Prof. A. R. Boccaccini (Doctoral Programme in Engineering (Biomaterials), FAU).

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More details about P4 FIT project, requirements for the candidates and recruitment procedure:

www.p4fit.eu/jobs