Nicolás J. Hernández Banadik

Contact Information

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Research Interests

High–dimensional and Functional data analysis, Information Theory, Data Mining, Machine Learning, Statistical Computing and Bayesian Statistics with applications in Health, Business, Environmental Science, Demography, Technology and Economics.

Education

Universidad Carlos III de Madrid, Getafe, Madrid Spain

Ph.D. (cand.) in Applied Mathematics, (expected graduation date: July, 2019)

- Thesis: "Statistical learning methods for functional data with applications to prediction, classification and outlier detection". Advisor: Alberto Muñoz García.

Master of Science in Business and Quantitative Methods, July 2015

- Dissertation Topic: "Deep Bootstrap Predictions for Univariate, Multivariate and Functional Time Series.". Advisor: Juan Romo Urroz

Center for Economic Research (CINVE), Montevideo, Uruguay

Policy Impact Evaluation Techniques, Universidad ORT Uruguay – Center for Economic Research (CINVE) – Universidad de Los Andes. Montevideo, Uruguay, March, 2012

Universidad ORT Uruguay, Montevideo, Uruguay

B.S. Economics, May, 2011 (GPA: 8.8/Top 5%)

Short-term stays

Laboratory ERIC - University Lumire Lyon 2, France.

Research project, Sep-Dec 2018.

- Topic: Development of new methodologies for prediction of functional time series as well as the construction of prediction bands.
- Sponsor: Ph.D. Julien Jacques.
- Participants Ph.D. Julien Jacques and Ph.D. Jairo Cugliari

Refereed Journal Publications

Martos, G., **Hernández, N.**, Muñoz, A. & Moguerza, J. M. (2018). "Entropy Measures for Stochastic Processes with Applications in Functional Anomaly Detection". Entropy, 20(1), 33.

Muñoz, A., **Hernández, N.**, Moguerza, J. M. & Martos, G. (2018). "Combining entropy measures for anomaly detection". Entropy, 20(9), 698.

Papers Under Review

"Kernel depth measures for functional data with applications in functional outlier detection". With G. Martos (Universidad Torcuato Di Tella) and A. Muñoz (Universidad Carlos III de Madrid). *Submitted to Pattern Recognition Journal.*

"Boosting classification performance with functional time series: A domain selection approach". With G. Martos (Universidad Torcuato Di Tella and CONICET) and A. Muñoz (Universidad Carlos III de Madrid). *Submitted to IEEE/CAA Journal of Automatica Sinica.*

Papers In Progress

"Domain selection in functional data: a Bayesian approach". With G. Martos (Universidad Torcuato Di Tella) and Miguel de Carvalho (The University of Edinburgh).

"Minimum entropy forecasts for functional time series". With J. Jacques and J. Cugliari (University Lumire Lyon 2 - Laboratory ERIC).

Refereed Conference Papers

N. Hernández, A. Muñoz. (2016). "Kernel Depth Measures for Functional Data with Application to Outlier Detection". Lecture Notes in Computer Science, vol 9887, pp 235-242.

Conference Presentations and Posters

N. Hernández, Jairo Cugliari & Julien Jacques. "Forecasting Functional Time Series under a Reproducing Kernel Hilbert Space Model". To be Presented in, CM-Statistics – ERCIM, Pisa, Italy, December, 2018.

N. Hernández, G. Martos & A. Muñoz. "Domain selection For functional Data Classification". Presented in, CRoNoS Summer Course on Functional Data Analysis and Software (FDA 2018) , Iasi, Romania, August, 2018.

N. Hernández, G. Martos & A. Muñoz. "A novel domain selection to boost classification problems in Functional Data" 1st CRoNoS International Workshop on Multivariate Data Analysis and Software (MDA 2018) , Limassol, Cyprus, April 3-5, 2018.

N. Hernández, G. Martos & A. Muñoz. "Domain selection For functional Data Classification" 11th International Conference on Computational and Financial Econometrics (CFE 2017) , London, UK, December 16-18, 2017.

N. Hernández, A. Muñoz. "Kernel Depth Functions for Functional Data". Internal Seminar, Department of Statistics, Universidad Carlos III de Madrid, Madrid, Spain, June, 2017.

N. Hernández, A. Muñoz. "Kernel Depth Function for Functional Data" (Poster). Statlearn'17 - 8th Statlearn workshop a conference of the French Society of Statistics (SFdS), Lyon, France, April 5-8, 2017.

N. Hernández, A. Muñoz. "Kernel Depth Functions for Functional Data with Application to Outlier Detection". 25th International Conference on Artificial Neural Networks, Barcelona, Spain, September 6-9, 2016.

Academic Experience

Universidad Carlos III de Madrid, Madrid Spain

Statistics. Engineering Program for International Students. UC3M International School. Lecturer	**2016 - present**
Quantitative Methods in Management. MBA. Lecturer	**2015 - present**
Prediction Techniques. Bs in Statistics; International Studies. Lecturer	**2015 - Present**
Time Series Econometrics. Bs. in Statistics; Finance and Accounting. Lecturer	**2014 - present**
Statistics. Bachelor in Business Administration. Teacher Assistant	**2015**

Universidad ORT Uruguay, Montevideo, Uruguay

Mathematics. Bachelor in Business Administration. Lecturer	**2012**
Principles of Economics. Bachelor in Economics. Teacher Assistant	**2011 - 2013**
Mathematical Economics. Bachelor in Economics. Teacher Assistant	**2009 - 2013**

Professional Experience

Department of Economics, CPA-Ferrere Consultants, Montevideo, Uruguay.

Senior Research Analyst **Jan, 2010 - August, 2013**

- Fraud detection models for the National Customs Agency of Uruguay, (DNA)
- Development of an econometric model to estimate the likelihood of underreported income by employees in the manufacturing sector, through the processing of the National Household Survey.

- Estimation of econometric models to develop a Fiscal Risk Map to detect fraudulent companies for the Government Taxation Office (DGI).
- Design of the sample for the survey of net energy consumption in the industrial sector for the Ministry of Industry and Energy.
- Impact analysis on financial inclusion of banking policies.
- Socio–economic impact assessment of a great economic significance iron mining project in Uruguay.
- Estimation of housing demand for low income households of the Institute of Social Security Housing Program.
- Technical Report of the Credit Card Market, analyzing the regulatory, efficiency and equity aspects.

Honors and Awards

Doctoral stay grant (PPI). Universidad Carlos III de Madrid, 2018.
Scholarship to attend the *CRoNoS Summer Course on Functional Data Analysis and Software* (Romania, 2018).
Scholarship to attend the *CRoNoS Spring Course on Multivariate Data Analysis and Software* (Cyprus, 2018).
Scholarship for Doctoral studies (PIF). Universidad Carlos III de Madrid, 2015 - present.
Scholarship for postgraduate studies. Universidad Carlos III de Madrid, 2013-2015.

Services

Reviewer of the Neurocomputing and Entropy jorunals.
Reviewer of the proceedings at the conference: European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning.

Languages

Spanish **Mothertongue**
English **Advanced (Working proficiency)**

Computer Skills

- R, Eviews, SPSS (Advanced).
- Python, Matlab, Stata (Intermediate).

Academic References

Alberto Muñoz García. Associate Professor. Department of Statistics. Universidad Carlos III de Madrid (Ph.D. Advisor)
E-mail: alberto.munoz@uc3m.es

Julien Jacques. Full Professor. Université de Lyon - Lumière. Head of the Data Mining & Decision team of ERIC laboratory.
E-mail: : julien.jacques@univ-lyon2.fr

Rosa E. Lillo Rodríguez. Full Professor, Department of Statistics. Head of the UC3M-BS Institute of Financial Big Data (IFiBiD). Universidad Carlos III de Madrid.
E-mail: lillo@est-econ.uc3m.es

Gabriel Martos Venturini. Assistant Professor. Department of Mathematics and Statistics, Universidad Torcuato Di Tella.
E-mail: gmartos@utdt.edu