

## Postdoc Position

### “Mechanics of materials and structures: multiscale approaches and/or AI-based approaches”

#### Project summary

This post-doc position offers the opportunity to develop one of the following approaches in materials and/or structural mechanics, as chosen by the candidate:

- (i) **“Multiscale mechanics and couplings”** - This approach is long-standing at the laboratory, with a strong focus on small spatial and temporal scales (micro-nano) in recent years. We would like to strengthen the experimental/theoretical and/or numerical dialogue between at least two spatial or temporal scales of a material/structure/phenomenon, among the scales studied at 3SR Lab (from nm to decam; from quasi-static to ultra-fast with characteristic times from  $10^{-7}$ s to  $10^7$ s). The studied phenomena may combine mechanics to other relevant physics (thermo-hydro-mechanics, fluid/mechanical couplings, etc.), or to chemistry and/or biology.
- (ii) **“AI-based approaches in mechanics”** – These approaches are new in the laboratory, and we would like to develop interactions between research in mechanics of materials and/or structures (experimental/theoretical and/or numerical), and recent advances in data science and artificial intelligence (AI): neural networks, deep learning, statistical learning, Big Data processing, etc. For example, AI can be used to reduce the dimensionality of a model and thus speed up calculation times, and/or to perform data assimilation in order to adapt a model to new operating conditions.

The global aim of this offer is to give a candidate the opportunity to work on a topic of his/her choice in 3SR Lab, in line with one or both themes above (i and/or ii), and with the scientific activities of one of the three lab's research teams :

- [CoMHet team](#) : Mechanics and multi-physical couplings of heterogeneous media
- [GeoMechanics team](#) : Mechanics of geomaterials and geotechnical structures
- [RV team](#) : Risks, Vulnerability of structures and mechanical behaviour of materials

The applications of this research project will fall within one of the team's major areas of application and, more generally, within those of 3SR Lab: civil engineering, environment, energy, transport, defence or health.

This offer will enable the successful candidate to develop a scientific research project within 3SR Lab, and thus facilitate his/her application for a permanent CNRS position within the laboratory.

#### Work context and practical aspects

- **Location:** the successful applicant will be hosted by **the 3SR laboratory**, a research unit Grenoble Alpes University and CNRS ([www.3sr-grenoble.fr/](http://www.3sr-grenoble.fr/)) in engineering sciences, conducting cutting-edge research into **mechanics of solids, materials and structures**, for a wide range of applications. This post-doc position is not assigned in advance to one of the

lab's three research teams ([CoMHet team](#); [GeoMechanics team](#); [RV team](#)). Assignment will depend on the profile and preference of the person who is ultimately recruited.

- **Duration and starting date:** the post-doc fellowship offer is available from **November or December 2025** for a period of **12 months** (possible 6-months extension to be confirmed).
- **Gross salary** (before tax deduction): from  $\approx 2991$  €/month to  $\approx 4166$  €/month, depending on the number of years of post-doctoral experience.

### Skills & Applications

- **Requested degree and experience:** PhD and solid skills in mechanics of materials and/or structures + between 2 and 7 years of experience after the PhD. Professional experience in line with the keywords of the lab (below), and/or AI-based approaches will be strongly appreciated.
- **Keywords of the lab :** mechanics of solids, materials, structures; multiscale and multi-physics approaches; experimental mechanics: tests on materials and structures with complex loadings/various environments, coupled with 2D/3D imaging (optical, X-rays and/or neutron tomography) and field measurements/quantitative image analyses; theoretical mechanics (upscaling methods, behavior laws, enriched continuous media); numerical mechanics (simulations of nano/microstructures using finite elements or volumes, discrete elements, molecular dynamics, probabilistic methods, multi-scale methods such as FEMxDEM, MPMxDEM, FEM<sup>2</sup>, domain decomposition, etc.)
- **Moral commitment:** to apply for a research fellow position at the CNRS at the end of the postdoctoral program (end of 2026), in order to join one of the three teams at the 3SR lab as a permanent researcher.
- **Contact:** Interested candidates should send their CV and a cover letter before **2025, June the 25<sup>th</sup>** to **3SR head team: Gaël Combe** (director; [gael.combe@3sr-grenoble.fr](mailto:gael.combe@3sr-grenoble.fr), (+33) (0)4 76 82 86 29) and **Lucie Bailly** (deputy director; [lucie.bailly@3sr-grenoble.fr](mailto:lucie.bailly@3sr-grenoble.fr), (+33) (0)4 76 82 70 85).