

Name of Research Unit: ^(MAT-LVT-6) Centro de Estatística e Aplicações da Universidade de Lisboa

Coordinator: Maria Antonia Conceição Abrantes Amaral Turkman

Main Scientific Domain: Matemática

Other Subdomains: n/a

Host Institutions

Leading Host Institution: Faculdade de Ciências - Universidade de Lisboa

Other Institutions Involved:

Objectives & Achievements

Unit Description

The Center of Statistics and Applications of University of 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-Departamento de Estatística e Investigação Operacional) 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 in 31 December 2010 was systematized in 3 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 groups were

- GI 1: Order Statistics, Extremes and Applications (14 (I) + 10(C))

Responsible Researcher: Maria Ivette Leal de Carvalho Gomes

- GI 2: Probability, Modelling and Data Analysis (20 (I) + 11 (C))

Responsible Researcher: Dinis Duarte Ferreira Pestana

- GI 3: Statistical Modelling in Environmental and Life Sciences (19(I) + 28 (C))

Responsible Researcher: Maria Antonia Conceição Abrantes Amaral Turkman

In the last evaluation, as it was referred to in previous reports, the International Panel has given a classification of VERY GOOD to the GLOBAL UNITY, although has reported asymmetries between Groups' performances. In particular, for the group GI 4, there has been a strong recommendation about the integration of this group in the main strategy of CEAUL.

As a consequence of the Panel recommendations, the Unity was restructured in 2010. The Scientific Committee met on 25th of February 2010 and approved a proposal by the scientific panel, supported by the Advisory Board, to extinguish the research group GI 4: "Applied Multivariate Data Analysis and Modelling" and integrate their members in one of the remaining 3 groups, according to their research interests.

The GI's are encouraged to interact between them in their activities, whenever that is appealing.

The group 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

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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. Although collaborators are not sponsored by FCT, some of their activities are financed by the Center, particularly if they are Ph.D. students, under the recommendation of the GI leaders. There is a scientific as well as a financial autonomy of the GIs.

CEAUL had 3 associated FCT Projects during 2010:

FCT /PTDC/MAT/101736/2008 "EXTREMA" PI: M. Ivette Gomes

FCT/ PTDC/MAT/64924/2006 "EXES PI: Laurentius de Haan

FCT/ PTDC/MAT/64353/2006 "MEGA" PI: K.F.Turkman

General Objectives

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 and Life Sciences and Biology, Financial Risk and hazards posed by nature in Geophysics and Environment. Together with applied research, fundamental research is carried out on several areas: Probability, Stochastic processes, Statistics of Extremes, Computational Statistics and Simulation, Resampling Methodologies, Quality Control, Bayesian Statistics, Biostatistics, Statistics in Genomics and Proteomics, Survival Analysis, Clinical Trials, Time Series, Data Analysis, Sampling, Classification methods, 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), collaboration with researchers in other areas, and an updated Library to community.

Another objective involves the links with National Statistical Institutions, namely National Institute of Statistics (INE) and Portuguese Statistical Society (SPE).

Some of the senior members of CEAUL are deeply involved with the implementation of REVSTAT – Statistical Journal, an International Journal in the area of Probability and Statistics in English.

Main objectives of GI1 were in the field of statistics of univariate, multivariate, multidimensional and spatial extremes, with special emphasis on their applications to Life Sciences, Environment, Risk, Insurance, Finance and Statistical Quality Control.

GI2 main interests have been in Meta analysis and applications in Medicine, Structure of population matrices and Principal Components Analysis, History of Science, Fractal issues in population models, scale and location problems. Analysis of binary longitudinal data, Distance sampling models, Teaching of Statistics, Mixture models, Analysis of messy data, Simulation studies of the Rényi's rarefaction, Extensions of Dorfman's theory on analysis of combined blood samples.

The main objective of Group GI3 is to make contributions on specific probability and statistical issues in modeling environmental and biological data, as well as, to create a group with expertise in analyzing data coming from these fields. The areas of research were, spatial extremes; hierarchical Bayesian

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spatiotemporal analysis; stochastic modelling of dynamic systems; Bayesian latent class models; non-linear time series; missing data mechanisms; Bayesian classification methods; Bayesian nonparametric methods in diagnostic tests; survival analysis and longitudinal models; Bayesian analysis of allelic penetrance models for complex binary traits; ecological studies; modelling infectious diseases; syndromic surveillance; microarray data analysis.

Main Achievements during the year of 2010

CEAUL members have been making a special effort in order to publish their work on the mainstream high quality journals in each field and to disseminate their main results in well recognized international meetings. As a consequence, during 2010 CEAUL had the following production at international level:

- 39 Publications in peer review International Journals.
- 5 chapters of books and 17 publications in International proceedings
- 63 abstracts in international conferences
- 1 book of abstracts

and at the national level

- 2 books
- 14 publications in national periodicals
- 33 abstracts in national conferences.

Members of the center have been involved in software development. The R package `bild` – a package for Binary Longitudinal Data, developed by Salomé Cabral et al, is already made available to the R community.

CEAUL members have not disregarded the national counterpart of their post-graduation teaching activities by involving themselves in the supervision of PhD and MSc students. During 2010, 4 Ph. D. students (1 waiting for discussion) and 9 M. Sc. Students completed their theses under the supervision or co-supervision of integrated members of the center. Details can be found in the GI's reports

Besides the publication in the mainstream domains in the areas of Probability and Statistics, there has been some investment in communicating the importance of Statistics to general society and attracting young students to the area. The team for 2011 will count with four students (3 under graduated and 1 M.Sc.) who were chosen among the most brilliant students of the Department of Statistics and Operations Research with the objective of initiating research in the areas of Probability and Statistics.

During 2010, the CEAUL was directly responsible for the organization of 26 seminars, 2 international workshops, 3 short courses and 2 advanced courses. Extensive list of regular International Seminar program can be found in <http://www.ceaul.fc.ul.pt/cs.html>.

Workshops:

- On some current research topics in extreme value theory (GI1)
- Stam2010- Statistical Modelling: challenges in health (GI3)

Advanced courses:

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- Havard Rue: Bayesian Computing with INLA (GI3)
- Peter Mueller: Bayesian Nonparametric Statistical Methods - Theory and Application (GI3)

Short courses within Stam2010

- Adelaide Freitas: R tools for microarray data Part I (GI3)
- Lisete Sousa: R tools for microarray data Part II: Detecting differentially expressed genes (GI3)
- Inês Sousa: Joint modelling of longitudinal and survival data (GI3)

Also as part of the activity of its research groups, CEAUL has been involved in the organization of international thematic sessions and national and international conferences. These are fully described in each group productivity report.

Members of CEAUL have kept deep international contacts and several members have been invited speakers at international conferences, workshops and seminars. International involvement is well described by each group coordinator as part of the group productivity.

Activities

Integrative/multidisciplinary activities during the year of 2010

There has been a direct evidence of the interaction between the theoretical and applied components of the work. During 2010 members of CEAUL actively collaborated with researchers from several research institutions in different fields, resulting in international publications. The motivating problems of collaboration were on diverse areas such as: health, forest fires, ecology, fisheries, chemical production, radioactivity, quality control, insurance, finance, and education. This is well documented in each research productivity group report.

Some members of CEAUL integrate the research teams of international projects, such as the DEEPFISHMAN project, regarding the Black scabbardfish abundance estimate in the Portuguese coastal waters and the projects on “Maternal Deaths and Severe Maternal Morbidity in Maputo City and Province” and “Support to Integrated Malaria Control in the Chókwè Region – Moçambique.

We also highlight bellow some of the CEAUL integrative/multidisciplinary activities in 2010, with reference to Links with Portuguese Institutions:

- Collaborations with:
- CEAUL / SPE

SPE (Sociedade Portuguesa de Estatística) counts with the collaboration of CEAUL in several Integrative/multidisciplinary activities; in 2010 the collaboration of CEAUL with SPE has been fruitful with the involvement of Daniel Paulino and Dinis Pestana in the production of the Portuguese Statistical Glossary and in the involvement of Fernando Rosado who acts as the editor of the SPE newsletter.

- CEAUL / INE (National Institute of Statistics): I Gomes is the editor of REVSTAT – Statistical Journal, and MA Turkman is co-editor. REVSTAT gained international recognition by being included in SCOPUS and ISI web of knowledge. E Graça Martins is actively collaborating in the ALEA project. Lucília Carvalho is the Leader of the Working Group of the National Statistical Institute (INE) on Labor Force Survey – Implementation of Computer Assisted Telephone Interviewing /CATI. (Inquérito ao Emprego” – Introdução da Entrevista Telefónica).

Activities

- CEAUL / CGF (Calouste Gulbenkian Foundation): Daniel Paulino has his research have been collaborating with researchers from Gulbenkian Institute of Science on Statistical Modelling and Analysis of problems of Immunology and Genetics.

- CEAUL / ISA

ISA (Instituto Superior de Agronomia) MM Neves is responsible for the organization of the cycle of one-day workshops on the theme “A Matemática nas Ciências Biológicas” (2010).

Members of GI3 collaborated actively with researchers from the Departamento de Engenharia Florestal.

- CEAUL / CLAD

CLAD (Ass Port Classificação e Análise de Dados) members of GI1 (MM Neves and Teresa Oliveira) were members of the Scientific Committee of the “XVII JOCLAD”, at ISCTE

Outreach activities during the year of 2010

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

In the teaching of Statistics at non-university level: ME 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 have been involved in the revision of basic and secondary school books of Mathematics (Probability and Statistics) and in producing documentation for teachers. CEAUL organized in January 2010 a one day workshop under the theme “Teaching of Statistics: from the basic level to the secondary level” in honor of E. G. Martins on the occasion of her retirement. Around 100 people attended this one-day workshop.

In the teaching statistics at post-graduate level M Neves collaborated with the MSc program in Agronomics and Natural Resources in Cabo Verde University.

D. Pestana pursued his activity with the multilingual glossary of statistical terms connected with the International Statistical Institute project of a multilingual dictionary.

Members of GI1 have kept contacts with the Portuguese Institute of Quality (“Instituto Português da Qualidade”), Portucel and Auto-Europa in order to introduce in the industry the recent developed robust methods in Statistical Process Control, although up to this date, there was not yet any kind of formal contract.

The group GI3 was the motor for the signature during 2009, through the Faculty of Sciences, of a protocol of cooperation with “EXIGO consultores. Under this protocol some members of the CEAUL (MA Amaral Turkman, Feridun Turkman, Patrícia Bermudez, Marília Antunes and Valeska Andreozzi) participated during 2010 in two consulting projects of the company. In the first one – Metoject – three of the members referred above were responsible for the calculation of the sample size needed to carry on an observational trial that aimed to test a new treatment for Rheumatoid Arthritis. After the data collection, the CEAUL members will be involved in their analysis. The second project was carried out for the Portuguese Court of Accounts. All the members mentioned above actively participated in the study. It consisted on the evaluation of the system of payment used in Portugal for compensating the costs of the hospitals of the National Health Service.

CEAUL jointly with SPE celebrated on 20/10/2010 the first World Statistics day with an afternoon dedicated to the role of Statistics in the Scientific Research for the wellbeing of the Society. The plenary talk was given by Prof Tony O'Hagan from the University of Sheffield, UK, under the title "Statistical methods for cost- effective health care" There was a poster exhibition under the theme "The State of Art of the Statistical Research in Portugal" with the collaboration of 25 research groups in statistics and other

Activities

scientific areas where statistics plays an important role.

Several members of CEAUL acted as reviewers for a big set of International Peer Review Journals and some act as Editors in Editorial Board of International Peer Review Journals

Funding

	2008	2009	2010
LA FCT	0,00	0,00	0,00
Units FCT	245.304,00	127.050,00	147.262,50
Projects FCT	0,00	20.856,00	71.904,00
Other (National)	0,00	0,00	0,00
Other (International)	0,00	0,00	0,00
National Industry	0,00	0,00	0,00
International Industry	0,00	0,00	0,00
	245.304,00	147.906,00	219.166,50

General Indicators

	2006	2007	2008	2009	2010	Total
No. of Researchers Proposed	0,00	0,00	0,00	0,00	0,00	0,00
No. of Researchers Hired (LA)	0,00	0,00	0,00	0,00	0,00	0,00
Balance	0,00	0,00	0,00	0,00	0,00	0,00
No. of Researchers Hired (Ciência Programme)	0,00	0,00	1,00	0,00	0,00	1,00
No. of Researchers integrated with PhD	36,00	41,00	43,00	50,00	53,00	
Training Masters (Master thesis completed)	14,00	4,00	34,00	12,00	0,00	64,00
Training PhDs (PhD thesis completed)	9,00	16,00	11,00	6,00	3,00	45,00

Researchers Hired

Name	Start Date	End Date	Other Institution
No researchers found...			

Technical Personnel Hired

Name	Start Date	End Date	Other Institution
No technical personnel found...			

Additional Comments

Research Groups

Reference	Title / Principal Investigator
RG-LVT-6-948	Order Statistics, Extremes and Applications (MARIA IVETTE LEAL DE CARVALHO GOMES)
RG-LVT-6-949	Probability, Modelling and Data Analysis (Dinis Duarte Ferreira Pestana)
RG-LVT-6-951	Statistical Modelling in Environmental and Life Sciences (Maria Antonia Conceição Abrantes Amaral Turkman)

Group Description

Title of Research Group: ^(RG-LVT-6-948) Order Statistics, Extremes and Applications

Principal Investigator: MARIA IVETTE LEAL DE CARVALHO GOMES

Main Scientific Domain: Matemática

Group Host Institution: Faculdade de Ciências - Universidade de Lisboa

Funding, source, dates

Funding, source, dates

ALL THE REFERRED AMOUNTS INCLUDE OVERHEADS TO PAY FFCUL

FCT Base for Research Group

Funding corresponding to 2010

1 June 2010/15.817,88

1 July 2010/26.962,26

The above-mentioned source funding was available during 2010:

FCT/ PTDC/MAT/64924/2006

“EXES — SPATIAL EXTREMES”

Principal Investigator: Laurentius de Haan

Starting: July 2007; Finishing: December 2010.

Funding: 60,000 Euros

FCT/PTDC/MAT/101736/2008

Title: “EXTREMA: Statistics of Extremes in Today’s World”

Principal Investigator: M. Ivette Gomes

Other responsible researchers: Luísa Canto e Castro, M. Isabel Fraga Alves and M. Manuela Neves,

Starting date: January 1, 2010; Finishing date: December 2012.

Funding: 89,520 Euros.

Objectives & Achievements

Objectives

The objectives of the team for 2010 were in the fields of Univariate, Multivariate, Multidimensional and Spatial Extremes, with special emphasis on their applications to Biometry, Life Sciences, Environment, Risk, Insurance, Finance, Statistical Quality Control and Design of Experiments. Those objectives were related with the topics reproduced from the future research objectives in the 2009 Report:

1) Development of Heuristic and Asymptotic Data-driven Methods for Threshold Selections. The use of bootstrap methodology and other resampling techniques.

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2) Statistical Quality Control (SQC), Experimental Design and Multivariate Data Analysis will be also fundamental areas of research in the nearby future. In the area of SQC, special emphasis will be given to the role of the quantile function in the building of robust control charts. Small balanced samples will be used to study the power of randomization tests and the multivariate Statist approach will be used to deal with a possible restructuration of privatized firms.

3) Random Censored Data Analysis: Applications in Life Sciences and Survival Analysis. Development of new adequate methodology for the analysis of this type of data, not only in the field of Extremes but also in areas like Design of Experiments and Forensic Statistics.

4) Asymptotic Comparison, at Optimal Levels, of Classical, Reduced-bias and Minimum-variance Reduced-bias (MVRB) estimators of the Extreme Value Index. Development of new estimators of several relevant parameters of extreme events.

5) Weak Dependent Structures and Positively (or negatively) Associated Sequences. We intend to deal with diversified stochastic processes, including the pRRMAX processes and spatial processes.

Main Achievements

We refer separately the main achievements in the above mentioned 2010 topics of research:

1) Heuristic Data-driven Methods for Threshold Selections and Monte-Carlo Simulations. We mention [P1], papers accepted at J. Statist. Comput. and Simul., and at Comm.Statist.—Theory and Methods, [I1], [I2], [I5], [I8], [I10] and [I11], 1 of the 17 short abstracts in international conferences (ICs), [N5], [N8], [N9] and [N17] (partially), [N13] and [N16].

2) Statistical Quality Control, Experimental Design and Multivariate Data Analysis. The main achievement was [P5]. We also mention [I2], [I13], [I14] and [I15], 10 of the 17 short abstracts in ICs, the book [N1], as well as [N2], [N3] and [N17] (partially), [N6], [N12], [N14], [N15] and the 4 one page abstracts. The Ph.D. thesis is essentially in this topic, as well as the 3 M.Sc thesis.

3) Randomly Censored Data Analysis in Life Sciences and Survival Analysis. Article [P1] is partially included in this topic, as well as an article accepted in Intern. J. of Math. Model. and Numer. Optim. We also mention [I12], 1 of the 17 short abstracts in ICs, and [N3] (partially).

4) Asymptotic Comparisons at Optimal Levels and Semi-parametric Estimation Procedures. The main achievements in this topic were the articles [P2], [P6], [P7], and part of [P9]. We also refer papers accepted at J. Statist. Planning and Infer., Extremes, and Comm.Statist. — Simul. and Computation. It is still worth mentioning [I1], [I3], [I4], [I7], [I11], 3 of the 17 short abstracts in ICs, [N5], [N8], [N9] (partially), [N4], [N7], [N10].

5) Dependent Frameworks and Extremes of Stochastic Processes. We refer [P3], [P4], [P8] and part of [P9]. It is also worth mentioning 2 papers accepted at Adv. Appl. Probab. and Comput. Statist. and Data Analysis. We also mention [I6] and [I9], as well as 2 of the 17 short abstracts in ICs, [N2], part of [N3] and [N4], as well as [N11].

Group Productivity

Publications in peer review Journals

[P1] Branco, F., Oliveira, T.A., Oliveira, A. (2010): The Impact of Distributional Shape on the Power of randomization Tests for Two Independent Groups: a Simulation Study Using Small Balanced Samples. Biometrical Letters, 47:2, 107-118. Abstract available at:

<http://www.au.poznan.pl/biometrical.letters/index.php?p=abstract&a=2010.47.2.2>

[P2] Caeiro, F. and Gomes, M.I. (2010). An asymptotically unbiased moment estimator of a negative

Group Productivity

extreme value index. *Discussiones Mathematicae Probability and Statistics* 30:1, 5-19.

Available at: <http://www.discuss.wmie.uz.zgora.pl/ps/>

[P3] Ferreira, M. and Canto e Castro, L. (2010). Modeling rare events through a pRRMAX process, *J. Statist. Plann. Inference* 140:11, 3552-3566.

[P4] Ferreira, M. and Canto e Castro, L. (2010). Asymptotic and pre-asymptotic tail behavior of a power max-autoregressive model. *ProbStat Forum* 3:8, 91-107. Available on-line at: <http://probstat.org.in/PSF-0610.pdf>

[P5] Gil, Pedro M., Figueiredo, F. and Afonso, O. (2010). Equilibrium Price Distribution with Directed Technical Change. *Economics Letters*, 108, 130-133.

[P6] Gomes, M.I. and Henriques-Rodrigues, L. (2010). Comparison at optimal levels of classical tail index estimators: a challenge for reduced-bias estimation? *Discussiones Mathematica: Probability and Statistics* 30:1, 35-51. Available at: <http://www.discuss.wmie.uz.zgora.pl/ps/>

[P7] Gomes, M.I., Henriques-Rodrigues, L., Pereira, H. & Pestana, D. (2010). Tail index and second order parameters' semi-parametric estimation based on the log-excesses. *J. Statist. Comput. and Simul.*, 80(6), 653-666. DOI: 10.1080/00949650902755178.

URL: <http://dx.doi.org/10.1080/00949650902755178>

[P8] Neves, M.M. and Cordeiro, C. (2010). Exponential smoothing and resampling techniques in time series prediction. *Discussiones Mathematicae. Probability and Statistics* 30:1, 87-101. Available at: <http://www.discuss.wmie.uz.zgora.pl/ps/>

[P9] Prata Gomes, D. and Neves, M.M. (2010). Extremal behaviour of stationary processes: the calibration technique in the extremal index estimation. *Discussiones Mathematicae. Probability and Statistics* 30, 21-33.

Moreover, we mention 8 papers accepted in 2010, in *Adv. Appl. Probab., Comm.Statist.—Simul. and Comput., Comm.Statist.—Theory and Methods, Computational Statistics and Data Analysis, Extremes, International Journal of Mathematical Modelling and Numerical Optimisation, J. Statist. Comput. and Simul.*, and *J. Statistical Planning and Inference*, to be included in the 2011 report.

Other international publications

CHAPTERS of BOOKS

[I1] Caeiro, F., Gomes, M.I. and B. Vandewalle. Semi-Parametric Probability-Weighted Moments Estimation Revisited. IWAP 2010. On-line at:

http://www.fundacion.uc3m.es/IWAP2010/Extended_Abstracts.html.

[I2] Cordeiro, C., Machás, A. and M.M. Neves. A Case Study of a Customer Satisfaction Problem: Bootstrap and Imputation Techniques. In Esposito Vinzi, V. et al. (Eds.), *Handbook of Partial Least Squares Concepts, Methods and Applications*, Springer Handbooks of Computational Statistics, 279-288.

[I3] Fraga Alves, M.I., Neves, C. and U. Cormann. Heavy and Super-Heavy Tail Analysis. In Falk, M., Hüsler, J. and Reiß, R.-D., *Laws of Small Numbers: Extremes and Rare Events*, 3rd Edition, Springer-Basel, ISBN: 978-3-0348-0008-2, Chapter 2, Section 2.7, 75-101.

We also mention 3 invited articles at Lovric, M. (Ed.), *International Encyclopedia of Statistical Science*,

Group Productivity

Springer-Verlag, released by the end of 2010.

PROCEEDINGS

[I4] Araújo Santos, P. and M.I. Fraga Alves. VaR Prediction with a Duration Based POT method. Proc. ISF2010, San Diego, CA, USA.

[I5] Cordeiro, C. and M.M. Neves. Boot.EXPOS in NNGC competition. Proc. WCCI 2010, 1135-1141.

SIS 2010 Scientific Meeting. Invited Session on Statistics of Extremes in Today's World. Electronic publication:

[I6] Ferreira, A. and L. de Haan. Spatial extremes and high quantile estimation of aggregated rainfall.

[I7] Fraga Alves, M.I. How far can Man go?

[I8] Gomes, M.I., Henriques-Rodrigues, L. and F. Caeiro. Refined Estimation of a Light-Tail: an Application to Environmental Data.

[I9] Ferreira, M. and L. Canto e Castro. A method for fitting a pRRARMAX model: an application to financial data”, Proc. of the 2010 Intern. Conf. on Engin. and Computer Science, 2022-2026.

In Luzar-Siffler et al. (eds.), Proceedings of the ITI 2010, SRCE Univ. Computing Centre Editions:

[I10] Gomes, M.I. and L. Henriques-Rodrigues. A Heuristic Choice of Tuning Parameters in a Location-Invariant Reduced-Bias Estimation of the Extreme Value Index: Application to Financial Log-returns and Simulated Data, 527-532.

[I11] Gomes, M.I., Henriques-Rodrigues, L. and C. Miranda. A Simulation Study of PORT Second-Order Reduced-Bias Extreme Value Index Estimation, 533-538.

[I12] Gomes, M.I. and M.M. Neves. A Note on Statistics of Extremes for Censoring Schemes on a Heavy Right Tail, 539-544.

[I13] Oliveira, A. and T.A. Oliveira. Recursos Computacionais no ensino e na aprendizagem da Estatística em ambiente online. Atas do XIII Encontro Ibero-Americano de Educação Superior a Distância, 16-18/9 2010. Universidade Aberta. ISBN: 978-972-674-689-8 (CD).

[I14] Oliveira, T.A. (2010). BIB Designs with Repeated Blocks: Review and perspectives. Proc. ICCS-X, ISBN 978-977-416-365-8. Volume I, 82-96.

[I15] Oliveira, T.A.; A. Oliveira. Strategies and methodologies of Experimental Design in the online environment. In Skiadas, H. (ed.), Proc. SMTDA 2010 (CD).

We still mention the publication of 17 abstracts associated with international conferences.

Other national publications

Apart from the edition of “Boletim da SPE”, by Fernando Rosado, we mention:

[N1] Gomes, M.I., Figueiredo, F. e Barão, M.I. (2010). Controlo Estatístico da Qualidade. Edições I.N.E. (xii+305 pages), 2ª edition, revised, ISBN: 978-972-8890-23-0.

In F. Rosado (ed.), Boletim da SPE: Outono de 2010, SPE editions.

Group Productivity

[N2] Ferreira, A. e de Haan, L. (2010). Processos max-estáveis: uma caracterização simples e exemplos, 17-22.

[N3] Sampaio, T., Zwolinski, J. e Neves, M.M. (2010). A Análise de Dados Espaciais em duas áreas das Ciências Biológicas, 29-38.

In Braumann, C. et al. (eds.) XVIII Congresso SPE, Livro de resumos:

[N4] Araújo Santos, P. e Fraga Alves, M.I. (2010). Estimação do parâmetro de forma na distribuição Weibull discreta, 56-58.

[N5] Caeiro, F. e Gomes, M.I. (2010). Estimação semi-paramétrica da cauda: nova classe de estimadores dos momentos ponderados de probabilidade, 152.

[N6] Gonçalves, G.S., Figueiredo, A.M. e Figueiredo, F. (2010). Análise da evolução dos principais sectores de actividade em Portugal., 25-27.

[N7] Fraga Alves, M.I. e Araújo Santos, P. (2010). Método POT com base em durações e aplicação na predição do VaR, 147-148.

[N8] Gomes, M.I. (2010). Estimação Adaptativa, Invariante e de Viés-Reduzido do Índice de Valores Extremos, 98-99.

[N9] Gomes, M.I. e Henriques-Rodrigues, L. (2010). Estimação adaptativa e PORT-MVRB do índice de valores extremos, 144-146.

[N10] Henriques-Rodrigues, L. e Gomes, M.I. (2010). A metodologia PORT na estimação d um parâmetro de forma de segunda ordem, 149-151.

[N11] Prata Gomes, D. e Neves, M.M. (2010). Extremos espaciais: estudo de valores máximos de precipitação no norte de Portugal, 170-172.

[N12] Rosado, F. e Figueira-Neves, M. (2010). Sobre Outliers em Estatística Forense, 84-87.

In Lemos, A.C. et al. (eds.), Actas ENSPM 2010:

[N13] Gomes, M.I. (2010). Estimação Adaptativa, Invariante e de Viés-Reduzido do Índice de Valores Extremos, 98-99.

[N14] Oliveira, T.A. (2010): “Planos em Blocos Incompletos Equilibrados e Parcialmente Equilibrados (BIB e PBIB Designs): Na fronteira entre a Estatística e a Matemática, 96.

[N15] Santos, J.A. e Neves, M.M. (2010). “Um modelo semi-paramétrico de regressão logística”, 113-114.

In Actas JOCLAD 2010, Livro de Resumos:

[N16] Branco, F., Oliveira, T.A. (2010) - A influência de valores extremos na potência dos testes de aleatorização: Um estudo por simulação com pequenas amostras equilibradas, 103.

[N17] Oliveira, A. Oliveira, T.A. (2010). Estatística e Análise de Dados: Visualizações Gráficas em R, 191-193.

Group Productivity

We further refer

- 4 one page abstracts, published in Actas 5th Scientific Meeting ISLA, ISBN:978-989-96995-0-2, all included in item 2) of the main achievements.
- 10 internal reports, available at <http://www.ceaul.fc.ul.pt/notas.html?ano=2010>

Ph.D. thesis completed

[PhD1] Santos Branco, Fernando José. “Investigação Experimental: Potência Estatística dos Testes de Aleatorização na Comparação de dois Grupos Independentes”. Ph.D. Programme in Mathematics and Design of Experiments, Universidade Aberta (waiting for discussion)

Orientador: M.T. Oliveira

Organization of conferences

1. XVII Jornadas de Classificação e Análise de Dados, 24-27 March, ISCTE, Lisboa. (members in scientific committee)
2. 74th European Study Group with Industry, Departamento de Matemática, Universidade de Aveiro, April 26-30.
3. SMTDA 2010, Crete, 8-11 June. Invited session, “The R project for Statistical Computing”.
4. Statistics of Extremes in Today’s World, Invited Session to the SIS 2010, University of Padua, June 6-18.
5. Extremes and Risks, Invited Session to IWAP 2010, International Workshop on Applied Probability, Madrid, Spain, July 5-8.
6. Encontro Nacional da Sociedade Portuguesa de Matemática, July 8-10, Instituto Politécnico de Leiria. Thematic sessions on “Probability and Statistics”.
7. Programa P17 da Academia de Verão 2010, Departamento de Matemática, Universidade de Aveiro.
8. 40th International Biometrical Colloquium and 2nd Polish-Portuguese Workshop on Biometry in honour of Prof. J.T. Mexia, August 29 – September 2, Bedlewo, Poland. (organized by a member of the group; members in scientific committee, invited session)
9. XVIII Congresso Anual da Sociedade Portuguesa de Estatística, São Pedro do Sul, 29 de Setembro a 2 de Outubro. (members of scientific committee)
10. CONFMET 2010: Medições na Ciência e na Tecnologia, Lisboa, Portugal, November 4-5.
11. 5th Scientific Meeting ISLA - Data Mining and Business Intelligence, Methods and Applications. 11-13 Novembro, Santarém. (members of scientific committee)
12. Workshop on some Currents Research Topics in Extreme Value Theory. Organized by FCT/MCTES Research Project on Spatial Extremes and CEAUL. Lisbon, December 13. (organized by the group)

Under preparation in 2010:

1. Workshop on Risk & Extreme Values in Insurance and Finance, 6-7 June, 2011.
2. Statistics of Extremes in Today’s World. Invited Session to ISI 2011, Dublin, Ireland, August 21-26,

Group Productivity

2011.

3. WSMC-2011: V Workshop in Statistics, Mathematics and Computation - Methods and Applications, Faculdade de Economia, Universidade do Algarve, Faro, July 11-12, 2011.

4. ALICE 2011, in conjunction with the INCOS 2011, November 30 - December 2, 2011, Fukuoka, Japan.

Industry contract research

We keep on the contacts with the Portuguese Institute of Quality (“Instituto Português da Qualidade”) and Auto-Europa, without any formal contract. The main objectives are the introduction in the industry of the recent developed robust methods in Statistical Process Control.

Internationalization

The members of this team have kept deep international contacts and are well-recognized internationally in the areas of statistics of extremes, spatial, environmental and financial statistics, risk assessment, statistical quality control, experimental design and biometry. There was collaborative publication with J.J.-Cai, J. Einmahl, Z. Kabluchko, V. Leiva, M. Schlather, C. de Vries, C. Zhou, most of it not yet finalized. The internationalization of the team was partially responsible for the number of invited lectures in 2010, either national or international: Luísa Canto e Castro (invited seminar at Évora University), Ana Ferreira (SIS 2010, Padova, Italy; Bern, Switzerland); Fernanda Figueiredo (PUC, Rio de Janeiro; Universidade do Minho; FEP and LIAAD/INESC-PORTO; ISBIS 2010); Isabel Fraga Alves (SIS 2010, Padova, Italy); M. Ivette Gomes (Siegen, Germany; IWAP 2010, Madrid; ENSPM 2010, Leiria; Poznan, Poland; Eotvos Lorand Univ., Budapest, Hungary; Azores University, San Miguel; University of Coimbra); Laurens de Haan (medallion lecture, IMS annual meeting, Gothenburg, Sweden); Lígia Henriques-Rodrigues (SIS 2010, Padova, Italy); Cristina Miranda (Mathematics Dept, Aveiro); Cláudia Neves (ISBIS 2010); Manuela Neves (ISBIS 2010); Amílcar Oliveira (LEAD, Lisboa); Teresa Oliveira (JOCLAD 2010, Lisboa; ENSPM 2010, Leiria; Lednice, Czech Republic; IN3-HAROSA Workshop, Barcelona, Spain). We also would like to emphasize the strong co-operation with researchers in Amsterdam Univ., Bern Univ., Erasmus School of Economics, Erasmus Univ. Rotterdam, Fundan Univ., Georgia Pol. Inst., Katholieke Univ. Leuven, Liberec Univ., Eotvos Lorand Univ., Royal Netherlands Meteor. Inst., Saarland Univ., Siegen Univ., The Petroleum Inst. and Tinbergen Institute. Also as a result of the internationalization of the team, we can mention the enormous number of reviews produced by members of the team in the most diversified journals.

Group Description

Title of Research Group: ^(RG-LVT-6-949) Probability, Modelling and Data Analysis

Principal Investigator: Dinis Duarte Ferreira Pestana

Main Scientific Domain: Matemática

Group Host Institution: Faculdade de Ciências - Universidade de Lisboa

Funding, source, dates

Funding, source, dates

ALL THE REFERRED AMOUNTS INCLUDE OVERHEADS TO PAY FFCUL

FCT Base for Research Group

Funding corresponding to 2010

1 June 2010/16.426,26

1 July 2010/27.999,36

Objectives & Achievements

Objectives

1 • Meta analysis and applications in Medicine; uniformity issues related to combined p-values and random p-values, data transformations and sample augmentation. Reserach team: F. Sequeira, F. Brilhante, S. Mendonça, D. Pestana, L. Soares de Almeida, R. Vasconcelos, M. Malva, J. P. Martins, M. L. Rocha.

2 • Structure of population matrices and Principal Components Analysis. Research team: J. L. Cadima and co-workers from ISA.

3 • History of Science — Research in Probability and Statistics in Portugal during the first Republic. Research team: R. Santos, D. Pestana.

4• Fractal issues in population models. Research team: J. L. Rocha, S. Aleixo, D. Pestana, R. Santos.

5 • Scale analysis using the independence of scale and location estimators. Research team: D. Pestana, M. Marques dos Santos, F. Brilhante, S. Mendonça, M. Malva.

6• Analysis of binary longitudinal data, in view of medical applications. Research team: S. Cabral, H. Gonçalves.

7 • Further work on errors in distance sampling models, and modeling bird death rates in eolic plants. Research team: T. A. Marques, R. Bispo.

8 • Teaching of Statistics: Documentation for teachers, and collaboration with INE's Alea Project. Research team: E. Graça Martins, D. Pestana, S. Velosa

9 • Extensions of Dorfman's theory on analysis of combined blood samples: specificity and sensibility issues in quantitative tests; mixture models. Research team: D. Pestana, M. Felgueiras, R. Sousa, R. Vasconcelos.

10 • Simulation studies of the Rényi's rarefaction, and applications to sampling theory. Research team: S. Aleixo, F. Diamantino, D. Pestana.

11 • Scientific translation in the area of Probability and Statistics, and Statistics, and development of an e-

Objectives & Achievements

learning platform for professional translators for TRADULÍNGUAS. Research team: C. Ventura, S. Velosa, D. Pestana.

Main Achievements

- 1 • Uniform sample augmentation algorithms have been developed, in the light of combined p-values in meta-analysis; F. Brilhante investigated random p-values, in this connection, and applications to health sciences and biology have been investigated — namely in the systematic review in the area of virtual colonoscopy and mutant human DNA in colon-rectal cancer diagnosis (R. Vasconcelos). Applications in dental and forensic medicine have been developed.
- 2 • Cadima and co-workers published their research on eigenstructure of block-structured correlation matrices, and developed applications on the study of the diet of ruminants.
- 3 • Portuguese and Spanish publications in Statistics in the beginning of the XXth century have been put in context of European publications in the XIXth-XXth century.
- 4 • The beta(p,q) family has been extended to more general population growth models connected with extremal growth, and their fractal and chaotic characterization has been made; random repair models have been used to produce new Cantor-like fractal sets, and their dimension has been studied.
- 5 • (no developments in 2010).
- 6 • S. Cabral, H. Gonçalves and A. Azzalini produced for the R library the package `bird` — BInary Longitudinal Data.
- 7 • T. Marques and co-workers, R. Bispo and co-workers, and Dinis Pestana developed research on distance sampling, and on casualties in eolic plants.
- 8 • E. Graça Martins developed work for the ALEA Project, and started the supervision of Ms. Emília Oliveira. Pestana and Velosa book reached the 4th edition.
- 9 • R. Sousa, D. Pestana and J. P. Martins presented a paper (now submitted for publication) on extensions of Dorfman's theory, incorporating sensitivity, sensibility and quantitative data, and continued the supervision of the Ph. D. student Ricardo Sousa in this area.
- 10 • S. Aleixo, F. Diamantino, D. Pestana submitted for publication a study on the Generalized Laplace-Gauss family of distributions, used as a benchmark on the investigation of rarefaction.
- 11 • C. Ventura studied distance teaching methods with the Open University, and D. Pestana pursued his activity with the multilingual glossary of statistical terms connected with the International Statistical Institute project of a multilingual dictionary.

Group Productivity

Publications in peer review Journals

Borchers, D. L. , Marques, T., Gunnlaugsson, T. & P. Jupp (2010) Estimating distance sampling detection functions when distances are measured with errors. *JABES*. 15: 346-361.

Bruno-Soares, A.M., Cadima, J., and Matos, T.J.S. (2010) Predicting degradability parameters of diets for ruminants using regressions on chemical components, *Journal of the Science of Food and Agriculture*, 90 949-955

Cadima, J., Calheiros, F.L., and Preto, I.P. (2010) The eigenstructure of block-structured correlation

Group Productivity

matrices and its implications for Principal Component Analysis, *Journal of Applied Statistics*, 37, 577-589.

Gomes, M. I., Henriques-Rodrigues, L., Pereira, H., and Pestana, D. (2010). Tail index and second order parameters' semi-parametric estimation based on the log-excesses. *J. Statisti. Comput. and Simul.* 80, 653-666.

Heide-Jørgensen, M.; Laidre, K.; Borchers, D.; Marques, T., Sern, H. & Simon, M. (2010). The effect of sea-ice loss on beluga whales (*Delphinapterus leucas*) in West Greenland. *Polar Research*. 29: 198-208.

Heide-Jørgensen, M., Laidre, M. L., Burt, D. L., Borchers, T. A., Marques, R. G., Hansen, M., Rasmussen and S., Fossette (2010) Abundance of narwhals (*Monodon monoceros* L.) on the hunting grounds in Greenland. *Journal of Mammalogy* 91: 1135—1151.

Marçalo, A., Marques, T. A., Araújo, J., Pousão-Ferreira, P., Erzini, K. & Stratoudakis, Y. (2010) Fishing simulation experiments for predicting effects of purse seine capture on sardines (*Sardina pilchardus*). *ICES Journal of Marine Sciences*. 67: 334-344.

Marques, T. A., Buckland, S. T., Borchers, D., Tosh, D. & McDonald, R. A. (2010) Point transect sampling along linear features. *Biometrics*. 66: 1247-1255.

Moretti, D., T. A. Marques, L. Thomas, N. Dimarzio, A. Dilley, R. Morrissey, E. McCarthy, J. Ward and S. Jarvis (2010) A dive counting density estimation method for Blainville's beaked whale (*Mesoplodon densirostris*) using a bottom-mounted hydrophone field as applied to a Mid-Frequency Active (MFA) sonar operation. *Applied Acoustics*. 71: 1036-1042.

Pereira, C., Bernardo, M., Pestana, D., Costa Santos, J., Mendonça, M. C. (2010). Contribution of Teeth in Human Forensic Identification - Discriminant function sexing odontometrical techniques in Portuguese Population. *J. Forensic and Legal Medicine* 17, 105-110.

Pires, Ana Elisabete; Afonso, Ana Filipa; Queirós, Ana; Cabral, Maria Salomé; Porrata, Luis; Markovic, Svetomir N.; Kaveri, Srini V.; da Silva, Maria Gmes; João, Cristina (2010). Treatment With Polyclonal Immunoglobulin During T-cell Reconstitution Promotes Naive T-cell Proliferation. *Journal of Immunotherapy*. 33(6): 618-625.

Thomas, L.; Buckland, S. T. ; Rexstad, R. ; Laake, J. L., Strindberg, S., Hedley, S., Bishop, J., Marques, T. A. & Burnham, K. P. (2010). Distance software: design and analysis of distance sampling surveys for estimating population size. *Journal of Applied Ecology*. 47: 5-14.

accepted in 2010, in print:

Bernardino, J., Bispo, R., Torres, P., Mascarenhas, M. Costa, H. M. & Rebelo, R. (2010). Improving bird and bat mortality estimation at wind energy facilities: comparison of two estimators and search protocols according to different scenarios. *Journal of Environmental Planning and Management* (accepted)

Bernardino, J., Bispo, R., Torres, P., Mascarenhas, M. Costa, H. M. & Rebelo, R. (2010). Enhancing of carcass removal trials at three wind energy facilities in Portugal. *Wildlife Biology in Practice* (accepted)

Marques, T. A.; Munger, L.; Thomas, L.; Wiggins, S. & Hildebrand, J. A. (in press) Estimating North Pacific right whale (*Eubalaena japonica*) density using passive acoustic cue counting. *Endangered Species Research*.

Group Productivity

Marques, T. A., Thomas, L., Martin, S.W., Mellinger, D. K., Jarvis, S., Morrissey, R. P., Ciminello, C. and Dimarzio, N. (in press) Spatially explicit capture-recapture methods to estimate minke whale abundance from data collected at bottom mounted hydrophones. *Journal of Ornithology*.

Marques, T. A., Thomas, L. and J. A. Royle (in press) A hierarchical model for spatial capture-recapture data: Comment. *Ecology*.

Ward, J., Jarvis, S., Moretti, D., Morrissey, R., Dimarzio, N., Thomas, L. and Marques, T. A. (in press) Beaked Whale (*Mesoplodon densirostris*) Passive Acoustic Detection with Increasing Ambient Noise. *The Journal of the Acoustical Society of America*

Other international publications

Packages

Cabral, S., Gonçalves, H., and Azzalini, A. (2010) *bild* — a package for BInary Longitudinal Data (R library)

Bispo, R. & Palminha, G. (2010). An Web-Application for Mortality Adjustment regarding Scavenging Removal. Bio3, Lda., Centro de Biociências/ISPA-IU & CEAUL, Lisboa, Portugal. url: <http://internal.bio3.pt/mortality>.

Book chapters:

Acilina Caneco, J. Leonel Rocha, Clara Grácio and Sara Fernandes, Some Conjectures about the Synchronizability and the Topology of Networks, In *Frontiers in the Study of Chaotic Dynamical Systems with Open Problems*, Elhadj, Z. and Sprott, J. C. (eds): World Scientific Series on Nonlinear Science, Series B, 2010, Chap. 7, 121-152. (ISBN-10: 9814340693, ISBN-13: 978-9814340694)

Acilina Caneco, J. Leonel Rocha and Clara Grácio, Chaotic Synchronization of Piecewise Linear Maps, In *Discrete Dynamics and Difference Equations*, Elaydi, S., Oliveira, H., Ferreira, J. M. and Alves, J. F. (eds): World Scientific Publishing Co, 2010. (ISBN-10 9814287644, ISBN-13 9789814287647)

accepted in 2010, in print:

Aleixo, S., Rocha, J. L., and Pestana, D. (2010). Beta(p,q)-Cantor Sets: Determinism and Randomness. In Christos H. Skiadas, Ioannis Dimotikalis and Charilaos Skiadas (Eds.), *Chaos Theory: Modeling, Simulation and Applications*, World Scientific Books (in press).

Aleixo, S., Rocha, J.L., and Pestana, D. (2011). Probabilistic Methods in Dynamical Analysis: Population Growths Associated to Models Beta (p,q) with Allee Effect, in Peixoto, M. M; Pinto, A.A.; Rand, D. A. J. (Eds.), *Dynamics, Games and Science*, in honour of Maricio Peixoto and David Rand, vol II, Ch. 5, 79-95, Springer Verlag, New York.

Marques, T. A., Buckland, S. T., Borchers, D. L., Rexstad, E. & Thomas, L. (2011), Distance Sampling, Pages 398-400 in *International Encyclopedia of Statistical Science* (ed. L. Miodrag), Springer. DOI: 10.1007/978-3-642-04898-2_214.

Gomes, M. I., Mendonça, S., and Pestana, D. (2011). Adaptive Reduced-bias Tail Index and VaR Estimation via the bootstrap methodology. *Communications in Statistics* (in print).

Pestana, D. (2011). Combining p-values, in M. Lovric (Ed.), *International Encyclopedia of Statistical Science*, 1145-1147, Springer Verlag, New York.

Pestana, D., Aleixo, S., and Rocha, J. L., (2010). Regular variation, paretian distributions, and the interplay

Group Productivity

of light and heavy tails in the fractality of asymptotic models. In Christos H. Skiadas, Ioannis Dimotikalis and Charilaos Skiadas (Eds.), *Chaos Theory: Modeling, Simulation and Applications*, World Scientific Books (in press).

Proceedings

Aleixo, S., Rocha, J. L., and Pestana, D. (2010). Beta(p,q)-Cantor Sets: Determinism and Randomness. *Chaotic Modeling and Simulation*. In C. H. Skiadas, Y. Dimotikalis and C. Skiadas (eds), *Proceedings of the 3rd Chaotic Modeling and Simulation International Conference (CHAOS2010)*, CD book.

Bispo, R., Palminha, G., Bernardino, J., Marques, T. & Pestana, D. (2010). A new statistical method and a web-based application for the evaluation of the scavenging removal correction factor. In *Proceedings of the VIII Wind Wildlife Research Meeting*, Denver, EUA.

Brilhante, M. F., Pestana, D., and Sequeira (2010). Combining p-values and Random p-values, In Luzar-Stiffler, V., Jarec, I. and Bekic, Z. (eds.), *Proceedings of the ITI 2010, 32nd International Conference on Information Technology Interfaces*, IEEE CFP10498-PRT, 515-520.

Brilhante, M. F., Mendonça, S., Pestana, D., and Sequeira (2010). Using Products and Powers of Products to Test Uniformity, In Luzar-Stiffler, V., Jarec, I. and Bekic, Z. (eds.), *Proceedings of the ITI 2010, 32nd International Conference on Information Technology Interfaces*, IEEE CFP10498-PRT, 509-514.

Pestana, D., Aleixo, S., and Rocha, J. L., (2010). Regular variation, paretian distributions, and the interplay of light and heavy tails in the fractality of asymptotic models. In C. H. Skiadas, Y. Dimotikalis and C. Skiadas (eds), *Proceedings of the 3rd Chaotic Modeling and Simulation International Conference (CHAOS2010)*, CD book.

Other national publications

Book

Pestana, D. D. e Velosa, S. (2010). "Introdução à Probabilidade e à Estatística", 4ª ed. revista, 1164 pp., Calouste Gulbenkian Edition.

Papers:

Bispo, R. (2010). *Análise Estatística de Dados. Aplicações à Clínica Obstétrica*. In Mendes da Graça, L. (Ed.) *Medicina Materno-Fetal*. Edições Lidel, Lisboa.

Faustino, C. E. S., M. A. Silva, T. A. Marques & L. Thomas (2010). Designing a shipboard line transect survey to estimate cetacean abundance off the Azores archipelago. *Arquipelago - Life and Marine Sciences*. 27: 49-58.

Pestana, D. (2010). Devemos Acreditar em Análises Clínicas? *Salutis Scientia* 2, 4-14.

accepted in 2010, in print:

Brilhante, M. F., Pestana, D., e Rocha, M. L. (2011), *Betices*, Boletim da SPM (in press).

Felgueiras, M. (2010). Mistura de gaussianas e distribuição t de Student em Finanças. *Actas do Encontro Nacional da Sociedade Portuguesa de Matemática*.

Pestana, D. (2011). "Representações Gráficas na Formação da Intuição, na Análise dos Dados e na Comunicação das Ideias". In "As Imagens com que a Ciência se Faz", Pombo, O. e Di Marco, S. (Eds), *Fim de Século Edições*, 105-119, ISBN 978-972-754-279-6 (em publicação).

Group Productivity

Ph.D. thesis completed

Acilina do Nascimento Caneco, Sincronização Caótica de Sistemas Dinâmicos não Lineares Acoplados, Doutoramento em Matemática, Departamento de Matemática da Escola de Ciências e Tecnologia da Universidade de Évora (supervisors: J. L. Rocha and Maria Clara Grácio, UE), 29 de Abril de 2010.

Maria Luísa Silva Rocha got her Ph. D. in 2010, Thesis title: "Modelos e Evidência Empírica na Limitação de Riscos Financeiros", Universidade dos Açores (co-supervisors: António de Menezes Dinis Pestana and Maria de Fátima Brilhante)

Organization of conferences

To take place in 2011

XIX congresso da Sociedade Portuguesa de Estatística Rui Sousa Santos, Miguel Felgueiras)

XVIII Jornadas de Análise e Classificação de Dados (J. Cadima)

International Conference on Modeling, Optimization and Dynamics, Porto (J. L. Rocha)

Internationalization

S. Cabral and H. Gonçalves pursued their joint research on longitudinal data analysis with A. Azzalini.

R. Bispo started joint research with M Huso (Oregon State University, USA)

Members of this team presented their work at the following international conferences:

9th International Conference on Practical Applications of Agents and Multi-Agent Systems, Salamanca

International Conference on Data Analysis and Modelling in Earth Sciences., Lisboa

32nd International Conference on Information Technology Interfaces, Cavtat, Croatia LINSTAT 2010, Tomar

2nd International Statistical Ecology Conference, Kent, UK

159th Acoustic Society of America Meeting - Baltimore, Maryland

International Conference on Modeling, Optimization and Dynamics, Porto

CHAOS2010, Chania, Crete

VIII Wind Wildlife Research Meeting, Denver

12th International Scientific Meeting of the Association for Research in Infant and Child Development, Londres

Workshop on Estimating Fatality at Wind-Power Plants

XIX Mediterranean International Congress of Legal Medicine, Tozeur. Tunísia

VII Congreso Latinoamericano de Derecho Médico, Chile

The R User Conference 2010 (UseR!2010). Gaithburg, Maryland, USA.

Group Productivity

19th International Conference on Computational Statistics (Compstat 2010). Paris, France

Members of this team acted as referees for the following journals and institutions:

Actas da SPE

Animal Conservation

Aquaculture

Aquatic Biology

Australian Marine Mammal Centre

Canadian Journal of Acoustics

Computational Statistics and Data Analysis

Ecology

Endangered Species Research

Environmetrics

European Journal of Wildlife Research

Hawaii Cooperative Studies Unit technical report

Journal of Applied Ecology

Journal of Agricultural, Biological and Environmental Statistics

Journal of Field Ornithology

Journal of Industrial Ecology

Journal of Wildlife Management

Methods in Ecology and Evolution

Ornitologia Neotropical

Polar Biology

RevStat

Group Description

Title of Research Group: ^(RG-LVT-6-951) Statistical Modelling in Environmental and Life Sciences

Principal Investigator: Maria Antonia Conceição Abrantes Amaral Turkman

Main Scientific Domain: Matemática

Group Host Institution: Faculdade de Ciências - Universidade de Lisboa

Funding, source, dates

Funding, source, dates

ALL THE REFERRED AMOUNTS INCLUDE OVERHEADS TO PAY FFCUL

FCT Base for Research Group

Funding corresponding to 2010

1 June 2010/22.205,86

1 July 2010/37.850,88

Projects: The following Project has Principal Investigator from the Group:

(RG-MATH-LVT-Lisboa-6-951) - Statistical Modelling in Environmental and Life Sciences

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 (extension asked till 31 December 2010)

Coordinator: Prof. K.F.Turkman

Objectives & Achievements

Objectives

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 and Life Sciences. Together with applied research we have as an objective to continue developing fundamental research in the areas of interest, namely on: spatial extremes ; hierarchical Bayesian spatiotemporal analysis; stochastic modelling of dynamic systems; Bayesian latent class models; non-linear time series; missing data mechanisms; Bayesian classification methods; Bayesian non-parametric methods; survival analysis and longitudinal models; Bayesian analysis of allelic penetrance models for complex binary traits; ecological studies; modelling infectious diseases; syndromic surveillance; microarray data analysis.

Objectives & Achievements

This team has 19 integrated members, 15 Ph.D. students, 1 undergraduate student and 11 collaborators with Ph.D.

For the year 2010 we set as main objectives:

1. Prepare the 2nd edition of the textbook “Bayesian Statistics”; continue working on the book “Non-linear time series analysis”; start working on the book “Survival analysis: theory and applications to health”.

2. Start the collaboration with UFRJ team of the project "Análise bayesiana de sistemas estocásticos complexos: aspectos metodológicos e aplicações" approved in the framework of bilateral agreement FCT(Portugal)/CAPES(Brazil).

3. Start the scientific collaboration with EXIGO consultants

4. Continue with the collaboration at Interdisciplinary level

5. Organize seminars in the areas of interest, open to all the scientific community, and continue with the organization of an annual meeting of the group to discuss ongoing work.

6. Work on the research topics

- Extremes of Continuous Processes and Their Discrete Versions
- Incomplete data and missing mechanisms
- Applications of Extreme Value Theory to the Analysis of wildfire data
- Bayesian Hierarchical models and simulation based inference techniques for spatial-temporal point processes
- Statistical Screening Methods in Supervised Classification
- Model Bayesian assessment; non-parametric methods to assess model adequacy
- Bayesian hierarchical models for road safety data.
- Bayesian non-parametric methods in diagnostic tests and in supervised classification
- ROC methodology for bilateral diagnostic tests and ROC surface analysis.
- Application of non-homogeneous Markov chains to flu epidemic surveillance.
- Use of Generalized Additive Neural Networks for prediction and comparison of its performance with Generalized Additive Models.
- Use of PLS Path Modeling with medical data
- Start the study of multivariate survival analysis toward the breast cancer data problem and the study of the joint analysis of survival and longitudinal modeling.
- Identification of differentially expressed genes: two different approaches will be considered. One approach based on the area under the ROC curve as a procedure to rank up- and down-regulated genes and another based on principal components analysis (PCA). Robust PCA followed by supervised classification methods

Objectives & Achievements

as classification trees, neural networks and nearest neighbours will be considered.

Main Achievements

Objectives 2-5 which were basically accomplished. Relatively to objectives 1 and 6 we refer to the main achievements:

KF Turkman finished the work on Extremes of Continuous Processes and Their Discrete Versions with the publication as an invited chapter for the Handbook of Statistics, Time Series-Methods and Applications. Together with M Scotto and P de Zea Bermudez he worked on the book on non-linear time series. The book now with 302 pages has 7 chapters.

MA Amaral Turkman, KF Turkman, P de Zea Bermudez and G Silva worked on the general theme of Bayesian hierarchical models and simulation based inference techniques for spatial-temporal processes applied to forest fires. This work has been done jointly with researchers from the Forest Research Center.. This work resulted in several publications and communications in International Conferences (some as invited talks).

The collaborative work of D Paulino with several groups has been very fruitful as demonstrated by publications or submissions on the following themes: Incomplete Data (within the scope of ongoing postgraduate studies of F. Poletto and with partial involvement of a researcher from Hasselt University – Belgium); Statistical Modelling and Analysis of problems of Immunology and Genetics (with researchers from Gulbenkian Institute of Science); Statistical Applications in Problems of Physics, Environmetrics, Biology and Medicine (proposed by researchers from Nuclear and Technological Institute, Portugal, University of São Paulo, Brazil and Portuguese Oncology Institute, Portugal).

MA Amaral Turkman, M Antunes and S Ramos worked on screening methods in supervised classification. They generalized the work published on Computational Statistics and Data Analysis in 2010 using Bayesian nonparametric methods. S Ramos finished her PhD thesis in December. Bayesian nonparametric methods were also used by V Inácio and MA Amaral Turkman in the study of the ROC surface. The paper was submitted for publication.

L Sousa continued her collaboration with the biology research group on the analysis of microarray data. The work with EBarreto on Pre-processing Optimization of RNA Immunoprecipitation Microarray data, was revised and accepted for publication.

M Antunes collaborated with researchers from the department of Plant Biology (FCUL) on DFNB1-associated deafness in Portuguese cochlear implant users: Prevalence and impact on oral outcome, resulting in the publication of an international paper.

L Gonçalves continued to work on Statistical Epidemiology and Public Health, giving particular attention to the collaborative work on the applications of statistical methods in tropical medicine. Her work was published at the Memórias do Instituto Oswaldo Cruz and two other papers were submitted.

V Andreozzi worked on joint modelling of repeated measured and survival data with an application to Aids cohort data (Brasil), on application of finite mixture model to the length of stay data from Portuguese National Health Service hospitals and application of survival data analysis to the Prospective Study of Pain Intensity of Cancer (ProSPIC) and to the Cystic Fibrosis Cohort from Brazil. As a result some papers were published and three papers are to be submitted.

L Carvalho, I Natário and B Nunes worked on influenza epidemics and related topics. Their paper was accepted for publication. Also L Carvalho and INatário continued their consultancy role in the DEEPFISHMAN project, regarding the estimation of Black scabbardfish abundance in the Portuguese coastal waters. L Carvalho prepared an article on state-space models applied to shark population dynamics.

Objectives & Achievements

C Rocha e AL Papoila worked on Generalized Additive Models with flexible link. Their paper was accepted for publication. The collaboration of AL Papoila with medical doctors has been very important and fruitful resulting in several publications and communications in conferences.

C Silva-Fortes with MA Amaral Turkman and L Sousa, developed and implemented algorithms in R, concerning the relation between the overlapping area between two kernel densities and the area under the ROC curve. An application to microarray data was proposed.

Group Productivity

Publications in peer review Journals

1. Achcar J., Rodrigues E., Paulino C.D. and Soares, P. (2010). Non-homogeneous Poisson models with a change-point: an application to ozone peaks in Mexico City. *Environmental and Ecological Statistics*, 17, 521-541.
2. Basso B.; Amato, M.; Bitella G.; Rossi, R.; Kravchenko A.; Sartori; L.; Lucília M. Carvalho; Gomes J. Two-Dimensional Spatial and Temporal Variation of Soil Physical Properties in Tillage Systems Using Electrical Resistivity Tomography. *Agronomy Journal*, Volume 102, Issue 2, 2010. doi: 10.2134/agronj2009.0298
3. Chora JR, Matos TD, Martins JH, Alves MC, Andrade SM, Silva LF, Ribeiro CA, Antunes MC, Fialho MG, Caria MH. DFNB1-associated deafness in Portuguese cochlear implant users: Prevalence and impact on oral outcome. *International Journal of Pediatric Otorhinolaryngology* 74 (2010) 1135–1139.
4. Gonçalves-Pereira, M., Carmo, I., Alves da Silva J., Papoila A.L., Mateos, R., & Zarit, S. H. (2010). Caregiving experiences and knowledge about dementia in Portuguese clinical outpatient settings. *International Psychogeriatrics*, 22, 270-280
5. Jorge Mendes, Patrícia Cortés de Zea Bermudez, José Pereira, K. F. Turkman and M. J. P. Vasconcelos (2010) Spatial extremes of wildfire sizes: Bayesian hierarchical models for extremes, *Environmental and Ecological Statistics*, 17, 1, 1-28, 2010.
6. Larsen R., Gozzelino R., Jeney V., Tokaji L., Bozza F.A., Japiassú A.M., Bonaparte D., Cavalcante M.M., Chora A., Ferreira A., Marguti I., Cardoso S., Sepúlveda N., Smith A., Soares M. P. (2010). A central role for free heme in the pathogenesis of severe sepsis. *SciTransl Med.* 2, 51ra71.
7. Malta, F.M., Medeiros-Filho, J.E.M., Azevedo, R.S., Gonçalves, L., da Silva, L.C., Carilho, F.J., Pinho, J.R.R. (2010) Sequencing of E2 and NS5A regions of HCV genotype 3a in Brazilian patients with chronic hepatitis. *MemInstOswaldo Cruz*, Vol. 105(1): 92-98
8. Miguel Paiva, Pedro Martins, Susana Carvalho, Marta Chambel, Anália Matos, Isabel Almeida, Ana Luísa Papoila, Nuno Neuparth, Paula Leiria Pinto (2010). Avaliação do controlo da asma: Utilização de diferentes métodos. *Re Port. Imunoalergologia* ; 18 (3): 27 - 241.
9. Nunes B, Natário I, Carvalho ML (2010). Time series methods for obtaining excess mortality attributable to influenza epidemics. *Statistical Methods in Medical Research*. Published online before print March 8, 2010, doi 10.1177/0962280209340201.
10. P. de Zea Bermudez and S Kotz. Parameter estimation of the generalized Pareto distribution - Part I. *Journal of Statistical Planning and Inference*, 140, 6, 1353-1373, 2010.
11. P. de Zea Bermudez and S Kotz. Parameter estimation of the generalized Pareto distribution - Part II. *Journal of Statistical Planning and Inference*, 140, 6, 1374-1388, 2010.

Group Productivity

12. Poletto F., Singer J. and Paulino C.D. (2010). Missing data mechanisms and their implications on the analysis of categorical data. *Statistics and Computing* 21, 31-43 (DOI: 10.1007/s11222-009-9143-x).
13. Ramos, S., AmaralTurkman, M. A. and Antunes, M. (2010) Bayesian classification for bivariate normal gene expression. *Computational Statistics and Data Analysis*, 54, 2012-2020.
14. Sambo M.R., Trovoada M.J., Benchimol C., Quinhentos V., Gonçalves L., Velosa R., Marques M. I., Sepúlveda N., Clark T.G., Coutinho A. and Penha-Gonçalves C. (2010). Transforming growth factor 2 and hemoxygenase 1 genes are risk factors for the cerebral malaria syndrome in angolan children. *PLoSOne*, 5, e11141.
15. Sampaio, P., Calado, C., Sousa, L., Bressler, D., Pais, M.S., Fonseca, L. (2010). Optimization of the culture medium composition using response surface methodology for new recombinant cyprosin B production in bioreactor for cheese production. *European Food Research and Technology* 231: 339–346. (Doi:10.1007/s00217-010-1281-z)
16. Sepúlveda N., Paulino C.D. and Carneiro J. (2010). Estimation of T-cell repertoire diversity and clonal size distribution by Poisson abundance models. *Journal of Immunological Methods*, 353,124-137.
17. Silva L., AmaralTurkman A. and Paulino C.D. (2010). Statistical evaluation of repeated peak area measurements using Bayesian inference. *Applied Radiation and Isotopes*, 68, 1397-1402.
18. Turkman, K.F., AmaralTurkman, M.A. and J.M. Pereira(2010) Asymptotic models and inference for extremes of spatio-temporal data, *Extremes* 13, 375-397.

• In press and accepted

1. AmaralTurkman MA, Turkman, KF, Le Page, Y, Pereira, JM (2010). Hierarchical space-time models for fire ignition and percentage of land burned by wildfires. *Environmental and Ecological Statistics*. ((doi: 10.1007/s10651-010-0153-9)
2. Barreto-Hernandez, E., Gama-Carvalho, M., Sousa, L. (2010). Pre-processing optimization of RNA immunoprecipitation microarray data. *Journal of Computational Biology*. In Press
3. Faria, N.; Kim, J.; Gonçalves, L.; Martins, M.L.; Chan, K.; Campbell, B. Enhanced activity of antifungal drugs using natural phenolics against yeast strains of *Candida* and *Cryptococcus*. (Conditionally accepted 30/12/2010)
4. Papoila, A.L. and Rocha, C.S. (2010). Modelling current status data using Generalized Additive Models with flexible link: the Additive Gamma-logit Model. *International Journal of Applied Mathematics & Statistics* (accepted for publication).
5. Poletto F., Molenberghs G., Paulino C.D., and Singer J. (2010). Sensitivity analysis for incomplete continuous data. *Test* (in press)(DOI:10.1007/s11749-010-0219-x).
6. Poletto F., Paulino C.D., Molenberghs G. and Singer J. (2010). Inferential implications of over-parameterization: a case study in incomplete categorical data. *International Statistical Review* (in press) (doi:10.1111/j.1751-5823.2011.00130.x).
7. Poletto F., Singer J. and Paulino C.D. (2010). Comparing diagnostic tests with missing data. *J. Applied Statistics* (in press).
8. Soto, K., Coelho, S., Rodrigues, B., Martins, H., Frade, F., Lopes, S., Cunha, L., Papoila, A.L., Devarajan, P.

Group Productivity

(2010). Cystatin C as a marker of acute kidney injury in the emergency department. *Clinical Journal of the American Society of Nephrology* (doi: 10.2215/CJN.00690110)

Other international publications

Book of Abstracts

Antunes, M., Andreozzi V., Sousa, L., Gonçalves, L. (2010). StaM2010 – Statistical Modelling: Challenges in Health. Programme and Book of Abstracts, Centro de Estatística e Aplicações da Universidade de Lisboa.

Book Chapters

Turkman, K. F. (2011) Discrete-Continuous Time Extremes of Stationary Processes. *Handbook of statistics-vol 30, 2011. Time Series-Methods and applications*. Ed. C.R.Rao and SubbaRao, Elsevier-North Holland, accepted.

Conference Proceedings

Poleto F., Molenberghs G., Paulino C.D. and Singer J. (2010). Sensitivity analysis for incomplete continuous data: In Proceedings of the 25th International Workshop on Statistical Modelling, Glasgow, July 5-9 (A. Bowman, ed.), 445-448

In Book of Abstracts: 9th Valencia International Meeting on Bayesian Statistics, Benidorm – Spain, 2010

1. Antunes, M., Sousa, L. EMB: A combination of EM-algorithm and Bayesian classification model for gene identification, 65-66.
2. Natário I & Carvalho ML. Bayesian estimation of ILI incidence using non-representative data, 217-218.
3. Poleto F., Paulino C.D., Molenberghs G. and Singer J., Inferential implications of over-parameterization: a case study in incomplete categorical data, 231-232.
4. Ramos, S., AmaralTurkman, M. A. and Antunes, M. Nonparametric Bayesian approach for supervised classification based on pairs of covariates. Ninth Valencia International Meeting on Bayesian Statistics. Benidorm, 2010, p. 236.
5. Sepúlveda N., Sousa V., Guindani M., Paulino, D., Mueller P. and Carneiro J. Biodiversity estimation: unraveling the T-cell receptor repertoire in the body's cellular ecosystem, 259
6. Silva G.L. and Dias M.I. . Modelling the proportion of burned area in Portuguese forest fire, 261-262
7. Soares P., Paulino C.D. and Achcar J. How much can change at a change point? A note on modeling change points in non-homogeneous Poisson processes, 267-268.
8. Silva-Fortes, C., AmaralTurkman, M.A., Sousa, L. Comparison between Bayesian and classical methodologies for discovering transcription-factor targets from RIP-chip experiments, 260.

In Book of Abstracts of Workshop on Statistical Modelling: Challenges in Health, Lisbon-Portugal, May 9-12, 2010

9. Juarez-Colunga E., Silva G.L. and Dean C.B. Joint modeling of hot flush recurrent events and severities., p 61-62.
10. Martins R., Silva G.L. and Andreozzi V. Bayesian joint analysis of longitudinal and survival AIDS data

Group Productivity

in Brazil, 66-67.

11. Natário I & Carvalho ML. Estimating influenza like illness from surveillance data, 31-35.
12. Nunes B, Natário I, Carvalho L. Non-homogenous Markov mixtures of periodic autoregressions with exogenous variables applied to the influenza surveillance, 36-39
13. Pedro, S., Sousa,L., Pires,A.M. (2010) Classification of microarray data using logistic regression, 72
14. Ramos, S., AmaralTurkman, M. A. and Antunes, M. Nonparametric Bayesian density estimation in supervised classification based on pairs of covariates, 72-73
15. Silva-Fortes,C., AmaralTurkman,M.A., Sousa,L. Decision rule to obtain a convex ROC curve to select up- and down-regulated genes in one channel microarrays, 80-81
16. Subtil, A., Gonçalves, L., Oliveira, M.R. Investigating some issues in latent class models, 82-83
17. Vanda Inácio and AntóniaTurkman. ROC curve and bimodal distributions, 60
18. Ribeiro, C. AmaralTurkman, MA and Cardoso, Road Safety as an Hazard Health Issue: A Bayesian Approach, 74-75

In Programme of XIX SINAPE, São Pedro-SP, Brazil, July 26-30.

19. Dias M.I. and Silva G.L. Análise espaço-temporal de efeito de fogos florestais em Portugal.
20. Poletto F., Molenberghs G., Paulino C.D. and Singer J. Sensitivity analysis for incomplete continuous data.
21. Silva G.L. and Dean C.B. Modelação e análise de taxas de incidência de doenças por grupos etários e regiões.

In Workshop on Statistical Aspects of Environmental Risk, Statistical and Applied Mathematical Sciences institute (SAMSI) - Research Triangle Park, Raleigh (NC), USA, 07-09, April 2010,
<http://legacy.samsi.info/workshops/2009spatial-risk201004.shtml>

22. P. de Zea Bermudez and Zilda Mendes. Regional analysis of cholesterol levels in Portugal.
23. Silva G.L. and Dias M.I. Modeling and analysis of forest fire data in Portugal.
24. Turkman, K. F. and Amaral Turkman, MA. Wildfires: some statistical issues. Session Wildfire and Extreme Risks.

In Abstract Booklet of XXVth International Biometrics Conference, Florianópolis-Brazil, December 5-10

25. Poletto F., Singer J. and Paulino C.D. Comparing Diagnostic Tests with Missing Data.
26. Sepúlveda N., Correia C. and Paulino C.D. The Allelic Penetrance Approach: a new statistical modeling framework for genetic analysis.
27. Sepúlveda, N., Paulino C.D., Guindani M., Mueller P. and Carneiro J. (2010). Biodiversity estimation: unraveling the T-cell receptor repertoire in the body's cellular ecosystem.

Group Productivity

28. Sara S. Dias, Valeska Andreozzi, Rosário O. Martins. Poisson mixture regression model to analyse HIV/Aids length of stay.

Others international

29. Martins R., Silva G.L. and Andreozzi V. (2010). Joint analysis of longitudinal and survival AIDS data in Brazil. In Programme of V International Workshop on Spatio-Temporal Modelling, Santiago de Compostela - Spain, June 26-30

30. Figueiredo, A., Ali, K., Fortes, A.M., Maltese, F., Young, Y.H., Monteiro, F., Sousa, L., Rex, M., Zyprian, E., Verpoorte, R., Pais, M.S. (2010) "Defense response to downy mildew in grapevine: Learning from transcriptomics and metabolomics". In Book of Abstracts: 10th International Conference on Grapevine Breeding and Genetics, New York – USA, 2010, pp. 123.

31. Pedro, S., Sousa, L., Pires, A.M. (2010) "Microarray data reduction and classification". In Book of Abstracts: EURO 2010 – 24th European Conference on Operational Research, Lisbon - Portugal, 2010, pp. 140. .

32. Poleto F., Paulino C.D., Molenberghs G. and Singer J. (2010). Inferential implications of over-parameterization: a case study in incomplete categorical data. In Programme of 10th Bayesian Statistics Brazilian Meeting, Angra dos Reis-RJ, Brazil, March, 21-24.

33. Sepúlveda N., Correia C. and Paulino C.D. (2010). The Allelic Penetrance Approach: a new statistical modeling framework for genetic analysis. In Abstract Booklet of 5th Annual Canadian Genetic Epidemiology & Statistical Genetics Meeting, King City-Canada, April 5-10.

34. Turkman, K. F. (2010) Extremes of continuous-discrete time series. 4th Computational and Financial Econometrics, Book of Abstracts, p91.

Other national publications

1. Antunes, Marília (2010) CRM e Prospecção de Dados – ao seu serviço. Boletim da Sociedade Portuguesa de Estatística, Volume I, p 34-39

2. Carvalho ML & Natário I (2010). Uma perspectiva histórica da estatística espacial. Boletim da Sociedade Portuguesa de Estatística, Volume II., p.39-46.

3. Miguel Paiva, Pedro Martins, Susana Carvalho, Marta Chambel, Anália Matos, Isabel Almeida, Ana Luísa Papoila, Nuno Neuparth, Paula Leiria Pinto (2010). Avaliação do controlo da asma: Utilização de diferentes métodos. Rev. Port. Imunoalergologia; 18 (3): 227 - 241.

4. P. de Zea Bermudez and Zilda Mendes (2010). Aplicação da teoria de valores extremos em Ciências Médicas: análise dos níveis elevados de colesterol total observados em Portugal, Boletim da SPE, Volume II., 65-70.

5. Paulino C.D., Silva G.L. and Branco M. (2010). A fully Bayesian parametric approach for cytogenetic dosimetry. Technical Report RT-MAE-2010-08, Instituto de Matemática e Estatística, USP.

6. Poleto F., Paulino C.D., Molenberghs G. and Singer J. (2010). Inferential implications of over-parameterization: a case study in incomplete categorical data. Technical Report RT-MAE-2010-04, Instituto de Matemática e Estatística, USP.

7. Sepúlveda N., Paulino C.D. and Carneiro J. (2010). PAM: Um pacote estatístico para estimar (bio)diversidade (e algo mais) através de modelos poissonianos de abundâncias. Boletim SPE, 63-70,

Group Productivity

Volume I.

8. Silva, G.L. (2010). Análise bayesiana de modelos espaço-temporais aditivos. Boletim da Sociedade Portuguesa de Estatística, 23-28, Volume II.

9. Toste A, Soares RM, Feliciano J, Andreozzi V, Silva S, Alves S, Ferreira L, Abreu A, Ferreira RC. Combining ventilatory efficiency and peak oxygen consumption in the prognostic assessment of patients with chronic heart failure. Rev Port Cardiol. 2010 Sep;29(9):1305-20. English, Portuguese.

Abstracts In National Conferences

1. Correia, V., Romão, L., Albuquerque, C., Rosado-Ganhão, S., Cláudio, Ana Paula, Carmo, B. (2010) A new perspective on perspective. Nexus 2010 – Relationships between Architecture & Mathematics, Porto.

2. Dias M.I. and Silva G.L. (2010). Análise espaço-temporal de fogos florestais em Portugal. In Abstract Book of XVIII Congresso Anual da SPE (S. Pedro do Sul, 29 Set - 3 Out 2010), vol.I, 164-166, SPE.

3. Gonçalves, L., Subtil, A., Oliveira, M.R., Rosário, V., Lee, P.; Shaio, F.(2010) Modelos de classes latentes no diagnóstico da malária. XVIII Congresso da Sociedade Portuguesa de Estatística, 29 Setembro a 2 de Outubro 2010, São Pedro do Sul, Portugal. Livro de Resumos, Volume I, pp.156-157

4. Martins R., Silva G.L. and Andreozzi V. (2010). Análise conjunta bayesiana de dados longitudinais e de sobrevivência. In Abstract Book of XVIII Congresso Anual da SPE (S. Pedro do Sul, 29 Set - 3 Out 2010), vol. II, 41-44, SPE.

5. Paulo João, Victor Lobo e Fernando Bação (2010) Predictive Model for Criminality in Lisbon, , XVII Annual Conference of the Portuguese Association of Classification and Data Analysis (CLAD) held at ISCTE – Lisbon University Institute from 25th to 27th March, 2010,

6. Poleto F., Paulino C.D., Molenberghs G. and Singer J. (2010). Implicações inferenciais de modelos sobreparametrizados e inidentificáveis: um estudo de caso em dados categorizados com omissão. In Abstract Book of XVIII Congresso Anual da SPE (S. Pedro do Sul, 29 Set - 3 Out 2010), vol. II, 67-70, SPE.

7. Ribeiro, C. and Amaral Turkman, MA (2010) Uma aplicação de modelos bayesianos hierárquicos na modelação de acidentes rodoviários, In Programa e Resumos, SPE, XVIII Congresso Anual da Sociedade Portuguesa de Estatística. September 29th – October 2nd , 2010 at São Pedro do Sul, 193-195

9. Sepúlveda, N. (2010). Um chute na biodiversidade: quando a Liga Sagres encontra a Ecologia. In Abstract Booklet of ENSPM 2010 (Leiria, 8-10 de Setembro de 2010).

10. Silva G.L. and Dean C.B. (2010). Análise conjunta de dados de contagem e severidade inflacionados de zeros. In Abstract Book of XVIII Congresso Anual da SPE (S. Pedro do Sul, 29 Set - 3 Out 2010), vol. II, 71-74, SPE.

11. Subtil, A., Oliveira, M.R., Gonçalves, L. (2010) A Validação da Hipótese de Independência Condicional no Modelo de Classes Latentes: um Estudo de Simulação. XVIII Congresso da Sociedade Portuguesa de Estatística, 29 Setembro a 2 de Outubro 2010, São Pedro do Sul, Portugal. Livro de Resumos, Volume II, pp.144-146.

Ph.D. thesis completed

Ramos, S. (2010) Métodos Estatísticos de Screening em Classificação Supervisionada, Ph.D. thesis, DEIO, FCUL, 22 December 2010. Supervised by M A Amaral Turkman and Marília Antunes.

Group Productivity

Organization of conferences

Workshop organized

StaM2010 - Statistical Modelling: Challenges in Health, 9-12 May 2010, Lisbon

Seminars organized

1. Eugen Ursu: Analysis of Extreme Rainfall in the Region Cévennes-Vivarais
2. Anthony O'Hagan: Statistical Methods for Cost-Effective Health Care
3. Víctor Leiva: Generalized Birnbaum-Saunders Models: Characterization, Estimation, Implementation and Applications
4. Tomas Goicoa: Spatio-Temporal Modelling of Risks Using P-Splines
5. Alan Gelfand: Spatial Modeling of Presence-Only Data over Large Regions
6. Rahul Roy: Coverage of Regions by Random Sets: a Probabilistic Model of DNA Sequencing
7. Márcia D'Elia: Regressão Binária Bayesiana com Ligação Probito Assimétrica
8. Susana Esteves: Network Meta-Analysis using Bayesian Methodology: an Application for the Treatment of Multiple Myeloma
9. Raquel Nicolette: Alguns Tópicos sobre Métodos de Monte Carlo via Cadeias de Markov com Saltos Reversíveis
10. SubbaRao: Statistical Inference Associated with Spatio, Stationary, Spatio-Temporal Processes-an Application to Kriging
11. Victor Panaretos: Sparse Approximations of Protein Structure Given Noisy Random Projections
12. Vitor Sousa: Approximate Bayesian Computation (ABC) as Flexible Inference Methods - Examples of Applications from Population Genetics
13. Isabel Natário: Sequential Monte Carlo Methods
14. Paulo Soares: Slice Sampling
15. Jorge Félix: Marcadores Temporais Intermédios Enquanto Predictores da Sobrevivência Global no Mieloma Múltiplo
16. Miguel de Carvalho: Teoria de Valores Extremos em Problemas Económicos

Advanced courses organized:

1. Havard Rue: Bayesian Computing with INLA
2. Peter Mueller: Bayesian Nonparametric Statistical Methods - Theory and Applications
3. Adelaide Freitas: R tools for microarray data Part I

Group Productivity

4. Lisete Sousa: R tools for microarray data Part II: Detecting differentially expressed genes

5. Inês Sousa: Joint modelling of longitudinal and survival data

Internationalization

K. F. Turkman was an invited speaker of the workshop on Statistical Aspects of Environmental Risk, organized by SAMSI, USA, April 2010. M. A. Amaral Turkman and P de Zea Bermudez were invited to give a short-course on Bayesian Data Analysis and Extreme Value Statistics, respectively, prior to the workshop on Analysis and Modelling in Earth Sciences (DAMES 2010).

G.L. Silva was invited to give the talks:, Universidade Federal do Ceará, 24/08/2010, Fundação Oswaldo Cruz, Rio de Janeiro, 22/07/2010, Universidade Federal do Rio de Janeiro, 14/07/2010, Universidad Pública de Navarra, Pamplona 24/03/2010.

Editorial responsibilities

K F Turkman is member of the Editorial Board of Journal of Applied Mathematics and Journal of Statistical Theory and Practice.

MA Amaral Turkman is co-editor of REVSTAT

C.D. Paulino is Associate Editor of the Chilean Journal of Statistics.

C.D. Paulino collaborates actively with researchers from University of São Paulo, Hasselt University and University of Texas at Houston. N. Sepúlveda has bonds to London School of Hygiene and Tropical Medicine. G.L. Silva has research contacts with Simon Fraser University, Federal University of Rio de Janeiro and Universidad Pública de Navarra. V Andreozzi collaborates regularly with researchers from ENSP Sergio Arouca, on problems related to public health.

C.D. Paulino and G.L. Silva are members of a Spanish Biostatistics Net named BIOSTATNET.

C.D. Paulino is the coordinator of the Luso-Brazilian joint committee responsible for producing an updated version of English-Portuguese glossary of statistical terms and disseminating it through a user-friendly informatics platform to be created by Paulo Soares. He also is the Portuguese representative of SPE to ISI.

Participation in international projects

L. Gonçalves is a member of the projects “Maternal Deaths and Severe Maternal Morbidity in Maputo City and Province” (SAREC - Swedish Agency for Research Cooperation) and “Support to Integrated Malaria Control in the Chókwè Region - Moçambique” (EU)

L Carvalho and I Natario participate in 7º Programa-quadro DEEPFISHMAN, FP7 - KBBE- 2008-1-4-02. Management and Monitoring of Deep-sea Fisheries and Stocks: Case study: Black scabbardfish.

Members of the team were reviewers for around 20 different periodicals during 2010.

Government/Organization contract research

Lucília Carvalho is the Leader of the Working Group of the National Statistical Institute (INE) on Labor Force Survey – Implementation of Computer Assisted Telephone Interviewing /CATI. (Inquérito ao Emprego” – Introdução da Entrevista Telefónica)