

Scientific Program

# 16<sup>th</sup> Conference of the International Federation of Classification Societies

**26-29 August 2019**  
**Thessaloniki Concert Hall**  
Thessaloniki, Greece  
**#IFCS2019**

ORGANISED BY



LOCAL ORGANISER



IN COOPERATION WITH

**THE GREEK  
SOCIETY  
OF DATA ANALYSIS**

DIRECTOR OF THE CONFERENCE

**Theodore Chadjipadelis**

T. +30 2310 997912, E. [chadjj@polsci.auth.gr](mailto:chadjj@polsci.auth.gr)

# CHAIRMAN'S WELCOME LETTER



Dear colleagues,

We are pleased to inform you that the 2019 conference of the International Federation of Classification Societies (IFCS) will take place on 26th - 29th of August 2019 in Thessaloniki (Greece).

On behalf of the Thessaloniki local organisers (Aristotle University of Thessaloniki in cooperation with Greek Society of Data Analysis – GSDA) and on behalf of the Federation we would like to invite you to join the IFCS-2019 Conference. The International Federation of Classification Societies (IFCS) founded in 1985 and is composed of many statistical societies all over the world. IFCS is an interdisciplinary and international organisation whose main purposes are to promote the scientific study of classification and clustering (including systematic methods of creating classifications from data), and to disseminate scientific and educational information related to its fields of interests.

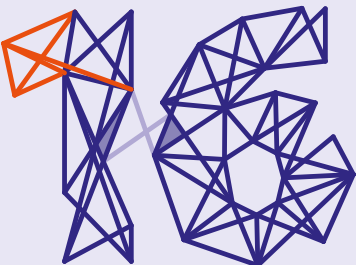
The conference will bring some of leading researchers and practitioners in the related areas and will provide an opportunity for exchanging ideas, between researchers and practitioners, and establishing networking and collaborations. The conference will include several invited papers on important and timely topics from well-known leaders in the field, and parallel tracks of oral presentation sessions of the accepted papers. We will be glad to welcome you all to Thessaloniki in August 2019!

Best Regards,

**Theodore Chadjipadelis**

A handwritten signature in blue ink, appearing to read 'Theodore Chadjipadelis', written in a cursive style.

Director of the IFCS-2019 Conference



## IFCS 2019

The 2019 conference of the International Federation of Classification Societies (IFCS) will be held in Thessaloniki, Greece from August 26 to 29, 2019. The conference theme will be 'Data Analysis and Rationality in a Complex World'. The conference opening will take place on August 26 late afternoon and pre-conference workshops will be held. The conference itself will start on August 27 in the morning, and will close on August 29 with a full day conference program and a conference dinner. The conference will include a President's invited session and a Presidential address, invited presentations, invited and contributed sessions, and poster sessions. The following awards and medals ceremony will be scheduled at the conference.

**Helga and Wolfgang Gaul Stiftung Award** (age < 30)

**Chikio Hayashi Award** (age 30 – 35)

**IFCS Research Medal for outstanding research achievements** (age > 35)

**Student/Postdoctoral Fellow Paper Competition and Travel Award** (age 22 – 29)

**Cluster Benchmarking Competition Award**

## COMMITTEES

### Scientific Program Committee

Theodoros Chadjipadelis	Chair
Berthold Lausen	Vice-chair, IFCS President
Tae Rim Lee	Vice-chair
Angela Montanari	IFCS President Elect
Akinori Okada	IFCS Past President
Christian Hennig	IFCS Scientific Secretary
Sugnet Lubbe	IFCS Treasurer
Katrijn van Deun	Publication Officer
Eva Boj	SEIO-AMyC
Paula Brito	CLAD
Sanjeena Dang	CS
Giannoula Florou	GSDA
Krzysztof Jajuga	SKAD
Hans Kestler	GfKI
Simona Korenjak Černe	SSS
Peter Kovacs	HSA-CMSG
Koji Kurihara	JCS
Angelos Markos	GSDA
Paul McNicholas	CS
Fionn Murtagh	BCS
Mauricio Vichi	CLADAG
Roberto Rocci	CLADAG
Mark de Rooij	VOC
Niel le Roux	SASA-MDAG

### Local Organizing Committee

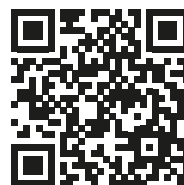
Theodore Chadjipadelis	LOC Chair, Aristotle University Thessaloniki
Giannoula Florou	President GSDA
Sofia Anastasiadou	University of Western Macedonia
Dimitris Karapistolis	Alexandrian Technological Institute
Nikos Koutsoupas	University of Macedonia
Angelos Markos	Democritus University of Thrace
George Menexes	Aristotle University Thessaloniki
Odysseas Moschidis	University of Macedonia
Thanos Thanopoulos	Hellenic Statistical Authority
Christos Tzimos	Hellenic Statistical Authority
Despoina Amarantidou	ARTION conferences & events
Vicky Bouranta	Secretary
Marina Sotirolglou	Secretary

## Thessaloniki Concert Hall



The **Thessaloniki Concert Hall** ([Building M2](#)) is located along the coast of the city, close to the city center and the airport. Designed by the renowned architect Arata Isozaki, M2 building adorns the city with a unique construction that epitomizes the virtues of modern architecture. Geometrical lines, extended glass surfaces and elements of steel compose an image of imposing simplicity. Filled with natural light and enjoying a superb view to the sea, M2's foyer is a vast space of sophisticated aesthetics that expands in three levels and adjoins all of the Hall's important spaces. Equipped with cutting-edge

technology and having an exceptional infrastructure, it provides a contemporary cultural and conference center of international standards with the capacity to host various events.



[Get directions](#)

**26-29 August 2019 Thessaloniki Concert Hall**

## CONFERENCE TOPICS

Contributed papers from scholars and practitioners are invited on any of the topics below as well as on related issues:

Data Analysis and Classification in the Natural Sciences, Engineering, Medicine and Biology / Banking and Finance / Bioinformatics and Biostatistics / Biomedical Data Analysis and Imaging / Business and Industry / Classification, Discriminant Analysis, and Supervised Learning / Clustering and Unsupervised Learning / Complex Event Processing / Data Analysis in Archaeology / Databionics / Exploratory Data Mining / Formal Concept Analysis / Functional Data Analysis / Geospatial Planning / Graphics and Vision / High-Dimensional Data and Dimension Reduction / Image Analysis and Computer Vision / Information Retrieval and Library Science / Impact of Technical Revolution, Globalization on Statistical Process / Knowledge Discovery / Linguistics and Musicology / Machine Learning and Pattern Recognition / Marketing and Management / Medical and Health Sciences / Neural Networks and Deep Learning / Psychology and Educational Sciences / Social Network Analysis / Sparse Modeling / Statistical Data Analysis, Statistical Models and Model Selection / Swarm Systems / Symbolic Data Analysis / Text Mining, Web Mining, and Ontology Learning / Visualization. Special sessions on Official Statistics will be organized in collaboration with the Hellenic Statistical Authority.

The Cluster Benchmarking Task Force of the IFCS is calling for contributions to a cluster benchmarking competition as part of IFCS-2019. Benchmarking studies will be presented in special sessions.

## SOCIAL PROGRAM



On Monday August 26th at 8:30pm, after the conference opening, the welcome reception will take place at the Prefecture of Thessaloniki (Leof. Vasilissis Olgas 198), a 15min walk from the conference venue.

The conference dinner will be held on Wednesday August 28th at 8:30p.m., in a beautiful restaurant by the sea. In a currently renewed environment just beside the sea you can experience a perfect gastronomical dinner.

A bus city tour will be provided starting at 7.10p.m. from 25 Martiou Str., the main street in front of the conference venue. The bus will end up at the restaurant.



## INVITED SPEAKERS



### David J. Hand

is Emeritus Professor of Mathematics and Senior Research Investigator at Imperial College, London, where he formerly held the Chair in Statistics. He is a Fellow of the British Academy, and an Honorary Fellow of the Institute of Actuaries, and has served (twice) as President of the Royal Statistical Society. He is a non-executive director of the UK Statistics Authority, a member of the European Statistical Advisory Committee, a member of the International Scientific Advisory Committee of the Canadian Statistical Sciences Institute, a member of the Advisory Board of the ONS's Data Science Campus, and a member of the Advisory Board of the Cambridge Institute for the Mathematics of Information. He previously Chaired the Research Board of Imperial College's Data Science Institute and was Chair of the UK's Administrative Data Research Network. He spent eight years as Chief Scientific Advisor to Winton Capital Management. He has published 300 scientific papers and 29 books, including *Principles of Data Mining*, *Information Generation*, *Measurement Theory and Practice*, *The Improbability Principle*, and *The Wellbeing of Nations*. In 2002 he was awarded the Guy Medal of the Royal Statistical Society, and in 2012 he and his research group won the Credit Collections and Risk Award for Contributions to the Credit Industry. He was awarded the George Box Medal in 2016. In 2013 he was made OBE for services to research and innovation.



### Vladimir Batagelj

is Professor Emeritus of the University of Ljubljana, Slovenia. He is also a member of the Institute of Mathematics, Physics and Mechanics (IMFM), Ljubljana, and of AMI, UP, Koper. His coauthored book *Generalized Blockmodeling* was awarded the 2007 Harrison White Outstanding Book Award by the Mathematical Sociology Section of the American Sociological Association. From the International Network for Social Network Analysis he was awarded the Georg Simmel Award (2007) and the Richards Software Award for the program Pajek (2013).



### Theodoros Evgeniou

is a Professor of Decision Sciences and Technology Management at INSEAD in Fontainebleau France and an Academic Director of INSEAD eLab, a research and analytics center at INSEAD that focuses on data analytics for business. He graduated first in the MIT class of 1995 dual degrees in Mathematics, won medals in international mathematical Olympiads, and European awards for business case studies. At INSEAD, Theodoros has been focusing on data analytics applied to a range of areas from customer insights and marketing to finance. He has been developing and teaching courses on Data Analytics, Statistics and Decision Making.



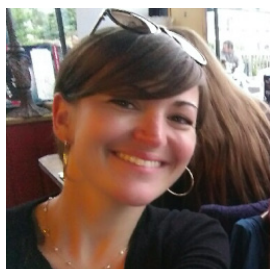
### Michael Greenacre

is Professor of Statistics at the Universitat Pompeu Fabra, Barcelona, Spain. He has authored and co-edited 10 books and over 100 journal articles and book chapters, mostly on *correspondence analysis* but more recently on *compositional data analysis*. He has given short courses in fifteen countries to environmental scientists, sociologists, data scientists and marketing professionals, and has specialized in statistics in ecology and social science. He is presently participating in many different research projects on Arctic ecology.



### **David Hunter**

is Professor at Penn State Department of Statistics. His research interests include statistical computing, models for social networks, and statistical clustering. He has published extensively on networks, optimization algorithms and mixture models.



### **Julie Josse**

is Professor of Statistics at Ecole Polytechnique in France. She has specialized in missing data, visualization and the nonparametric analyses of complex data structures. She has published over 30 articles and written 2 books in applied statistics. Julie Josse has developed packages to transfer her works such as missMDA dedicated to missing values. She is deeply involved in the R community and is part of Rforwards to widen the participation of minorities in the communities.



### **Andy Mauromoustakos**

is Professor at the Department of Crop, Soil, and Environmental Sciences and works as an Applied Statistician for the AGRI STAT LAB at the University of Arkansas Fayetteville campus. Andy teaches graduate courses and does research related to Experimental Designs and Data Analysis for the AG Experiment Station and the Division of AG.



### **Sofia Olhede**

is Professor of Statistics at University College London, director of UCL's Centre for Data Science, an honorary professor of Computer Science and a senior research associate of Mathematics at University College London. Sofia has contributed to the study of stochastic processes; time series, random fields and networks. She is on the ICMS Programme Committee since September 2008, a member of the London Mathematical Society Research Meetings Committee, a member of the London Mathematical Society Research Policy Committee and an associate Editor for Transactions in Mathematics and its Applications. Sofia was also a member of the Royal Society and British Academy Data Governance Working Group, and the Royal Society working group on machine learning.

# PRE-CONFERENCE WORKSHOPS

## Workshop 1: Compositional Data Analysis in Practice

**Date:** Monday, August 26, 2019, 08.30am - 11:30am

**Venue:** University of Macedonia (Central PC Lab, 1<sup>st</sup> floor)

**Fee:** 50EUR (paid via the conference website or on-site)

### Name of instructor:

Prof. Michael Greenacre, Universitat Pompeu Fabra, Barcelona.

### Short description:

Compositional data are multivariate data with the constant sum constraint, for example sets of nonnegative data that each sum to 1, often found in chemistry (samples in bio- and geochemistry), sociology and economics (time and monetary budgets) and marketing (market shares), for example. The key idea is the logratio transformation, which has certain implications for the analysis and then the interpretation of the results. This short course explains the main features of this novel area of statistics, with many illustrations to real data in a variety of contexts.

### Introductory background:

Greenacre, M.J. (2018). Compositional Data Analysis in Practice. Chapman & Hall / CRC Press.

URL: <https://github.com/michaelgreenacre/CODAiPractice>

### Tentative schedule:

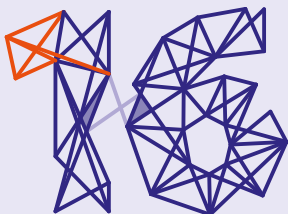
1. Compositional data and the logratio transformation: practical implications and interpretation [50 min]
  2. Total logratio variance and logratio distance; logratio analysis [50 min]
- Break [20 min]
4. Modeling with logratios; variable selection; software [60 min].

### Target Audience:

Practitioners and researchers related to any domains where compositional data are found. Statisticians who want an introduction to this field of research and application.

### Facilities Required:

- Course participants should preferably bring their own laptops.
- Software: R, open source, with the R package **easyCODA** installed (which also requires the **ca**, **vegan**, **boot** and **ellipse** packages)
- Course Material. All course materials, including the data and R scripts for the examples, will be made available for course participants.





## **Workshop 2: Symbolic Data Analysis: Parametric multivariate analysis of interval data**

**Date: Monday, August 26, 2019, 11.40am - 15.30pm**

**Venue: Venue: University of Macedonia (Central PC Lab, 1<sup>st</sup> floor)**

**Fee: 50EUR** (paid via the conference website or on-site)

### **Names of instructors:**

Paula Brito, University of Porto, Portugal

Pedro Duarte Silva, Católica Porto Business School, Portugal.

### **Short description:**

Symbolic Data is concerned with analysing data with intrinsic variability, which is to be taken into account. In Data Mining, Multivariate Data Analysis and classical Statistics, the elements under analysis are generally individual entities for which a single value is recorded for each variable - e.g., individuals, described by age, salary, education level, etc. But when the elements of interest are classes or groups of some kind - the citizens living in given towns; car models, rather than specific vehicles - then there is variability inherent to the data. Symbolic data goes beyond the usual data representation model, considering variables whose observed values for each element are no longer necessarily single real values or categories, but may assume the form of sets, intervals, or, more generally, distributions. In this Tutorial we focus on the analysis of interval data, i.e., when the variables' values are intervals of IR, adopting a parametric approach. The proposed modelling allows for multivariate parametric analysis; in particular M(ANOVA), discriminant analysis, model-based clustering, robust estimation and outlier detection are addressed. The referred modelling and methods are implemented in the R package MAINT.Data, available on CRAN.

### **Introductory background:**

Brito P. (2014). Symbolic data analysis: another look at the interaction of Data Mining and Statistics. *WIRES Data Mining and Knowledge Discovery*, 4(4), 281-295.

Brito P. and Duarte Silva A.P. (2012). Modelling interval data with Normal and Skew-Normal distributions. *Journal of Applied Statistics*, 39(1), 3-20.

### **Tentative schedule:**

1. Introduction to Symbolic Data Analysis: Motivation. Examples. Types of symbolic variables and their representations. Sources of symbolic data: aggregation of microdata. [60 min].

Break [15 min]

2. Parametric modelling of interval data: Gaussian and Skew-Normal models. (M)ANOVA, Discriminant Analysis, Robust estimation and outlier detection, Model-based clustering [90min].

Break [15 min]

3. Case-studies with R Package MAINT.Data [60 min].

### **Target audience:**

The course is aimed at all potential data analysts who need or are interested in analyzing data with variability, e.g. data resulting from the aggregation of individual records into groups of interest, or data that represent abstract entities such as biological species or regions as a whole. This methodology is particularly interesting for Economics and Management studies, Marketing, Social Sciences, Geography, Official Data statistics, as well as for Biology or Geology Data Analysis.

It is assumed that the participants have a good background in classical Statistics and Multivariate Data Analysis.

### **Facilities Required:**

- Course participants should bring own laptops, with R, RStudio, and the R package
- MAINT.Data installed.
- Course Material. All course materials, including the data and examples of software used for the case studies, will be made available for course participants.

## INVITED SESSIONS

**Theofanis Exadaktylos, Theodore Chadjipadelis (GSDA/ECPR):** Analysis of European Parliament Elections

**José Fernando Vera & Eva Boj del Val (SEIO-AMyC):** New developments in clustering and scaling data

**Christian Hennig (BCS):** Philosophy relevant to classification and data science.

**Christian Hennig (IFCS Cluster Benchmarking Task Force):** Neutral Benchmarking Studies of Clustering

**David Hunter (BCS):** Statistical theory of cluster analysis

**Salvatore Ingrassia (CLADAG):** Advances in Mixture Modeling

**Krzysztof Jajuga (SKAD):** Data Analysis in finance

**Aglaia Kalamatianou (GSDA):** Data mining techniques and classification methods in Social Sciences

**Nataša Kejžar, Simona Korenjak-Černe, Andrej Srakar (SSS):** Advances in classification analysis for complex data – compositional and symbolic approaches

**Koji Kurihara (JCS):** Clustering for spatio-temporal data and its visualization

**Paul McNicholas (CS):** Clustering, Classification and Data Analysis via Mixture Models

**Angela Montanari (CLADAG):** Supervised classification with imprecise labels and complex data

**Theophilos Papadimitriou, Periklis Gogas (GSDA):** Emerging methodologies in economics and finance

**Iannis Papadimitriou (GSDA):** Developments of data analysis in Greece

**Jozef Pociecha (SKAD):** Classification methods in economics and business

**Mark de Rooij (VOC):** Crossroads of Statistical Learning and Psychometrics

**Niel le Roux (SASA-MDAG):** Classification, visualisation and dimension reduction

**Cristina Tortora (GSDA):** Clustering categorical and mixed-type data

### President's invited session

**Berthold Lausen, Theodore Chadjipadelis:** Data Science Education

### Presidential Address

**Berthold Lausen:** Predictive ensemble methods for event time data

## POST CONFERENCE PROCEEDINGS

Post conference proceedings will be published in [Studies in Classification, Data Analysis, and Knowledge Organization](#). (Edited by Theodore Chadjipadelis, Berthold Lausen, Angelos Markos, Tae Rim Lee, Angela Montanari, Rebecca Nugent). Single papers can be made open access on payment of the open access to Springer.

## THE CITY OF THESSALONIKI



The city was founded in 315 BC by Cassander, in honor of his wife Thessaloniki, sister of Alexander the Great. Since then, and due to its strategic position, Thessaloniki has been a commercial and cultural crossroad that brought together people and ideas from all over the world. The signs of this uninterrupted urban activity for more than 2,300 years are evident in each corner of the city. Nowadays, Thessaloniki is a big, modern city, with a population of around one million, and an important administrative and financial center of the Balkans. The warm and vibrant city life is largely influenced by the Aristotle University of Thessaloniki and the University of Macedonia which host tens of thousands of students. Thessaloniki is surrounded by places of great natural and historic beauty such as Olympus National Park, Vergina, where the Royal tomb of

Philip II, father of Alexander the Great was found, the autonomous Mouth Athos, which is forbidden to women and children, and Halkidiki with its beautiful sandy beaches.

### People & Life

Thessaloniki is a popular destination. You will certainly enjoy a pleasant and interesting stay in the city. People are friendly and happy to help with any questions. The atmosphere is unique during the day in the commercial and shopping centre, but especially during the evening, in the wide variety of bars, restaurants and theatres for entertainment. Thessaloniki is renowned for its unique location, along the Thermaikos Gulf, its sunsets, its long history, its monuments and museums as well as its distinguished cuisine.

## IMPORTANT DATES

- Monday, November 19, 2018** Start early bird registration
- Sunday, May 05, 2019** Deadline for abstract submission
- Sunday, May 19, 2019** Notification of acceptance for abstract submission
- Sunday, May 26, 2019** Deadline for early bird registration
- Sunday, June 23, 2019** Deadline for standard registration
- Sunday, July 21, 2019** Deadline for late registration
- Monday, August 26, 2019** Conference opening and pre-conference workshops
- August 27-29, 2019** IFCS-2019 conference sessions

## PUBLICATIONS RELATED TO THE CONFERENCE

We are planning to publish a post-conference proceedings. The tentative schedule is as follows:

- December 31, 2019** Manuscript submission deadline
- January 30, 2020** First notification
- February 28, 2020** Deadline revised manuscript submission
- June 15, 2020** Publication and shipment



## ARTION CONFERENCES & EVENTS

PROFESSIONAL CONGRESS ORGANISER FOR IFCS-2019 CONFERENCE

**www.artion.com.gr**

**E.** [ifcs@artion.com.gr](mailto:ifcs@artion.com.gr)

**T.** +30 2310 257803 (direct line), +30 2310 272275

**W.** [www.ifcs.gr](http://www.ifcs.gr)

### **Conference Coordination**

Despina Amarantidou

### **Co-ordination of the scientific program**

Chara Ignatiadou, Kelly Angelaki

### **Management of delegates and residence**

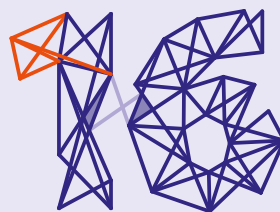
Markos Papadopoulos

### **Marketing, Publications, Sponsors**

Prodromos Nikolaidis, Lila Stathaki, Efi Mamoglou

### **IT**

George Kanakaris



# PROGRAM

## Monday, 26<sup>th</sup> August 2019

**Venue: University of Macedonia (Central PC Lab, 1<sup>st</sup> floor)**

**08.00 – 08.30** Workshop registration

**08.30 – 10.00** Workshop on **Compositional Data Analysis in Practice**  
Michael Greenacre (Part I)

**10.00 – 10.20** **Coffee Break**

**10.20 – 11.30** Workshop on **Compositional Data Analysis in Practice**  
Michael Greenacre (Part II)

**11.40 – 13.00** Workshop on **Symbolic Data Analysis: Parametric multivariate analysis of interval data**  
Paula Brito and Pedro Duarte Silva (Part I)

**13.00 – 14.00** **Lunch Break**

**14.00 – 15.30** Workshop on **Symbolic Data Analysis: Parametric multivariate analysis of interval data**  
Paula Brito and Pedro Duarte Silva (Part II)

**Venue: Thessaloniki Concert Hall (Building M2)**

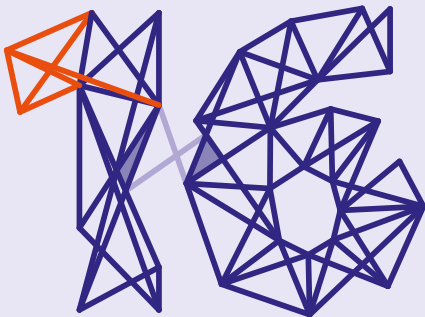
**16.30 – 18.00** Registration

**18.00 – 18.30** Opening Ceremony

Plenary Hall

**18.30 – 20.00** Panel discussion on **Data Science, Elections and Government**  
Athanasios Thanopoulos, *President of the Hellenic Statistical Authority*  
**Moderator:** Theodore Chadjipadelis

**20.30** Welcome Reception







## Tuesday, 27<sup>th</sup> August 2019

Venue: Thessaloniki Concert Hall (Building M2)

08.00 – 09.00 Registration

### Parallel Sessions

09.00 – 10.40 **CONTR1: Supervised learning and applications I**

**Chair:** Pedro Duarte Silva

Room I

**Multiclass posterior probability support vector machines for big data**

Pedro Duarte Silva

**Improving credit client classification by deep neural networks?**

Klaus Bruno Schebesch, Ralf Stecking

**Performance measures in discrete supervised classification**

Ana Sousa Ferreira, Anabela Marques

**Empirical comparison of recommendation strategies for legal documents on the web**

Ruta Petraityte, Ansgar Scherp, Berthold Lausen

**Multi-loss CNN architecture for image classification**

Jian Piao, Mingzhe Jin

09.00 – 10.40 **SP1: Data mining techniques and classification methods in Social Sciences**

organized by A. Kalamatianou

**Chair:** Aglaia Kalamatianou

Room II

**TV channels and predictive models: an analysis on social media**

Paolo Mariani, Andrea Marletta, Mauro Mussini, Mariangela Zenga

**Data mining techniques in autobiographical studies. Is there a chance?**

Franca Crippa, Angela Tagini, Fulvia Mecatti

**Requirements and competencies for labour market using conjoint analysis**

Paolo Mariani, Andrea Marletta, Mauro Mussini, Mariangela Zenga

**A data mining framework for Gender gap on academic progress**

Aglaia Kalamatianou, Adele Marshall, Mariangela Zenga

**Classification through graphical models: evidences from the EU-SILC data**

Federica Nicolussi, Agnese Maria Di Brisco, Manuela Cazzaro

09.00 – 10.40 **CONTR2: Data science education**

**Chair:** Sofia Anastasiadou

Room III

**Cross-disciplinary higher education of data science – beyond the computer science student**

Evangelos Pournaras

**The implications of network science in economic analysis**

Éva Kuruczleki

**Conception of measures of central tendency of primary school teachers**

Evanthis Chatzivasileiou

09.00 – 10.40 **CONTR3: Classification and clustering in biological and medical research I**

**Chair:** George Menexes

Room IV

**Quality of life profiles of colon cancer survivors: A three-step latent class analysis**

Felix J. Clouth, Gijs Geleijnse, Lonneke van de Poll-Franse, Steffen Pauws, Jeroen Vermunt

**Classifying functional groups of microorganisms with varying prevalence level using 16S rRNA**

Rafal Kulakowski, Etienne Low-Decarie, Berthold Lausen

**Identifying Chronic Obstructive Pulmonary Disease (COPD) phenotypes to predict treatment response**

Vasilis Nikolaou, Sebastiano Massaro, Masoud Fakhimi, Lampros Stergioulas

**The use of gene ontology to improve gene selection process for omics data analysis**

Chadia Ed-driouch, Hassan Kafsou, Ahmed Moussa

**10.40 – 11.10 Coffee Break**

**11.10 – 12.00 President's Invited Lecture: Deciding what's what: classification from A to Z**

**David Hand**

**Chair:** Berthold Lausen

Plenary Hall

**12.00 – 12.50 Award Session**

**Chair:** Maurizio Vichi

Plenary Hall

**IFCS 2019 Research Medal:** David Hand

**IFCS 2019 Chikio Hayashi Award:** Sanjeena Dang, Abby Flynt, Brian Franczak, Cristina Tortora

**IFCS 2019 Helga and Wolfgang Gaul Stiftung Award:** Aghiles Salah

**IFCS 2019 Student/Postdoctoral Fellow Paper Competition and Travel Award:** Ali Mertcan Köse, Hanneke van der Hoef

**13.00 – 14.00 Mid-day Break**

**Parallel Sessions**

**14.00 – 15.20 SP2: Classification, visualisation and dimension reduction I**

dedicated to the late John Gower and organized by N. J le Roux

**Chair:** Sugnet Lubbe

Room I

**Properties of individual differences scaling and its interpretation**

Niël J le Roux, John Gower

**Local and global relevance of features in multi-label classification**

Trudie Sandrock

**A multivariate ROC based classifier**

Martin Kidd

**Functional linear discriminant analysis for several functions and more than two groups**

Sugnet Lubbe

**14.00 – 15.20 SP3: Advances in mixture modeling**

organized by S. Ingrassia

**Chair:** Salvatore Ingrassia

Room II

**Variable selection in linear regression models with non-gaussian errors: a Bayesian solution**

Giuliano Galimberti, Saverio Ranciat, Gabriele Soffritti

**Finite mixtures of matrix-variate regressions with random covariates**

Salvatore Daniele Tomarchio, Paul McNicholas, Antonio Punzo

**Telescoping mixtures - Learning the number of components and data clusters in Bayesian mixture analysis,**

Gertraud Malsiner-Walli, Sylvia Frühwirth - Schnatter, Bettina Grün

**Finite mixture modeling and model-based clustering for directed weighted multilayer networks**

Volodymyr Melnykov, Shuchismita Sarkar, Yana Melnykov



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- 14.00 – 15.20 SP4: Philosophy relevant to classification and data science**  
 organized by C. Hennig  
**Chair:** Christian Hennig Room III  
**The epistemology of nondistributive profiles**  
 Patrick Allo [Skype Presentation](#)  
**Prediction without estimation: a case study in computer vision**  
 Jérémy Grosman  
**Reconceptualizing null hypothesis testing**  
 Jan Sprenger
- 
- 14.00 – 15.20 CONTR4: Official statistics**  
**Chair:** Athanasios Thanopoulos Room IV  
**Intertemporal exploratory analysis of Greek households in relation to information and communications technology (ICT) from official statistics**  
 Stratos Moschidis, Athanasios Thanopoulos  
**Hierarchical clustering for anonymization of economic survey data**  
 Kiyomi Shirakawa, Takayuki Ito  
**Improvement of training data based on pattern of reliability scores for overlapping classification**  
 Yukako Toko, Mika Sato-Ilic, Shinya Iijima
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- 14.00 – 15.20 SP5: Data science education I (President's invited session)**  
 organized by B. Lausen and T. Chadjipadelis  
**Chair:** Berthold Lausen Room V  
**Progress of statistics and data science education in Japanese universities**  
 Akimichi Takemura  
**Before Teaching Data Science, Let's First Understand How People Do It**  
 Rebecca Nugent
- 
- 15.20 – 16:10 Plenary Invited: Modeling Networks and Network Populations via Graph Distances**  
**Sofia Olhede**  
**Chair:** Christian Hennig Plenary Hall
- 
- 16.10 – 17:00 Plenary Invited: Principles for building your own machine learning methods: From theory to applications to practice**  
**Theodoros Evgeniou**  
**Chair:** Odysseas Moschidis Plenary Hall
- 
- 17.00 – 17.30 Coffee Break**
- Parallel Sessions**
- 
- 17.30 – 18.50 CONTR5: Dimension reduction and clustering I**  
**Chair:** Alfonso Iodice D'Enza Room I  
**Simultaneous clustering and dimension reduction on multi-block data**  
 Shuai Yuan, Katrijn Van Deun  
**Model-based hierarchical parsimonious clustering and dimensionality reduction**  
 Carlo Cavicchia, Maurizio Vichi, Giorgia Zaccaria  
**Active labeling using model-based classification**  
 Cristina Tortora  
**Chunk-wise PCA with missings**  
 Alfonso Iodice D'Enza, Angelos Markos, Francesco Palumbo
-

- 17.30 – 18.50** **CONTR6: Correspondence analysis I**  
**Chair:** Giannoula Florou Room II  
**Multidimensional data analysis of shopping records towards knowledge-based recommendation techniques**  
George Stalidis, Pantelis Kaplanoglou, Kostas Diamantaras  
**Principal Component Analysis to explore social attitudes towards the green infrastructure plan of Drama city**  
Vassiliki Kazana, Angelos Kazaklis, Dimitrios Raptis, Efthimia Chrisanthidou, Stella Kazakli, Nefeli Zagourgini  
**MCA's visualization techniques: an application to social data**  
Vasileios Ismyrlis, Efstratios Moschidis, Theodoros Tarnanidis
- 
- 17.30 – 18.50** **SP6: Data analysis in finance**  
organized by K. Jajuga  
**Chair:** Krzysztof Jajuga Room III  
**Sentiment and return distributions on the German stock market**  
Emile David Hövel, Matthias Gehrke  
**Risk management based on conditional extreme quantile risk measures on energy market**  
Grażyna Trzpiot, Alicja Ganczarek-Gamrot, Dominik Krężolek  
**Comparison of systemic risk in the banking sector and selected sectors of real economy – case of Poland**  
Katarzyna Kuziak, Krzysztof Piontek  
**Credit risk with credibility theory: a distribution-free estimator for probability of default, value at risk and expected shortfall**  
Anne Sumpf
- 
- 17.30 – 18.50** **CONTR7: Algorithms for clustering and classification I**  
**Chair:** Akinori Okada Room IV  
**Flexible clustering**  
Andrzej Sokołowski, Małgorzata Markowska  
**A coefficient of determination for clusterwise linear regression with mixed-type covariates**  
Salvatore Ingrassia, Roberto Di Mari  
**Triplet clustering of one-mode two-way proximities**  
Akinori Okada, Satoru Yokoyama
- 
- 17.30 – 18.50** **SP7: Data science education II (President's invited session)**  
organized by B. Lausen and T. Chadjipadelis  
**Chair:** Theodore Chadjipadelis Room V  
**Societal responsibility of data scientists**  
Ursula Garczarek, Detlef Steuer  
**Data Science Education, Skills and Industry in Europe**  
Berthold Lausen, Alexander Partner, Stephen Lee, Henrik Nordmark, Mahdi Salhi, Christopher Saker  
**Discussion on Data Science Education**  
moderated by Berthold Lausen, Theodore Chadjipadelis
- 
- 18.50 – 19:40** **Plenary Invited: Correspondence analysis: Jack of all trades, Master of one**  
Michael Greenacre  
**Chair:** Patrick Groenen Plenary Hall
- 
- 19:40 - 20:15** **Data Science, Elections and Government**  
Theodoros Livanios, *Deputy Minister for Local Government and Elections, Greece* Plenary Hall



## Wednesday, 28<sup>th</sup> August 2019

08.00 – 09.00 Registration

### Parallel Sessions

09.00 – 10.40 **SP8: Classification methods in economics and business**

organized by J. Pocięcha

**Chair:** Józef Pocięcha

Room I

**Analysis of statistical tests indications in assessing data conformity to Benford's Law in fraud detection**

Józef Pocięcha, Mateusz Baryła

**Conditional extreme quantile risk measures on metals market**

Dominik Krężolek, Grażyna Trzpiot

**Fuzzy clustering with skew components, with applications in Economics and Business**

Francesca Greselin, Luis Angel Garcia-Escudero, Agustín Mayo-Isacar

**Distance measurement and clustering when fuzzy numbers are used. Survey of selected problems and procedures**

Jozef Dziechciarz, Marta Dziechciarz Duda

**The impact of the publication of short selling positions on German stock returns**

Matthias Gehrke, Jannis Kepper

09.00 – 10.40 **CONTR8: Topic models, document clustering and classification I**

**Chair:** Boris Mirkin

Room II

**Japanese women's attitudes towards childrearing: text analysis and multidimensional scaling**

Kunihiro Kimura

**Using domain taxonomy for computational generalization**

Boris Mirkin, Dmitry Frolov, Susana Nascimento, Trevor Fenner

**Detection of topics and time series variation in consumer web communication data**

Atsuh Nakayama

**Making product recommendations based on latent topics: an analysis of online purchase data with topic models**

Johanna Fischer

**Quantitative analysis of phonological structure used in dialects in Osamu Dazai's works**

Naoko Oshiro, Sayaka Irie, Mingzhe Jin

09.00 – 10.40 **CONTR9: Supervised learning and applications II**

**Chair:** Katrijn Van Deun

Room III

**Isotonic boosting procedures for classification**

Miguel Fernández, David Conde, Cristina Rueda, Bonifacio Salvador

**Development of indices for the regional comparative analysis of musical compositions, focusing on rhythm**

Akihiro Kawase, Mitsuru Tamatani

**View selection through meta-learning**

Wouter van Loon, Marjolein Fokkema, Botond Szabo, Mark de Rooij

**The  $\delta$ -machine: Classification based on distances towards prototypes**

Beibei Yuan, Willem Heiser, Mark de Rooij

**09.00 – 10.40 SP9: Classification, visualisation and dimension reduction II**

organized by N. J. le Roux

**Chair:** Niël J le Roux

Room IV

**Tree-base ensemble methods for classification**

Daniel Uys

**Unsupervised feature selection and big data**

Renato Cordeiro De Amorim

**A simulation study for the identification of missing data mechanisms using visualisations**

Johané Nienkemper-Swanepoel, Niël J le Roux, Sugnet Lubbe

**Using separate sampling to understand mobile phone security compliance**

Rénette Blignaut, Isabella Venter, Humphrey Brydon

**09.00 – 10.40 SP10: Clustering categorical and mixed-type data**

organized by C. Tortora

**Chair:** Cristina Tortora

Room V

**Model based clustering through copulas: parsimonious models for mixed mode data**

Dimitris Karlis, Ioannis Kosmidis, Fotini Panagou

**Clustering ranked data using copula**

Marta Nai Ruscone

**Linking different kinds of omics data through a model-based clustering approach**

Vincent Vandewalle, Camille Ternynck, Guillemette Marot

**A probabilistic distance algorithm for nominal data**

Francesco Palumbo, Mario Migliaccio, Cristina Tortora

**Stability of joint dimension reduction and clustering**

Michel van de Velden, Angelos Markos, Alfonso Iodice D'Enza

**10.40 – 11.10 Coffee Break**

**Parallel Sessions**

**11.10 – 12.50 CONTR10: Algorithms for clustering and classification II**

**Chair:** Francesco Palumbo

Room I

**Hierarchical clustering through a penalized within-cluster sum-of-squares criterion**

Patrick Groenen, Yoshikazu Terada, Mariko Takagishi

**PerioClust: a new Hierarchical Agglomerative Clustering method including temporal ordering constraints**

Lise Bellanger, Arthur Coulon, Philippe Husi

**Iterated dissimilarities and some applications**

François Bavaud

**Constrained three-way clustering around latent variables approach**

Véronique Cariou, Tom Wilderjans

**Clustering binary data by application of combinatorial optimization heuristics**

Javier Trejos, Luis Amaya, Alejandra Jiménez, Alex Murillo, Eduardo Piza, Mario Villalobos

**11.10 – 12.50 CONTR11: Classification and clustering in biological and medical research II**

**Chair:** Fionn Murtagh

Room II

**Testing for equation of distance-based regressions to see whether two groups form a species**

Christian Hennig, Bernhard Hausdorf





**Mental health: analytical focus and contextualization for deriving mental capital**

Fionn Murtagh

**A deep learning analytics to detect prognosis of HCC**

Taerim Lee

**Analysis of the regional difference of number of patients with blood coagulation disorders in Japan**

Shinobu Tatsunami, Kagehiro Amano, Akira Shirahata, Masashi Taki

**11.10 – 12.50 CONTR12: Data science in economics and business I**

**Chair:** Tadashi Imaizumi

Room III

**Analysis of the Power Balance of the companies of the "keiritsu" with the Asymmetric MDS**

Tadashi Imaizumi

**A fast-electric vehicle planner using clustering**

Jaël Champagne Gareau, Vladimir Makarenkov, Éric Beaudry

**The technology innovation and the critical raw material stock**

Beatrix Margit Varga, Kitti Fodor

**Knowledge graph mining and affinity analysis for product recommendation on online-marketplace platforms**

Siti Nur Muningggar, Reza Aditya Permadi, Simon Simbolon, Verra Mukty, Putri Wikie Novianti

**Pension expenditure modelling and classification analysis**

Kimon Ntotsis, Marianna Papamichail, Peter Hatzopoulos, Alex Karagrigoriou

**11.10 – 12.50 SP11: Supervised classification with imprecise labels and complex data**

organized by A. Montanari

**Chair:** Angela Montanari

Room IV

**Estimation of classification rules from partially classified data**

Geoffrey McLachlan

**Classification with imperfect training labels**

Timothy Cannings, Yingying Fan, Richard Samworth

**Classification with unknown class conditional label noise on non-compact feature spaces**

Henry Reeve, Ata Kaban

**Supervised classification of long or unbalanced datasets**

Laura Anderlucci, Roberta Falcone, Angela Montanari

**11.10 – 12.50 CONTR13: Modeling of psychological processes and clustering in educational research**

**Chair:** Eva Ceulemans

Room V

**Kernel change point detection on the running statistics: A flexible, comprehensive and user-friendly tool**

Eva Ceulemans, Jedelyn Cabrieto, Kristof Meers, Janne Adolf, Peter Kuppens, Francis Tuerlinckx

**School motivation profiles of students in secondary education**

Matthijs Warrens, Denise Blom

**Probing the nature of psychological constructs with Taxometrics and Latent Class Analysis:**

**The case of children's mental models**

Dimitrios Stamovlasis, Julie Vaiopoulou, George Papageorgiou

**On the use and reporting of cluster analysis in educational research: A systematic review**

Hanneke van der Hoef, Matthijs Warrens, Marieke Timmerman

11.10 – 14.00 **Poster Session**

Poster Area

**Chairs:** Sofia Anastasiadou, Odysseas Moschidis

**The relationship of the apolipoprotein E genotype gene to the Alzheimer's Disease: A meta-analysis**

Sofia Anastasiadou

**Bayesian analysis for chromosomal interactions in hi-c data using hidden Markov random field model**

Osuntoki Intunu, Andrew Harrison, Hongsheng Dai, Yanchun Bao, Nicolae Zabet

**New financial instruments: Pollution emission rights and their trading on the stock exchange**

Argiro Dimitoglou

**Econometric assessment of the relation between the situation of youth on the labour market and macroeconomic situation among the EU countries**

Beata Bal-Domańska, Elżbieta Sobczak

**Comparison of pattering methods: Clustering of variables, Implicative Statistical Analysis and Correspondence Analysis**

Sofia Anastasiadou

**Framing coworking spaces digital marketing strategy via social media analytics**

Dimitrios Vagianos, Nikos Koutsoupas

**Sales performance measure: A systematic review and typology of research studies**

Tor Korneliussen, Per Ivar Seljeseth, Michael Greenacre

**Document clustering via multiple correspondence, term and metadata analysis in R**

Nikos Koutsoupas, Kyriakos Mikelis

**Comparison of multivariate methods in group/cluster identification: PCA vs Discriminant Analysis and K-Means clustering**

Sofia Anastasiadou

**Asymptotic cumulants of the minimum phi-divergence estimator for categorical data under possible model misspecification**

Haruhiko Ogasawara

**Multidimensional data analysis in perception of European Union by different generations**

Agnieszka Stanimir

13.00 – 14.00 **Mid-day Break**

14.00 – 14.50 **Presidential Address: Predictive ensemble methods for event time data**

Berthold Lausen

**Chair:** Angela Montanari

14.50 – 15.40 **Plenary Invited: On the consistency of supervised learning with missing values**

**Julie Josse**

**Chair:** Angelos Markos

Plenary Hall

15.40 – 16.10 **Coffee Break**

**Parallel Sessions**

16.10 – 17.10 **SP12: New developments in clustering and scaling data**

organized by J. F. Vera & E. Boj del Val

**Chair:** Jose Luis Vicente-Villardón

Room I

**A cellwise trimming approach to Cluster Analysis**

Luis Angel Garcia-Escudero, Diego Rivera-García, Joaquín Ortega, Agustín Mayo-Iscar



**Redundancy analysis for categorical data based on logistic regressions**

Jose Luis Vicente-Villardón, Laura Vicente-Gonzalez

**A log-ratio approach to cluster analysis of count data when the total is irrelevant**

Marc Comas-Cufí, Josep Antoni Martín-Fernández, Glòria Mateu-Figueras, Javier Palarea-Albaladejo

**16.10 – 17.10 SP13: Developments of data analysis in Greece**

organized by I. Papadimitriou and T. Chadjipadelis

**Chair:** Giannoula Florou

Room II

**Doing research and teaching data analysis in Greek higher education**

Iannis Papadimitriou, Vicky Bouranta

**Data Analysis Bulletin**

Dimitris Karapistolis, Marina Sotiropoulou

**The Past, the Presence and the Future (round table)**

Ilias Athanasiadis, Giannoula Florou, Georgia Panagiotidou

**16.10 – 17.10 CONTR14: Symbolic data**

**Chair:** Paula Brito

Room III

**Clustering and classification of interval time series**

Ann Maharaj, Paula Brito, Paulo Teles

**Multiple-valued symbolic data clustering using regression mixtures of Dirichlet distributions**

José Dias

**Visualization of heterogeneity in exploratory meta-analysis**

Masahiro Mizuta

**16.10 – 17.10 CONTR15: Multivariate visualization**

**Chair:** Adalbert Wilhelm

Room IV

**QVisVis: Framework and R toolkit for Exploring, Evaluating, and Comparing Visualizations**

Stephen L. France, Ulas Akkucuk

**Visual exploration for feature extraction and feature engineering**

Adalbert Wilhelm

**Multivariable analysis on the use of social media & web 2.0/3.0. Modeling & clustering of users**

Evangelia Nikolaou Markaki, Theodore Chadjipadelis

**16.10 – 17.10 CONTR16: Data science in economics and business II**

**Chair:** George Stalidis

Room V

**Probabilistic collaborative representation learning**

Aghiles Salah, Hady Lauw

**User profiling for a better search strategy in e-commerce website**

Putri Wikie Novianti, Fatia Kusuma Dewi

**Comparison of the sharing economy participants' motivation**

Roland Szilágyi, Levente Lengyel

**17.10 – 18.00 Plenary Invited: Model-based clustering without parametric assumptions**

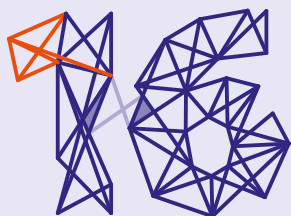
**David Hunter**

**Chair:** Akinori Okada

Plenary Hall

**18.00 – 19.45** IFCS Council Meeting

**19.10** Bus City Tour





## Thursday, 29<sup>th</sup> August 2019

08.00 – 09.00 Registration

### Parallel Sessions

09.00 – 10.40 **SP14: Clustering for spatio-temporal data and its visualization**

organized by K. Kurihara

**Chair:** Koji Kurihara

Room I

**Classification of suicidal execution area in Japan by areal statistics of committed suicide**

Takafumi Kubota

**Visualization and provision method of meteorological data for Energy Management System**

Yoshiro Yamamoto

**Spatial perception for structured and unstructured data in topological data analysis**

Yoshitake Kitanishi, Fumio Ishioka, Masaya Iizuka, Koji Kurihara

**Dimensional reduction clustering with modified outcome method**

Kensuke Tanioka, Hiroshi Yadohisa

09.00 – 10.40 **SP15: Emerging methodologies in economics and finance**

organized by T. Papadimitriou and P. Gogas

**Chair:** Theophilos Papadimitriou

Room II

**Forecasting transportation demand for the U.S. market**

Vasilios Plakandaras, Theophilos Papadimitriou, Periklis Gogas

**Money neutrality, monetary aggregates and machine learning**

Emmanouil Sofianos, Theophilos Papadimitriou, Periklis Gogas

**Forecasting S&P 500 spikes: an SVM approach**

Athanasios-Fotios Athanasiou, Theophilos Papadimitriou, Periklis Gogas

**Assessing the resilience of the U.S. banking system**

Anna Agrapetidou, Theophilos Papadimitriou, Periklis Gogas

09.00 – 10.40 **SP16: Analysis of European parliament elections**

organized by T. Exadaktylos, T. Chadjipadelis

**Chair:** Theodore Chadjipadelis

Room III

**What was really the case? Party competition in Europe at the occasion of the 2019 European Parliament Elections**

Theodore Chadjipadelis, Eftichia Teperoglou

**First-time voter in Greece: Views and attitudes of youth on Europe and Democracy**

Georgia Panagiotidou, Theodore Chadjipadelis

**Developing a model for the analysis of the political programmes**

Theodore Chadjipadelis, Panagiotis Paschalidis

**How the undecided voters decide?**

George Siakas

09.00 – 10.40 **CONTR17: Topic models, document clustering and classification II**

**Chair:** Kunihiro Kimura

Room IV

**Improving the performance of Japanese authorship attribution with phonetic related information**

Hao Sun, Mingzhe Jin

**Double helix multi-stage text classification model to enhance chat user experience in e-commerce website**

Figry Revadiansyah, Abdullah Ghifari, Rya Meyvriska

**Latent dimensions of the museum experience: the role of the online reviews**

Melisa Diaz, Anna Calissano

**A corpus-based approach to explore the stylistic peculiarity of Kouji Uno's postwar works**

Xueqin Liu, Mingzhe Jin

## 10.40 – 11.10 Coffee Break

### Parallel Sessions

#### 11.10 – 12.50 **CONTR18: Network analysis and applications**

**Chair:** Vladimir Batagelj

Room I

**The analyses of the WoS data on network clustering**

Anuška Ferligoj, Vladimir Batagelj, Patrick Doreian

**Approximate core-and-shell supercluster in statics and dynamics**

Boris Mirkin

**Trust your data or not - Standard remains Standard (QP); implications for robust clustering in social networks**

Immanuel Bomze, Michael Kahr, Markus Leitner

**Classifying users through keystroke dynamics**

Ioannis Tsimperidis, George Peikos, Avi Arampatzis

#### 11.10 – 12.50 **SP17 Neutral Benchmarking Studies of Clustering**

organized by the IFCS Cluster Benchmarking Task Force

**Chair:** Iven Van Mechelen, **Moderator:** Christian Hennig

Room II

**Introduction**

Matthijs Warrens

**K-means, spectral clustering, or DBSCAN: a benchmarking study**

Irene Cho, Nivedha Murugesan, Cristina Tortora\*

**Benchmarking minimax linkage**

Xiao Hui Tai, Kayla Frisoli

**Benchmarking in cluster analysis for mixed-type data**

Madhumita Roy, Jarrett Jimeno, Cristina Tortora\*

**Comparison of dimensionality reduction and cluster analysis methods for high dimensional datasets**

Jingfei Gong, Yuwen Luo, Cristina Tortora\*

**Evaluation of text clustering methods and their dataspace embeddings: an exploration**

Alain Lelu, Martine Cadot

\*video-recorded presentation

#### 11.10 – 12.50 **SP18: Advances in classification analysis for complex data – compositional and symbolic approaches**

organized by N. Kejžar, S. Korenjak-Černe, A. Srakar

**Chair:** Simona Korenjak-Černe

Room III

**Clustering transformed compositional data using K-means, with applications in gene expression and bicycle sharing system data**

Antoine Godichon-Baggioni, Cathy Maugis-Rabusseau, Andrea Rau





**Entrepreneurial regimes classification: a symbolic polygonal clustering approach**

Andrej Srakar, Marilena Vecco

**Distances and discriminant analysis for microbial communities composition to classify inflammatory bowel diseases**

Glòria Mateu-Figueras, Pepus Daunis-i-Estadella, Mireia López-Siles, Josep Antoni Martín-Fernández

**Symbolic data analysis of gender-age-cause-specific mortality in European countries**

Filipe Afonso, Aleša Lotrič Dolinar, Simona Korenjak-Černe, Edwin Diday

**11.10 – 12.50 SP19: Clustering, classification and data analysis via mixture models**

organized by P. McNicholas

**Chair:** Brian Franczak

Room IV

**Clustering multivariate count data using a family of multivariate Poisson log-normal distributions**

Sanjeena Dang

**Growth mixture modeling with measurement selection**

Abby Flynt, Nema Dean

**On the use of multiple scaled distributions for outlier detection and model-based learning**

Brian Franczak, Antonio Punzo, Cristina Tortora

**Skewed distributions or transformations? Accounting for skewness in cluster analysis**

Michael Gallaugher, Paul McNicholas, Volodymyr Melnykov, Xuwen Zhu

**13.00 – 14.00 Mid-day Break**

**14.00 – 14.50 Plenary Invited: Clustering in networks**

**Vladimir Batagelj**

**Chair:** Angela Montanari

Plenary Hall

**Parallel Session**

**14.50 – 15.50 CONTR19: Dimension reduction and clustering II**

**Chair:** Vartan Choulakian

Room I

**Clustering of variables using CDPCA**

Adelaide Freitas

**A study of the variable outlyingness ranking that is obtained using different loading similarity coefficients**

Sopiko Gvaladze, Kim De Roover, Francis Tuerlinckx, Eva Ceulemans

**Some properties of coherent clusters of rank data**

Vartan Choulakian

**14.50 – 15.50 CONTR20: Classification and regression trees** Skype Presentations

**Chair:** Iven van Mechelen

Room II

**C443: A methodology to see a forest for the trees**

Iven Van Mechelen, Aniek Sies

**Assessing how feature selection and hyper-parameters influence optimal trees ensemble and random projection**

Nosheen Faiz, Naz Gul, Metodi Metodiev, Andrew Harrison, Zardad Khan, Berthold Lausen

**Residual diagnostics for model-based trees for ordinal responses**

Rosaria Simone, Carmela Cappelli, Francesca Di Iorio

- 
- 14.50 – 15.50** **CONTR21: Functional data** Room III
- Chair:** Tomasz Górecki
- Measuring and testing mutual dependence for functional data**  
Tomasz Górecki, Mirosław Krzyśko, Waldemar Wołyński
- A co-clustering method for multivariate functional curves**  
Amandine Schmutz, Julien Jacques, Charles Bouveyron, Laurence Chèze, Pauline Martin
- One-way repeated measures ANOVA for functional data**  
 Łukasz Smaga
- 
- 14.50 – 15.50** **SP20: Statistical theory of cluster analysis** Room IV
- organized by D. Hunter
- Chair:** David Hunter
- Hidden Markov models for continuous multivariate data with missing responses**  
 Fulvia Pennoni
- Mixtures of cluster-weighted models with latent factor analyzer structure**  
 Sanjeena Dang
- Specification of basis spacing for process convolution Gaussian process models**  
Herbert Lee, Waley Liang
- 
- 14.50 – 15.50** **CONTR23: Classification and clustering in biological and medical research III** Room V
- Chair:** Taerim Lee
- Comparison of hierarchical clustering methods for binary data from SSR and ISSR molecular markers**  
Emmanouil Pratsinakis, Lefkothea Karapetsi, Symela Ntoanidou, Angelos Markos, Panagiotis Madesis, Ilias Eleftherohorinos, George Menexes
- Inspecting smoking addiction of youth in Turkey through a latent class analysis**  
Ali Mertcan Köse, Elif Çoker
- Data analysis on the annual use of the new deferasirox formulation in pediatric thalassemia patients**  
 Alkistis Adramerina, Aikaterini Teli, Symeon Symeonidis, Nikoleta Printza, Antonios Papastergiopoulos, Labib Tarazi, Emmanouil Chatzipadelis, Marina Economou
- 
- 15.50 – 16.20** **Coffee Break**
- Parallel Sessions**
- 
- 16.20 – 17.40** **SP21: Crossroads of statistical learning and psychometrics** Room I
- organized by M. de Rooij
- Chair:** Mark de Rooij
- Recursive partitioning of longitudinal and growth curve models**  
 Marjolein Fokkema
- Bayesian regularization in probabilistic PCA with sparse weights matrix**  
 Davide Vidotto
- Gaussian process panel modeling – statistical learning inspired analysis of longitudinal panel data**  
Julian Karch, Andreas Brandmaier, Manuel Voelkle
- Finding the hidden link: Sparse common component analysis**  
 Katrijn Van Deun
-



16.20 – 17.40 **CONTR22: Correspondence analysis II**

**Chair:** Michel van de Velden

Room II

**Variants of three-way correspondence analysis: An R package**

Rosaria Lombardo, Michel van de Velden, Eric Beh

**Another view of Correspondence Analysis through Design and Projection matrices and General Linear Models**

George Menexes, Angelos Markos, Emmanouil Pratsinakis

**Implicative and conjugative variables in the context of Correspondence Analysis**

Odysseas Moschidis, Angelos Markos

**Combined use of Correspondence Analysis and Ordinary kriging to display “supplementary” values of quantitative variables onto the factorial planes**

Georgios Menexes, Thomas Koutsos

16.20 – 17.40 **CONTR24: Model-based clustering**

**Chair:** Geoffrey McLachlan

Room III

**On missing label patterns in semi-supervised learning**

Daniel Ahfock, Geoffrey McLachlan

**Bayesian nonparametric mixture modeling for ordinal regression**

Athanasios Kottas, Maria DeYoreo

**Assessment of recent social attitudes in Japan: a latent class item response theory model for web survey data**

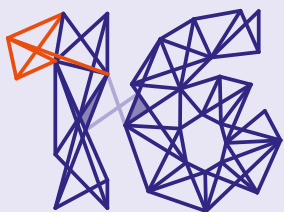
Fulvia Pennoni, Miki Nakai

17.40 – 18.10 Benchmarking Challenge Award

Presentation of IFCS-2021

Closing Ceremony

Plenary Hall





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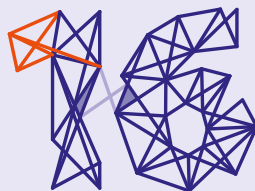


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