

# José Miguel Hernández Lobato

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## Academic Positions

- 2016 – now **University Lecturer (US Assistant Professor) in Machine Learning.** Department of Engineering, University of Cambridge, UK.
- 2014 – 2016 **Postdoctoral Researcher.** Collaborating with Professor Ryan Adams. Harvard Intelligent Probabilistic Systems Group, School of Engineering and Applied Sciences, Harvard University, USA.
- 2013 – 2014 **Research Associate.** Wolfson College, Cambridge, UK.
- 2011 – 2014 **Postdoctoral Researcher.** Supervised by Professor Zoubin Ghahramani. Computational and Biological Learning Group, Engineering Department, Cambridge University, UK.
- 2010 – 2011 **Teaching Assistant.** Machine Learning Group, Computer Science Department, Universidad Autónoma de Madrid, Spain.

## Education

- Dec. 2010 **Ph.D. in Computer Science.** Thesis: *Balancing Flexibility and Robustness in Machine Learning: Semi-parametric Methods and Sparse Linear Models.* Universidad Autónoma de Madrid, Spain.
- Jun. 2007 **M.Sc. in Computer Science.** Project: *Time Series Models for Measuring Market Risk.* Universidad Autónoma de Madrid, Spain.
- Jun. 2004 **B.Sc. in Computer Science.** Universidad Autónoma de Madrid, Spain.

## Awards

- 2012 First prize in the EMC Data Science competition, London, worth 1,200 £, London, UK.
- 2012 Madrid Mentoring Network Award for the business project "Sugerendo".
- 2012 Cink emprende award to the best business project "Sugerendo".
- 2011 Bancaja award to the best business project "Sugerendo".
- 2006 Second best poster presentation, Summer School on Pattern Recognition, Plymouth, UK.
- 2004 First prize and special prize in the programming contest for the region of Madrid (CUPCAM).
- 2004 **Special prize to the best academic record on graduation,** Universidad Autónoma de Madrid.

## Grants, Fellowships and Research Contracts

- May 2014 Rafael del Pino grant to fund a postdoctoral research program.
- 2009 – 2010 Full-time researcher at Universidad Autónoma de Madrid.
- 2006 Three months scholarship to visit Radboud University, Nijmegen, The Netherlands.

- 2005 – 2009 FPU fellowship granted by *Universidad Autónoma de Madrid* to complete a Ph.D. program.
- 2005 **Fulbright** fellowship to fund a Ph.D. program in USA (turned down to study a Ph.D. in Madrid).
- 2002 Scholarship for summer school *Linux: an Open Environment*, Universidad Autónoma de Madrid.
- 2000 Free Tuition for finishing secondary education with Honors. Universidad Autónoma de Madrid.

## Industrial Collaborations

- 2016 – 2016 Collaboration with Siemens AG: Model-based reinforcement learning.
- 2014 – 2016 Collaboration with Samsung Electronics: Discovery of new materials.
- 2011 – 2013 Collaboration with Infosys Technologies Limited: Analysis of market basket data.
- Dec 2012 Consultancy work for Cambridge Capital Management, LCC.
- 2011 Founding partner of the company “Sugerendo”, Madrid, Spain.

## Participation in Research Projects

- 2014 – The Harvard Clean Energy Project. Harvard University, USA.
- 2014 – Samsung Electronics, A combined theory and experimental approach towards the discovery of novel blue organic light-emitting diode materials. Harvard University, USA.
- 2014 – Machine Learning and Bayesian Optimization. Harvard University, USA.
- 2013 – Advanced Algorithms for Data Analysis. Universidad Autónoma de Madrid, Spain.
- 2013 – 2014 Probabilistic Matrix Factorization Methods. Cambridge University, UK.
- 2011 – 2013 Machine Learning Models for Market Basket Analysis. Cambridge University, UK.
- 2010 – 2012 Advanced Learning on a Large Scale. Universidad Autónoma de Madrid, Spain.
- 2008 – 2010 Machine Learning and Applications. Universidad Autónoma de Madrid, Spain.
- 2005 – 2007 Learning, Evolution and Extreme Statistics. Universidad Autónoma de Madrid, Spain.

## Teaching Experience

- 2015 An Introduction to Bayesian Optimization (Lectures). Universidad Autonoma de Madrid, Spain.
- 2015 CS281: Advanced Machine Learning (Teaching assistant), Harvard University, USA.
- 2013 Bayesian Inference (Lectures). Charles University in Prague, Czech Republic.
- 2010 – 2011 Computer Programming II (Practicals). Universidad Autónoma de Madrid, Spain.
- 2006 – 2011 Language Processing Systems (Practicals). Universidad Autónoma de Madrid, Spain.

## Academic Supervisions

- 2016 – 2016 PhD student co-supervision, Stefan Depeweg, Technical University of Munich, Germany.
- 2014 – 2014 PhD student co-supervision, Michael A. Gelbart, Harvard University, MA, USA.
- 2012 – 2014 PhD student co-supervision, Yue Wu, Cambridge University, UK.
- 2012 – 2014 PhD student co-supervision, Neil Houlsby, Cambridge University, UK.
- 2013 – 2014 4th-year project co-supervision, Kee Chong Tan, Cambridge University, UK.
- 2012 – 2013 4th-year project co-supervision, Mina Spasic, Cambridge University, UK.

- 2012 – 2013 4th-year project co-supervision, Menglun Li, Cambridge University, UK.
- 2009 – 2010 MEng student co-supervision, Pablo Morales-Mombiola, Universidad Autónoma de Madrid, Spain.
- 2009 – 2010 BEng student co-supervision, David Lopez-Paz, Universidad Autónoma de Madrid, Spain.

## Summer Schools and Others

- 2006 International Summer School on Pattern Recognition, Plymouth, UK.
- 2006 International Summer School on Empirical Asset Pricing, Frankfurt, Germany.
- 2006 Machine Learning Course. Nijmegen, The Netherlands.
- 2002 Summer School "Linux: an Open Environment", Madrid, Spain.

## Professional Services

- 2012 - now Program Committee: ICML 2012, ICML 2013, NIPS 2013, ICML 2014, NIPS 2014, ICML 2015, NIPS 2015, ICLR 2015, AISTATS 2016, ICML 2016, NIPS 2016, AISTATS 2017, ICLR 2017.
- 2009 - now Journal Reviewer: IEEE TPAMI, Journal of Machine Learning Research, Neural Computation, Journal of the Royal Statistical Society, Transactions on Knowledge and Data Engineering, Journal of Selected Topics in Signal Processing, Neurocomputing, Journal of Empirical Finance, IBM Journal of Research and Development.

## Personal Development Courses and Other Activities

- 2015–2016 Vice-president of the Harvard Argentine Tango Society, Harvard University, USA.
- 2015 Fundamentals of Teaching in STEM. Harvard University, USA.
- 2012 Regarding Supervising & Small Group Teaching (3 hours). Cambridge University, UK.
- 2011 Interactive Whiteboard for University Teaching. 1 ECTS. Universidad Autónoma de Madrid, Spain.
- 2011 Development of Creative Thought. 1 ECTS. Universidad Autónoma de Madrid, Spain.
- 2011 Electronic Resources in Computer Science. 1 ECTS. Universidad Autónoma de Madrid, Spain.

## Selected Seminars and Talks

- Sep 2016 *Bayesian Optimization for Accelerated Exploration of Chemical Space*, IPAM Workshop: Machine Learning Meets Many-Particle Problems, Institute for Pure and Applied Mathematics, Los Angeles, California, USA.
- Sep 2016 *Bayesian Machine Learning for Efficient Optimization of Black-box Functions*, Department of Engineering, University of Oxford, UK.
- Jul 2016 *Bayesian Optimization of Genetic Programs*, Foundry Annual Meeting. Broad Institute of MIT and Harvard, Cambridge, MA, USA.
- Mar 2016 *Bayesian Machine Learning for Efficient Optimization of Black-box Functions*, University of Toronto, Toronto, Canada.
- Mar 2016 *Bayesian Machine Learning for Efficient Optimization of Black-box Functions*, Edinburgh University, Edinburgh, UK.
- Mar 2016 *Bayesian Machine Learning for Efficient Optimization of Black-box Functions*, Max Planck Institute for Intelligent Systems, Tübingen, Germany.
- Mar 2016 *Bayesian Machine Learning for Efficient Optimization of Black-box Functions*, EPFL, Lausanne, Switzerland.
- Feb 2016 *Bayesian Machine Learning for Efficient Optimization of Black-box Functions*, New York University, New York City, USA.

- Jan 2016 *Bayesian Machine Learning for Efficient Optimization of Black-box Functions*, Amazon, Berlin, Germany.
- Jan 2016 *Bayesian Machine Learning for Efficient Optimization of Black-box Functions*, Amazon, Berlin, Germany.
- May 2015 *Probabilistic Backpropagation for Scalable Learning of Bayesian Neural Networks*. Workshop on Gaussian Process Approximations, Copenhagen, Denmark.
- March 2015 *Bayesian Optimization and Information-based Approaches*. Machine Learning Meetup, Boston, Massachusetts, USA.
- May 2014 *Stochastic Variational Inference for Large Scale Machine Learning*. Department of Computer Science, Universidad Autónoma de Madrid, Spain.
- Feb 2014 *An Introduction to Determinantal Point Processes*. Machine Learning Group, Cambridge University, Cambridge, UK.
- Feb 2014 *Gaussian Process Conditional Copulas*. Microsoft Research, Cambridge, UK.
- Oct 2013 *Gaussian Process Conditional Copulas with Applications to Financial Time Series*. Oxford-Man Institute of Quantitative Finance, University of Oxford, UK.
- Jun 2013 *Gaussian Process Vine Copulas for Multivariate Dependence*. Columbia University, New York, USA.
- Apr 2013 *An Introduction to Sum Product Networks*. Department of Engineering, Cambridge University, UK.
- Feb 2013 *Stochastic Variational Inference for Modeling Binary Matrices*. Xerox Research, Bangalore, India.
- Feb 2013 *NetBox: a Probabilistic Method for Analyzing Market Basket Data*. Infosys Limited, Bangalore, India.
- Feb 2012 *Ensemble Methods and Optimal Ensemble Size*. Toshiba Research Laboratory, Cambridge, UK.
- Dec 2011 *Expectation Propagation for the Estimation of Conditional Bivariate Copulas*. NIPS Workshop on Copulas in Machine Learning, Granada, Spain.
- Sep 2011 *Modeling Transaction Data*. Infosys Limited, Bangalore, India.
- Sep 2011 *Market Basket Analysis: An Introduction*. Infosys Limited, Bangalore, India.
- Jul 2011 *Gaussianity Measures for Detecting the Direction of Causal Time Series*. International Joint Conference on Artificial Intelligence, Barcelona, Spain.
- Sep 2010 *Hub Gene Selection Methods for the Reconstruction of Transcription Networks*. European Conference on Machine Learning (ECML), Barcelona, Spain.
- Jul 2009 *Modeling Dependence in Financial Data with Semiparametric Archimedean Copulas*. International Workshop on Advances in Machine Learning for Computational Finance (AMLFCF), London, UK.

## Patents

- 2015 Shastri L., Gharamani Z., Hernández-Lobato J. M., Kanagasabapathi B. and Raj K. S. A. A. D. Method and system for mining frequent and in-frequent items from a large transaction database. United States Patent Application 20150178303 A1. Assignee: INFOSYS LIMITED.

## Publications

### Refereed Journal Papers

- 2016 Hernández-Lobato J. M., Gelbart A. M., Hoffman M. W., Adams R. and Ghahramani Z. A General Framework for Constrained Bayesian Optimization using Information-based Search, *Journal of Machine Learning Research*, in press.  
Impact Factor 2012: 3.420. Google scholar h5-median: 102.
- 2015 Hernández-Lobato J. M., Hernández-Lobato D. and Suárez A. Expectation Propagation in Linear Regression Models with Spike-and-slab Priors, *Machine Learning*, 99(3):437–487.  
Impact Factor 2012: 1.88. Google scholar h5-median: 56.

- 2013 Hernández-Lobato D., Hernández-Lobato J. M. and Dupont P. Generalized Spike-and-Slab Priors for Bayesian Group Feature Selection Using Expectation Propagation, *Journal of Machine Learning Research*, 14:1891–1945.  
Impact Factor 2012: 3.420. Google scholar h5-median: 102.
- 2011 Hernández-Lobato J. M. and Suárez A. Semiparametric Bivariate Archimedean Copulas. *Computational Statistics & Data Analysis*, 55(6), 2038–2058.  
Impact Factor 2012: 1.304. Google scholar h5-median: 52.
- 2011 Hernández-Lobato J. M., Hernández-Lobato D. and Suárez A. Network-based Sparse Bayesian Classification, *Pattern Recognition*, 44(4), 886–900.  
Impact Factor 2012: 2.632. Google scholar h5-median: 83.
- 2010 Hernández-Lobato D., Hernández-Lobato J. M. and Suárez A. Expectation Propagation for Microarray Data Classification, *Pattern Recognition Letters*, 31(12), 1618–1626, 2010.  
Impact Factor 2012: 1.266. Google scholar h5-median: 55.
- 2008 Hernández-Lobato D. and Hernández-Lobato J. M. Bayes Machines for Binary Classification, *Pattern Recognition Letters*, 29(10), 1466–1473, 2008.  
Impact Factor 2012: 1.266. Google scholar h5-median: 55.

### Refereed Conference Papers

- 2016 Hernández-Lobato J. M., Li Y., Rowland M., Bui T. D., Hernández-Lobato D. and Turner R. E. Black-Box Alpha Divergence Minimization, In *33th International Conference on Machine Learning (ICML)*. ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2016 Bui T. D., Hernández-Lobato D., Li Y., Hernández-Lobato J. M. and Turner R. E. Deep Gaussian Processes for Regression using Approximate Expectation Propagation, In *33th International Conference on Machine Learning (ICML)*. ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2016 Hernández-Lobato D., Hernández-Lobato J. M., Shah A. and R. P. Adams. Predictive Entropy Search for Multi-objective Bayesian Optimization, In *33th International Conference on Machine Learning (ICML)*. ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2016 Sharmanska V., Hernández-Lobato D., Hernández-Lobato J. M. and Quadrianto N. Ambiguity Helps: Classification with Disagreements in Crowdsourced Annotations, In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016.  
ERA conference ranking: A. Google scholar h5-median: 203.
- 2016 Reagen B., Whatmough P. Adolf R., Rama S., Lee H., Lee S., Hernandez-Lobato J. M., Wei G. Y. and Brooks D. Minerva: Enabling Low-Power, High-Accuracy Deep Neural Network Accelerators, In *International Symposium on Computer Architecture (ISCA)* 2016.  
ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2015 Li Y., Hernández-Lobato J. M. and Turner R. E. Stochastic Expectation Propagation, In *Advances in Neural Information Processing Systems 28 (NIPS)*. ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2015 Hernández-Lobato J. M. and Adams R. Probabilistic Backpropagation for Scalable Learning of Bayesian Neural Networks, In *32th International Conference on Machine Learning (ICML)*, 1861–1869.  
ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2015 Hernández-Lobato J. M., Gelbart A. M., Hoffman M. W., Adams R. and Ghahramani Z. Predictive Entropy Search for Bayesian Optimization with Unknown Constraints, In *32th International Con-*

- ference on Machine Learning (ICML)*, 1699–1707.  
ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2015 Hernández-Lobato D., Hernández-Lobato J. M. and Ghahramani Z. A Probabilistic Model for Dirty Multi-task Feature Selection, In *32th International Conference on Machine Learning (ICML)*, 1073–1082.  
ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2014 Hernández-Lobato J. M., Hoffman M. W. and Ghahramani Z. Predictive Entropy Search for Efficient Global Optimization of Black-box Functions, In *Advances in Neural Information Processing Systems 27 (NIPS)*, 918–926.  
ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2014 Wu Y., Hernández-Lobato J. M. and Ghahramani Z. Gaussian Process Volatility Model, In *Advances in Neural Information Processing Systems 27 (NIPS)*, 1044–1052.  
ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2014 Hernández-Lobato J. M., Houlsby N. and Ghahramani Z. Probabilistic Matrix Factorization with Non-random Missing Data, In *31th International Conference on Machine Learning (ICML)*, 1512–1520.  
ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2014 Houlsby N., Hernández-Lobato J. M. and Ghahramani Z. Cold-start Active Learning with Robust Ordinal Matrix Factorization, In *31th International Conference on Machine Learning (ICML)*, 766–774.  
ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2014 Houlsby N., Hernández-Lobato J. M. and Ghahramani Z. Hernández-Lobato J. M., Houlsby N. and Ghahramani Z. Stochastic Inference for Scalable Probabilistic Modeling of Binary Matrices, In *31th International Conference on Machine Learning (ICML)*, 379–387.  
ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2013 Hernández-Lobato J. M., Lloyd J. R. and Hernández-Lobato D. Gaussian Process Conditional Copulas with Applications to Financial Time Series, In *Advances in Neural Information Processing Systems 26 (NIPS)*, 1044–1052.  
ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2013 Hernández-Lobato D. and Hernández-Lobato J. M. Learning Feature Selection Dependencies in Multi-task Learning, In *Advances in Neural Information Processing Systems 26 (NIPS)*, 746–754.  
ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2013 Wu Y., Hernandez-Lobato J. M. and Ghahramani Z. Dynamic Covariance Models for Multivariate Financial Time Series, In *30th International Conference on Machine Learning (ICML)*, 558–566.  
ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2013 López-Paz D., Hernández-Lobato J. M. and Ghahramani Z. Gaussian Process Vine Copulas for Multivariate Dependence, In *30th International Conference on Machine Learning (ICML)*, 10–18.  
ERA conference ranking: A\*. Google scholar h5-median: 95.
- 2013 Kaschesky M., Sobkowicz P., Hernández-Lobato J. M., Bouchard G., Archambeau C., Scharioth N., Manchin R., Gschwend A. and Riedl R. Bringing Representativeness into Social Media Monitoring and Analysis, In *46th Hawaii International Conference on System Sciences (HICSS)*, 2003–2012.  
ERA conference ranking: A. Google scholar h5-median: 53.
- 2012 Houlsby N, Hernández-Lobato J. M., Huszar F. and Ghahramani Z. Collaborative Gaussian Processes for Preference Learning, In *Advances in Neural Information Processing Systems 25 (NIPS)*, 2105–2113.  
ERA conference ranking: A\*. Google scholar h5-median: 80.

- 2012 López-Paz D., Hernández-Lobato J. M. and Schölkopf B. Semi-Supervised Domain Adaptation with Non-Parametric Copulas, In *Advances in Neural Information Processing Systems 25 (NIPS)*, 674–682. ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2011 Hernández-Lobato D., Hernández-Lobato J. M. and Dupont P. Robust Multi-Class Gaussian Process Classification, In *Advances in Neural Information Processing Systems 24 (NIPS)*, 280–288. ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2011 Hernández-Lobato J. M., Morales-Mombiela P. and Suárez A. Gaussianity Measures for Detecting the Direction of Causal Time Series, In *22nd International Joint Conference on Artificial Intelligence (IJCAI)*, 1318–1323. ERA conference ranking: A\*. Google scholar conference h5-median: 47.
- 2010 Hernández-Lobato D., Hernández-Lobato J. M., Helleppute T. and Dupont P. Expectation Propagation for Bayesian Multi-task Feature Selection, In *European Conference on Machine Learning and Knowledge Discovery in Databases (ECML PKDD)*, Volume 6321, 522–537. ERA conference ranking: A. Google scholar h5-median: 42.
- 2010 Hernández-Lobato J. M. and Dijkstra T. M. H. Hub Gene Selection Methods for the Reconstruction of Transcription Networks, In *European Conference on Machine Learning and Knowledge Discovery in Databases (ECML PKDD)*, Volume 6321, 506–521. ERA conference ranking: A. Google scholar h5-median: 42.
- 2007 Hernández-Lobato J. M., Hernández-Lobato D. and Suárez A. GARCH Processes with Non-parametric Innovations for Market Risk Estimation, In *17th International Conference on Artificial Neural Networks (ICANN)*, Part II, 718–727. ERA conference ranking: B. Google scholar conference h5-median: 19.
- 2007 Hernández-Lobato J. M., Dijkstra T. and Heskes T. Regulator Discovery from Gene Expression Time Series of Malaria Parasites: a Hierarchical Approach, In *Advances in Neural Information Processing Systems 20 (NIPS)*, 649–656. ERA conference ranking: A\*. Google scholar h5-median: 80.
- 2006 Hernández-Lobato D., Hernández-Lobato J. M., Ruiz-Torrubiano R. and Valle A. Pruning Adaptive Boosting Ensembles by Means of a Genetic Algorithm, In *7th International Conference on Intelligent Data Engineering and Automated Learning (IDEAL)*, 322–329. ERA conference ranking: C. Google scholar conference h5-median: 13.
- 2006 Hernández-Lobato J. M. and Suárez A. Competitive and Collaborative Mixtures of Experts for Financial Risk Analysis, In *16th International Conference on Artificial Neural Networks (ICANN)*, Part II, 691–700. ERA conference ranking: B. Google scholar h5-median: 19.

### Workshop Abstracts and Technical Reports

- 2015 Hernández-Lobato J. M., Li Y., Hernández-Lobato D., Bui T. and Turner R. Black-box  $\alpha$ -divergence Minimization, In *NIPS Workshop on Black Box Learning and Inference*, Montreal, Canada, 2015.
- 2015 Bui T., Hernández-Lobato J. M., Hernández-Lobato D., Li Y. and Turner R. Training Deep Gaussian Processes using Stochastic Expectation Propagation and Probabilistic Backpropagation, In *NIPS Workshop on Advances in Approximate Bayesian Inference*, Montreal, Canada, 2015.
- 2015 Hernández-Lobato D., Hernández-Lobato J. M., Li Y., Bui T., and Turner R. Stochastic Expectation Propagation for Large Scale Gaussian Process Classification, In *NIPS Workshop on Advances in Approximate Bayesian Inference*, Montreal, Canada, 2015.

- 2014 Hernández-Lobato J. M., Lloyd J. R., Hernández-Lobato D. and Ghahramani Z. Learning the Semantics of Discrete Random Variables: Ordinal or Categorical?, In *NIPS Workshop on Learning Semantics*, Montreal, Canada, 2014.
- 2013 Hernández-Lobato J. M., Houlby N. and Ghahramani Z. Stochastic Inference for Scalable Probabilistic Modeling of Binary Matrices, In *NIPS Workshop on Randomized Methods for Machine Learning*, Lake Tahoe, Nevada, United States.
- 2011 David López-Paz and Hernández-Lobato J. M. Transfer Learning with Copulas, In *NIPS Workshop on Copulas in Machine Learning*, Granada, Spain.
- 2011 Hernández-Lobato J. M., David López-Paz and Ghahramani Z. Expectation Propagation for the Estimation of Conditional Bivariate Copulas, In *NIPS Workshop on Copulas in Machine Learning*, Granada, Spain.
- 2009 Hernández-Lobato J. M. and Suárez A. Modeling Dependence with Semiparametric Archimedean Copulas, In *International Workshop on Advances in Machine Learning for Computational Finance*, London, UK.
- 2011 Hernández-Lobato J. M. and Hernández-Lobato D. Convergent Expectation Propagation in Linear Models with Spike-and-slab Priors. *arXiv:1112.2289 [stat.ML]*

**Ph.D. Thesis and M.Phil. Thesis**

- 2010 Ph.D. Thesis, Hernández-Lobato J. M. *Balancing Flexibility and Robustness in Machine Learning: Semi-parametric Methods and Sparse Linear Models*, Universidad Autonoma de Madrid.
- 2007 M.Phil. Thesis, Hernández-Lobato J. M. *Time Series Models for Measuring Market Risk*, Universidad Autonoma de Madrid.