

La spectroscopie proche infrarouge au CRA-W

(non exhaustif ...)

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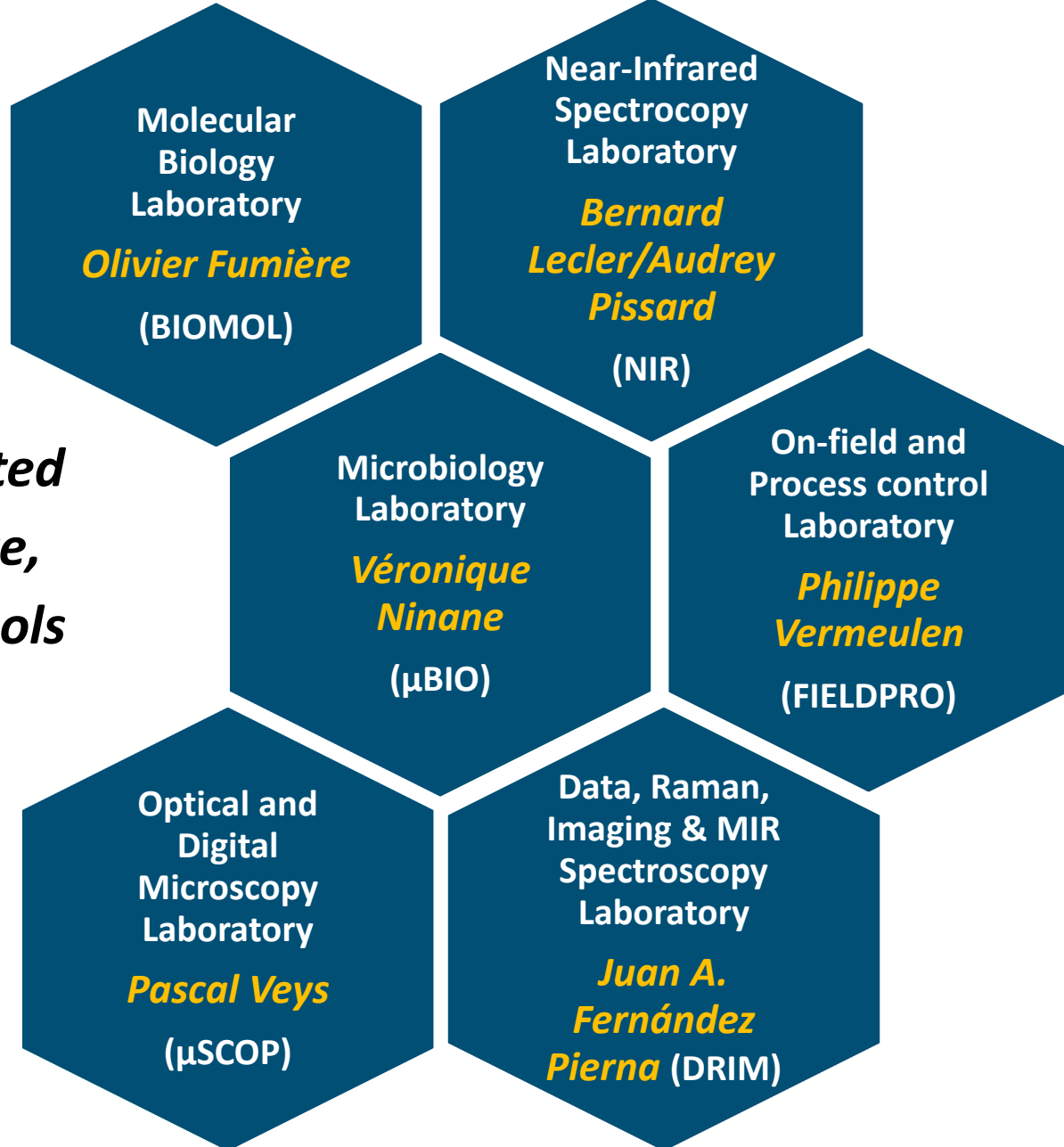
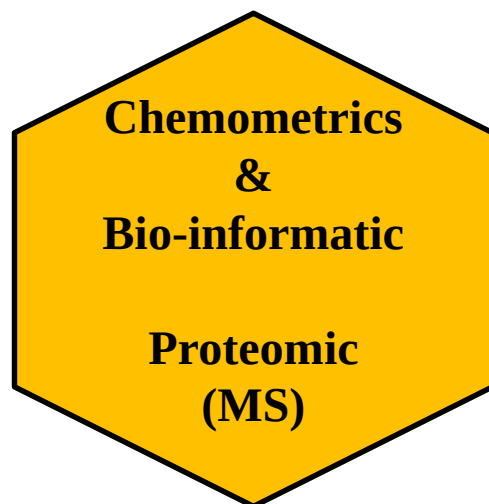


***« An active and innovative
Unit involved in the
development of sustainable
methods to reinforce and
assess the quality and
authentication of
agricultural and agro-food
products »***



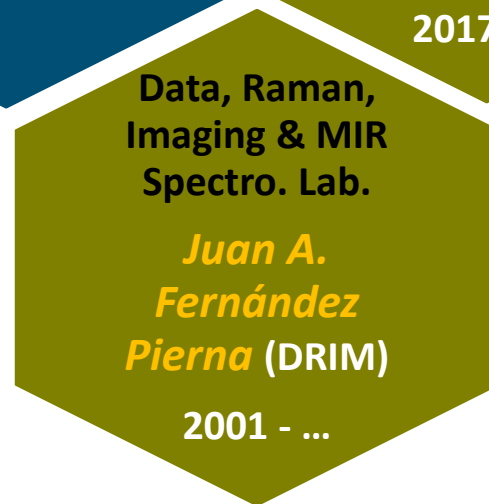
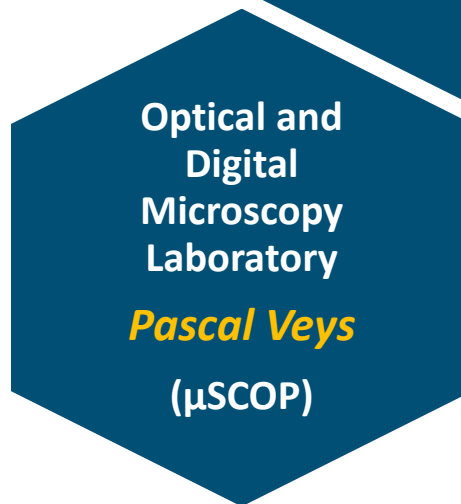
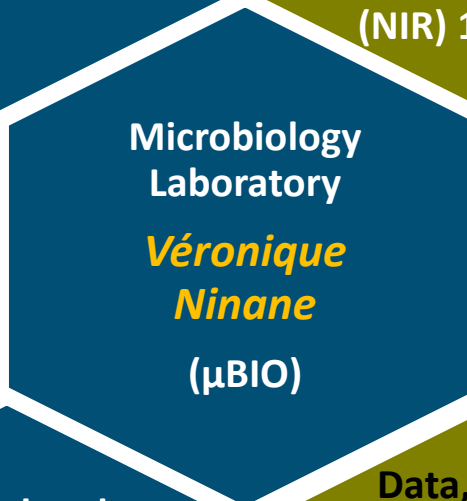
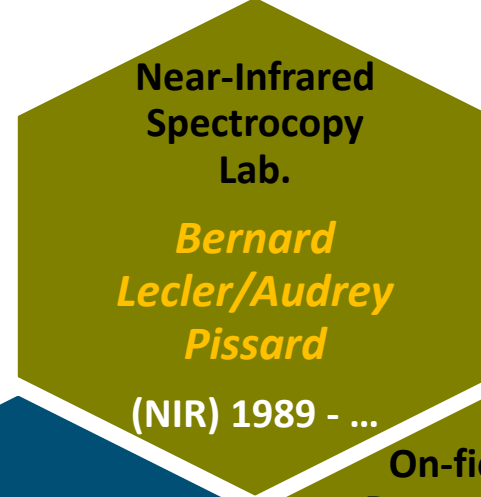
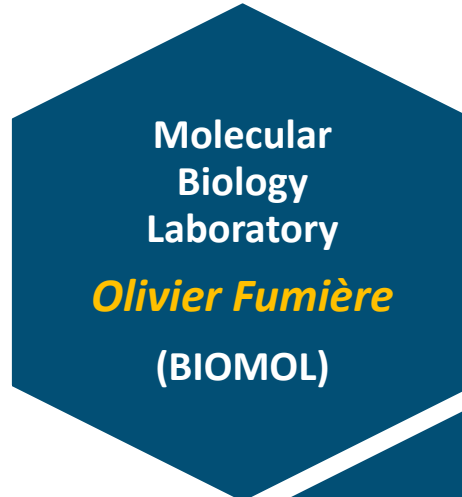
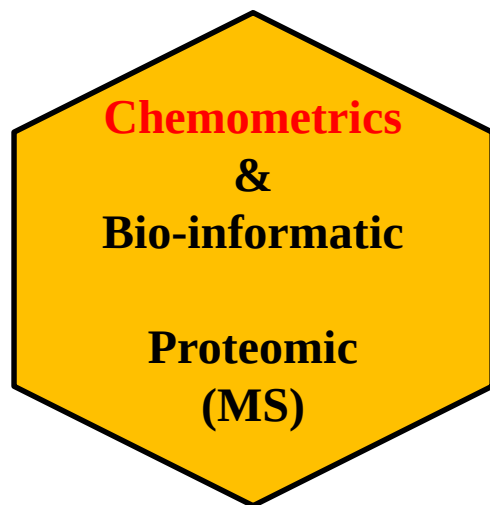
QAP Unit

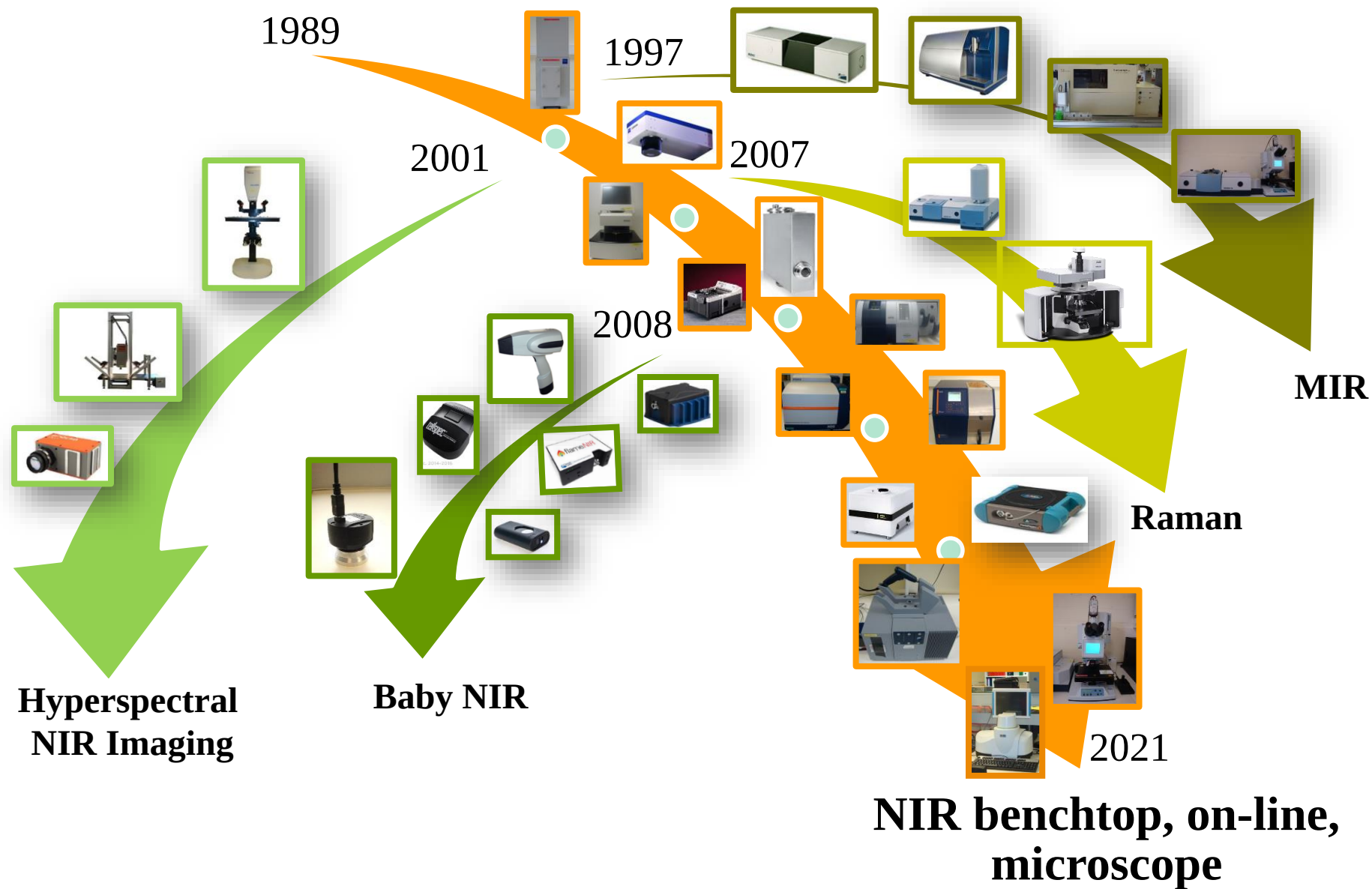
***30 staff members committed
to develop and to validate,
analytical methods and tools***



QAP Unit

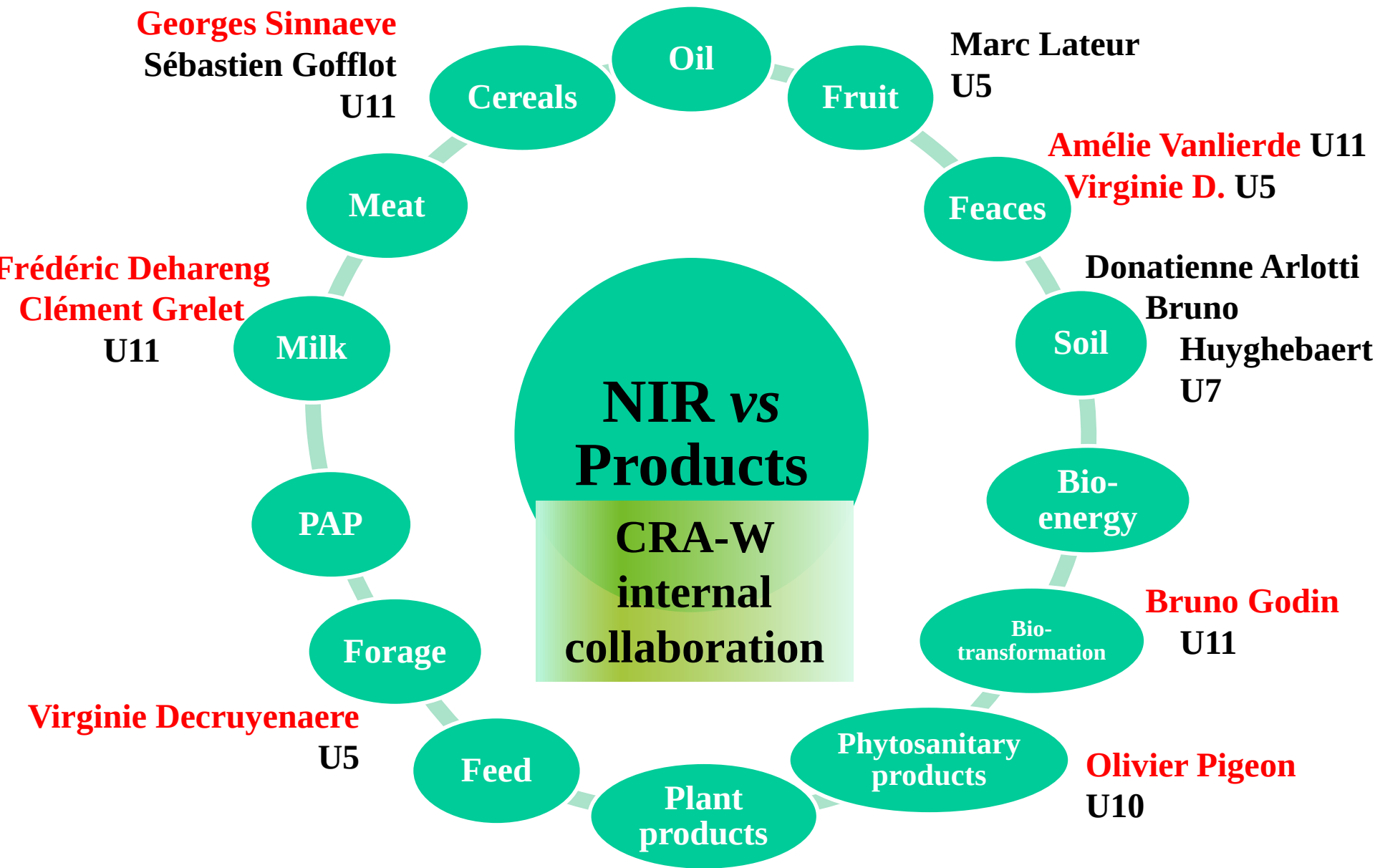
***30 staff members committed
to develop and to validate,
analytical methods and tools***





Quality and authentication of products Unit





4 MAIN RESEARCH FIELDS

PRECISION
AGRICULTURE

PRECISION
LIVESTOCK
FARMING

RISK
MANAGEMENT

UNDERSTANDING
PRODUCTS

**Analysis in the
fields and orchards**

PHENWHEAT
Cereal phenotyping

BEETPHEN
*Sugar beet
phenotyping*

FIRST
Potato phenotyping

INVITE
*Evaluation of
varieties in Europe*

**Analysis in the farm
and in the industry**

EFFORT
Lab Farm

INDIGGES
GHG

ECOAFRICA
IAEA-Feces
*Efficiency of tropical
forages*

**Analysis in the
laboratory**

EURL-AP *
*European Laboratory
for Animal protein*

FARMYNG
Insect meal

ANTAGONIST
*Microbiology
identification*

WBI-MOST
*Contaminants
And Impurities*

**Analysis in the
Laboratory**

LNR-OGM
LNR-Feed Additives

IAEA-Handheld
Baby-NIR

BELCOBRA
Cocoa and Chocolate

DSM
NIR expertise

REQUASUD
NIR network

CADDY-NIR
Food

FERTIWALIM
Bovine Fertility

TERA4ALL - Thz

POLBEES - Bee



INnovations in plant Variety Testing in Europe

<https://www.h2020-invite.eu/>

2019-2024



Research of rapid methods
to select new apple cultivars
presenting high nutritional quality



2 **Develop new phenotyping and genotyping tools** to assess bioindicators related to better adaptation to more sustainable crop management practices and variable climatic conditions; as well as to enhance the speed, accuracy and efficiency of variety testing. (WP2 & WP3)



XDS (FOSS NIRSystems, Inc.)



From laboratory to orchards

From laboratory to field



PhenWheat : A field phenotyping platform for wheat trials

UMONS

LIÈGE université
Gembloux
Agro-Bio Tech



Transition of dairy farming toward a better efficient use of fodder resources



Sampling of corn silage



Corn silage (April 12 2018), red points on silo front represent sampling points.

Sampling of haylage bale



Haylage bale, red points represent sampling points.

Base de données spectrales

- Développement d'une base de données (ProtoSpec) avec 47,393 spectres NIR importés depuis avril 2020
- Facilité de recherche de spectres/appareil/produit/DQ(série d'échantillon)

The screenshot displays the ProtoSpec web application interface. At the top, there is a navigation bar with tabs for 'Products', 'Projects', 'Clients', and 'DQ', and a 'ProtoSpec' label on the right. Below the navigation bar, the 'Search by projects' section is highlighted. It contains a dropdown menu labeled 'Effort' and a text input field labeled 'All year(s) selected'. A red box highlights the 'Effort' dropdown, and an arrow points from it to a text box labeled 'Recherche de spectres IR par projet'. Below this, there is a green section with a search bar containing 'FieldSpec4_CP' and a dropdown menu labeled '94.06 - Maize silage wh'. A red box highlights the search bar, and an arrow points from it to a text box labeled 'Recherche de spectres IR par appareil et par produit'. A 'SEARCH' button is located next to the search bar. To the right of the search bar, there are 'RESET' and 'VALIDATE' buttons. Below the search section, the 'Results' section is visible. It contains a table with the following data:

FieldSpec4_CP					
N°	Level 2	Level 1	Constituent(s)	Number of spectra	Download
1	Fresh silages	Maize silage wh	Const	5700	JDX CSV

The CRAWLSPEC initiative : Spectra Data Base System Project

Historical Data set	#inserted
FEED	84 413
FORAGE	54 572
BRUKER	84 410
Total	223 395

Projets	#inserted
DSM	114 628
Effort	36 071
CaddyNir	4 457
U05Obtention	7 992
Total	163 148

GRAND TOTAL : 386 543

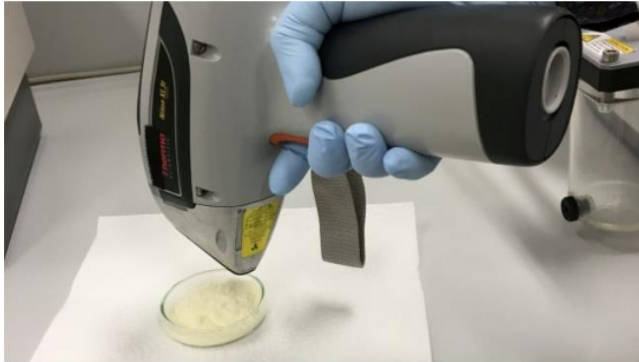
Status 2020

New IAEA Project Looks at Portable Detection Equipment to Help Prevent Food Fraud

2017/21

Vienna, Austria

JUN
9
2017



A new IAEA project looks to enable countries to quickly detect fraud and contamination in milk and vegetable oils with the help of low-cost, portable tools, such as this X-ray fluorescence detector.
(Photo: IAEA)

Related resources

- [Food Safety and Quality](#)
- [Food and Environmental Protection Laboratory](#)
- [Nuclear Instrumentation](#)
- [Coordinated Research Activities](#)



IAEA photo1

Collaboration avec l'Agence Internationale de l'Energie Atomique

Web-based tools for managing spectral data-bases

IAEA | Upload Tool

Wallonie
recherche
CRA-W
Walloon Agricultural Research Centre

International Atomic Energy Agency

Login

Email address

Enter your password

☐ Show password

Login

Forgot your password ?

Welcome to the
IAEA Shared Analytical Data Library
Upload Tool



IAEA
International Atomic Energy Agency

Protocols



Analytical procedure using MicroNIR



Procedure for scanning the milk powder samples

using a Viavi MicroNIR.

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Make the analysis	5
Export the spectral data	6
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Introduction

The aim of this document is to propose a procedure for scanning the milk powder samples using a Viavi MicroNIR. You will find :

- Requirements for the use of the instrument ;
- Explanations on the device preparation before sample analysis ;
- Instructions for the analysis itself ;
- Recommendations for exporting spectral data from the device;
- Guidelines for uploading spectral data using « IAEA Shared Analytical Data Library Upload Tool » web interface.

Take the time to go through the entire document before starting the analyses.

For help and support, please contact

Olivier Minet at p.minet@cra.wallonie.be or Philippe Vermeulen at p.vermeulen@cra.wallonie.be

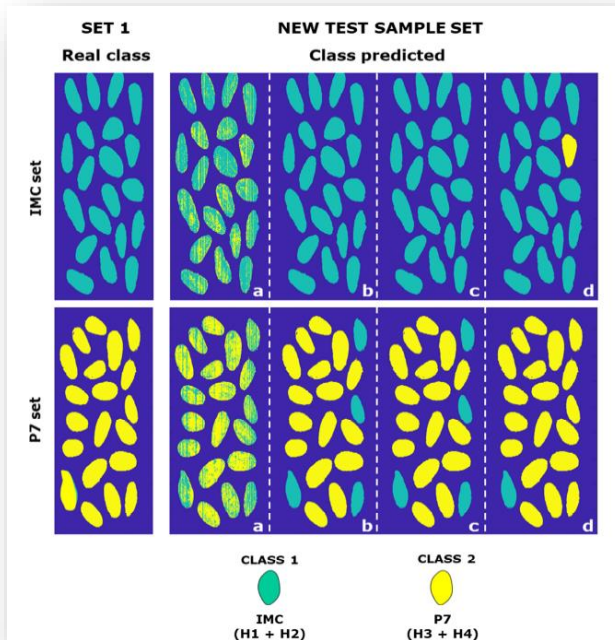
Training boxes



Quality and Authentication of Products Unit (QAP Unit)

Cruz-Tirado, J.P. , Fernandez Pierna, J.A. , Rogez, H. , Fernandes Barbin, D. & Baeten, V. (2020). **Authentication of cocoa (*Theobroma cacao*) bean hybrids by NIR-hyperspectral imaging and chemometrics**. Elsevier : Food Control, 118 : 107445: 1-13.

To benefit from HSI advantages for high throughput analysis : to go to batch segmentation



Need of traceability and authentication tools

BelCobra project : WBI/CAPES

Chemometrics– what's new?

Rapid & specific regression methods

Local Calibration by Percentile Selection (LCPS)
Local Calibration by Customized Radii Selection (LCCRS)

Local PLS based on global PLS scores



Analytica Chimica Acta

Volume 933, 24 August 2016, Pages 50–58



Regression models based on new local strategies for near infrared spectroscopic data

F. Allegrini^a, J.A. Fernández Pierna^b, W.D. Fragoso^c, A.C. Olivieri^a, V. Baeten^b, P. Dardenne^b

Received: 24 October 2018 | Revised: 19 December 2018 | Accepted: 16 January 2019
DOI: 10.1002/cem.3117

RESEARCH ARTICLE

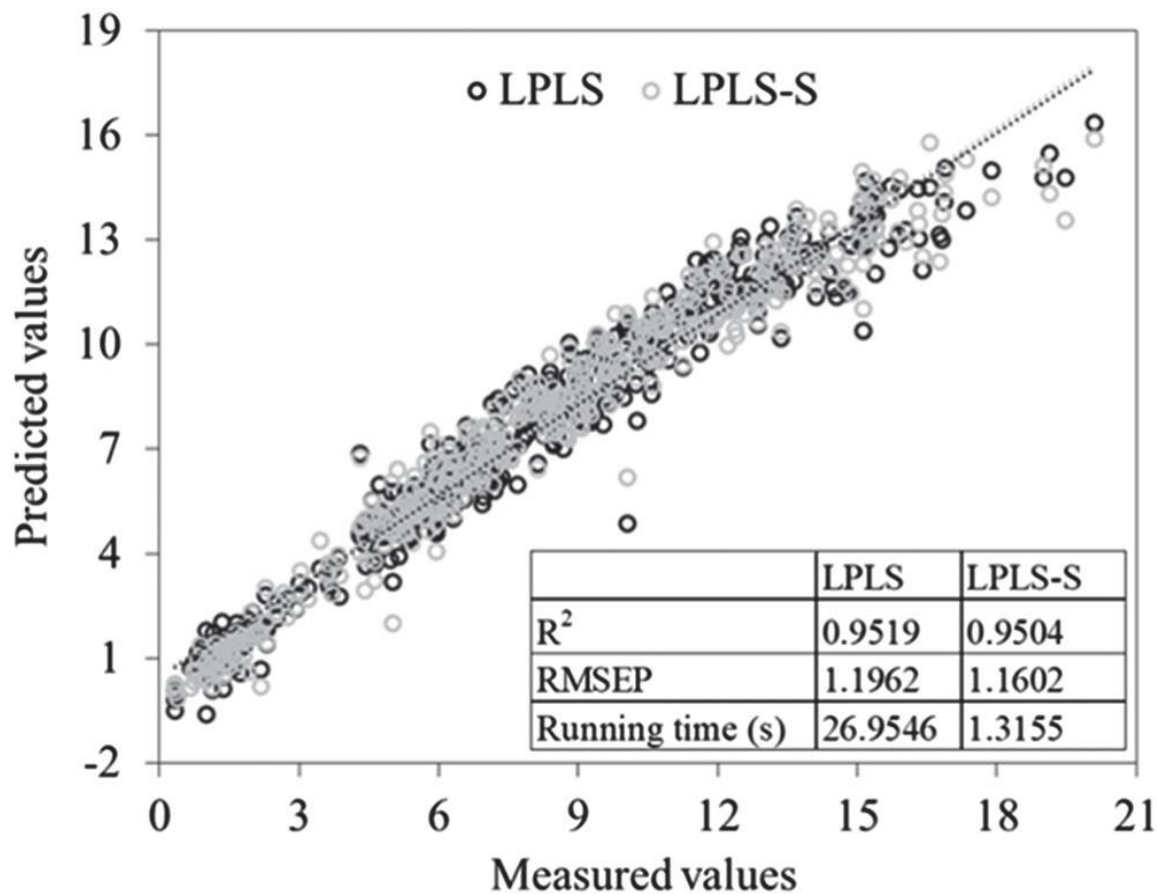
WILEY **CHEMOMETRICS**

Local partial least squares based on global PLS scores

Guanghai Shen^{1,2} | Matthieu Lesnoff^{3,4} | Vincent Baeten² | Pierre Dardenne² |
Fabrice Davrieux^{5,6} | Hernan Ceballos⁷ | John Belalcazar⁷ | Dominique Dufour^{6,7,8,9} |
Zengling Yang¹ | Lujia Han¹ | Juan Antonio Fernández Pierna²

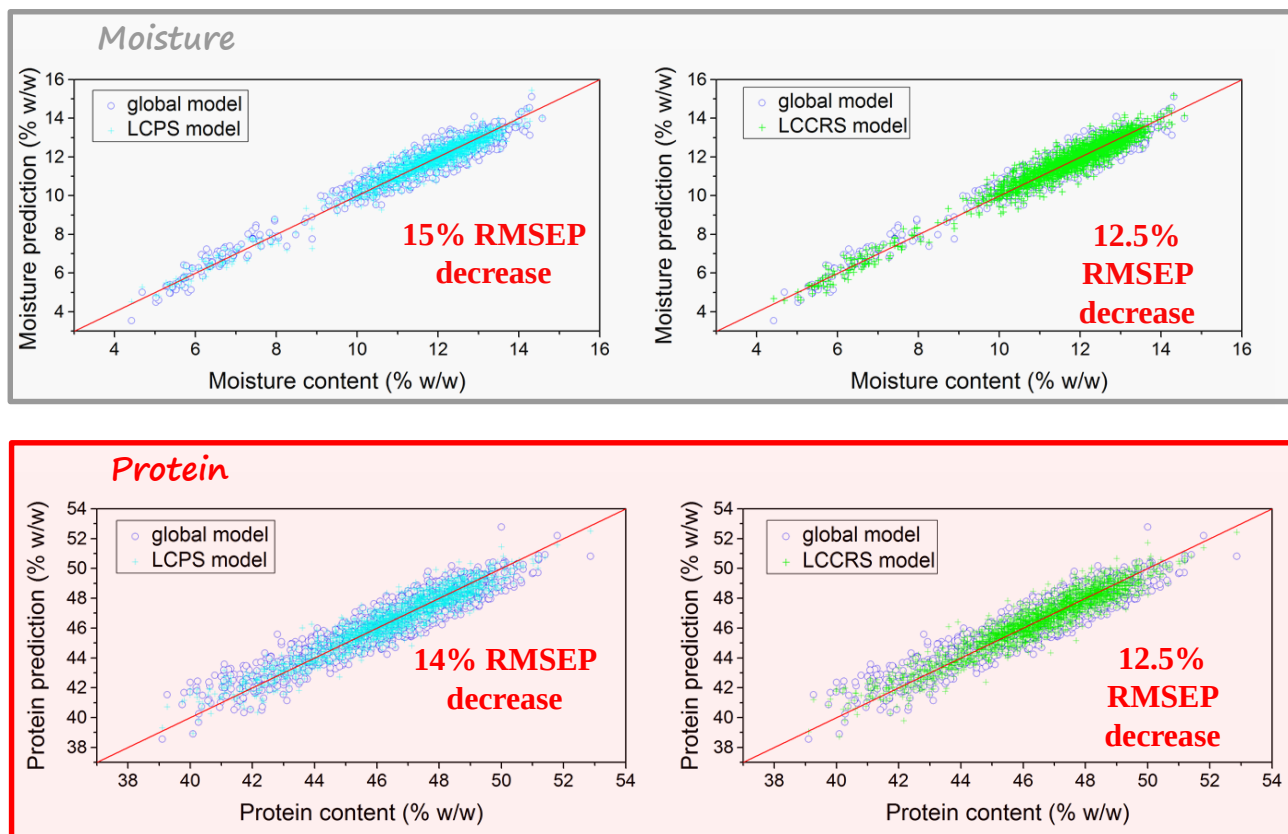
Chemometrics– what's new?

Local regression modelling



Chemometrics– what's new?

Local regression modelling



Target versus untarget



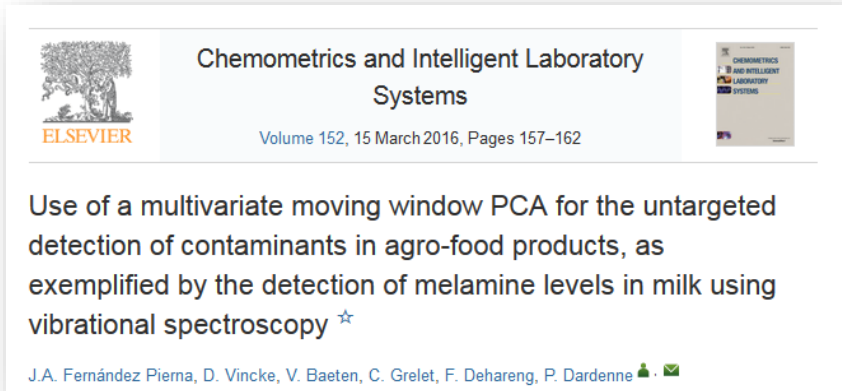
Targeted detection



Untargeted detection

Source : Sørensen et al., The use of rapid spectroscopic screening methods to detect adulteration of food raw materials and ingredients, *Current Opinion in Food Science*. (2016). DOI: [10.1016/j.cofs.2016.08.001](https://doi.org/10.1016/j.cofs.2016.08.001)

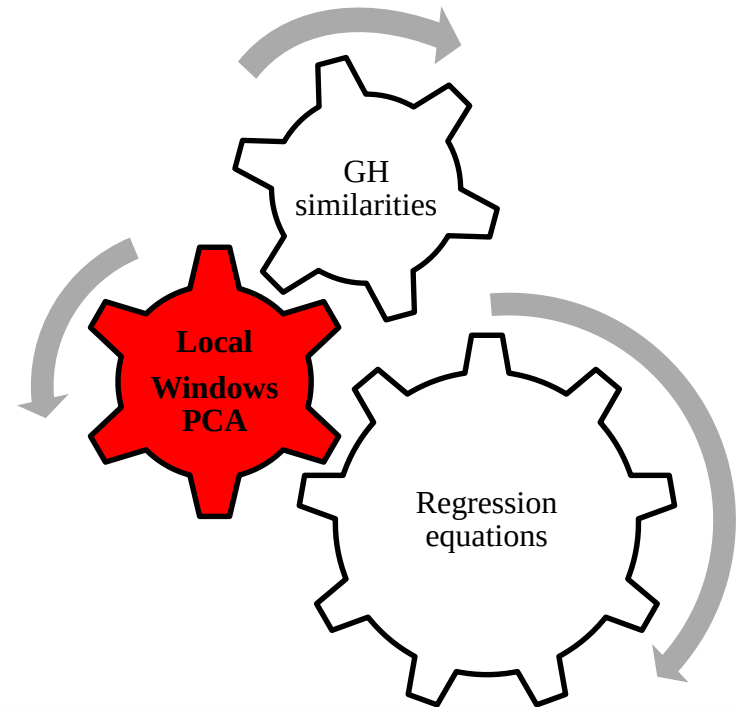
UNTARGETED ANALYSIS



Local Window Principal Component Analysis (LWPCA)



One Class modelling



U12 staff involved in spectroscopy and chemometric : A team at your service

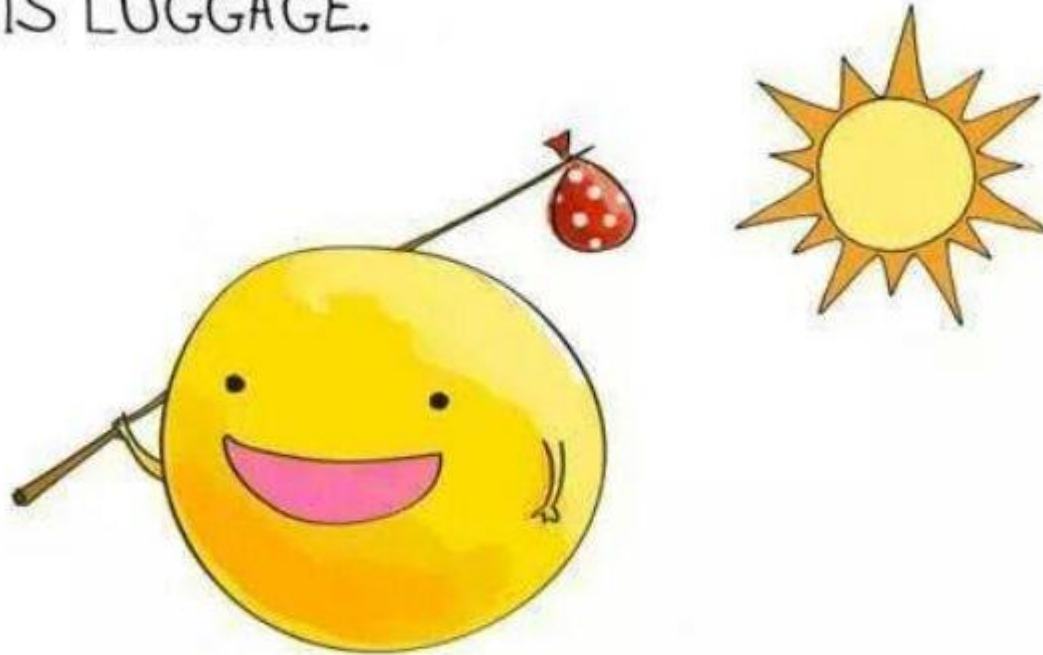
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Lisa Plasman
Quentin Arnould
Nicaise Kayoka Mukendi
Vincent Baeten

With the strong support of Colleagues and Retired Young Seniors

Georges Sinnaeve, Sébastien Gofflot, Virginie Decruyenaere,
Bruno Godin, Donatienne Arlotti, Clément Grelet, ..., Amélie
Vanlierde, Marc Lateur, **Bernard Lecler & Pierre Dardenne**

A PHOTON CHECKS INTO A HOTEL AND
IS ASKED IF HE NEEDS ANY HELP WITH
HIS LUGGAGE.



"NO, I'M TRAVELLING LIGHT."

<https://www.pinterest.fr/pin/72128031508013467/>