

## Post-Doc position in Computational modelling of multi-scale mechanobiology in arteries – 36-month fixed-term contract

### Description

#### JOB ENVIRONMENT:

Institut Mines-Télécom is the leading public group of engineering and management Grandes Écoles in France. Consisting of eight public graduate Grandes Écoles and two subsidiary graduate schools, Institut Mines-Télécom leads and develops a rich ecosystem of partner schools, economic, academic and institutional partners, key players in education, research and economic development.

Mines Saint-Étienne, a graduate school of the Institut Mines-Télécom, is responsible for education, research, innovation, industrial transfer and scientific culture dissemination. With 2,500 students, 500 staff and a budget of €50m, it has 3 campuses dedicated to the industry of the future, health and well-being, and digital sovereignty and microelectronics. It is ranked in the top 15 graduate engineering schools in France and the top 500 universities worldwide.

The 2023-2027 strategy of Mines Saint-Etienne is in line with that of Institut Mines Telecom. It aims to:

- Support the ecological, digital and generational transitions and educate the people involved
- Support national and European sovereignty in microelectronics and digital technology.

To support this strategy, it is recruiting a **postdoctoral**.

#### JOB DESCRIPTION:

The CIS brings together 70 people, including 18 professors in engineering industrial/computing, biomechanics and healthcare engineering. Since its creation in 2004, the CIS has been representative of the ability of Mines Saint-Etienne to acquire leadership on innovative themes such as, for example,

Soft tissue biomechanics. SAINBIOSE (INSERM UMR 1059) brings together researchers from the CIS (biomechanics, biomaterials and bioengineering), the faculty of Medicine from Jean Monnet University, Saint-Etienne University Hospital, Inserm and the French Blood Establishment. The global scientific objective of SAINBIOSE is a better understanding and of biostress in osteoarticular (LBTO team) and cardiovascular pathology (DVH team).

Website: <https://sainbiose-lab.fr/>

Biomechanics, experimental and computational, is a major research topic of SAINBIOSE, which goes from modelling the mechanical behaviour of tissues to clinical and industrial applications, especially with the textile industry. In 2024, Prof Stéphane Avril was awarded an ERC Advanced grant from the European Research Council for the project JuvenTwin “Multiscale mechanobiological synergies in vascular homeostasis, ageing and rejuvenation”, which aims to establish multiscale

### Hiring organization

Candidate-1st

### Employment Type

Full-time

### Beginning of employment

asap

### Job Location

Saint-Etienne, Auvergne-Rhône-Alpes, France

### Working Hours

40

### Base Salary

euro EUR 28K - 53K \*

### Date posted

June 1, 2024

digital twins of ageing effects on vascular mechanobiology and to simulate and screen effective rejuvenation treatments. This project will take place in a research group having 15 years experience in biomechanics and mechanobiology (<https://emse.fr/~avril/>).

We open a non-permanent position of post-doctoral fellow to join the Avril's team working on JuvenTwin's project. The work will be carried out at Mines Saint-Etienne, within the SAINBIOSE research unit (Inserm U1059). It is based at the Centre Ingénierie et Santé (Hospital campus at the North of Saint-Etienne). The objective of the post-doctoral fellow will be to develop an innovative computational models (multi-scale digital twin) in which we will calculate deformation fields using a combination of traditional finite-element model and physics informed neural network for realistic microstructures of arterial extracellular matrix (reconstructed from patient-specific micro-architectures) in which a large population of prestressed cells will be embedded. Temporal variations of cell prestress in the model will be informed from the patient-specific data of collaborators in the JuvenTwin project and using a computational model of cell signalling networks. A stay of 3 months at TU Graz (Gerhard Holzapfel's lab) is planned.

Tasks may change depending on the needs of the department and Mines Saint-Etienne.

## Requirements

### **PROFIL SOUGHT:**

**You are in one of the following situations:**

- A doctoral degree no more than 3 years old, in which case you will be employed as a post-doctoral researcher
- If your doctorate is more than 3 years old, you will be employed as a research and development engineer

**And ideally:**

- Holder of PhD degree in computational (bio)mechanics

**You have the following skills, knowledge and experience:**

- Capacity to successfully integrate a team and a group within a R&D environment
- Good knowledge of computational methods for mechanics
- Understanding of multi-scale modelling
- First experience with developing a computational model
- Interest in coding
- Expertise in front-end and back-end development

### **WHY JOIN US:**

Institut Mines-Telecom is characterised by:

<https://www.youtube.com/watch?v=m39m6hdNC48>

- A scientific environment of excellence
- A group with entities throughout France

Mines Saint-Etienne is distinguished by:

- A privileged working environment with a high student supervision rate and a high environment rate (support and back-up functions)
- First-rate experimental and digital resources
- Significant contract research activity (€11m/year in Research and Innovation contracts), mainly with industrial partners
- 25% international students, Member of the T.I.M.E. network and the EULIST European University
- A centre for scientific, technical and industrial culture – La Rotonde – which is unique in France, and which has a major impact on society (> 50,000 visitors per year)
- Pleasant workplace, easily accessible by public transport and close to motorways
- Public transport costs reimbursed up to 75% (subject to conditions)
- Sustainable mobility package
- Staff committee that subsidises sports, leisure, cultural and social events and activities
- The possibility of partial remote working
- 49 days annual leave

### **ADDITIONAL INFORMATION:**

#### **Recruitment conditions:**

- Fixed-term contract for a period of 36 months
- Desired start date: 1st October 2024
- Remuneration will be set according to the candidate's profile, based on the rules defined by the *Institut Mines Télécom*'s management framework
- Full time
- Position based in Saint-Étienne
- For internal use:
  - > Category II – Job P – *Post doctorant* according to the Management Framework

The position is open to all, with accommodation available on request for candidates with disabilities. The job is open to civil servants and/or the general public. All applications may be subject to an administrative enquiry.

#### **How to apply:**

Applications (CV, covering letter, letter of recommendation if applicable) must be submitted on the RECRUITEE platform **no later than 23/08/2024**:

<https://institutminestelem.com/o/post-doc-position-in-computational-modelling-of-multi-scale-mechanobiology-in-arteries-considering-vascular-ageing-conditions-36-month-fixed-term-contract-2>

**Candidates selected for an interview will be informed rapidly. Part of the interview will be held in English.**

As part of its Equality, Diversity and Inclusion policy, École des Mines de Saint Etienne is an employer that is committed to fair treatment of all applicants.

#### **For more information:**

For further information about the position, please contact:

Stephane AVRIL – Researcher

[avril@emse.fr](mailto:avril@emse.fr)

04 77 42 01 88

For all administrative information, please contact:

Charlotte MOGIER – Human Resources

Phone + 33 (0)4 77 42 01 18

[charlotte.mogier@emse.fr](mailto:charlotte.mogier@emse.fr)

Useful links:

<https://www.mines-stetienne.fr/>

<https://www.imt.fr/>

<https://www.youtube.com/watch?v=QUeuC5iQiN0>

Data protection :

<https://www.mines-stetienne.fr/wp-content/uploads/2018/12/Informations-des-candidats-sur-les-traitements-de-donn%C3%A9es-personnelles.pdf>

### **How the process will look like**

Your teammates will gather all requirements within our organization. Then, once priority has been discussed, you will decide as a team on the best solutions and architecture to meet these needs. In continuous increments and continuous communication between the team and stakeholders, you're part of making data play an even more important (and understood) part withing Brand New Day.

### **Job Benefits**

EUR 28K – 53K \*