


IMT Mines Alès
École Mines-Télécom


SCIENCE & CREATIVITY TO INVENT A SUSTAINABLE WORLD

PhD Position in Computer Science

Institution	IMT Mines Alès (Ecole Nationale Supérieure des Mines d'Alès)
Main job assignment	Teaching and Research center on Computer Science and Systems
Administrative residence	Alès (Département du Gard – Région Occitanie)
Starting date	October 2025

1. Context

The Institut Mines-Télécom (IMT), a major institution within the meaning of the Education Code, is a public scientific, cultural and professional institution (EPSCP) placed under the principal supervision of the ministers responsible for industry and digital technology. It is the largest group of engineering schools in France, with 11 public engineering schools spread across the country, which train 13,500 engineers and PhDs each year. The ITM employs 4,500 people and has an annual budget of €400M, 40% of which comes from its own resources. IMT has 2 Carnot institutes, 35 industrial chairs, produces 2100 A rank publications annually, 60 patents and carries out 110M€ of contractual research.

Created in 1843, IMT Mines Alès currently has 1,400 students (including 250 foreigners) and 380 staff. The school has 3 research and teaching centers of high scientific and technological level, which work in the fields of materials and civil engineering (C2MA), environment and risks (CREER), artificial intelligence and industrial and digital engineering (CERIS). It has 12 technological platforms and has 1,600 partner companies.

2. Research project

Title: AdaptiveMLOps (ANR project)

Keywords: Software engineering, Artificial intelligence, MLOps, DevOps, Static and dynamic variability, Software product line engineering, Model-driven engineering, Continuous evolution, Autonomous adaptation, Infrastructure as Code

The use of AI models is poised to become mainstream in application development. To achieve this, AI code must be fully operationalized, that is, transformed into robust software components that meet both functional and quality requirements for deployment and execution across development, testing, and production environments. This objective requires adapting or extending the software production management and automation frameworks provided by DevOps infrastructures. Specifically, it involves incorporating the principles, strategies, and best practices of MLOps, which are dedicated to the continuous development, deployment, monitoring, and maintenance of AI models.

To preserve the DevOps philosophy—which removes the barrier between development and operations phases—MLOps must enable collaboration between Data, AI, and Software engineers within projects, or

assist them in mastering the many domain-specific components required for the design and deployment of AI models. A no-code / low-code solution would be well-suited to the diverse profiles of contributors, who must work with concepts far from their areas of expertise. However, designing such a solution is challenged by the diversity and variability of the components that make up MLOps pipelines.

The goal of the ANR AdaptiveMLOps project is to explore the application of product line engineering approaches to catalog the recurring elements of MLOps pipelines and document their static and dynamic variability. The domain knowledge thus collected and formalized will help guide and support the design of MLOps pipelines through reuse, composition, and configuration. It will be implemented using a model-driven engineering approach that will propose a DSL (Domain-Specific Language) that is:

i) **generic and extensible**, to cover the variety of pipeline components and the evolution of MLOps practices,
ii) **abstract**, to be easily usable without requiring specific expertise,
iii) **pivotal**, to enable transformations into Platform / Infrastructure as Code languages used in deployments,
iv) **capable of handling static and dynamic variability**, so as not to limit customization, fine-tuning, or dynamic adaptation.

AdaptiveMLOps specifically targets the automatic and dynamic management of (re)deployment across multiple providers of different parts of the pipeline and the associated AI components, to optimize performance, cost, and environmental footprint. All solutions will be prototyped and validated through proofs of concept (PoCs), using the industrial partner's platform (a cloud solutions provider), based on real-world use cases provided by the industrial partner's clients (major French corporations).

3. Team supervision and PhD registration

Research center : CERIS (Centre de Recherche en Informatique et Systèmes) at IMT Mines Ales (Ales)
Research Unit : EuroMov-DHM
Graduate school: IMT Mines Alès (Université de Montpellier)

Supervision will be handled collectively by the scientific leaders of the project's consortium:
EuroMov-DHM (IMT Mines Alès, coordination): Christelle Urtado, Sylvain Vauttier
LIRMM (Montpellier University): Djamel Seriai, Vincent Berry
IRISA (Bretagne Sud University): Chouki Tibermacine
GetCaas (Company): Xavier Quesnot

4. Candidate profile

We are looking for candidates who have completed a Master 2 program in software engineering, with skills and/or experience in model-driven engineering, product line engineering, DevOps/MLOps, Software architecture development and management, Static and dynamic variability of software architectures, Autonomic adaptation of software architectures. Skills and/or experience in Artificial Intelligence, or in combining software engineering with artificial intelligence, would be an asset.

Research experience (internships, assignments, projects) would also be appreciated.

A good English proficiency, particularly in writing, is required.

Application: Candidates must send a cover letter, a CV, their Master's transcripts, as well as letters of recommendation to the scientific contacts of the project (christelle.urtado@mines-ales.fr, sylvain.vauttier@mines-ales.fr).

5. References

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6. Contacts

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