



Research evaluation

FINAL RESUME ON THE RESEARCH UNIT:
Systemic Modelling Applied to Ruminants
(MoSAR)

UNDER THE SUPERVISION OF THE
FOLLOWING INSTITUTIONS AND
RESEARCH BODIES:

AgroParisTech - Institut des sciences et industries
du vivant et de l'environnement
Institut National de la Recherche Agronomique -
INRA

EVALUATION CAMPAIGN 2018-2019
GROUP E

Report published on February, 14 2019

High Council for evaluation of research and higher education



In the name of Hcéres¹:

Michel Cosnard, President

In the name of the experts committee²:

Veerle Fievez, Chairwoman of the
committee

Under the decree No.2014-1365 dated 14 November 2014,

¹ The president of Hcéres "countersigns the evaluation reports set up by the experts committees and signed by their chairman." (Article 8, paragraph 5);

² The evaluation reports "are signed by the chairman of the experts committee". (Article 11, paragraph 2).

Tables in this document were filled with data provided by laboratories and supervising bodies in the unit's application and in the Excel files "Données du contrat en cours" and "Données du prochain contrat".

UNIT PRESENTATION

Unit name:	Systemic Modelling Applied to Ruminants
Unit acronym:	MoSAR
Requested label:	UMR
Application type:	Renewal
Current number:	0791
Head of the unit (2018-2019):	Mr Nicolas FRIGGENS
Project leader (2020-2024):	Ms Maryline BOVAL
Number of teams and/or themes:	1

EXPERTS COMMITTEE MEMBERS

Chair:	Ms Veerle FIEVEZ, Ghent University, Belgium
Experts:	Mr Étienne JOSIEN, VetAgro Sup Clermont-Ferrand (representative of CSS) Mr Christophe KLOPP, Inra Toulouse (supporting personnel) Ms Lucile MONTAGNE, Agrocampus Ouest Rennes (representative of CNECA)

HCÉRES REPRESENTATIVE

Mr Jean-François HOCQUETTE

REPRESENTATIVES OF SUPERVISING INSTITUTIONS AND BODIES

Mr Thierry DORE, AgroParisTech

Ms Françoise MEDALE, INRA

INTRODUCTION

HISTORY AND GEOGRAPHICAL LOCATION OF THE UNIT

MoSAR stands for « Modélisation Systémique Appliquée aux Ruminants ». MoSAR came into being on the 1st of January 2010, prior to this the unit was called "Physiologie de la Nutrition et Alimentation". The unit has a long-standing expertise in ruminant nutritional physiology and feed evaluation, applied to dairy goats, as well as in systemic modelling of animal physiology and biology. Since becoming MoSAR, the scientific objectives of the research unit have evolved to give the systemic modelling a more central role, together with a clearer focus on the characterisation of phenotypic variation in the acquisition, transformation and allocation of nutrients to different life functions.

It is located on 2 sites in Ile-de-France: the unit at AgroParisTech, Paris and the experimental facility (goat farm) at Thiverval-Grignon (78).

MANAGEMENT TEAM

Till 31-05-18

Director: Mr Nicolas Friggens

Deputy director: Ms Christine Duvaux-Ponter

As of 01-06-18

Director: Ms Maryline Boval

Deputy director: Mr Philippe Schmidely

HCÉRES NOMENCLATURE

SVE1_3

SCIENTIFIC DOMAIN

The unit carries out research work in: animal nutrition, animal behaviour, rumen physiology, energy metabolism and modelling. The common research theme of this work is the description and quantification of the processes by which ruminants obtain, ingest, digest, metabolize and partition nutrients between production and other life functions. Experimental work is centred on lactating goats at the level of the whole-animal, but with collaborative projects that integrate the underlying levels (cellular and molecular) and higher levels of aggregation (herd, farm systems).

Research within MoSAR is structured around:

- Acquisition of nutritional resources, which includes pre-ingestive and feeding behaviour, rumen function and digestion, as well as the interaction between these elements, the goal being to characterise their impact on digestive efficiency and ruminal robustness.
- Allocation of nutritional resources, which includes the regulation of nutrient partitioning between different life functions, characterisation of the dynamic of resource allocation through time, the impact of the environment on allocation and the interaction between them. The goal is to be able to predict animal resilience and lifetime efficiency.

These two aspects are fundamental for predicting the consequences of diverse strategies in the management and genetic selection of the robustness of the animal and systems. To this end, the unit deploys phenotyping and modelling approaches, including the study of underlying mechanisms. The phenotyping work allows to characterise variation between individuals in their capacity to cope with environmental perturbations. The modelling work develops the framework for prediction of animal performance across environments and physiological stages. Together, phenotyping and modelling contribute synergistically to the development of decision support tools particularly in the domain of precision livestock farming.

UNIT WORKFORCE

	Unit workforce	
	Systemic Modelling Applied to Ruminants	
Active staff	Number 30/06/2018	Number 01/01/2020
Full professors and similar positions	2	3
Assistant professors and similar positions	5	5
Full time research directors (Directeurs de recherche) and similar positions	3	2
Full time research associates (Chargés de recherche) and similar positions	4	4
Other scientists ("Conservateurs, cadres scientifiques des EPIC, fondations, industries, etc.")	0	0
High school teachers	0	0
Supporting personnel (ITAs, BIATSSs and others, notably of EPICs)	13	12
Permanent staff	27	26
Non-permanent professors and associate professors, including emeritus	1	
Non-permanent full time scientists, including emeritus, post-docs	6	
<i>PhD Students</i>	3	
Non-permanent supporting personnel	6	
Non-permanent staff	13	
Total	40	26

GLOBAL ASSESSMENT OF THE UNIT

The scientific strategy of MoSAR has the following objective: to improve the understanding of, and ability to predict, the inter-relations between the livestock animal and its nutritional environment. The ultimate goal being to develop knowledge and tools, that allow an optimal balance to be found between performances, robustness functions and animal well-being, and thereby an improved efficiency of use of feed resources.

MoSAR is a relatively small joint unit with two managing bodies: INRA and AgroParisTech. The unit takes an original and internationally leading position through its combination of systemic modelling and phenotyping to describe livestock's robustness based on the concepts of dynamic nutrient acquisition and allocation. Its timely and appealing overarching project proposal allows the unit to consolidate its dual and interactive (modelling and experimentation) expertise, in which its experimental facility with lactating goats as well as integration in

externally funded national and international projects, are a key factor for success. Additionally, MoSAR emphasizes on and ensures transfer of their scientific concepts towards stakeholders of the non-academic world.

MoSAR is at a turning point due to the concomitant occurrence of some key events: recent establishment of the new direction, recent and future retirement of key researchers, integration in the Institute "Sciences animals Paris-Saclay" and moving to the Saclay plateau. For this, the scientific vision and organisational strategy of the unit should be further strengthened. This will also consolidate the unit's outreach towards and collaboration with stakeholders as well as attracting doctoral students.

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