Stevenson Bolívar

Department of Statistics, Rutgers University
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Research Interests

Time series analysis, matrix and tensor factor models, high-dimensional statistics, and structured dependence, with flexible applications across diverse scientific domains.

Education

08/2012 – 04/2021 **Ph.D. in Statistics**, Universidad Nacional de Colombia, Bogotá.
Dissertation: *Analysis of Dynamic Common Factors in the Presence of Autocorrelated Noise Processes*.
Advisors: Professor Fabio Nieto, Ph.D., and Professor Daniel Peña, Ph.D.

08/2005 – 07/2007 **M.Sc. in Industrial Engineering**, Universidad de los Andes, Bogotá.
Thesis: *Algorithm-Based Estimation of ARMA Model Parameters*.
Advisor: Professor Maria Elsa Correal, Ph.D.

03/2001 – 08/2005 **B.Sc., Industrial Engineering**, Universidad Tecnológica de Pereira, Pereira, Colombia.
Undergraduate project: Identification, analysis, and design of methods and processes in the production area of the Dotación Integral enterprise. Design and implementation of a control software.
Advisor: Professor Carlos Acevedo, M.Sc.

08/2001 – 08/2003 **Professional Technician in the Occupational Health Area**, Servicio Nacional de Aprendizaje (SENA), Pereira, Colombia.
Final Project: Occupational health diagnosis of the Molduras y Maderas Ltda. enterprise.
Advisor: Professor Martha Hidalgo, Head Nurse.

Academic and Professional Experience

07/2022 – present Postdoctoral Associate, Department of Statistics, Rutgers University.

09/2024 – present Lecturer, Department of Statistics, Rutgers University.
Courses taught: Data Wrangling with R (Master's Program, Spring 2025), Introduction to Statistics for Research (Fall 2024), Introduction to Statistics for Business (Spring 2026).

08/2017 – 06/2022 Assistant Professor, Department of Industrial Engineering, Pontificia Universidad Javeriana.

07/2016 – 08/2017 Instructor, Department of Industrial Engineering, Pontificia Universidad Javeriana.

06/2015 – 07/2016 Data Analyst (SARLAFT), Alianza Fiduciaria.

08/2012 – 05/2015 Teaching Fellow, Department of Statistics, Universidad Nacional de Colombia.

08/2007 – 08/2012 Instructor, Department of Industrial Engineering, Universidad de los Andes.

07/2005 – 07/2007 Teaching Assistant, Department of Industrial Engineering, Universidad de los Andes.

Awards

2021 Ph.D. Thesis Award Laureate, Universidad Nacional de Colombia.

Refereed Journal Publications

1. **Bolívar, S.**, Huang, S., and Chen, R. (2025). Analysis of Tensor Time Series. *Annual Review of Statistics and Its Application* (Accepted: May 9, 2025).
2. Gutiérrez-Gómez, M.-L., Ruíz, Z., Gamboa, F., Roa, N. S., Cardozo, C., Ariza, B., Aristizábal, A., Lugo, A., **Bolívar, S.**, Henao, D., and García-Robayo, D.-A. (2024). SARS-CoV-2 diagnosis in saliva samples: Usefulness and limitations. *Diagnostic Microbiology & Infectious Disease*, 109(3), 116320.
3. Mejía, G., Montoya, C., **Bolívar, S.**, and Rossit, D. (2022). Job shop rescheduling with rework and re-conditioning in Industry 4.0: An event-driven approach. *The International Journal of Advanced Manufacturing Technology*, 119(5), 3729–3745.
4. **Bolívar, S.**, Nieto, F. H., and Peña, D. (2021). On a new procedure for identifying a dynamic common factor model. *Revista Colombiana de Estadística*, 44(1), 1–21.
5. Meléndez, R., **Bolívar, S.**, and Rojano, R. (2020). Imputation of missing values and detection of outliers in functional data: An application with PM10 data. *UIS Ingenierías*, Universidad Industrial de Santander, 19(1), 1–10.
6. Otero, R., **Bolívar, S.**, and Palacios, J. (2016). Retention analysis of engineering students based on consecutive course failure: A Markov Chain Approach. *Ingeniería Industrial: Actualidad y Nuevas Tendencias*, 16(1), 7–18.
7. Otero, R., **Bolívar, S.**, and Rincón, N. (2016). Comparison through in-store picking of two delivery alternatives in a supermarket home delivery environment. *Cuadernos de Contabilidad*, 17(1), 575–594.

Submitted Manuscripts

1. Chen, B., Chen, E., **Bolívar, S.**, and Chen, R. (2025). Time-Varying Matrix Factor Models. Under review.
2. **Bolívar, S.**, Chen, R., and Han, Y. (2025). Threshold Tensor Factor Models in CP Form. Under review.

Working Papers

1. **Bolívar, S.**, Peña, D., and Chen, R. Tensor Factor Models with Main and Interaction Effects.
2. **Bolívar, S.**, Xiao, H., and Zhang, C.-H. Matrix-Dependent Multivariate Regression with Low-Rank Matrix Coefficients: A Regressor-Rotation Approach.

Conference Proceedings / Book Chapters

2021 Nieto, F., Peña, D., and **Bolívar, S.**
"Analysis of Seasonal Common Factors in Big Data." In: *Econometric Analysis and Big Data*, Fundación de las Cajas de Ahorros (FUNCAS), 2021. `https://www.funcas.es/libro/analisis-econometrico-y-big-data-2/`

Master's Thesis Supervision

2022 Benavides, A.M., et al., Co-tutor: Rendon, J.A. Model for the prediction of interactions received in a call center. Pontificia Universidad Javeriana.

2021 Hernandez Motta, J.S., Co-tutor: Rendon, J.A. Model for the prediction of credit card cancellation and retention of high-value customers. Pontificia Universidad Javeriana.

2021 Sarmiento, G.A., and Ronderos, C.E., Co-tutor: Rendon, J.A. Davivienda areas of influence. Pontificia Universidad Javeriana.

2021 Ballen, J.H., Cely, J.F., and Llorente, P.A., Co-tutor: Rendon, J.A. Model to improve the resolution rate of virtual agents in a company in the BPO sector. Pontificia Universidad Javeriana.

2021 Gonzalez, J.M., and Paredes, D.A., Co-tutor: Rendon, J.A. Creation of order prediction model for the GHT company. Pontificia Universidad Javeriana.

2021 Acero, G., and Peñaranda, L., Co-tutor: Rendon, J.A. Factors incident in the effective use of Colvatel's Ftth service provision. Pontificia Universidad Javeriana.

2021 Sarmiento, R.G., and Ronderos, C., Co-tutor: Rendon, J.A. Identification of branches and/or ATMs that are susceptible to being closed due to their low influx of Banco Davivienda. Pontificia Universidad Javeriana.

2021 Avella, C.A., Chandler, D.E., and Piñeros, J.D., Co-tutor: Rendon, J.A. Proposal of a product diversity indicator for future microcredit granting in Mo Technologies. Pontificia Universidad Javeriana.

2021 Jaramillo, L.C., and Castellanos, D.A., Co-tutor: Rendon, J.A. Vipo Group. Pontificia Universidad Javeriana.

2020 Hernández, M.A., Mercado, L.J., Molano, I.F., and Sierra, S.M., Co-tutor: Rendon, J.A. Analysis to reduce the cost of risk through effective collection for the SME segment. Pontificia Universidad Javeriana.

2020 Alvarez, J.D., Corredor, C.M., and Martinez, H.A., Co-tutor: Rendon, J.A. Characterization and understanding of the needs and purchasing behaviors of RCN Radio clients, based on the implementation of data analysis algorithms in the business wheel strategy. Pontificia Universidad Javeriana.

2020 Linero, M.I., Rojas, C.I., and Martínez, J.C., Co-tutor: Rendon, J.A. Analysis of macroclimatic indicators and the flow of the rivers of Colombia. Pontificia Universidad Javeriana.

2019 Arango, D.F., and Salazar, E., Co-tutor: Rendon, J.A. Degree work applied to students registered and enrolled at the Pontificia Universidad Javeriana. Pontificia Universidad Javeriana.

2019 Serna, J.C., Aparicio, A.F., and Camargo, J.J., Co-tutor: Rendon, J.A. Detection of anomalies in the consumption of industrial electrical energy. Pontificia Universidad Javeriana.

2018 Torres, J.O., and Almendrales, Á.J., Co-tutor: Rendon, J.A. Construction of an analytical model for predicting service cancellations in the corporate segment at the company Smart Taxi. Pontificia Universidad Javeriana.

2018 Buitrago, S.D., Macías, D.A., and García, E.J., Co-tutor: Rendon, J.A. Development of a clustering model of taxi drivers for improving profitability in Smart Taxi's corporate segment. Pontificia Universidad Javeriana.

Undergraduate Project Supervision

2018 Salas, Juan P., and Martínez, Katherine, Co-tutor: Montoya, Carlos E. Design of a tool for planning input requirements for a coffee-producing company. Pontificia Universidad Javeriana.

2017 Barrero, N., and Galvis, D., Co-tutor: Martinez, C.V. Design of a framework to give perception capabilities to an industrial robot for waste separation tasks. Pontificia Universidad Javeriana.

2016 Ballesteros, M., Forero, M.C., and Vásquez, L.N., Co-tutor: Montoya, Carlos E. Design of a heuristic for coordination between retailers, considering multiple products, discounts, and flexible payments. Pontificia Universidad Javeriana.

2011 Medina, F.J. Analysis of mortgage default in Colombia, Logit Model. Universidad de los Andes.

2011 Pérez, Juan I. Linear regression models for commercial appraisals of properties subject to the horizontal property regime in Bogotá. Universidad de los Andes.

2011 Marciales, C.E. A methodology for estimating volatility of compensated and settled instruments in La Cámara de Riesgo Central de Contraparte. Universidad de los Andes.

2010 Castro, E. A time series model to forecast sales for a store in Colombia. Universidad de los Andes.

2009 Valderrama, M.P. Analysis of bootstrap methodology in time series models ARMA (p, q). Universidad de los Andes.

Consulting Projects

2022 Development of a Colombian Covid-Check system for detection and quantification of SARS-CoV-2, validated with the gold standard.

2011 Estimating costs and investments for annual demand in the IES (Institutions of Higher Education) during the period 2011–2020, to achieve the targets of quality, coverage, and relevance of higher education in Colombia.

2011 Model to estimate and analyze urban development budgets based on previous comparable projects, supporting strategic planning decisions. Fundación AMANS URDEM.

2010 Analysis of estimation models of energy lost in the electric power transmission and distribution system of CODENSA S.A. (Colombian public electric services enterprise), voltage level 1.

2008 Projection of investments for the expansion of the distribution system at CODENSA S.A. (Colombian public electric services enterprise).

Service

01/2019 – 06/2022 Area Coordinator, Production Section, Pontificia Universidad Javeriana.
Coordinated academic activities for undergraduate and graduate courses in the Production area, including class scheduling, faculty assignments, and lecturer recruitment. Analyzed student feedback to improve course quality and provided academic advising to support student success.

06/2019 – 06/2021 Dean-Assigned Course Designer and Implementer, *Introduction to Engineering*, School of Engineering, Pontificia Universidad Javeriana.
Designed and implemented the course with a 70% transversal component for all engineering disciplines and 30% discipline-specific content across multiple programs: Industrial, Mechanical, Biomedical, Mechatronics, Electronic, Civil, Systems / Computer, and Networks and Telecommunications Engineering.

01/2019 –06/2020 Committee Member, Industrial Engineering Curriculum Redesign, Pontificia Universidad Javeriana.
Participated in the redesign of the undergraduate Industrial Engineering program, reducing the curriculum from five to four years while maintaining academic quality and learning outcomes. Applied the CDIO framework (Conceive, Design, Implement, Operate) to guide course sequencing, credit allocation, and program alignment with accreditation standards.

01/2017 – 06/2022 Faculty Academic Advisor, Undergraduate Students, Pontificia Universidad Javeriana.
Advised and mentored undergraduate students in Industrial Engineering, providing guidance on course planning, major selection, and academic progress. Assisted students in navigating university policies and procedures, and supported their personal and professional development through orientation, personalized advising, and mentorship.

07/2021 – 12/2021 Ph.D. Qualifying Examination Committee Member, Jenifer Vásquez Aguilar. Ph.D. in Engineering Program, Pontificia Universidad Javeriana.

Software / Tools

2025 **ANASOP – Análisis de Operaciones** (Python / Educational Engineering Tool)
Co-authors: Carlos Eduardo Montoya Casas, Luis Andrés Saavedra Robinson.
Simulates a production line with four independent stations, allowing adjustment of production times, lot sizes, and inventory levels. Computes key operational metrics including lead time, cycle time, and throughput.
Copyright Pontificia Universidad Javeriana, Colombia.

2020 **INGEPROtool** (Microsoft Excel VBA Add-in with Custom Ribbon / Educational Engineering Tool)
Co-authors: Andrés Felipe Yaya Bohorquez, Harry Hernandez Serrato, Luis Andrés Saavedra Robinson, Pawel Breznev Alayon Benavides, Alexandra Cabanzo Moisés.
Provides an interactive platform for students to visualize engineering process concepts. Features include facility layouts (CORELAP and CRAFT), Critical Path Method, and Rank Order Algorithm, implemented via a custom Excel ribbon.
Copyright Pontificia Universidad Javeriana, Colombia.

2011 **FODESEPProspec** (Microsoft Access VBA / Cost Prediction Software)
Developed software to create scenarios and estimate annual demand costs for higher education institutions, supporting targets for quality, coverage, and relevance.
Copyright Higher Education Development Fund – FODESEP. And the website remains: https://fodesep.gov.co

2011 **MECET System – Growth Assessment and Location Planning Model** (Microsoft Access VBA / Scenario Analysis and Budgeting Tool)
Software to estimate and analyze urban development budgets based on previous comparable projects, supporting strategic planning decisions.
Copyright Fundación AMANS URDEM.

Personal Information

Languages:	Spanish (native), English (fluent)	Citizenship:	Colombian
Marital Status:	Married, two children	Date of Birth:	March 17, 1983