

REPORT OF ACTIVITIES

Statistical Methodology and Computing Service

1 September 2022
to 31 August 2023



2022-2023

Statistical Methodology and Computing Service
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Introduction

Introduction

Every year, when I write this section, I wonder about you. Are you an intrigued observer, a university management member, a colleague? Our desire is to better understand your perspectives, which in turn enables us to be more responsive and attuned to your needs. Your engagement with the SMCS is invaluable.

As you can read on the following pages, the SMCS continued under difficult conditions to deliver its services to the university community. I would like to thank all the members of our team for their dedication and creativity during these challenging times.

Christian Ritter,
president of the management committee.

It's true that 2022-2023 has been a year of ups and downs for SMCS...

In terms of services, nothing seems to have changed, **we have continued to provide our services, and volumes have remained similar to before** (580 consultancies, 160 training days, 650 participants, 80 users of our statistical application servers). However, the year was not without its ups and downs. We had to cope with a **wage increase** of over 10%. On top of that, the fact that the **actual volume of our core services** to the university (unbilled services) in the field of consulting and training far exceeded the regular budget allocation of 3 full-time equivalents (it reached 5.5 FTEs). The only way to break even in such a situation was to work over 100% to generate sufficient funding... The heavy workload and sense of uncertainty associated with this situation led some members of our team to seek more stable employment elsewhere. As a result, **our team of consultants went from 8 full-time equivalents to 5.5** in one year...

These changes have forced us to take a step back and reflect. Together, we set out a series of measures, endorsed by the Management Committee, with the following objectives: **The challenge for 2023-2024 will be**

to reduce the scope of our core services while maintaining service quality, fostering excellence in research, and ensuring that our consultants can thrive in a quality work environment.

In terms of training, in 2023-2024 we will be launching **distance learning courses** that can be taken on demand. This would enable us to support researchers with their requests for advice and basic training, without it being too time-consuming for the SMCS consultants. The SMCS will therefore reduce the number of training courses it offers but will provide videos for a full year after a course has been set up. This will allow us to broaden our range of courses and, above all, meet a real need expressed by the researchers: having year-round remote access to our training courses.

On the consulting front, we will need to structurally **accelerate the funding** of our services for the time-consuming support provided by our consultants. This is not a change in policy, but rather the implementation of a policy outlined in our ROI since the creation of SMCS. Time-consuming support is not part of what we call standard services and must be financed by research projects or entities. For some institutes with a very large number of consulting requests, additional levers will undoubtedly have to be found. The coming year will be an opportunity to think concretely about what we can do to ensure that the SMCS consultants can once again flourish in a quality working environment.

With these changes in place, the next step will be to ensure that the measures taken continue to bear fruit, enabling us to consider recruitment and thus rebuild the team while maintaining the new balance found.

I'm convinced that the measures we've taken will benefit everyone - the researchers, our external customers and our team. My sincere thanks go to the **formidable team of consultants** who, through their human and professional qualities, make the SMCS a unique service of which the university can be proud!

And you! Thank you for your support and collaboration!

Nathalie Lefèvre, Director

People and organization



People and Organization

MANAGEMENT AND ADMINISTRATION

Director: Nathalie Lefèvre

President of Management Committee: Christian Ritter

Administrative coordinator: Nancy Guillaume

Communications and Quality Manager: Marie-Pascale Cosse

Administrative support: Tatiana Regout

MANAGEMENT COMMITTEE

The management committee (comité de gestion) met twice. The Fall meeting has focused on long term planning whereas the Spring meeting has concentrated on finances, project accounting, and short-term planning.

President: Christian Ritter

Director: Nathalie Lefèvre

SSH representative (LIDAM institute): Catherine Legrand

SSS representative (IRSS institute): Niko Speybroeck

SST representative (ELI institute): Marnik Vanclooster

Representative of research activities (ISBA): Michel Denuit

Representative of training activities (LSBA): Anouar El Ghouch

Associate consultant academic representative:
Bernadette Govaerts

Consultant representative: Aurélie Bertrand

With consultative voice:

Administrative coordinator: Nancy Guillaume

Representative of external activities: Antoine Froidure
(St Luc)

Representative for each University entity with which the platform has IT collaborations: Thomas Keutgen for CISM and Laurent Buset for SGSI

USER COMMITTEE

The user committee is a precious relay: relaying the needs of the users of their entities to the SMCS and relaying the services offered by the SMCS within their entities.

Bruno Masquelier (IACCHOS), Magali Paquot (IL&C), Gordy Pleyers (LOURIM), Françoise Muller (INCAL), Michael Andres (IPSY), Cécile Bonmariage (ISP), Pierre Baudewyns (ISPOLE), Frédéric Vesentini (JUR-I), Michael Andres (IoNS), Annie Robert (IREC), Vincent Lorant (IRSS), Laure Elens (LDRI), Laurent Gatto (DDUV), Nicolas Schtickzelle (ELI), Jean-Charles Delvenne (ICTEAM), Tom Leyssens (IMCN), Vincent Destoop (IMMC), Andrea Giammanco (IRMP), Sergio Altomonte (LAB), Isabelle Donnay (LIBST), Vincent Vandenberghe (LIDAM), Nathan Lassance (LIDAM-Mons), Françoise Docq (ADEF), Patrick Watrin (CENTAL), Damien François (CISM), Laurent Buset (SGSI)

PEOPLE

The year 2022-2023 was marked by the departure of several consultants: Vincent Bremhorst has left UCLouvain and Aurélie Bertrand has secured a stable position as 50% data analyst at LIDAM. We wish them every success in their new role. Aurélie Bertrand now works as a data analyst for both the SMCS and LIDAM. Two of our other consultants, Séverine Guisset and Lieven Desmet, will be in a similar situation from Septembre 2023, with one foot at the SMCS and one at IRSS, where they have each secured a stable 50% position as data analysts. The SMCS is delighted to be able to forge close links with these entities.

People and organization

Consultants



Aurélié Bertrand (UCLouvain/LIDAM/SMCS – 0.5 FTE and UCLouvain/LIDAM – 0.5 FTE)

Main areas of activity: Human Sciences Sector (SSH), specific projects in collaboration with the Institute of Statistics, Biostatistics and Actuarial Sciences.

Doctorat en Sciences – Statistique (UCL, 2017)

Master en statistiques, orientation générale, à finalité spécialisée (UCL, 2011)

Bachelier en Ingénieur de gestion (UCL, 2009)

Vincent Bremhorst (UCLouvain/LIDAM/SMCS – 1 FTE – until April 2023)

Main areas of activity: Human Sciences Sector (SSH) and University Administration, bayesian support.

Doctorat en Sciences – Statistique (UCL, 2017)

Master en statistique (ULB, 2011)

Bachelier en mathématique (ULB, 2009)

Céline Bugli (UCLouvain/LIDAM/SMCS – 0.8 FTE)

Main areas of activity: Medical Sector (SSS), services for external clients.

Doctorat en Sciences – Statistique (UCL, 2006)

Master (DEA) en statistique (UCL, 2003)

Ingénieur Civil en Mathématiques Appliquées (UCL, 2001)

Benjamin Colling (UCLouvain/LIDAM/SMCS – 1 FTE)

University Administration

Doctorat en Sciences – Statistique (UCL, 2017)

Master en Statistique (UCL, 2011)

Master en Mathématique (UCL, 2010)

Lieven Desmet (UCLouvain/LIDAM/SMCS – 0.95 FTE)

Main area of activity: Health Sciences Sector (SSS).

Doctor of Sciences, orientation statistics (KUL, 2009)

Master in Mathematics (VUB 2004)

Master in Applied computer sciences (VUB, 1999)

Alain Guillet (UCLouvain/LIDAM/SMCS – 1 FTE)

Main areas of activity: Medical Sector (SSS), and statistical computing.

Master professionnel Sciences, Santé, Technologie, mention Mathématiques et Applications, spécialité Ingénierie Mathématique (Université de Nantes, 2005)
DEA en informatique (Université de Nantes, 2004)

Séverine Guisset (UCLouvain/LIDAM/SMCS – 0.8 FTE)

Main areas of activity: Human Sciences Sector (SSH), Medical Sector (SSS), survey support, services for external clients.

Master en statistique (UCL, 2017)

Master in European Studies (King's College London, 2007)

Diplôme de l'Institut d'Etudes Politiques de Strasbourg (Université Robert Schuman, 2006)

Nathalie Lefèvre (UCLouvain/LIDAM/SMCS – 0.5 FTE and UCLouvain/IPSY – 0.5 FTE)

Main areas of activity: Human Sciences Sector (SSH) and University Administration.

Master en Statistique (UCL, 2007)

Doctorat en Sciences psychologiques (UCL, 2003)

Licence en Psychologie et en Sciences de l'Education, orientation psychologie expérimentale (UCL, 1992).

Manon Martin (UCLouvain/LIDAM/SMCS – 0.2 FTE, UCLouvain/LIBST – 0.5 FTE and UCLouvain/ELI – 0.3 FTE)

Main areas of activity: Science and Technology Sector (SST)

Doctorat en Sciences – Statistique (UCLouvain, 2020)

Master en Statistique (UCL, 2014)

Master en Bioingénieur, orientation économie agricole (UCL, 2012)

Catherine Rasse (UCLouvain/LIDAM/SMCS – 0.8 FTE)

Main areas of activity: Science and Technology Sector (SST).

People and organization

Master (DEA) en Statistique (Gembloux, 2007).
Ingénieur agronome, orientation Génie rural (Gembloux, 2001).

ASSOCIATED CONSULTANTS

Associated consultants are professors or consultants who collaborate with the SMCS on trainings and consulting projects but who are not formally SMCS staff.

Professors

Michel Denuit (LIDAM/ISBA), Sébastien de Valleriola (ICHEC), Thomas François ILC/PLIN), Laurent Gatto (DDUV), Bernadette Govaerts (LIDAM/ISBA), Vincent Lorant (IRSS), Catherine Legrand (IDAM/ISBA), Bruno Masquelier (IACCHOS), Eugen Pircalabelu (LIDAM/ISBA), Christian Ritter SC/LSBA), Bruno Schoumaker (IACCHOS), Nicolas Schtickzelle (ELI), Sébastien Van Bellegem (LIDAM), Vincent Vandenberghe (LIDAM/IREs).

Consultants at other institutes

Aurélié Bertrand (SSH/LIDAM), Jonathan Dedonder (SSH/IACCHOS), Nathalie Lefèvre (SSH/IPSy), Manon Martin (SST/LIBST, ELI), Jérôme Ambroise (SSS/IREC), Aline van Maanen (Institut Roi Albert II - Cancérologie et Hématologie), Axelle Lorient (SSS/DDUV), Valérie Dormal (SSS/CICN) and soon Lieven Desmet (SSS/IRSS), Séverine Guisset (SSS/IRSS).

RESEARCHERS AND RESEARCH ASSISTANTS

Some researchers and doctoral students of the ISBA participate in the consulting and training activities of the SMCS. This gives them an opportunity to gain valuable experience in practical statistics.

INTERNS AND JOBISTS

Elise Bertrand began an internship in April 2023 that will continue into 2023-2024. This year, Elise has carried out programming in R and SAS as part of UCLouvain's internal projects.

Two jobists, Laure Meniodem Delioté Keline and Madeline Vast worked for several months on SMCS projects. Laure was involved in estimating the number and capacity of heat pumps in Wallonia for the 2030/2050

timeframe while Madeline has carried out analyses of metabolomic and/or biochemical data.

TRAINERS AND CONSULTANTS

The following list gives the names of the people who contributed this year to the training and consulting activities of the SMCS. This includes SMCS and associated consultants, other members of the ISBA, visitors, and external trainers.

Aurélié Bertrand (SMCS), Vincent Bremhorst (SMCS), Céline Bugli (SMCS), Benjamin Colling (SMCS), Jonathan Dedonder (IACCHOS), Morine Delhelle (ISBA), Lieven Desmet (SMCS), Valérie Dormal (CICN), Laurent Gatto (DDUV), Bernadette Govaerts (ISBA), Alain Guillet (SMCS), Séverine Guisset (SMCS), Fanny Hoogstoel (ISBA), Alexandre Jacquemain (ISBA), Chikeola Ladekpo (ISBA), Eric Lecoutre (WeLoveDataScience!), Nathalie Lefèvre (SMCS), Lise Léonard (ISBA), Stéphane Lhaut (ISBA), Oscar Liessens (IRSS), Axelle Lorient (DDUV), Manon Martin (LIBST, ELI, SMCS), Charles Guy Njike Leunga (ISBA), Catherine Rasse (SMCS), Christian Ritter (LSBA), Christophe Robyns (Agilytic), Antoine Soetewey (ISBA), external experts.

SPONSORING

We are grateful to Agilytic, Cream Consulting and Micropole for their support in the organization of our Junior Data Analyst certificate.

Training

Training

Training is one of our main missions. In general, we focus on practical statistical training and the use of statistical software in ways that are not covered by regular university courses. The number of training courses we organize each year remains very high, too high for the size of our team. Let's not forget that our university funds the equivalent of 1 full-time position (1 FTE) to set up the training courses for researchers. Overall, the training activity of the SMCS occupies about 3 full time staff equivalents (FTE). 2.7 FTE of this effort are directly oriented towards the UCLouvain research and teaching units. Out of 48 training courses, 46 involved UCLouvain members (corresponding to 151 training days or 986 hours, counting only classroom time and not preparation).

The coming academic year will be an opportunity to refocus our activities and reflect on how we can offer fewer training courses while still providing a service that meets UCLouvain's internal needs. As a result of our efforts, a partnership has been established between Instats and UCLouvain. Next year, we will be offering **online training** with Instats. These courses will be recorded and can be watched on demand by UCLouvain members for an entire year. This will enable us to organize fewer training courses while offering an enhanced service that meets the needs of researchers.

A final point of attention concerns customized trainings for specific audiences. Every year, the SMCS organizes trainings at the request of UCLouvain researchers. These courses take a long time to organize, and even if some institutes fund them, it doesn't come close to covering the time invested. Each year, the IPSY institute funds €800 to set up a new training course requested by its researchers. This amount covers an investment of 10 hours. This is far from enough, given that the trainings are often advanced. We'll also have to look into financing solutions for this type of service in the future.

The SMCS offered the following types of training during the year:

- **Regular SMCS trainings:** 2-3-day courses (once or twice per year) on commonly used statistical and associated software at UCLouvain (SPSS, R, JMP, Stata, NVivo, Excel, Limesurvey).

The SMCS offers many trainings about R, some as an initiation to the R language and others more advanced. Some trainings are organized to respond to users' requests. Some trainings organized to respond to user requests thereafter become Regular SMCS trainings. For example, the R training, *"Generalized Linear Mixed Models using R"*.

- **Customized trainings for specific audiences** (UCLouvain and external). Examples: *"Modèles multi-niveaux avancés avec SPSS"* or *"Basic concepts and practical applications of Bayesian statistics"* (organized in collaboration with IPSY but open to everyone), *"Analyse de données Omics sur base de techniques multivariées avec R"* (organized for and funded by GSK but open to UCLouvain researchers).
- **University certificate.** In collaboration with the LSBA, the SMCS is also involved in and/or coordinate university certificates. This year, 3 certificates were organized: *"Certificat universitaire en Analyse de données appliquées en R&D - Niveau de base"* + *"Niveau avancé"* and *"Certificat universitaire en Junior Data Analyst - Formule modulaire"*.
- **Summer/Winter School:** A one-week in-depth training on an advanced topic given by invited speakers who are specialists in the field. The specificity of the program was to propose, besides courses, some social activities which have been greatly appreciated by the participants. No summer/winter schools were organized during the academic year.
- **Seminars and Lunch sessions (Midis du SMCS):** short (1-3h) informal demonstrations of statistical methods or software of particular practical interest.

Training

Before detailing our training activities by sector, it is worth remembering that most of our training courses are aimed at UCLouvain members (46 out of 48), the remainder being aimed at external customers, such as "FOREM" and a number of private companies and public administrations.

The trainings given to external clients are designed to meet three objectives. First, they are a part of our mission of service to society. Second, they allow us to develop new course modules for internal use, such as the FOREM training, which has enabled us to assemble an entire course portfolio in bioinformatics and to provide new accredited certificates. These course modules can then be offered to members of the life and health sciences groups in SST, SSH or SSS. Third, but not least, they allow us to generate financial resources to have enough funds for our staff members not financed by UCLouvain. Of course, we have to be careful when choosing and organizing these training courses, in order to ensure that they have a positive payoff (financial and otherwise).

Of the 46 training courses organized for UCLouvain members, 8 are new programs and 14 were given in English. We will continue to offer many of our training courses in English each year, but for the more advanced courses, participants generally prefer to be taught in their mother tongue. Of the 50 training courses initially scheduled, 4 (6.5 days) had to be cancelled because there were not enough participants. A personalized coaching solution was offered to participants who had registered. Based on our experience over the past two years, some of our training courses will only be available upon specific request.

Here are the attendance statistics for our training courses:

Table 1 shows that the SMCS organized 48 courses in the academic year 2022-2023 for 159,5 teaching days.

Table 1. Global statistics on SMCS trainings

	20/21	21/22	22/23
Courses	46	51	48
Course Days	189	193	159.5
Participants UCLouvain	524	583	593
Person-Days* UCLouvain	2106.5	1983	1684
Participants Ext	138	72	57
Person-Days* Ext	287.5	366	159.5

**Total effective number of training days: for instance, 9 people attending 2 training days is equivalent to 18 person-days.*

Table 2 shows the number of participants from the three sectors. Table 3, Table 4 and Table 5 show the origin of participants from respectively SSH, SSS and SST sectors.

Table 2. Number of participants per sector

	20/21	21/22	22/23
SSH	196	173	183
SSS	134	160	186
SST	81	124	89
Students	110	118	119
Central services	3	8	16

The observed fluctuations between years and sectors reflect natural variation and the organization of special events.

The statistics training program reaches the entire SSH sector. The high participation of IPSY and IACS-SPLE-ESPO are explained by specific seminars or training requested by these entities. The concerning trainings are often organized in collaboration with associated consultants coming from these entities. However, these trainings remain open to all.

Training

Table 3. Origin of participants from the Human Sciences Sector (SSH)

	20/21	21/22	22/23
SSH	232	226	263
IACS-SPLE-ESPO	60	42	47
ILC	27	32	19
LOURIM-LSM	23	18	20
LIDAM	29	28	16
INCAL-FIAL	8	3	6
IPSY-PSP	47	45	70
JURI-DRT		3	4
RSCS-TECO	2	2	1
Students	36	53	80

In the health sciences sector courses were also followed by participants from a wide range of institutes. Many clinical researchers find it difficult to attend longer trainings due to their appointment schedules at the university clinics. We updated the training format to take this particularity into account and are organizing sessions on the Woluwe campus (6 training sessions this year).

Table 4. Origin of participants from the health sciences sector (SSS)

	20/21	21/22	22/23
SSS	141	180	194
ASS			5
DDUV	3	23	38
IONS	56	45	53
IREC-MEDE-FSM	40	48	38
IRSS-FSP	15	19	16
LDRI-FASB	18	23	32
Clinics	2	2	4
Students	7	20	8

In the science and technology sector courses were also followed by participants from a wide range of institutes.

Table 5. Origin of participants from the science and technology sector (SST)

	20/21	21/22	22/23
SST	148	169	120
AST			1
AGRO	3	2	3
ELI	49	64	34
ICTEAM-EPL	3	3	2
IMCN		2	5
IMMC	5	15	13
IRMP	1		
LAB-LOCI	8	28	8
LIBST	10	9	23
LIDAM	2	1	
Students	67	45	31

A note to close this section: The SMCS is also regularly invited to sessions organized by other entities and these presentations are not included in the training statistics.

Consulting

Consulting

Consulting is another of our main missions. We help researchers, administrators, and external clients in collecting meaningful data and in interpreting them.

Whenever possible, we provide methodological support to enable our clients to solve their problems by themselves. Our support can just be a piece of advice or short-term assistance. This type of consulting is pre-paid by the financial contribution of the sectors up to 1 FTE but it actually requires about 1.8 FTE. The activity reports shows that the team offers too many services for the funding SMCS receives from the university.

Once again, the coming academic year will be an opportunity to refocus our activities and, above all, to apply more systematically the policy defined by our internal regulations. The latter stipulates that for projects requiring more time, funding must be provided by the researcher or entity concerned. The consulting thereby evolves into a “*collaboration*”.

We should move more quickly and systematically to a fee-based service for cases that go beyond short-term advice or assistance, although we are already developing this type of collaboration when the complexity or volume of statistical work requires the SMCS consultant to devote a lot of time to a project. This type of support, fairly stable compared to previous years, corresponds to 3129 hours and more or less 60% of these hours were spent on internal projects (1214 hours for external projects and 1915 for internal one's). Remember that SMCS consultants can not develop external collaborations when they are involved in internal projects. However, some internal projects are still funded by external partners, such as a research project with CluePoint (see the section on larger projects).

Overall, the consulting activity of the SMCS occupies about 4.8 full time staff equivalents (FTE). 3.7 FTE of this effort is directly oriented towards the UCLouvain research, teaching and administrative units, the remainder towards external clients.

Table 6. Origin of consulting projects

Client split	20/21	21/22	22/23
Research	495	538	538
Educational project	5	8	6
Admin. services	21	22	17
External clients	33	28	22
Total	554	596	583

From 1 September 2022 to 31 August 2023, the SMCS worked on 583 projects of which 561 came from UCLouvain. As expected, most of the projects are linked to university research. Some larger projects involving the university administration, or the schools or institutes and external clients are presented in the section “Larger projects”.

The following tables present the breakdown of the project origins in the three university sectors. They clearly show that the SMCS services reach almost all areas of research at UCLouvain. Even if each request counts for one unit in the table, some of them can represent up to 350 hours of work.

Table 7 (SSH) shows that the number of requests from the Human Sciences Sector goes over the 200 requests this year (1551 hours of work this year). As in previous years, the institute and the school of psychology had by large the highest share. In this respect, particular attention should be paid to the IPSY institute, which already has a part-time statistical consultant, but for support corresponding to full-time work (the statistician involved in IPSY is Nathalie Lefèvre, also director of SMCS). The next academic year will be an opportunity to see how best to ensure that IPSY researchers receive the support they need, without overburdening the IPSY statistical consultant or the SMCS. IACCHOS and LIDAM also have an internal specialist for data questions matters (Jonathan Dedonder for IACCHOS and Aurélie Bertrand since February 2023), who is also associated member of the SMCS. Besides IPSY with particularly high activity, requests came from almost all units of this sector.

Consulting

Table 7. Origin of consulting requests from the Human Sciences Sector (SSH)

	20/21	21/22	22/23
SSH	182	193	203
Cross-disciplinary	3	1	
IACCHOS-ISPOLE-ESPO	33	22	14
ILC-INCAL-FIAL-ISP	20	37	34
IPSY-PSP	96	100	112
JURI-DRT	4	2	2
LOURIM-LSM	11	10	14
LIDAM	15	20	27
RSCS-TECO		1	

Table 8 (SSS) shows that the number of requests from the Health Sciences Sector fluctuates around 200-240 requests per year (1051 hours of work this year).

Table 8. Origin of consulting requests from the health sciences sector (SSS)

	20/21	21/22	22/23
SSS	206	239	238
ASS-Cross-disciplinary	1	1	4
DDUV	2	6	7
FASB	3	4	2
FSM	13	15	5
IONS	49	56	65
IREC	54	52	62
IRSS-FSP	28	40	38
LDRI	14	14	13
MEDE	37	42	38
Clinics	5	9	4

Table 9 (SST) shows that the number of requests from the science and technology sector fluctuates around 90-120 requests per year (527 hours of work this work). We can notice those figures are stable. The number of hours worked and the number of requests in ELI account for about 40% of the SST support, other requests came from almost all units of this sector.

Table 9. Origin of consulting requests from the science and technology sector (SST)

	20/21	21/22	22/23
SST	121	121	108
AST-Cross-disciplinary	4	1	2
AGRO	8	14	7
ELI	53	51	48
ICTEAM-EPL	1	2	3
IMCN			
IMMC	19	14	12
LIBST	25	26	15
LIDAM	3	1	
LOCI-LAB	3	4	11
SC	5	8	10

Our main consultant for the science and technology sector (SST), Catherine Rasse, also continues to be a member of an ethics committee related to experimentation on animals. And Manon Martin is in charge of the sector's bioinformatics projects, more specifically from ELI and LIBST.

Finally, **14 projects** also originated from the central administration (AC, AS, SGSI, BIUL). In recent years, support to central administration and administrative services in general was particularly high, with a total of 903 hours of work this year. This is explained first of all by the establishment of a new collaboration between SASP and SMCS on an institutional project to monitor success in BAC and MASTER.

The statistics shown above do not present in details large-scale internal and external projects documented in a later section of this report.

Computing

Servers and Statistical Software

The SMCS has two servers dedicated to statistical computing managed in collaboration with the CISM. There also is one with the SGSI on several activities to reduce barriers to using appropriate statistical software for university members. The computing activities require about 0.5 FTE.

STATISTICAL COMPUTING SERVER

We renewed the system in October 2019. Our current two performance servers are based on a dual Intel Xeon Gold 6144 processor with 192 GB of RAM and an SSD disk for the SAS temporary folder. The CISM (UCLouvain's high performance computing platform) hosts this server system and its storage and is in charge of the operating system and the user management. The SMCS takes care of the statistical software on these machines. Currently, SAS, R and Stata-MP4 are available.

The statistical computing server has about 80 users. People from LIDAM and IACCHOS are the main users of this service (the table on the following page provides more details about the users of the two servers). We can divide users into two categories: people who want to use SAS for free in the Big5-STAT project and people in need of a high-performance computer mainly for the three installed software packages (large RAM and multi-processors version). The average CPU charge was 30% on smcs1 and 25% on smcs2 with spikes (100% for smcs1 and 100% for smcs2) occurring when users execute paralleled programs in Stata or R. We observe lately a decrease of the CPU demand that could be explained by more and more R users using the CECI infrastructure to have greater capacity for parallelisation.

More data analysts at UCLouvain should consider using this server system. It offers more performance, storage, and data security than local PC-based systems and is a good first step before using bigger HPC infrastructures like Manneback or Lemaitre3.

UDS

UDS is a service provided by the SGSI that allows users who asked for an access to use software without having it

on their computer. It works through a web browser.

It is possible to add software to UDS. Who pays for it will depend on many criteria so you should send an email to service-desk@uclouvain.be to have more details.

AVAILABLE SOFTWARE

Via the Big5-STAT initiative, any UCLouvain member can request the installation of or the access to one or several of the five most used statistical software packages, R, JMP, SAS (via Enterprise Guide), SPSS, and Stata. The request should be made via the "Centre de logiciels" for Windows users or via Munki for MacOS users except for SAS that requires to contact the Service des. More and more UCLouvain members use this service but there still are too many university members who don't know about it and buy software they could get for free. The most asked software was SPSS far before Stata which also is far from JMP and R (but everybody can install R for free from internet even without administrator rights). The least demanded software is SAS even counting SAS and SAS Enterprise Guide together.

High performance solutions in SAS, R and Stata (multi-processor) are available on the two statistical computing servers.

Finally, UDS already offers the Big5-STAT software and gives access to HLM, MPlus, PASS and some licenses of SPSS with more modules than the version deployed in local installations.

The access conditions and procedures about a given software for the statistical computing servers are available in every software section when they are concerned on our website <https://www.uclouvain.be/smcs> (identification is required) or you can ask at the Service desk.

Computing

USAGE STATISTICS

Table 10. Users of the statistical computing server

	20/21	21/22	22/23
Total	69	62	80
SSH	37	42	48
IACS-SPLE-ESPO	17	22	20
ILC	1	1	1
IPSY			1
LIDAM	19	19	25
LSM			1
SSS	14	11	14
IREC-MEDE	3	4	4
IRSS-FSP	11	6	8
LDRI		1	2
SST	18	9	18
ELI	6	5	9
ICTEAM-EPL	4	2	2
IMCN		1	2
IMMC	4		
IRMP	2		
LIBST-AGRO	1		1
SC	1	1	4

Usage of the Big5-stat

The most demanded statistical software as usual is SPSS far before Stata and JMP which were installed about the same number of times. Far behind there is SAS/SAS Enterprise Guide. Note that R is not mentioned since some people install it by themselves without asking the Service desk.

Usage of UDS

We don't know how many people used the different software during the academic year 2022-2023 but we have their frequency of use (at least 5 minutes). Mplus is quite used and for long tasks (307), followed by PASS (181) that allows to compute sample size (mandatory for most of studies with animals and human beings), then we have SPSS Premium for the few cases the distributed version is not enough and finally there is HLM with only 5 uses. This last software will stop being offered through UDS due to a lack of users.

Larger Projects

Larger Projects

This section summarizes the largest projects in which the SMCS was involved in 2022-2023. Some of these projects are research projects coordinated by academic members of UCLouvain or other universities. Other projects consist in providing support: regarding surveys, teaching activities, but also data management and data extraction (for the UCLouvain administration). Finally, some university certificates also belong to this category.

RESEARCH PROJECTS

CluePoints (2018-2023)

In collaboration with CluePoints' R&D department, the SMCS is involved in activities of research and validation of solutions for Central Statistical Monitoring of Clinical Trials.

PDR (2020-2024)

The SMCS is involved in research project METNATPAR for the identification of the metabolic and/or the biochemical pathways that are triggered by promising natural antiparasitic derivatives in *Trypanosoma brucei* and *Plasmodium falciparum*.

Survey among book authors in Fédération Wallonie-Bruxelles (2018-2022)

This survey was implemented within the framework of a cooperation agreement between SMCS and Maison des Auteurs/Bela asbl, with a grant from Fédération Wallonie-Bruxelles. The main objective is to study the socio-economic standing of authors in Wallonia and Brussels, and more specifically the diversity of their professional activities and income (type, structure and amounts). The SMCS took part in the questionnaire design, programming and data analysis. The study results were made public in early 2023.

Gender and housing in Brussels (2022-2023)

This project consists in the mapping, gathering and processing of data on gender and housing in Brussels, on behalf of the SPRB. The final report will assess 6 dimensions of the topic. SMCS is in charge of the

coordination of the project. Prs Salembier (LAB), Wagener (IACCHOS) and Bernard (USaint-Louis) bring their expertise to the project, while post-doc Benjamin Leclercq (LAB) coordinates the qualitative part of the project. The final report and recommendations were submitted in June 2023.

SURVEY SUPPORT

Survey support consulting was provided for a wide range of applications in all three sectors in 2022-2023 and included advice on survey and questionnaire design, programming in LimeSurvey, sampling, data management, weighting and analysis. A survey on urbanistic developments in Louvain-La-Neuve was completed in May 2023, while support to a survey about sport and cultural activities offered at UCLouvain is ongoing. Questionnaire design and data management support were also provided to a survey among medical students. Two to three training sessions linked to surveys are given as standard each year, with additional training sessions tailored to specific requests or audiences.

Election processes (2020-2023)

Several elections for presidents of institutes, deans and vice-rectors took place in a digital format. The SMCS contributed to the implementation and supervision of secure election processes via LimeSurvey for each of these. This process was implemented 23 times with success, including during the election of the SST Vice-Rector.

CONSULTING

Data management and statistical support - Strategic decisions of the general services (2019-...)

In collaboration with the "Service d'Analyse de Stratégie et de Prospective (SASP)", indicators related to the evolution of the duration of studies and the evolution of the percentage of students graduated on time are generated. Dashboards are developed and maintained to summarize such indicators numerically and to graphically illustrate their evolution. Up to now, the first generation UCLouvain student cohorts and the UCLouvain master's first entrance cohorts are considered. Since January 2022,

Larger Projects

the collaboration with SASP is extended to a statistical support for the strategic decisions of the general services.

Support to the CICON platform (2016- ...)

The SMCS assists the CICON (Clinical Investigation Centre for Nutrition) platform in writing protocols for clinical studies in nutrition by reviewing study design, calculating sample sizes and creating randomization lists. The SMCS also assists in setting up statistical analyses or realizes some of them.

Support to the MiIL platform (2021-2023)

In collaboration with the MiIL platform, the SMCS is involved in the implementation of a weighted algorithm to make the Opinio panel of the RTBF as representative as possible of the Walloon population on the basis of age, gender and region.

Collaboration with the CIM (2020-...)

In collaboration with the CIM (Centre d'Information sur les Médias), the SMCS is involved in a project consisting in implementing and validating an algorithm that predicts missing listening notebooks in the radio survey of the CIM.

Collaboration with ORES (2022-2023)

In collaboration with ORES, the SMCS is involved in the estimation of the number and the capacity of heat pumps in Wallonia for 2030 and 2050, by low-voltage network. The aim of this work is to make an inventory of the information already available and to identify the needed supplementary resources.

Development of teaching materials

One member of our team is responsible for the maintenance of the Shiny applications of the project Shiny@UCLouvain (<https://sites.uclouvain.be/RShiny/main.html>).

Evaluation of medical internship sites (2021-2023)

The internship administration of the medical faculty of UCLouvain organizes an evaluation of the different internship sites by the medical students, looking not only at pedagogical aspects but also at practical aspects of the different internship sites in order to assess their continued quality. The SMCS assists the faculty in producing automated reports per internship supervisor.

TRAINING

University Certificate - Analyse de données en R&D (2020-...)

Since 2011/12, the SMCS provides a course in bioinformatics/biostatistics for the FOREM. This course is aimed at people who have bio-sciences degrees and difficulties finding a suitable job. The course volume is 33 days (corresponding to more than 200 hours of lectures and supervised exercise sessions). The course is since January 2020 valued in 2 university certificates. The fourth edition of the 2 certificates took place in 2022-2023 with as much success as ever.

University Certificate - Junior Data Analyst (2016-...)

In collaboration with the LSBA, the SMCS launched in 2016 a new certificate called "Junior Data Analyst", an intensive course for graduates in humanities in practical data management, analysis, and interpretation. In January 2020, the first edition of a modular JDA was launched. This modular program is more compatible with a professional activity because half of the courses are organized on Saturdays. In 2022, an insufficient number of participants enrolled in the intensive formula, which was discontinued. The fourth edition of the modular formula started in January 2023 as planned.

Summer School - Collaboration with the CENTAL (2019-...)

In 2018-2019, the SMCS launched a new type of training, a Summer School, focused on an advanced topic and given by invited specialists. The first edition was about Text Mining in Python (with a focus on the analysis of financial documents), in collaboration with the Cental. The second one, about Text Mining and Social Network Analysis in Python (again in collaboration with the Cental), took place in July 2022. A third edition (about Text Mining and medical data analysis) was planned in September 2023 but had to be cancelled due to a lack of participants.

Larger Projects

YOUR PROJECTS? SMCS CAN BE YOUR PARTNER!

As you can see from this report, we are ready to become partner of various types of projects. Do not hesitate to contact us.

We can provide an early estimation of the amount of statistical work needed in your project, plan important stages of this work, and give an outline of the statistical methodology which would be employed.

The advantages of involving us in the early stages of a project include a more thorough study design, efficient allocation of resources and methodologies, and data that are easier to analyze and interpret.

The benefits are higher research efficiency and more credibility towards the granting authorities and scientific journals.

Appendix

Appendix

LIST OF TRAININGS AND SEMINARS 2022-2023

Trainings

- Pratique de la statistique avec SPSS - Initiation à l'outil, 3 heures, le 12 septembre 2022 (Séverine Guisset)
- Introduction to data analysis with R, 3 jours, du 05 septembre 2022 au 13 septembre 2022 (Antoine Soetewey)
- Plans d'expérience avec JMP (Formation organisée pour PDCLine), 4 jours, du 05 septembre 2022 au 15 septembre 2022 (Catherine Rasse)
- NEW - Introduction au calcul de taille d'échantillon (formation organisée en partenariat avec l'institut IPSY), 2 jours, du 22 septembre 2022 au 23 septembre 2022 (Benjamin Colling)
- NEW - Création de tableaux de bord interactifs (dashboards) en Power BI, 6 heures, le 04 octobre 2022 (Benjamin Colling)
- Data manipulation and visualisation with R, 2 jours, du 04 octobre 2022 au 06 octobre 2022 (Laurent Gatto, Axelle Lorient, Manon Martin)
- Initiation à la statistique avec applications en JMP (Formation intégrée dans un programme intensif plus large du FOREM), 4 jours, du 04 octobre 2022 au 07 octobre 2022 (Lieven Desmet, Catherine Rasse)
- Initiation au logiciel NVivo, 2 jours, du 10 octobre 2022 au 13 octobre 2022 (Jonathan Dedonder)
- Analyser la médiation, la modération et la médiation modérée avec SPSS, 2 jours, du 11 octobre 2022 au 13 octobre 2022 (Aurélié Bertrand)
- NEW - RNAseq data analysis, 2 jours, du 18 octobre 2022 au 20 octobre 2022 (Laurent Gatto, Axelle Lorient)
- Introduction to JMP software, 7 heures, du 24 octobre 2022 au 25 octobre 2022 (Catherine Rasse)
- Introduction to GraphPad, 1.5 jours, du 18 octobre 2022 au 27 octobre 2022 (Lieven Desmet)
- Data management and analysis using Stata, 2.5 jours, du 24 octobre 2022 au 28 octobre 2022 (Alain Guillet)
- Visualisation des données et outils avancés de programmation en R, 2 jours, du 07 novembre 2022 au 08 novembre 2022 (Benjamin Colling)
- NEW - Introduction à Jamovi, manipulation de données et analyse descriptive, 6 heures, du 22 novembre 2022 au 24 novembre 2022 (Aurélié Bertrand)
- Applied statistics with JMP, 3 jours, du 17 novembre 2022 au 24 novembre 2022 (Catherine Rasse)
- Write and publish your work in an R-package, 6 heures, le 25 novembre 2022 (Vincent Bremhorst, Alexandre Jacquemain)
- Pratique de la statistique avec SPSS, 2.5 jours, du 18 novembre 2022 au 09 décembre 2022 (Nathalie Lefèvre)
- NEW - Introduction to mixed-effects models using R, 2.5 jours, du 05 décembre 2022 au 09 décembre 2022 (Lieven Desmet)
- Notions de base en probabilité et inférence statistique, 4 jours, du 06 décembre 2022 au 16 décembre 2022 (Vincent Bremhorst, Morine Delhelle)
- Analyse de données pré-cliniques et cliniques avec SPSS, 1.5 jours, du 09 décembre 2022 au 16 décembre 2022 (Nathalie Lefèvre)
- Pratique de la statistique avec SPSS, 2.5 jours, du 09 janvier 2023 au 13 janvier 2023 (Nathalie Lefèvre)
- Certificat universitaire en Junior Data Analyst - Formule modulaire, 24 jours, du 28 janvier 2022 au 14 janvier 2023 (Vincent Bremhorst, Benjamin Colling, Jonathan Dedonder, Formateurs hors UCLouvain, Alain Guillet, Séverine Guisset, Fanny Hoogstoel, Nathalie Lefèvre, Christian Ritter)
- Préparation et mise en place d'une enquête, 2 jours, du 23 janvier 2023 au 24 janvier 2023 (Jonathan Dedonder, Séverine Guisset)
- Introduction to experimental design with JMP, 4 jours, du 16 janvier 2023 au 24 janvier 2023 (Catherine Rasse)

Appendix

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- Initiation au langage Python, 3 jours, du 23 janvier 2023 au 26 janvier 2023 (Vincent Bremhorst)
 - Initiation au logiciel NVivo, 2 jours, du 30 janvier 2023 au 02 février 2023 (Jonathan Dedonder)
 - Initiation au langage R, 2.5 jours, du 30 janvier 2023 au 03 février 2023 (Alain Guillet)
 - Analyses multivariées avec SPSS, 2 jours, du 06 février 2023 au 09 février 2023 (Séverine Guisset)
 - Introduction à la réalisation d'enquêtes en ligne avec LimeSurvey, 6 heures, du 09 février 2023 au 10 février 2023 (Jonathan Dedonder)
 - NEW - Introduction à l'utilisation de la plateforme REDCap (formation organisée en partenariat avec l'institut IPSY), 6 heures, le 16 février 2023 (Valérie Dormal)
 - Introduction to data analysis with R, 3 jours, du 09 février 2023 au 16 février 2023 (Lieven Desmet)
 - Data manipulation and visualisation with R (organized in collaboration with the BIOINFO platform), 2 jours, du 06 mars 2023 au 08 mars 2023 (Laurent Gatto, Axelle Lorient)
 - Gestion et visualisation de données en Excel, 2 jours, du 13 mars 2023 au 14 mars 2023 (Séverine Guisset)
 - Utilisation avancée du logiciel Nvivo, 2 jours, du 20 mars 2023 au 24 mars 2023 (Jonathan Dedonder)
 - Analyses multivariées exploratoires en R, 2 jours, du 27 mars 2023 au 28 mars 2023 (Benjamin Colling)
 - NEW - Introduction to sample size calculation, 2 jours, du 30 mars 2023 au 31 mars 2023 (Benjamin Colling)
 - Introduction aux modèles multi-niveaux avec SPSS, 2.5 jours, du 17 avril 2023 au 21 avril 2023 (Aurélié Bertrand, Nathalie Lefèvre)
 - Certificat d'université : Analyse de données appliquée en R&D - niveau de base, 20.5 jours, du 06 février 2023 au 21 avril 2023 (Aurélié Bertrand, Céline Bugli, Lieven Desmet, Alain Guillet, Catherine Rasse)
 - Applied statistics with SPSS, 2.5 jours, du 24 avril 2023 au 28 avril 2023 (Séverine Guisset)
 - Introduction à l'analyse de Réseaux Sociaux avec Gephi, 1.5 jours, du 07 juin 2023 au 09 juin 2023 (Jonathan Dedonder)
 - Introduction à l'analyse de données avec R, 3 jours, du 09 juin 2023 au 16 juin 2023 (Antoine Soetewey)
 - Introduction aux modèles mixtes avec R, 2.5 jours, du 12 juin 2023 au 16 juin 2023 (Alain Guillet)
 - Introduction à la création de tableaux de bord interactifs (dashboards) en Power BI (formation organisée en partenariat avec l'administration des relations extérieures et de la communication de l'UCLouvain), 6 heures, le 22 juin 2023 (Benjamin Colling)
 - Data visualisation and advanced tools in R, 2 jours, du 22 juin 2023 au 23 juin 2023 (Alain Guillet)
 - Certificat universitaire en Analyse de données appliquées en R&D - Niveau avancé, 17 jours, du 24 avril 2023 au 27 juin 2023 (Céline Bugli, Alain Guillet, Manon Martin, Catherine Rasse)
 - Cours préparatoire d'été en statistiques pour étudiants PSP, 2.5 jours, du 21 août 2023 au 25 août 2023 (Morine Delhelle, Fanny Hoogstoel)
 - Cours préparatoire d'été en statistiques pour étudiants ESPO, 2.5 jours, du 21 août 2023 au 25 août 2023 (Lise Léonard)
 - *Certificat universitaire en Junior Data Analyst - Formule modulaire, de janvier 2023 à décembre 2023 (Benjamin Colling, Jonathan Dedonder, Alain Guillet, Christian Ritter, Séverine Guisset, Vincent Bremhorst, Formateurs externes) - Not counted in the statistics of this report because training is still ongoing in 2023-2024*

PUBLICATIONS AND PRESENTATIONS BY SMCS MEMBERS

Although the primary mission of SMCS members is to support other research projects, its members are encouraged to participate in scientific meetings, to present their work, and to publish.

Appendix

Publications

Journal Articles

Perspectives économiques 2023-2024. Bertrand, Aurélie[UCL] Bodart, Vincent[UCL] De Bundel, Florian[UCL] Guillet, Alain[UCL] Lachapelle, Nathan[UCL] Pourtois, Mathilde[UCL] Sauvenier, Mathieu[UCL] Van Keirsbilck, Leïla[UCL] (2023) *Regards économiques* — no.180, p. 1-12.

Les représentations lexicales sémantiques et phonologiques dans le manque du mot chez l'enfant présentant un trouble du développement du langage oral : étude de cas multiples - Bragard, Anne[UCL] Schelstraete, Marie-Anne[UCL], Lefèvre, Nathalie[UCL] (2022) *A.N.A.E.*, Vol. 181, P. 1-9.

Discussion Paper

Réalisation d'une étude préparatoire en vue d'une recherche sur la précarité énergétique et hydrique des femmes en région Bruxelloise – Memorandum of understanding. Guisset, Séverine ; Salembier, Chloé ; Van Moeseke, Geoffrey ; Wagener, Martin (2023) LIDAM Discussion Paper SMCS ; 2023/01 18 pages

Seminars and Presentations

Extra-muros seminars and video

Bugli C., *Les statistiques dans votre mémoire: il vaut mieux y penser avant pour éviter les ennuis après...* Présentation aux mémorants FSM, Louvain-la-Neuve, le 24 octobre 2022 et le 14 février 2023.

Bugli Céline - Cours de statistique pour conseillers en prévention (cpfb), Louvain-la-Neuve, le 18/11/2022.

Bugli Céline - *Cours de statistique pour conseillers en prévention en hygiène* (cpfb), Louvain-la-Neuve, les 03/02, 10/02, 10/03 et 17/03/2023.

Bugli, Céline - "*Statistics: sample size calculation, Statistical Plan*", PhD training in clinical research: from project drafting to study completion, 25/05/2023, Woluwé.

Salembier, Chloé et Guisset, Séverine - Webinaire "*L'impact de la précarité énergétique et hydrique sur les Bruxelloises*" - Conseil bruxellois de l'égalité entre les femmes et les hommes - 06/06/2023



2022-2023