

PROGRAM and BOOK of ABSTRACTS

JOCLAD2019

11 - 13 APRIL

UISEU, PORTUGAL



XXVI MEETING OF THE PORTUGUESE ASSOCIATION FOR CLASSIFICATION AND DATA ANALYSIS
XXVI JORNADAS DE CLASSIFICAÇÃO E ANÁLISE DE DADOS



Program and Book of Abstracts

XXVI Meeting of the Portuguese Association for Classification and Data Analysis (CLAD)

11–13 April 2019

Viseu, Portugal

www.joclad.ipt.pt/joclad2019/

Sponsors

Associação Portuguesa de Classificação e Análise de Dados
Instituto Politécnico de Viseu
Escola Superior de Tecnologia e Gestão de Viseu
Banco de Portugal
Instituto Nacional de Estatística
PSE – Produtos e Serviços de Estatística

Câmara Municipal de Viseu
Museu Nacional Grão Vasco
Adega Cooperativa de Silgueiros
Chocolateria Delícia
Comissão Vitivinícola Regional do Dão
Confeitaria Amaral
Que Viso Eu? Gastronomia, Arte e Cultura

Program and Book of Abstracts

XXVI Meeting of the Portuguese Association for Classification and Data Analysis (JOCLAD2019)

Editors: Conceição Amado, Ana Cristina Matos, José Gonçalves Dias, Conceição Rocha, André Codeço Marques, Carla Manuela Henriques, Nuno Bastos, Isabel Silva

Publisher: CLAD

Printed: Statistics Portugal

ISBN 978-989-98955-6-0

Depósito legal: 454416/19

Preface

Welcome to JOCLAD2019! The JOCLAD2019 – Meeting of the Portuguese Association for Classification and Data Analysis aims to bring together researchers and practitioners interested in Data Science. This is already the twenty-six meeting of the CLAD, the Portuguese Association for Classification and Data Analysis. After many meetings all over Portugal – 2016 in Évora, 2017 in Porto, 2018 in Lisbon – JOCLAD2019 is held in Viseu, at the Escola Superior de Tecnologia e Gestão de Viseu (ESTGV) of the Instituto Politécnico de Viseu (IPV), which co-organizes it. The IPV was created in 1979 and, since then, has played a crucial role in the development of the region of Viseu, namely in the higher education offered by its five integrated schools, in the cooperation with local institutions and companies, and in the promotion and dissemination of scientific research. ESTGV, as an education and research unit of the Instituto Politécnico de Viseu, is a center for the creation, diffusion and transmission of culture, science and technology. Offering courses in the areas of engineering and management and being governed by quality standards, ESTGV ensures appropriate education to the needs of the current labor market. This volume is one of the main outcomes of the JOCLAD2019 and documents the meeting contents.

This twenty-sixth meeting is special as it celebrates the quarter of a century of our association. Indeed, these meetings started before CLAD and somehow triggered its foundation. We have a Thematic Session that celebrates this achievement. This edition also takes a new step in the development of the JOCLAD – Meetings of the Portuguese Association for Classification and Data Analysis. For the first time, this book is edited in English, making its contents available to a wider audience.

The program for this meeting results from the dedicated effort of many people. We thank the invited speakers: M. Salomé Cabral (CEAUL, Departamento de Estatística e Investigação Operacional, FCUL, Portugal), Peter Filzmoser (Vienna University of Technology, Austria), and Agustín Mayo-Iscar (Dpto. Estadística e I.O. & Instituto de Matemáticas, Universidad de Valladolid, Spain). Their talks present a representative cross-section of research in data science. This volume contains the abstracts of the two workshops taught by M. Salomé Cabral on Analysis in Longitudinal Data and Peter Filzmoser on Compositional Data Analysis. A Thematic Session is devoted to the students granted with a 2019 CLAD scholarship, whose members of the evaluation committee were Conceição Amado (Chair), Susana Faria and Catarina Marques. We also thank the organizers of the other Thematic Sessions: Filipa Lima (Banco de Portugal), Carlos Marcelo (INE – Instituto Nacional de Estatística), and Sónia Gouveia and Isabel Silva (CLAD-SPE). Additionally, this volume contains all the abstracts of talks and

posters presented at regular oral and poster sessions. Each abstract published in this volume has been double-blind evaluated by at least one anonymous member of the scientific committee. We thank all authors who submitted an abstract to our meeting and the reviewers who supported the editorial process with their fast and constructive reactions. These procedures definitely contribute to reinforce the overall quality of the JOCLAD2019 program. Additionally, we thank all the chairs of these sessions. Our deep gratitude extends to the members of the board of CLAD – Carlos Marcelo, Conceição Rocha, Isabel Silva and Luís Grilo, who volunteered their time to support CLAD activities. Last but not least, it is a pleasure to thank the sponsors for helping the organization of this meeting. Our institutional sponsors deserve a special mention: Instituto Nacional de Estatística (INE), Banco de Portugal and PSE.

A successful meeting involves more than the presentation of talks and posters. It is also a meeting of people and exchange of research ideas and collaborations. Thus, a social program – dinner and visit to Viseu – has been arranged in order to promote and facilitate this networking. Our deep thanks extend to the local organizing committee, Ana Matos, André Codeço Marques, Carla Henriques, Conceição Rocha and Nuno Bastos, and to the local sponsors, who made it possible for participants to become more involved with the region of Viseu, creating opportunities of knowing something more about this region through social and tasting moments.

Finally, a big thank you goes to all of you for coming, for your support for JOCLAD2019, and for helping us to make this meeting a success. With your high-quality work, CLAD will continue its tradition of excellence in advancing the data science field for the next 25 years! We wish all of you an unforgettable stay in the city of Viseu. We hope to meet you again for the JOCLAD2020!

Viseu, April 2019

Chair of the Scientific Program

Conceição Amado

Conference Chair

Ana Cristina Matos

President of CLAD

José Gonçalves Dias

Organization

President of the CLAD

José Gonçalves Dias

Chair of the JOCLAD2019

Ana Cristina Matos (Escola Superior de Tecnologia e Gestão de Viseu)

Local Organizing Committee

Ana Cristina Matos (Escola Superior de Tecnologia e Gestão de Viseu)

André Codeço Marques (Escola Superior de Tecnologia e Gestão de Viseu)

Carla Manuela Henriques (Escola Superior de Tecnologia e Gestão de Viseu)

Conceição Rocha (CPES - INESC TEC)

Nuno Bastos (Escola Superior de Tecnologia e Gestão de Viseu)

Chair of the Scientific Program Committee

Conceição Amado (IST-Universidade de Lisboa)

Scientific Program Committee

A. Manuela Gonçalves (Universidade do Minho)

Adelaide Figueiredo (Universidade do Porto)

Adelaide Freitas (Univerdade de Aveiro)

Ana Lorga da Silva (Universidade Lusófona)

Ana Matos (Instituto Politécnico de Viseu)

Ana Sousa Ferreira (Universidade de Lisboa)

Anabela Afonso (Universidade de Évora)

Carla Henriques (Instituto Politécnico de Viseu)

Carlos Ferreira (Universidade de Aveiro)

Carlos Soares (Universidade do Porto)

Catarina Marques (Instituto Universitário de Lisboa)

Conceição Rocha (INESC - TEC and Universidade do Porto)

Fernanda Otilia Figueiredo (Universidade do Porto)

Fernanda Sousa (Universidade do Porto)

Helena Bacelar-Nicolau (Universidade de Lisboa)

Irene Oliveira (Universidade de Trás-os-Montes e Alto Douro)
Isabel Silva Magalhães (Universidade do Porto)
José Gonçalves Dias (Instituto Universitário de Lisboa)
Luís Miguel Grilo (Instituto Politécnico de Tomar)
Manuela Neves (Universidade de Lisboa)
Margarida Cardoso (Instituto Universitário de Lisboa)
Maria de Fátima Salgueiro (Instituto Universitário de Lisboa)
Maria Filomena Teodoro (Escola Naval-Marinha Portuguesa)
Paula Brito (Universidade do Porto)
Paula Vicente (Instituto Universitário de Lisboa)
Paulo Infante (Universidade de Évora)
Pedro Campos (Universidade do Porto)
Pedro Duarte Silva (Universidade Católica Portuguesa)
Rosário Oliveira (Universidade de Lisboa)
Susana Faria (Universidade do Minho)
Victor Lobo (Universidade Nova de Lisboa)

Contents

Program Overview	xi
Program	xv
Abstracts	1
Mini-Courses	3
Longitudinal data analysis	5
Compositional data analysis: concepts, software, and examples	7
Plenary Sessions	9
Robust proposals for model based clustering of multivariate data	11
Modelling longitudinal binary data	13
The log-ratio approach to handle relative information	15
Thematic Session: CLAD's 25 Years	17
CLAD's 25 Years	19
Thematic Session: CLAD 2019 Scholarship	21
Anomaly detection and classification for streaming data	23
An approach for representing Pareto frontiers on the web	25
Symbolic clustering and anomaly detection for business analytics	27
Thematic Session: Banco de Portugal	29
Identifying High-Growth Enterprises using different criteria	31
The value relevance of consolidated financial information	33
Loans and debt securities – an analysis of corporate financing	35
What are we holding? – households' investments in negotiable financial instruments	37
Thematic Session: Statistics Portugal	39
Using administrative data to enumerate population	41
Survey on Mobility in the Metropolitan Areas of Porto and Lisboa	43
The Well-being Index of Portugal: assessment and outlook	45
Speak to Inspire about Statistics	47
Thematic Session: CLAD–SPE	49

Dynamic Principal Component Analysis	51
Time series analysis via complex networks: a first approach	53
Risk stratification of heart failure patients from age-independent thresholds	55
Detection of diseases in heart rate variability	57
Contributed Sessions	59
From sparse principal components to clustering of variables in high-dimensional data	61
Evaluating outlier detection methods: A review of performance measures	63
Looking for atypical groups of distributions in the context of genomic data	65
Internet usage patterns: Segmentation of European users using a multilevel latent class model	67
State space modeling in water quality monitoring in a river basin	69
Normalization of foot clearance and spatiotemporal gait data using multiple linear regression models	71
Pediatric arterial hypertension modeling	73
First four order cumulants in Mixed Models	75
Predictive value in healthcare: a forgotten measure?	77
Analysis of administrative data with a binary response variable	79
Understanding power at tax investigation – The Portuguese tax inspector’s view	81
Reduced social accounting matrix for Mozambique	83
Multiple-valued symbolic data clustering: a model-based approach	85
Time series clustering using forecast densities based on GAM models	87
Clustering interval time series	89
Discriminant factors of website trust	91
Pilgrimage and mobile use	93
How social networks influence similarity between examination answers – longitudinal study	95
Prices in the electricity Iberian market - a clustering approach	97
PLS-SEM in college students’ burnout	99
Modelling a predator-prey interaction: an in-class exercise	101
Higher education students in Viseu Polytechnic - an evolutive study since the Bologna Treaty	103
Clinical characteristics of patients with chronic obstructive pulmonary disease (COPD): are they different?	105
Poster Session	107
Statistical modeling: a study on customer retention in health & fitness industry	109
Application of principal components analysis to life cycle analysis for environmental assessment in production systems in mexico - case studies of maize and porcine production	111
Pavement friction performance model	113
The effect of incubation on the companies’ performance: a study with companies from the central region of Portugal	115
Corporate social responsibility: What about Portugal?	117
Comparison of tides in real time	119

Nonparametric two-way ANOVA: A simulation study to compare results from balanced and unbalanced designs	121
Chemical hazard pictograms and safety signs taught in higher education: a statistical approach	123
Maximum likelihood method by logistic regression in the evaluation of lifestyles, anthropometric and lipid indicators in young university students with and without family support	125
Evaluation of potential biomarkers in the development of chronic complications in Diabetes Mellitus using the binary logistic regression model	127
Detection of outliers municipalities in Portugal: a compositional analysis of occupational status and academic qualification	129
A simulation study for robustly estimate the number of components for finite mixtures of linear mixed models	131
Zika: literacy and behavior of individuals on board ships. A preliminary analysis	133
Perception of business corruption in EU28: A multilevel application	135
Desires, fears and degree of satisfaction with life of young students of secondary education in a county in the interior of Portugal	137
Handling overdispersion count data	139
Author Index	141

Program Overview



Thursday, 11 April

8:30	Registration	Hall of ESTGV Auditorium
9:00	Mini-course A	Room SD1
10:15	Coffee Break	
10:30	Mini-course A (cont.)	Room SD1
12:00	Lunch Time	
13:00	Mini-course B	Room SD1
14:30	Coffee Break	
14:45	Mini-course B (cont.)	Room SD1
16:00	Opening Session of the Meeting	ESTGV Auditorium
16:30	Plenary Session I	ESTGV Auditorium
17:30	Thematic Session I - CLAD's 25 Years	ESTGV Auditorium
18:30	Reception: <i>Dão de Honra</i>	Solar do Vinho do Dão

Friday, 12 April

8:30	Registration	Hall of ESTGV Auditorium
9:00	Parallel Session I	Room A2 & A3
10:20	Coffee Break	
10:40	Parallel Session II	Room A2 & A3
12:00	Plenary Session II	ESTGV Auditorium
13:00	Lunch Time	
14:00	Thematic Session II - Banco de Portugal	ESTGV Auditorium
15:20	Thematic Session III - CLAD 2019 Scholarship	ESTGV Auditorium
16:20	Coffee Break	
16:40	Thematic Session IV - Statistics Portugal	ESTGV Auditorium
18:00	Visit to Historic Centre of Viseu	
19:30	General Assembly of CLAD	Clube de Viseu
20:30	Meeting Dinner	Clube de Viseu

Saturday, 13 April

9:00	Registration	Hall of ESTGV Auditorium
9:30	Parallel Session III	Room A2 & A3
10:50	Coffee Break	
11:10	Thematic Session V - CLAD-SPE	ESTGV Auditorium
12:30	Lunch Time	
13:30	Poster Session	Auditorium atrium
14:10	Plenary Session III	ESTGV Auditorium
15:10	Closing Session of the Meeting	ESTGV Auditorium
15:30	Coffee Break	

Program



Thursday, 11 April

8:30 Registration - Hall of ESTGV Auditorium

9:00 **Mini-course A** - Room SD1
Longitudinal data analysis
M. Salomé Cabral, p. 5

Chair: Carla Henriques

10:15 **Coffee Break**

10:30 **Mini-course A** (cont.)

12:00 **Lunch Time**

13:00 **Mini-course B** - Room SD1
Compositional data analysis: concepts, software, and examples
Peter Filzmoser, p. 7

Chair: A. Pedro Duarte Silva

14:30 **Coffee Break**

14:45 **Mini-course B** (cont.)

16:00 **Opening Session of the Meeting** - ESTGV Auditorium

16:30 **Plenary Session I** - ESTGV Auditorium
Robust proposals for model based clustering of multivariate data
Agustín Mayo-Iscar, p. 11

Chair: José G. Dias

17:30 **Thematic Session I - CLAD's 25 Years** - ESTGV Auditorium
Helena Bacelar-Nicolau, Fernanda Sousa, José G. Dias, p. 19

18:30 **Reception: *Dão de Honra*** - Solar do Vinho do Dão

Friday, 12 April

8:30 Registration - Hall of ESTGV Auditorium

9:00 Parallel Session I

	Room A2 Clustering and outliers detection methods	Room A3 Data science modeling
	Chair: Paulo Infante	Chair: Conceição Amado
9:00	From sparse principal components to clustering of variables in high-dimensional data , Adelaide Freitas, p. 61	State Space Modeling in Water Quality Monitoring in a River Basin , A. Manuela Gonçalves, Marco Costa, p. 69
9:20	Evaluating outlier detection methods: A review of performance measures , A. Pedro Duarte Silva, p. 63	Normalization of foot clearance and spatiotemporal gait data using multiple linear regression models , Flora Ferreira, Carlos Fernandes, Miguel Gago, Nuno Sousa, Wolfram Erlhagen, Estela Bicho, p. 71
9:40	Looking for atypical groups of distributions in the context of genomic data , Ana Helena Tavares, Vera Afreixo, Paula Brito, p. 65	Pediatric arterial hypertension modeling , M. Filomena Teodoro, Carla Simão, p. 73
10:00	Internet usage patterns: Segmentation of European users using a multilevel latent class model , Ana Gomes, José G. Dias, p. 67	First four order cumulants in Mixed Models , Patrícia Antunes, Sandra Ferreira, Célia Nunes, Dário Ferreira, João Mexia, p. 75
10:20	Coffee Break	

10:40 Parallel Session II

	Room A2	Room A3
	Data Science in health and economics	Classification and symbolic Data
	Chair: Fernanda Sousa	Chair: Luís Grilo
10:40	Predictive value in healthcare: a forgotten measure? , Carina Ferreira, Teresa Abreu, Mário Basto, p. 77	Multiple-valued symbolic data clustering: a model-based approach , José G. Dias, p. 85
11:00	Analysis of administrative data with a binary response variable , Maria de Fátima Salgueiro, Marcel D.T. Vieira, P.W. F. Smith, p. 79	Time series clustering using forecast densities based on GAM models , Maria Almeida Silva, Conceição Amado, Dália Loureiro, p. 87
11:20	Understanding power at tax investigation - The Portuguese tax inspector's view , João Marques, Ana Helena Tavares, p. 81	Clustering Interval Time Series , Elizabeth Ann Maharaj, Paulo Teles, Paula Brito, p. 89
11:40	Reduced Social Accounting Matrix for Mozambique , Eliza Monica A. Magaua, p. 83	Discriminant factors of website trust , Ana Andrade, Margarida G. M. S. Cardoso, Vítor V. Lopes, p. 91

12:00 **Plenary Session II - ESTGV Auditorium**
Modelling longitudinal binary data
M. Salomé Cabral, p. 13

Chair: Maria de Fátima Salgueiro

13:00 **Lunch Time**

14:00 **Thematic Session II - Banco de Portugal - ESTGV Auditorium**
Economy and finance

Chair: Filipa Lima

14:00	Identifying High Growth Enterprises using different criteria , Ana Filipa Carvalho, Cloé Magalhães, João Meneses, Mário Lourenço, p. 31
14:20	The Value Relevance of Consolidated Financial Information , Ana Bárbara Pinto, Diogo Silva, p. 33
14:40	Loans and debt securities - an analysis of corporate financing , André Fernandes, José Soares, Pedro Silva, Rafael Figueira, Ricardo Correia, p. 35
15:00	What are we holding? - households' investments in negotiable financial instruments , André Fernandes, José Soares, Pedro Silva, Rafael Figueira, Ricardo Correia, p. 37

15:20 **Thematic Session III - CLAD 2019 Scholarship** - ESTGV Auditorium
Chair: Susana Faria

15:20 **Anomaly detection and classification for streaming data**, João Brazuna, p. 23
15:40 **An approach for representing Pareto frontiers on the web**, Marco Marto, p. 25
16:00 **Symbolic clustering and anomaly detection for business analytics**, Ana Teresa Fernandes, p. 27

16:20 **Coffee Break**

16:40 **Thematic Session IV - Statistics Portugal - ESTGV Auditorium**
Challenges in Official Statistics VIII
Chair: Carlos Marcelo

16:40 **Using administrative data to enumerate population**, Sandra Lagarto, Paula Paulino, p. 41
17:00 **Survey on Mobility in the Metropolitan Areas of Porto and Lisboa**, Bárbara Veloso, Rute Cruz Calheiros, p. 43
17:20 **The Well-being Index of Portugal: assessment and outlook**, Sérgio Bacelar, p. 45
17:40 **Speak to Inspire about Statistics**, Carla Farinha, José Pinto Martins, Margarida Rosa, p. 47

18:00 **Visit to Historic Centre of Viseu**

19:30 General Assembly of CLAD - Clube de Viseu

20:30 **Meeting Dinner** - Clube de Viseu

Saturday, 13 April

9:00 Registration - Hall of ESTGV Auditorium

9:30 Parallel Session III

	Room A2 Data science applications Chair: Margarida Cardoso	Room A3 Data science in health and educational sciences Chair: Maria Eduarda Silva
09:30	Pilgrimage and mobile use , Ângela Antunes, Carla Henriques, Suzanne Amaro, p. 93	PLS-SEM in college students' burnout , Luis M. Grilo, Anuj Mubayi, Katelyn Dinkel, Bechir Amdouni, Joy Ren, Mohini Bhakta, p. 99
09:50	How social networks influence similarity between examination answers - longitudinal study , Milton Severo, João Borges, Fernanda Silva-Pereira, p. 95	Modelling a predator-prey interaction: an in-class exercise , Inês Bento, Joana Araújo, Joana Pereira, Margarida Marques, Matilde Almodovar, Morgan Ribeiro, Pedro Afonso, Rita Pereira, Tiago Marques, p. 101
10:10	Prices in the electricity Iberian market - a clustering approach , Ana Martins, João Lagarto, Margarida Cardoso, p. 97	Higher Education Students in Viseu Polytechnic - an evolutive study since the Bologna Treaty , Joana Fialho, Madalena Malva, Paula Sarabando, Paulo Costeira, p. 103
10:30		Clinical characteristics of patients with chronic obstructive pulmonary disease (COPD): are they different? , Vera Enes, Ana Helena Tavares, Vera Afreixo, Filipa Machado, Alda Marques, p. 105

10:50	Coffee Break
11:10	Thematic Session V - CLAD - SPE - ESTGV Auditorium Analysing time series data: from classical to innovative approaches Chair: Isabel Silva
11:10	Dynamic Principal Component Analysis , Isabel Silva, Maria Eduarda Silva, p. 51
11:30	Time series analysis via complex networks: a first approach , Vanessa Silva, Maria Eduarda Silva, Pedro Ribeiro, p. 53
11:50	Risk stratification of heart failure patients from age-independent thresholds , Sónia Gouveia, Manuel G. Scotto, Paulo J. S. G. Ferreira, p. 55
12:10	Detection of Diseases in Heart Rate Variability , Argentina Leite, Ana Paula Rocha, Maria Eduarda Silva, p. 57
12:30	Lunch Time
13:30	Poster Session - Auditorium atrium
	Statistical modeling: a study on customer retention in health & fitness industry A. Manuela Gonçalves, Guadalupe Costa, Alexandre Freitas, p. 109
	Application of principal components analysis to life cycle analysis for environmental assessment in production systems in Mexico - case studies of maize and porcine production Miriam Paulino Flores, Maria del Rosario Villavicencio, Angel Campos, Francisco Castañeda, Ana Lorga da Silva, p. 111
	Pavement friction performance model Adriana Santos, Susana Faria, Elisabete Freitas, p. 113
	The effect of incubation on the companies' performance: a study with companies from the central region of Portugal Carla Henriques, Pedro Pinto, Rita Almeida, p. 115
	Corporate social responsibility: What about Portugal? Cláudia Silvestre, Mafalda Eiró-Gomes, Ana Raposo, João Simão, Tatiana Nunes, p. 117
	Comparison of tides in real time Dora Carinhas, Paulo Infante, António Martinho, Pedro Santos, p. 119

Nonparametric two-way ANOVA: A simulation study to compare results from balanced and unbalanced designs

Dulce G. Pereira, Anabela Afonso, p. 121

Chemical hazard pictograms and safety signs taught in higher education: a statistical approach

Fernando Sebastião, Lizete Heleno, Sílvia Monteiro, p. 123

Maximum likelihood method by logistic regression in the evaluation of lifestyles, anthropometric and lipid indicators in young university students with and without family support

João Paulo Figueiredo, Mariana Pratas, Mariana Pereira, Daniela Correia, Nádia Osório, Armando Caseiro, António Gabriel, Andreia Costa, Ana Ferreira, p. 125

Evaluation of potential biomarkers in the development of chronic complications in Diabetes Mellitus using the binary logistic regression model

João Paulo Figueiredo, Andreia Almeida, Ana Cristina Alves, Cláudia Silva, Tatiana Varandas, Amélia Pereira, Élio Rodrigues, Marta Amaral, Ana Valado, Nádia Osório, António Gabriel, Armando Caseiro, p. 127

Detection of outliers municipalities in Portugal: a compositional analysis of occupational status and academic qualification

Letícia Leite, Adelaide Freitas, Cristina Gomes, p. 129

A simulation study for robustly estimate the number of components for finite mixtures of linear mixed models

Luísa Novais, Susana Faria, p. 131

Zika: literacy and behavior of individuals on board ships. A preliminary analysis

João Faria, Rosa Teodósio, M. Filomena Teodoro, Claudia Valette, p. 133

Perception of business corruption in EU28: A multilevel application

Nikolai Witulski, José G. Dias, p. 135

Desires, fears and degree of satisfaction with life of young students of secondary education in a county in the interior of Portugal

Paulo Infante, Anabela Afonso, Gonçalo Jacinto, Rosalina Pisco Costa, José Conde, Luísa Policarpo, p. 137

Handling overdispersion count data

Susana Faria, p. 139

14:10 **Plenary Session III** - ESTGV Auditorium
The log-ratio approach to handle relative information
Peter Filzmoser, p. 15

Chair: Paula Brito

15:10 **Closing Session of the Meeting** - ESTGV Auditorium

15:30 **Coffee Break**
