

General Information

	(MAT-LVT-6)
Name of Research Unit:	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 Fundação da Faculdade de Ciências - Faculdade de Ciências da Universidade de Lisboa
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Other Institutions Involved:

Objectives & Achievements

Unit Description

The Center of Statistics and Applications of the University of Lisbon (CEAUL-Centro de Estatística e Aplicações da Universidade de Lisboa), created in 1975, is a R&D unit, close to the Department of Statistics and Operations Research (DEIO-Departamento de Estatística e Investigação Operacional) of the 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 the strategic project PEst-OE/MAT/UI0006/2011.

The Internal Organization of CEAUL's team in 31 December 2011 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 (16 (I) + 9(C)) Among the 9 collaborators, 4 are Ph.D. students: Responsible Researcher: Maria Ivette Leal de Carvalho Gomes
- GI 2: Probability, Modelling and Data Analysis (19 (I) + 13 (C)) Among the 13 collaborators, 4 are Ph.D. students: Responsible Researcher: Dinis Duarte Ferreira Pestana
- GI 3: Statistical Modelling in Environmental and Life Sciences (18(I) + 28 (C)) Among the 28 collaborators, 14 are Ph.D. students: Responsible Researcher: Maria

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Antonia Conceição Abrantes Amaral Turkman

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 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 2 associated FCT Projects during 2011 and one was approved to initiate in 2012:

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

FCT/ PTDC/MAT/112770/2009 "Extremes in Space" PI: Laurentius de Haan

PTDC/MAT/118335/2010: "Statistical Methods in Environmental and Epidemiological Processes" PI: K F Turkman (started 1/1/2012)

General Objectives

This R&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: Extreme Value Theory, Order Statistics and Outliers, Statistical Quality Control, Reliability and Design of Experiments, Risk Theory, Resampling Methodologies, Computational Statistics and Simulation, Probability models, Longitudinal data analysis, Time Series, Bayesian Statistics, Biostatistics, Statistics in Immunology and Genetics, Incomplete data, Temporal and Spatial Statistics, Stochastic modeling of dynamic systems.

Research is the core of the activity of CEAUL. In this respect, the main objective of CEAUL is to contribute to the development of new theoretical framework and of

Objectives & Achievements

methodological issues addressed to applications to real problems, making efforts towards the correct use of Statistics in Society and Academics. This 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, others), supervision of Ph.D. and M.Sc students and the collaboration with researchers in other areas, and an updated Library to community.

Also, an important objective of this research unit is to maintain activities in order to promote Statistics in Society and Schools. Towards that, CEAUL has strong links and cooperates with the National Institute of Statistics (INE), Portuguese Statistical Society (SPE), Portuguese Mathematical Society (SPM), Center of International Mathematics (CIM), Universities and Polytechnics, among other institutions.

Members of CEAUL are grouped, according to their research interests, in three main research lines, led by senior researchers who define the program of activities in order to give coherence to the group but keeping always in mind the fulfillment of the objectives and main goals of the research unit.

Main Achievements during the year of 2011

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 2011 CEAUL had the following production at international level:

- 40 Publications in peer review International Journals (already published) and 16 already in press.
- 15 chapters of books and 41 publications in International proceedings or extended abstracts
- 61 abstracts in international conferences
- 1 Special Edition of International Periodic (REVSTAT)
- 2 Books of Abstracts

At the national level

- 3 books
- 2 book chapters
- 1 electronic edition of the glossary

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- 2 editions of the Bulletin of SPE
- 15 publications in national periodicals
- 46 abstracts in national conferences.

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 2011, 7 Ph. D. students and 15 M. Sc. Students completed their theses under the supervision or co-supervision of integrated members of the center.

During 2011, the CEAUL was directly responsible for the organization of 13 seminars, 2 international workshops, 1 half-day workshop, 1 roundtable, 3 advanced courses. At national level, members of CEAUL were involved in the organization of 4 conferences. Extensive list of regular International Seminar program can be found in <http://www.ceaul.fc.ul.pt/cs.html>.

Workshops:

- Workshop on Risk & Extreme Values in Insurance and Finance, 6-7 June, 2011 (GI1)
- WSMC-2011: V Workshop in Statistics, Mathematics and Computation: Methods and Applications, Faculdade de Economia, Universidade do Algarve, Faro, July 11-12. (GI1)
- Half-day Workshop on Spatio-temporal Modelling, FCUL, 11 January 2011 (GI3)

Advanced Courses:

- Statistical Analysis in the Lexis Diagram: Age-Period-Cohort Models: Lecturer: Dr. Bendix Carstensen (Department of Biostatistics, University of Copenhagen), 16–19/09/11 (GI3)
- Modelos Dinâmicos Bayesianos em Séries Temporais: Lecturer Prof. Hélio Migon (UFRJ) 12-13/09/11 (GI3)
- Introdução à Estatística Bayesiana via WinBUGS at Instituto de Saúde Pública, Universidade do Porto, Lecturers D Paulino, G Silva and P Soares 28/02-02/03/2011. (GI3)

Roundtable on Distance Learning Sheffield MSc Courses. Nick Fieller, University of Sheffield, 10/05/11 (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

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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 2011

There has been a direct evidence of the interaction between the theoretical and applied components of the work. During 2011 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 (i) the DEEPFISHMAN project, regarding the Black scabbardfish abundance estimate in the Portuguese coastal water, (ii) the project on the data support centre of MalariaGEN - Genomic Epidemiology Network of Malaria, (iii) the Spanish Biostatistics Net named BIOSTATNET, (iv) U the project “Análise bayesiana de sistemas estocásticos complexos: aspectos metodológicos e aplicações” approved in the framework of bilateral agreement FCT(Portugal)/CAPES(Brazil)

We also highlight bellow some of the CEAUL integrative/multidisciplinary activities in 2011, 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 2011 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. D. Paulino was elected President of SPE for the period 2012-2015.

- 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.

Activities

(Inquérito ao Emprego” – Introdução da Entrevista Telefónica).

- CEAUL / CGF (Calouste Gulbenkian Foundation): Antonia Turkman and Carina Silva Fortes were invited to lecture on Biostatistical Foundations in Bioinformatics in the GTPB Bioinformatics training programme of the Instituto Gulbenkian de Ciência, 24-28/10/11. Nuno Sepúlveda and D Paulino have been collaborating with researchers from IGC on Statistical Modelling and Analysis of problems of Immunology and Genetics.

- CEAUL / ISA

Members of GI3 collaborated actively with researchers from the Forest Research Center.

- CEAUL / CLAD

CLAD (Ass Port Classificação e Análise de Dados) MM Neves and J Cadima were members of the Scientific Committee of the “XVIII JOCLAD”, at Vila Real

Outreach activities during the year of 2011

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.

D. Pestana pursued his activity with the multilingual glossary of statistical terms connected with the International Statistical Institute project of a multilingual dictionary. He has participated as well in cultural events discussing the role of Statistics in Scientific Research, in surveys, in citizenship and welfare, in taming risk, etc.

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.

Under the protocol between the Faculty of Science of Lisbon University and the company Exigo Consultores, members of GI3 have been involved in a research project aimed to assess the financing system of the public hospitals belonging to the Portuguese National Health Service. The report of this project was used by the Portuguese Court of Auditors in its final report audit.

Antonia Turkman acts as a consultant to the project led by the consortium Siemens –

Activities

Joint Commission International (JC) towards the development of a National Health Care Evaluation System in Portugal (SINAS – Sistema Nacional de Avaliação em Saúde), in response to a challenge set by the Portuguese Health Regulatory Authority. Quality assessment and improvement across the health care system are the aims of SINAS

Ana Luisa Papoila gives support to the Research Unit of Centro Hospitalar de Lisboa Central (CHLC) as co-head of the Epidemiology and Statistics Consulting Core

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	2011
LA FCT	0,00	0,00		
Units FCT	245.304,00	127.050,00	147.262,50	111.449,10
Projects FCT	0,00	20.856,00	71.904,00	0,00
Other (National)	0,00	0,00	0,00	0,00
Other (International)	0,00	0,00	0,00	0,00
National Industry	0,00	0,00	0,00	0,00
International Industry	0,00	0,00	0,00	0,00
	245.304,00	147.906,00	219.166,50	111.449,10

General Indicators

	2007	2008	2009	2010	2011	Total
No. of Researchers Hired (Ciência Programme)	0,00	0,00	0,00	0,00	0,00	0,00
No. of Researchers integrated with PhD	0,00	0,00	0,00	0,00	53,00	
Training PhDs (PhD thesis completed)	0,00	0,00	0,00	0,00	7,00	7,00

Researchers Hired

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

Technical Personnel Hired

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

Strategic Project Adjustments

Scientifically the main objectives for 2011 were accomplished and well overpassed with respect to the expected indicators as proposed on the strategic project. We had however to postpone for 2012 some of the invited speakers for the regular international seminars of CEAUL, due to the fact that at the beginning of April the FFCUL urged the centers to uphold expenses due to lack of cash flow.

Relatively to the budget, a small amount was used from the budget received referred to 2011, since several expenses done during 2011 had to be presented to FCT to justify expenses done in previous years which were considered by FCT as not eligible.

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 2011

12 January 2011/11.353,38

30 May 2011/9.601,32

6 July 2011/16.002,52

The above-mentioned source funding was available during 2011:

FCT /PTDC/MAT/101736/2008

“EXTREMA: EXTREMES IN TODAY’S WORLD”

Principal Investigator: M. Ivette Gomes

Other members in this Group: M. Manuela Neves, M. Isabel Fraga Alves, Luísa Canto e Castro, Fernanda Figueiredo, Cláudia Neves and Lígia Henriques-Rodrigues.

Starting: January 2010; Finishing: December 2012

Funding: 89,520 Euros

Received in 2011: 0 Euros

FCT/ PTDC/MAT/112770/2009

“EXTREMOS NO ESPAÇO”

Principal Investigator: Laurentius de Haan

Other members in this Group: Luísa Canto e Castro, Ana Ferreira, Cláudia Neves.

Funding, source, dates

Starting: February 2011; Finishing: January 2014.

Funding: 61,560 Euros

Received in 2011: 12.312,00 Euros

Objectives & Achievements

Objectives

The objectives of the team for 2011 were in the fields of Univariate, Multivariate, Multidimensional and Spatial Extremes, with special emphasis on their applications to Life Sciences, Environment, Risk, Insurance, Finance, Outliers and Biometry. Topics in the areas of Statistical Quality Control, Design of Experiments and Forensic Statistics were also of related interest. Those objectives were related with the topics reproduced from the future research objectives in the 2010 Report:

I) Quasi-PORT and PORT Methodologies for the EVI, VaR and other Parameters of Extreme Events. Adaptive Choice of Thresholds, Probability Weighted Moments Estimation and Max-stability versus Max-semistability. Revisiting Parametric Methodologies and the R Language. Randomly Censored Data Analysis and Extreme Value Birnbaum-Saunders models.

II) The Bootstrap Methodology and other Resampling-based Methods in Action. Asymptotic Comparisons at Optimal Levels. Refined Estimation of Light Tails: Application in Athletics and Environment. Bias-corrected Methodology. Semi-parametric Testing.

III) Multivariate Data Analysis and Statis. Robust methods in Statistical Quality Control and Experimental Designs. Forensic Statistics. Weak and Strong Financial Fragility and the Extent of Internet Auction Markets. Extreme Risk Regions under Multivariate Regular Variation. Long-Term Experiences in Mathematics E-Learning. Forecast Evaluation.

IV) Statistics for Dependent Frameworks. Exceedance Probabilities of Integrals of Stochastic Processes and Extreme Residual Dependence for Random Vectors and Processes Estimation of Extreme Multivariate Quantile Regions. Extremal Index Estimation.

Main Achievements

We refer separately the main achievements in the above mentioned topics of research for 2011:

I) Regarding “Quasi-PORT and PORT Methodologies”, we refer [P8], an enlarged

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version of CEAUL 01/2011, also related with a heuristic adaptive choice of thresholds, the article [P7*], recently accepted at J.Statist.Comp.Sim. (JSCS), a second article, [P5*], accepted at JSCS, [I13], [I14], [N3] and [N14]. On “Adaptive Choice of Thresholds et al.”, we mention [P2], [P6], [P11], related with a contributed talk at ISI 2011, another article related with the preprint CEAUL 03/2011 and under revision, [I8], [I11] and [N17]. Regarding the “Revisitation of Parametric Methodologies and the R Language”, we mention [P3*], an article accepted at Revstat, on the EVBS model, [I17], [N5], [N7], [N25] and an invited talk at the V WSMC. On “Randomly Censored Data”, we refer [P10].

II) On “The Bootstrap Methodology and other Resampling-based Methods”, and apart from CEAUL 04/2011, accepted at Extremes ([P6*]), we mention [P9], [P3], associated with an invited conference at ISI 2011, [I12], [I23], [N16], [N19], two invited conferences at ISI 2011 and ERCIM 2011, and a plenary lecture at SPE 2011. Regarding “Asymptotic Comparisons at Optimal Levels”, we refer [P4]. On “Refined Estimation of Light Tails”, we mention [P7], associated with a second invited conference at ISI 2011, and [P14]. Regarding “Bias-corrected Methodology and Semi-parametric Testing”, we mention the preprint CEAUL 20/2011, recently submitted, [I9], [N9] and [N18].

III) In the topic “Multivariate Data Analysis”, it is worth mentioning [P4*], an article accepted at Struct.Change & Econom.Dynam. On “Robust Methods in Statistical Quality Control and Experimental Design”, we refer [P15], [I4] and [I5], [I6], [I10], [I16], [I19], [I20], [I21], [N4], [N13], [N15], and several invited talks by members of the Group. On “Outliers and Forensic Statistics”, we refer [I18], [N12], [N23], [N24], as well as an invited talk at SPE 2011. On “Financial Fragility, the Extent of Internet Auction Markets and Forecast Evaluation”, we mention CEAUL 08/2011 and 17/2011, under submission, an article, [P1*], accepted at Comp.Statist.&DataAnal., another one, [P8*], accepted at J.Evol.Econ. and [I24]. One of the Ph.D thesis (PhD1) is mainly in this area, but also covers topics in I and II, Regarding “Extreme Risk Regions under Multivariate Regular Variation”, we refer [P5]. Regarding “Long-Term Experiences in Mathematics E-Learning”, it is worth mentioning the chapter of a book, already accepted, [N11], [N15], [N20], [N22] and two invited talks.

IV) In “Statistics for Dependent Frameworks and Spatial Statistics”, we mention [P16], [I25], [N8], [N10] and an invited talk at WCMC 2011. On “Exceedance Probabilities and Extreme Residual Dependence”, we refer [P13] and an article, [P2*], accepted at J.Mult.Analysis. Regarding the topic “Estimation of Extreme Multivariate Quantile Regions and Extremal Index Estimation”, we refer [P9*], an article accepted at Disc.Math.Probab.Statist., [I22] and [N21].

Generally speaking, and transversal to all tasks devised for 2011, we mention the edition of SPE Bulletin, [N1] and [N2], the edition of [I1], with 6 extended abstracts of communications presented by members of this research group, and [I2], with 13

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abstracts of communications presented by members of this group. We also refer an article [I3], published as a chapter of the International Encyclopedia of Statistical Science, and [N6]. We further mention the acceptance of nine additional articles to be published as chapters of books (4 in Selected Papers SPE 2009, 3 at Selected Papers SPE 2010, 1 at Selected Papers SIS 2010, in volumes edited by Springer, and 1 in Decision Making under Uncertainty in the Service Industry, to be edited by Taylor & Francis). We also mention the deep involvement of members of this Group in 6 international and 4 national conferences. In 2011, four Ph.D. thesis and seven M.Sc thesis have been supervised by members of this Group.

Beyond the programmed objectives, we mention [I26], on “Hierarchical Linear Models”, [P1] and [P12], on “Chaotic Stochastic Models and Simulation”, extended versions of [I7] and [I15], associated to the conference CHAOS 2011.

Group Productivity

Publications in peer review Journals

[P1] Brilhante, M.F., Gomes, M.I. & D. Pestana (2011). BetaBoop brings in chaos. Chaotic Modelling and Simulation (CMSIM) 1, 39-50.

[P2] Caeiro, F. & M.I. Gomes (2011). Semi-parametric tail inference through Probability-Weighted Moments. J. Statistical Planning and Inference 141:2, 937-950.

[P3] Caeiro, F. & M.I. Gomes (2011). Computational Validation of an Adaptive Choice of Optimal Sample Fractions. Bull. Internat. Statist. Inst. LXIV (Electronic publication, 8 pages).

[P4] Caeiro, F. & M.I. Gomes (2011). Asymptotic comparison at optimal levels of reduced-bias extreme value index estimators. Statistical Neerlandica 65:4, 462-488.

[P5] Cai, J., Einmahl, J. & L. de Haan (2011). Estimation of extreme risk regions under multivariate regular variation. Annals of Statistics 39, 1803-1826.

[P6] Canto e Castro, L. & S. Dias (2010). Generalized Pickands' estimators for the tail index parameter and max-semistability. Extremes 14:4, 429-449.

[P7] Fraga Alves, M.I., de Haan, L. & C. Neves (2011). Right Endpoint of a Distribution in Gumbel Domain of Attraction – Statistical Inference. Bulletin International Statistical Institute LXIV (Electronic publication, 8 pages).

[P8] Gomes, M.I., Henriques-Rodrigues, L. & C. Miranda (2011). Reduced-Bias Location-Invariant Extreme Value Index Estimation: a Simulation Study. Communications in Statistics, Simulation and Computation 40:3, 424-447.

Group Productivity

[P9] Gomes, M.I., Mendonça, S. & D. Pestana (2010). Reduce-bias tail index and VaR estimation via the bootstrap methodology. *Communications in Statistics, Theory and Methods* 40:16, 2946-2968.

[P10] Gomes, M.I. & M.M. Neves (2011). Estimation of the extreme value index for randomly censored data. *Biometrical Letters* 48:1, 1-22.

[P11] Gomes, M.I. & D. Pestana (2011). A note on the adaptive choice of the optimal threshold in extreme value analysis. *Bulletin International Statistical Institute LXIV* (Electronic publication, 8 pages).

[P12] Gomes, M.I., Pestana, D.D. & P. Pestana (2011). Sir Pinsky rides again. *CMSIM* 1, 77-90.

[P13] de Haan, L. & C. Zhou (2009) Extreme residual dependence for random vectors and processes, *Advances in Applied Probability* 43, 217-242.

[P14] Henriques-Rodrigues, L., Gomes, M.I. & D. Pestana (2011). Statistics of Extremes in Athletics. *Revstat* 9:2, 127-153.

[P15] Neves, C., Gomes, M.I. & M.I. Fraga Alves (2011). Nitriding limits in aluminum extrusion. *International Journal of Mathematical Modelling and Numerical Optimisation (IJMMNO)* 2:3, 342-355.

[P16] Neves, M. & D. Prata Gomes (2011). Geostatistics for spatial extremes. A case study of maximum annual rainfall in Portugal. *Procedia Environmental Sciences, Spatial Statistics 2011*, Elsevier, Vol. 7, 2011, 246-251.

Moreover, we mention 9 papers accepted in 2010/2011, to be possibly included, if published, in the 2012 report:

[P1*] Araújo Santos, P. and Fraga Alves, M.I. (2010). A new class of independence tests for interval forecasts evaluation. Accepted at *Computational Statistics and Data Analysis*.

DOI: 10.1016/j.csda.2010.10.002

[P2*] Ferreira, A., de Haan, L. and Zhou, C. (2012). Exceedance probability of the integral of a stochastic process. *Journal of Multivariate Analysis*, Volume 105:1, 241-257.

[P3*] Ferreira, M., Gomes, M.I. and Leiva, V. (2011). On an extreme value version of the Birnbaum-Saunders distribution. *Revstat*, in press.

[P4*] Figueiredo, A., Figueiredo, F., Monteiro, N.P. and Straume, O.R. (2012). Labor adjustments in privatized firms: a Statis approach. *Structural Change and Economic*

Group Productivity

Dynamics 23, 108-116.

[P5*] Figueiredo, F., Gomes, M.I., Henriques-Rodrigues, L. and Miranda, C. (2011). A computational study of a quasi-PORT methodology for VaR based on second-order reduced-bias estimation. *Journal Statistical Computation and Simulation*. DOI: 10.1080/00949655.2010.547196

[P6*] Gomes, M.I., Figueiredo, F. and Neves, M.M. (2011). Adaptive estimation of heavy right tails: the bootstrap methodology in action. *Extremes*, DOI: 10.1007/s10687-011-0146-6

[P7*] Gomes, M.I., Henriques-Rodrigues, L., Fraga Alves, M.I. and Manjunath, B.G. (2011). Adaptive PORT-MVRB Estimation: an Empirical Comparison of two Heuristic Algorithms . *Journal Statistical Computation and Simulation*, in press.

[P8*] Mazedo Gil, P.R. and Figueiredo, F. (2012). Firm size distribution under horizontal and vertical innovation. *Journal of Evolutionary Economics*, in press.

[P9*] Neves M. and Cordeiro, C. (2012). Computational intensive methods for prediction and imputation in time series analysis. *Discussiones Mathematicae. Probability and Statistics*, in press.

Other international publications

BOOKS (Editor)

[I1] Fraga Alves, M.I., Gomes, M.I., de Haan, L. & C. Neves (2011).

Risk and Extreme Values in Insurance and Finance: Book of Abstracts.

CEAUL Editions, ISBN: 978-989-8203-73-1 (x + 120 pages).

[I2] Oliveira, T.A., Castela, G. Oliveira, A., Grilo, L. & V. Vairinhos (2011). Book of Abstracts: 5th Workshop on Statistics, Mathematics and Computation.

ISBN: 978-972-9473-54-8. Instituto Politécnico de Tomar Editions.

CHAPTERS of BOOKS

[I3] Fraga Alves, M.I. & C. Neves (2011). Extreme Value Distributions. In Lovric, M. (ed.), *International Encyclopedia of Statistical Science*, Springer-Verlag.

[I4] Gomes, M.I. (2011). Statistical Process Control. In Lovric, M. (ed.), *International Encyclopedia of Statistical Science*, Springer-Verlag, Part 19, 1459-1463.

[I5] Gomes, M.I. (2011). Acceptance Sampling. In Lovric, M. (ed.), *International Encyclopedia of Statistical Science*, Springer-Verlag, Part 1, 5-7.

Group Productivity

We also mention 10 accepted book chapters in books to be edited by Springer, another one on Decision Making under Uncertainty in Service Industry, edited by Taylor & Francis, and a final one edited by IGI Global Publisher: Math-E-Learning, on Teaching Mathematics Online: Emergent Technologies and Methodologies.

PROCEEDINGS

[I6] Branco, F., Oliveira, T.A., Oliveira, A. & C.E. Minder (2011). The effect of nonnormality on the power of randomization tests: a simulation study using normal mixtures In Simos, T. et al. (eds.) AIP Conference Proceedings, Vol. 1389 (ICNAM 2011), 1463-1466.

[II7] Brilhante, M.F., Gomes, M.I. & D. Pestana (2011). BetaBoop Brings in Chãos. In Skiadas, C. et al. (eds.), 4th CHAOS 2011 (Electronic publication, 8 pages).

[I8] Caeiro, F. & M.I. Gomes (2011). Probability Weighted-Moment Bootstrap Estimation: an Application to Insurance Data. In Fraga Alves et al. (eds.). Risk and Extreme Values in Insurance and Finance: Book of Abstracts, CEAUL editions, 27-30.

[I9] Caeiro, F. & M.I. Gomes (2011). Asymptotic distribution of an extreme value index estimator based on the scaled log-spacings. In Simos, T. et al. (eds.) AIP Conference Proceedings, Vol. 1389 (ICNAM 2011), 1467-1471.

[I10] Figueiredo, F. & M.I. Gomes (2011). The Total Median Statistic Revisited. ENBIS 2011 Proceedings (on-line)

[I11] Figueiredo, F., Gomes, M.I. & M. Neves (2011). Adaptive Reduced Bias Estimation of Financial Log>Returns. In Fraga Alves et al. (eds.). Risk and Extreme Values in Insurance and Finance: Book of Abstracts, CEAUL editions, 43-46.

[I12] Gomes, M.I. (2011). The Importance of Resampling Methodologies in the Field of Extremes. In Canas-Rodrigues, P. & M. de Carvalho (eds.) Proceedings of the 17th Young European Statistician Meeting, FCT/UNL, 25-26.

[I13] Gomes, M.I. & L. Henriques-Rodrigues (2011). Adaptive Reduced Bias Invariant Estimation of a Heavy Right Tail: an Application to Financial Log>Returns. In Fraga Alves et al. (eds.). Risk and Extreme Values in Insurance and Finance: Book of Abstracts, CEAUL editions, 55-58.

[I14] Gomes, M.I., Henriques-Rodrigues, L. & C. Miranda (2011). A Heuristic Data-driven Choice of Tuning Parameters in PORT-MVRB Estimation. In Fraga Alves et al. (eds.). Risk and Extreme Values in Insurance and Finance: Book of Abstracts, CEAUL editions, 85-88.

[I15] Gomes, M.I., Pestana, D. & P. Pestana (2011). Sir Pinski Rides Again. In Skiadas, C. et al. (eds.), 4th CHAOS 2011 (Electronic publication, 8 pages).

Group Productivity

[I16] Oliveira, A. & T.A. Oliveira (2011). Method for detection of mixtures of normal distributions with application to vine varieties. HAICTA 2011: 5th International Conference on Information and Communication Technologies in Agriculture, Food and Environment, 771-781.

[I17] Oliveira, A. & T.A. Oliveira (2011): Visualization in Joint Regression Analysis using R. 6th EASTERN MEDITERRANEAN REGION Conference Proceedings.

[I18] Oliveira, T.A., Branco, F, Oliveira, A. & C.E. Minder (2011). The impact of outliers on the power of the randomization test for two independent groups. In Simos, T. et al. (eds.) AIP Conference Proceedings, Vol. 1389 (ICNAM 2011), 1545-1548.

[I19] Oliveira, T.A. & A. Oliveira (2011): Experimental Design: BIBD and PBIBD applications and links. ENBIS 2011 Proceedings (on-line)

[I20] Oliveira, T.A. & A. Oliveira (2011). Exploring the links between the BIBD and PBIBD and mathematics, Faculty of Horticulture of Mendel University, Central Institute of Supervising and Testing in Agriculture. In Hampel, D. et al. (eds.), Biometric Methods and Models in Current Science and Research, 183-194.

[I21] Oliveira, T.A., Lima, R. & A. Oliveira (2011): Confounding Techniques in Experimental Design: Results of an experiment on Aniba Rosaedora in the Central Amazon. 6th EASTERN MEDITERRANEAN REGION Conference Proceedings.

[I22] Prata Gomes, D. & M. Neves (2011). Extremal index estimation through an adaptive resampling approach. In Fraga Alves et al. (eds.). Risk and Extreme Values in Insurance and Finance: Book of Abstracts, CEAUL editions, 93-96.

[I23] Prata-Gomes, D. & M. Neves (2011). Resampling methodologies and the estimation of parameters of rare events. In Simos, T. et al. (eds.) AIP Conference Proceedings, Vol. 1389 (ICNAM 2011), 1475-1478.

[I24] Roçadas, C., Oliveira, T.A. & J.T. Mexia (2011). Populations with periodic reclassification: Application to the financial sector. In Fraga Alves et al. (eds.). Risk and Extreme Values in Insurance and Finance: Book of Abstracts, CEAUL editions, 105-106.

[I25] Torres, M.O., Neves, M. & D. Prata Gomes (2011) Spatial Analysis of some soil physicochemical properties in mountainous massif of Sicó, Portugal. In Barbara Cafarelli (ed.), Proceedings of SPATIAL 2: Spatial Data Methods for Environmental and Ecological Processes (2nd Edition), 376-379.

[I26] Valente, V. & T.A. Oliveira (2011). Hierarchical linear models: Review and applications. In Simos, T. et al. (eds.) AIP Conference Proceedings, Vol. 1389 (ICNAM 2011), 1549-1552.

Group Productivity

We still mention the publication of 31 abstracts associated with international conferences: 13 related with V Workshop on Statistics, Mathematics and Computation, 9 related with EVA 2011, 1 at WMSE 2011, 1 at ISF 2011, 2 at 3rd International Workshop on Mathematical E-Learning: E-MATH 2011, 1 at AMISTAT 2011, and 4 at CFE & ERCIM'11.

Other national publications

BOOKS and Journals (Edition)

[N1] Rosado, F. (2011). Edição do Boletim SPE, Primavera 2011, Sondagens e Censos (102 pages).

[N2] Rosado, F. (2011). Edição do Boletim SPE, Outono 2011, Análise de Sobrevivência (104 pages).

NATIONAL PERIODICALS

[N3] Gomes, M.I. & L. Henriques-Rodrigues (2011). Estimação Adaptativa, Invariante e de Viés Reduzido do Índice de Valores Extremos. Boletim da Sociedade Portuguesa de Matemática, Número Especial (Actas do Encontro Nacional da SPM 2010), 191-196.

[N4] Oliveira, T.A. (2011). Planos em blocos incompletos equilibrados (BIB e PBIB designs): na fronteira entre a Estatística e a Matemática. Boletim da Sociedade Portuguesa de Matemática, Número Especial (Actas do Encontro Nacional da SPM 2010), 238-246.

[N5] Santos, J.A. & M.M. Neves (2011). A semiparametric model of the logistic regression. Boletim da Sociedade Portuguesa de Matemática, Número Especial (Actas do Encontro Nacional da SPM 2010), 197-203.

[N6] Fraga Alves, M.I. (2011). Teoria de Valores Extremos: porque nem tudo é Normal!. In INFO-CIÊNCIAS DIGITAL- 6 Out 2011.

Acessível em: <http://infocienciasdigital.fc.ul.pt/noticia.aspx?id=655&editoria=4>

PROCEEDINGS AND ABSTRACTS

[N7] Araújo Santos, P. & I. Fraga Alves (2011). Momentos de um novo estimador para o parâmetro de forma da distribuição Weibull discreta. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 135-136.

[N8] Bessa, C., Calheiros, F. & M.M. Neves (2011). Análise de séries temporais multivariadas: desafios e perspectivas. Aplicações. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 245-246.

Group Productivity

- [N9] Caeiro, F. & M.I. Gomes (2011). Estimação de um Parâmetro de Forma de Segunda-Ordem. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 235-236.
- [N10] Cordeiro, C. & M.M. Neves (2011). Intervalos de previsão usando o procedimento Boot.EXPOS. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 241-242.
- [N11] Ferreira, M.C., Lourenço, E. & T.A. Oliveira (2011). As Tecnologias na Aprendizagem da Matemática – relato de uma experiência. Em Jornadas de Matemática da Universidade Aberta Uab- Matemática ao Longo da Vida: Aplicações e Ensino. 29 de outubro de 2011, Auditório do Museu Municipal de Coruche.
- [N12] Figueira-Neves, M. & F. Rosado (2011). Estudo de outliers em dados forenses. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 9-10.
- [N13] Figueiredo, F. & P. Castagliola (2011). Cartas de medianas com limites de controlo estimados. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 35-36.
- [N14] Fraga Alves, M.I. & P. Araújo Santos (2011). Quantis extremos, value-at-risk e método DPOT. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 233-234.
- [N15] Garcia, V. & T.A. Oliveira (2011). Representação Geométrica de Planos em Blocos Incompletos Equilibrados. Em Jornadas de Matemática da Universidade Aberta Uab- Matemática ao Longo da Vida: Aplicações e Ensino. 29 de outubro de 2011, Auditório do Museu Municipal de Coruche.
- [N16] Gomes, M.I. (2011). A Importância de Métodos de Re-Amostragem em Estatística de Extremos. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 301-302.
- [N17] Gomes, M.I. (2011). Comparação Assintótica de Estimadores de um Parâmetro de Forma de Segunda-Ordem em Caudas Pesadas. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 101-102.
- [N18] Gomes, M.I. & L. Henriques-Rodrigues (2011). Excessos acima de Níveis Aleatórios e Estimação Linear Óptima e Centrada. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 105-106.
- [N19] Gomes, M.I. & D. Pestana (2011). Uma Generalização do Estimador de Hill. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 103-104.

Group Productivity

[N20] Mendes, R. & T.A. Oliveira (2011). Quadrados Latinos, Sudoku e Futebol. Em Jornadas de Matemática da Universidade Aberta Uab- Matemática ao Longo da Vida: Aplicações e Ensino. 29 de outubro de 2011, Auditório do Museu Municipal de Coruche.

[N21] Miranda, C., Souto de Miranda, M., Rocha, A. & M.I. Gomes (2011). Uma Versão Robusta para o Estimador do Índice Extremal de Nandagopalan. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 205-206.

[N22] Noronha, C. & T.A. Oliveira (2011). “Crossover Designs”: Revisão e Desafios. Em Jornadas de Matemática da Universidade Aberta Uab- Matemática ao Longo da Vida: Aplicações e Ensino. 29 de outubro de 2011, Auditório do Museu Municipal de Coruche.

[N23] Rosado, F. (2011). Estatística Forense com dados Normais — uma abordagem (Bayesiana e frequentista) ao estudo de outliers. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 129-130.

[N24] Rosado, F. (2011). A Força dos menores. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 187.

[N25] Santos, P., Gomes, M.I. & P. de Zea Bermudez (2011). Testes Não-Paramétricos para Validação de Modelos Extremais: Aplicação a Dados de Atletismo. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos, 47-48.

Ph.D. thesis completed

[PhD1] Araújo-Santos, Paulo. “Excesses, Durations and Forecasting Value-at-Risk”. Doutoramento em Estatística e Investigação Operacional, Ramo de Probabilidade e Estatística, Universidade de Lisboa, 2011.

Orientador(es): M. Isabel Fraga Alves

[PhD2] Cordeiro, Clara Maria Henrique. “Métodos de Reamostragem e Previsão em Séries Temporais”. Doutoramento em Matemática, Ramo de Estatística, Instituto Superior de Agronomia, Universidade Técnica de Lisboa, 2011.

Orientador(es): M. Manuela Neves.

[PhD3] Santos Branco, Fernando José. “Investigação Experimental: Potência Estatística dos Testes de Aleatorização na Comparação de dois Grupos Independentes”. Doutoramento em Matemática, Planeamento de Experiências, Universidade Aberta, 2011.

Group Productivity

Orientador(es): Teresa A. Oliveira.

Finished in 2011, but discussed in January 2012:

[PhD4] Reis, Paula. “Modelos Limite para a Fiabilidade de Sistemas de Grande Dimensão”. Doutoramento em Estatística e Investigação Operacional, Ramos de Probabilidade e Estatística, Universidade de Lisboa, 2011 (waiting for discussion).

Orientador(es): Luísa Canto e Castro.

Organization of conferences

1. XVIII Jornadas de Classificação e Análise de Dados, April 6-9, 2011, UTAD, Vila Real. Scientific Committee Member (SCM): M. Neves

2. VII Conferencia Estatística e Qualidade na Saúde, May 19-20, Instituto de Higiene e Medicina Tropical da Universidade Nova de Lisboa e Escola Superior de Tecnologia da Saúde de Lisboa. SCM: M.Neves

3. Workshop on Risk & Extreme Values in Insurance and Finance, 6-7 June, 2011. SCMs and Organizing Committee Members (OCMs): I. Fraga Alves (chair), I.Gomes, L.de Haan and C.Neves. Information available at:

<http://www.rev2011.ceaul.fc.ul.pt/organization.htm>.

4. Statistics of Extremes in Today's World. Invited Session to ISI 2011, 58th Meeting of the International Statistical Institute, Dublin, Ireland, August 21-26, 2011.

Organizers: Jan Beirlant and I.Gomes. Discussants: I. Gomes and I.Fraga Alves. Information still available at: <http://www.isi2011.ie/content/>

5. WSMC-2011: V Workshop in Statistics, Mathematics and Computation: Methods and Applications, Faculdade de Economia, Universidade do Algarve, Faro, July 11-12. President, OCM and SCM: T.Oliveira.

Other SCMs in this Group: A.Oliveira, I.Gomes and M.Neves

Invited speakers in this Group: I. Gomes and M.Neves

Information available at: <http://sites.google.com/site/wsmc2011/home>

6. XIX Congresso Anual da SPE, 29 de Setembro a 2 de Outubro, 2011.

Member of the SC: I.Gomes. Plenary speakers in this Group: I.Gomes and F.Rosado

7. Encontro Nacional da SPMet/RELACRE: Metrologia e Suporte de Competitividade na Indústria, IPIMAR, November 11. SCM in this Group: I.Gomes

Group Productivity

8. The 4th International Conference of the ERCIM WG on Computing & Statistics (ERCIM'11), London, 17-19 December. SCM in this Group: I.Gomes

9. Resampling Methodologies and Statistics of Extremes. Invited Session to ERCIM 2011, ERCIM WG on Computing and Statistics, London, UK, December 17-19.

Organizer: I.Gomes. Invited Speaker in this Group: M.Neves

10. ALICE 2011: International Workshop on Adaptive Learning via Interactive, Collaborative and Emotional Approaches (<http://clpl.uoc.edu/~alice2011>) in conjunction with the INCOS 2011: Third International Conference on Networking and Collaborative Systems (<http://voyager.ce.fit.ac.jp/~incos2011>); Nov. 30 – Dec. 2, 2011.Fukuoka, Japan. PCM: T.Oliveira

Industry contract research

We have kept 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 (SPC). We also participate at SPMet/RELACRE boards in the areas of Metrology and Competititivy at Industry.

There has also been some contacts with CIM (Companhia Industrial da Matola, Mozambique), with the supervision of a M.Sc. thesis, by Odete Omar, on the Application of Experimental Design and Statistical Control in the production of cookies. Another M.Sc. thesis, by Manuel Ana Mário Alberto, with an application to the production of MIMO juice is also under progress. This is related with the factory “Seis Líquidos Alimentares”, in Luanda, Angola.

It is also worth mentioning the industry contacts with the company Extruverde-SA, responsible for the extrusion of aluminum., and a reference to the publication by Neves, C., Gomes, M.I. and Fraga Alves, M.I. (2011), on Extreme nitriding limits in aluminum extrusion, published at a Special Issue on “Mathematics and Industry” of the International Journal of Mathematical Modelling and Numerical Optimization.

Internationalization

All members of this team have kept deep international contacts and are well-recognized internationally not only in the area of statistics of extremes, but also in the areas of spatial, environmental and financial statistics, risk assessment theory, SPC, biometry and e-learning. In 2011, there was collaborative publication with J. Beirlant, J. Cai, J. Einmahl, J.-A. Jiménez-Martin, A.A. Juan, Victor Leiva, M. McAleer, C.E. Minder, T. Pérez Amaral, A. Pérez-Bonilla, O.R. Straume, S. Trenholm, J. Simosa, and C. Zhou. The internationalization of the team was responsible for the number of invited lectures

Group Productivity

(ILs) in 2011, either national or international: A.Ferreira (IL at WMSE 2011, Covilhã; visit to C.Zhou, De Nederlandsche Bank and Erasmus Univ. Rotterdam); F.Figueiredo (seminars at UTAD, Vila Real; IL at ENBIS 2011, Coimbra), I.Fraga Alves (IL at ISI 2011, Dublin); M.I.Gomes (diverse seminars; plenary lectures at YESM 2011 and SPE 2011; responsible for invited sessions at ISI 2011 and ERCIM 2011); M.Neves (IL at ERCIM 2011, London); A.Oliveira (seminar at Évora Univ.; ILs at ICNAAM, ENBIS and E-MATH 2011); T.A.Oliveira (seminar at Tagus Park; ILs at ICNAAM, ENBIS and E-MATH 2011). The research contacts with KU Leuven have also become stronger, and, jointly with J.Beirlant, we have organized an Invited Paper Session (IPS) at ISI 2011, Dublin, and are involved in the preparation of a review paper. Together with Liang Peng, from Georgia Tech. Univ., USA, we are involved in the organization of an IPS at ISI 2013, Hong-Kong. Members of this team are already involved in the SC of EVA 2013, among other conferences in 2012 and 2013. Strong research contacts have also been kept with J.Picek (Liberec Univ., Check Republic), J.Husler (Bern University, Switzerland), V.Leiva (Universidad ValeParaíso, Chile), L.Markus (Eotvos Lorand Univ., Hungary), S.Mejza (Poznan Univ., Poland) and R.-D.Reiss (Siegen Univ., Germany), among others. As a result of the internationalization of the team, we can mention an enormous number of reviews produced by members of the team in the most diversified journals. Also M.I.Gomes has been an Associate Editor (AE) of JSPI, in 2007-2012, an AE of Extremes since 2007, Editor-in-Chief of Revstat, since 2003, and has recently accepted the invitation to be an AE of CMSIM. L.de Haan has been an AE of Extremes since 1989.

Strategic Project Adjustments

Scientifically the main objectives for 2011 were accomplished and well overpassed with respect to the expected indicators as proposed on the strategic project. We had however to postpone for 2012 some of the invited speakers for the regular international seminars of CEAUL, due to the fact that at the beginning of April the FFCUL urged the centers to uphold expenses due to lack of cash flow.

Relatively to the budget, a small amount was used from the budget received referred to 2011, since several expenses done during 2011 had to be presented to FCT to justify expenses done in previous years which were considered by FCT as not eligible.

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

12 January 2011/10.111,55

30 May 2011/8.551,2

6 July 2011/18.002,84

Objectives & Achievements

Objectives

The objectives of the team for 2011 were

1• Meta analysis and applications in Medicine; uniformity issues related to combined p-values and random p-values, data transformations and sample augmentation. Research 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.

Objectives & Achievements

- 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 development of an e-learning platform for professional translators for TRADULÍNGUAS. Research team: C. Ventura, S. Velosa, D. Pestana.

Main Achievements

We refer separately the main achievements in the above mentioned topics of research for 2011:

- 1• The research on meta-analysis and computational sample augmentation has resulted in the publication of [I3-PMDA], [I10-PMDA] and [I11-PMDA]. Applications to Medicine, forensic Medicine and dental Medicine (Cristiana Pereira, D. Pestana and L. Soares de Almeida) have been submitted to the proceedings of international conferences, and further research will be a priority objective in the near future.
- 2• J. Cadima and co-workers published [P3], and submitted other preprints for publication.
- 3• The main contributions in the field have been made by R. Santos, who published [I21-PMDA], [I22-PMDA] and [N4-PMDA].
- 4• Brilhante, D. Pestana, P. Pestana, with the collaboration of M. I. Gomes, published the papers [P2-PMDA], [P7-PMDA] in a peer review journal. Several papers — [I1-PMDA], [I2-PMDA], [I4-PMDA], [I5-PMDA], [I12-PMDA] — have been published as chapters of international books, and in proceedings of international conferences, cf. [I15-PMDA], [I16-PMDA], [I18-PMDA], [I19-PMDA], [I20-PMDA], and presented at the annual meeting of SPE (N6-PMDA)).
- 5• The progress in this area has been presented in the book [B1-PMDA]. M. Felgueiras in [I6-PMDA] investigated Pareto scale mixtures, and submitted a paper on their

Objectives & Achievements

applications in the modelation of the energy released by extreme seisms.

6• S. Cabral and H. Gonçalves wrote the book [B2-PMDA], and taught the annual course invited by the Portuguese Statistical Society (SPE) at the annual meeting, and S. Cabral published [N7-PMDA].

7• T. A. Marques and R. Bispo published a large number of papers in peer review journals and as chapters of international books — [P1-PMDA], [P4-PMDA], [P9-PMDA], [P10-PMDA], [P11-PMDA], [P12-PMDA], [P13-PMDA], [P14-PMDA], [P15-PMDA], [I9-PMDA] — and actively participated in international conferences — [I22-PMDA] till [I33-PMDA] and in national conferences, cf. [N5-PMDA], [N9-PMDA] and [N10-PMDA].

8• Eugénia Graça Martins continued her involvement with the international award winning INE's ALEA project. D. Pestana delivered a conference on Statistics and Psychology at the University Institute of Psychology ISPA, and jointly with M. F. Brilhante a conference O Meu Amigo Ri(s)co [My (Rich) Friend Risk] in the series Mathematics Without Limits. He also has been invited to present a conference at Gulbenkian Foundation on the role of Statistics in the methodology of scientific research, and at the Faculty of Medicine of Porto University on Meta Analysis. [N12-PMDA] and [N14-PMDA] result from the investment of R. Santos in the area of teaching of Statistics.

9• Aside from [N11-PMDA], a revised version of a paper on combined samples qualitative tests (Santos, Pestana and Martins) when sensibility or sensitivity are lesser than 1 has been submitted.

10• The projected research has been abandoned in favour of (1) a more rewarding investment in collaboration with M. I. Gomes in the area of extreme value theory and applications, resulting in the publication of [P5-PMDA], [P6-PMDA], [P8-PMDA], [I17-PMDA] and [N8-PMDA]; (2) collaboration with colleagues from Geology/Hydrology, resulting in the publication of [N13-PMDA] and [N15-PMDA]; (3) sampling theory, [N4-PMDA] and [MSc1-PMDA]. Lagorithmic and simulation issues have been investigated by M. Felgueiras and R. Santos, cf. [I7-PMDA], [I8-PMDA], [I13-PMDA], [I20-PMDA].

11• Due to the fact that the research team has members from Lisbon, Funchal and Ponta Delgada, and hence presential meetings to discuss strategies are scarce, the final report has been postponed for November 2012. A revised version of the English-Portuguese statistical glossary had an improved on-line 2nd edition, at the SPE web site.

Group Productivity

Publications in peer review Journals

Group Productivity

[P1-PMDA] Bispo, R., Marques, T. A., and Pestana, D. (2011). Statistical power of goodness-of-fit tests based on the empirical distribution function for Type I right censored data. *J. Statist. Computing Simul.* (in print,

<http://dx.doi.org/10.1080/00949655.2011.624519>).

[P2-PMDA] Brilhante, M.F., Gomes, M.I. & D. Pestana (2011). BetaBoop brings in chaos. *Chaotic Modelling and Simulation (CMSIM)* 1, 39-50.

[P3-PMDA] Bruno-Soares, A.M., Matos, T.J.S. & Cadima, J. (2011). Nutritive value of *Cistus salvifolius* shrubs for small ruminants, *Animal Feed Science and Technology*, 165, p. 167-175.

[P4-PMDA] CEIA, R. S.; RAMOS, J. A.; HELENO, R. H.; HILTON, G. M. & MARQUES, T. A. (2011) Status assessment of the Critically Endangered Azores Bullfinch *Pyrrhula murina*. *Bird Conservation International*. 21: 477-489.

DOI: 10.1017/S0959270911000025

[P5-PMDA] Gomes, M.I., Mendonça, S. & D. Pestana (2010). Reduce-bias tail index and VaR estimation via the bootstrap methodology. *Communications in Statistics, Theory and Methods* 40:16, 2946-2968.

[P6-PMDA] Gomes, M.I. & D. Pestana (2011). A note on the adaptive choice of the optimal threshold in extreme value analysis. *Bulletin International Statistical Institute LXIV* (Electronic publication, 8 pages).

[P7-PMDA] Gomes, M.I., Pestana, D.D. & P. Pestana (2011). Sir Pinsky rides again. *Chaotic Modelling and Simulation (CMSIM)* 1, 77-90.

[P8-PMDA] Henriques-Rodrigues, L., Gomes, M. I., & Pestana, D. (2011). Statistics of extremes in athletics, *RevStat*, 9, 127-153.

[P9-PMDA] KUSEL, E., MELLINGER, D. K., THOMAS, L., MARQUES, T.A., MORETTI, D. & WARD, J. (2011). Cetacean population density estimation from single fixed sensors using passive acoustics. *The Journal of the Acoustical Society of America*. 129: 3610-3622. DOI: 10.1121/1.3531844

[P10-PMDA] MARQUES, T. A.; MUNGER, L.; THOMAS, L.; WIGGINS, S. & HILDEBRAND, J. A. (2011) Estimating North Pacific right whale (*Eubalaena japonica*) density using passive acoustic cue counting. *Endangered Species Research*. 13: 163-172. DOI: 10.3354/esr00325

[P11-PMDA] MARQUES, T. A., THOMAS, L., MARTIN, S. W., MELLINGER, D. K., JARVIS, S., MORRISSEY, R. P., CIMINELLO, C. & DIMARZIO, N. (2011) Spatially explicit capture recapture methods to estimate minke whale abundance from data collected at bottom mounted hydrophones. *Journal of Ornithology*. DOI:

Group Productivity

10.1007/s10336-010-0535-7

[P12-PMDA] MARQUES, T. A. , THOMAS, L. AND J. A. ROYLE (2011) A hierarchical model for spatial capture-recapture data: Comment. Ecology. 92: 526-528. DOI: 10.1890/10-1440.1

[P13-PMDA] MARTIN, S. W., MARQUES, T. A., THOMAS, L., MORRISSEY, R. P., JARVIS, S., DIMARZIO, N., MORETTI, D. MELLINGER, D. K. (in press) Estimating minke whale (*Balaenoptera acutorostrata*) boing sound density using passive acoustic sensors. Marine Mammal Science.

[P14-PMDA] WARD, J., JARVIS, S., MORETTI, D., MORRISSEY, R., DIMARZIO, N., THOMAS, L. & MARQUES, T. A. (2011) Beaked whale (*Mesoplodon densirostris*) passive acoustic detection with increasing ambient noise. The Journal of the Acoustical Society of America. 129: 662-669. DOI: 10.1121/1.3531844

[P15-PMDA] WARD, J. A., L. THOMAS, S. JARVIS, N. DIMARZIO, D. MORETTI, T. A. MARQUES, C. DUNN, D. CLARIDGE, E. HARTVIG & P. TYACK (2011). Passive Acoustic Density Estimation of Sperm Whales in the Tongue of the Ocean, Bahamas. Marine Mammal Science. (in press)

Other international publications

CHAPTERS of BOOKS

[I1-PMDA] Aleixo, S., Rocha, J. L., and Pestana, D. (2011). Beta(p,q)-Cantor Sets: Determinism and Randomness. In C. H. Skiadas, I. Dimotikalis and C. Skiadas (Eds.), Chaos Theory: Modeling, Simulation and Applications, World Scientific Books, 333-340.

[I2-PMDA] 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.

[I3-PMDA] Brilhante, M. F., Malva, M., Mendonça, S., Pestana, D., Sequeira, F., and Velosa, S. (2011). Uniformity. In Brauman, C., Esquivel, M., and Mexia, J. T. (eds): Studies in Theoretical and Applied Statistics, Springer, Berlin.

[I4-PMDA] Caneco, A., C. Grácio and J. L. Rocha, Symbolic Dynamics and Synchronization, In Chaos Theory: Modeling, Simulation and Applications, Skiadas, C. H., Dimotikalis, Y. and Skiadas, C. (Eds), World Scientific Publishing Co, 2011, 135-142.

Group Productivity

[I5-PMDA] Caneco, A., S. Fernandes, C. Grácio and J. L. Rocha, Networks Synchronizability, Local Dynamics and Some Graph Invariants, In Dynamics, Games and Science I, Peixoto, M. M., Pinto, A. A. and Rand, D. A. (Eds): Springer Proceedings in Mathematics 1, Springer-Verlag Berlin Heidelberg, 2011, Vol. 1, Chap. 14, 221-238

[I6-PMDA] Felgueiras, M. (2011). Pareto Scale Mixtures. Studies in Theoretical and Applied Statistics. Springer, Berlin. (Aceite)

[I7-PMDA] Felisberto, F.; Felgueiras, M.; Domingues, P.; Fdez-Riverola, F.; Pereira, A. (2011). Improving the Elder Care's Wireless Sensor Network Fall Detection System Using Logistic Regression. Communications in Computer and Information Science, Vol. 221. ENTERprise Information Systems, Part III, 317-326. Springer, Berlin.

[I8-PMDA] Felisberto, F.; Felgueiras, M.; Seco, A.; Fdez-Riverola, F.; Pereira, A. (2011). Application of Statistical Methods to Improve an Acceleration Based Algorithm. Communications in Computer and Information Science, Vol. 221. ENTERprise Information Systems, Part III, 327-336. Springer, Berlin

[I9-PMDA] MARQUES, T. A., BUCKLAND, S. T., BORCHERS, D. L., REXSTAD, E. & THOMAS, L. (2011), Distance Sampling, In Lovric, M. (ed.), International Encyclopedia of Statistical Science, Springer-Verlag, 398-400.

[I10-PMDA] Pestana, D. (2011). Combining p-values. In Lovric, M. (ed.), International Encyclopedia of Statistical Science, Springer-Verlag, Part 1, 1145-1147.

[I11-PMDA] Pestana, D., Rocha, M. L., Vasconcelos, R., and Velosa, S. (2011). Publication Bias and Meta-Analytic Syntheses. In Brauman, C., Esquível, M., and Mexia, J. T. (eds): Studies in Theoretical and Applied Statistics, Springer, Berlin.

[I12-PMDA] Pestana, D., Aleixo, S., and Rocha, J. L., (2011). Regular variation, paretian distributions, and the interplay of light and heavy tails in the fractality of asymptotic models. In C. H. Skiadas, I. Dimotikalis and C. Skiadas (Eds.), Chaos Theory: Modeling, Simulation and Applications, World Scientific Books, 309-316.

[I13-PMDA] Seco, A.; Felgueiras, M.; Fdez-Riverola, F.; Pereira, A. (2011). Elder Care Alert Management – Decision Support by a Logistic Regression Model. Advances in Intelligent and Soft Computing Vol. 90. Trends in Practical Applications of Agents and Multiagent Systems, 9-16. Springer, Berlin.

PROCEEDINGS

[I15-PMDA] S. M. Aleixo, M. F. Brilhante, D. Pestana (2011). General Stuttering Beta(p,q) Cantor-Like Random Sets, Proceedings of the 58th ISI Congress, CPS008:1-16

Group Productivity

[I16-PMDA] Brilhante, M. F., Gomes, M. I., and Pestana, D. (2011). BetaBoop Brings in Chaos. Proceedings of the Chaos 2011 — 4th Chaotic Modeling and Simulation International Conference,

http://www.cmsim.org/images/Proceedings_CHAOS_2011_A-B.pdf, p. 45-52.

[II7-PMDA] M. I. Gomes, D. Pestana (2011). A Note on the Adaptive Choice of the Optimal Threshold in Extreme Value Analysis, Proceedings of the 58th ISI Congress, CPS014-04.

[II8-PMDA] Gomes, M. I., Pestana, D., and Pestana, P. (2011) Sir Pinski Rides Again. Proceedings of the Chaos 2011 — 4th Chaotic Modeling and Simulation International Conference,

http://www.cmsim.org/images/Proceedings_CHAOS_2011_B-Got.pdf, p. 137-144.

[II9-PMDA] Pestana, D., and D., Aleixo, S. (2011). Stuttering Cantor-Like Random Sets, In Luzar-Stiffler, V., Jarec, I. and Bekic, Z. (eds.), Proceedings of the ITI 2010, 32nd International Conference on Information Technology Interfaces, 29-34.

[I20-PMDA] Pestana, Pedro, Lindenmayer systems and the harmony of fractals, Proceedings of the Chaos 2011 — 4th Chaotic Modeling and Simulation International Conference, http://www.cmsim.org/images/Proceedings_CHAOS_2011_P.pdf, p. 419-426.

[I21-PMDA] Santos, Rui (2011). Simulation Analysis of Statistical Properties of Random Polygonal Lines Iteratively Generate on the Plane, Proceedings of the ITI 2011, 33rd International Conference on Information Technology Interfaces, pp. 557-562.

[I22-PMDA] Santos, Rui (2011). Probabilidade Circa 1914 e a Construção de Diogo Pacheco d'Amorim, Actas do V Encontro Luso-Brasileiro de História das Matemáticas, pp. 75-87.

ABSTRACTS: 11; conferences in Norway, USA and Holland; participants R. Bispo, T. Marques, D. Pestana

Other national publications

BOOKS

[B1-PMDA] Brilhante, M. F., Pestana, D. D., Rocha, J, Rocha, M. L., e Velosa, S. (2011). "Inferência Estatística Sobre a Localização Usando a Escala", XVIII+289 p., Instituto Nacional de Estatística, Lisboa.

[B2-PMDA] Cabral, M. S. e Gonçalves, M. H. (2011). Análise de Dados

Group Productivity

Longitudinais. Sociedade Portuguesa de Estatística. (ISBN: 978-972-8890-24-7)

Chapter of Book

[N7-PMDA] Cabral, M. S. (2011). Capítulo 4 - Ensaio Clínicos. In Gilda Cunha, Margarida Eiras e Nuno Teixeira (coord.): Bioestatística e Qualidade na Saúde. Lidel, Lisboa, pp. 95-145.

NATIONAL PERIODICALS

[N1-PMDA] Brilhante, M. F., Pestana, D., e Rocha, M. L. (2011), Betices, Boletim da Sociedade Portuguesa de Matemática, Número Especial (Actas do Encontro Nacional da SPM 2010), 238-246.

[N2-PMDA] Felgueiras, M. (2011). Mistura de gaussianas e distribuição t de Student em Finanças. Boletim da Sociedade Portuguesa de Matemática, Número Especial (Actas do Encontro Nacional da SPM 2010), 210-214.

[N3-PMDA] Aleixo, S., Brilhante, M. F., Diamantino, M. F., Mendonça, S, e Pestana, D. (2011). Erros Não Amostrais — Uma Floresta de Enganos, Bol. SPE, 53-68.

[N4-PMDA] Pestana, D. & Santos, R. (2011). Alguns Clássicos da Probabilidade e da Estatística, Resumos alargados das comunicações do 23.º Seminário Nacional de História da Matemática, Suplemento do Boletim da Sociedade Portuguesa de Matemática 64 (Maio de 2011), pp. 49-51.

NATIONAL PROCEEDINGS AND ABSTRACTS

[N5-PMDA] BISPO, R., MARQUES, T. A. & PESTANA, D:– Estratégia de verificação de cadáveres de aves em testes de remoção nos estudos de monitorização de parques eólicos, Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos.

[N6-PMDA] M. F. Brilhante , D. Pestana, M. L. Rocha (2011). Conjuntos de Cantor com Reparação Aleatória, X In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos.

[N8-PMDA] Gomes, M.I. & D. Pestana (2011). Uma Generalização do Estimador de Hill. In Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos.

[N9-PMDA] MARQUES, T. A. MARTIN, S. W., MORRISSEY, R. P., JARVIS, S., DIMARZIO, N., MORETTI, D., MELLINGER, D. & THOMAS, L Spatially explicit capture-recapture minke whale density estimation, Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos.

[N10-PMDA] Marques, T. A., Métodos acústicos para estimar a abundância de

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cetáceos, Lectures in Cetacean Science – Escola de Mar, Lisboa.

[N11-PMDA] Martins, João; Santos, Rui & Sousa, Ricardo (2011). Distribuição do máximo condicionada à soma aplicada em testes quantitativos compostos, Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos.

[N12-PMDA] Martins, Maria Alice; Ribeiro, Helena & Santos, Rui (2011). Estatística no ensino secundário - um contributo para a clarificação do estudo da regressão linear simples, Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos.

[N13-PMDA] Oliveira, M., Silva, M.C.R., Diamantino, F., (2011) – Quimismo da água subterrânea em meio urbano – Estudo de caso da Bacia Hidrográfica de Alcântara – Lisboa. 8º Seminário sobre Águas Subterrâneas.

[N14-PMDA] Pedro, Salomé; Santos, Rui & Cotrim, Luís (2011). Simulação - uma aplicação ao problema da ruína do jogador, Braumann, C. et al. (eds.) XVIII Congresso da Sociedade Portuguesa de Estatística — Livro de resumos.

[N15-PMDA] Silva, M.C.R., Diamantino, F., Oliveira M. (2011) - Bacia Hidrográfica de Alcântara (Lisboa), um caso de estudo da água subterrânea em meio urbano. Livro de actas do VIII Cong. Iber. Geol. - XVII Sem. Geol. - II Vol. Editores: Antunes I.M.H.R., Almeida J.P.F., Albuquerque M.T.D., IPCB, Castelo Branco, 651-655.

Organization of conferences

1. XIX Congresso da Sociedade Portuguesa de Estatística, que decorreu na Nazaré em Setembro de 2011. Scientific Committee member: R. Santos, M. Felgueiras.
2. VII Conferencia Estatística e Qualidade na Saúde, May 19-20, Instituto de Higiene e Medicina Tropical da Universidade Nova de Lisboa e Escola Superior de Tecnologia da Saúde de Lisboa. Scientific Committee member: D. Pestana
3. Encontro Nacional da SPMet/RELACRE: Metrologia e Suporte de Competitividade na Indústria, IPIMAR, November 11. Scientific Committee member in this Group: D. Pestana
4. XVIII Jornadas de Classificação e Análise de Dados, April 6-9, 2011, UTAD, Vila Real. Scientific Committee Member (SCM): J. Cadima

Internationalization

The participation of the team members in international conferences and workshops, with the presentation of substantial theoretical results and algorithms/software, has

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been incentivated, and resulted for instance in the collaboration of Regina Bispo with M. Huso, or in the invitation of D. Pestana for the scientific committee of the international Chaos 2012 conference, and the editorial team of Chaos Modeling and Simulation. Through the involvement of T. A. Marques with StAndrews based Buckland's team on distance sample, a rich international cooperation with several research teams worldwide has been developed

Strategic Project Adjustments

Scientifically the main objectives for 2011 were accomplished and well overpassed with respect to the expected indicators as proposed on the strategic project. We had however to postpone for 2012 some of the invited speakers for the regular international seminars of CEAUL, due to the fact that at the beginning of April the FFCUL urged the centers to uphold expenses due to lack of cash flow.

Relatively to the budget, a small amount was used from the budget received referred to 2011, since several expenses done during 2011 had to be presented to FCT to justify expenses done in previous years which were considered by FCT as not eligible.

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

12 January 2011/12.772,57

30 May 2011/10.801,48

6 July 2011/14.252,24

Objectives & Achievements

Objectives

This team has 18 integrated members, 14 Ph.D. students, 1 undergraduate student and 12 collaborators with Ph.D.

The main objectives of this group are to: (A) provide relevant methodological contributions to probability and statistical issues in modelling environmental and biological data and publish the results in peer review journals, (B) keep interdisciplinary collaboration; (C) continue the Ph.D. program on the main research themes of the group; (D) present the research at international and national conferences; (E) organize seminars, workshops and advanced courses of general interest in the areas of expertise of the group; (F) serve the community in general by giving advice on statistical issues.

[A] Currently, methodological work is carried on the following general themes

1. Extremes of discrete-continuous processes,
2. Time series with particular relevance to non-linear time series;

Objectives & Achievements

3. Incomplete data analysis from frequentist and Bayesian point of view;
4. Bayesian non parametric methods on diagnostic tests and model identification;
5. Functional ROC analysis;
6. Gaussian random fields; Spatial point processes;
7. Bayesian hierarchical modeling; spatio-temporal analysis
8. Survival analysis: Generalized additive models, joint analysis of survival and longitudinal modeling
9. Hidden Markov Models
10. Latent class models and Diagnostic tests
11. New methods for identification of differentially expressed genes
12. Supervised classification

[B] Application work is currently on

1. Forest Fires: Collaborative work with researchers from the Institute of Agriculture of the Technical University of Lisbon (ISA/UTL). Modelling and analysis of forest fire data; Bayesian spatio-temporal analysis; Spatio-temporal non-homogeneous marked point processes; Models for the analysis of fire frequency data.
2. Road safety: Ongoing collaborative work with Laboratório Nacional de Engenharia Civil on Bayesian hierarchical models for road safety data.
3. Immunology and Genetics with researchers from Gulbenkian Institute of Science, University College of London, University of Oxford;
4. Biology, Medicine and Epidemiology with researchers from University of São Paulo - Brazil, Hasselt University – Belgium, University of Texas at Houston and Austin and Portuguese Oncology Institute - Portugal
5. Microarray data: Collaborative work with researchers on Biology from Faculty of Sciences and on Medicine from Institute of Molecular Medicine.
6. Epidemiology Medicine and Health: Collaborative work with researchers from the Instituto Ricardo Jorge on: Modelling infectious diseases; Syndromic surveillance; Stochastic modelling of dynamic systems; Collaborative work with researchers from Fio Cruz, Brasil on application of screening methods to Dengue epidemics; Collaborative work on the applications of statistical methods in tropical medicine; Collaborative work with researchers from Research Unit of Centro Hospitalar de

Objectives & Achievements

Lisboa Central.

7. Fisheries: Continue the consultancy role in DEEPFISHMAN project.

8. Human Resources: Bayesian models in planning human resources

Members of the group are working on several books;

1. Bayesian Statistics (in Portuguese) – revision and 2nd edition;

2. Non-linear Time Series –

3. Survival analysis: theory and applications to health.

We aim as well to continue international collaboration; to keep interdisciplinarity activities; to collaborate with scientific societies in their activities; to collaborate with society in general, by acting as peer reviewers to national and international journals, by giving advice in statistical issues and by organizing short courses for the scientific community.

Main Achievements

KF Turkman finished the work on Extremes of Continuous Processes and Their Discrete Versions with the publication [CB2]. Together with pos-doc student E Ursu he worked on periodic autoregressive model identification [P20]. KF Turkman, M Scotto and P de Zea Bermudez worked on the book on non-linear time series. The book was submitted for publication as lecture notes to Springer.

D Paulino and the PhD student F Poletto worked on incomplete data analysis. Poletto finished his thesis [PhD4] which was awarded the prize Casimiro Montenegro Filho. They published a collection of papers on the subject [P14, 15, 16, 17]. D Paulino also worked on Bayesian methodology applied to problems in genetics: with G Silva [PC4, A4], with N Sepúlveda [PC8, A6].

A Amaral Turkman and the PhD student V Inácio worked on Bayesian non parametric methods for the estimation of ROC surface [P8]. V Inácio spent three months in Santiago de Compostela to work on functional data analysis under the supervision of Wenceslao-Manteiga. They produced a joint paper [A3].

KF Turkman and the PhD student P Pereira worked on spatial marked point processes with particular emphasis in modelling forest fires. Part of the work was published in [PC5]. He intervened in the discussion of a read paper at RSS [P19], related to Gaussian random fields.

A Amaral Turkman, KF Turkman and G Silva worked on problems related to Bayesian hierarchical space time modelling applied to forest fires, as part of the collaboration

Objectives & Achievements

with researchers from ISA/UTL, resulting in the publications [P2], [PC9]. A Amaral Turkman and the PhD student C Ribeiro also used Bayesian hierarchical space time models in road safety data. The results were published in [PC6].

C Rocha e AL Papoila worked on Generalized Additive Models with flexible link, resulting in the publication [P12]. The collaboration of AL Papoila with medical doctors resulted in the publications [P9], [N9] and several communications in conferences. Her work with medical doctors was the recipient of two prizes Nutribén 2011 and SPAIC - Bial Aristegui 2011.

G Silva, V Andreozzi and their PhD student R Martins worked on survival analysis and longitudinal data. Their work applied to AIDS data in Brazil was the theme of an invited talk by G Silva [PCI3] and a communication to a conference.

V Andreozzi wrote a book on Survival Analysis [N1] and worked on Survival analysis of Cystic Fibrosis patients, among other problems on survival analysis, which were theme of conference communications. She collaborated with A Amaral Turkman, M Antunes and S Ramos on a study to devise alarm system for epidemiological data with application to Dengue epidemics [PC12].

L Carvalho, I Natário and their PhD student B Nunes worked on the application of hidden Markov models to influenza epidemics in Portugal. The work was part of the PhD thesis of B Nunes [PhD1] and was submitted for publication to Statistics in Medicine. Together with studies on excess of mortality published in [P4], that work is part of the collaborative work with Instituto Ricardo Jorge.

L Gonçalves worked on Statistical Epidemiology and Public Health, on applications in tropical medicine. As a result she published the papers [P4, P5]. She also worked with P de Zea Bermudez on count models [PC3] and on latent class models and diagnostic tests [PC1,PC2].

L Sousa continued her collaboration with the biology research group on the analysis of microarray data [P7,P18]. With her PhD student E Barreto [PhD2], they published a paper on Pre-processing Optimization of RNA Immunoprecipitation Microarray data [P3]. She also worked with the PhD student S Rebouças on Robust PCA methods for the analysis of microarray data [PhD5].

L Sousa, A Amaral Turkman and the PhD student C Silva Fortes developed and implemented in R a plot for the analysis of gene expression profiles, the Arrow plot. The paper was submitted to BMC Bioinformatics.

N Sepulveda worked on several problems in Immunology and Genetics [P11], [PC7]

Group Productivity

Group Productivity

Publications in peer review Journals

- [P1] Amaral Turkman, MA (2011) Book Review: INTRODUCTION TO TIME SERIES MODELING, by Genshiro Kitagawa (ed), published by Chapman & Hall/CRC, 2010. Total number of pages 289. ISBN: 978-1-58488-921-2. *J. Time Ser. Anal.*, 32, 33
- [P2] Amaral-Turkman, MA , Turkman, KF, Le Page, Y and Pereira, JM (2011). Hierarchical space-time models for fire ignition and percentage of land burned by wildfires. *Environmental and Ecological Statistics*, Volume 18, Issue 4 (2011), Page 601-617
- [P3] Barreto-Hernandez,E., Gama-Carvalho,M. and Sousa,L. (2011). Pre-processing Optimization of RNA Immunoprecipitation Microarray Data. *Journal of Computational Biology*, 18(10): 1319-1328.(DOI: 10.1089/cmb.2010.0020)
- [P4] Borges-Costa J.; Silva R.; Gonçalves L.; Filipe P.; Soares de Almeida L.; Marques Gomes M. (2011) Clinical and laboratory features in acute generalized pustular psoriasis: a retrospective study of 34 patients, *Am J Clin Dermatol.*, 12(4):271-6.
- [P5] Faria, N.; Kim, J.; Gonçalves, L.; Martins, M.L.; Chan, K.; Campbell, B. (2011) Enhanced activity of antifungal drugs using natural phenolics against yeast strains of *Candida* and *Cryptococcus*, *Letters in Applied Microbiology*, 52(5):506-13.
- [P6] Felix J, ANDREOZZI V, Soares M, Borrego P, Gervásio H, Moreira A, Costa L, Marcelo F, Peralta F, Furtado I, Pina F, Albuquerque C, Santos A, Passos-Coelho JL for the Portuguese Group for the Study of Bone Metastases (2011). Hospital resource utilization and treatment cost of skeletal-related events in patients with metastatic breast or prostate cancer: An estimation for the Portuguese National Health System. *Value in Health* Volume 14 Issue 4, 499-505
- [P7] Fortes,A.M., Agudelo-Romero,P. Silva,M.S., Ali,K., Sousa,L., Maltese,F., Choi,Y.H., Grimplet,J., Martinez- Zapater,J.M., Verpoorte,R. and Pais,M.S. (2011). Transcript and metabolite analysis in Trincadeira cultivar reveals novel information regarding the dynamics of grape ripening. *BMC Plant Biology*. 11:149.
- [P8] Inácio, V., Amaral Turkman, A .A., Nakas, C.T., Alonzo, T.A. (2011) “Nonparametric Bayesian estimation of the three-way receiver operating characteristic surface”, *Biometrical Journal*, 53, 1011-1024
- [P9] Martins P, Valente J, Papoila AL, Caires I, Araújo-Martins J, Mata P, Lopes M, Torres S, Rosado-Pinto J, Borrego C, Annesi Maesano I, Neuparth (2012). Airways changes related to air pollution exposure in wheezing children. *Eur Respir J* 39(2):246-53, (Epub ahead of print Jun 30). PMID: 21719492. In press (will be issued in 2012)

Group Productivity

[P10] Nunes B, Viboud C, Machado A, Ringholz C, Rebelo-de-Andrade H, et al. (2011) Excess Mortality Associated with Influenza Epidemics in Portugal, 1980 to 2004. PLoS ONE 6(6): e20661. doi:10.1371/journal.pone.0020661

[P11] Nunes-Cabaço, H., Caramalho, I., Sepúlveda, N. and Sousa, A. E. (2011). Differentiation of human thymic regulatory T cells at the double positive stage. European Journal of Immunology 41, 3604-3614.

[P12] Papoila, AL and Rocha, C. (2011). Modelling current status data using Generalized Additive Models with flexible link: the additive gamma-logit model. International Journal of Applied Mathematics & Statistics, Volume 24, 2-19, Number SI-11A

[P13] Pinto, A. E., Pires, A., Silva, G. L., Bicho, C., André, S. and Soares, J. (2011). Ploidy and S-phase fraction as predictive markers of response to radiotherapy in cervical cancer. Pathology Research and Practice 207, 623-627.

[P14] Poletto F., Molenberghs G., Paulino C.D., and Singer J. (2011). Sensitivity analysis for incomplete continuous data. Test 20, 3, 589-606.

[P15] Poletto F., Paulino C.D., Molenberghs G. and Singer J. (2011). Inferential implications of over-parameterization: a case study in incomplete categorical data. International Statistical Review 79, 1, 92-113.

[P16] Poletto F., Singer J. and Paulino C.D. (2011). Comparing diagnostic tests with missing data. J. Applied Statistics 38, 6, 1207-1222

[P17] Poletto F., Singer J. and Paulino C.D. (2011). Missing data mechanisms and their implications on the analysis of categorical data. Statistics and Computing 21, 31-43

[P18] Sampaio, P.N., Sousa, L., Calado, C.R.C., Pais, M.S. and Fonseca, L.P. (2011). Application of chemometrics for selection the *Saccharomyces cerevisiae* expression system and culture medium composition for heterologous cyprosin B production. Biotechnology Letters 33: 2111-2119. (DOI 10.1007/s10529-011-0678-5)

[P19] Turkman, K.F. (2011) Discussion to Lindgren, F., Rue, H. and J. Lindström (2011) An explicit link between Gaussian fields and Gaussian random fields: the stochastic partial differential equation approach JRSS Series B, 73, 423-498

[P20] Ursu, E. and Turkman, K.F. (2012) Periodic autoregressive model identification using genetic algorithms. Journal of Time Series, J. of Time Series Analysis. On-line DOI: 10.1111/j.1467-9892.2011.00772.x In press (will be issued in 2012)

Other international publications

Group Productivity

Chapter of Books

[CB1] Sepúlveda, N. and Carneiro, J. (2011). Repertoire dynamics of peripheral regulatory and effector T cells competing for antigen presenting cells. In *Mathematical Models and Immune Cell Biology* (C. Molina-París and G. Lythe, eds.), p. 275-304, Springer Verlag, London.

[CB2] Turkman, K.F. (2011) Continuous-Discrete Time Extremes of Stationary Processes. *Handbook of statistics- vol 30. Time Series-Methods and applications*. Editors C.R.Rao and T .Subba Rao. Elsevier. DOI:10.1016/B978-0-444-53858-1.1.00020-X

Special Edition:

[SE1] Sousa,L., Andreozzi,V., Antunes,M. and Gonçalves,L. (Eds), Special issue on "Statistical Modelling: Challenges in Health". *REVSTAT* Volume 9, Number 1, March 2011.

Proceedings of international conferences

[PC1] Gonçalves, L., Subtil, A., Oliveira, M.R. Sampling Strategies and Bayesian Latent Class Models for Estimating Sensitivity and Specificity In *Proceedings of XIII Spanish Biometry Conference and III Ibero-American Biometry Meeting, Barcelona, September 7-9, 2011* (Electronic ed., Number 101, 4 pages)

[PC2] Oliveira, M.R., Subtil, A., Gonçalves, L., Confidence Intervals for Sensitivity and Specificity: a Comparison Study In *Proceedings of XIII Spanish Biometry Conference and III Ibero-American Biometry Meeting, Barcelona, September 7-9, 2011* (Electronic ed., Number 103, 4 pages).

[PC3] Olivença, D., Zea Bermudez, P. , Figueiredo, J., Belo, S., Gonçalves, L. Count models - an application to the study of the Schistosomiasis. In *Proceedings of XIII Spanish Biometry Conference and III Ibero-American Biometry Meeting, Barcelona, September 7-9, 2011* (Electronic ed., Number 110, 4 pages).

[PC4] Paulino, C. D. Silva, G. L. and Branco, M. (2011). A Bayesian approach to cytogenetic dosimetry. In *Proceedings of XIII Spanish Biometry Conference and III Ibero-American Biometry Meeting, Barcelona, September 7-9, 2011* (Electronic ed., Oral commun., Number 96, 6 pages)

[PC5] Pereira, P.S., Turkman, K.F. (2011) Spatial Point Processes Applied to the Study of Forest Fires In Portugal, In *Proceedings of the Spatial Data Methods for Environmental and Ecological Processes – 2nd Edition*, Foggia-Baia delle Zagare, Italy, (B.Cafarelli, ed.), 443-446.

[PC6] Ribeiro, C., Amaral Turkman, M.A. and Cardoso, J.C. (2011) Bayesian

Group Productivity

Hierarchical Models: An analysis of Portugal Road Accident Data, In Proceedings of the Spatial Data Methods for Environmental and Ecological Processes – 2nd Edition, Italy, Foggia-Baia delle Zagare September, 01-02, (B.Cafarelli, ed.), 101-104

[PC7] Sepúlveda, N. and Clark, T. (2011). Detection of copy number variations using deep-sequencing data. In Proceedings of XIII Spanish Biometry Conference and III Ibero-American Biometry Meeting, Barcelona, September 7-9, 2011 (Electronic ed., Oral commun., Number 125, 4 pages).

[PC8] Sepúlveda, N., Guindani, M., Paulino, C. D. and Mueller, P. (2011). T-cell receptor diversity estimation through Poisson mixture models. In Proceedings of XIII Spanish Biometry Conference and III Ibero-American Biometry Meeting, Barcelona,

[PC9] Silva, G. L. and Dias, M. I. (2011). Spatio-temporal analysis of forest fires in Portugal. In Proceedings of XIII Spanish Biometry Conference and III Ibero-American Biometry Meeting, Barcelona, September 7-9, 2011 (Electronic ed., Oral commun., Number 98, 4 pages).

international conferences

(invited talks)

[PCI1] Amaral Turkman, MA and Turkman, KF Some Issues in Modelling Wildfires. 7th International Statistics Congress, Antalya, 28/04-01/05 2011, p. 28. (Invited Talk)

[PCI2] Amaral Turkman, MA; Andreozzi, V; Ramos, S; Antunes, M. 2011. “Optimal Bayesian semiparametric alarm system for epidemiological data”..Seventh Workshop on Bayesian Inference in Stochastic Process (BISP7) Madrid, Spain. Sept 2011, p.7 (Invited Talk)

[PCI3] Silva, G. L., Martins, R. and Andreozzi, V. (2011). Joint analysis of longitudinal and survival AIDS data in Brazil. In Proceedings of XII Escola de Modelos de Regressão, Fortaleza - Brazil, March 13-16, 2011 (Invited speaker, Number 12, page 181).

[PCI4] Turkman, KF and Silva, L. A Bayesian Hierarchical Model for Man Power planning. Spec. Inv. Session: Discrete Time Markov Models in Manpower Planning. MSMPRF 2011. Workshop in Markov and Semi Markov Processes and related fields, Porto Carras, 20-23 September 2011, p. 34 (Invited talk)

[PCI5] Turkman, KF Why Non-Linear Time Series Have Heavy Tails. 7th International Statistics Congress, Antalya, 28/04-01/05 2011, p.23 (Keynote speaker, Invited Talk)

[PCI6] Turkman, KF, Amaral Turkman, M.A., Pereira, P. and Pereira, J:M:C: Annual Fire Risk Maps: 17th European Meeting of Young Statisticians 2011, 5-9 September 2011, FCT.UNL, Costa da Caparica, Portugal (Invited talk)

Group Productivity

We still mention the publication of 13 abstracts associated with contributed papers to international conferences.

Other national publications

[N1] Carvalho, MS ; Andreozzi, VL; Codeço, CT; Campos, DP; Barbosa, MTS; Shimakura, SE. 2011. Análise de Sobrevivência: Teoria e aplicações em saúde. Editora Fiocruz, Rio de Janeiro, Brazil. ISBN: 978-85-7541-216-9. 2ª edição (revista e ampliada): 2011.

(<http://www.fiocruz.br/editora/cgi/cgilua.exe/sys/start.htm?infoid=960&sid=52>) - BOOK

[N2] Silva-Fortes, C. (2011). Testes de Diagnóstico e Curvas ROC. Em Bioestatística e Qualidade na Saúde. Cunha, G., Eiras, M. e Teixeira, N. (Eds). LIDEL. ISBN: 978-972-757-684-5. - Chapter of BOOK

[N3] Paulino, C. D., Pestana, D., Branco, J., Singer, J., Barroso, L. e Bussab, W. (2011). Glossário Inglês-Português de Estatística, 2ª edição eletrónica publicada em <http://glossario.spestatistica.pt>. Electronic publication

[N4] Andreozzi, V. (2011). Sobrevivência no R. Boletim SPE, Outono 2011, 73-80

[N5] Papoila, A.L. (2011) Censura intervalar: modelação de dados do estado atual, Boletim SPE, Outono 2011, 35-46

[N6] Pitta-Grós Dias M, Dionísio E, Martins C, Virella D, Papoila AL, Alves M, Pereira-da-Silva L, Cordeiro Ferreira G. Percentagem de massa gorda em crianças e adolescentes com excesso de peso e obesidade definidos pelo índice de massa corporal. Resultados preliminares. Acta Pediatr Port 2011;42 (Supl. 1):S56.

[N7] Rocha, C. Modelos com fragilidade: aplicação à modelação da heterogeneidade não observada, Boletim SPE, Outono 2011, 26-34.

[N8] Sepúlveda, N. (2011). Quando a Estatística se põe à conversa sobre Futebol e Diversidade. Boletim SPM (edição especial), 215-221.

[N9] Silva AR, Camões T, Neves R, Pereira-da-Silva L, Moreira AC, Virella D, Papoila AL, Alves M, Serelha M, Mendes L, Cordeiro Ferreira G.(2011) Qual o efeito do consumo de ácidos gordos polinsaturados de cadeia longa durante a gravidez na composição corporal do recém-nascido de termo? Resultados preliminares. Revista da Associação Portuguesa de Nutrição Entérica e Parentérica;5:72-9.

[N10] Silva, G.L. (2011). Análise Bayesiana de Modelos de Sobrevivência Baseados em Processos de Contagem. Boletim SPE, Outono 2011, 63-72.

[N11] Silva-Fortes, C., Amaral Turkman, M.A. and Sousa, L. (2011). Arrow Plot: A

Group Productivity

new tool for the analysis of gene expression profiles. N&C CEAUL 19/11

In Proceedings and abstracts

Batalha, S, T. Moscoso, S. Antunes, M. Alves, A. L. Papoila, D. Virella, J. Cabral (2011). Pode o Anticorpo Anti-Transglutaminase substituir a Biópsia Intestinal no Diagnóstico de Doença Celíaca em Pediatria? 24ª Reunião Anual de Gastrenterologia Pediátrica. Esposende, 2011. Acta Pediatr Port 2011:42(2):S5

Belo, A., Rocha, C. e Monteiro, P. (2001) Factores de risco para a ocorrência de enfartes múltiplos decorrentes de uma síndrome coronária aguda, Programa e Resumos, XIX Congresso Anual da Sociedade Portuguesa de Estatística, Nazaré, p. 273

Dias SS, Andreozzi V, Martins R (2011). Análise da duração dos internamentos por VIH/SIDA através de um modelo hierárquico de misturas finitas. XIX Congresso Anual da Sociedade Portuguesa de Estatística Nazaré, 269-270

Dias, O., Doria, I. and Sousa Ferreira, A. (2011). Estudantes do ensino superior: Caminhos para o sucesso ou insucesso. Programa e Resumos, XIX Congresso da Sociedade Portuguesa de Estatística, Nazaré, 113-114, SPE.

Dionísio E., M. P. G. Dias, C. Martins, M. Pereira, L. Pereira-da-Silva, D. Virella, A. L. Papoila, M. Alves, G. Cordeiro Ferreira (2011). Percentagem da massa gorda medida por pletismografia por deslocação de ar, pregas cutâneas e bioimpedância eléctrica bipolar, em crianças e adolescentes com excesso de peso ou obesidade. Portuguese journal of Nephrology and Hypertension, 25, N1, p 55.

Fidalgo P., S Coelho, B Rodrigues, L Inchaustegui, AL Papoila, K Soto (2011). Sequelae of acute kidney dysfunction in the emergency setting- Plasma NGAL as a marker of outcome, Portuguese National Congress of Nephrology, Vilamoura, April 2011

Moreira, S., Gonçalves, L. Obesidade e Excesso de peso: um estudo numa população escolar. VII Conferência EQS - Estatística e Qualidade na Saúde. Lisboa, [Prémio EQS2011/Timberlake na área da Estatística na Saúde], p.57

Natário I & Oliveira, MM & Carvalho ML & Marques S & Borges J. Modelação espaço-temporal de fogos florestais em Portugal. XIX Congresso da Sociedade Portuguesa de Estatística. 2011. Nazaré, 171-172

Nunes AR, Shruballs S & Natário I. Modelação espacial de acidentes rodoviários em Lisboa. XIX Congresso da Sociedade Portuguesa de Estatística. 2011. Nazaré, 121-122

Polidoro, M.J., Magalhães, F. and Amaral Turkman, MA (2011) Métodos Bayesianos de Adequação de Modelos Estatísticos. XIX Congresso da Sociedade Portuguesa de Estatística. 2011. Nazaré, p. 209

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Ribeiro, C., Amaral Turkman, M.A. and Cardoso, J.C., Modelação de acidentes rodoviários, Programa e Resumos, XIX Congresso Anual da Sociedade Portuguesa de Estatística, , Nazaré, 257-258

Ribeiro, C., Amaral Turkman, M.A. and Cardoso, J.C., Modelos hierárquicos na modelação de acidentes rodoviários, Programa de Jornadas de Engenharia e Tecnologia – Investigação Aplicada nas Universidades do Algarve e de Cádiz, Instituto Superior de Engenharia da Universidade do Algarve.

Silva, L. and Turkman, K.F. Estatística bayesiana no planeamento de Recursos humanos, XIX Congresso Anual da Sociedade Portuguesa de Estatística. Nazaré, 261-262

Silva-Fortes, C., Amaral Turkman, M. A. e Sousa, L. (2011). Afinal as Curvas ROC degeneradas nem sempre degeneram. XVII Congresso Estatística e Qualidade na Saúde, Lisboa, p 15.

Subtil, A., Oliveira, M.R., Gonçalves, L. Comparação de Intervalos de Confiança para sensibilidades e Especificidades. XIX Congresso Anual da Sociedade Portuguesa de Estatística, Nazaré, Programa e Resumos, pp.11-12.

Subtil, A., Oliveira, M.R., Gonçalves, L. Considerações sobre Intervalos de Confiança para sensibilidades e especificidades. VII Conferência EQS - Estatística e Qualidade na Saúde. Lisboa, p. 12

Ursu, E. and Turkman, K.F. Periodic autoregressive model identification using genetic algorithms. XIX Congresso Anual da Sociedade Portuguesa de Estatística. Nazaré, 55-56

Ph.D. thesis completed

[PhD1] Baltazar Nunes. Statistical methods for modeling and nowcasting the impacts of influenza epidemics.[dissertation]. [Lisboa]: PhD Thesis in Probability and Statistics, DEIO – FCUL, Supervised by Lucília Carvalho and Isabel Natário (exam in 2 Feb 2012). 153 p

[PhD2] Emiliano Barreto Hernández, “Statistical Methodologies for the Analysis and Normalization of RIP-CHIP Data”, October 2011. PhD Thesis in Biostatistics and Bioinformatics, DEIO – FCUL, supervised by Lisete Sousa

[PhD3] Leonel Silva Vicente,. 'Modelos Bayesianos Hierárquicos no Planeamento de Recursos Humanos', November 2011, PhD Thesis in Probability and Statistics, DEIO – FCUL,, Supervised by Kamil Feridun Turkman

[PhD4] Poletto, F. (2011). Análise de Dados Categorizados com Omissão em Variáveis

Group Productivity

Explicativas e Respostas. PhD Thesis, Department of Statistics, University of São Paulo, April 2011. Supervised by Julio Singer and C. D. Paulino. Thesis awarded with Prémio Casimiro Montenegro Filho, edição 2011, da Secretaria de Assuntos Estratégicos da Presidência da República do Brasil.

[PhD5] Sílvia Maria Dias Pedro Rebouças, “Metodologias de Classificação Supervisionada para Análise de Dados de Microarrays”, June 2011. PhD Thesis in Probability and Statistics, DEIO – FCUL, supervised by Lisete Sousa and Ana Pires.

Organization of conferences

Conferences and workshops

Estatística e Qualidade na Saúde – EQS2011, 19-20/05/11, Lisboa; C. Silva Fortes was local organizer and Antónia Turkman was in the Scientific Committee.

4th edition of the Technical University week for Mathematics: "À descoberta das Rotas Matemáticas da UTL. S.Rosado-Ganhão was in the organization committee

Half-day Workshop on Spatio-temporal Modelling, 11/01/11: invited speakers Wenceslao González Manteiga, Raquel Menezes, Wolfgang Polasek and Feridun Turkman. Organized by G. Silva

GI3 Meeting took place in Sesimbra, 26-27/03/11, organized by M Antunes. There were 26 participants. Talks were delivered by the Ph.D. students

Courses:

Statistical Analysis in the Lexis Diagram: Age-Period-Cohort Models: Lecturer: Dr. Bendix Carstensen (Department of Biostatistics, University of Copenhagen), 16–19/09/11 (organized by: A. Papolia and L. Sousa)

Modelos Dinâmicos Bayesianos em Séries Temporais: Lecturer Prof. Hélio Migon (UFRJ) 12-13/09/11 (organized by G. Silva)

Roundtable on Distance Learning Sheffield MSc Courses. Nick Fieller, University of Sheffield, 10/05/11 (organized by KF Turkman)

Introdução à Estatística Bayesiana via WinBUGS at Instituto de Saúde Pública, Universidade do Porto, Lecturers D Paulino, G Silva and P Soares 28/02-02/03/2011.

Genomic epidemiology using data from new genetic technologies. 56a Reunião Anual da Região Brasileira da Sociedade Internacional de Biometria, Maringá, Brasil – 27-28/07/2011. Lecturer: N Sepúlveda

Biostatistical Foundations in Bioinformatics in the GTPB Bioinformatics training programme of the Instituto Gulbenkian de Ciência, 24-28/10/11: lecturers: Antonia

Group Productivity

Turkman and C Silva-Fortes

Seminars

Details in <http://www.ceaul.fc.ul.pt/sem.html>

L. Sousa organized 6 seminars in the ambit of the master in Biostatistics.

G. Silva organized the seminars of Arthur Schilitz from COPE, University of Rio de Janeiro and Fernando Silva Moura from UFRJ and Maria Costa from Warwick University.

KF Turkman organized the seminar of Nick Fieller from Sheffield University

Industry contract research

Under the protocol between the Faculty of Science of Lisbon University and the company Exigo Consultores, members of this group have been involved in a research project aimed to assess the financing system of the public hospitals belonging to the Portuguese National Health Service. The report of this project was used by the Portuguese Court of Auditors in its final report audit available at

http://www.tcontas.pt/pt/actos/rel_auditoria/2011/2s/audit-dgtc-rel030-2011-2s.shtm

Antonia Turkman acts as a consultant to the project led by the consortium Siemens – Joint Commission International (JC) towards the development of a National Health Care Evaluation System in Portugal (SINAS – Sistema Nacional de Avaliação em Saúde), in response to a challenge set by the Portuguese Health Regulatory Authority. Quality assessment and improvement across the health care system are the aims of SINAS. Two Master Students of the Department of Statistics and Operations Research, were supervised by Antonia Turkman during their trainee year in Siemens.

Complex and robust statistical models were developed for estimating a rating for each hospital, for each clinical area, assessing compliance with clinical guidelines and expected outcomes. Both outcome and process measures were included, focusing simultaneously on the patient's health status and the process of care. For outcome measures, the methodology involves a risk adjustment model which allows for adjusting results, accounting for the characteristics of all patients assisted by each hospital. For process measures, the extent to which a provider complies with evidence-based care guidelines is evaluated. In order to assign a rating or level of clinical excellence, results are combined into an overall composite measure. The model developed allows for establishing ratings for heterogeneous hospitals, accounting for variation in patient mix and allowing for the comparison of hospital performance.

Internationalization

Group Productivity

Amaral Turkman acted as evaluator to research projects of the European Union on FP7 Innovation call. She was invited speaker at BISP7 held in Madrid and at 7th International Statistics Congress, Turkey. She is co-Editor of REVSTAT.

KF Turkman was a keynote speaker at 7th International Statistics Congress, Turkey, invited speaker at the Workshop in Markov and Semi Markov Processes and Related Fields, Greece and at 17th European Meeting of Young Statisticians, Portugal. He was invited by the RSS to contribute to the discussion of the read paper “An explicit link between Gaussian fields and Gaussian random fields”. He is at the Editor of 4 international periodicals.

L Carvalho has a consultant role in DEEPFISHMAN project, EU 7^o FP, of IPIMAR partner.

CD Paulino collaborated with researchers from the Universities of São Paulo, Hasselt, Texas at Houston. He is Associate Editor of Chilean Journal of Statistics and coordinator of Luso-Brazilian joint committee for the English-Portuguese glossary of statistical terms. He is the Portuguese representative of SPE to ISI for glossary matters.

GL Silva has research contacts with Simon Fraser and Western Ontario Universities. He has research projects with Federal Univ. of Rio de Janeiro and Univ. Pública de Navarra.

N Sepúlveda has strong bonds with the University College of London and Welcome Trust Centre for Human Genetics of University of Oxford (member of the data support centre of MalariaGEN).

P de Zea Bermudez was a visitor at Dep. of Statistics of University Carlos III, Madrid.

V. Andreozzi worked with researchers from Fio Cruz, Rio de Janeiro.

V Inácio collaborated with W González-Manteiga (U. de Santiago de Compostela), T Hanson (U. of South Carolina) and T Alonzo (U. of Southern California).

CD Paulino, GL Silva and L Gonçalves are members of the Spanish Biostatistics Net.

Members of the group acted as reviewers for several periodicals and gave seminars in several universities abroad.

Government/Organization contract research

Lucilia Carvalho is 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).

Strategic Project Adjustments

Group Productivity

Scientifically the main objectives for 2011 were accomplished and well overpassed with respect to the expected indicators as proposed on the strategic project. We had however to postpone for 2012 some of the invited speakers for the regular international seminars of CEAUL, due to the fact that at the beginning of April the FFCUL urged the centers to uphold expenses due to lack of cash flow.

Relatively to the budget, a small amount was used from the budget received referred to 2011, since several expenses done during 2011 had to be presented to FCT to justify expenses done in previous years which were considered by FCT as not eligible.