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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.

### ESR15 – UNISA (double degree with Reykjavik University)

#### Advanced technologies in imaging for pathological and aged human soft tissue

**Objectives:** To identify the role of advanced image analysis and machine learning to improve diagnosis and prognosis of soft tissue affected and their relations with epidemiological studies based on active and working population.

**Expected Results:** (1) Design of a medical image acquisition and processing pipeline that allows improved segmentation, visualization and analysis of tendons, cartilage and bone tissues. (2) Acquisition, registration and analysis of multimodal images (MRI and CT). (3) Selection of the region of interest based on patients having acute injuries (knee and ankles tendons/cartilage damage) or with degenerative pathologies (arthrosis). (4) 3D segmentation and reconstruction of the anatomical structure. (5) Creation of a 3D model patient specific database and associated morphological parameters from traumatic and degenerative cases. Hounsfield based density profiles will be extracted from the CT scans of different anatomical tissues pre and post clinical treatment. (6) Creation of a database of classified pathologies with their associated bones and tendons morphological and densitometry values. (7) Epidemiological study based on active and working population and investigation of co-relationships with image in order to estimate socio-economic impacts of tendinopathy and tendon ruptures. These data will be correlated with 3D morphology, tissues type, density, pathology and patient clinical data and lifestyle. (8) Design of a predictive model based on the knowledge base extracted in the previous steps and able to improve diagnosis and prognosis.

**Keywords:** medical imaging, image analysis, machine learning, multimodality images, computer aided diagnosis, tendon pathologies

**Applicant Profile:** Master level in Computer Engineering, Biomedical Engineering or related fields, ideally with background in computer vision 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 at [Reykjavik University \(RU, Iceland\)](#), and secondments at [Kiso \(Iceland\)](#).

**Double PhD Tutors:** Prof. F. Tortorella (Doctoral Programme in Computer Science Engineering, UNISA); Prof. P. Gargiulo (Doctoral Programme in Biomedical Engineering, RU).

### Main contact:

Prof. Francesco Tortorella (ftortorella@unisa.it)

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

[www.p4fit.eu/jobs](http://www.p4fit.eu/jobs)