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Unidades de I&D : Entrega de Relatórios Científicos e Confirmação de Equipas de Investigação (2008)  
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Centro de Estatística e Aplicações da Universidade de Lisboa (15-04-2008 12:48:44)

### **Objectives & Achievements**

This part of the report will allow you to describe the way in which the Unit is organized and managed, to give the general objectives of the research within the Unit and finally to give a brief description of the main achievements of the research carried out in the Unit as a whole during the 2007 period. A maximum number of characters (without spaces) is allowed in each field. If the number of characters exceeds the maximum you will not be able to complete the form and an error message will appear when you try to save your work.

1. Unit Description (2000 ca.)

#### **Here indicate form of organization and management.**

The Center of Statistics and Applications of University Lisbon (CEAUL-Centro de Estatística e Aplicações da Universidade de Lisboa), created in 1975, is a Unit I&D, close to Department of Statistics and Operations Research (DEIO) of Faculty of Sciences of the University of Lisbon (FCUL:Host Institution), which offers physical facilities to CEAUL- infrastructures, installations, budget management and contribution of a technician - to the prosecution of CEAUL's activities in accordance with article 2 of the Regulation of Program of Financing Plurianual of I&D (PFP I&D); financial support is assured in the picture of PFP I&D FCT, being the Foundation of FCUL the Management Institution.

The Internal Organization of CEAUL's team (43 PhD members in 31 December 2007) is systematized in Research Groups (GI's), sharing similar scientific interests in Applied Probability, Statistical Inference, Probability Modelling and Data Analysis, but with diverse emphasis in methods and applications and accordingly with the Planning Subproject of each senior Principal Investigator. The GI's are encouraged to interact between them in its activities, whenever that is appealing. The GI's for 2007-2010 are:

- GI 1: Order Statistics, Extremes and Applications
- GI 2: Probability, Modelling and Data Analysis
- GI 3: Statistical Modelling in Environmental and Life Sciences
- GI 4: Applied Multivariate Data Analysis and Modelling

The 4 groups leaders, together with the elect Coordinator and Vice-Coordinator, are the core of the scientific panel whose responsibility is to monitor and inflect the main goals of the research unit, and to rule the investment policies. The Internal Regulation of CEAUL provides a Scientific Committee, which approves in a plenary meeting the general guidelines of Scientific and Financial management: a part of the budget for common expenses (Periodicals and Books for the Library, Common Software and Informatics Assistance as well as maintenance of WebPage) and the remaining is shared among the GI's, according to the number of PhDs in each GI. There is a scientific as well as a financial autonomy of the GIs, which integrate other collaborators too.

In last years, our strategy includes an increase of the space for Library, the strongest in Portugal in this field and opens to the scientific community. All members have their own computers and those from DEIO have their offices. Nowadays, space facilities also include two rooms for visitors.

2. General Objectives (3000 ca.)

**This refers to the current aims of the Unit as a whole.**

This I&D Unit plays a central role in Portugal as a Research Center in Probability, Statistics and its Applications, developing multidisciplinary activities that aim to carry out research in domains as diverse as Health Sciences and Biology, Financial Risk and hazards posed by nature in Geophysics and Environment, Statistics of Extremes, Computational Statistics and Simulation, Resampling Methodologies, Quality Control, Bayesian Statistics, Biostatistics, Genomics and Proteomics, Survival Analysis, Clinical Trials, Time Series, Data Analysis, Sampling, Psychology, Automatic Classification, Temporal and Spatial Statistics, Design of Experiments and Teaching of Statistics. The main objective of CEAUL is to contribute to the development of new theoretical framework and of methodological issues addressed to applications to real problems, making efforts to correct use of Statistics in Society and Academics. That is attained through different inter-linked activities, among which we mention Conferences and Seminars, Scientific Publications both in National and International peer review journals, Post-graduate courses (MSc, PhD), support in Statistics and an updated Library to community.

A major objective has been the implementation and production of REVSTAT – Statistical Journal, an International Journal in the area of Probability and Statistics in English. [1 vol. (= 3 issues) a year] Journal, ISSN 1645-6726, <http://www.ine.pt/revstat/index.html>, edited by National Institute of Statistics (INE). Some of the senior members of CEAUL are deeply involved with the implementation of this project, which has been a success among international and national scientific academy. Another big project in which several CEAUL members have been attached was the organization of the largest International Statistical Conference – 56th Session ISI Int Stat. Institute, in Lisbon. Next to this, a special issue of REVSTAT in Extremes and Applications, has been organized by some members of CEAUL. The link CEAUL/SPE (Portuguese Statistical Society) has also been one objective under schedule.

Each GI had specific research objectives for the period under observation, which had been fulfilled.

Main objectives of GI1 were in the fields of Extreme Value Theory (EVT), Statistical Process Control and Outliers (parameters of rare events - Extreme Value Index and Value-at-Risk, VaR; Tests for Extremes; Heavy tails; max-semi-stable laws.

GI2, whose main interests lies in Probability Models, the interplay of Probability, Calculus and Functional Analysis, consulting and Applied Probability in Life Sciences and in Social Sciences, traditionally interacts with Group GI1, namely in the development of formal models for spacings, methodological handling of asymptotic issues in sums (and randomly stopped sums) and extremes (resp. randomly stopped extremes).

The objectives of GI3 have been focused in the contribution in modelling environmental and biological data as well as to start creating, a group with expertise in analyzing data coming from these fields. Some themes involving Extremes in Environment interact with group GI1.

Group GI4 was focused in modelling analysis for extracting knowledge from large multivariate data sets (data mining), specially in Behavioural Sciences, Education and Biomedicine.

3. Main Achievements during the year of 2007 (3000 ca.)

**Highlights from past research over the period under evaluation.**

CEAUL as a whole was able to increase substantially the scientific production relatively to the previous period, as FCT Database clearly shows, and even exceeded in some of forecasted scientific indicators. Special effort has been taken on publication in what would be widely regarded as the mainstream high quality journals in each field, leading to a large number of publications: peer review papers in international journals and in national periodicals. An extensive list of CEAUL publications can be found in [http://www.ceaul.fc.ul.pt/publicacoes\\_internacionais.html](http://www.ceaul.fc.ul.pt/publicacoes_internacionais.html) (about 65 international publications)

and

[http://www.ceaul.fc.ul.pt/publicacoes\\_nacionais.html](http://www.ceaul.fc.ul.pt/publicacoes_nacionais.html) (about 40 national publications)

There has been a special effort focused in published communications – a significant proportion are invited - in international conferences and almost at national meetings, mainly in SPE Annual Conferences.

Although these publication efforts, CEAUL members have not disregarded the national counterpart of their teaching duties involving the Bologna Reform in superior courses and the supervision of PhD and MSc students.

Aside from publication in the mainstream domains in the areas of Probability and Statistics, there has been a great investment in communicating the interest of Statistics to the layman and attracting young students to the area (conferences in secondary schools, help to journalists dealing with statistical matters, conference at Gulbenkian Foundation in the “Despertar para a Ciência” series, consulting activities, involvement in MSc in Mathematics for secondary school teachers.

The collaboration in the Portuguese Statistical Glossary, jointly with SPE, has given large steps towards its concretization in a near future.

Interaction with CEAUL and national and international research groups has been reinforced, and evidenced by publications in cooperation. Besides its traditional research strong points (e.g. Extremes, Bayesian Statistics and Data Analysis) CEAUL has launched important areas such as Biostatistics and Biomedical applications of Statistics and Environmental Statistics, with a strong investment in spatio-temporal data analysis.

Cooperation with life sciences research groups has been reinforced; namely, participation in forensic research, on discriminant analysis applied to dental identification, interaction with transfusional authority and study of the blood groups distribution across Portugal, lecturing on methanalytical synthesis in the Health Superior School and Faculty of Pharmacy of Lisbon.

Another achievement to highlight in this last period is joining efforts in organizing small Workshops, focused essentially in appealing themes shared by several groups, which constitutes a strategy for optimizing the resources and interchanging ideas between GI's; that was particularly visible in the recent SEER2007 Workshop (Statistical Extremes and Environmental Risk) organized mainly by GI1&GI3, which made possible a successful concentration in Lisbon of statisticians (both with theoretical or more applied profile) and practitioners from fields in a wide band of environmental areas and from different nationalities. <http://seer2007.fc.ul.pt/>

#### **Activities**

This part of the report will allow you to describe general activities of the Unit that are aimed at integrating the research of various groups of which multidisciplinary and/or trans-disciplinary activities are of particular relevance. The second part is aimed to describe work that the Unit does to extend beyond the scientific environment and to reach the general public, schools or other forms of engaging the public in the work of the Unit.

1. Integrative/multidisciplinary activities during the year of 2007 (3000 ca.)

#### **Special activities that aim to carry out research across disciplines.**

There has been a direct evidence of interaction between the theoretical and applied components of the work, in particular of doctoral students. Moreover, there has been a considerable effort on theoretical issues reinforced with involvement in applications to real world.

CEAUL is an associate from CIM (International Center for Mathematics), which aims at promoting research in Mathematics, giving facilities for the organization of meetings in mathematics and many interdisciplinary conferences; Ivette Gomes belongs to the Board of Directors and Amaral-Turkman to the Scientific Council. CEAUL interacted with CIM through seminars and workshops (recently Amaral-Turkman organized a Workshop on Statistics in Genomics and Proteomics (March 2007).

We highlight below some of the Groups integrative/multidisciplinary activities in 2007:

There has been a few informal contacts between Group GI1 and with the “Instituto Português da Qualidade” to try introducing in the industry the recent developed robust methods in Statistical Process Control.

In Group GI2, we refer the joint projects with the Center for Molecular Sciences and Materials, University of Lisbon, planning the experimental protocol for the optimization of stir bar sorptive extraction for the determination of polybrominated diphenyl ethers in environmental matrices, and of restoration of a Limestone Quarry, in cooperation with the Centro de Ecologia e Biologia Vegetal; modeling extremes and

financial data (cooperating with A. Menezes Azores team on credit scoring and micro-credit); statistical translation: publication of the English-Portuguese for the ISI Multilingual on-line Glossary, and the workshops on translation of Statistics (for Tradúlinguas) investment in Biostatistics: edition of a special issue of the SPE Bulletin on Biostatistics, collaboration with IGC on the doctoral program in Neurosciences and Computational Biology, doctoral program in Biophysics, and Meta-analysis at the Faculty of Pharmacy.

We also highlight some of GI 3 activities: Modelling very large wildfire sizes; Evolution of the human resources of the Faculty of Sciences of Lisbon and projections for 2020; Application of methods of multivariate analysis to the study of grapevine leaves and mature berries in order to identify metabolites that could discriminate among five important Portuguese grape varieties; collaboration with researchers from Escola Nacional de Saúde Pública Sergio Arouca, Brasil on the relation between job stress and interruption of the habitual activities due to health problems; collaboration with researchers from PALOPS in epidemiological studies.

Several members of group GI4 have made an strong involvement in collaboration with colleagues of other areas (e. g. Behavioural Sciences, Education and Biomedicine) with a pedagogical goal: to teach how to use statistics. Also, this team has made a substantial effort in applied projects very valuable for the CEAUL as a whole. There has also been co-orientation of MSc and PhD thesis in Educational Sciences and Psychology.

2. Outreach activities during the year of 2007 (3000 ca.)

**Science and Society/general public/schools, etc.**

CEAUL played an important role in promoting Statistics in Science, Society and Schools. Namely:

a) M. E. Graça Martins has a prominent role in ALEA project (<http://alea-estp.ine.pt/>, jointly with INE), and her activity is recognized as a landmark in improving the teaching of Statistics at secondary schools level. Also, several members (F.Oliveira, L. C. Castro, Amaral-Turkman) were responsible for the revision of basic and secondary school books of Mathematics (Probability and Statistics) and several members visited schools, to address teachers and students on the role of Statistics in Society and full citizenship. M. I. Fraga Alves has been a member of GEBS that supports the Board Direction of SPM (Mathematical Portuguese Society) for these levels of Education, elaborated appreciations on specialty of Probability and Statistics for the official examinations of Mathematics to secondary school level.

b) Dinis Pestana has been invited by Calouste Gulbenkian Foundation to prepare a conference in the series "Despertar para a Ciência", attended at Gulbenkian Foundation by over 1000 students, and repeated at Coimbra, Faro and Viseu. On the other hand, D. Pestana has helped journalists to present Probability and Statistics principles when dealing with popular matters such as euromillions or elections forecasting. Several members of the group have been presenting Statistics to the general public, in conferences at schools and at the Portuguese Red Cross, collaboration with the media on explaining risk assessment and hazard games and lotteries.

c) With respect to activities outside the academic world, we emphasize, the role played by D Pestana as a consultant of the Alta Autoridade para a Comunicação Social and the role of L Gonçalves in the Project "Epidemiologia e controlo da Leptospirose nos Açores".

d) CEAUL members are always willing to help other researchers in data analysis; a fine example is the contribution of Mendes Leal to data analysis in a Medicine PhD, Fac Med Sci, New Univ Lisbon – "Comorbilidade das doenças crónicas" (Dra. Isabel Santos). Some of these acknowledged publications are deposited in a folder.

e) During this period the Center reinforced cooperative work in subject-matter journals, particularly in the areas of Biology and Health Sciences; for more details see [http://www.ceaul.fc.ul.pt/publicacoes\\_internacionais.html](http://www.ceaul.fc.ul.pt/publicacoes_internacionais.html)

f) D. Paulino, L Carvalho and D. Pestana were in the taskforce from SPE (Portuguese Statistical Society) that, in cooperation with the SBE (Brazilian Statistical Society), worked out the Portuguese part in the ISI multilingual Statistics dictionary. This can be seen in <http://www.spestatistica.pt/>,

g) Aside from the regular International Seminar program several conferences for general audiences were organized, namely the "Colóquio e Debate sobre O Ensino da Estatística a Nível Superior" (speakers: Prof. Fred Smith (University of Southampton, UK), Prof. Dinis Pestana e Prof. João Branco(IST) ). January de 2007.

A list of National and International Conferences can be found in <http://www.ceaul.fc.ul.pt/cs.html>.

h) The extensive list of regular International Seminar program can be found in

<http://www.ceaul.fc.ul.pt/cs.html>):

speakers: John Einmahl (Department of Econometrics - Tilburg University - The Netherlands); Susana Rosado Ganhão (Fac. Arquitectura/UTL); R. D. Reiss - Probability Theory and Mathematical Statistics (University of Siegen - Germany); Rui Paulo Baptista Paulo (ISEG/UTL); Jorge M. Mendes (ISEGI/UNL).

### General Indicators

This section is a simple summary table describing the total number of PhD researchers within the Unit along time, as well as the total number of completed Masters and PhDs during the year of 2007

	2007
<b>Nº of Researchers (FTE)*</b>	41
<b>Masters Completed in the Period</b>	4
<b>PhDs Completed in the Period</b>	16

\* Full Time equivalent researcher refer exclusively to PhDs. 1PhD with equal of more than 20% dedicated to research in the Unit is equal to 1.0 FTE.

### Research Groups

In this last section of the report you have the names of each Research Group and the Principal Investigators that were proposed to the period 2007-2010 period. You have to confirm whether the Group was part of the Unit during 2007 or insert the Research Groups that made up the unit, if they are not present on this list. Once the table is completed each individual Research Group can start filling in their individual form by pressing on the group's name.

By following the link in the groups name you will be able to access the individual form of the group.

To remove a given group you need to select the checkbox and press "-REMOVE"(4).

Group:	Principal Investigator
Statistical Modelling in Environmental and Life Sciences RG-MATH-LVT-Lisboa-6-951	Maria Antonia Conceição Abrantes Amaral Turkman
Order Statistics, Extremes and Applications RG-MATH-LVT-Lisboa-6-948	MARIA IVETTE LEAL DE CARVALHO GOMES
Probability, Modelling and Data Analysis RG-MATH-LVT-Lisboa-6-949	Dinis Duarte Ferreira Pestana
Applied Multivariate Data Analysis and Modelling RG-MATH-LVT-Lisboa-6-1519	Maria Helena Bacelar Valente da Costa Nicolau

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### Group Description

Please confirm here the name of the group, the Host Institution in which the Principal Investigator is located, four Key words that best describe your work and finally in concise form indicate mains sources of funding for the research of your group. Include all types of funding, like FCT projects, FCT Base, as well as funding from other institutions. You should indicate an approximate amount in EUROS, and the source to which the funds apply.

1. Group Name/Designation

Order Statistics, Extremes and Applications

(RG-MATH-LVT-Lisboa-6-948)

2. Principal Investigator

MARIA IVETTE LEAL DE CARVALHO GOMES

3. Location of Group (Host Institution)

Faculdade de Ciências da Universidade de Lisboa

4. Keywords

Extreme Value

Order Statistic

Statistical Qua

Risk Theory

5. Funding, source, dates (1000 ca.)

- CEAUL Research Project :

FCT/Prog.Fin.Plurianual 2003-2005/MAT/sub-project nº756

"Exploratory Data Analysis, Order statistics , Outliers and Extremes " (Order Statistics and Extremes).

Principal Investigator: Prof. Maria Ivette Leal Carvalho Gomes

Sub-project starting date: 01-01.2003; finishing date: 31-03-2007.

Funding: 137.640 Eur

- FCT/POCI/MAT/58876/2004

"ERAS — EXTREMES, RISK, SAFETY and the ENVIRONMENT"

Principal Investigator: M. Ivette Gomes

Starting: March 1, 2005; Finishing: December 31, 2007

Funding: 45720 Euros

- FCT/PPCDT/ MAT/58876/2004

"ERAS — EXTREMES, RISK, SAFETY and the ENVIRONMENT"

Principal Investigator: M. Ivette Gomes

Starting: January 1, 2007; Finishing: November 30, 2008

Funding: 14280 Euros.

- FCT/ PTDC/MAT/64924/2006

"EXES — SPATIAL EXTREMES"

Principal Investigator: Laurentius de Haan

Starting: July 2007; Finishing: July 2010

Funding: 60000 Euros

### **PI & Researchers**

In this section indicate first the PhD researchers that make up the group by selecting them from the list of researchers integrated in the Unit. In the second section you can indicate whether other PhD researchers not integrated in the Unit collaborate with group by typing their public key. Finally in the last part you should include all the non-PhDs members of the group.

#### 1. Researchers in the Group (**PhD. Only**) (1)

Ana Maria Santos Ferreira Gorjão Henriques (Professor Auxiliar)

Björn Jochen Vandewalle (Outra)

Fernanda Otilia de Sousa Figueiredo (Professor Auxiliar)

Fernando Manuel Fialho Rosado (Professor Catedrático)

José António da Conceição Palma (Outra)

Laurentius Franciscus Maria de Haan (Professor Catedrático)

Luisa da Conceicao dos Santos do Canto e Castro de Loura (Professor Associado)

Maria Cristina Souto Miranda (Professor-Adjunto)

MARIA ISABEL FRAGA ALVES (Professor Associado)

MARIA IVETTE LEAL DE CARVALHO GOMES (Professor Catedrático)

Maria Manuela Costa Neves Figueiredo (Professor Catedrático)

Sandra Cristina Pires Dias (Professor Auxiliar)

#### 2. Other Researchers in the Group (**PhD.**) (2)

Ana Paula André Martins (Professor Auxiliar)

Helena Maria Simões Ferreira (Professor Catedrático)

Luísa Maria Jota Pereira Amaral (Professor Auxiliar)

Maria da Graca Santos Temido Neves Mendes (Professor Auxiliar)

3. Other Researchers in the Group (**non PhD.**) (2)

Hugo Filipe Valente dos Santos Pereira (Outra)

Ligia Carla Pinto Henriques Jorge Rodrigues (Professor-Adjunto)

Maria Manuela Caria Figueira de Sá Neves (Professor-Adjunto)

Paula Cristina Martins dos Reis (Outra)

Paulo Jose Araujo dos Santos (Outra)

### **Objectives & Achievements**

In this section please describe the main objectives and achievements of the group during the 2007 period . If the number of characters is more than the permitted maximum you will not be able to complete the form.

1. Objectives (2000 ca.)

The main objectives of the team for 2007 were essentially in the field of Statistics of Extremes and applications to Insurance, Finance and Environmental Statistics, but also in fields as diverse as Statistical Quality Control, Robustness and Outliers, where order statistics play a prominent role. The recently developed minimum variance reduced bias estimators, devised for heavy tails, are expected to play an important role in the estimation of other relevant parameters of extreme events. The same comment applies to the PORT methodology, with PORT standing for Peaks Over Random Threshold. Semi-stable models have also deserved our attention. Those objectives were essentially related to the following topics:

1. Development of new estimation procedures of parameters of extreme events, like the extreme value index, the primary parameter in the analysis of almost disastrous events, as well as the Value at Risk, and in a dual way, probabilities of exceedances of high thresholds. A deeper study of the second and third order structure in statistics of extremes, with the development of new estimators of scale and shape second order parameters, together with the derivation of their asymptotic and finite sample behaviour.

2. Testing of extremal models, under parametric and semi-parametric set-ups, with the development of new test statistics that obey adequate optimality conditions. Characterization of max-semi-stable and other non max-stable laws, together with their possible relevance in applications.

3. Exploratory data analysis and extremes, with particular emphasis to the fields of statistical quality control, robustness and outliers' identification.

4. Identification of the extremal and central behaviour of specific univariate and multivariate time series. Solving optimality problems in statistics of extremes. Spatial extremes. Development of new methods of estimation of parameters of extreme events relevant in the analysis of weakly dependent structures.

2. Main Achievements (2000 ca.)

In 2007, 2 didactic books have been published and 2 other books edited, [O3] and [O4]. Going back to the 4 topics in the objectives:

1. Apart from [P2]--[P8] and [O5], the accommodation of bias in the log-excesses led to a paper accepted at J.Roy.Statist.Soc.B, and the accommodation of bias in the excesses led to SPE 2007 prize (see CEAUL 17/2007). We also refer 2 papers on Reduced-bias estimation accepted at Test and Revstat, and CEAUL 11/2007, on the PORT Methodology, accepted at Comm.Statistics:Comput.&Simul. We have devised and studied a new estimator, the mixed moment estimator (CEAUL 14/2007, submitted). Two related preprints were accepted at Statist.&Probab.Letters and Revstat. Additionally, we refer 20 publications (7 in the national book, "Estatística: Ciência Interdisciplinar" (E-CI), 4 in [O3], 1 related with the XV SPE, 5 in ISI Bull. and 3 related with EVA 2007).

2. We refer a review paper on Statistics of Extremes for IID Data. Part of it has been accepted at Extremes, and partially presented as an invited talk at EVA 2007. We refer also 1 paper in a national journal, and 4 additional publications (1 in E-CI, 1 at [O3], 1 at ISI Bull. and 1 related with EVA 2007). See also [P10]. On max-semistable models, we refer 1 paper in a national journal, the submission of 2 preprints, and 5 additional publications (2 in E-CI, 1 (beyond [O6]) at [O3], 1 in ISI Bull. and 1 related with EVA 2007).

3. See CEAUL 7/2007, on Dependent Control Statistics, a paper on Extreme Values in Reliability, to



appear at Encyclopedia of Quantitative Risk Assessment, and CEAUL 6/2007, on the limit model for a series/parallel system. We also refer 6 additional publications (1 in E-CI, 2 in XV SPE, 1 related with ISBIS 2007, and 2 in ISI Bull.).

4. The main achievement on spatial extremes was a paper accepted at Ann.Appl.Probab. CEAUL 8, 9 and 10/2007, as well as a preprint on Portfolio Selection with Secondary Risk Indicators have been submitted. On the extremal index, we had a paper accepted at J.Comput.Statist.& Data Analysis and CEAUL 12/2007, still under evaluation. We refer also 10 additional papers (3 in E-CI, 1 at [O3], 3 in ISI Bull., 2 related with EVA 2007 and 1 related with XV SPE).

### Productivity

This section refers to the research output of the group during the 2007. From the list provided choose the items that you want to complete and a field will appear. Follow the instructions provided in each item. You are not required to fill in all the items only those for which your group has output. Please note that for peer reviewed publication you must include impact factor and number of citations. If these indicators are not available you must include that publication as **Other Publications**.

Publications in peer review Journals (3000 ca.)

(Up to a max of 10. Always indicate at the end of the citation, impact factor of the journal (IF=) and number of citations (n° C=). Give title and full citation in original language. DO NOT translate)

Remark: In the ISI Web of Knowledge, the Impact Factor (IF) for 2007 is not yet available. We have used the 2006 IF, whenever there is a 2006 reference to the journal. For the number of citations, we provide two indicators: the Thomson (NCT) and the Google Scholar (NCG). We use the notation n/a for non-available.

[P1] Barão, M.I., de Haan, L. and Li, D. (2007). Comparison of estimators in multivariate EVT. International J. of Statistics and Systems 2, 75-91 (IF=n/a, NCT=n/a, NCG=1).

[P2] Caeiro, F. and Gomes, M.I. (2007). A new class of estimators of a "scale" second order parameter. Extremes 9, 193-211 (IF=n/a, NCT= n/a, NCG=4).

[P3] Fraga Alves, M.I., Gomes, M.I., de Haan., L. and Neves, C. (2007). A note on second order conditions in extreme value theory: linking general and heavy tails conditions. Revstat 5 (3), 285-305 (IF=n/a, NCT= n/a, NCG=n/a).

[P4] Gomes, M.I., Martins, M.J. and Neves, M. (2007). Improving second order reduced bias extreme value index estimation. Revstat 5 (2), 177-207 (IF=n/a, NCT=n/a, NCG=2).

[P5] Gomes, M.I., Miranda, C. and Viseu, C. (2007). Reduced-bias tail index estimation and the Jackknife methodology. Statistica Neerlandica 61(2), 243-270 (IF=0.552, NCT=1, NCG=1).

[P6] Gomes, M.I. and Pestana, D. (2007). A simple second order reduced bias' tail index estimator. J. Statist. Comput. and Simulation 77(6), 487-504 (IF=0.215, NCT=2, NCG=4).

[P7] Gomes, M.I. and Pestana, D. (2007). A sturdy reduced bias extreme quantile (VaR) estimator. J. Amer. Statist. Assoc. 102, No. 477, 280-292 (IF=2.171, NCT=2, NCG=5).

[P8] de Haan, L. (2007). Comments on "plotting positions in extreme value analysis". J. Applied Meteorology and Climatology 46 (3), 396-396 (IF=n/a, NCT=n/a , NCG=n/a).

[P9] Hall, A. and Temido, M.G. (2007). On the maximum term of MA and Max-AR models with margins in Anderson's class. Theory of Probability and its Applications 51 (2), 291-304 (IF=0.299, NCT=n/a , NCG=2).

[P10] Neves, C. and Fraga Alves, M.I. (2007). Semi-parametric approach to the Hasofer-Wang and Greenwood statistics in Extremes. Test 16 (2), 297-313 (IF=0.581, NCT= n/a, NCG=2).

Other publications (3000 ca.)

(Include only Books, chapters or full papers published in conference proceedings up to max of 10. Give title and full citation in original language)

NATIONAL JOURNALS:

[O1] Gomes, M. I. (2007). A "Escola de Extremos em Portugal": Memorial da Escola. Boletim da Sociedade Portuguesa de Estatística, Primavera 2007, 37-51.

#### BOOKS (authorship):

[O2] Figueiredo, F., Figueiredo, A., Ramos, A. e Teles, P. (2007). *Estatística Descritiva e Probabilidades – Problemas Resolvidos e Propostos com Aplicações em R*. Escolar Editora, Lisboa, Portugal, ISBN: 978-972-592-221-7 (viii+407 pages).

#### BOOKS (edition):

[O3] Fraga Alves, M.I., Gomes, M.I., de Haan, L. and Turkman, K.F. (2007). *Statistical Extremes and Environmental Risk (SEER 2007)*. CEAUL eds. ISBN:978-972-8859-69-5 (94 páginas).

[O4] Gomes, M.I., Pestana, D. and Silva, P. (2007). *ISI 2007 Book of Abstracts*. CEAUL, INE and ISI eds, ISBN:978-972-8859-71-8 (lxv+689 páginas).

#### CHAPTERS of BOOKS

[O5] Gomes, M.I., Reiss, R.-D. and Thomas, M. (2007). *Reduced-Bias Estimation*. In Reiss, R.-D. and Thomas, M., *Statistical Analysis of Extreme Values with Applications to Insurance, Finance, Hydrology and Other Fields*, 3rd edition, Chapter 6, 189-204, Birkhäuser Verlag.

#### PROCEEDINGS

[O6] Dias, S. and Canto e Castro, L. (2007). *Is there evidence of log-periodicities in the tail of the distribution of seismic moments?* In Fraga Alves et al. (eds.), *Statistical Extremes and Environmental Risk*, 35-38, CEAUL Editions.

[O7] Ferreira, A. and Ferreira, H. (2007). *Estimation of the Extremal Index in Stationary Sequences under a Specified Stability Condition*. In Gomes, M.I., Pestana, D. and Silva, P. (eds.), *ISI 2007 Book of Abstracts*, CEAUL, INE and ISI editions, 321 (+electronic publication of *The Bulletin of the ISI*).

[O8] Miranda, C. and Gomes, M.I. (2007). *Comparison of Tail Index Estimators in Dependent Structures*. In Gomes, M.I., Pestana, D. and Silva, P. (eds.), *ISI 2007 Book of Abstracts*, CEAUL, INE and ISI eds, 324 (+electronic publication of *The Bulletin of the ISI*).

[O9] Neves, M., Martins, M.J. and Gomes, M.I. (2007). *Extreme Value Index Estimation: a Look at Kernel-type Estimators*. In Gomes, M.I., Pestana, D. and Silva, P. (eds.), *ISI 2007 Book of Abstracts*, CEAUL, INE and ISI editions, 324 (+electronic publication of *The Bulletin of the ISI*).

[O10] Vandewalle, B. (2007). *A robust estimator for the tail index of Pareto-type distributions*. In Fraga Alves et al. (eds.), *Statistical Extremes and Environmental Risk*, 83-84, CEAUL Eds.

Master and Ph.D. thesis completed (3000 ca.)

Ph. D. Thesis:

[PhD1] Dias, Sandra. "Inferência Estatística em Modelos Max-semiestáveis". Dezembro 2007, Universidade de Lisboa.

Supervisor: L. Canto e Castro.

M. Sc. Thesis:

[MSc1] Pedro Manuel Dias Gomes (2007). *Comparação Assintótica de Estimadores Semi-paramétricos do Índice de variação Regular*, DEIO, FCUL.

Supervisor: M. Ivette Gomes.

[MSc2] Conceição, Sandra (2007\*). "Modelos de Mutação em Microssatélites e Inferência Filogenética". Universidade de Lisboa. Orientador: L. Canto e Castro.

[MSc3] Cunha, Luísa (2007\*). "Modelos Rasch e escalas de Likert e Thurstone na medição de atitudes". Universidade de Lisboa. Orientador: L. Canto e Castro.

[MSc4] Freitas, Ana Subtil (2007\*). "Significância Estatística em Testes de Hipóteses Simultâneos: uma Abordagem Envolvendo Modelos de Mistura". Universidade de Lisboa. Orientador: L. Canto e Castro.

[MSc5] Soares, Marta (2007\*). "Stochastic processes in Cost-effectiveness analysis in Health Care". Universidade de Lisboa. Orientador: L. Canto e Castro.

\*Submitted but not discussed

Organization of conferences (2000 ca.)

- "Statistics of Extremes and Environmental Risk (SEER 2007)", February 15-17, 2007, Faculdade de Ciências de Lisboa. Local organizers: M. Isabel Fraga Alves, M. Ivette Gomes, Laurens de Haan and K. Feridun Turkman.

- Statistics of Extremes and Environmental Risk (SEER 2007), February 15-17, 2007, FCUL.

Local organizers: M. Isabel Fraga Alves, M. Ivette Gomes, Laurens de Haan and K. Feridun Turkman.

- 5th Conference on Extreme Value Analysis — Probabilistic and Statistical Models and their Applications, Bern, Switzerland, July, 23-27, 2007. M.Ivette Gomes and Laurens de Haan were members of the Scientific Committee and invited speakers.

See: <http://www.imsv.unibe.ch/eva2007/index.html>.

- The XV Annual Conference of the Portuguese Statistical Society, a national conference, held in Lisboa, 19-21st August, 2007.

- ISI 2007 (56th Session of the International Statistical Institute), Lisboa, August 22-29, 2007. M. Ivette Gomes was the Chair of the Local Program Committee (LPC), member of the Scientific International Committee (SIC) and Vice-Chair of the Local Organizing Committee (LOC). M. Isabel Fraga Alves and Fernando Rosado were members of the LPC.

For more details see: <http://www.isi2007.com.pt/>

- IASC 07 (Statistics for Data Mining, Learning and Knowledge Extraction), Aveiro, Aug. 30 – Sept. 1, 2007. Cristina Miranda was a member of the LPC.

Details available at: <http://www2.mat.ua.pt/iasc07/>

- 2º Encontro Nacional da SPMet — Metrologia e Inovação, Funchal, October 3 and 4, 2007.

M. Ivette Gomes was a member of the Scientific Committee.

Thematic Sessions

- Extremes, Risk and the Environment. Invited Session to the 56th Session of the ISI, Lisboa, Portugal, August 2007.

Organization: M. Isabel Fraga Alves.

- Statistical Modelling of Earthquakes and Tsunamis: Lisbon 1755. Invited Session to the 56th Session of the ISI, Lisboa, Portugal, August 2007.

Organization: M. Luísa Canto e Castro and Jef Teugels

Meetings under preparation in 2007:

- Meeting SPE/CIM on "Statistical Extremes", Fevereiro 15, 2008. Organizer: M. Luísa Canto e Castro. Speakers from CEAUL: M. Ivette Gomes, Laurens de Haan and Ana Ferreira.

- COMPSTAT 2008, Porto, 24 a 29 de Agosto, 2008. Fernanda Figueiredo belongs to the Local Organizing

Committee.

Details available at: <http://www.fep.up.pt/compstat08/>

- 6th Conference on Extreme Value Analysis — Probabilistic and Statistical Models and their Applications (EVA 2009), Fort-Collins, Colorado, 22-26 de Julho, 2009.

M. Ivette Gomes has accepted the invitation to be a member of the "Scientific Committee".

Industry contract research (2000 ca.)

There has been a few contacts with the Portuguese Institute of Quality ("Instituto Português da Qualidade") to try introducing in the industry the recent developed robust methods in Statistical Process Control.

However, there is not yet any formal contract.

Internationalization (2000 ca.)

(Collaborative publication, Research, Graduate Training Networks or other forms of participation of the Research Group at the international level)

Most of the members of this team have kept several international contacts and are well-recognized internationally, particularly in the area of statistics of extremes, but also in the areas of environmental statistics, financial statistics and risk assessment theory. In 2007 there was collaborative publication with the following researchers: Beirlant, J.; Buishand, T.; Christmann, A.; Geluk, J.; Hubert, M.; Li, D.; Peng, L.; Reiss, R.-D.; Silva, P.; Thomas, M.; Vandewalle, B.; de Vries, C.; Zhou, C. The organization of the 56th Session of the International Statistical Institute, in Lisbon, with a strong collaboration of several members of this team, helped Portugal to become well-known internationally in the whole area of Statistics. This internationalization was without doubt responsible for the recent appointments of M. Ivette Gomes, as Associate Editor of the journal *Extremes* (Laurens de Haan is also an associate editor), after an invitation by Jurg Husler, the recently appointed Editor-in-Chief of the journal, as well as of the *Journal of Statistical Planning and Inference*, after an invitation by N. Balakrishnan, the Executive Editor of the journal. We also would like to emphasize the strong co-operation with researchers in the Erasmus School of Economics, Erasmus University Rotterdam and the Tinbergen Institute, where Laurens de Haan is supervising the Ph.D. thesis of C. Zhou. The research contacts with the Katholieke Universiteit Leuven, have also become more and more strong in recent years, as can be inferred from papers written jointly with Jan Beirlant and Bjorn Vandewalle, a CEAUL Post-Doc student in 2005/2006 and 2006/2007. Strong research contacts have also been kept with T.A. Buishand (Royal Netherlands Meteorological Institute), Dejuan Li (Bern University, Switzerland), Holger Drees (Saarland University, Germany), Jan Picek (Liberec University, Check Republic), a CEAUL Post-Doc student in 2003/2004, Jap Geluk (The Petroleum Institute, United Arab Emirates), John Einmahl (Tilburg University, The Netherlands), Jurg Husler (Bern University, Switzerland), Liang Peng (Georgia Polytechnical Institute, USA), R.-D. Reiss (Siegen University, Germany), among others.

Concerning scientific membership, M.I. Fraga Alves became in 2007 an Elected member of the ISI-International Statistical Institute (M.I. Gomes and F. Rosado are also Elected members of the ISI).

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Centro de Estatística e Aplicações da Universidade de Lisboa (15-04-2008 12:48:44)

### Group Description

Please confirm here the name of the group, the Host Institution in which the Principal Investigator is located, four Key words that best describe your work and finally in concise form indicate mains sources of funding for the research of your group. Include all types of funding, like FCT projects, FCT Base, as well as funding from other institutions. You should indicate an approximate amount in EUROS, and the source to which the funds apply.

1. Group Name/Designation

Probability, Modelling and Data Analysis

(RG-MATH-LVT-Lisboa-6-949)

2. Principal Investigator

Dinis Duarte Ferreira Pestana

3. Location of Group (Host Institution)

Faculdade de Ciências da Universidade de Lisboa

4. Keywords

Probability mo

Stoped sums

Longitudinal d

Small sample

5. Funding, source, dates (1000 ca.)

- CEAUL Research Project ---

FCT/Prog.Fin.Plurianual 2003-2005/MAT/sub-project nº1227

"Count data, random sums and analytical methods in statistical modeling of the real world " (Modelling the Real World) .

Principal Investigator : Prof. Dinis Duarte Ferreira Pestana

Sub-project starting date 01-01.2003; finishing date: 31-03-2007.

Funding: 117.300 Eur

### PI & Researchers

In this section indicate first the PhD researchers that make up the group by selecting them from the list of researchers integrated in the Unit. In the second section you can indicate whether other PhD researchers not integrated in the Unit collaborate with group by typing their public key. Finally in the last part you should include all the non-PhDs members of the group.

#### 1. Researchers in the Group (**PhD. Only**) (1)

Dinis Duarte Ferreira Pestana (Professor Catedrático)

Helena Maria Iglésias Pereira (Professor Associado)

Jorge Filipe Campinos Landerset Cadima (Professor Associado)

Maria de Fátima Almeida Brilhante (Professor Auxiliar)

Maria Helena Neves de Queirós Gonçalves (Professor Auxiliar)

Maria Madalena de Freitas Malva (Outra)

Maria Salomé Esteves Cabral (Professor Associado)

Sandra Maria Freitas Mendonça (Professor Auxiliar)

Sílvio Filipe Velosa (Professor Auxiliar)

Tiago André Lamas Oliveira Marques (Outra)

#### 2. Other Researchers in the Group (**PhD.**) (2)

Maria Eugénia Santos Lino Pires Graça Martins (Professor Associado)

Miguel Luís Simões Marques dos Santos (Outra)

Rita Maria César e Sá Fernandes de Vasconcelos (Professor Associado)

#### 3. Other Researchers in the Group (**non PhD.**) (2)

fernando jose araujo correia da ponte sequeira (Assistente Convidado)

João Paulo Oliveira Martins (Outra)

Maria Fernanda Nunes Diamantino (Assistente Convidado)

Miguel Martins Felgueiras (Outra)

Paulo José Figueira Semblano (Outra)

Ricardo Augusto Domingues Gomes de Sá e Sousa (Professor-Adjunto)

Rui Filipe Vargas de Sousa Santos (Outra)

Sandra maria da Silva Figueiredo Aleixo (Outra)

### Objectives & Achievements

In this section please describe the main objectives and achievements of the group during the 2007 period . If the number of characters is more than the permitted maximum you will not be able to complete the form.

#### 1. Objectives (2000 ca.)

(Quotation from the 2007 document):

1. To develop a general theory of beta randomly extended Panjer's families, and their bearing in stopped sums and stopped maxima, and issues on N-infinite divisibility, N-self-decomposability and N-stability.

2. To develop extensions of Panjer-Sundt-Jewell results on aggregate claims, for Pestana and Velosa's class of randomly extended Panjer stopped sums.

3. To work out extensions of studentization and analysis of scale for comparison of locations in non-gaussian symmetric distributions, with research on robustness properties; and for beta, Pareto and gamma distributions, using the inverse integral transform methods derived by Pestana, Rocha and Brilhante.

4. To investigate link regression in the extended Panjer distributions.

5. Research on parametric and non-parametric methods for longitudinal models.
6. Consistent use of conjugate distributions to investigate large deviations and saddlepoint approximations.
7. Applications of Zipf-Mandelbrot and discrete lognormal distributions in modeling biological and linguistic data.
8. Distance sampling and ratio estimators, and error modeling, namely error in covariates issues.
9. Structure of hyperexponential mixtures, and their use in modeling computer jobs.
10. Teaching of Statistic, namely a discussion on teaching discrete models, will be a research interest

2. Main Achievements (2000 ca.)

1. partially achieved in [Ph2], [1], [P1] and [P4].
2. partially achieved in [Ph2], [1], [P1] and [P4].
3. [P5]
4. postponed.

5. Aside from the achievements described in the Internalization heading below, this team started joint projects with the Center for Molecular Sciences and Materials, University of Lisbon, planning the experimental protocol for the optimization of stir bar sorptive extraction for the determination of polybrominated diphenyl ethers in environmental matrices, and of restoration of a Limestone Quarry, in cooperation with the Centro de Ecologia e Biologia Vegetal. Cf. also Publications [3], [6], [7] and [P3], [MSc1].

6. [CB2], [MSc2]

7. postponed

8. [2], [8], [Ph1].

9. postponed.

10. Eugénia Graça Martins had a leading role at the Project Alea, that recently has been awarded the Best Cooperative Project Award of the International Statistical Literacy Project.

Aside from the above mentioned achievements directly connected with the objectives, this team made major investments in

- application of Statistics in modeling extremes and financial data ([4], [5], [P2]), cooperating with A. Menezes Azores team on credit scoring and micro-credit.
- presenting Statistics to the general public [CB1], conferences in schools and at the Portuguese Red Cross, collaboration with the media on explaining risk assessment and hazard games and lotteries;
- statistical translation: publication of the English-Portuguese for the ISI Multilingual on-line Glossary, and the workshops on translation of Statistics (for Tradulínguas) [NJ1];
- investment in Biostatistics: international team dealing with DMM [9], edition of a special issue of the SPE Bulletin on Biostatistics, collaboration with IGC on the doctoral program in Neurosciences and Computational Biology, doctoral program in Biophysics, and Meta-analysis at the Faculty of Pharmacy.
- investment on the Portuguese contribution to the early development of Probability and Statistics [B2], namely at the ISI 56th Session.

**Productivity**

This section refers to the research output of the group during the 2007. From the list provided choose the items that you want to complete and a field will appear. Follow the instructions provided in each item. You are not required to fill in all the items only those for which your group has output. Please note that for peer reviewed publication you must include impact factor and number of citations. If these indicators are not available you must include that publication as **Other Publications**.

Publications in peer review Journals (3000 ca.)

(Up to a max of 10. Always indicate at the end of the citation, impact factor of the journal (IF=) and number of citations (n° C=). Give title and full citation in original language. DO NOT translate)

Remark: In the ISI Web of Knowledge, the Impact Factor (IF) for 2007 is not yet available. We have used the 2006 IF, whenever there is a 2006 reference to the journal. For the number of citations, we provide two indicators: the Thomson (NCT) and the Google Scholar (NCG). We use the notation n/a for non-available.

[1] Brilhante, M. F., and Kotz, S. Infinite divisibility of the spacings of a Kotz-Kozubowski-Podgórski generalized Laplace model, to appear in the 2008 issue of Statistics and Probab. Letters.

[2] Buckland, S.T., Borchers, D.L., Johnston, A., Henrys, P.A. , and Marques, T.A. (2007). Line transect methods for plant surveys. Biometrics 63: 989-998.

[3] Cabral, M. S., Serôdio, P., and Nogueira, J. M. F. (2007). Use of Experimental Design in the Optimization of a Stir Bar Sorptive Extraction for the Determination of Polybrominated Diphenyl Ethers in Environmental Matrices. J. Chromatography A1141, 259-270.

[4] Gomes, M.I. and Pestana, D. (2007). A simple second order reduced bias' tail index estimator. J. Statist. Comput. and Simulation 77(6), 487-504 (IF=0.215, NCT=2, NCG=4).

[5] Gomes, M.I. and Pestana, D. (2007). A sturdy reduced bias extreme quantile (VaR) estimator. J. Amer. Statist. Assoc. 102, No. 477, 280-292 (IF=2.171, NCT=2, NCG=5).

[6] Gonçalves, M. H., and Azzalini, A. (2008). Using Markov chains for marginal modelling of binary longitudinal data in an exact likelihood approach, to appear in 2008 issue of Metron.

[7] Gonçalves, M. H., Cabral, M. S., Ruiz de Villa, M. C., Escrich, E., and Solanas, M. (2007). Likelihood approach to count data in longitudinal experiments. Comput. Statistics Data Analysis 51, 6511-6520.

[8] Marques, T. A., Thomas, L., Fancy, S. G. and S. T. Buckland (2007). Improving estimates of bird density using multiple covariate distance sampling. The Auk. 124: 1229-1243.

[9] Soares de Almeida, L. M., Requeña, L., Rütten, A., Kutzner, H., Garbe, C., Pestana, D., and Marques Gomes, M. (2008). Desmoplástico maligno melanoma: a clínico-patológico análise de 113 casos. American J. Dermatopathology, to appear in the 2008 July issue.

Other publications (3000 ca.)

(Include only Books, chapters or full papers published in conference proceedings up to max of 10. Give title and full citation in original language)

NATIONAL JOURNALS:

[NJ1] Pestana, D., e Ventura, C. (2008). O Glossário de Expressões Estatísticas da SPE, uma Ferramenta (Também) para Tradutores, Boletim da Sociedade Portuguesa de Estatística, 8-18.

BOOKS (edition):

[B1] Gomes, M.I., Pestana, D. and Silva, P. (2007). ISI 2007 Book of Abstracts. CEAL, INE and ISI eds, ISBN:978-972-8859-71-8 (lxv+689 páginas).

[B2] Mendonça, S., Pestana, D., and Sousa Santos, R. (2007) Diogo Pacheco d'Amorim's The Elements of Probability Calculus — diplomatic edition, with side by side facsimile and English translation with anotações, electronic edition, <http://www.estg.ipleiria.pt/~rsantos>

CHAPTERS of BOOKS

[CB1] Pestana, D. (2007). Os Desastres de Sofia, in Despertar para a Ciência, Novos Ciclos de



Conferências, Gradiva, 275-332.

[CB2] Pestana, D, e Mendonça, S. (2007). Normal?, in Estatística, Ciência Interdisciplinar, 43-58.

#### PROCEEDINGS

[P1] Aleixo, S., Brilhante, F., Diamantino, F., Mendonça, S., and Pestana, D. (2007). Non-Response and Sample Size, In Gomes, M.I., Pestana, D. and Silva, P. (eds.), ISI 2007 Book of Abstracts, CEAUL, INE and ISI editions, 321 (+electronic publication of The Bulletin of the ISI).

[P2] Gomes, M.I. and Pestana, D. (2007). A Note on the Asymptotic Variance at Optimal Levels of a Bias-corrected Hill Estimator. In Gomes, M.I., Pestana, D. and Silva, P. (eds.), ISI 2007 Book of Abstracts, CEAUL, INE and ISI editions, 321 (+electronic publication of The Bulletin of the ISI).

[P3] Gonçalves, M. H., and Cabral, M. S. (2007). Modelling longitudinal count data with overdispersion, In Gomes, M.I., Pestana, D. and Silva, P. (eds.), ISI 2007 Book of Abstracts, CEAUL, INE and ISI editions, 321 (+electronic publication of The Bulletin of the ISI).

[P4] Malva, M., S. Mendonça, S., D. Pestana, D., and Sequeira, F. (2007). Dispersion Index, Panjer Stopped Sums, and Variance of Mixtures, In Gomes, M.I., Pestana, D. and Silva, P. (eds.), ISI 2007 Book of Abstracts, CEAUL, INE and ISI editions, 321 (+electronic publication of The Bulletin of the ISI).

[P5] Martins, J. P. , and Pestana, D. (2007). Extensions of the delta method, In Gomes, M.I., Pestana, D. and Silva, P. (eds.), ISI 2007 Book of Abstracts, CEAUL, INE and ISI editions, 321 (+electronic publication of The Bulletin of the ISI).

Master and Ph.D. thesis completed (3000 ca.)

Ph. D. Thesis:

[Ph1] Marques, Tiago, Incorporating Measurement error and density gradients in distance sampling surveys, Un. St.Andrews. Supervisors: Steve Buckland and Dinis Pestana

[Ph2] Velosa, Sílvio, Padrões de Aleatoriedade na Modelação do Acaso, Universidade de Lisboa, Supervisor: Dinis Pestana

M. Sc. Thesis:

[MSc1] Bispo, Regina, Estudo sobre a adaptação dos modelos log-lineares à ordinalidade e à presença de zeros amostrais em tabelas de contingência, Universidade de Lisboa, Supervisor: Dinis Pestana.

[MSc2] Dias, Maria Osvaldo, Famílias Exponenciais, Universidade de Lisboa, Supervisor: Dinis Pestana. Organization of conferences (2000 ca.)

Collaboration in the ISI 56th Session Book of Abstracts [B1].

Internationalization (2000 ca.)

(Collaborative publication, Research, Graduate Training Networks or other forms of participation of the Research Group at the international level)

Eugénia Graça Martins had a leading role at the Project Alea, that recently has been awarded the Best Cooperative Project Award of the International Statistical Literacy Project.

Salomé Cabral collaborates in the Immune recovery after Autologous Stem Cell Transplantation - modulation by Ig and potential clinical application, developed at Gulbenkian Science Institute (Instituto Gulbenkian de Ciência, IGC) in collaboration with IPO, Lisbon, and Mayo Clinic, Rochester, MN, USA.

Salomé Cabral and her co-workers began cooperation with the Departamento Estadística. Facultad de Biología. Universidad de Barcelona and the Departamento de Biología Celular y Fisiología, Facultad de Medicina. Universidad Autónoma de Barcelona on Likelihood approach for count data in longitudinal experiments [7].

Helena Gonçalves [6] published joint work with A. Azzalini. Fátima Brilhante published joint work [1] with Samuel Kotz.

Tiago Marques actively collaborates with Steve Buckland's research and services group at the University

of St.Andrews, and namely he entered the international teams that estimated the number of polar bears in Laponia, and the number of whales and narwhals in Greenlanb using distance sampling methods. He published with members of that team [2] and [8].

Dinis Pestana collaborated with the German based group of dermaphatologists designing the research and performing the satistical data analysis about desmoplastic malignant melanoma [9].

Dinis Pestana co-edited the ISI 56th Session Book of Abstracts [B1].

Dinis Pestana is member of the Portuguese-Brazilian team that worked out the Portuguese Glossary of Statistics, now included in the on-line ISI Multilingual Glossary of Statistics.

José Cruz, from Angola University, enrolled as Ph. D. student under the supervision of Dinis Pestana.

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Centro de Estatística e Aplicações da Universidade de Lisboa (15-04-2008 12:48:44)

### Group Description

Please confirm here the name of the group, the Host Institution in which the Principal Investigator is located, four Key words that best describe your work and finally in concise form indicate mains sources of funding for the research of your group. Include all types of funding, like FCT projects, FCT Base, as well as funding from other institutions. You should indicate an approximate amount in EUROS, and the source to which the funds apply.

1. Group Name/Designation

Statistical Modelling in Environmental and Life Sciences

(RG-MATH-LVT-Lisboa-6-951)

2. Principal Investigator

Maria Antonia Conceição Abrantes Amaral Turkman

3. Location of Group (Host Institution)

Faculdade de Ciências da Universidade de Lisboa

4. Keywords

Spatio-tempor

Bayesian hier

Biostatistics

Environmental

5. Funding, source, dates (1000 ca.)

- CEAUL Research Project ---

FCT/Prog.Fin.Plurianual 2003-2005/MAT/sub-project nº1506

"Modelling Environmental and Biological Data " (MEBIDA)

Principal Investigator: Prof. Maria Antónia Amaral Turkman

Sub-project starting date 01-01.2003; finishing date: 31-03-2007.

Funding 124.560 Eur

- FCT/ PTDC/MAT/64353/2006

MEGA – STATISTICAL METHODS IN GENETIC AND ENVIRONMENT

Funding Entity: PTDC - FCT

Total Award Ammount: 60 000 Eur

Prime Contractor: Universidade de Lisboa - Fundação da F.C.U.L.

Period Covered: from September of 2007 to September of 2010

Coordinator: Prof. K.F.Turkman

### **PI & Researchers**

In this section indicate first the PhD researchers that make up the group by selecting them from the list of researchers integrated in the Unit. In the second section you can indicate whether other PhD researchers not integrated in the Unit collaborate with group by typing their public key. Finally in the last part you should include all the non-PhDs members of the group.

#### 1. Researchers in the Group (**PhD. Only**) (1)

Ana Luisa Trigoso Papoila da Silva (Professor Auxiliar)

Carlos Daniel Mimoso Paulino (Professor Associado)

Cristina Maria Tristão Simões Rocha (Professor Auxiliar)

Fernando José Malheiro de Magalhães (Professor Coordenador)

Giovani Loiola da Silva (Professor Auxiliar)

Isabel Cristina Maciel Natário (Professor Auxiliar)

Kamil Feridun Turkman (Professor Catedrático)

Lisete Maria Ribeiro de Sousa (Professor Auxiliar)

Luzia Augusta Pires Gonçalves (Professor Auxiliar)

Maria Antonia Conceição Abrantes Amaral Turkman (Professor Catedrático)

Maria Lucília Salema e Carvalho (Professor Associado)

Marília Cristina de Sousa Antunes (Professor Auxiliar)

Natércia Felgueiras Seabra Durão (Professor Auxiliar)

Patricia Cortes Zea Bermudez (Professor Auxiliar)

Paulo José de Jesus Soares (Professor Auxiliar)

Susana Maria Gouveia Rosado Ganhao (Professor Auxiliar)

Valeska Lima Andreozzi (Outra)

#### 2. Other Researchers in the Group (**PhD.**) (2)

Ivone Maria Ribeiro Figueiredo da Silva Rosa (CO-ORIENTADORA) (Investigador Auxiliar)

Jorge Morais Mendes (Professor Auxiliar)

Júlia Maria Vitorino Teles (Professor Auxiliar)

Manuel Gonzalez Scotto (Professor Auxiliar)

Maria Fernanda A.S.F. Oliveira (Professor Auxiliar)

#### 3. Other Researchers in the Group (**non PhD.**) (2)

Baltazar Emanuel Guerreiro Nunes Bravo Nunes (Outra)

Carina Soares da Silva Fortes (Professor-Adjunto)

Cláudia Susana Pereira dos Santos (Outra)

Emiliano Barreto\_Hernandez (Não aplicável (bolseiro))

Leonel da Silva Vicente (Outra)

Maria da Conceicao Rodrigues Ribeiro (Outra)

Maria João Fernandes Pereira Polidoro (Outra)

Nuno Henriques dos Santos de Sepulveda (Não aplicável (bolseiro))

RITA MARIA MACHADO REBELO DE SOUSA LOPES (Assistente Convidado)

Sandra Cristina de Faria Ramos (Outra)

### **Objectives & Achievements**

In this section please describe the main objectives and achievements of the group during the 2007 period . If the number of characters is more than the permitted maximum you will not be able to complete the form.

#### 1. Objectives (2000 ca.)

The main objective of this research group is to make contributions on specific probability and statistical issues in modelling environmental and biological data, as well as, to create a group with expertise in analyzing data coming from these fields. To achieve this goal we seek collaboration with researchers from the environmental and biological sciences, not only with the objective to gather data to apply the methodology developed, but as well to help them in solving their own problems. Another objective is to continue the Ph.D. programme on the main research themes, namely Hierarchical Bayesian Modelling, Spatial-temporal modelling, Statistics in Genetics. Together with applied research we have as an objective to continue developing fundamental research in the areas of interest, namely on

- Extremes of Random Fields;
- Some theoretical and practical aspects of continuous -and discrete- time extremes
- Inference on Generalized Pareto Distribution
- Analyses of categorical data with missingness in responses and factors
- Model selection and model adequacy from a Bayesian perspective
- Elicitation of prior information in presence of nuisance parameters
- Generalized additive models with flexible link in survival analysis
- Marked point processes
- Screening methods in Supervised classification
- Disease mapping
- Stochastic modelling of dynamic systems
- Statistical problems in Cellular Biology and Genetics
- Microarray data analysis
- Bayesian analysis of allelic penetrance models for complex binary traits.

#### 2. Main Achievements (2000 ca.)

A part from the papers published in peer review journals, chapters of books, proceedings of Conferences and other periodicals, which are discriminated below, in their proper places, work was done on the following topics:

- asymptotic expressions for the distribution of the maximum of stationary, heavy tailed random fields over finite rectangles.
- Geographically weighted regression; a new approach via Bayesian hierarchical modeling methods.
- Modelling very large wildfire sizes.

- Evolution of the human resources of the Faculty of Sciences of Lisbon and projections for 2020.
- Analysis of missing categorical data under stratification
- Effect of atmospheric environment on pediatric respiratory emergency admissions
- Log-linear analysis for coarse categorical data
- Estimation of T-cell receptor diversity
- Hierarchical spatio-temporal models for correlated binomial data
- Application of methods of multivariate analysis to the study of grapevine leaves and mature berries in order to identify metabolites that could discriminate among five important Portuguese grape varieties.
- A comparative study of Bayesian and Non-Bayesian classification methods to identify differential expressed genes.
- The use of Bayesian hierarchical models and optimal screening methods in gene profile classification.
- Using generalized additive models to predict mortality in intensive care units
- Modelling patterns of alcohol consumption
- Modelling the dynamics of the population of the Portuguese Dogdish
- Leptospirosis in Azores: some issues on risk assessment
- Collaborative work on the application of advanced statistical methods to (i) the study of the predictive value of some respiratory tests in Amyotrophic Lateral Sclerosis and (iii) the analysis of the longitudinal variations of CD40L at the onset of acute myocardial infarction and along the recovery period.

Most of this work was presented as invited or contributed papers in International Conferences, published as extended abstract; or submitted for publication.

### **Productivity**

This section refers to the research output of the group during the 2007. From the list provided choose the items that you want to complete and a field will appear. Follow the instructions provided in each item. You are not required to fill in all the items only those for which your group has output. Please note that for peer reviewed publication you must include impact factor and number of citations. If these indicators are not available you must include that publication as **Other Publications**.

Publications in peer review Journals (3000 ca.)

(Up to a max of 10. Always indicate at the end of the citation, impact factor of the journal (IF=) and number of citations (n° C=). Give title and full citation in original language. DO NOT translate)

- Bermudez, P., Mendes, J. Turkman, K.F. and Pereira, J. (2007) Extremes of Wildland Fire Sizes. International Journal of Wildland fire. Accepted. 2007, IF=1.679
- Carneiro, J., Leon, K., Caramalho, I., van den Dool, C., Gardner, R., Oliveira, V., Bergman, M-L., Sepúlveda, N., Paixão, T., Faro, J. and Demengeot, J. (2007). When three is not a crowd: A crossregulation model of the dynamics and repertoire selection of regulatory CD4 T cells. Immunological Reviews 216:48-68, IF=10.758
- Encarnação, F., Gonçalves, L., Campino, L., Cristóvão, J.M. and Oliveira, M.R. (2007) Evaluation of the Accuracy of Diagnostic Tests using Latent Class Analysis, International Journal Communications in Dependability and Quality Management, 10, pp.33-40. IF=
- Fonseca JE, Cavaleiro J, Teles J, Sousa E, Andreozzi VL, Antunes M, Amaral-Turkman MA, Canhão H, Mourão AF, Lopes J, Caetano-Lopes J, Weinmann P, Sobral M, Nero P, Saavedra MJ, Malcata A, Cruz M7, Melo R, Braña A, Miranda L, Patto JV, Barcelos A, Canas da Silva J, Santos LM, Figueiredo G, Rodrigues M, Jesus H, Quintal A, Carvalho T, Pereira da Silva JA, Branco J, Viana Queiroz M (2007). Contribution for new genetic markers of rheumatoid arthritis activity and severity: sequencing of the tumour necrosis

factor alpha gene promoter. *Arthritis Res Ther.* 2007 Apr 4;9(2):R37 , IF=3.801

• Gonçalves, L. and Amaral Turkman, M.A. (2007) Triangular and Trapezoidal Distributions: Applications in the Genome Analysis. *Journal of Statistical Theory and Practice*, 2, nº1 (to appear <http://journalstp.gracescientific.com/Volume2Number1.aspx?rand=0.5887197322366765>), IF=

• Maia C., Ramada J., Cristóvão, J., Gonçalves L., Campino L (2007) Diagnosis of canine leishmaniasis: conventional and molecular techniques using different tissues *The Veterinary Journal*, doi:10.1016/j.tvjl.2007.08.009, IF=1.589

• Maia C., Rolão N., Nunes M., Gonçalves L., Campino L. (2007) Infectivity of five different types of macrophages by *Leishmania infantum*, *Acta Tropica*, 103: p150-155, IF=2.211

• Mendes, J. Bermudez, P., Pereira, J. and Turkman, K.F. (2007) Spatial extremes of wildfire sizes: Bayesian hierarchical models for extremes. *Ecological and environmental statistics*. Accepted. 2007, IF=1.022

• Sepúlveda, N., Paulino, C.D., Carneiro, J. and Penha-Gonçalves, C. (2007). Two-gene interaction models for complex binary traits based on the allelic penetrance approach. *Heredity*, 99, 173-184, IF=2.872

• Silva, G.L., Dean, C.B, Niyonsenga, T. and Vanasse, A. (2007). Hierarchical Bayesian spatiotemporal analysis of revascularization odds using smoothing splines. *Statistics in Medicine* (accepted on September 2007), IF=1.737

Other publications (3000 ca.)

(Include only Books, chapters or full papers published in conference proceedings up to max of 10. Give title and full citation in original language)

• de Macedo, LET; Chor, D; ANDREOZZI, VL; Faerstein, E; Werneck, GL;

Lopes, CS. (2007) Job stress and interruption of the habitual activities due to health problems within the Pró-Saúde study. *Reports in Public Health*, 23(10):2327-2336.

• Papoila, A.L. e Rocha, C.S. (2007). Modelling Survival Data using Generalized Additive Models with Flexible Link. In *Proceedings of the 22nd International Workshop on Statistical Modelling, Barcelona, Spain* (J. del Castillo et al., Eds.), 471-476.

• Carvalho, M. L. & Natário, I. (2007) Modelação dos efeitos de covariáveis em análises espaciais de doenças raras. *Estatística e Qualidade na Saúde: Problemas e Temáticas*, In Cunha,C and Varanda,J (eds.), 117-122

• Sousa,L.(2007) A Estatística ao encontro da Genética. *Estatística e Qualidade na Saúde: Problemas e Temáticas*, In Cunha,C and Varanda,J (eds.), 174-180

• Silva-Fortes,C. Amaral Turkman,M.A. and Sousa,L (2007) Aplicação das Curvas ROC em Dados de Microarrays *Estatística e Qualidade na Saúde: Problemas e Temáticas*, In Cunha,C and Varanda,J (eds.), 15-21

• Antunes,M. and Sousa,L (2007) Classificação Bayesiana para Identificação de Genes com m Expressão Diferencial. In Ferrão,ME et al. (eds), *Estatística: Ciência Interdisciplinar Edições SPE*, 217-224

• Rosado-Ganhão, S., Amaral Turkman, A, (2007) Predição Bootstrap via amostragem Gibbs do montante anual de indemnizações, *Estatística Ciência Interdisciplinar*, In Ferrão,ME et al. (eds), p. 685-694

• Nuno Cardoso, Mário J. Silva and Marília Antunes (2007) Validação estatística dos resultados do HAREM in "HAREM, a primeira avaliação conjunta de sistemas de reconhecimento de entidades mencionadas para português".Editors: Diana Santos, Nuno Cardoso. *Linguatca*, 59-77.

• Sepúlveda, N. e Carneiro, J. (2007). Que loci controlam as proporções das diversas populações de timócitos? In *Estatística: Ciência Interdisciplinar* (Ferrão, M. E., Nunes, C., Braumann, C. A., eds), p. 729-740, Edições SPE, Lisboa

• Poletto, F., Singer, J. and Paulino, C.D. (2007). A product-multinomial framework for analysis of

categorical data with missing responses. In Proceedings of the 22nd International Workshop on Statistical Modelling, Barcelona, July 2-6, 2007 (J. Castillo, A. Espinal and P. Puig, eds.), 508-511

- Silva, G.L. and Amaral Turkman, M.A. (2007). Additive survival models with shared frailty. In Proceedings of the 22nd International Workshop on Statistical Modelling, Barcelona, July 2-6, 2007 (J. Castillo, A. Espinal and P. Puig, eds.), 544-547.

- Sepúlveda, N. e Carneiro, J. (2007). Que loci controlam as proporções das diversas populações de timócitos? In Estatística: Ciência Interdisciplinar (Ferrão, M. E., Nunes, C., Braumann, C. A., eds), p. 729-740, Edições SPE, Lisboa

- Teles, J. and Amaral Turkman, MA(2007) Bayesian Model Selection Criteria: a Comparative Study through Simulation. In Proceedings of the 22nd International Workshop on Statistical Modelling, Barcelona, July 2-6, 2007 (J. Castillo, A. Espinal and P. Puig, eds.),560-564

Master and Ph.D. thesis completed (3000 ca.)

- Rosado-Ganhão, S , Análise Preditiva em Populações Finitas, Ph.D. thesis, FCUL, defense February 2007, Supervised by M.A. Amaral Turkman.

- \*Correia, Elisete, O papel de Distribuições Condicionamente Especificadas em Estatística Bayesiana, Ph.D. Thesis, FCUL, 2007, defense February 2008, Supervised by M.A. Amaral Turkman.

- Martins, Ana Patricia, Imputação Múltipla – Aplicação aos Dados do Inquérito ao Emprego, Master Thesis, DEIO/FCUL, 2007, supervised by Patricia Bermudez.

- Lima Bastos, Joana A, Análise de Sobrevivência - Aplicação ao Estudo do Melanoma Maligno da Pele, Master Thesis, DEIO/FCUL, 2007, supervised by Cristina Rocha.

- Lira, Mafalda Isabel de Castro Durães - Análise de Dados Espaciais referentes a doenças raras. Master Thesis, DEIO/FCUL, 2007, supervised by Lucília Carvalho.

- Machado, Carla Sofia S., Privação em Portugal na década de 90 – Uma abordagem multidimensional da pobreza com base na análise de classes latentes, Master Thesis, ISEGI/UNL, 2007, Supervised by Francisco Nunes and Carlos Daniel Paulino.

- Vieira, Rute, Predição de Variantes Genéticas do VIH-1, Master Thesis, DEIO/FCUL, 2007, supervised by Lisete Sousa.

\*Submitted but not discussed

Organization of conferences (2000 ca.)

- "Statistics of Extremes and Environmental Risk (SEER 2007)", February 15-17, 2007, Faculdade de Ciências de Lisboa.

Local organizers: M. Isabel Fraga Alves, M. Ivette Gomes, Laurens de Haan and K. Feridun Turkman.

- Statistics in Genomics and Proteomics, Follow-up meeting. CIM, Coimbra 9-10 March 2007

- Workshop on Smoothing-Based and Gaussian -Process-Based Methods for Non-Parametric Regression in Environmental problems, March 26-30, 2007 Edinburg <http://icms.org.uk/workshop.php?id=1>

- Análise de Dados Estatísticos em R, Escola de Tecnologias da Saúde, 16-20 April 2007

- Encontro de Bioestatística no V Congresso Nacional de Epidemiologia, 14 - 16 Novembro 2007, Lisboa.

Internationalization (2000 ca.)

(Collaborative publication, Research, Graduate Training Networks or other forms of participation of the Research Group at the international level)

- K.F. Turkman collaborated with C.W. Anderson from the Sheffield University on the papers: Extremes of Random Fields; Continuous -and discrete- time extremes: Some theoretical and practical aspects. He was an invited speaker in three international conferences International Conference on Advances in Interdisciplinary statistics and Combinatorics, University of North Carolina; Workshop on Smoothing-Based and Gaussian -Process-Based Methods for Non-Parametric Regression in Environmental problems,



Edinburg;5th Conference on Extreme value Analysis, Bern.

- C.D. Paulino collaborated with Poletto, F., Singer, J from University of São Paulo. He is co-supervising the Ph.D. thesis of F. Poletto, who is a student at the University of São Paulo. They presented several papers at the XI Conferencia Española y I Encuentro Iberoamericano de Biometría, Salamanca, at the International Workshop on Statistical Modelling, Barcelona, and at the 56th Session of the International Statistical Institute, Lisbon. He was invited to give a series of talks and courses in Brasil, namely at the Universidade Federal do Rio de Janeiro, Universidade Federal de São Carlos, Universidade Federal do Rio Grande do Norte, Universidade Federal do Ceará

- C.D. Paulino and Soares, P. collaborated with the Brazilian researchers Achcar, J.A., Martinez, E. Z., Ruffino-Netto, A.,. in a statistical model investigating the prevalence of tuberculosis in New York City using counting processes with two change-points.

- Silva, G.L. collaborated with C.B. Dean, Niyonsenga, T. and Vanasse, A. from Canada, on hierarchical Bayesian spatiotemporal analysis of revascularization odds using smoothing splines.

- Andreozzi, V. collaborated with researchers from Escola Nacional de Saúde Pública Sergio Arouca, Brasil on the relation between job stress and interruption of the habitual activities due to health problems.

- Gonçalves, L. collaborated with researchers from PALOPS in epidemiological studies.

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Centro de Estatística e Aplicações da Universidade de Lisboa (15-04-2008 12:48:44)

### Group Description

Please confirm here the name of the group, the Host Institution in which the Principal Investigator is located, four Key words that best describe your work and finally in concise form indicate mains sources of funding for the research of your group. Include all types of funding, like FCT projects, FCT Base, as well as funding from other institutions. You should indicate an approximate amount in EUROS, and the source to which the funds apply.

1. Group Name/Designation

Applied Multivariate Data Analysis and Modelling

(RG-MATH-LVT-Lisboa-6-1519)

2. Principal Investigator

Maria Helena Bacelar Valente da Costa Nicolau

3. Location of Group (Host Institution)

Faculdade de Ciências da Universidade de Lisboa

4. Keywords

Classification | Data Represe | Experimental | Linear Hierarc

5. Funding, source, dates (1000 ca.)

- CEAUL Research Project ---

FCT/Prog.Fin.Plurianual 2003-2005/MAT/sub-project nº1629 -

"Multivariate Data Analysis: Statistical Modelling, Classification and Data Mining in Behavioural Sciences, Education and Biomedicine " (Multivariate Data Analysis) .

Principal Investigator: Prof. Maria Helena Bacelar Valente Costa Nicolau

Sub-project starting date 01-01.2003; finishing date: 31-03-2007.

Funding 60.000 Euros

### **PI & Researchers**

In this section indicate first the PhD researchers that make up the group by selecting them from the list of researchers integrated in the Unit. In the second section you can indicate whether other PhD researchers not integrated in the Unit collaborate with group by typing their public key. Finally in the last part you should include all the non-PhDs members of the group.

#### 1. Researchers in the Group (**PhD. Only**) (1)

ANA MARIA PORTELA NUNES DE SOUSA FERREIRA (Professor Auxiliar)

Áurea Sandra Toledo de Sousa (Professor Auxiliar)

Maria Helena Bacelar Valente da Costa Nicolau (Professor Catedrático)

Teresa Paula Costa Azinheira Oliveira (Professor Auxiliar)

#### 2. Other Researchers in the Group (**PhD.**) (2)

Ana Isabel Gonçalves da Costa Lorga da Silva (Professor Associado Convidado)

Margarida Maria Teixeira Diniz Mendes Leal (Professor Auxiliar)

Maria Margarida Guerreiro Martins dos Santos Cardoso (Professor Auxiliar)

#### 3. Other Researchers in the Group (**non PhD.**) (2)

Amílcar Manuel do Rosário Oliveira (Assistente)

Ana Paula Martins do Nascimento (Outra)

Anabela de Fátima Domingues Cardoso Marques (Outra)

Isabel Maria Tudela Reimão Pinto de França Doria (Assistente Convidado)

Leonor Bacelar Valente da Costa Nicolau (Assistente Convidado)

Osvaldo Dias Lopes da Silva (Assistente)

Otilia Maria da Conceicao Dias (Professor-Adjunto)

Vitor Manuel Fernandes Valente (Outra)

### **Objectives & Achievements**

In this section please describe the main objectives and achievements of the group during the 2007 period . If the number of characters is more than the permitted maximum you will not be able to complete the form.

#### 1. Objectives (2000 ca.)

This research project was based on the development and utilization of statistical models of multivariate analysis for extracting and analysing knowledge from large multivariate data sets. Applications were especially concerned with Behavioural Sciences, Education and Biomedicine.

Also Agricultural and Industry applications have been made recently.

The objectives of the project can be synthesised as follows:

- Development of models of multivariate analysis to extract knowledge from large data sets (data mining), specially in cluster analysis context.

- Development of empirical and probabilistic procedures for validating and interpreting the results on real and on simulated data.

- Development and application of discriminant analysis procedures.

- Research on problems in randomization tests analysis related to power and serial dependency and development of applications for Conventional MANOVA, Nonrandomized Designs and Nonrandomized Classification of Variables

- Development and adaptation of methodology on applied research areas, mainly those concerning education, behavioural sciences and biometry.

#### 2. Main Achievements (2000 ca.)

According to the objectives for the year 2007 the Applied Multivariate Data Analysis and Modelling Project main achievements were the following:

- Books (edition), 3;
- Papers/chapters in book, 2;
- Papers in International Journals, 4 (+3 submitted);
- Papers in National Journals, 5;
- Communications in International Scientific Conferences, 16 (8 with publication in Proceedings with referee; 8 with abstract publication in Proceedings with referee);
- Communications in National Scientific Conferences, 12 (5 with publication in Proceedings with referee; 7 with abstract publication in Proceedings with referee);
- Seminars Organization, 8;
- Organization or participation on Committee of International Conferences, 5;
- Organization of Thematic Invited Session in International Conference, 1;
- PhD thesis in progress 12;
- Master thesis in progress 6; completed 5;
- Organization of seminars or advanced courses, 9.

### **Productivity**

This section refers to the research output of the group during the 2007. From the list provided choose the items that you want to complete and a field will appear. Follow the instructions provided in each item. You are not required to fill in all the items only those for which your group has output. Please note that for peer reviewed publication you must include impact factor and number of citations. If these indicators are not available you must include that publication as **Other Publications**.

Publications in peer review Journals (3000 ca.)

(Up to a max of 10. Always indicate at the end of the citation, impact factor of the journal (IF=) and number of citations (nº C=). Give title and full citation in original language. DO NOT translate)

- Fonseca, Jaime R. S.; Cardoso, Margarida G. M. S. (2007). Mixture-Model Cluster Analysis using Information Theoretical Criteria. *Intelligent Data Analysis*, 11(2), p.155-173. (IF = , Nº C= )
- Fonseca, Jaime R. S.; Cardoso, Margarida G. M. S. (2007). Supermarket customers segments stability. *Journal of Targeting, Measurement and Analysis for Marketing*, 15 (4), p. 210-221. (IF = , Nº C= )
- Silva Pereira, M., Oliveira, T.A., Mexia, J.T. (2007), Multiple Regression Models for Lactation Curves. *Biometrical Letters*, 44(1), p. 71-81. (IF, Nº C not available)
- Veiga Simão A. M; Flores A. M. e Ferreira Sousa A. (2007). Oportunidades de aprendizagem e de desenvolvimento profissional no local de trabalho: uma proposta de questionário. *Arquipélago, Journal of Univ. Açores*, 59-116.
- Oliveira, A., Oliveira, T.A., Mexia, J.T. "Analysis of residuals: Adjustment and validation in Joint Regression Analysis" (accepted in *Biometrical Letters*, 2008) (IF, Nº C not available)
- Gonçalves B., Fagulha T. e Sousa Ferreira, A. Depressão, depressão crónica e sintomatologia depressiva nas mulheres de meia-idade: relação com o nível sócio-cultural e a zona de residência, *Revista da Associação Portuguesa de Psicologia* (2007 – in press).

Other publications (3000 ca.)

(Include only Books, chapters or full papers published in conference proceedings up to max of 10. Give title and full citation in original language)

- Bacelar-Nicolau, H.; Ferro, J. M. ; Bacelar-Nicolau, L.; Rodrigues, T.; Canhão, P. (2007). Clustering

and Risk Score Models to Predict the Prognosis of Cerebral Vein and Dural Sinus Thrombosis. In: ICSMRA2007 Extended Abstracts Book, H.Bacelar-Nicolau, L. Bacelar-Nicolau (Edit), FML, 52-53.

- Bacelar-Nicolau, L.B., Marketing Research: Princípios e Aplicações, Cap. 9 "Maximizar o Valor da Informação: gerir melhor o presente para aumentar sucesso no futuro", p.126-132, B.Cota e L.Bacelar-Nicolau (Edit), Editora Universidade Lusíada, Lisbon, ISBN 978-972-8883-92-8.
- Bacelar-Nicolau, L.; Bacelar-Nicolau, H.; Nicolau, F. C.; Sousa, Á.; Silva, O.; Magalhães, B. (2007). Clustering Sources of Parenting Stress with the Affinity Coefficient. In: Proceedings of the 56th Session of the International Statistical Institute (ISI), Lisbon, Portugal, 22-29 August, 2007 (in press). Published on the ISI 2007 CD Proceedings.
- Cardoso, M. (2007). Clustering and Cross-Validation. IASC 07 - Statistics for Data Mining, Learning and Knowledge Extraction, Proceedings. C. Ferreira, C. Lauro, G. Saporta and M. Souto de Miranda (Edit). ISBN 978-90-73592-26-1.
- Díaz, C.; Bacelar-Nicolau, H. (2007). Cluster and Factor Analysis of Students' Responses to the CPR Questionnaire (Teaching Statistics for Non-statisticians). In: Proceedings of the ISI 2007, Lisbon, Portugal, 22-29 August, 2007 (in press) Published on the ISI 2007 CD Proceedings.
- Mendes, A.B.; Funk, G. & M. and Sousa, Á. "O uso de provérbios: Uma abordagem estatística" In: Funk, Gabriela (coordination) Estudos sobre Património Oral, Encontro de Cultura Popular 4ª ed., C. M. de Ponta Delgada (2007) 217-241.
- Monteiro, S., Oliveira, T.A.: "Yate's algorithm for Two-level Factorial and Fraccional Designs- an application"; Book of abstracts, ISI 2007, p 582; paper published on CD Proceedings of ISI 2007.
- Nicolau, F.; Bacelar-Nicolau, H.; Sousa, Á.; Bacelar-Nicolau, L.; Silva, O.; Magalhães, B. (2007). Probabilistic Models in Three Way Cluster Analysis. In: Proceedings of the ISI2007 Conference (Lisbon, Portugal, 22-29 August, 2007, IPM 90 on Analysis of Complex Data in Health Sciences, on behalf of the CLAD Association) (in press). - published on the CD Proceedings of ISI 2007.
- Oliveira, A., Oliveira, T.A, Mexia, J.T: "Multiplicative Approximate Normality" Book of abstracts, ISI 2007, p 398; paper published on CD Proceedings of ISI 2007.
- Ribeiro, I.; Sousa, Á.; Silva, O. (2007). StuProfiles-Estudo do Perfil dos Alunos do 1º Ciclo do Ensino Básico da Região Açores. In: Proceedings of the 2nd Iberian Conference on Information Systems and Technologies - CISTI 2007 (Porto, Portugal, 21-23 June, 2007, Univ. Fernando Pessoa (UFP)) - published on the CD Proceedings of CISTI 2007.

Master and Ph.D. thesis completed (3000 ca.)

- Aleixo, João (2007). "Segmentos de clientes de comunicações móveis: o papel da lealdade". Logistic Master Thesis, IST, UTL. Supervisor: Margarida Cardoso.
- Monteiro, Sandra. "Planeamento de Experiências: Aplicações em Análise Factorial". Statistics and Optimization Master Thesis, FCT, UNL. Supervisor: T.A. Oliveira.
- Pargana, Sónia (2007). "O Impacto da Publicidade nas vendas no sector dos sumos e refrigerantes". Marketing Master Thesis, ISCTE (Co-supervisor: Margarida Cardoso).
- Pereira, Ricardo. "A Importância das Técnicas Audio-Visuais no Ensino da Matemática" (2007) Education of Sciences Master Thesis, Universidade Aberta. Supervisor: T.A. Oliveira.
- Valente, Vítor (2007). "Relevância do Apoio da Escola nas Perspectivas Profissionais dos Alunos". Education of Sciences Master Thesis, Universidade Aberta. Supervisor: T.A. Oliveira

Organization of conferences (2000 ca.)

This group has made substantial effort in the organization of large scientific meetings as well as focused on smaller meetings on specialized themes.

Some selected meetings are:

International Conference on Statistical Methods for Risk Analysis, ICSMRA2007, Satellite Conference of the bi-annual meeting of the International Statistical Institute, ISI2007, Faculty of Medicine of the University of Lisbon August 30-31 2007. Organized by the Institute of Preventive Medicine and the

Laboratory of Biomathematics of the Faculty of Medicine of Lisbon.

- Co-chair: Helena Bacelar-Nicolau, on behalf of the Biomathematics Laboratory of the Faculty of Medicine of Lisbon and the Laboratory of Statistics and Data Analysis of the Faculty of Psychology and Education;

- Other members of the Organizing Committee belonging to the GI4: Isabel Doria and Leonor Nicolau. (<http://www.fm.ul.pt/ICSMRA2007>).

International Symposium on Business and Industrial Statistics, ISBIS-2007, Satellite Conference of the bi-annual meeting of the International Statistical Institute, ISI2007, University of Azores, August 18-20 2007.

Co-chair of the Local Organizing Committee: Helena Bacelar-Nicolau.

Other LOC members belonging to the GI4: Osvaldo Silva and Aurea Sousa. (<http://www.isbis2007.uac.pt/intro.php>).

Seventh International Seminar on Statistics and Clinical Practice,

To be held 19-21 June 2008 Warsaw, Poland; Organized by the International Centre of Biocybernetics. H Bacelar-Nicolau is member of the Organizing Committee.

III Workshop on Statistics, Mathematics and Computation, and First Portuguese-Polish Workshop in Biometry, Lisbon, July 2008. Teresa Oliveira is the Chair.

International Conference in Computational Statistics - Compstat 2008, to be held at Porto (Portugal) in 24-29 August 2008. H Bacelar-Nicolau and A Sousa Ferreira, are members of the Scientific and Loc Committees, respectively. <http://www.fep.up.pt/compstat08>

#### THEMATIC SESSIONS:

Invited Paper Meeting on "Analysis of Complex Data in Health Sciences".

Organizer: H. Bacelar-Nicolau

IPM organized on behalf of the Portuguese Association of Classification and Data Analysis, CLAD (ISI2007 co-sponsor society), during the bi-annual meeting of the International Statistical Institute, ISI2007, Lisbon, August 21-29 2007 (<http://www.isi2007.com.pt/>).

Industry contract research (2000 ca.)

Several members of this group have made an important investment in collaboration with colleagues and students of other areas (e. g. Biomedicine, Marketing as well as Behavioural Sciences and Education) with a pedagogical goal (to teach how to use statistics well) offering an important contribution to the improvement of teaching and research in statistical methodology in fields such as Health, Education, Engineering or Health Economy. This investment is giving results that will be published in the long run. Also this team has made a substantial effort in applied projects that will give place to publication in the next future:

- Project nº DH MD/P.I.01.13 of Calouste Gulbenkian Foundation "Humanização dos Cuidados Paliativos em contexto domiciliário", co-ordinated by Prof. Dr.M. Silvério Marques (IPOFG of Lisbon), 2003 (3 years). The publication of 2 papers is foreseen.

- Project POCTI/CTM/59960/2004 of FCT "Study of the Local Potencial and Current Distribution at the Metals Surface" co-ordinated by Prof. Dr.António Castela Escola Superior de Tecnologia do Barreiro do Instituto Politécnico de Setúbal (ESTBarreiro/IPS), started only in 2006 (3 years). One paper published; the publication of 2 or 3 papers is foreseen.

- Participation in Project POCD/CED/6929/2006 "Implementation and Dissemination of Active Learning and Cooperative Learning Methodologies in Engineering Education: Developing a tool to monitor student activity so as to promote the development of active, autonomous learners" co-ordinated by Prof. William Williams ( ESTBarreiro/IPS) in cooperation with Instituto Superior de Engenharia de Lisboa (ISEL) and coordinated by Professor Dr. Isabel Carvalho (ISEL), started in September 2007 (3 years).

- Participation in Project "Tecnologias e Metodologias de eLEARNING para a Educação Assistida por Computador no IPS", Instituto Politécnico de Setúbal, started in Jan. 2003.

Internationalization (2000 ca.)

(Collaborative publication, Research, Graduate Training Networks or other forms of participation of the Research Group at the international level)

At present internationalization particularly concerns organization of conferences and seminars, or participation in European projects and scientific association committees:

- European Inter-University Cooperation Programme (SOCRATES-ERASMUS) , 2005-2008. Includes the Annual Intensive Seminar on "Mathematical and Computational Models in the Psychological Sciences" as well as students and teachers mobility

H. Bacelar-Nicolau is the Portuguese Responsible of the Project, as Representing Professor of the University of Lisbon.

Other Partner Universities are: Glasgow (England) (IP coordinator); Graz (Austria); Tartu (Estonia); Lisboa (Portugal); Bremen (Germany); Oldenburg (Germany); Leuven (Belgium); Padova (Italy) ; Debrecen (Hungary); Complutense Madrid (Spain); Tubingen (Germany); Amsterdam (The Netherlands).

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- Organization or participation in the five Internacional Conferences mentioned above (see in 5.Organization of Conferences); as well as of the following seminars:

- "On a Combining information in agricultural experiments", by Professor Stanislaw Mejza, Department of Mathematical and Statistical Methods, Agricultural University of Poznan, Poland Universidade Aberta, 18 June 2007,

"Some results on A-Optimal Chemical Balance Weighing Design", by Professor Bronislaw Ceranka, Department of Mathematical and Statistical Methods, Agricultural University of Poznan, Poland, Universidade Aberta, 25 June 2007,

"Variance and efficiency balanced block designs: results and examples", proferido pela Professora Malgorzata Graczyk, Department of Mathematical and Statistical Methods, Agricultural University of Poznan, Poland, Universidade Aberta, 25 June 2007,

organized by Teresa Oliveira.

Also the following seminars were presented by Teresa Oliveira:

Multivariate Analysis an application in human genetics, Agricultural University of Poznan, Poland, Setember 2007, under Sócrates/Erasmus program

Prospective Research towards BIB Designs with Repeated Blocks, UIC-University of Illinois at Chicago-USA, Department of Mathematics, Statistics and Computer Science, invited by Samad Hedayat, Distinguished Professor, April 2007,

Singular value decomposition of daily milk production, data matrix Serra da Estrela ewe's production curves and total milk production, Agricultural University of Poznan, Poland, Setember 2007, under Sócrates/Erasmus program,

Statistical challenges: to deal with applications in several fields, UIC-University of Illinois at Chicago-USA, Department of Mathematics, Statistics and Computer Science, invited by Samad Hedayat, Distinguished Professor, April 2007,

Concerning scientific journals, A. Lorga is referee member of the American Mathematical Society; A. Sousa Ferreira is member of the scientific board of The Spanish Journal of Psychology; .H. Bacelar-Nicolau is member of the scientific board of REVSTAT and of the Italian Journal of Psychology,

Concerning scientific membership, H. Bacelar-Nicolau is Elected member since 1994 of the ISI-International Statistical Institute, is member since 1998 of the IASE - International Association for Statistical Education; is elected member of the Election Committee of the International Federation of Classification Societies , IFCS for the period 2007-2009. (Was Elected Member of the Board of Directors of the International Association for Statistical Computing, IASC, European Section, for the period 2000-2004; and was Chair of the IFCS Education Committee, 2002-2005 of the IFCS.)

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Centro de Estatística e Aplicações da Universidade de Lisboa (15-04-2008 19:08:59)

Validação e Lacragem do Formulário

A presente página verificará automaticamente se lhe é ou não possível a lacragem de cada uma das partes do processo de preenchimento. No caso de o seu formulário já estar completo ficará disponível na secção correspondente o "botão" que lhe permite lacrar a informação fornecida. Relembramos que após lacragem da lista da equipa de investigação deverá imprimir e assinar o correspondente **Termo de Responsabilidade**, enviando-o posteriormente à FCT.

Actualização da Lista de Equipa de Investigação

[Toda a equipa de investigação foi validada e confirmada.](#)

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