

# Florentina Bunea

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## Education

- Ph.D. in Statistics, University of Washington, Seattle, 2000.  
Dissertation: A Model Selection Approach to Partially Linear Regression.  
Advisor: Jon A. Wellner.
- M.S. in Mathematics, First Class, University of Bucharest, Romania, 1991.
- B.S. in Mathematics, First Class, University of Bucharest, Romania, 1989.

## Employment

- **Professor:** Cornell University, Department of Statistical Science, 2011 -
- **Assistant/Associate Professor:** Florida State University, Department of Statistics, 2000 - 2011.
- **Research/Teaching Assistant :** University of Washington, Department of Statistics and the National Research. September 1995 - August 2000.
- **Assistant Professor:** University Politehnica Bucharest, Department of Mathematics (Romania). September 1991 - September 1995.

## Research Interests

- Methods and theory for model selection in high dimensions and high dimensional inference. The application and development of empirical processes techniques for model selection type estimators, in semiparametric and nonparametric models are of particular interest.
  - High dimensional random matrix models.
  - Dimension reduction methods.
  - Nonparametric techniques in curve aggregation and classification. Online prediction algorithms. Adaptation to unknown sparsity in high dimensions.
- The theoretical analysis of computationally efficient model selection and classification procedures. Applications to Neuroscience, Genetics and Medicine.
- Integrating EEG and fMRI information in mental health studies.
- Connections between algebraic geometry and MCMC sampling schemes on spaces of random matrices.

## Editorship

- Series Editor: Monographs on Statistics and Applied Probability (The Green Series), Chapman & Hall/CRC (2009 - ongoing).
- Associate Editor: JASA (2011 - ongoing).
- Associate Editor: Bernoulli (2010 - ongoing).
- Associate Editor: The Electronic Journal of Statistics, IMS (2007 - ongoing).
- Associate Editor: Journal of the Royal Statistical Society (JRSS)-B (2012- 2014)
- Associate Editor: The Annals of Applied Statistics (2011 - 2012).
- Associate Editor: The International Journal of Biostatistics, Berkeley Press (2007 - 2012).
- Associate Editor: The Annals of Statistics (2007 - 2010).

## Grants

- NSF-DMS award 1310119, co-PI, *Estimation of high dimensional matrices of low effective rank with applications to structural copula models*, 2013 - 2015.
- NSF-DMS award 10007444, PI, *Matrix estimation under rank constraints for complete and incomplete noisy data*, 2010 - 2013.
- (NSF-DMS) award 0925275, PI, conference grant, *From Probability to Statistics and Back: High-Dimensional Models and Processes*, Seattle, July 28 - 31, 2010.
- (NSF-DMS) award 0706829, co-PI: *Sparsity oracle inequalities via l1 regularization in non-parametric models*, 2007 - 2010.
- (NSF-DMS) 0406049, PI: *Curve aggregation and classification*, 2004 - 2007.

## Publication Record

### Published and In Press Articles

(In inverse chronological order)

- Florentina Bunea and Luo Xiao, *On the sample covariance matrix estimator of reduced effective rank population matrices, with applications to fPCA*, Bernoulli, (2013), In Press.
- Florentina Bunea, Johannes Lederer and Yiyuan She, *The Group Square-Root Lasso: Theoretical Properties and Fast Algorithms*, IEEE-Information Theory, (2013), In Press.
- *Edited volume*. From Probability to Statistics and Back: High-Dimensional Models and Processes, A Festschrift in Honor of Jon Wellner; IMS Collections, Volume 9, 2012, Banerjee, M., Bunea, F., Huang, J., Koltchinskii, V., and Maathuis, M. H., Editors
- Florentina Bunea, Yiyuan She and Marten Wegkamp *Joint variable and rank selection for parsimonious estimation of high dimensional matrices*. The Annals of Statistics, (2012), In Press.

- Florentina Bunea, Yiyuan She and Marten Wegkamp *Optimal selection of reduced rank estimators of high dimensional matrices*. The Annals of Statistics, Vol 39, 1282- 1309, (2011).
- Florentina Bunea, Andrada Ivanescu and Marten Wegkamp *Adaptive inference for the mean of a Gaussian process in functional data*. J.R. Statist. Soc. B, Vol 73 (4), 531 - 558, (2011).
- Florentina Bunea, Yiyuan She, Hernando Ombao et al. *Penalized Least Squares Regression Methods and Applications to Neuroimaging*. NeuroImage, Vol. 55, 1519 - 1527 (2011).
- Florentina Bunea, Alexandre Tsybakov, Marten Wegkamp and Adrian Barbu *SPADES and mixture models*, The Annals of Statistics, Vol 38, 2525 - 2558, (2010).
- Florentina Bunea and Adrian Barbu *Dimension reduction and variable selection in case-control studies via regularized likelihood optimization*, Electronic Journal of Statistics, Vol. 3, 1257 - 1287, ( 2009 )
- Florentina Bunea *Honest variable selection in linear and logistic regression models via  $\ell_1$  and  $\ell_1 + \ell_2$  penalization*, Electronic Journal of Statistics, Vol 2, pp 1153 - 1194, (2008).
- Florentina Bunea and Andrew Nobel *Online prediction algorithms for aggregation of arbitrary estimators of a conditional mean*. IEEE Transactions on Information Theory, Vol 54 (4), pp 1725 - 1735, (2008).
- Florentina Bunea *Consistent selection via the Lasso for high dimensional approximating models*. IMS Lecture Notes-Monograph Series, Vol 123, pp. 123 - 137, (2008).
- Florentina Bunea, Alexandre Tsybakov and Marten Wegkamp *Sparsity oracle inequalities for the lasso*. Electronic Journal of Statistics, pp. 169 - 194, (2007).
- Florentina Bunea, Alexandre Tsybakov and Marten Wegkamp *Sparse density estimation with  $l_1$  penalties*. Annual Conference on Learning Theory, Lecture Notes in Artificial Intelligence, pp. 530 - 544, Springer, (2007).
- Florentina Bunea, Alexandre Tsybakov and Marten Wegkamp *Aggregation for Gaussian regression*. Annals of Statistics, Vol 35, 1674 - 1697, (2007).
- Florentina Bunea, Alexandre Tsybakov and Marten Wegkamp *Aggregation and sparsity via  $l_1$  penalized least squares*. Lecture Notes in Artificial Intelligence, Springer, pp. 379 - 391, (2006).
- Florentina Bunea, Marten Wegkamp and Anna Auguste *Consistent covariate selection in high dimensional regression via multiple testing*. Journal of Statistical Planning and Inference, Elsevier, Vol 136, pp 4349-4364, (2006).
- Florentina Bunea, Hernando Ombao and Anna Auguste *Minimax adaptive spectral estimation from an ensemble of signals*. IEEE Transactions on Signal Processing, Vol. 54, pp. 2865 -

2874, (2006).

- Gerard Biau, Florentina Bunea and Marten Wegkamp *Function Classification in Hilbert Spaces*. IEEE Transactions on Information Theory, Vol. 51, pp 2163 - 2172, (2005).
- Florentina Bunea and Ian McKeague *Covariate selection for semiparametric hazard function regression models*. The Journal of Multivariate Analysis, Vol. 92, pp. 186 - 204, (2005).
- Florentina Bunea *Consistent covariate selection and postmodel selection inference in semiparametric regression*. The Annals of Statistics, Vol. 32, No. 3, pp. 898 - 927, (2004).
- Florentina Bunea and Marten Wegkamp *Two-stage model selection procedures in partially linear regression*. The Canadian Journal of Statistics, Vol. 32, pp. 105 - 118, (2004).
- Florentina Bunea and Marten Wegkamp. *A Note on Penalized Minimum Distance Estimation in Nonparametric Regression*. The Canadian Journal of Statistics, Vol. 31, No 3, pp. 267-274, (2003).
- Florentina Bunea and Julian Besag *Markov Chain Monte Carlo in  $I \times J \times K$  contingency tables*, Fields Institute Communications, AMS, Providence, Rhode Island. Vol. 26, pp. 25 - 36, (2000).
- Florentina Bunea *Geometrical restrictions in self deconvolution*, The Annals of University of Bucharest, Mathematics and Informatics Series, Vol. 44, pp. 41-50, (1995).

## Honors/Awards

- The Isaac Newton Institute (Cambridge University, UK) Fellowship, 2008.
- FSU Teaching Award nominations 2003, 2005, 2007.
- The Centre National de la Recherche Scientifique (CNRS) Award in Statistics for young researchers, 2001 (CNRS is the French equivalent of the National Science Foundation.)
- The FSU First Year Assistant Professor Award, 2001.

## Student supervision

Former Ph. D. students: Anna Auguste (2006), Andrada Ivanescu (2008), Shuva Gupta (2009), Jennifer Geis (2012). Current Ph.D students: David Sinclair.

## Service

### Conference and/or Program organizer

- LDHD Workshop: Statistical Inference in Sparse High-dimensional Models: theoretical and computational challenges, February 2014.
- Program leader for the 2013 - 2014 SAMSI Program on Low-dimensional Structure in High-dimensional Systems (LDHD).
- The international conference *From Probability to Statistics and Back: High-Dimensional Models and Processes*, Seattle, July 2010.
- Nonparametrics Research International Conference, Tallahassee, FL, Jan 2003.

### Conference session organizer

- Invited chair and organizer of the session "High-Dimensional Statistical Inference for Matrix Models", at WNAR, Colorado, June 2012.
- Invited chair and organizer of the session "High dimensional inference and matrix models", at the 1st conference of the International Society for Non-Parametric Statistics, Greece, June 2012.
- Program committee member and chair of the "Machine Learning" session for SRCOS (Southern Regional Conference on Statistics), Norfolk, Virginia, June 2010.
- Invited chair and organizer of the session "Recent results in theoretical machine learning" at the eighth ICSA International Conference: Frontiers of Interdisciplinary and Methodological Statistical Research, Guangzhou University, China, Dec 2010.
- Invited chair and organizer of the invited IMS session "Advances in Statistical Aggregation" at the Joint Statistical Meeting, Salt Lake City, August 2007.
- Invited chair and organizer of the invited IMS session "Semiparametric Inference in Practice" at the Joint Statistical Meeting, Seattle, August 2006.
- Invited chair and organizer of the invited IMS session "Aggregation in non-parametric models" at the Joint Statistical Meeting in Minneapolis, August 2005.

### Service to the academic community at large, diversity and education

- IMS representative to the selection committee of the COPSS F.N. David Award, 2014-2018.
- Summer school organizer for the LDHD SAMSI Program, August 2013.
- NSF - DMS Panel member, January 2008, 2009, 2011, 2012, 2014.
- Member of the advisory council of the FSU Women in Mathematics, Science and Engineering Program (2001 - 2010).
- Member of the FSU Council on Research and Creativity, an internal grant awarding unit (2006 - 2008).

## Invited Fellow/Scholar

- SAMSI fellow, Spring 2014.
- Invited Professor, Université de Paris VI, June 2009.
- Invited Visiting Scholar, The John Hopkins School of Public Health, Jan/Feb 2008.
- Invited Visiting Fellow, Newton Institute, Cambridge University, UK, April/June 2008.
- Invited Research Professor, Université de Paris VI (Jussieu) and CREST, France, May 2003 (Host: Alexandre Tsybakov.)
- Invited Researcher, L'Institut Henri Poincaré, Paris, France, April/July 2001. (Host: Lucien Birgé.)
- Invited Researcher, Université Rennes II, France, July 2001. (Host: Marian Hristache.)

## Presentations

### Invited conference and workshop talks

#### **International**

- International Symposium on Business and Industrial Statistics/Conference of the ASA Section on Statistical Learning and Data Mining, Durham, June 2014.
- Oberwolfach Workshop, Adaptive Statistical Inference, Oberwolfach, Germany, March 2014.
- High-dimensional problems in statistics workshop, ETH, Zurich, Switzerland, September 2011, *Simultaneous variable and rank selection for optimal estimation of high dimensional matrices.*
- Instantaneous Frequencies and Trends for Nonstationary Nonlinear Data, IMA, Minneapolis, September 2011, *Simultaneous variable and rank selection for optimal estimation of high dimensional matrices.*
- Sparse Statistics, Optimization and Machine Learning BIRS Workshop, Banff, Canada, January 2011, *Optimal selection of reduced rank estimators of high dimensional matrices.*
- Sparsity in high dimensions conference, The Mathematical Institute at Oberwolfach, Germany, March 2009, *Model selection and sparsity in case control studies.*
- Understanding the New Statistics: Expanding Core Statistical Theory, Banff, Canada, September 2008. *Honest variable selection.*
- The Isaac Newton Institute, Cambridge University, UK, Programme on Statistical Theory and Methods for Complex, High-Dimensional Data, May 2008. *Non-asymptotic variable selection.*
- Statistical and Probabilistic Methods in Model Selection, The Mathematical Institute at Oberwolfach, Germany, October 2005. *On-line prediction algorithms in aggregation.*
- International Workshop on Applied Probability, Greece, March 2004. *One and multiple-sample aggregation in nonparametric regression models.*

- International conference on current advances and trends in nonparametric statistics, Crete, July 2002. *Post model selection inference in semiparametric regression models.*

### National/International

- Dimension Reduction and High Dimensional Inference Workshop, University of Florida, January 2014.
- 3rd Princeton Day of Statistics Workshop, Oct. 19, 2012.
- International Chinese Statistics Association 2012 Applied Statistics Symposium will take place in Boston, June 23-June 26, *Simultaneous variable and rank selection for optimal estimation of high dimensional matrices.*
- Instantaneous Frequencies and Trends for Nonstationary Nonlinear Data, IMA Hot Topics Workshop, Minneapolis, September 2011, *Simultaneous variable and rank selection for optimal estimation of high dimensional matrices.*
- The Applied Statistics Symposium of the International Chinese Statistical Association, Indianapolis, June 2010, *Adaptive Rank Penalized Estimators in Multivariate Regression.*
- Conference on Resampling Methods and High Dimensional Data, College Station, Texas, March 2010. *Optimal dimension reduction in high dimensional matrix models via the Rank Selection Criterion.*
- International Workshop on Sparsity in High Dimensional Statistics and Learning Theory, March 2008, Georgia Institute of Technology, Atlanta. *On  $\ell_1$  regularization in functional data and binary response regression models.*
- The Joint Statistical Meeting, the Institute of Mathematical Statistics section, Salt Lake City, August 2007. *Sparse oracle inequalities for the Lasso.*
- The Annual Conference on Learning Theory (COLT), San Diego, June 2007. *Identifying components in sparse mixtures: the Spades estimator.*
- The Annual Conference on Learning Theory (COLT), Pittsburgh, June 2006.
- Kickoff Workshop of the SAMSI program on High Dimensional Inference and Random Matrices, September 2006.
- The Joint Statistical Meeting, the Institute of Mathematical Statistics Section, Seattle, August 2006.
- The Joint Statistical Meeting, the Institute of Mathematical Statistics section, Minneapolis, August 2005. *Aggregation for regression learning.*
- New Researchers Conference, Davis, CA, July 2003. *Consistent model selection via the FDR procedure.*
- 1999 SIAM Annual Meeting, Atlanta. *MCMC for multi-dimensional contingency tables.*

## **Regional/Local**

- SRCOS/ASA Summer Research Conference, Virginia Tech, June 2004. *Oracle inequalities in aggregation.*
- Nonparametrics Research Conference, Tallahassee, FL, January 2003. *The consistency of the FDR procedure with applications to semiparametric models.*

## **Invited Individual Seminars**

- *Canada:* University of Toronto (2002), University of British Columbia (2000).
- *France:* Université de Paris VI and CREST (Paris, 2009), Université de Paris VI (Paris, 2003), ENSAI (Rennes, 2001), L'Institut Henri Poincaré (Paris, 2001).
- *United Kingdom:* Bath University (2001), Newton Institute, Programme on Statistical Theory and Methods for Complex High-dimensional Data, Cambridge (2008).
- *Switzerland:* The Swiss Institute of Technology (ETH), Zurich (2008).
- *USA*  
2010, 2012: Cornell University  
2008: University of Chicago.  
2007: Carnegie Mellon University, Johns Hopkins University, University of Minnesota, Rutgers University.  
2006: Texas A & M University, North Carolina State University.  
2005: University of Georgia, University of Illinois at Urbana.  
2004: The Pennsylvania State University, Duke University.  
2002: University of Florida.  
2000/2001: Yale University, University of Pennsylvania, Stanford University.

## **Professional Affiliations**

- Member of the Institute of Mathematical Statistics.

## **Courses (Sample)**

- Statistics through examples
- Introduction to Probability
- Mathematical Statistics
- Probability Models and Inference
- Probability and Measure
- Probability Theory
- Topics in Stochastic Processes
- Advanced Topics in Probability and Statistics: Model Selection



- Advanced Topics in Probability and Statistics: Semiparametric models and empirical processes
- Advanced Topics in Probability and Statistics: Aggregation in non-parametric models
- Advanced Topics in Probability and Statistics: Model selection and aggregation in high dimensions
- Advanced Topics in Probability and Statistics: Inference in large scale problems: vector and matrix models.