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USC - Sensométrie et Chimiométrie

Rapport Hcéres

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HCERES

High Council for the Evaluation of Research
and Higher Education

Research units

HCERES report on research unit:

Unité Sensométrie et Chimiométrie

USC

Under the supervision of
the following institutions
and research bodies:

ONIRIS - École Nationale Vétérinaire, Agroalimentaire
et de l'Alimentation, Nantes Atlantique

Institut National de la Recherche Agronomique – INRA

Evaluation Campaign 2015-2016 (Group B)

HCERES

High Council for the Evaluation of Research
and Higher Education

Research units

In the name of HCERES,¹

Michel Cosnard, president

In the name of the experts committee,²

Stéphane Robin, chairman of the committee

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

¹ The president of HCERES "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 expert committee". (Article 11, paragraph 2)

Evaluation report

This report is the sole result of evaluation by the expert committee, the composition of which is specified below.

The assessments contained herein are the expression of an independent and collegial reviewing by the committee.

Unit name: Unité Sensométrie et Chimiométrie

Unit acronym: USC

Label requested:

Current number:

**Name of Director
(2015-2016):** Mr El Mostafa QANNARI

**Name of Project Leader
(2017-2021):** Ms Évelyne VIGNEAU

Expert committee members

Chair: Mr Stéphane ROBIN, AgroParisTech

Experts: Mr Philippe BESSE, INSA Toulouse

Ms Beata WALCZAK, Université de Silésie, Pologne

Scientific delegate representing the HCERES:

Mr François COQUET

Representative of supervising institutions and bodies:

Ms Marie-Anne COLLE, ONIRIS

Head of Doctoral School:

Mr Hervé PREVOST, Doctoral school n° 495, Végétal, Environnement, Nutrition, Agroalimentaire, Mer

1 • Introduction

History and geographical location of the unit

The “Unité de Sensométrie et Chimiométrie (USC)” has been working for more than 20 years in conceiving, developing and promoting statistical methods applied to sensometrics and chemometrics. It is situated on the ONIRIS campus de la Géraudière mostly involved in food and food processing.

Management team

The unit has been led by Mr El Mostafa QANNARI up to the end of 2015. Since January 1st, 2016, the management is overtaken by Ms Évelyne VIGNEAU.

HCERES nomenclature

ST1-Mathématiques

Scientific domains

Statistical methods applied to sensometrics and chemometrics.

Unit workforce

Unit workforce	Number on 30/06/2015	Number on 01/01/2017
N1: Permanent professors and similar positions	5	5
N2: Permanent researchers from Institutions and similar positions		
N3: Other permanent staff (technicians and administrative personnel)	2	2
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)		
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)		
N6: Other contractual staff (technicians and administrative personnel)		
N7: PhD students	2	
TOTAL N1 to N7	9	
Qualified research supervisors (HDR) or similar positions	3	

Unit record	From 01/01/2010 to 30/06/2015
PhD theses defended	10
Postdoctoral scientists having spent at least 12 months in the unit	
Number of Research Supervisor Qualifications (HDR) obtained during the period	

2 • Overall assessment of the unit

Introduction

USC is a small statistical unit involved in the development of statistical methodology in sensometrics and chemometrics, with a special emphasize in applications to food science.

Global assessment of the unit

The unit's scientific production is very coherent and focused on its two applications fields, which is consistent with both its institutional position and its size. The members of the unit have a very good notoriety in their field, both at the national and international level. Due to the nature of its research, the unit also has strong interactions with various international partners. The scientific production is important with respect to size of the unit, mostly in journals of interface (senso- and chemometrics).

To summarize, the unit fits very well in its academic and industrial environment. The evaluation criteria which would be those of a unit of mathematics or statistics are to be modulated accordingly.

Strengths and opportunities in the context

Thanks to the coherence of the scientific activity and its long-term experience in sensometrics and chemometrics, the unit is one of the best statistical groups involved in this application field at the national level, and highly competitive at the international level. It also responds perfectly to the training needs.

Openings to new areas, such as -omics (more specifically metabolomics) and high-throughput phenotyping are considered by the unit and constitute good opportunities for the unit as they respond to a real need at the present time and because the adaptation of the methodologies developed by the unit to this new kind of data seem feasible with a reasonable effort. In the same vein, the analysis of preference and rank data is also a speciality of the unit, which has become very popular again in the recent years. The network of interactions and collaborations at the national and international level both with academic and industrial partners that has been developed by the unit along time make it in a good position to contribute significantly.

Weaknesses and threats in the context

The scientific production of the unit mainly borrows techniques from exploratory multivariate data analysis (PCA, LDA, PLS, multi-table analyses, etc.). From a mathematical point-of-view, this mostly relies on a strong expertise in linear algebra, with few random ingredients, as opposed to a vast part of statistical techniques. This makes the production very coherent, but may also contribute to a scientific isolation with respect to the rest of the statistical community. Even modest openings to more general techniques from classical statistics (e.g. model based clustering, mentioned in the unit's report) or machine learning (CART, Lasso, also mentioned) would be more than welcome. Parallel to this, research interactions with the university seem a bit weak.

The main risk for the unit within the next contract will be the renewal of its members in view of the preservation of its scientific activity. In the next 5-10 years, several of its members will get retired within a short

period of time. The expertise of the unit obviously responds to a need, which could get lost then. This point needs to be addressed pretty soon, both by the unit and by the institutions it depends on.

Recommendations

- strengthen its scientific position at the interface between statistics and senso- and chemo-metrics. Reinforce its scientific investment in a series of new scientific tracks such as high-throughput phenotyping, -omics data and subjects having a second youth such as preference data analysis. The development of one main package dedicated to senso- and chemo-metrics gathering a series of methods developed by the unit could also help to comfort this position;
- broaden the scope of the statistical techniques mastered by the unit. Increase the number of publications in regular statistical and/or mathematical journals and increase interactions with the university. The last two points will help to increase the notoriety of the unit in the French academic community and can make it more attractive for future recruitment;
- address the question of the renewal of the unit. This has to be considered in close connexion with the institutions in charge (ONIRIS and INRA).