Curriculum Vitae

Elisa M. Molanes-López

University Carlos III of Madrid

Department of Statistics

Last update: February 23, 2015

PERSONAL INFORMATION

Surname: Molanes-López
Name: Elisa M.
Date of birth: February 9, 1976
Researcher ID: K-4467-2014
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Google Scholar: citations
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CURRENT PROFESSIONAL POSITION

Professional category: Visiting Assistant Professor
Affiliation: University Carlos III of Madrid
Centre: Juan Benet Building, Engineering School, Leganes Campus
Department: Statistics
Start date: November 1, 2009
Termination date: August 31, 2015
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FIELDS OF INTEREST

- Nonparametric Statistics (kernel estimators, bandwidth selectors, empirical likelihood)
- Survival Analysis (left truncated and right censored data, gap times)
- Receiver Operating Characteristic (ROC) curve (Youden index, Symmetry point)
- Relative curves (relative density, relative distribution)
- Copula functions

SECTIONS IN THIS C.V.

I. ACADEMIC TRAINING

BACHELOR DEGREE

June 2000

Bachelor Degree in Mathematics (specialized in Statistics), University of Santiago de Compostela.

PhD DEGREE

March 2007

European PhD degree, University of A Coruña

PhD program: Statistics and Operations Research, interuniversity program from University of Santiago de Compostela, University of Vigo and University of A Coruña *(2000-2002)*

PhD thesis supervisor: Ricardo Cao Abad

Title: "Nonparametric statistical inference for relative curves in two-sample problems"
http://200.dm.fi.udc.es/mate/fileadmin/documentos/2007_TD_MolanesElisaMar.pdf

Score: Sobresaliente cum laude

COURSES

A. STATISTICS COURSES FROM THE PhD PROGRAM

1. Dependent data analysis
2. Categorical data analysis
3. Survival analysis and reliability
4. Nonparametric curve estimation
5. Specification tests
6. Instrumental techniques and computer simulation
7. Statistical packages
8. Probability theory and limit theorems
9. Biomedical models

B. OTHER STATISTICS COURSES

April 2002

1. "Analysis of variance" (20 hours).
   Institution: University of Santiago de Compostela.

June 2002

2. "Update in public health surveillance: Analysis of geographic variation in health phenomena" (40 hours).
   Institution: Consellería de Sanidad, Generalitat Valenciana.

May 2003

3. "Use of spatial analysis and geographic information systems in the area of health" (40 hours).
   Institution: University of Porto.

September 2003

4. "Longitudinal data analysis" (12 hours).
   Institution: University of Santiago de Compostela.

August 2004 – September 2004

5. "Empirical processes. Theory and statistical applications" (30 hours).
   Institution: University of Cantabria.

Academic year 2004-2005

6. "Survival data analysis" in the Postgraduate Programme Master of Science in Biostatistics (4 ECTS).
   Institution: Center for Statistics, Universiteit Hasselt (Diepenbeek, Belgium).

7. "Clinical trials 1" in the Postgraduate Programme Master of Science in Biostatistics (3 ECTS).
   Institution: Center for Statistics, Universiteit Hasselt (Diepenbeek, Belgium).

8. "Clinical trials 2" in the Postgraduate Programme Master of Science in Biostatistics (3 ECTS).
   Institution: Center for Statistics, Universiteit Hasselt (Diepenbeek, Belgium).

Academic year 2005-2006

9. "Bayesian data analysis" in the Postgraduate Programme Master of Science in Biostatistics (3 ECTS).
   Institution: Center for Statistics, Universiteit Hasselt (Diepenbeek, Belgium).

10. "Bioinformatics" in the Postgraduate Programme Master of Science in Biostatistics (3 ECTS).
    Institution: Center for Statistics, Universiteit Hasselt (Diepenbeek, Belgium).

11. "Genetic data analysis" in the Postgraduate Programme Master of Science in Biostatistics (3 ECTS).
    Institution: Center for Statistics, Universiteit Hasselt (Diepenbeek, Belgium).

May 2007

12. "Sparsity oracle inequalities via L1 regularization in nonparametric models" (6 hours).
    Institution: Université Catholique de Louvain.

13. "Nonparametrics in financial econometrics: discrete time volatility and continuous time processes" (6 hours).
    Institution: Université Catholique de Louvain.

14. "Nonparametric regression methods in survey" (6 hours).
    Institution: Université Catholique de Louvain.

October 2007

15. "Splines with penalties: Theory and Applications" (15 hours).
    Institution: Public University of Navarra.

October 2008

16. "Nonlinear time series models" (10 hours).
    Institution: University Carlos III of Madrid.

April 2011

17. "Nonparametric methods for ROC curves" (2 hours).
    Institution: University of Santiago de Compostela.

C. COMPUTER SCIENCE COURSES

June 2001 – November 2001

1. "Programmer of computer applications" (950 hours).
   Institution: Consellería de familia e promoción de emprego, muller e xuventude, Xunta de Galicia.

December 2001

2. "Professional presentations: Powerpoint" (43 hours).
   Institution: University of Santiago de Compostela / Fundación Pública Escola Galega de Administración Sanitaria.

December 2002

3. "Latex math editor" (20 hours).
   Institution: University of Santiago de Compostela.

February 2003

4. "Management of information sources on the Internet" (12 hours). Institution: Fundación Pública Escola Galega de Administración Sanitaria.

D. ENGLISH COURSES

November 2001 – December 2001

1. "Introduction to scientific English" (20 hours).
   Institution: University of Santiago de Compostela.

February 2002 – March 2002

2. "Scientific writing in English. Advanced aspects" (20 hours).
   Institution: University of Santiago de Compostela.

Academic year 2002 – 2003

3. "English course - 5th grade" (80 hours).
   Institution: Centro de Linguas Modernas, University of Santiago de Compostela.

November 2003 – January 2004

4. "English conversation (initial and intermediate level)" (60 hours).
   Institution: University of A Coruña.

E. TEACHER TRAINING COURSES

October 27, 2000 – March 31, 2001

1. "Pedagogical Certificate of the Institute of Education Science" (CAP, Curso de Aptitud Pedagógica)" (300 hours).
   Institution: University of Santiago de Compostela.

November 21, 2007 – December 4, 2007

2. "Voice care for teachers" (30 hours).
   Institution: University Carlos III of Madrid.

March 23, 2011 – April 12, 2011

3. "How to make mini-videos with interactive whiteboard" (10 hours).
   Institution: University Carlos III of Madrid.

SCHOLARSHIPS AND GRANTS

November 1, 2001 – June 30, 2002

1. Grant in Public Health: Training in Statistical Analysis of Epidemiological Data, 10th phase.

Institution: Consellería de Sanidade e University of Santiago de Compostela.

July 1, 2002 – June 30, 2003

2. Grant in Public Health: Training in Statistical Analysis of Epidemiological Data, 11th phase.
   Institution: Consellería de Sanidade e University of Santiago de Compostela.

July 1, 2003 – June 30, 2007

3. Spanish grant for research training (FPI) associated to the national research project BFM2002-00265 entitled "Nonparametric curve estimation under dependence, censoring or truncation. Applications in thermogravimetry, medical sciences and sysmology". Institution: University of A Coruña.

II. PREVIOUS PROFESIONAL EXPERIENCE

AT THE UNIVERSITY

1. Visiting Assistant Professor at University Carlos III of Madrid (*October 2007 – March 2008).*
2. Assistant Professor at University Carlos III of Madrid (*April 2008 – October 2009.*

III. RESEARCH EXPERIENCE

PUBLISHED ARTICLES

1. Maíz C.S., Molanes-López, E.M., Míguez, J. & Djurić, P. (2012). A particle filtering scheme for processing time series corrupted by outliers. *IEEE Transactions on signal processing*, **60**(9): 4611-4627.

http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6203606

DOI: 10.1109/TSP.2012.2200480
Accession Number: WoS:000307790800009
Rank: 25/243 journals (2012 JCR, Engineering, Electrical & Electronic)
Impact factor: 2.813
Citations: 4 (2013 JCR, Engineering, Electrical & Electronic), 8 (Google Scholar)

Abstract

The literature in engineering and statistics is abounding in techniques for detecting and properly processing anomalous observations in the data. Most of these techniques have been developed in the framework of static models and it is only in recent years that we have seen attempts that address the presence of outliers in nonlinear time series. For a target tracking problem described by a nonlinear state-space model, we propose the online detection of outliers by including an outlier detection step within the standard particle filtering algorithm. The outlier detection step is implemented by a test involving a statistic of the predictive distribution of the observations, such as a concentration measure or an extreme upper quantile. We also provide asymptotic results about the convergence of the particle approximations of the predictive distribution (and its statistics) and assess the performance of the resulting algorithms by computer simulations of target tracking problems with signal power observations.

2. Molanes-López, E.M. & Letón, E. (2011). Inference of the Youden index and associated threshold using empirical likelihood for quantiles. *Statistics in Medicine*, **30**: 2467–2480.

http://onlinelibrary.wiley.com/doi/10.1002/sim.4303/abstract

DOI: 10.1002/sim.4303
Accession Number: WoS:000293738600010
Rank: 15/116 journals (2011 JCR, Statistics & Probability)
Impact factor: 1.877
Citations: 4 (2013 JCR, Statistics & Probability), 6 (Google Scholar)

Abstract

The Youden index is a widely used measure in the framework of medical diagnostics, where the effectiveness of a biomarker (screening marker or

predictor) for classifying a disease status is studied. When the biomarker is continuous, it is important to determine the threshold or cut-off point to be used in practice for the discrimination between diseased and healthy populations. We introduce two methods aimed at estimating the Youden index and its associated threshold. The first one is a modified version of a recent approach based on the delta method, and the second one is based on the adjusted empirical likelihood for quantiles in the setting of a two-sample problem. We also include CIs for both of them. In the simulation study, we compare both methods under different scenarios. Finally, a real example of prostatic cancer, well known in the literature, is analysed to provide the reader with a better understanding of the new methodology.

3. Molanes-López, E.M., Cao, R. & Van Keilegom, I. (2010). Smoothed empirical likelihood confidence intervals for the relative distribution with left-truncated and right-censored data. *The Canadian Journal of Statistics*, **38**(3): 453–473.

http://onlinelibrary.wiley.com/doi/10.1002/cjs.10079/abstract

DOI: 10.1002/cjs
Accession Number: WoS:000281179300008
Rank: 74/110 journals (2010 JCR, Statistics & Probability)
Impact factor: 0.689
Citations: 1 (2013 JCR, Statistics & Probability), 2 (Google Scholar)

Abstract

The study of differences among groups is an interesting statistical topic in many applied fields. It is very common in this context to have data that are subject to mechanisms of loss of information, such as censoring and truncation. In the setting of a two-sample problem with data subject to left truncation and right censoring, we develop an empirical likelihood method to do inference for the relative distribution. We obtain a nonparametric generalization of Wilks' theorem and construct nonparametric pointwise confidence intervals for the relative distribution. Finally, we analyse the coverage probability and length of these confidence intervals through a simulation study and illustrate their use with a real data set on gastric cancer.

4. Molanes-López, E.M., Van Keilegom, I. & Ververbeke, N. (2009). Empirical likelihood for non-smooth criterion functions. *Scandinavian Journal of Statistics*, **36**: 413–432.

http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9469.2009.00640.x/full

DOI: 10.1111/j.1467-9469.2009.00640.x
Accession Number: WoS:000268988600003
Rank: 44/100 journals (2009 JCR, Statistics & Probability)
Impact factor: 1.022
Citations: 6 (2013 JCR, Statistics & Probability), 25 (Google Scholar)

Abstract

Suppose that $X_1, \ldots, X_n$ is a sequence of independent random vectors, identically distributed as a d-dimensional random vector X. Let $\mu \in R^p$ be a parameter of interest and $\nu \in R^q$ be some nuisance parameter. The unknown, true parameters (μ_0, ν_0) are uniquely determined by the system of equations $E\{g(X,\mu_0, \nu_0)\} = 0$, where $g = (g_1, \ldots, g_{p+q})$ is a vector of p+q functions. In this paper we develop an empirical likelihood (EL) method to do inference for the parameter μ_0. The results in this paper are valid under very mild conditions on the vector of criterion functions g. In particular, we do not require that $g_1, \ldots, g_{p+q}$ are smooth in μ or ν. This offers the advantage that the criterion function may involve indicators, which are encountered when considering, e.g. differences of quantiles, copulas, ROC curves, to mention just a few examples. We prove the asymptotic limit of the empirical log-likelihood ratio, and carry out a small simulation study to test the performance of the proposed EL method for small samples.

5. Romera, R. & Molanes-López, E.M. (2009). Copulas in finance and insurance. *Revista de Economía Financiera*, **17**: 70-97.

http://www.aefin.es/articulos/pdf/A17-4_876357.pdf

Indexed in the database DICE
Latindex criteria satisfied: 28

Abstract

Copulas provide a potential useful modeling tool to represent the dependence structure among variables and to generate joint distributions by combining given marginal distributions. Simulations play a relevant role in finance and insurance. They are used to replicate efficient frontiers or extremal values, to price options, to estimate joint risks, and so on. Using copulas, it is easy to construct and simulate from multivariate distributions based on almost any choice of marginals and any type of dependence structure. In this paper we outline recent contributions of statistical modeling using copulas in finance and insurance. We review issues related to the notion of copulas, copula families, copula-based dynamic and static dependence structure, copulas and latent factor models and simulation of copulas. Finally, we outline hot topics in copulas with a special focus on model selection and goodness-of-fit testing.

6. Molanes-López, E.M. & Cao, R. (2008). Relative density estimation for left truncated and right censored data. *Journal of Nonparametric Statistics*, **20**(8): 693–720.

http://www.tandfonline.com/doi/abs/10.1080/10485250802447882#.UtkkffvOTk0

DOI: 10.1080/10485250802447882
Accession Number: WoS:000260797700003
Rank: 85/92 journals (2008 JCR, Statistics & Probability)

Impact factor: 0.346
Citations: 2 (2013 JCR, Statistics & Probability), 4 (Google Scholar)

Abstract

In biostatistical applications, it is very common that the generation of data is subject to mechanisms of loss of information such as censoring and truncation. In this setting, the direct application of traditional methods designed for completely observed data is not suitable at all. In the setting of a two-sample problem, this paper is focused on a kernel-type relative density estimator defined for left truncated and right censored data. First of all, an asymptotic representation of the estimator is found and based on this representation, its bias, variance and limit distribution are obtained. Then, a plug-in global bandwidth selector is designed for the kernel-type relative density estimator and their performance is checked through a simulation study. Finally, the estimator and the bandwidth selector are applied to a medical data set concerning gastric adenocarcinoma.

7. Molanes-López, E.M. & Cao, R. (2008). Plug-in bandwidth selector for the kernel relative density estimator. *Annals of the Institute of Statistical Mathematics*, **60**: 273–300.

http://link.springer.com/article/10.1007/s10463-006-0108-y

DOI: 10.1007/s10463-006-0108-y
Accession Number: WoS:000255997100003
Rank: 75/92 journals (2008 JCR, Statistics & Probability)
Impact factor: 0.565
Citations: 4 (2013 JCR, Statistics & Probability), 9 (Google Scholar).

Abstract

This paper is focused on two kernel relative density estimators in a two-sample problem. An asymptotic expression for the mean integrated squared error of these estimators is found and, based on it, two solve-the-equation plug-in bandwidth selectors are proposed. In order to examine their practical performance a simulation study and a practical application to a medical dataset are carried out.

ARTICLES UNDER REVIEW

1. Confidence intervals for the Symmetry Point: an optimal cutpoint in continuous diagnostic tests (joint work with Monica López-Ratón, Carmen Cadarso-Suárez & Emilio Letón).

Abstract

Nowadays it has been proven that computer-based formative assessment is an effective and engaging way to promote learning. However, there is still a debate about what type of feedback should be used to improve the learning gain: video

podcasts (a booming learning resource) or text for reading (a traditional resource). In this work, we combined the use of a web-based assessment system (Siette) with a special type of video podcast (modular teaching mini-videos). Our goal is to measure the effectiveness of video feedback in a university-level statistics course, and compare the results with illustrated text feedback of equivalent content including graphs and figures. We have designed two experiments to measure the learning gain obtained using both types of feedback. In both cases a chunk of information is presented as feedback in response to a student's incorrect answer, containing an explanation of the concept that is needed to solve the question. Our results indicate that both methods are equally effective for learning the concepts associated with the questions.

2. Video podcast and illustrated text feedback in a web-based formative assessment environment (joint work with Emilio Letón, Manuel Luque & Ricardo Conejo).

Abstract

Continuous diagnostic tests are often used for discriminating between healthy and diseased populations. For this reason, it is useful to select an appropriate discrimination threshold. There are several optimality criteria: the North-West corner, the Youden index, the Concordance probability, and the Symmetry point, among others. In this paper, we focus on the Symmetry point that maximizes simultaneously the two types of correct classifications. We construct confidence intervals for this optimal cutpoint and its associated specificity and sensitivity indexes using two approaches: one based on the Generalized Pivotal Quantity and the other on Empirical Likelihood. We perform a simulation study to check the practical behaviour of both methods and illustrate their use by means of three real biomedical datasets on melanoma, prostate cancer, and coronary artery disease.

ONGOING RESEARCH

1. D-vine copula based composite diagnostic score derived from the likelihood ratio statistic (joint work with Emilio Letón).

Abstract

In classification studies, when there are several continuous biomarkers available, it is of special interest to know how to best combine them into a composite one that increases the classification accuracy of each biomarker alone. Based on the Neyman-Pearson lemma as a theoretical basis, we propose to combine several biomarkers using a semiparametric estimate of a reparametrization of their likelihood ratio function via D-vine copula functions and relative curves. Then, through a simulation study, where we consider different dependence structures among the biomarkers, we show that the combined predictor outperforms the behaviour of each biomarker alone, in terms of a global index and a local index of accuracy, both derived from the `Receiver Operating Characteristic' curve.

Finally, a real dataset, well-known in the literature, and a synthetic one are included to illustrate the technique described in this paper.

2. Non-parametric estimation of the conditional bivariate distribution for censored gap times (joint work with Ewa Strzalkowska-Kominiak & Emilio Letón).

Abstract

In many survival studies, consecutive events may occur during the follow-up study of the individuals. This situation can be found, for example, in transplant studies, where there are two consecutive events of interest and therefore two consecutive gap times subject to a common censoring time. In this work, we incorporate the information of covariates into the bivariate distribution of the two gap times of interest and propose two nonparametric methods to cope with it. These two methods will be referred to as Beran based estimator and Kaplan-Meier based estimator. We perform a simulation study to see the performance of both approaches and illustrate their use with a well-known real example.

3. Confidence intervals of the conditional Youden index and associated threshold value adjusted by covariates (joint work with Juan Carlos Pardo-Fernández & Emilio Letón).

Abstract

In many medical studies, continuous variables or biomarkers are used to classify patients into diseased or healthy populations. The classification rule is based on a threshold value, which should be properly chosen. In some cases, a covariate can be used in order to increase the performance of the classification procedure. Taking into account the effect of the covariate, we propose in this paper a new nonparametric approach for estimating the Youden index and the associated optimal threshold value in the biomarker scale.

4. Generalized ROC curve for a diagnostic test with non-monotone likelihood ratio function (joint work with Ignacio López de Ullibarri, Ingrid Van Keilegom y Ricardo Cao).

Abstract

In classical ROC analysis, when the objective is to classify the individuals into two groups of interest (for instance, healthy versus diseased), and there is available a continuous diagnostic test to perform this classification, it is common practice to assume that the larger the value of the biomarker, the larger the likelihood of being diseased. If this is the case, then the slope of the ROC curve is non-decreasing. However, even in the so common binormal model, this assumption is not always a valid one. In practice, when this is the case, the traditional ROC curve may fail, that is, it may erroneously rate a good diagnostic test as having a smaller classification accuracy of what it does. Therefore, using the concept of relative density, we propose here a classification rule that always yields proper ROC curves, in the sense of always having non-

decreasing slopes, whether it is true or not the above-mentioned assumption. These proper ROC curves, referred to them as generalized ROC (GROC) curves from here on, are constructed by moving the threshold value in the relative density scale rather than in the diagnostic test scale. In this paper, we first introduce formally the concept of GROC curve and we then study some properties of interest, similar to those previously studied in the literature for the traditional ROC curve. We then propose a kernel type GROC estimator and some bandwidth selectors to estimate the area under the GROC curve (GAUC). Finally, we check their practical behavior through a simulation study and we illustrate the new approach using a real example.

TECHNICAL REPORTS

1. Letón, E. & Molanes-López, E.M. (2009). Adjusted empirical likelihood estimation of the Youden index and associated threshold for the bigamma model. *Working Paper, Statistics and Econometrics Series, University Carlos III of Madrid*, 09-19 (07).
http://e-archivo.uc3m.es/bitstream/handle/10016/3816/ws091907.pdf

2. Molanes-López, E.M. & Cao, R. (2008). Bootstrap bandwidth selectors for two kernel-type relative density estimators. *University of A Coruña*.
http://dm.udc.es/modes/sites/default/files/Bootstrap_20selectors_20-_20Stat_20and_20Comp.pdf

COLLABORATION IN RESEARCH PROJECTS

December 31, 2005 – December 30, 2008

1. Full-time member of the research project: "Modelling, tests and nonparametric inference: survival analysis, dependent data and applications (MTM2005-00429)", supported by Ministry of Education and Science.

January 1, 2009 – December 31, 2011

2. Full-time member of the research project: "Statistical techniques for data of large complexity in finance and business (ECO2008-05080)", supported by Ministry of Science and Innovation.

January 1, 2011 – December 31, 2011

3. Full-time member of the research project: "Statistical procedures based on functional data and high dimensional data with applications in finance and biostatistics" (CCG10-UC3M/HUM-5114), supported by Comunidad de Madrid.

November 15, 2010 – November 14, 2012

4. Full-time member of the research project: "Creation of a National Network in Biostatistics" (MTM2010-09213-E), supported by Ministry of Science and Innovation.

June 1, 2012 – May 31, 2014

5. Full-time member of the research project: "Consolidation of the National Network BIOSTATNET: new strategies of collaboriation in research" (MTM2911-15849-E), supported by Ministry of Science and Innovation.

January 1, 2012 – December 31, 2014

6. Part-time member of the research project: "Analysis of very high dimensional data in Economy and Business" (ECO2011-25706), supported by Ministry of Science and Innovation.

January 1, 2012 – December 31, 2014

7. Part-time member of the research project: "Flexible smoothing methods and efficient algorithms in Epidemiology, Demography and Environment" (MTM2011-28285-C02-02), supported by Ministry of Science and Innovation.

RESEARCH STAYS ABROAD

A. PREDOCTORAL STAYS

March 26, 2004 – June 26, 2004

1. Faculty of Sciences (Universiteit Hasselt), Diepenbeek, Belgium. Research topic: Bandwidth selection in nonparametric relative density estimation.

April 3, 2005 – July 3, 2005

2. Faculty of Sciences (Universiteit Hasselt), Diepenbeek, Belgium. Research topic: Theoretical study of the kernel type relative density estimator with LTRC data.

March 12, 2006 – June 11, 2006

3. Faculty of Sciences (Universiteit Hasselt), Diepenbeek, Belgium. Research topic: Statistical tests based on relative curves.

August 1, 2006 – September 1, 2006

4. MD Anderson Cancer Center (The University of Texas), Houston, Texas. Research topic: Real data applications of relative curves.

October 2, 2006 – November 5, 2006

5. Institut de Statistique (Université Catholique de Louvain), Louvain-la-Neuve, Belgium. Research topic: Statistical tests to compare two populations based on relative curves and empirical likelihood.

B. POSTDOCTORAL STAYS

April 13, 2007 – June 24, 2007

1. Faculty of Sciences (Universiteit Hasselt), Diepenbeek, Belgium. Research topic: Empirical likelihood based inference of copulas.

COMMUNICATIONS AT CONFERENCES

A. RESEARCH IN STATISTICS

1. XX Joint Scientific Meeting of the IEA European Epidemiology Federation and the Spanish Society of Epidemiology, Barcelona (Spain), September 12-14, 2002.

- Poster presented: "Analysis of the geographical variation of anal and rectal cancer in Galicia (1980-1999)"
  Authors: Hervada Vidal, Xurxo; Molanes López, Elisa Mª; Santiago Pérez, Mª Isolina; Lado Lema, Mª Eugenia.
  Publication: Gaceta Sanitaria, Supl.1 2002 ; 16: 109-112.

2. XXI Scientific Meeting of the Spanish Society of Epidemiology, Toledo (Spain), October 1-4, 2003.

- Poster: "Analysis of the geographical variation of the mortality by stomach cancer in Galicia ".
  Authors: Molanes López, Elisa Mª; Lado Lema, Mª Eugenia.
  Publication: Gaceta Sanitaria, Supl.2 2003 ; 17: 85-90.

3. International Seminar on Nonparametric Inference, A Coruña (Spain), July13-15, 2005.

- Poster presented: "Bandwidth selection for the kernel relative density estimator".
  Authors: Molanes López, Elisa Mª; Cao, Ricardo.
  Publication: ISNI 2005, 66-69

4. 14th Annual Meeting of the Belgian Statistical Society, Houffalize (Belgium), October 11-13, 2006.

- Poster presented: "Relative density estimation for left truncated and right censored data".

Authors: Molanes López, Elisa Mª; Cao, Ricardo.
Publication: SBS BVS - 14th Annual Meeting of the Belgian Statistical S ociety. Houffalize, October (11), 12 & 13, 2006, page 82.

5. Workshop on Statistical Inference for Dependent Data (Flemish-South African bilateral scientific and technological cooperation and IAP research network in Statistics), Diepenbeek (Belgium), April 26-27, 2007.

- Invited oral communication: "Two-sample test via empirical likelihood for left truncated and right censored data".
  Authors: Molanes López, Elisa Mª; van Keilegom, Ingrid and Cao, Ricardo.

6. 56th session of the International Statistical Institute, Lisbon (Portugal), August 22-29, 2007.

- Oral communication: "Bootstrap bandwidth selectors for the relative density".
  Authors: Molanes López, Elisa Mª; Cao, Ricardo.

7. Probability and Statistics in Science and Technology (ISI satellite meeting), Porto (Portugal), August 30 – September 1, 2007.

- Oral communication: "Relative density estimation for left truncated and right censored data".
  Authors: Molanes López, Elisa Mª; Cao, Ricardo.
- Oral communication: "Distributional comparisons using relative curves. Two real data applications regarding prostate and gastric cancer".
  Authors: Molanes López, Elisa Mª; Cao, Ricardo.
- Invited oral communication (presented by Cao, R.): "Two sample problem via empirical likelihood for left and right censored data".
  Authors: Cao, Ricardo; Molanes López, Elisa Mª; Van Keilegom, Ingrid.

8. Joint meeting of the Statistical Society of Canada and the Societé Française de Statistique 2008, Ottawa (Canada), May 25-29, 2008.

- Invited oral communication (presented by Van Keilegom, I.): "Empirical likelihood for non-smooth criterion functions"
  Authors : Van Keilegom, Ingrid; Molanes López, Elisa Mª and Veraverbeke, Noël.

9. 7th world Congress in Probability and Statistics, Singapore, July 14 – 19, 2008.

- Oral communication (presented by Van Keilegom, I.): "Empirical likelihood for non-smooth criterion functions"
  Authors : Van Keilegom, Ingrid; Molanes López, Elisa Mª and Veraverbeke, Noël.

10. International Workshop on Statistical Modeling, Ithaca, New York, July 20 – 24, 2009.

- Oral communication: "Empirical likelihood based approach for the inference of the Youden index and associated threshold" (presented by Emilio Letón)
  Authors : Molanes López, Elisa Mª and Letón, Emilio.

11. International Workshop on Statistical Modeling, Glasgow, United Kingdom, July 5 – 9, 2010.

- Oral communication: "Copula based estimate of the likelihood ratio function for combining continuous biomarkers".
  Authors : Letón, Emilio and Molanes López, Elisa Mª.

12. International Workshop on Statistical Modeling, Valencia, Spain, July 11 – 15, 2011.

- Oral communication: "Covariate-adjusted inference for the Youden index and associated classification threshold".
  Authors: Molanes-López, Elisa Mª; Pardo-Fernández, Juan Carlos; Letón, Emilio.
- Oral communication (presented by Badiella, Llorenç): "Area under the ROC curve using logistic regression with random effects. Estimation and Inference".
  Authors: Badiella, Llorenç; Letón, Emilio; Molanes-López, Elisa Mª, Puig, Pedro; Sánchez, Xavier.
- Poster presented: "Second order delta method for estimating the Youden index and optimal threshold"
  Authors: Letón, Emilio; Molanes-López, Elisa Mª.

13. 4th International Conference of the ERCIM Working Group on Computing & Statistics, London (United Kingdom), December 17-19, 2011.

- Oral communication: "The use of the Youden index in diagnostic studies"
  Authors: Molanes López, Elisa Mª and Letón, Emilio

14. 27th International Workshop on Statistical Modelling, Prague (Czech Republic), July 16-20, 2012.

- Poster presented: "Multivariate copula models in ROC analysis"
  Authors: Molanes López, Elisa Mª and Letón, Emilio
- Poster presented: "Estimation of the conditional distribution of two censored gap times based on a nonparametric approach"
  Authors: Ewa Strzalkowska-Kominiak, Elisa M. Molanes-López and Emilio Letón
- Poster presented: "Inference of the Symmetry point with different costs for the specificity and sensitivity"
  Authors: López-Ratón, Mónica, Cadarso-Suárez, Carmen, Molanes López, Elisa Mª and Letón, Emilio
- Poster presented: "Multiple testing based on depth"

Authors: Elisa M. Molanes-López and Juan Romo

15. 2nd General Meeting of the National Network on Biostatistics *Biostatnet*, Santiago de Compostela (Spain), January 25-26, 2013.

• Oral communication (presented by López-Ratón, M.): "Estimation of the generalized symmetry point for classification in continuous diagnostic tests"
Authors: Mónica López Ratón, Carmen Cadarso Suárez, Elisa M. Molanes-López and Emilio Letón

16. 28th International Workshop on Statistical Modelling, Palermo (Italy), July 8-12, 2013.

- Poster presented: GsymPoint: An R Package for estimating the Generalized Symmetry Point as the optimal cutpoint (ISBN 978-88-96251-49-2, pages 663-667)
Authors: Mónica López Ratón, Carmen Cadarso Suárez, Elisa M. Molanes-López and Emilio Letón

17. XXIX-th European Meeting of Statisticians, Budapest (Hungary), July 20-25, 2013.

- Oral communication (presented by Pardo-Fernández, J.C.): "Nonparametric inference for covariate adjusted summary indices of ROC curves"
Authors: Juan Carlos Pardo Fernández, Elisa M. Molanes-López and Emilio Letón

18. XI Galician Congress of Statistics, A Coruña (Spain), October 24-26, 2013.

• Oral communication (presented by López-Ratón, M.): "A Bayesian perspective of the Generalized Symmetry point, an optimal criterion for classification in diagnostic tests"
Authors: Mónica López Ratón, Carmen Cadarso Suárez, Elisa M. Molanes-López and Emilio Letón

19. 2nd Conference of the International Society of Non Parametric Statistics (Cádiz, 2014).

- Oral communication (presented by Pardo-Fernández, J. C.): "Nonparametric inference for covariate-specific summary indices of ROC curves".
Authors: Pardo-Fernández, J. C.; Molanes-López, E. M.; Letón, E.

20. 35th Annual Conference of the International Society for Clinical Biostatistics (Vienna, 2014).

- Poster (presented by Pardo-Fernández, J. C.): "Nonparametric estimation of covariate-specific summary indices of ROC curves through regression models".
Authors: Pardo-Fernández, J. C.; Molanes-López, E. M.; Letón, E.

B. RESEARCH IN INNOVATIVE TEACHING METHODS

1. XVII International Congress of technologies for education and knowledge, Madrid (Spain), July 3-5, 2012.

• Oral communication (presented by León, E.). "Classification of different recording modes and their relationship with the modular teaching mini-videos"
Authors: Emilio León, Isabel Gómez del Río, Ignacio Quintana-Frías & Elisa M. Molanes-López

2. First International Conference on University Teaching Innovation in Technology-enriched Learning Spaces, Madrid (Spain), September 19-21, 2012.

• Oral communication (presented by León, E.). "Real blended learning through modular teaching mini-videos"
Authors: Emilio León, Tomás García-Saiz, María I. Gómez del Río, María Jordano, Manuel Luque, Alejandro Rodríguez Ascaso, Elisa Mª Molanes-López, Álvaro Prieto Mazaira & Ignacio Quintana Frías

3. Sixth Conference of research networks in teaching innovation, Madrid (Spain), May 28-30, 2013.

• Oral communication (presented by León, E.): "The modular teaching mini-videos and their relation to other various recording modes"
Authors: Emilio León, Tomás García-Saiz, María I. Goméz del Río, Manuel Luque, Alejandro Rodríguez Ascaso, Jorge Vega Núñez, José García Rodríguez, Elisa M. Molanes-López, Ignacio Quintana Frías, Álvaro Prieto Mazaira & Raúl Santiago

4. XVIII International Congress of technologies for education and knowledge, Madrid (Spain), June 26-29, 2013.

• Oral communication (presented by León, E.): "How to design a MOOC (Massive Open Online Course) based on modular teaching mini-videos?"
Authors: Emilio León; Manuel Luque; Tomás García-Saiz; Molanes López, Elisa Mª

5. 6th International Conference on Computer Supported Education, Barcelona (Spain), April 1-3, 2014.

- Poster (presented by León, E.): "Two new concepts in video podcasts - minimalist slides and modular teaching mini-videos"
  Authors: León, E; Molanes López, Elisa Mª

RESEARCH SEMINARS

June 3, 2005

1. Bandwidth selection for a kernel-type estimator of the relative density. Center for Statistics, Universiteit Hasselt, Diepenbeek (Belgium).

October 19, 2006

2. Plug-in bandwidth selectors for kernel-type relative density estimators. Institut de Statistique, Université Catholique de Louvain, Louvain-la-Neuve (Belgium).

March 15, 2007

3. Nonparametric statistical inference for relative curves in two sample problems.
   Department of Mathematics, University of A Coruña (Spain).

March 23, 2007

4. Bandwidth selectors for two kernel-type relative density estimators.
   Department of Statistics, University Carlos III of Madrid (Spain).

November 11, 2010

5. Inference of the Youden index and associated threshold using parametric and nonparametric methods.
   Department of Mathematics, University of A Coruña.

April 15, 2011

6. The importance of being diagnosed (by Youden index).
   Department of Statistics, University of Santiago de Compostela (Spain).

January 20, 2012

7. Relative curves and copula functions in classification analysis.
   Department of Statistics, University Carlos III of Madrid (Spain).

ACTIVITY AS A PEER REVIEWER

1. Referee of 20 articles for the following 13 JCR-indexed journals:
   - Annals of the Institute of Statistical Mathematics
   - Biometrics
   - Communications in Statistics - Theory & Methods
   - Computational Statistics
   - Journal of Nonparametric Statistics
   - Journal of Statistical Planning and Inference
   - Journal of Statistical Software
   - Scandinavian Journal of Statistics
   - Statistica Neerlandica
   - Statistics
   - Statistics and Probability Letters
   - Statistics in Medicine
   - Test

2. Luc Duchateau and Paul Janssen certify in the Preface of their book "The frailty model", with ISBN: 978-0-387-72834-6, my participation in the review process.

IV. TEACHING EXPERIENCE

TEACHING ACTIVITY

University of A Coruña

2005-2006

- Queuing Theory (15 hours)
- Statistical Simulation (20 hours)

2006-2007

- Queuing Theory (30 hours)

University Carlos III of Madrid

2007-2008

- Statistics (30 hours) in Tech. Engin. in Computer Science of Management.
- Statistical methods (45 hours) in Technical Industrial Engineering: Electricity.
- Statistical methods (45 hours) in Technical Industrial Engineering: Mechanics.

2008-2009

- Statistics (48 hours) in Bachelor's Degree in Audiovisual System Engineering.
- Statistics (48 hours) in Bachelor's Degree in Communication System Engineering.
- Statistics I (45 hours) in Industrial Engineering.

2009-2010

- Statistics (48 hours) in Telecommunication Engineering.
- Statistics (48 hours) in Bachelor's Degree in Audiovisual System Engineering.
- Statistics (24 hours) in Bachelor's Degree in Communication System Engineering.
- Statistics I (45 hours) in Industrial Engineering.

2010-2011

- Statistics (48 hours) in Telecommunication Engineering.
- Statistics (24 hours) in Bachelor's Degree in Communication System Engineering.
- Statistics (72 hours) in Bachelor's Degree in Telematics Engineering.

2011-2012

- Statistics (48 hours) in Bachelor's Degree in Audiovisual System Engineering.
- Statistics (24 hours) in Bachelor's Degree in Communication System Engineering.
- Statistics (48 hours) in Bachelor's Degree in Electrical Power Engineering.
- Statistics (48 hours) in Bachelor's Degree in Telematics Engineering.

2012-2013

- Statistics (24 hours) in Bachelor's Degree in Audiovisual System Engineering.
- Statistical Methods for Telecommunications* (48 hours) in Bachelor's Degree in Communication System Engineering and in Telematics Engineering.
- Statistics (72 hours) in Bachelor's Degree in Telematics Engineering.

(*) coordinator, in addition to teaching class

2013-2014

- Statistics (48 hours) in Bachelor's Degree in Audiovisual System Engineering
- Statistical Methods for Telecommunications* (48 hours) in Bachelor's Degree in Communication System Engineering and Bachelor's Degree in Telematics Engineering.
- Statistical Methods for Telecommunications* (48 hours) in Bachelor's Degree in Audiovisual System Engineering and Bachelor's Degree in Telecommunication Technologies Engineering.

(*) coordinator, in addition to teaching class

2014-2015

- Statistics (24 hours) in Bachelor's Degree in Audiovisual System Engineering
- Statistical Methods for Telecommunications* (48 hours) in Bachelor's Degree in Communication System Engineering and Bachelor's Degree in Telematics Engineering.
- Statistical Methods for Telecommunications* (48 hours) in Bachelor's Degree in Audiovisual System Engineering and Bachelor's Degree in Telecommunication Technologies Engineering.

(*) coordinator, in addition to teaching class

UNED

2009-2010 / 2010-2011 / 2011-2012 / 2012-2013 / 2013-2014 / 2014-2015

- "Diagnostic tests" (40 hours) in the Master's Degree "Management tools and health research".

MOOCS

1. "Modular teaching mini-videos: A key element in the design of a MOOC". (8 weeks of duration)
https://www.miriadax.net/web/videos_docentes
http://ocw.innova.uned.es/ocwuniversia/tecnologias-audiovisuales/mini-videos-docentes-modulares-un-elemento-critico-en-el-diseno-de-un-mooc
https://itunes.apple.com/es/course/mini-videos-docentes-modulares/id668514865

VIDEO-LECTURES

1. "Diagnostic tests" (in "Interpretation and practical analysis of medical studies")
http://unedvideoclases.blogspot.com/2009/11/pruebas-diagnosticas-ii-herramientas-de.html

MINI-VIDEOS

1. "Three daughters"
http://www.canal.uned.es/mmobj/index/id/16991

2. "John and Paul"
http://www.canal.uned.es/mmobj/index/id/16989

3. "Valoración MOOC"
http://www.canal.uned.es/mmobj/index/id/16732

4. "Consejos MOOC"
http://www.canal.uned.es/mmobj/index/id/16731

5. "Tres hijas"
http://www.youtube.com/embed/_Sr62ovthVA

6. "Juan y Pablo"
http://www.youtube.com/embed/StPKpfQrTQs

7. "Sïnergy. Ejemplo 1"
http://www.canaluned.com/mmobj/index/id/10848

8. "ROC curve"
https://arcamm.uc3m.es/arcamm_3/item/show/edb4edf0db9ceee1d8df37ebf6e2e344

AWARDS

1. Outstanding Course Award in the Awards of the OpenCourseWare Consortium 2014. OCW course awarded: "Modular teaching mini-videos to design a MOOC" by Letón, E., Luque, M., García-Saiz, T., & Molanes-López, E.M.,
http://ocw.innova.uned.es/ocwuniversia/premio-a-la-excelencia-2014-al-portal-ocw-de-uned-abierta
https://canal.uned.es/mmobj/index/id/20942

2. Second prize for the best teaching practice in the Awards of the Social Council of the Spanish University of Distance Education (UNED) 2013.
MOOC awarded: "Modular teaching mini-videos: A key element in the design of a MOOC" by Letón, E., Luque, M., García-Saiz, T., & Molanes-López, E.M.
https://canal.uned.es/mmobj/index/id/16659 (min 1:40 - 1:45)
https://canal.uned.es/mmobj/index/id/16654
https://canal.uned.es/mmobj/index/id/20940

COLLABORATION IN PROJECTS ON INNOVATIVE TEACHING METHODS

Academic year 2008-2009

1. Collaboration in the Bologna Process for adapting the first course of the undergraduate programs on Technical Telecommunication Engineering, Telecommunication Engineering and Industrial Engineering to the requirements of the European Higher Education Area (University Carlos III of Madrid).
2. "Online test generator for the continuous assessment". VI Edition of the call for support to Experiences of Educational Innovation and Improvement (University Carlos III of Madrid).
3. "It's your turn". VI Edition of the call for support to Experiences of Educational Innovation and Improvement. (University Carlos III of Madrid).

Academic year 2009-2010

4. Collaboration in the Bologna Process for adapting the second course of the undergraduate programs on Technical Telecommunication Engineering, Telecommunication Engineering and Industrial Engineering to the requirements of the European Higher Education Area (University Carlos III of Madrid).

Academic year 2010-2011

5. "Optimization of the blended learning through modular teaching mini-videos". V Edition of the call for Research Networks for Educational Innovation (UNED).

Academic year 2011-2012

6. "Integration of the modular teaching mini-videos with different recording formats". VI Edition of the call for Research Networks for Educational Innovation (UNED).

Academic year 2012-2013

7. Collaboration in the Bologna Process for adapting the new undergraduate programs on Technical Telecommunication Engineering, Telecommunication Engineering and Industrial Engineering to the requirements of the European Higher Education Area, University Carlos III of Madrid.
8. "Assistance and reinforcement in the adaptive tests from SIETTE". VII Edition of the call for Research Networks for Educational Innovation, UNED.

V. OTHER RELEVANT MERITS

EVALUATION OF THE ACADEMIC ACTIVITY

1. Accredited as Assistant Professor "Ayudante Doctor" by ACSUG (Galician Agency for Quality Evaluation), since October 29, 2007.

2. Accredited as Assistant Professor "Ayudante Doctor" by ANECA (National Agency for Quality Evaluation and Accreditation), since September 16, 2009.

3. Accredited as Associate Professor "Contratado Doctor" by ANECA (National Agency for Quality Evaluation and Accreditation), since September 5, 2014.

EXPERIENCE IN ORGANIZING I+D ACTIVITIES

1. Member of the local organizing committee of the International Workshop on Applied Probability 2010, held at Colmenarejo Campus (University Carlos III of Madrid) on July 5-8, 2010.

ACTIVITIES OF DISSEMINATION

1. Radio program "The MOOCs (Massive Open Online Courses) are here to stay".
   http://www.canal.uned.es/mmobj/index/id/15981

2. "World Statistics Day" (University Carlos III of Madrid, October 20, 2010).

PROMOTOSHIP OR SUPERVISION ACTIVITIES RELATED TO PhD THESES

From the academic year 2012-2013, I am co-supervising a thesis project at University of Santiago de Compostela, entitled "Optimal cutoff points for classification in diagnostic studies: new contributions and software development" by the PhD student Mónica López Ratón.

MEMBERSHIP OF SCHOLARLY COMMITTEES

1. Member of the Teaching Committee of the Statistics Department (University Carlos III of Madrid) from the academic course 2011-2012.

MEMBERSHIP OF STATISTICAL SOCIETIES & GROUPS

1. Member of the Statistical Modelling Society (2010-2012).
2. Member of the Galician Society of Statistics and Operations Research (SGAPEIO).

3. Member of the Research Group: Statistical modelling and inference (MODES), University of A Coruña (during my PhD period).

LANGUAGES

English: Advanced level

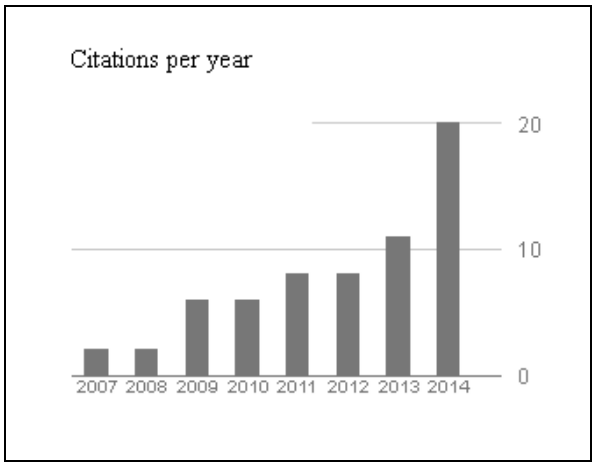
OTHERS

1. Collaboration in the development of Epidat 3.0, freeware software developed by the Galician General Office of Public Health and the Pan American Health Organization.

VI. PERSONAL SUMMARY

Elisa M. Molanes López has a degree in Mathematics, specialized in Statistics, since 2000 (University of Santiago de Compostela) and a European PhD degree in Statistics since 2007 (University of A Coruña). She has the national accreditation as Assistant Professor (*Profesor Ayudante Doctor*) since September 2009 and as Associate Professor (*Profesor Contratado Doctor*) since September 2014.

She did her PhD under a Spanish grant for research training (*FPI*) and had the opportunity to visit several foreign universities: Universiteit Hasselt (Belgium), Université Catholique de Louvain (Belgium) and University of Texas (Houston, USA). She joined the Department of University Carlos III of Madrid as Visiting Assistant Professor in October 2007.



Her research lines are based on Nonparametric Statistics (Kernel type estimators and Empirical Likelihood methodology), Survival Analysis with Left Truncated and Right Censored (LTRC) data, and Receiver Operating Characteristic (ROC) curves.
She has co-authored 6 papers in JCR-indexed journals (5 in Statistics & Probability and 1 in Engineering, Electrical and Electronic). Based on Google Scholar, her general indicators of quality of scientific output are the following: citations = 63, h-index = 4 and i10-index = 1.

From the academic year 2012-2013, she is co-supervisor of a PhD student, Mónica López Ratón, whose thesis project is entitled "Optimal cutoff points for classification in diagnostic studies: new contributions and software development". She has been member of 6 national research projects and 1 regional project. She has been part of the local organizing committee of the 5th International Workshop on Applied Probability (IWAP 2010). She has refereed 20 papers for 13 JCR-indexed journals (in the area of Statistics & Probability). Recently, she received a second prize for the best teaching practice from UNED Social Council with the Massive Open Online Course (MOOC) "*Mini-vídeos docentes modulares: un elemento crítico en el diseño de un MOOC*" in 2013, and she received the "Outstanding Course Award of Excellence" from the OCW Consortium with the OCW course "*Mini-vídeos docentes modulares para diseñar un MOOC*" in 2014.