

PhD Position in Experimental Mechanics of Materials/Structures

“From the vocal-fold 3D structure and micro-mechanics to the design of biomimetic materials”

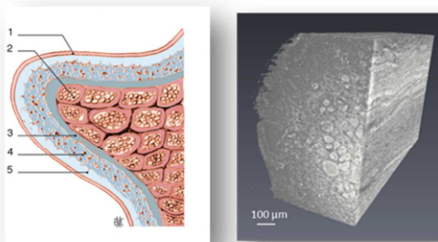
Location : **3SR Lab**, CoMHet team, Grenoble, France

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Collaboration : **GIPSA-lab**, VSLFD team, Grenoble, France

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Project summary



Scheme and imaging of vocal-fold fibrous microstructure

The vocal folds are soft multi-layered laryngeal tissues, owning remarkable vibro-mechanical performances. Composed of collagen and elastin microfibrils' networks, the upper layers play a major role in the vocal-fold vibrations. However, the impact of these tissues' histological features on their mechanical behavior is still poorly known. This is mainly ascribed to their challenging experimental characterization at the scale of their fibrous networks.

Therefore, this PhD project aims to gain an in-depth understanding of the link between the micromechanics of vocal-fold tissues and their unique vibratory macroscale performances. The strategy will be :

1. To go further in the investigation of the vocal-fold 3D architecture and micromechanics and behaviour upon finite deformation. This step will be based on experimental biomechanical campaigns and unprecedented synchrotron X-ray in situ microtomography ;
2. To use these data to mimic and process fibrous biomaterials with tailored structural and biomechanical properties ;
3. To characterize the vibro-mechanical properties of these biomaterials at different scales (macro/micro) and frequencies (low/high).

Location and practical aspects

The successful applicant will be hosted by the **laboratory Soils, Solids, Structures, Risks (3SR, UMR5521 - Grenoble, France - www.3sr-grenoble.fr/)** in the “CoMHet” team. A part of his/her work will also be conducted in the **Images, Speech, Signal and Automation Laboratory (GIPSA-lab, UMR5216 - Grenoble, France - www.gipsa-lab.grenoble-inp.fr/)**. This project will benefit from a collaboration existing between researchers in mechanical engineering, voice production and clinicians from Grenoble University Hospital (LADAF).

The PhD fellowship offer is available from **September 2018** (possible adjustments of this starting date if need be) for a period of **3 years** (financial support acquired from ANR MicroVoice project).

Applications

Candidates with academic backgrounds in solid mechanics, materials science and engineering are expected. Specific skills in dynamics of composites, vibromechanics, and experimental mechanics will be appreciated. Additional knowledge in acoustics and/or biomechanics of soft tissues will be interestingly examined.

Interested candidates should send their CV, a cover letter and official transcripts of the last two years before **2018, April the 30th** to Lucie BAILLY, lucie.bailly@3sr-grenoble.fr, (+33) (0)4 76 82 70 85.