



UMR0791

## Systemic Modelling Applied to Ruminants (MoSAR)

### Direction

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### Research topics

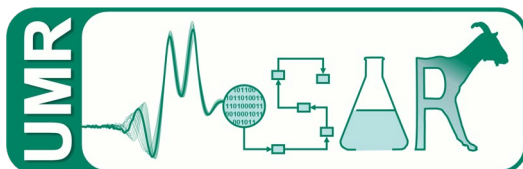
- Animal behaviour
- Feed efficiency
- Precision livestock farming
- Ruminal and energetic metabolism
- Systemic modelling
- Ruminant nutrition
- Resilience et robustness

### Key numbers

- 11 scientists
- 7 technicians
- Experimental facility  
Goat farm (120 dairy goats)  
equipped for animal phenotyping  
via automated individual recordings

### Mission et objectives

Our goal is to improve understanding and quantification of feed efficiency (FE), resilience and robustness of ruminants to make better use of resources through livestock farming and limit external supplies.



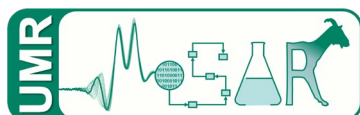
To reach our goal, our research activities aim at producing biological knowledge and metrics, at different underlying levels of organization (e.g., organs, animal, herd) and time scales (short and long term - life-time). Our activities also aim at developing innovative mathematical models for integrating knowledge, interpreting data and producing diagnostic tools. Our scientific strategy integrates *in vivo*, *in vitro* and *in silico* approaches and uses the goat as an animal model and as target species.

Furthermore, the UMR MoSAR plays a major role in promoting open science, particularly through the international initiative [Peer Community In Animal Science](https://peercommunityinanimalscience.org/), which was created within the unit.





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## Research

The two main research axes of MoSAR are:

Axis 1: Understand feed efficiency (FE) to better quantify and manage it.

- Investigate the underlying mechanisms of FE in ruminants, by specifically analysing key digestive and metabolic processes and their factors of variation of dietary origin.
- Phenotype the underlying components of FE (metrics and proxies) and their temporal dimension.

Axis 2: Understand the relationships between FE, resilience and robustness to identify levers for actions toward sustainable FE.

- Understand and model lifetime FE, by integrating interactions between functions and factors of variation linked to the farm environment.
- Understand and characterize the dynamics of physiological and behavioural responses to perturbations to quantify resilience.
- Develop simulation tools to support the design of strategies aimed at maximizing sustainable efficiency of the animal and the herd.

## Collaborations

MoSAR develops collaborations with academic teams at the national and international level. MoSAR is part of the collective [SAPS](#) (Animal Sciences Paris-Saclay).

MoSAR develops collaborations with socio-economic partners in the livestock sector. Our team is a partner of the UMT SC3D (Mixed Techno-logical Unit "Sustainable Goat Systems of Tomorrow") and the "Goat Feeding and Nutrition" group of IDELE (French Livestock Institute).

## Teaching

The lecturers of MoSAR belong to the training and research unit (UFR) Nutrition, Food, Product Quality and Animal Welfare – NAQPBE of the SVS (Life Sciences and Health) department of [AgroParisTech](#) and participate in the training of students in engineering and Masters courses. We are involved in the [Graduate School BIOSPHERA](#) of [Université Paris-Saclay](#). MoSAR is affiliated to the doctoral school [ABIES](#).



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