

"I can do all things through Christ which strengtheneth me." Phil. 4:13

Research Interests

Machine Learning: Formulation of Novel Learning Algorithms, Ensembles, Deep Learning, **Application Fields:** Outlier/Rare-Event/Anomaly Detection (i.e., fraud), Complex ML Forecasting (i.e, stocks, cryptocurrencies)

Experience

- ≥ 2013 **Assistant Professor Business Analytics**, MIAMI UNIVERSITY, Oxford, OH.
- 2012–2013 **Assistant Vice President, Risk Modeling (Fraud) Analytics**, JPMORGAN CHASE, Columbus, OH.
- 2007–2012 **Teaching Assistant (Instructor)**, THE UNIVERSITY OF ALABAMA, Tuscaloosa, AL.
- 2006–2007 **Assistant Vice President, Market Information Analytics**, BANK OF AMERICA, Charlotte, NC.
- 2005–2005 **Operations Productivity Intern**, MACY'S LOGISTICS & OPERATIONS, Secaucus, NJ.
- 2001–2004 **Airport Operations**, AMERICAN AIRLINES, POP Airport, Puerto Plata, Dominican Republic.

Education

- 2007–2012 **Ph.D. Applied Statistics**, *The University of Alabama*, Tuscaloosa, AL.
Dissertation: "Three Essays on the Use of Margins to Improve Ensemble Methods."
- 2007–2009 **M.Sc. Applied Statistics**, *The University of Alabama*, Tuscaloosa, AL.
- 2004–2006 **Master of Business Administration (M.B.A.)**, *The University of Alabama*, Tuscaloosa, AL.
Concentration: Business Intelligence & Data Mining
- 2001–2004 **Magister (equiv. M.Sc.) Management**, *Pontificia Universidad Católica Madre y Maestra*, D.R..
Thesis: "Strategic Market Analysis of American Airlines in the Caribbean."
- 1996–2000 **Ingeniero (equiv. B.Sc) Computer Science Engineering**, *Universidad Tecnológica de Santiago*, D.R..
Thesis: "On the Use of Expert Systems in Business and Health Care."

Publications in Peer-Reviewed Journals [7]

- [1] **Martinez, W.**, Weese, M., Jones-Farmer, A.: A One-Class Peeling Method for Multivariate Outlier Detection with Applications in Phase I SPC, *Quality and Reliability Engineering International*, 2020, 36 (4): 1272-1295
- [2] Weng, B., **Martinez, W.**, Tsai, Y.T., Li, C., Lu, L., Barth, J., Megahed, F. M.: Macroeconomic Indicators can Help Predict the Monthly Closing Price of Major U.S. Indices: Insights from Artificial Intelligence, Time-Series Analysis and Hybrid Models, *Applied Soft Computing*, 2018, 71, 685-697
- [3] Weng, B., Wang, X., Lu, L., **Martinez, W.**, Megahed, F. M.: Predicting Short-Term Stock Prices using Ensemble Methods and Online Data Sources, *Expert Systems with Applications*, 2018, 112, 258-273
- [4] Weese, M., **Martinez, W.**, Jones-Farmer, A.: On the Selection of the Bandwidth Parameter for the k-Chart, *Quality and Reliability Engineering International*, 2017, 33 (7): 1527-1547
- [5] **Martinez, W.** and Gray, J. B: Noise Peeling Methods for Improving Boosting Algorithms, *Computational Statistics and Data Analysis*, 2016, 93: 483-497.
- [6] Weese, M., **Martinez, W.**, Megahed, F., Jones-Farmer, A.: Statistical Learning Methods Applied to Process Monitoring: An Overview and Perspective, *Journal of Quality Technology*, 2016, 48 (1): 4-24.
- [7] **Martinez, W.** and Gray, J. B: The role of margins in the performance of Boosting, *Wileys Interdisciplinary Reviews (WIREs) Computational Statistics*, 2014, 6: 124-131.

Preprints [3]

- [1] **Martinez, W.:** Ensemble Pruning via Margin Maximization. Preprint: arXiv preprint arXiv:1906.03247, 2019
- [2] **Martinez, W.** and Gray, J. B.: On the Insufficiency of the Large Margins Theory in Explaining Boosting Algorithms. Preprint: arXiv preprint arXiv:1906.04063, 2019
- [3] **Martinez, W.,** and Gray, J. B.: On the Current State of Research in Explaining Ensemble Performance Using Margins. Preprint: arXiv preprint arXiv:1906.03123, 2019

Research in Progress [4]

- [1] **Martinez, W.,** Leonard, R. D., Megahed, F. M., Megahed, M., Carvalho, A.: A Hybrid ARIMA-LSTM Time Series Algorithm with Applications in Cryptocurrency Forecasting, Target Journal: *Applied Soft Computing*, expected submission 12/2020
- [2] Leonard, R. D., **Martinez, W.,** Maman, Z. S.: An Analysis of Base-Learning Algorithms for Ensembles, Target Journal: *Journal of Artificial Intelligence Research*, expected submission 12/2020
- [3] Leonard, R. D., **Martinez, W.,** Megahed, F. M.: Applications of Artificial Intelligence to Financial Time Series Forecasting: An Overview and Comparison, Target Journal: *Wileys Interdisciplinary Reviews (WIREs) Data Mining and Knowledge Discovery*, expected submission 8/2020
- [4] **Martinez, W.,** Leonard, R. D., Megahed, F. M., Megahed, M., Carvalho, A.: A Hybrid LSTM Ensemble Approach with Applications in Cryptocurrency Forecasting, Target Journal: *Applied Soft Computing*, expected submission 12/2020

Presentations & Invited Talks [17]

- Oct. 2019 "One-class Peeling For Anomaly Detection in High Dimensions" Co-authors: Weese, M., Jones-Farmer, L.A., INFORMS Annual Meeting, Seattle, WA.
- July 2019 "Insights from using Macroeconomic Indicators to predict the Monthly Closing Price of Major U.S. Stock Indices." Co-authors: Megahed, F., Weng, B., Tsai, Y., Li, C., Lu, L., Barth, J., International Conference on Data Science in Business, Finance and Industry, Da Nang, Vietnam.
- Jun. 2018 "One-Class Peeling Method for Outlier Detection in High Dimensions." Co-authors: Weese, M., Jones-Farmer, L.A., **Invited talk** at the Joint Research Conference of the American Statistical Association and Institute of Mathematical Statistics, Santa Fe, N.M.
- Nov. 2017 "An Analysis of Base Learning Algorithms for Ensembles." Section: Ensembles in Data Mining, INFORMS Annual Meeting, Houston, TX. (Presenter)
- Oct. 2017 "An Update on Statistical Learning Methods Applied to Process Monitoring" Co-authors: Weese, M., Jones-Farmer, L.A. **Invited talk** at Fall Technical Conference, Philadelphia, PA.
- Aug. 2017 "A One-Class Convex Hull Peeling Method for Outlier Detection." Co-authors: Weese, M., Jones-Farmer, Joint Statistical Meetings (JSM), Baltimore, MD. (Presenter)
- Nov. 2016 "Reducing the Complexity of Ensemble Methods for Use in Large Scale Multidimensional data." Section: Ensembles in Data Mining, INFORMS Annual Meeting, Nashville, TN. (Presenter)
- Oct. 2016 "On the Selection of the Bandwidth Parameter for the k-Chart." Co-authors: Weese, M., Jones-Farmer, L.A., Fall Technical Conference, Minneapolis, MN.
- Oct. 2015 "Nonparametric EWMA Control Chart Based on Linear Rank Statistics for Monitoring Location." Co-authors: Mercado, G. R., Chakraborti, S., Fall Technical Conference, Houston, TX.
- Oct. 2015 "A One-Class Ensemble Based Control Chart for Multivariate Process Monitoring." Co-authors: Weese, M., Jones-Farmer, L.A., **Invited talk** at Fall Technical Conference, Houston, TX. (Presenter)
- July 2015 "What Can We Learn from Statistical Learning in Statistical Process Control?" Co-authors: Weese, M., Jones-Farmer, A., Megahed, F. **Invited talk** at the International Symposium on Statistical Process Control, Padua, Italy.
- May 2015 "A Data-Driven Adaptive Distribution-Free Control Chart for Monitoring Location." Co-Authors: Mercado, G.R., Chakraborti, S.: Spring Research Conference of the American Statistical Association, Cincinnati, OH.

- May 2015 "Statistical Learning Methods Applied to Process Monitoring: An Overview and Perspective." Co-authors: Weese, M., Jones-Farmer, A., Megahed, F. **Invited talk** at the Spring Research Conference of the American Statistical Association, Cincinnati, OH.
- Aug. 2014 "On the Margins Distribution in Boosting and Ensemble Performance." Co-authors: Gray, J.B., Joint Statistical Meetings (JSM), Boston, MA. (Presenter)
- Aug. 2013 "Squeezing the Margins to Improve Ensemble Performance." Co-authors: Gray, J.B., Joint Statistical Meetings (JSM), Montreal, Quebec, Canada.
- Aug. 2011 "On the insufficiency of the large margins theory in explaining Boosting Algorithms." Co-authors: Gray, J.B., Joint Statistical Meetings (JSM), Miami, FL.
- Aug. 2010 "Outlier Detection Methods for Improving Boosting." Co-authors: Brian, J.B., Joint Statistical Meetings (JSM), Vancouver, BC, Canada. (Presenter)

Teaching

- ISA-4(5)91 **Introduction to Data Mining in Business, Miami University** *Instructor*
- ISA491A Spring 2019 **Course Evaluations:** 3.61/4.00
 - ISA491B Spring 2019 **Course Evaluations:** 3.56/4.00
 - ISA491A Spring 2018 **Course Evaluations:** 3.41/4.00
 - ISA491B Spring 2017 **Course Evaluations:** 3.30/4.00
 - ISA491A Spring 2017 **Course Evaluations:** 3.29/4.00
 - ISA491A Spring 2016 **Course Evaluations:** 3.15/4.00
- ISA-480B **Business Statistics using R, Miami University** *Instructor*
- ISA480B Spring 2018 **Course Evaluations:** 3.43/4.00
 - ISA480B Spring 2017 **Course Evaluations:** 4.00/4.00
 - ISA480B Fall 2015 **Course Evaluations:** 3.80/4.00
 - ISA480B Fall 2014 **Course Evaluations:** 3.89/4.00
- ISA-291 **Applied Regression Analysis in Business, Miami University** *Instructor*
- ISA291A Fall 2019 **Course Evaluations:** 3.67/4.00
 - ISA291B Fall 2019 **Course Evaluations:** 3.70/4.00
 - ISA291B Fall 2018 **Course Evaluations:** 3.50/4.00
 - ISA291C Fall 2018 **Course Evaluations:** 3.32/4.00
 - ISA291A Fall 2017 **Course Evaluations:** 3.63/4.00
 - ISA291C Spring 2016 **Course Evaluations:** 2.92/4.00
 - ISA291A Fall 2015 **Course Evaluations:** 2.72/4.00
 - ISA291B Fall 2015 **Course Evaluations:** 2.78/4.00
 - ISA291A Spring 2015 **Course Evaluations:** 2.65/4.00
 - ISA291B Spring 2015 **Course Evaluations:** 2.83/4.00
 - ISA291A Fall 2014 **Course Evaluations:** 3.48/4.00
 - ISA291B Fall 2014 **Course Evaluations:** 3.60/4.00
 - ISA291A Spring 2014 **Course Evaluations:** 3.45/4.00
 - ISA291B Spring 2014 **Course Evaluations:** 3.37/4.00
 - ISA291B Fall 2013 **Course Evaluations:** 3.46/4.00
 - ISA291A Fall 2013 **Course Evaluations:** 3.45/4.00
- ISA-205 **Business Statistics, Miami University** *Instructor*
- ISA205 Summer 2017 **Course Evaluations:** 2.20/4.00
- ST-260 **Statistical Data Analysis, University of Alabama** *Instructor*
- ST260 Summer 2008, 2009, Spring 2009
- ST-509 **Statistics for Business Applications (MBA), University of Alabama** *Teaching Assistant*
- ST509 Fall 2011
- ST-4(5)75 **Statistical Quality Control, University of Alabama** *Teaching Assistant*
- ST 474/575 Fall 2008

University Service

- Current Faculty Search Committee (Assistant Professor B. Analytics), ISA Department, Miami University
- Current High Performance Computing Committee, Miami University
- Current E-Learning Committee, Farmer School of Business, Miami University
- 2017-2019 Curriculum Committee, ISA Department, Miami University
 - 2018 Faculty Search Committee (Assistant Professor B. Analytics), ISA Department, Miami University
- 2016-2018 Diversity Committee, Farmer School of Business, Miami University
- 2014-2018 Future Curriculum Initiatives Committee, ISA Department, Miami University
 - 2017 Center for Analytics and Decision Sciences (CADS) Faculty Project Lead
- 2013-2015 STARS Seminar Committee, ISA Department, Miami University
- 2013-2014 Student Scholarship Awards Committee, ISA Department, Miami University
 - 2014 Faculty Search Committee (Assistant Professor B. Analytics), ISA Department, Miami University
 - 2014 Faculty Search Committee (Van Andel Chair Professorship B. Analytics), ISA Department, Miami University

Ad-hoc Reviewer for:

- The Journal of Machine Learning Research (ISSN 1533-7928)
- Expert Systems with Applications (ISSN: 0957-4174)
- IEEE Access (ISSN: 2169-3536)
- Applied Stochastic Models in Business and Industry (ISSN:1526-4025)
- Applied Sciences (ISSN 2076-3417)
- International Journal of Industrial and Operational Research (ISSN: 2633-8947)
- Sustainability (ISSN 2071-105)
- Energies (ISSN 1996-1073)
- Journal of Public Affairs (ISSN: 1479-1854)

Reviewed Research Proposals for

- The National Institute of Occupational Safety and Health
- International Conference on Information Systems (ICIS), 2019

Conference Session Chair

- 2017 Section: Learning from Data, Conference: INFORMS Annual Meeting, Houston, TX.
- 2016 Section: Ensembles in Data Mining, Conference: INFORMS Annual Meeting, Nashville, TN.

Other Training

SAS Base Programming Certified (SAS Institute, 2006), University of Alabama/SAS Data Mining Certificate (University of Alabama, 2006), Design of Experiments for Direct Marketing using SAS (Bank of America, 2006), Predictive Modeling using SAS Enterprise Miner (Bank of America, 2006), Data Analysis with JMP (University of Alabama, 2008), Six-Sigma Green Belt Training (Macys Logistics & Operations, 2005), Computer Database Administration (Universidad Dominicana O&M, 2000)

Technical Skills

- Programming R (Scripting, RMarkdown, Shiny), Python (NumPy, Pandas, Keras, Tensorflow, Scikit-Learn, Jupyter Notebooks,...), Matlab, Julia, SAS (Base, Macro, Stat, IML), C++, Unix Shell-Scripting, Java
- OS Windows, Linux (Debian-Based: Ubuntu, Linux Mint, Kali Linux, Debian), Unix, Mac OS
- Query Tools SQL, MySQL, PROC SQL (SAS)
- Statistical R, Python, SAS, SAS Enterprise Miner, SPSS, Matlab, JMP, Minitab
- Cloud Tools AWS, GCP, Azure, Google Colab, git

Awards & Grants

- 2017 **"FSB Summer Research Grant,"** \$6,000 Award. Farmer School of Business, Miami University.
- 2014 **"Outstanding Dissertation Research Award,"** Culverhouse College of Commerce and Business Administration, University of Alabama.
- 2014 Nominated for **"University-Wide Award for Outstanding Dissertation Research,"** University of Alabama.
- 2011 **"Summer in Excellence Research Grant."** \$5,000 Award. University of Alabama.
- 2010 **"CB&A Excellence in Teaching Award by a Doctoral Student,"** Culverhouse College of Commerce and Business Administration, University of Alabama.
- 2010 Nominated for **"University-Wide Award for Excellence in Teaching by Doctoral Student,"** University of Alabama.
- 2010 **"Jeff Kurkjian Teaching Award,"** University of Alabama.
- 2010 **"Summer in Excellence Research Grant."** \$5,000 Award. University of Alabama.
- 2009 **"Jeff Kurkjian Teaching Award,"** University of Alabama.
- 2004 **"Ehney Camp III MBA Scholarship,"** University of Alabama
- 2004 **"Fulbright Scholar,"** Dominican Republic. Visiting country: United States, 2004. (Among 10 honorees from the Dominican Republic selected to participate in graduate programs in the US, Program: MBA in Data Mining & Business Analytics).
- 2003 **"Employee Excellence Award for the Dominican Republic,"** American Airlines.
- 2002 **"Excellent Performance as Customer Service Agent,"** American Airlines.
- 1996 **"Valuable Contribution to Society Award for Youth,"** Dominican Republic Department of Education. (Academic achievement, among top scores in the country's high school standard tests).
- 1995 Memorial Award **"Marjorie Bolton" & Class Valedictorian,** Mary Lithgow H.S. (#1 out of > 500).
- 1995 **"Top honors student Mathematics, Sciences & Physics Track"** (#1 out of 36) & **"Gold Medal"** for academic performance throughout high school. (Mary Lithgow High School).

Languages

Spanish	Mothertongue	
English	Advanced	<i>Fluent</i>
French	Basic	<i>Basic conversational skills</i>
German	Basic	<i>Basic conversational skills</i>

Professional Affiliations

American Statistical Association (ASA)
INFORMS
ASQ
Fulbright Alumni Association
Beta Gamma Sigma Business Honor Society