Postdoctoral position in computational mechanics & scientific machine learning

Location: Ecole Nationale des Ponts et Chaussées, Champs-sur-Marne, France
Contract: 2 years full-time position, funded by ERC grant AUTOMATIX - 101229452.
Start date: September/October 2026 (flexible)
Application: Please submit a detailed CV, at least two recommendation letters or contact information of people who can recommend you, a short statement of interest and PhD thesis reports to Jeremy Bleyer, jeremy.bleyer@enpc.fr – Deadline: **March 31st 2026**

Position summary

Within the scope of the ERC Consolidator project AUTOMATIX (see details below), we are seeking a highly motivated **Postdoctoral Researcher** to contribute to the development of new methodologies at the interface between computational mechanics and scientific machine learning. The successful candidate will work on the design of hybrid, physics-informed modeling and identification frameworks for complex dissipative material behaviors, with an emphasis on full-field and history-dependent problems.

The postdoc will play a central role in the development of advanced numerical tools, in close interaction with other members of the project, and will contribute to shaping the scientific directions of the AUTOMATIX project.

Context

The increasing availability of full-field experimental data and advances in machine learning offer new opportunities to revisit how constitutive models are built and identified. While data-driven approaches have shown great promise, their reliability for complex material behavior strongly depends on the integration of physical principles, such as thermodynamic consistency, equilibrium, and history dependence.

This postdoctoral project focuses on dissipative material behaviors such as plasticity, viscoelasticity, and damage. A central challenge is to develop learning and identification strategies that can operate at the structural scale, account for path dependence, and exploit full-field information in heterogeneous specimens.

The postdoc will contribute to the development of hybrid modeling and identification approaches that combine classical constitutive frameworks, numerical simulation, and machine learning. The work will involve the coupling of advanced constitutive models with finite element simulations, and the formulation of full-field, physics-constrained training and calibration strategies. Applications will include both synthetic data from high-fidelity simulations and, at a later stage, experimental full-field measurements.

Qualifications

The candidate should:

- hold a PhD in solid mechanics, computational mechanics, applied mathematics, or a closely related field;
- have a strong background in continuum and computational mechanics;
- have solid programming skills and experience in scientific computing;
- show the ability to conduct independent research and to collaborate within an interdisciplinary team.

Experience with open-source finite element software (e.g. FEniCSx or similar) and/or machine learning frameworks (e.g. JAX, PyTorch, TensorFlow) is highly desirable.

Research environment

This full-time postdoctoral position is fully funded for two years within the ERC project AUTOMATIX. The postdoc will be supervised by Jeremy Bleyer and will be a core member of the AUTOMATIX research team.

The research will be carried out at the Navier Laboratory, a joint research unit of École Nationale des Ponts et Chaussées, CNRS, and Université Gustave Eiffel. The candidate will benefit from a stimulating interdisciplinary environment at the interface of computational mechanics, mechanical and civil engineering, and scientific machine learning.

The postdoc will be encouraged to publish in leading international journals, present their work at major conferences, contribute to open-source software developments, and actively participate in national and international collaborations.

The AUTOMATIX project

Principal Investigator: Jeremy Bleyer[1], Ecole Nationale des Ponts et Chaussées, IP Paris
Funding period: 2026-2031

The AUTOMATIX project aims to improve the modeling of material behavior in solid mechanics. Accurately capturing complex phenomena (such as plasticity, damage, or environmental effects) remains a major challenge in many applications. AUTOMATIX leverages advances in *machine learning* to automatically build models from experimental data while directly embedding physical and mathematical knowledge within the learning architecture. This hybrid approach produces more reliable models, consistent with mechanical laws and less dependent on large datasets.

A key outcome will be an open-source, modular, and high-performance library accessible to both academia and industry. AUTOMATIX will be applied in particular to the modeling of 3D-printed concrete at the Navier laboratory, to better predict complex phenomena such as material curing and crack formation.

[1] https://bleyerj.github.io/