



## Research fellow in multiscale mechanical modeling of gravity-driven mass movements (M/F) Grenoble (38), FRANCE

Research area : **Continuum mechanics, rheology**

### Recruitment

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Type of recruitment: open competitive exam (state civil service)

Terms: Position open to candidates with a PhD

*(In some cases and under certain conditions, applicants may request for recognition of equivalence of diplomas that are not in the list of qualifications required for this examination, diplomas issued or recognized by a Member State of the European Union or the States Parties to the agreement of the European Economic Area, or the professional qualification obtained).*

### Job's description

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Irstea is the National Research Institute of Science and Technology for Environment and Agriculture. Its four main scientific research areas are: **Risks**: Natural, health and environmental risks, **Bioeconomy and circular economy** of bio-resources and effluents: from technologies to actors, **Adaptive resource management** in territories constrained by global change and **Biodiversity**: Dynamics and management of ecosystems and ecosystem services. Having become a key player in both French and European research, the Institute carries out research in support of public policies and in partnership with industry. It employs 1,200 people across nine regional centers in France. As an ISO 9001 certified institution, Irstea has also received the French CARNOT label, which acknowledges its long-standing research partnerships with socioeconomic actors, within both the private and the public sector. From 1<sup>st</sup> January 2020, Irstea will pursue its research activities under a new organisation following the merger with National Institute for Agronomic Research (Inra).

Within the Waters scientific department, you will be affiliated to MGEO3 team (mechanics of geo-materials, geo-fluids and geo-structures) of ETNA research unit (torrential control, snow and avalanches). ETNA unit conducts research on the prevention of natural hazards in mountain environments (avalanches, snowdrift, torrential floods and debris flows, rock-falls, glacial hazards). The research studies are focused on the triggering and propagation of mass movements, flux and landform dynamics, interactions with elements at stakes, and risk evaluation and decision-support in a context of rapid and pronounced environmental changes. The research unit is comprised of 16 scientists, 8 technical staffs, and about twenty post-doctorate researchers and PhD-students. The research unit is associated with the University Grenoble-Alpes, and currently engaged in a project of merging with the Institute for geosciences and environmental research (UMR IGE).

Your missions will consist in conducting and animating research activities on multiscale modeling of rapid gravity-driven mass movements, notably snow avalanches and associated processes. An expert of at least one continuous modeling method (FEM, MPM, VOF), you will develop advanced numerical tools aiming at simulating the different phases of rapid mass movements (avalanches, mudflows, etc.), solid-fluid transitions and fluid-structure couplings. Your work shall build upon the various developments at the microscale carried out in MGEO3 team (through DEM models in particular), while seeking to properly account for the physics of the complex underlying processes at play. You will also be called upon to use and push forward the modeling tools already developed within the ETNA unit (depth-averaged shallow models in particular), in order to maintain the excellence of the team in this field. You will seek to implement your developments into the risk evaluation approaches developed by the research unit, and you will participate to the expertise and engineering support activities of the unit.

Your primary activities will be to build collaborative research projects, disseminate and transfer your academic results (publications, communications, expertise activities), mentor trainees, PhD-students and post-docs, and participate to the scientific animation of the MGEO3 team and ETNA research unit. You will maintain and develop collaborative relationships with laboratories specialized in advanced numerical modeling at the local, national and international levels.

### Required profile

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Diploma required : PhD

You hold a PhD in mechanics and/or physics and you show solid methodological skills in numerical mechanical modeling and/or applied mathematics. You have a successful initial experience in multiscale modeling approaches and you aspire to be involved in research activities dedicated to the understanding and prevention of natural hazards related to rapid mass movements, including avalanches and associated snow processes.

You are rigorous, organized, and quick to react. You master scientific communication in English and you show excellent team-working skills.

	Level required			
	Advanced	Pre-advance	Intermediate	Beginner
<b>Knowledge</b>				
Modelling in continuum mechanics	X			
Multi-scale approaches		X		
Applied mathematics			X	
Rapid mass movements, in particular snow avalanches				X
English language	X			
<b>Skills</b>				
Knowledge of numerical simulation software(s)	X			
Scientific programming, data treatment		X		
Project management			X	
Scientific communication	X			
<b>Social skills</b>				
Autonomy, team work		X		
Rigour, organization, reactivity	X			

## Work conditions and environment

### Access facility

Ground floor	<input type="checkbox"/> yes	<input checked="" type="checkbox"/> no
Elevator	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> no
Public transport	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> no
Car park	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> no

### Work environment

Institution catering	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> no
Works council	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> no

### Work conditions

- ✓ Working time per week : 38h40 (27 days of annual paid leave and 20 days off) or 36h20 (27 days of annual paid leave et 7 days off), for a full time of calendar year.
- ✓ Remote work (depend on eligibility criteria).

### Social benefits (depend on eligibility criteria)

- ✓ Health insurance: possibility to subscribe to one of 6 referenced health and life insurance policies.
- ✓ Holiday vouchers.
- ✓ CESU (Universal Employment Services Voucher).

### Training

- ✓ Support after the appointment.
- ✓ Possibility to follow training to develop professional and personal skills.

## For more information

### You can contact :

- ⇒ Florence NAAIM, head of UR ETNA, [florence.naaim@irstea.fr](mailto:florence.naaim@irstea.fr) - (+33) 4 76 76 27 09
- ⇒ Guillaume CHAMBON, deputy-head of UR ETNA, [guillaume.chambon@irstea.fr](mailto:guillaume.chambon@irstea.fr) - (+33) 4 76 76 27 66

## To apply

Application form can be obtained:

- on the website: [www.irstea.fr](http://www.irstea.fr) link "Nous rejoindre" and then link "concours externes"
- or by contacting the recruitment centre: [concours@irstea.fr](mailto:concours@irstea.fr) - +33 140 96 60 37 or 65 67

Full application should be submitted before **14<sup>th</sup> March 2019** and sent to :

Irstea  
 Direction des ressources humaines et des relations sociales  
 Pôle recrutement, mobilité et développement des compétences  
 1 rue Pierre-Gilles de Gennes - CS 10030  
 F-92761 ANTONY